

Supporting Documents for Quantitative Metric 3.3.2



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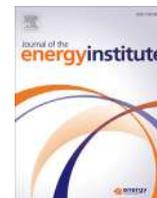
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Number of research papers per teachers in the Journals notified on UGC website during the last five years					
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Number of research papers per teachers in the Journals notified on UGC website during the last five years	109	138	166	188	147
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Energy, exergy and emission analysis on a DI single cylinder diesel engine using pyrolytic waste plastic oil diesel blend



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ABSTRACT

Depletion of fossil fuels and stringent emission norms focus attention to discover an evitable source of alternative fuel in order to attribute a significant compensation on conventional fuels. Besides, waste management policies encourage the valorization of different wastes for the production of alternative fuels in order to reduce the challenges of waste management. In this context, pyrolysis has become an emerging trend to convert different wastes into alternate fuel and suitable to be used as a substitute fuel for CI engines. The current investigation provides a sustainable and feasible solution for waste plastic management by widening the gap between global plastic production and plastic waste generation. It investigates the performance and emission of a single cylinder DI four stroke diesel engine using waste plastic oil (WPO) derived from pyrolysis of waste plastics using Zeolite-A as catalyst. Engine load tests have been conducted taking waste plastic oil and subsequently a blend of waste plastic oil by 10%, 20%, and 30% in volume proportions with diesel as fuel. The performance of the test engine in terms of brake thermal efficiency is found marginally higher and brake specific fuel consumption comparatively lowest for 20% WPO–diesel blend than pure diesel. The NO_x and HC emission is found lower under low load condition and became higher by increasing the load as compared to diesel. Fuel exergy was significantly increasing after blending of WPO with pure diesel, but exergetic efficiency of the blended fuels followed the reverse trend. However, increase in load of the engine improved the exergetic efficiency. The 20% WPO–diesel blended fuel is found suitable to be used as an alternative fuel for diesel engine.

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1. Introduction

Fast depletion of non-renewable and limited fossil fuels, unwarranted issues related to environmental pollution; waste to energy drive and legislative pressure demand an attractive alternative source of fuel for compression ignition engines [1]. Among the various alternative explored, waste plastics to fuel has been extensively researched source of energy. Catalytic pyrolysis of waste plastic to liquid fuel is regarded as a very promising method in obtaining hydrocarbon fuel oil from different thermo-plastic wastes in which polymeric chain is cracked into smaller molecules without any pollution. A significant number of researches have been reported on the pyrolysis of waste plastics using

different catalysts at some optimum temperature condition. The major product of this process i.e. the waste plastic oil is reported to possess matching composition and properties as that of petro fuels, thus could be used as an alternative fuel in diesel engine. This oil is treated as a better substitute for diesel fuel due to its carbon chain range of C₁₀–C₂₅ composition, low specific gravity and viscosity, and higher miscibility with diesel [2,3]. Few literature reports the use of waste plastic oil in diesel engine without any engine modification due to its higher drivability and stability. The experimental performance and emission results using waste plastic oil (WPO) in diesel engine reported by different researchers are summarized as follows.

Mani et al. carried out a complete experimental investigation on a single cylinder Kirloskar DI engine. They fueled the engine without any modification using both pure Waste Plastic Oil and blends of WPO and diesel oil. The performance, emission and combustion characteristics of waste plastic oil as compared to

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diesel are reported. They have claimed that the waste plastic oil used in the engine could able to replace diesel by 100%. The engine performed higher thermal efficiency 75% of the rated power by using waste plastic oil as reported. The waste plastic oil has good combustion properties of higher ignition delay period as compared to diesel. They found that the maximum heat release rate with WPO is higher than that with Diesel, because the engine running on WPO is affected by a longer ignition delay, causing also higher in-cylinder pressure peaks. However, there was an increased NOx emission and lower Smoke emission (lower up to 40–50%), which is due to the higher heat release rate and higher combustion temperature [4,5]. Subsequently, they tried to demonstrate improve the emission characteristics of the WPO blended diesel fuel by adjusting the injection timing and employing exhaust gas recirculation (EGR) [6,7]. Kumar et al. investigated the performance of waste plastic oil blends direct injection, twin cylinder engine and reported a lower brake thermal efficiency for the blend as compared to the diesel [8]. Güngör et al. tested waste polyethylene pyrolysis oil in a CI engine and reported a slight increase of power output by using plastic oil diesel blends with decrease of CO emissions and increase of NOx emission [9]. Panda et al. reported satisfactory engine performance result (higher BTE and lower BSFC) using Kaoline catalyzed waste plastic oil derived from polypropylene. They acclaimed that WPO with 30% blend with diesel showed good performance and beyond 50% caused vibration to the engine. Higher blend ratio and engine load results higher emission than diesel as reported [10]. Rinaldini et al. reported a marginal decrease in BTE and better BSFC in their investigation by using WPO as compared to diesel [11]. A small increase in the brake thermal efficiency and brake specific fuel consumption, and decrease in CO and HC emission was reported by Senthil Kumar et al. by adding 10–20% jatrophia methyl ester along with waste plastic oil in diesel [12]. Viswanathan et al. have investigated the use of diethyl ether along with waste plastic oil blended diesel in diesel engine and reported it as a suitable additive as it showed an increase in the brake thermal efficiency with increase in its percentage in the blends and considerable reduction of BSFC. They reported combustion delay for DEE blends when compared to neat plastic oil and diesel. A reduction in smoke level and NOx, and increase in CO and unburn hydrocarbon emissions was noted for blends at maximum brake power [13]. Sukjit et al. studied the efficacy of diesel engine using two oxygenated fuels like DEE and Butanol with waste plastic oil without any engine modification and claimed that these oxygenated fuels improved combustion efficiency and produce less smoke and particulate matter but higher HC emissions than those of diesel fuel. They also reported a significant decrease in HC, CO, NOx and smoke emissions, when the engine was powered with combination of DEE and castor oil. The results showed that the combustion of waste plastic oil was delayed with respect to diesel fuel combustion. While comparing, they found diethyl ether more potent to reduce HC and CO as compared to butanol and diethyl ether in the same waste plastic oil, especially at high engine operating load [14]. Devaraj et al. showed a decrease in smoke emission by addition of oxygenated fuel like methyl ester and diethyl ether with WPO [15]. Senthil et al. also discussed about the performance and emission of emulsified waste plastic oil in a DI diesel engine. They have concluded that the 30% emulsified waste plastic oil reduced the NOx CO and PM emission, EGT and smoke opacity while increased the BTE when compared to neat diesel at full load condition [16]. The performance and emission of a DI engine have been investigated by using n-butanol addition in waste plastic oil with diesel blend. The investigation revealed that a mixed fuel (10% n-butanol, 40%WPO, 50% Diesel) blend results significant increase of BTE, lower smoke emission and higher NOx emission and thus a viable additive for diesel engines operating with WPO extracted from mixed waste plastic [17].

From the review of literature it is concluded that, there has been reports on the studies on the performance and emission of waste plastic oil in internal IC engine calculated on the application of first law of thermodynamics. The research reports the successful operation of waste plastic oil in blend with diesel and other additives in different proportions in CI engines. The differential results reported by different researchers might be attributed to the different composition and properties of the WPO used. None of the work reports the performance of IC engine running on WPO engines using exergy analysis. It is a very popular and robust technique to resolve the troubles pertaining to the utilisation of different energy resources, understanding the thermodynamics of an energy conversion system, and also to evaluate and optimize the performance of an IC engine running on different renewable and non-renewable fuels. A number of research efforts studied the energy and exergy analysis of different fuels such as biodiesel from different source [18–23] natural gas [24] and their blend with diesel to understand the performance of an alternate fuel by identifying the optimum operating condition for the engine. The objective of the work is to extensively study the operation of waste plastic oil (obtained by the batch pyrolysis of medical plastic waste using Zeolite- A catalyst) in a CI engine and understand the performance by energy and exergy analysis.

2. Material and experimental study

2.1. Fuel preparation and property

The waste plastic oil was prepared by the thermo catalytic pyrolysis of shredded medical plastic wastes at an optimal temperature of 500°C in a semi batch reactor using Zeolite-A as Catalyst. The GC–MS composition of pyrolytic oil is as summarized in Table 1 and the oil consists of C₁₀–C₁₈ carbon chain containing aliphatic hydrocarbons and traces of alcohols. The physical properties of pyrolytic oil tested using standard IS methods is reported in Table 2. The density, fire point, flash point of WPO is found lower than diesel and calorific value of the test fuels are quite comparable with that of diesel. WPO-Diesel blends of 10, 20 and 30% were prepared by standard process and used in the test of diesel engine. These blends are denoted by 10WPO, 20WPO and 30WPO, where the numerical indicates the percentage of WPO in the blend. The characterization of diesel and catalytic WPO derived from medical wastes are summarized in Table 2.

Table 1
GC–MS of the WPO derived from medical wastes at 500 °C.

Peak value	% Area	Name of the compounds	Chemical formula
1	1.3	(2E)-3,7-Dimethyl-2-Octene	C ₁₀ H ₂₀
2	1.81	2,5,5-Trimethylheptane	C ₁₀ H ₂₂
3	1.01	2-Isopropyl-5-Methyl-1-Hexanol	C ₁₀ H ₂₂ O
4	2.58	4-Methyl Decane	C ₁₁ H ₂₄
5	9.23	2,3,7-Trimethyl-2-Octene	C ₁₁ H ₂₂
6	1.68	7-Methyl-4-Undecene	C ₁₂ H ₂₄
7	26.31	2,4-Dimethyl-2-Decene	C ₁₂ H ₂₄
8	0.83	7-Methyl-1-Undecene	C ₁₂ H ₂₄
9	8.74	(3E)-2,2-Dimethyl-3-Decene	C ₁₂ H ₂₄
10	4.98	1-Dodecene	C ₁₂ H ₂₄
11	1.69	2-Butyl, 1-Octanol	C ₁₂ H ₂₆ O
12	1.58	1,5-Diethyl-2,3-Dimethylcyclohexan	C ₁₂ H ₂₄
13	1.79	2,3,5,7-tetramethyl-2-Octene	C ₁₂ H ₂₄
14	2.04	2,6,7-Trimethyldecane	C ₁₃ H ₂₈
15	17.08	1-Tridecanol	C ₁₃ H ₂₈ O
16	1.53	Octadecene	C ₁₈ H ₃₆
17	0.97	3-Methyleneheptadecane	C ₁₈ H ₃₆
18	0.94	1-Octadecene	C ₁₈ H ₃₆

Table 2
Properties of different blends of WPO.

Properties	ASTM standard	Diesel	WPO	WPO10	WPO20	WPO30
Density @15 ° C, (g/m ³)	D 4052	835	793	830.8	826.6	822.4
Flash point (° C)	D 2500	52	5	47.3	51.06	37.9
Fire point (° C)	D 92	57	9	52.2	47.4	40.8
Calorific value (MJ/kg)	D 4809	45	46	45.1	45.2	45.3
Kinematic Viscosity (Cst) @30 ° C	D 445	2.15	3.75	2.31	2.47	2.63
Cetane number	D4737	42	31	40.9	41.78	38.7
C (wt%)	-	84.72	85.5	84.79	84.876	84.954
H (wt%)	-	13.66	13.36	13.63	13.654	13.57
N (wt%)	-	1.149	0	1.03	0.9192	0.8043
S (wt%)	-	0.442	0	0.397	0.433	0.3094
O (wt%)	-	0.03	0.84	0.111	0.192	0.273

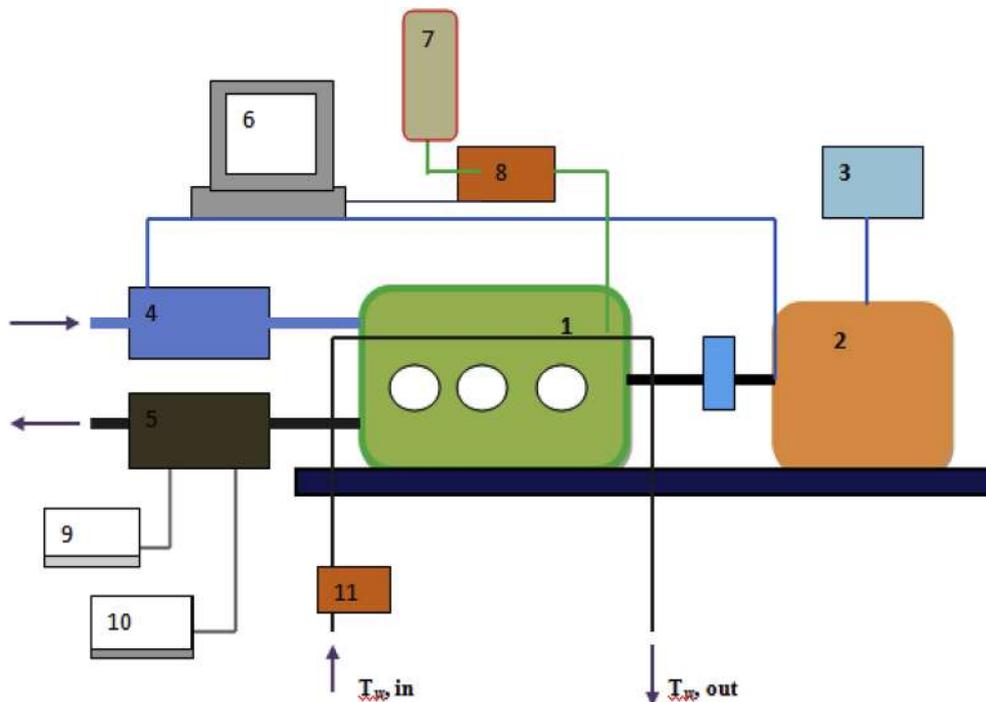


Fig. 1. Experimental Test Engine.

1. Diesel engine; 2. AC Alternator; 3. Electrical Dynamometer; 4. Air flow meter; 5. Exhaust Manifold; 6. Data Acquisition System; 7. Fuel Tank; 8. Fuel flow meter; 9. AVL Smoke meter; 10. Diacom 4000, Exhaust gas Analyzer; 11. Water Flow Meter.

2.2. Engine test

The schematic diagram of the test set up is shown in Fig. 1. The test engine specifications are also given in Table 3. The engine was loaded by means of an electrical dynamometer. In order to measure the air flow rate, an air box was also fitted to the engine. The fuel flow rate measurement was conducted by means of a fuel meter. Chromel alumel thermocouple was fitted with a digital temperature device in order to measure the exhaust gas temperature. A pressure transducer was mounted on the cylinder head of the engine with a charge amplifier to measure and record the cylinder pressure. Diacom 4000, Exhaust gas Analyzer was also used to measure NO_x/HC/CO emissions in the exhaust. All the experiments were conducted at the rated engine speed of 1500 rpm with a data acquisition system interface.

Pure diesel was used as a pilot fuel to start the engine for all tests followed by different blend of waste plastic oil with diesel. The brake thermal efficiency, brake specific fuel consumption and exhaust gas emissions were recorded for different load conditions

as well as blends ratio of WPO. Finally, the engine was allowed to run with pure diesel to flush out the waste plastic oil from the fuel line and the injection system.

Table 3
Technical Specifications of diesel engine.

Make of the Model	Kirloskar, TV ₁
Test Engine	Water Cooled, CI Engine
Bore diameter (mm)	87.50
Stroke length (mm)	110.00
Compression ratio	18:1
Rated Power @1500 rpm (kW)	5.20
Swept volume(cc)	661.45
Length of Connecting Rod (mm)	234.00
Nozzle Pressure(bar)	200
Number of cylinders	4 stroke Single Cylinder
Combustion system	4 stroke direct injection
Injection Timing (° C)	23 before TDC(CA)

2.3. Error and uncertainty analysis

While conducting an experiment with any device, there will be a possibility of occurrence metrological errors and uncertainties from instrument due to improper selection, calibration, ambient conditions, observation, reading and scheduled planning. Such analysis is essential to validate the extent of accuracy in the experiments. The significance of uncertainty analysis is to establish an interrelation between input and output uncertainties occurred during the test. The amount of uncertainties incurred with various performance and emission parameters were calculated by considering the percentage uncertainties of various instruments associated with the test engine as given in Table 4. An uncertainly analysis was enumerated using Eq. (1).

$$Y = \sqrt{X_1^2 + X_2^2 + X_3^2 + X_4^2 + X_5^2 + X_6^2 + X_7^2} \quad (1)$$

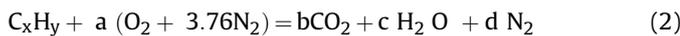
$$Y = \sqrt{(1)^2 + (0.2)^2 + (1)^2 + (0.2)^2 + (0.2)^2 + (0.2)^2 + (1)^2}$$

$$Y = \pm 1.78\%$$

2.4. Energy analysis of test fuel

Thermodynamics involves energy analysis of a fuel and its significance in order to address the energy release rate during combustion. Control volume concept explains the mathematical modeling between heat energy generated and utilized in the system. The waste plastic oil used as test fuel in the engine contains of a mixture of aliphatic and aromatic hydrocarbons chain with small amount of oxygen. During combustion, some amount of undesirable CO is also generated. It is highly appreciable to supply a required stoichiometric A/F mixture in order to accomplish a perfect combustion. The proportion of oxygen to nitrogen available in the combustion chamber is around 3.76 as stoichiometrically calculated. The standard operating conditions are taken as temperature 25°C and pressure of 1 atmospheric for both fuel and air stream associated with combustion.

The governing equation during combustion process in an engine can be illustrated as



Where a, b, c and d are coefficient of unknown mole numbers. These unknowns can be determined by applying the mass and energy balance to each of the elements both in reactant and product side.

For any Thermodynamic system [12,13], Mass balance equation is expressed as,

$$\dot{m}_{in} = \dot{m}_{out} \quad (3)$$

According to steady flow energy equation (SFE);

$$\begin{aligned} \dot{Q}_{in} - \dot{W}_{out} + \dot{m}_{in} \left[h_i + \frac{V_i^2}{2} + gZ_i \right] - \dot{m}_{out} \left[h_e + \frac{V_e^2}{2} + gZ_e \right] \\ = \frac{dE_{cv}}{dt} \end{aligned} \quad (4)$$

For a steady flow system and ignoring potential energy and kinetic energy, the fuel energy balance per mole may be expressed as [14];

$$\begin{aligned} \frac{\dot{Q}_{in}}{\dot{\eta}_f} - \frac{\dot{W}_{out}}{\dot{\eta}_f} = \bar{h}_p - \bar{h}_r = \sum_{product} n_{out} (\bar{H}_f^p + \Delta\bar{H})_{out} \\ - \sum_{reactant} n_{in} (\bar{H}_f^r + \Delta\bar{H})_{in} \end{aligned} \quad (5)$$

The heat supplied Q_{in} to the test engine explains the amount of heat energy generated by combustion of test fuel and can be determined by the following Equation (6),

$$\dot{Q}_{in} = \dot{m}_f X \quad (6)$$

Rate of distribution of fuel energy with correlations is shown in Table 5. The energy supplied by the fuel is not utilized fully by the shaft work and rest amount of energy is regarded as different losses.

2.5. Exergy analysis of test fuels

Exergy analysis involves the qualitative assessment of useful energy available in a fuel. Such analysis deviates from energy conservation principle as energy can be degraded in quality to accomplish the useful work. Hence exergy analysis is started with a specified initial state to final dead state.

According to Cengel and Boles [15],

Rate of Change in Exergy of any system = Rate of net exergy transfer by system - Rate of exergy destroyed

$$\frac{\Delta E_{Syst}}{dt} = [E_{in} - E_{out}] - \dot{E}_{dest} \quad (7)$$

Rate of exergy transfer by the system can be expressed as

$$\dot{E}_{heat} = \left(1 - \frac{T_0}{T} \right) \dot{Q}_{cv} \quad (8)$$

Table 4

Accuracy and Uncertainties of the test instruments.

Sl. No	Instruments	Calibration Range	Accuracy	% Uncertainties
1	Exhaust Gas Analyzer	CO: 0–10% CO ₂ : 0–20% HC: 0–10,000 ppm NO _x : 0–5000 ppm	±0.02 ±0.03 ±20 ppm ±10 ppm	±0.2 ±0.15 ±0.2 ±0.2
2	AVL Smoke meter	0–31,999 mg/m ³	±0.02 mg/m ³	±5
3	Exhaust gas Temperature indicator	0–1000 °C	±1 °C	±0.15
4	RPM Meter	0–1000 rpm	±10 rpm	±0.1
5	Load indicator	0–100 kg	±0.01 kg	±0.2
6	Fuel meter	0–100 cc	±0.01 cc	±1
7	Manometer	0–50 mm	±1 mm	±1

Table 5
Rate of Fuel energy analysis with correlations.

Sl No	Distribution of fuel energy	Correlations
1	Rate of Heat Supplied by Fuel (\dot{Q}_{in}), kW	$\dot{Q}_{in} = \dot{m}_f \times LHV$
2	Rate of Shaft Work Produced (\dot{Q}_s), kW	$\dot{Q}_s = \frac{2\pi N T}{6000}$
3	Rate of Energy loss in cooling water (\dot{Q}_w), kW	$\dot{Q}_w = m_w C_{pw} (T_{c2} - T_{c1})$
4	Rate of energy loss in Exhaust gas (\dot{Q}_e), kW	$\dot{Q}_e = [m_a + m_f]_{mix} C_{pe} (T_{e2} - T_{e1})$
5	Rate of Unaccounted Energy losses (\dot{Q}_u), kW	$\dot{Q}_u = \dot{Q}_{in} - \{\dot{Q}_s + \dot{Q}_w + \dot{Q}_e\}$

$$\dot{E}_{Work} = \dot{W}_{useful} \quad (9)$$

$$\dot{E}_{mass} = \dot{m}\psi \quad (10)$$

So, Exergy balance equation for steady-flow system becomes

$$\sum \left(1 - \frac{T_0}{T}\right) \dot{Q}_k - \dot{W}_{cv} + \dot{m}(\psi_1 - \psi_2) - \dot{E}_{dest} = 0 \quad (11)$$

Where the subscripts 1 and 2 represent the inlet and exit states, m is the mass flow rate, and by neglecting the potential and kinetic energy, $(\psi_1 - \psi_2)$ denotes change in the flow exergy and expressed as

$$(\psi_1 - \psi_2) = (h_1 - h_2) - T_0(s_1 - s_2) \quad (12)$$

Fuel exergy of different test fuels are calculated and the maximum power output is noticed during reversible process, and the exhaust stream is brought to the dead state. Distribution of rate of fuel exergy with relations is shown in Table 6.

2.6. Engine performance and emission parameters

The performance of a Compression Ignition engine is highly influenced by the parameters such as Brake thermal efficiency(BTE), Brake Specific Fuel consumption(BSFC), Combustion Efficiency(η_{comb}), Exergy efficiency(η_{exe}), Exergy destroyed (η_{des}).

2.6.1. Brake thermal efficiency (BTE)

It is the brake power of an engine to the heat input from the fuel by combustion. It also explains the conversion efficiency of the engine from heat energy to mechanical energy.

$$\eta_{BTE} = \frac{BP}{\dot{m}_f \times CV} = \frac{\dot{W}_{cv}}{\dot{m}_f \times LHV} \quad (13)$$

Where CV denotes the calorific value of the fuel and BP as the brake power which evaluates the amount of work produced by the engine.

2.6.2. Brake specific fuel consumption (BSFC)

It explains the mass rate of fuel consumed to produce engine power output.

$$BSFC = \frac{\dot{m}_f}{BP} = \frac{\dot{m}_f}{\dot{W}_{cv}} \quad (14)$$

2.6.3. Combustion efficiency (η_{comb})

The combustion efficiency of an engine is evaluated by the degree of combustion of a fuel which depends on heating values of the fuel. It can be expressed as the ratio of total energy transfer to the heat input during combustion;

$$\eta_{Comb} = \frac{BP + FP}{\dot{Q}_{in}} = \frac{\dot{W}_{cv} + \dot{Q}_{cv}}{\dot{Q}_{in}} \quad (15)$$

2.6.4. Exergy efficiency (η_{exe})

The actual useful work derived from the combustion of fuel is termed as exergy. The exergy efficiency expressed as;

$$\eta_{exe} = \frac{\dot{W}_{cv}}{\dot{E}_{in}} \quad (16)$$

2.6.5. Exergy destroyed ($\overline{\dot{E}}_{dest}$)

Exergy of destruction in an engine can be computed from energy and exergy balance across the control volume of the engine and are given by:

$$\overline{\dot{E}}_{dest} = \overline{\dot{E}}_{in} - \{\overline{\dot{Q}}_s + \overline{\dot{Q}}_{heat} + \overline{\dot{Q}}_{exh}\} \quad (17)$$

2.6.6. Exergy of fuel ($\overline{\dot{E}}_{in}$)

Fuel exergy is defined as the maximum available power output obtained with minimum fuel consumption during a reversible process occurred in combustion chamber. Therefore, the total fuel exergy is the chemical exergy of the fuel inducted to combustion

Table 6
Rate of Fuel exergy analysis with correlations.

Sl No	Distribution of Fuel exergy	Correlations
1	Rate of Fuel exergy ($\overline{\dot{E}}_{in}$), kW	$\overline{\dot{E}}_{in} = (\overline{\dot{E}}_{fuel}^{chem})_{in}$
2	Rate of Shaft work Produced ($\overline{\dot{Q}}_s$), kW	$\overline{\dot{Q}}_s = \dot{W}_{cv}$
3	Rate of heat loss exergy ($\overline{\dot{Q}}_{heat}$), kW	$\overline{\dot{Q}}_{heat} = \left(1 - \frac{T_0}{T}\right) \dot{Q}_{cv}$
4	Rate of Exhaust gas exergy ($\overline{\dot{Q}}_{exh}$), kW	$\overline{\dot{Q}}_{exh} = \overline{E}_{ex}^t + \overline{E}_{ex}^{ch}$
5	Rate of exergy destroyed ($\overline{\dot{E}}_{dest}$), kW	$\overline{\dot{E}}_{dest} = \overline{\dot{E}}_{in} - \{\overline{\dot{Q}}_s + \overline{\dot{Q}}_{heat} + \overline{\dot{Q}}_{exh}\}$

chamber and represented as

$$\bar{X}_{in} = \left(X_{fuel}^{Ch} \right)_{in}$$

$$= \left[\left\{ 1.0401 + 0.1728 \left(\frac{H}{C} \right) + 0.0432 \left(\frac{O}{C} \right) + 0.2169 \left(\frac{S}{C} \right) \times \left(1 - 0.0268 \left(\frac{H}{C} \right) \right) \right\} \right] XLHV_{Fuel} \quad (18)$$

2.7. Engine emission parameters

The combustion chamber of the engine has been modeled to burn the test fuel with different blend of diesel. Due to incomplete combustion, the fossil fuels when burnt release NO_x, unburned hydrocarbon, carbon monoxide, and carbon dioxide. The effect loads and blends on engine emission using WPO diesel blend have been analyzed in comparison to pure diesel.

3. Results and discussion

In order to study the performance and emission of the test fuels, a load test has been conducted with a 5.2 kW DI diesel engine using diesel and WPO diesel blend and the results enumerated as follows.

3.1. Performance

3.1.1. Brake thermal efficiency (BTE)

Fig. 2 shows the variation of brake thermal efficiency with variation of engine loads. It can be observed from the figure that a marginal improvement in break thermal efficiency is achieved while using WPO as the fuel as compared to diesel. The engine exhibits a thermal efficiency of 25.08% at full load for diesel and for the WPO corresponding value for diesel, it is 25.91%.

It can also be observed from the Fig. 2 that 20% WPO–Diesel blend shows the optimum performance among all other combinations and this improvement in efficiency is more significant at full load condition. However, when the % of WPO is increased

beyond 20%, the efficiency is observed to be adversely affected. This may be attributed the fact that since the calorific value of WPO is higher than diesel the corresponding value for WPO–diesel blend is also higher than diesel. In addition, it may also be noted that addition of WPO in diesel blend in higher proportion leads to an increase in viscosity and decrease in density of the blended fuels and decrease in total heat release rate as compared to diesel which affects atomization and vaporization of fuel and subsequently lowering BTE (Mani et al., 2011). The low viscosity, calorific value and density of blend could influence the fuel spray formation resulting in lower BTE than diesel (Bridjesh et al., 2018).

3.1.2. Brake specific fuel consumption (BSFC)

Fig. 3 depicts the brake specific fuel consumption (BSFC) of different WPO diesel blends with diesel with respect to load. It is quite obvious that BSFC decreases with increase in load for all fuels as expected. Furthermore, it can be seen that BSFC is found decreasing with an increase in the concentration of WPO in WPO–Diesel blend.

Higher calorific value of WPO than diesel attributes lower consumption of blended fuels as compared to pure diesel (Panda et al., 2016, Senthilkumar et al., 2015). It was also observed that the reduction in BSFC more distinct at lower load as compared to full load condition. The BSFC for 20% WPO as compared to diesel reduced by 4% at 25% load condition and almost follow same trend at full load condition.

3.1.3. Brake power (BP)

Fig. 4 shows the variation of engine brake power of different WPO diesel blends in comparison with diesel. The brake power varies from 0.71 kW at low load to 2.33 kW at full load for diesel, and it varies from 0.64 to 2.31 kW for 10% WPO, 0.62–2.25 kW for 20% WPO and 0.63–2.28 kW for 30% WPO.

In addition, the brake power of WPO is closer to diesel at 75% of full load and 20% blend. This may be due to better atomization of blend releasing higher heat energy as compared to diesel (Jerzy Walendziewski, 2005, Mani et al., 2009). The brake power also depends on the thermal efficiency of the engine and subjected to variation on different loads.

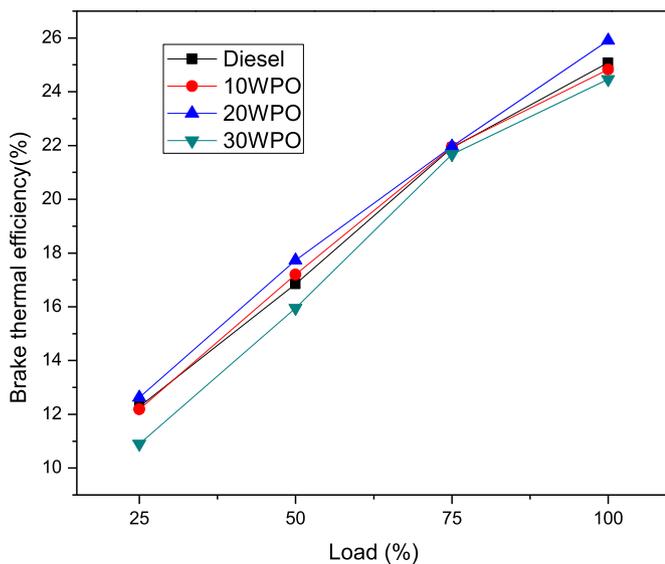


Fig. 2. Variation of BTE with loads.

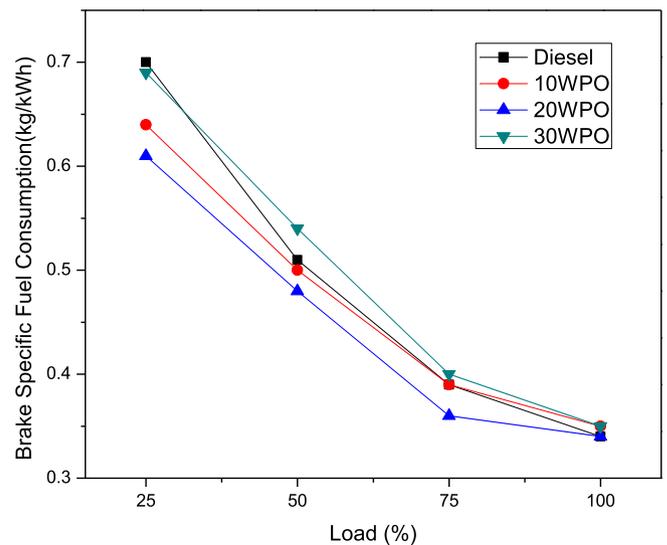


Fig. 3. Variation of BSFC with loads.

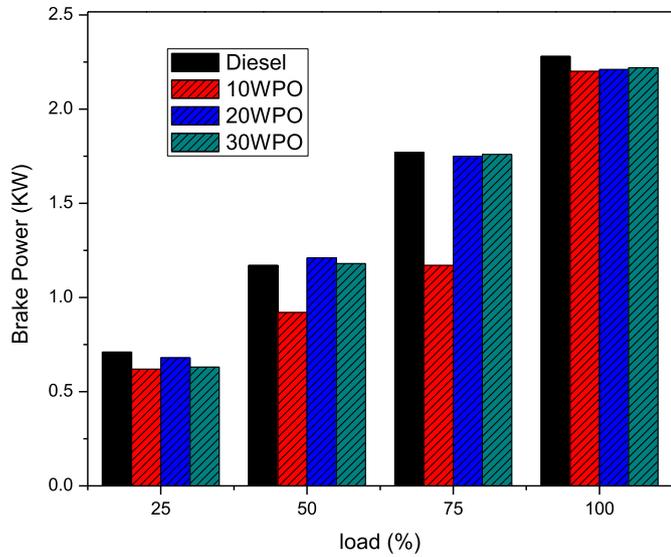


Fig. 4. Variation of brake Power with load.

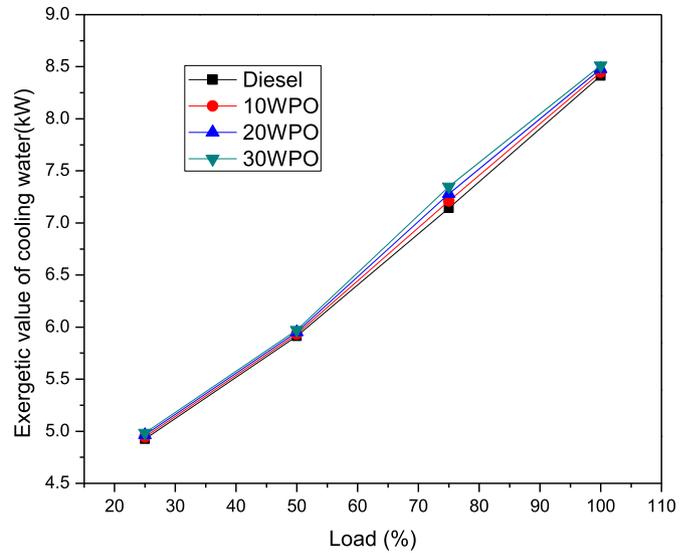


Fig. 6. Cooling water exergy at different loads.

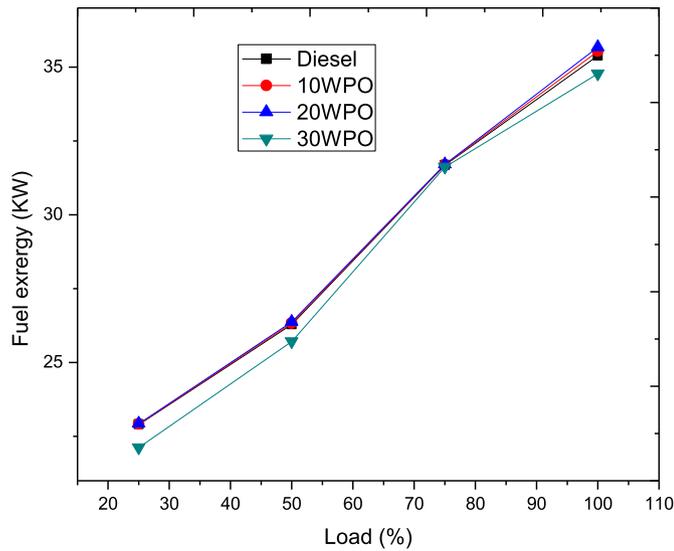


Fig. 5. Fuel exergy values of different fuels with load.

3.2. Exergy

3.2.1. Fuel Exergy of different fuels

Fig. 5 shows that the exergy values of different fuels used in the engine and subsequent variation with change in engine load. Thermodynamics and kinetic study of fuel cycles claims that fuel exergy becomes higher than corresponding fuel energy. Furthermore, fuel exergy of WPO-diesel blend is always higher than diesel due to its higher specific heat value as well as marginal increase of gross calorific value.

The fuel exergy has a significant role to explain the available energy obtained from combustion for improving engine efficiency. However, the fuel exergy is found increasing up to 20% blend of WPO with diesel and decreases on further blending due to lower heating value of blended fuels (Mortaza Aghbashlo, 2015). Moreover, fuel exergy has been substantially computed basing on specific chemical exergy of the fuels.

3.2.2. Exergy of cooling for different fuels

Fig. 6 shows that the rate of exergy loss during cooling system associated with engine and it increases with increase of engine load and increment of WPO in diesel blend. Higher consumption of fuel releases excess heat during combustion that leads to increase the exhaust gas temperature during increase of load. In addition, higher gross calorific value of WPO blended fuels as compared to the diesel promotes the corresponding increase in exergy of cooling.

Furthermore, the exergy of cooling increases gradually with increase of concentration of WPO in the blend and is highest in case of WPO20. This may be due to higher heat release and lower air fuel ratio during combustion of WPO diesel blend (Caio H. Rufino, 2019).

3.2.3. Exergy of exhaust gas for different fuels

Fig. 7 shows the variation of exhaust gas exergy with increase of engine load. Exhaust gas exergy is mainly dependent on kinetic component like its higher temperature and velocity of exhaust gas produced in the combustion chamber. Higher consumption of fuel at higher loads increases the exhaust gas temperature and

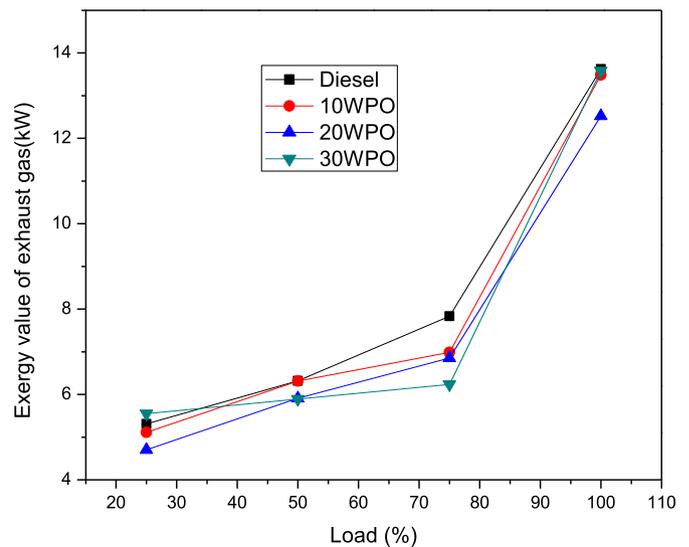


Fig. 7. Exergy of Exhaust gases.

subsequently increases the exergy of exhaust gas. The exhaust gas exergy for the blended fuels is found lower than the pure diesel due to the better combustion of the blended oil as compared to diesel [Mani et al., 2009, Caio H. Rufino, 2019]. However the exhaust gas exergy is found minimum at 20% blend with diesel at maximum load.

3.2.4. Exergy of destruction for different fuels

Due to irreversibility in a process, destructive exergy is increased in accordance with thermodynamic principle. Such exergy attributed to friction, irreversible heat transfer, fuel throttling, and irreversible fuel air mixing. Such exergy increases with increase in load and WPO concentration in the blend as shown in Fig. 8.

3.2.5. Exegetic efficiency for different fuels

Fig. 9 shows the exergetic efficiencies of different fuels with load. Exergetic efficiency of different blended fuels is found marginally higher than their thermal efficiency. By increasing the concentration of WPO in diesel blend, the efficiency is found increasing. The reason behind is due to higher exergy of destruction of WPO during fuel combustion as compared to diesel. In addition, higher BSFC of WPO diesel blend contributes less exergetic efficiency in comparison to diesel.

It has been observed that though the fuel exergy of WPO is higher as compared to diesel, the exergy efficiency is Maximum for 20% WPO, followed by 10% WPO, 0% WPO (pure diesel) and 30% WPO. This may happen due to reduction in fuel exergy input at 10% and 20%WPO as compared to pure diesel to a maximum value of 19.47% for the WPO blended diesel and 21.29% for pure diesel.

3.3. Emission

3.3.1. CO emission

The variation of CO emission with load for different blends of WPO fuels is shown in Fig. 10. The concentration of CO emission varies are calculated to be 0.08% at 25% load which reduces to 0.058% at full load for diesel. For 20% WPO the corresponding values of CO computed as is 0.083% at 25% engine load and 0.06% at full engine load. It is concluded from the result that the 20% WPO blend is environmental friendly only at high load condition. For other blends the emission is adversely affected. Lean A/F mixture

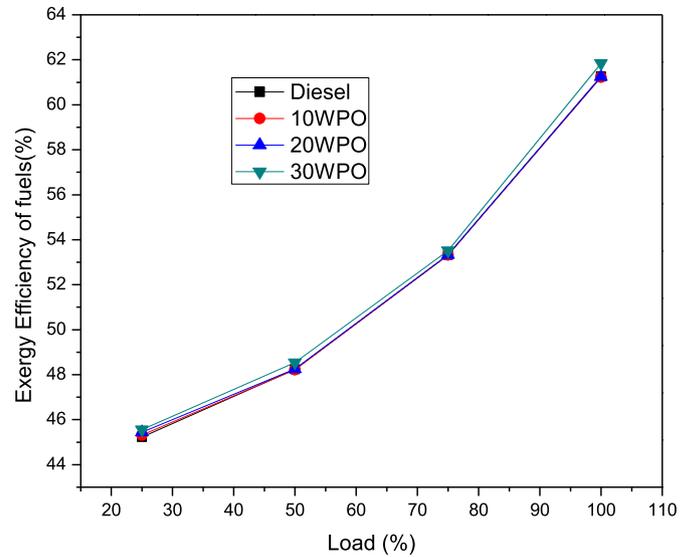


Fig. 9. Exergetic efficiency of different fuels.

preparation and insufficient oxygen at lower loads may attribute poor combustion resulting higher CO emission (Panda et al., 2016).

3.3.2. HC emission

Fig. 11 shows the variation of unburned hydrocarbon with load for tested fuels. HC emission is found increasing with an increase in engine loads. Same trend of HC emission is also followed when the concentration of WPO increases in the diesel blend.

HC emission increases due to of heterogeneous fuel distribution, low exhaust temperature, lean F/A mixture regions (Canakci et al.).In addition, higher quantity of fuel admission during high load, resulting increase in unburned hydrocarbon. HC emission observed increasing from 19 ppm to 42 ppm for Diesel when load increases from lower to highest, and it varies from 20 ppm to 44 ppm for 10% WPO, 24 ppm to 42 ppm for 20% WPO and 28 ppm to 46 ppm for 30% WPO from lower to highest load. In addition, rich F/A mixture admission during high load, resulting increase in unburned hydrocarbon. The other reason for excess emission is due to

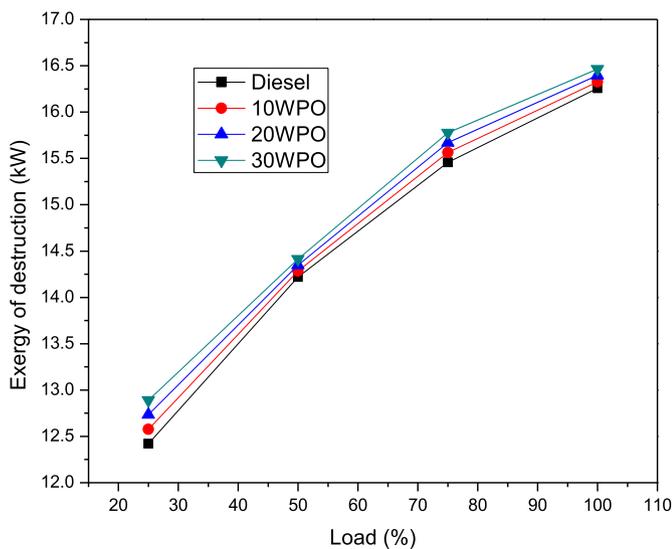


Fig. 8. Exergy of destruction.

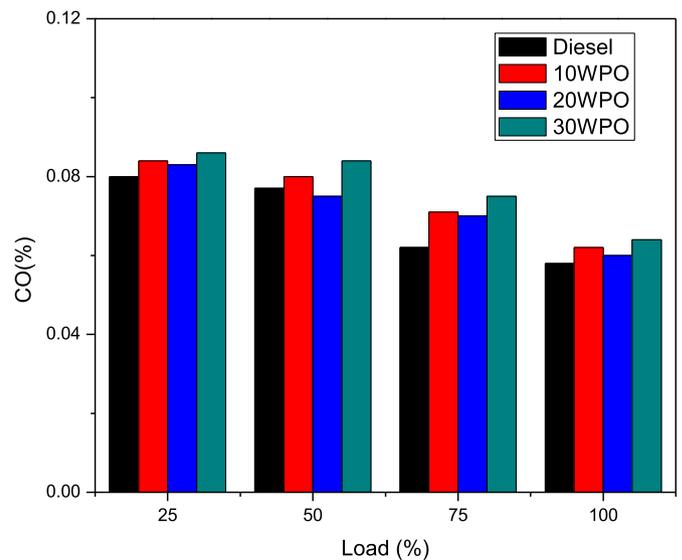


Fig. 10. CO emission with load.

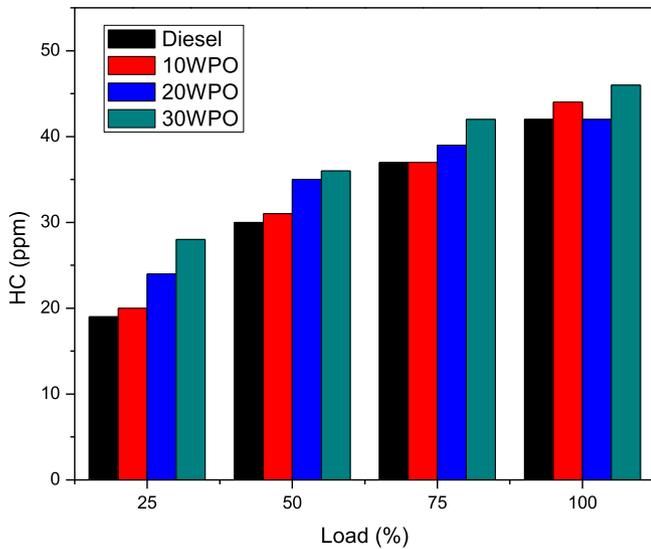


Fig. 11. HC emission with load.

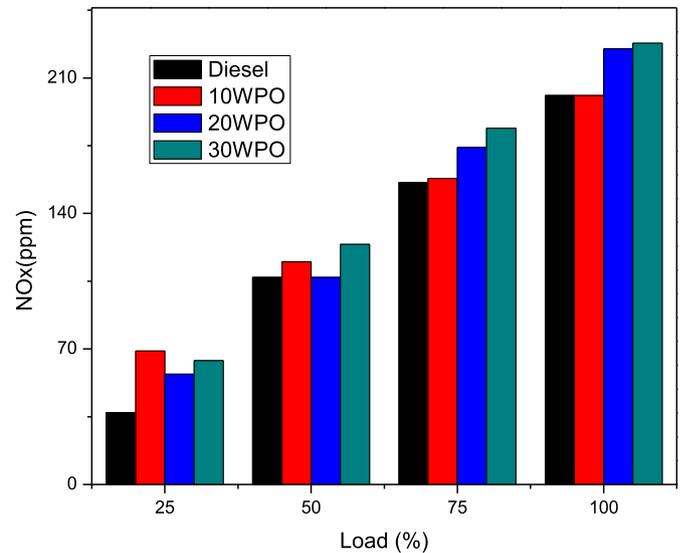
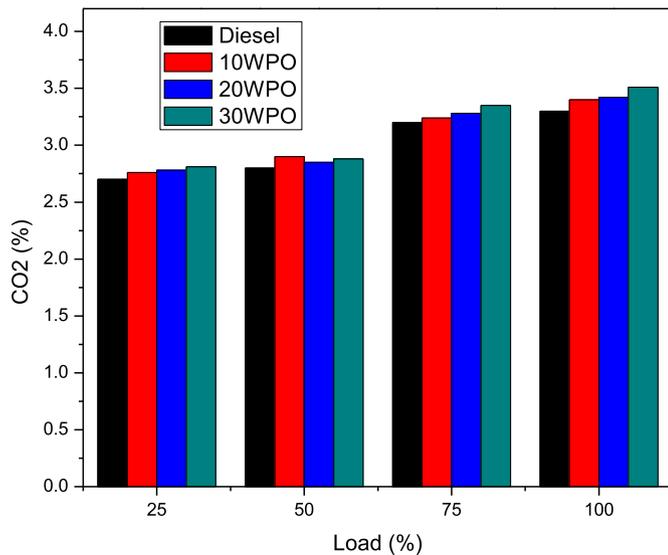


Fig. 13. NOx emission with load.

Fig. 12. CO₂ emission with load.

the presence of unsaturated hydrocarbons in the WPO, which are unbreakable during the combustion process (Kidoguchi et al.).

3.3.3. CO₂ emission

Fig. 12 shows the deviation of carbon dioxide emission with engine load for diesel and WPO blend during combustion. The results suggest that the CO₂ emission increases marginally with increase of load.

The results revealed that, subsequent increment in concentration of WPO in diesel produced marginally equal or higher CO₂ emission than diesel at all loads. This may be due to higher exhaust temperature of the blended fuels resulting better combustion.

3.3.4. NO_x emission

Fig. 13 depicts the variation of oxides of nitrogen for different blend of fuels with load. NO_x emission was found increasing with blend of WPO in diesel. This may be due to higher combustion delay period in consequence of long hydrocarbon chain augmented in

WPO. At high load and temperatures, NO_x levels increases (Ren et al., 2006). NO_x varies from 37ppmat 25% load to 201 ppm at 100% load for diesel. It varies from 64 to 212 ppm for 10% WPO, 61–220 ppm for 20% WPO and 66–228 ppm for 30% WPO with lower and highest load.

4. Conclusion

Based on the findings of the experiments, the performance, exergy and emission characteristics of the WPO-diesel blend has been enumerated as follows:

- BTE was significantly improved by the inclusion of WPO in diesel. Experimental results addressed the suitability of WPO used as a replacement for diesel in a DI diesel engine and further established its superior performance up to 20% blend with diesel.
- BTE was found a little bit higher and BSFC was lowest for 20% WPO-diesel blend in comparison with diesel used as test fuel.
- The NO_x and HC emission was found lower under low load condition and became higher by increasing the load as compared to diesel.
- Fuel exergy rate of the blended fuels were found higher than pure diesel fuel. However, the exergetic efficiency of blended fuels was found increasing with increase in engine load and decreasing with increase in concentration as compared to diesel. This may be in accordance with thermodynamic view point, as more exergy destroyed due to irreversibility caused in blending of fuels.

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Nomenclature

WPO: Waste plastic oil
 MSW: Municipal Solid Waste
 BTE: Brake thermal efficiency
 BSFC: Brake Specific fuel consumption
 DEE: Diethyl ether
 LHV: Low heat value
 GCMS: Gas Chromatography and Mass Spectrometry

Abbreviations

Φ : Exegetic efficiency
 C_{pex} : Specific heat of exhaust water
 C_{pw} : Specific heat of water
 E_{des} : Destructive exergy
 E_{exh} : Exergetic value of exhaust gas
 E_{in} : Available energy or exergetic value of the fuel
 E_s : Exergetic value of the shaft
 E_w : Exergetic value of cooling water
 LHV: Low heat value of the fuel
 m_a : Mass flow rate of air
 m_f : Mass flow rate of fuel inducted to engine
 m_w : Mass flow rate of water
 Q_E : Energy loss in exhaust gas per unit time
 Q_s : Shaft power
 Q_w : Energy loss in cooling water per unit time
 Q_{un} : Unaccounted losses of energy per unit time
 T_0 : Ambient temperature
 T_1 : Inlet cooling water temperature
 T_2 : Outlet cooling water temperature
 T_3 : Exhaust gas temperature
 T_4 : Surrounding temperature

Joining of AA3102 aluminium alloy with carbon steel 1010 by FSSW process using optimized weld parameters

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Abstract: Friction Stir Spot Welding (FSSW) is a non-fusion welding process which creates a metallurgical bond between two specimens. Since Resistance Spot Welding (RSW) has many disadvantages including high wear rate of electrode and the welding of materials using this RSW technique generates high amount of heat in the specimen and it also cools rapidly, due to this rapid cooling the material becomes brittle at that welded area and thus reducing the physical properties of the material, due these effects FSSW has been selected to weld AA3102 and Carbon Steel 1010. FSSW is governed by three process parameters which include, Tool Rotational Speed, Dwell time, Load. In this work the effect of process parameters on joint strength has been studied based on experimental and numerical results. The Taguchi method is selected as a tool to identify the optimized process parameters for welding AA3102 and Carbon Steel 1010. The experiments conducted as a combination of the process parameters were made based on the result given by the Taguchi orthogonal table. The Taguchi method uses Signal to Noise ratio (S/N ratio) to determine the effective process parameter. The specimens that are welded using these parameters were tensile tested and with the help of the results obtained the Taguchi analysis is done and the parameters which will yield the maximum strength is obtained.

Keywords: Friction Stir Spot Welding (FSSW), Tool Rotational Speed, Dwell time, Load, Taguchi method.

I. INTRODUCTION

In order to meet the present demands, to reduce the weight of structures, machines and also to meet the required strength there is a need for using dissimilar materials. But joining of these dissimilar materials is a tedious process and several researches have been carried out to weld various dissimilar materials according to their applications. Friction Stir Spot Welding (FSSW) is a solid state welding process which operates below the melting point of the work piece. The individual spot welds are created by pressing a rotational tool with a high force on to the surface of the work piece. Resistance Spot Welding (RSW) is a very commonly used technique in many of the automotive industries to join the dissimilar materials. But this RSW technique has many limitations which include high wear rate of electrode, high temperature and rapid cooling rate causes the formation of brittle microstructure. In order to avoid these limitations FSSW technique is selected as an alternative approach to weld the aluminium alloy and the carbon steel. FSSW process also has many advantages which include low distortion, excellent mechanical properties and is more economical than RSW process. Aluminium 3102 which is an alloy in the wrought aluminium- manganese family. It has good strength, good workability and high corrosion resistance. The chemical composition of these materials has been given in Table.1.

In the year 2001, Friction Stir Spot welding was developed as a substitute for Resistance Spot Welding in automotive sectors to weld aluminium sheets. In the last 10 years the feasibility of the joining aluminium and steel has been moderately studied. The first published study was by Uzen et al and it was mainly focussed on joining AA6013 to-T4 to X5CrNi18-10 stainless steel. Although the fatigue testing showed a 30% reduction in results compared to the ones with AA6013 as base metal, no tensile testing results were provided. In FSSW mainly three process parameters were considered which include tool rotational speed, load and dwell time. The experiment is carried out by varying one parameter at a time and keeping the other parameters constant. This conventional step by step process involves large number of test runs. To avoid these disadvantages the use of design of experiments (DoE) mainly based on Taguchi approach is the most efficient technique to reach the conclusion with minimum number of trials. The tool material was selected as tungsten carbide since it has high hardness and strength. From the literature survey done pin profile was selected as taper cylindrical since it has a good impact on welding of these dissimilar materials. The material with low melting point (aluminium) is kept at top and the material with high melting point (carbon steel) is kept at bottom.

Enhanced Security in ATM by IRIS and Face Recognition Authentication

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Abstract – Banking is very easier now a day, but sometimes the chances of cyber crimes are on rampant. There are number of frauds has occurred in banking transaction. Number of advantages of ATM system as well as number of frauds has become widespread. The growth in the online transaction has resulted in a greater demand for fast and accurate user recognition and authentication.lot of people have been depending on and trusting the Automatic teller Machine(ATM) to do banking needs easily. In this paper we propose the face recognition system for authentication process and increase the security in the banking area. By this system we can avoid the ATM robberies and unauthorized persons miss uses the ATM.

Keywords – ATM System, Face Recognition Software (FRS), Security, Iris Technology.

I. INTRODUCTION

In light of the progression of advancement in cash related structure most bank customers using Automatic teller machines, and electronic budgetary trade in site. Most of financial users utilize ATMs for cash transaction like cash withdrawal or cash deposit. ATMs also facing lot of issues caused by customers like many other systems. Some of the problems that customers forgetting their ATM card or cash are common issues. These issues are can be over to increasing security level. The main aim of our work is equipped with computer vision frame work which embedded ATM camera to detect and recognize the person in order to overcome such unnecessary losses caused by CCF. The system will find if there is a different customer entering in to the ATM other than the card holder and if do any transaction in ATM, cash will be retracted at that moment .the image of the person is matched to a gallery image in database, long time before the matching, under different conditions. In this scenario, the matching image and the gallery image are separated by the system.[1]

1. Face Recognition Systems

Face recognition system application is used to identify persons from a digital images or a video from a source. This paper uses face recognition technique for verification in ATM system. For face recognition, there are two types of comparisons. The first step in verification, this is where the system compares the given individual with who that individual says they are and gives a yes or no decision [2]. The second step is identifies this system compares the given image to the other entire image in the database list of matches. Face recognition system is a technology to analyze the unique features of human face like shape of the face, pattern and position of the face. The FRS technology is very complex and mostly based on

software. In Biometric Method, it is setting up the analysis structure with PCA algorithms for every type of biometric. Face recognition starts with a picture, trying to find a person in the image. This can be done by using number of methods including movement, skin color, facial expressions or blurred human shapes etc.Shown in fig (1).



Fig.1.face recognition system.

2. Iris Technology

For all these security features the bank united of Texas had developed first in United States to offer iris technology at ATMs. The customers can do their ATM transaction without card and password. So there's no need to show card and no need of biometric authentication as for show in fig(2). Then no customer inconvenience or discomfort with this process of verification, and they can do their banking transaction without carrying ATM card. Iris scanning computes the quirky pattern in irises, the different collared circles in human eyes. Biometry iris identification works by brighten the iris with IR light to pick up unique form that are not to the eye. Finally the result of iris is containing only set of pixels. Iris recognition technology used to speedup to matching the authorized person and refusal to accept false matches.

EXPERIMENTAL INVESTIGATION AND PERFORMANCE CHARACTERIZATION OF MACHINING PARAMETER IN AJM PROCESS USING ANALYTICAL METHOD

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ABSTRACT

The present investigates the performance characteristics of the process parameters in Abrasive Jet Machining using Taguchi orthogonal design matrix. The mixture of high pressure air with aluminium oxide (as abrasive particle) is used for machining of glass material. The nozzle is used to maximize the flow of abrasive particle. The machine automation was done by using the controller and driver circuit. The study established the optimum condition for the effect of over cut (OC) and material removal rate (MRR) of the said work piece. Individual optimal settings of parameters are carried out to minimize the OC and Maximize the MRR.

KEYWORDS: Abrasive Jet Machining, MRR, OC, Taguchi Orthogonal Array.

For rising of hard and brittle material, which is very difficult-to-machine, is found to be unsuitable for machining with conventional machining. The surface finish may not be smooth or may be the tool or workpiece damaged by using above process. Besides, machining of these materials into complex shapes is thorny, time consuming and sometimes unfeasible. Advanced materials such as hastalloy, waspalloy, nitralloy, carbides, nimonics, heat resisting steels, stainless steel and many other high-strength-temperature resistant (HSTR) alloys find wide application in aerospace, nuclear engineering and other industries owing to their high strength to weight ratio, hardness and heat resisting properties. Considering the importance of the difficulty, Merchant in 1960's highlighted the need for the development of newer ideas in metal machining. As a result, non-traditional machining processes have appeared to triumph over these difficulties. These non-traditional technologies do not utilize a conventional or traditional tool for metal removal, as a substitute they directly make use of some form of energy for metal machining. The classification of the machining processes, based upon the type of energy used, the mechanism of metal removal in the process, the source of energy, and the medium for transfer of those energies. Material removal may occur with chip formation or even no chip formation. In some cases microscopic size chip formation occurs.

Abrasive jet machining (AJM) is one of the non-traditional methods employed for machining process in which mechanical form of energy is used. The basic mechanism of metal removal process occurs due to erosion and the transfer media is the high velocity particles. Pneumatic / hydraulic pressure happens to be the energy source.

The AJM process was started a few decades ago, till today experimental and theoretical studies have been investigated throughout the world by many researchers to develop the most efficient method. Burzynski and papini [1] implemented the narrow band level set method (LSM) on AJM for find out the surface evolution on inclined masked micro-channel in poly-methyl-methacrylate (PMMA) and glass. The result profile of glass have round bottom and curved wall and the resulting profile of PMMA have straight walls and rectangular bottoms. Ghobeity et.al [2] presented a analytical models on AJMM in which the target is oscillated transversely to the overall scan direction, by which they predicted the shape, sidewall slope, and depth of machined planar areas and transitional slopes in glass Wakuda et.al [3] compared the machinability between AJM process and the solid particle erosion model. They concluded from the test result that the relative hardness of the abrasive against the target material is critical in the micro-machining process but it is not taken into consideration. In conventional erosion process radial crack do not propagate downwards as a result of particle impact due to no strength degradation occurs for the AJM surface. Gradeena et. al [4] used a cryogenic abrasive jet machining apparatus for solid particle erosion of polydimethylsiloxane (PDMS) using aluminum oxide as an abrasive at a temperature range between -178^oC to 17^oC and observed that optimum machining of PDMS occurred at temperature approximately at -178^oC and also concluded that PDMS can be machined above its glass transition temperature. Ally et. al [5] observed that the optimum erosion rate occurred at impact angles between 200 and 300 when machining the aluminum 6061-T6, 316L stainless steel and Ti-6Al-4V alloy and taking the 50 μmAl₂O₃ as

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Impact of milling time and method on particle size and surface morphology during nano particle synthesis from α -Al₂O₃

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Abstract

In this paper, ball milling of Industrial Alumina (α -Al₂O₃) powder was studied with varied milling time. For reducing the size of the particle Ball milling top down approach is adopted. The average size of micro level alumina was 70 μ m. The conversion was carried out by grinding process at two different stations for different time periods. Rotational speed, balls to powder ratio, water to powder ratio and milling time are the parameters included in this study. The scanning electron microscopy (SEM) result of the sample which was carried out by Insmart System for 120 hours ground materials indicates non contaminated particle but, did not give any clear picture of size. The grinding work by ball milling was carried out for 10 hours after rinsing of the jar with alumina. The result indicates that the size of Alumina is reduced from 70 μ m to 1.4 μ m with grey color agglomeration particles.

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Selection and/or Peer-review under responsibility of Materials Processing and characterization.

Keywords: Alumina powder, ball milling, particle size reduction, scanning electron microscopy, transmission electron microscopy

1. Introduction

Nanotechnology is considered to be a multidisciplinary and an interdisciplinary area of Research and development. The wide-ranging of applications that nanotechnology is and will be catering to speaks of its omnipresence. Nanotechnology finds a defining role to play in the field of agriculture, energy, electronics, medicine, healthcare, textiles, transport, construction, cosmetics, water treatment etc., as suggested by many researchers worldwide [1]. In this context, a particle is defined as a small object that behaves as a complete unit with respect to

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Impact of milling time and method on particle size and surface morphology during nano particle synthesis from α -Al₂O₃

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Abstract

In this paper, ball milling of Industrial Alumina (α -Al₂O₃) powder was studied with varied milling time. For reducing the size of the particle Ball milling top down approach is adopted. The average size of micro level alumina was 70 μ m. The conversion was carried out by grinding process at two different stations for different time periods. Rotational speed, balls to powder ratio, water to powder ratio and milling time are the parameters included in this study. The scanning electron microscopy (SEM) result of the sample which was carried out by Insmart System for 120 hours ground materials indicates non contaminated particle but, did not give any clear picture of size. The grinding work by ball milling was carried out for 10 hours after rinsing of the jar with alumina. The result indicates that the size of Alumina is reduced from 70 μ m to 1.4 μ m with grey color agglomeration particles.

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Selection and/or Peer-review under responsibility of Materials Processing and characterization.

Keywords: Alumina powder, ball milling, particle size reduction, scanning electron microscopy, transmission electron microscopy

1. Introduction

Nanotechnology is considered to be a multidisciplinary and an interdisciplinary area of Research and development. The wide-ranging of applications that nanotechnology is and will be catering to speaks of its omnipresence. Nanotechnology finds a defining role to play in the field of agriculture, energy, electronics, medicine, healthcare, textiles, transport, construction, cosmetics, water treatment etc., as suggested by many researchers worldwide [1]. In this context, a particle is defined as a small object that behaves as a complete unit with respect to

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Investigation of processing time and molecule size nano molecule from α -Al₂O₃

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Abstract

In this paper, ball milling of Industrial Alumina (α -Al₂O₃) powder was studied with varied milling time. For reducing the size of the particle Ball milling top down approach is adopted. The average size of micro level alumina was 70 μ m. The conversion was carried out by grinding process at two different stations for different time periods. Rotational speed, balls to powder ratio, water to powder ratio and milling time are the parameters included in this study. The scanning electron microscopy (SEM) result of the sample which was carried out by Insmart System for 120 hours ground materials indicates non contaminated particle but, did not give any clear picture of size. The grinding work by ball milling was carried out for 10 hours after rinsing of the jar with alumina. The result indicates that the size of Alumina is reduced from 70 μ m to 1.4 μ m with grey color agglomeration particles.

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I. INTRODUCTION

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Alumina, silicon, aluminum, copper, and silver shows higher magnitude heat transfer rate in increasing order. The thermal conductivity of silver, alumina and engine oil is 429 W/m-K, 40 W/m-K and 0.145 W/m-K correspondingly. Dispersing solid particles in fluids to enhance thermal conductivity give the basic concept of nanofluids. The foremost challenge is the quick settling of these solid particles in fluids. Nanoparticles differs from microparticles by better dispersion behavior, less clogging and abrasion and much larger surface area to

Experimental Study of Different Parameters Affecting Biogas Production from Kitchen Wastes in Floating Drum Digester and its Optimization

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Abstract: Recent challenges for fossil fuels, concerns over the environment issues and rising costs for energy demand encourages researchers to search for an alternate source of renewable energy. An attempt has been made to produce biogas from kitchen waste following anaerobic digestion process where the bacteria degrade organic matters in the absence of oxygen. Kitchen waste is used as the best raw material for the Bio-gas plant. Biogas contains around (55-85)% of methane (CH₄), (30-40)% of carbon dioxide (CO₂), a trace of hydrogen sulphide (H₂S) and moisture (H₂O). The calorific value of biogas is around 4700 kcal or 20 MJ. In this paper, different samples of biogas have been taken to optimize methane (CH₄) content by controlling the pH value, Temperature, concentration of slurry, retention time, C/N ratio and rate of loading. This experiment was done in a floating drum type anaerobic digester of 1cubicmeter capacity and it is made of fiber material. The maximum pH level is maintained to 7.3, maximum fermentation process at (30-35)°C, maximum Bio-gas produced 0.950m³ and the maximum methane(CH₄) is found to be 85%.

Keywords: Floating drum type Digester, Slurry, anaerobic digestion (AD), PH Value.

I. INTRODUCTION

Biogas is produced from all kind of biological organic waste like animal manure and industrial waste, human manure, restaurant waste etc. Such wastes become a major source of air and water pollution and responsible for 18% of the overall greenhouse gas and 64% of anthropogenic ammonia emission. Biogas is produced from organic wastes by the help of various groups of anaerobic bacteria through anaerobic decomposition. Anaerobic digestion (AD) is a biochemical and thermo chemical process which produces biogas. It has been found during anaerobic digestion that the microbial population makes use of about 25 to 30 times carbon faster than nitrogen [2]. In order to control excessive production of ammonia during AD is to increase the C/N ratio of feedstock. This can be done by co-digesting with other waste feedstock that is high in biodegradable carbon to improve the performance of AD.

Kitchen waste is an organic material having high calorific value and nutritive value to microbes, so efficiency of methane production can be enhanced by several orders of

magnitude. It means higher efficiency and size of reactor and cost of biogas production is reduced. Also in most of cities and places, kitchen waste is disposed in landfill or discarded which causes the public health hazards and diseases like malaria, cholera, typhoid. Inadequate management of wastes like uncontrolled dumping bears several adverse consequences. It not only leads to polluting surface and groundwater through leachate and further promotes the breeding of flies, mosquitoes, rats and other disease bearing vectors. Also, it emits unpleasant odour and methane which is a major greenhouse gas contributing to global warming [3].

At present biogas is used mainly in cooking and lighting. Produced biogas is generally stored in large impermeable bags at biogas plant site. The gas produced in digester is transported by piping to nearby kitchens on pressure developed in digester. But this pressure is not sufficient to transfer gas to farther distances from the biogas generation site. The main problem of biogas is its low energy content and it is difficult and costlier to liquefy it. This requires compression of biogas to as higher pressure as possible. Storage of the gas is another concern as cylinder becomes heavy and bulky for higher pressures. This may increase weight of the cylinder and hence affect its portability. So to increase energy content, other techniques like removing incombustible gases are to be implemented.

II. MATERIALS AND METHODS

2.1 Characterization of Biogas

Biogas is produced by methanogenesis bacteria through biodegradation of organic material under anaerobic conditions. Natural generation of biogas is an important part of bio-geochemical carbon cycle. It can be used both in rural and urban areas. Main products of the anaerobic digestion are biogas and slurry. In composition of biogas methane, carbon dioxide, hydrogen sulfide, nitrogen, oxygen, ammonia, chlorinated organic matter, silanes, siloxanes, volatile phosphorous substances and other volatile trace compounds are found.



Optimization of Engine Parameters and Ethanol Fuel Additive of a Diesel Engine Fuelled with Waste Plastic Oil Blended Diesel

Amar Kumar Das¹ · Manas Ranjan Padhi² · Dulari Hansdah³ · Achyut Kumar Panda⁴

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Abstract

This work reports the optimization of engine parameters (including compression ratio and load) and the fuel additive blend (concentration of plastic oil and ethanol) of a single cylinder 4-stroke direct injection (DI) variable compression ratio (VCR) diesel engine with an objective to identify suitable engine conditions for better thermal efficiency and exhaust emission. For this the engine performance and emission parameters are experimentally evaluated at 1500 rpm constant engine speed, varying loads and compression ratios. The brake thermal efficiency and emission quality is found improved by increasing load and compression ratio and by the addition of waste plastic oil (WPO) and ethanol with diesel. The best possible engine condition of load, compression ratio and fuel blend, for better performance and lesser emission have been optimized using Taguchi technique using the S/N ratio, ANOVA, and multivariate analyses results. The study revealed that higher compression ratio (18.1) and higher load (100%) give maximum brake thermal efficiency and lesser emissions for 20%WPO and 20% ethanol blended diesel. The optimized condition obtained in this study would provide a way to use the waste plastic oil as a sustainable alternate fuel in a diesel engine.

Keywords Optimization · Waste plastic oil · Ethanol · Performance · Emission · Taguchi method

Introduction

The rising demand of liquid fuel, resource depletion, and high pollution load due to the combustion of conventional fossil fuels necessitates global attention towards sustainable alternate sources of energy (Ozcanli, 2015). Significant research on the renewable alternate reported different alternate liquid fuels including bio-ethanol, biodiesel, and pyrolysis bio-oil but could not replace the fossil fuel altogether. This is owing to the lack of extensive research output that could ensure an improvement in engine performance and a reduction in ex-

haust pollution. Many industries like automotives, agriculture, and power generation sectors are mostly dependent on diesel fuels for higher thermal efficiency and better fuel economy (Lynos et al., 1986). So it is always encouraging to search for an alternative source of diesel. On the other hand, mass production of plastic products and subsequent huge generation of plastic wastes confronts a major disposal problem and other environmental issues. Oils derived from waste plastics can be a substitute for diesel and also reported by different researchers (Arjanggi and Kandedo, 2019). But the major outcome of the research is that it cannot be used directly in diesel engine due to its higher viscosity that results inconsistent spraying characteristics, injection, and combustion problems during engine running (Kalargaris et al. 2017). Again, the use of this fuel gives poor emission characteristics (Pakiya Pradeep and Gowthaman, 2019). So suitable adjustment of engine parameters and use of appropriate additive to WPO blended diesel should definitely improve the performance and thus the emission.

Adjusting the compression ratio (CR) of an engine is reported to directly affect its performance. VCR engines also make a significant contribution to thermo-dynamic efficiency which may be due to higher fuel efficiency and lower

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Energy, exergy and emission analysis on a DI single cylinder diesel engine using pyrolytic waste plastic oil diesel blend



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ABSTRACT

Depletion of fossil fuels and stringent emission norms focus attention to discover an evitable source of alternative fuel in order to attribute a significant compensation on conventional fuels. Besides, waste management policies encourage the valorization of different wastes for the production of alternative fuels in order to reduce the challenges of waste management. In this context, pyrolysis has become an emerging trend to convert different wastes into alternate fuel and suitable to be used as a substitute fuel for CI engines. The current investigation provides a sustainable and feasible solution for waste plastic management by widening the gap between global plastic production and plastic waste generation. It investigates the performance and emission of a single cylinder DI four stroke diesel engine using waste plastic oil (WPO) derived from pyrolysis of waste plastics using Zeolite-A as catalyst. Engine load tests have been conducted taking waste plastic oil and subsequently a blend of waste plastic oil by 10%, 20%, and 30% in volume proportions with diesel as fuel. The performance of the test engine in terms of brake thermal efficiency is found marginally higher and brake specific fuel consumption comparatively lowest for 20% WPO–diesel blend than pure diesel. The NO_x and HC emission is found lower under low load condition and became higher by increasing the load as compared to diesel. Fuel exergy was significantly increasing after blending of WPO with pure diesel, but exergetic efficiency of the blended fuels followed the reverse trend. However, increase in load of the engine improved the exergetic efficiency. The 20% WPO–diesel blended fuel is found suitable to be used as an alternative fuel for diesel engine.

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1. Introduction

Fast depletion of non-renewable and limited fossil fuels, unwarranted issues related to environmental pollution; waste to energy drive and legislative pressure demand an attractive alternative source of fuel for compression ignition engines [1]. Among the various alternative explored, waste plastics to fuel has been extensively researched source of energy. Catalytic pyrolysis of waste plastic to liquid fuel is regarded as a very promising method in obtaining hydrocarbon fuel oil from different thermo-plastic wastes in which polymeric chain is cracked into smaller molecules without any pollution. A significant number of researches have been reported on the pyrolysis of waste plastics using

different catalysts at some optimum temperature condition. The major product of this process i.e. the waste plastic oil is reported to possess matching composition and properties as that of petro fuels, thus could be used as an alternative fuel in diesel engine. This oil is treated as a better substitute for diesel fuel due to its carbon chain range of C₁₀–C₂₅ composition, low specific gravity and viscosity, and higher miscibility with diesel [2,3]. Few literature reports the use of waste plastic oil in diesel engine without any engine modification due to its higher drivability and stability. The experimental performance and emission results using waste plastic oil (WPO) in diesel engine reported by different researchers are summarized as follows.

Mani et al. carried out a complete experimental investigation on a single cylinder Kirloskar DI engine. They fueled the engine without any modification using both pure Waste Plastic Oil and blends of WPO and diesel oil. The performance, emission and combustion characteristics of waste plastic oil as compared to

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Static Analysis of Smart Functionally Graded Beams

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Abstract: The present paper deals with the analysis of Functionally Graded (FG) Beams integrated with a layer of Active Fiber Composite (AFC) material acting as distributed actuator. The material properties of the beam are assumed to vary along the thickness direction. An energy based Finite Element (FE) Model is developed for the beam integrated with the AFC layer using the first order shear deformation theory. The system of governing equations is solved and the model is validated by comparing the results with those available in literature. A simulation model is developed by using the ANSYS software and the results for the same are presented. Next, numerical results are computed and presented for the smart FG beam using the FE model. The results suggest the potential use of the distributed actuator made of AFC material for the deflection control of smart FG Beams. The effects of variation of power law exponent for the FG material have also been investigated.

Keywords: *Functionally Graded Materials (FGM), FG Beams, Smart FG Beams, Finite Element Methods.*

1. Introduction:

These days, there is a growing demand for Engineering Materials fulfilling simultaneous needs and having multiple characteristics. In order to satisfy conflicting property requirements, combinations of metals with other metals or non metals are being established and are being worked upon. While working to develop super heat resisting materials, Koizumi [1] proposed the concept of Functionally Graded (FG) Material that are microscopically heterogeneous and are typically fabricated from isotropic components. This FG Material belongs to a class of advanced materials with varying properties over a changing dimension and is considered superior to homogeneous materials composed of similar constituents. The properties, that may be designed and controlled for desired functionality include chemical, mechanical, thermal and electrical and are dependent on the spatial positions in the structure. FG Materials offer great promise in applications related to severe operating conditions and the use of these materials as thermal barriers is the most significant in the design of aerospace and nuclear structures.

Host Structures like the beams, plates and shells made of Functionally Graded materials are of increasing demand because of smooth variation of material properties along the preferred direction(s). The FG structures exhibit continuous stress distribution along the thickness and thereby considered superior to the conventional laminated composites. During the past few years, research on the buckling analysis, exact solution and thermoelastic analysis of structures made of FG material has been carried out [2-6] and this shows that the FG material can suitably be used for developing high performance advanced structures. When the FG structures are integrated with layers or patches of smart materials, they are customarily known as Smart FG Structures and are said to have self-controlling and self-monitoring

Chapter 62

Design and Fabrication of Aluminium/Alumina Ultra-fine Composite and Functionally Graded Material Using Powder Metallurgy Route



Aravind Tripathy , Rajat Gupta , Saroj Kumar Sarangi 
and Anil Kumar Chaubey 

Abstract Composites with light metals as the matrix and ceramic particles as the reinforcements are being acknowledged widely during the past decade for their superior mechanical properties, the most successful among them have been Aluminium/Alumina (Al/Al₂O₃) composite where Alumina particulates are reinforced in Aluminium matrix. Present work deals with fabrication and characterization of Al/Al₂O₃ ultra-fine composites with 10, 20, 30 and 40% Al₂O₃. These ultrafine composites are fabricated using uniaxial hot press under 10⁻⁵ mbar vacuum pressure at 400 °C sintering temperature and 3-tonne load for 2 h experimental condition. Effect of Al₂O₃ volume fraction on microstructural and mechanical properties of the composite are studied through optical microscopy. Phase analysis and microstructure investigations revealed that the consolidated material consists of Al as a matrix phase and Al₂O₃ phases with size below 1 μm homogeneously dispersed in a continuous matrix. Taking into consideration the results of above experiment, Al/Al₂O₃ system Functionally Graded (FG) Material is successfully hot pressed using powder metallurgy (PM) route under similar experimental conditions. It is found that relative density of the Al/Al₂O₃ FG Material increased with the rise in sintering temperature and its density range changed quasi-continuously from 2.67 × 10³ kg/m³ to 2.71 × 10³ kg/m³, while the microhardness value obtained at the top surface was 35.2 HV which gradually increased across its thickness to 74.81 HV at the other surface with the increase in reinforced Al₂O₃. This FGM is intended to be a good substitute

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A Case Study on Al/Al₂O₃ Ultrafine Composites Fabricated Using PM Route

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Abstract. Composites with light metals as the matrix and ceramic particles as the reinforcements are being acknowledged widely during the past decade for their superior mechanical properties, the most successful among them has been, Al/Al₂O₃ composite i.e. Alumina (Al₂O₃) particulate reinforced in Aluminium (Al) matrix. Al/Al₂O₃ ultrafine composites samples with 10%, 20%, 30% and 40% Al₂O₃ as reinforcement were fabricated using uni-axial hot press under 10–5 mbar vacuum pressure at 400 °C sintering temperature and 3-ton load for 2-h experimental condition. Effect of Al₂O₃ volume fraction on microstructural and mechanical properties of the composite was studied through optical microscopy. Phase analysis and microstructure investigations revealed, microstructure of the consolidated material consists of Al as a matrix phase and Al₂O₃ phases with size below 1 μm homogeneously dispersed in a continuous matrix. This ultra-fine composite is intended to be a good substitute 'low weight high strength material' with better wear resistance properties at elevated temperatures for automobile braking applications as well as for various other industrial applications which may include robots, high speed machineries and automobiles.

Keywords: Ultra fine composites · Powder metallurgy · Hot pressing · Mechanical properties

1 Introduction

The need for new materials in automotive and aerospace sector with superior characteristics such as low specific weight, higher strength, young's modulus, better resistance to temperature, corrosion, wear and thermal shock, better recyclability, environmental friendly are the areas of focus for researchers worldwide. Such composites have received widespread attention during the past decades and among them, Al/Al₂O₃ composite are the most successful type of MMCs [1]. The need of advanced materials is to meet the demands of extreme environments and complex thermo-mechanical loadings. Materials like steels, lightweight alloys (Al, Ti, and Mg), copper



Fabrication of Al/Al₂O₃ Functionally Graded Material Using Powder Metallurgy Route

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Abstract. Six-layer (100Al, 90Al–10Al₂O₃, 80Al–20Al₂O₃, 70Al–30Al₂O₃, 60Al–40Al₂O₃, 50Al–50Al₂O₃ by vol. fraction) Al/Al₂O₃ Functionally Graded Material (FGM) each layer thickness ~1.5 mm was successfully synthesized by powder metallurgy route and the effect of Al₂O₃ volume fraction on microstructural and mechanical properties were studied. The graded powder layers were compacted and sintered using uni-axial hot press by simultaneous application of temperature and pressure at 400 °C & 10–5 mbar pressure. Experimental results revealed that relative density depends on sintering temperature and it varies from 2.67×10^3 to 2.71×10^3 kg/m³ with increase of sintering temperature from 400 to 450 °C. The compacted sample shows increase of hardness with increase of Al₂O₃ volume fraction in the matrix from 35.2 HV to 74.8 HV of 100% Al and 50Al–50Al₂O₃ layers respectively. FESEM images of the cross section of the consolidated samples revealed that the layers are distinct and interface of layers are completely bonded with each other. The result also indicates that FGM fabricated by powder metallurgy method could be a better substitute for light weight and wear resistance application.

Keywords: FGM · Powder metallurgy route · Hardness · Volume fraction · Wear resistance

1 Introduction

The strive to achieve better outputs in terms of performance, optimum cost of operation, eco-friendly systems with wider recyclability of the components have always posed new and intriguing challenges before scientists, engineers at large and designers and manufacturers in particular to keep on improvising the designs and the technology to achieve the best results in all the spheres in automotive and aerospace sectors.

Parametric Optimization of Medical Plastic Wastes Conversion into Transportation Fuel using Mamdani Fuzzy Inference Systems (FIS)

Amar Kumar Das, Saroj Kumar Rout, Dulari Hansdah, Achyut Kumar Panda

Abstract: Rapid growth of medical plastic wastes required attention for its scientific disposal along with conversion into value added products. Pyrolysis method is found suitable process for such conversion of such wastes into liquid oil. The experiment was carried out with the medical plastic wastes collected from local medicals and treated in a batch reactor taking appropriate range of temperature change and use of Calcium bentonite (CB) and Zeolite-A (ZA) as catalysts. The yield of liquid oil, gas and char produced from the process are collected in scale. The yield of liquid fuel in this process was influenced by factors such as temperature, catalyst concentration and acidity of catalyst. It was observed that yield of liquid fuel in this process were significantly dependent on temperature, nature of catalyst and catalyst concentration. The maximum yield of oil reported at 500 C and even increased by adding 20% by weight of CB as catalyst and 10% by weight of Z-A. In this study, Mamdani Fuzzy inference System (FIS) is used in order to measure the performance of the process and can be analyzed with more objectives, oriented through mathematical modelling and simulation. Mamdani Fuzzy inference was also introduced to identify the significant factors affecting the response and helps to determine the best possible factor level of combination. Finally, a regression model for liquid fuel from catalytic degradation of medical plastic wastes has been developed and mapped as a function of process parameters.

Keywords: Medical plastic wastes, thermo-catalytic degradation, batch reactor, Mamdani Fuzzy inference System (FIS)

I. INTRODUCTION

Modern life becomes secured with the availability of good numbers of multifacilty hospitals in the city. The growing rate of hospitals substantially solves the health issues but simultaneously creating another acute challenge for medical waste disposal. Medical waste is limited to infectious, hazardous, and any other wastes that are generated from health care institutions, such as hospitals, clinics, dental offices, and medical laboratories According to National income level, volumes of medical waste generation are mainly dependent on the usage and income standard of the people. According to the survey made by World Health Organization (WHO) in 1999, the figure reported for medical waste generated and remained indisposed in worldwide is a matter of concerned.

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The amount of untreated medical wastes generated in developed countries like North America, Western Europe, Latin America, Eastern Asia and India are 09-10kg, 3-6kg, 3kg, 2.5kg and 08kg/bed respectively. They include mainly discarded surgical gloves, surgical instruments, syringe and Saline bottles [1].

Various modern waste management strategies have been adopted to dispose medical wastes for a sustainable, scientific, cost effective and low risk manner. In some of the countries, Incineration was used as a common method for medical waste treatment. However, recently some modern techniques are being introduced for disposal of such wastes reducing the pollution aspects but do not provide any resource from the wastes. So, to reduce the volume of such waste, some appreciable attempts could have been taken to reuse, recycle, segregate, and better management with minimum impact on the environment and ecosystem.

Pyrolysis is a promising technique used in the experiment for sustainable management of medical wastes. Pyrolysis or cracking processes break down polymer chains into useful lower molecular weight compounds. This can be achieved by the application of heat at atmospheric pressure in the absence of oxygen, which can be either thermal or catalytic cracking. The process is influenced by chemical composition of the feedstock, cracking temperature, heating rate, operation pressure, reactor type, residence time and application of catalyst[2,3]. In this context, we studied the performances of thermo-catalytic conversion of medical plastic wastes into liquid oil at various operational conditions. In the present experiment, we studied the influence of temperature and catalysts (CB and Z-A) concentration on production of liquid oil from medical plastic wastes in a batch reactor [2, 3]. Mamdani Fuzzy derivation System is utilized to enhance the oil estimation under different information parameters taken from proposed input list. In order to calculate the best oil yield, a set of 9 rules are also incorporated into the Fuzzy Inference System (FIS). A substantial investigation has been done in the proposed FIS in order to attain the exactness of oil computation as well as to set an improved standard of oil.

When a process is carried out with multiple conflicting factors influencing the result, Statistical modeling or optimization techniques are preferred for implementation in order to enhance the accuracy of the process. From the literature survey, it can be concluded that, during the past decade fuzzy logic has found a variety of applications in various fields including industrial-process control, medical diagnosis, securities in trading, control non-linear, time-varying, ill-defined systems to control systems whose dynamics are exactly known, such as servomotor position control, robot-arm control and to manage complex decision-making or diagnosis systems.

Foreign Direct Investment: a Paradigm shift in FDI- retailing perception

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I. INTRODUCTION

“The decision to invite Foreign Direct Investment (FDI) in the retail sector would greatly improve investment in the country; the FDI in the retail sector would go a long way in boosting trade at a time when declining investments had led to slower GDP growth. The multi-brand retail would give a boost to the organized retail sector, positively impacting several stakeholders including farmers, consumers, MSMEs and hence, the overall economy.” **CII president B Muthuraman.**

The economies all over the world are in the cross road as they are under the cobweb of global financial crisis so also the Indian economy. In this context, it is a big challenging task and acid test for the UPA government at center to introduce second generation reforms despite of lack of support from some coalition partners. After the ridiculous statement of the Times magazine, which accuses that Dr. Manmohan Singh is a non performer and a mere puppet in the hand of Mrs. Sonia Gandhi, though he is having ability to change the structure of the economy. However, in a major step forward to give a push to reform agenda, Prime Minister Dr. Manmohan Singh's government took a decision to allow up to 51 percent FDI in multi-brand retail and opened up the aviation sector to 49 percent investment by overseas airlines. Since then his government has been confronting resistance from opposition but he gave big sigh of relief when both the houses of parliament clear cabinet decision with regard to FDI in retail.

In 2004, The High Court of Delhi defined the term **retail** ‘as a sale for final consumption in contrast to a sale for further sale or processing (i.e. wholesale). Thus, retailing can be said to be the interface between the producer and the individual consumer buying for personal consumption. This excludes direct interface between the manufacturer and institutional buyers such as the government and other bulk customers. Retailing is the last link that connects the individual consumer with the manufacturing and distribution chain.

Indian retail industry is divided into organized and unorganized sectors. **Organized retailing** refers to trading activities undertaken by licensed retailers, that is, those who are registered for sales tax, income tax, etc. These include the corporate-backed supermarkets and retail chains, and also the privately owned giant retail businesses. **Unorganized retailing**, on the other hand, refers to the traditional formats of low-cost retailing, for example, the local *kiran* shops, owner manned general stores, *paan/beedis* shops, convenience stores, hand cart and pavement vendors, etc. Unorganized retailing is by far the prevalent form of trade in India – constituting 98% of total trade, while organized trade accounts only for the remaining 2%.

Can FDI in retail cater the need of the recession trapped Indian Economy?
In the wake of global economic recession when the Indian economy is struggling to maintain recovery when the

The Indian Council of Research in International Economic Relations (ICRIER), a premier economic think tank of the country, which was appointed to look into the impact of BIG capital in the retail sector, has projected the worth of Indian retail sector to reach \$496 billion by 2011-12 and ICRIER has also come to conclusion that investment of ‘big’ money in the retail sector would in the long run not harm interests of small, traditional, retailers.

The study has said that the opening up of FDI in retail could increase the organized retail market size to 260 billion dollars by 2020. It said that this would result in an aggregate increase in income of 35 to 45 billion dollars per year for all producers combined, three to four million new direct jobs and around four to six million new indirect jobs in the logistics space, contract labor and repackaging centers, housekeeping and security staff in the stores. It said that the government would also gain in ways of tax collection and reduction of tax slippages.

FDI in retailing is favored on following grounds:

- The global retailers have advanced management know how in merchandising and inventory management and have adopted new technologies which can significantly improve productivity and efficiency in retailing.

FDI in India and Regulatory Environment: Is it really conducive in current Business Scenario?

Dr. Biswaranjan Parida¹, Mr. Raja Sarkar²

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ABSTRACT

After the severe financial meltdown, all the economies are trying to revive their economies by bringing stringent reform programs in order to attract more number of Foreign Direct Investment and promote economic growth. India has been the major recipient of FDI, but recently it suffers from low inflow of FDI due to bold economic legislation and tough regulatory environment. Apart from this, there is large gap between approved and actual FDI on account of lack of co-ordination between Union and state governments, as in case of withdrawal of Mittal and undue delay of Posco, result in degradation of India's goodwill to the foreign investors. Through this article, the author has made an attempt to reveal the current regulatory frame work in India vis-à-vis China.

Key Words: Financial meltdown, Foreign Direct Investment, regulatory environment, economic legislation

I. INTRODUCTION

"Investor sentiment is hurt. It is deeply harmed by the fact that there is no stability, certainty and predictability in policy decisions today. As an economy, we have gone into a wait and watch mode so far as FDI is concerned. They are now waiting for the new government to come in. The fear of rollback is always there." Punit Shah, co-head (tax), KPMG.

The investment climate is central to growth and poverty reduction of any economy. Improving the opportunities and incentives for firms of all types to invest productively, create jobs, and expand should be a top priority for governments. On account of this, almost all economies of the world have introduced some drastic steps in order to revive their economy after the great financial meltdown in 2008. But, they have to be pragmatic in their approach, as it is not just about increasing the volume of investment but also spurring productivity improvements that are the keys to sustainable growth.

Investors are unlikely to make significant investments unless they are provided some sense of certainty or predictability in how a host nation will interpret its FDI laws and whether it will respect the contractual rights and property rights inherent in the investment. Absence of a high degree of confidence in the clarity, integrity, and stability of investment rules, investors may exaggerate the dangers inherent in a host nation's investment regime, resulting in less investment than would otherwise be provided.

Under Article IV of the IMF's Articles of Agreement, the IMF holds bilateral discussions with members, usually every year. In the context of

the 2013 Article IV consultation with India and based on information available at the time of these discussions, the staff report of IMF was completed on December 21, 2012 and suggested some structural reforms that building on recent progress is crucial, especially to address supply constraints in energy and move the pricing of various natural resources toward a market basis. Progress on taxation, land acquisition, and labor market reform, along with 12th Plan goals on infrastructure, skills mismatches and social outcomes, are necessary to return to a rapid rate of growth and poverty reduction. Tightening mechanisms to address deteriorating asset quality will promote healthier banks' balance sheets, but supporting faster growth and reaching Basel III targets will also require capital injections in public banks. In addition, addressing concentration risks, strengthening creditor rights, and supporting capital market development will lay the groundwork for a stronger recovery.

The global economic slowdown from 2008 into 2010 has led many to rethink their approach to the liberalization of markets and the courting of FDI. Some even see the crisis as caused, or at least magnified by, financial globalization. Yu Yongding, a prominent Chinese economist, recently remarked: "The United States has been a model for China. Now that it has created such a big mess, of course we have to think twice." In India, concerns over the credit crisis led the Reserve Bank of India (RBI) to reverse course on liberalizing some financial regulations: it will not permit issuance of credit-default swaps, a major contributor to the crisis.

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2020-09-15

Augmentation of Energy, Exergy and Emission Performance of Gas Turbine Engines Used for Ship Propulsion 2020-01-2028

Majority of prime movers for ship propulsion used currently are diesel engines mainly because of their elevated efficiency and their ability to run on residual oil. But in view of the increasing awareness for pollution control and stricter environmental regulations, gas turbine cycle can be regarded as a suitable alternative to propel large ships for cargo and military purpose. However during summer and in hot and humid climates, an increase in ambient temperature and ambient relative humidity is observed to adversely affect the performance of gas turbine (GT). In such circumstances, integration of inlet air cooling to GT cycle can be considered as a suitable alternative. The present paper discusses the possibility of using a vapor absorption inlet air cooled gas turbine cycle as a prime mover for marine application. A parametric study of the effect of compressor pressure ratio, turbine inlet temperature, ambient relative humidity and ambient temperature on energy, exergy and exhaust emission performance of film air cooled gas turbine cycle used in marine application has been carried out. Vapor absorption inlet cooling integrated to cooled gas turbine cycle has been observed to improve the power output by 19 % and efficiency by 7.6 %. Inlet air cooling has also been observed to improve emission performance with lower NO_x , UHC and CO emission. It is further reported that the relative gain in GT work of absorption inlet air-cooled gas turbine cycle over the one without inlet air cooling is more pronounced at higher ambient temperature and lower ambient relative humidity. The integration of vapor absorption inlet air cooling system has also been observed to enhance exergy efficiency and lower exergy destruction of the gas turbine cycle.

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Abstract

Advanced Exergy Analysis of an Air Craft Gas Turbine Engine at Different Power Loading Operations

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Sector: Aerospace
Event: AeroTech Europe
Language: English

Abstract

The innovations in aircraft propulsion have been identified as the key parameter towards the progress in transportation. Continuous advancement in the performance and efficiency of propulsion has enabled aircraft to travel over larger distances with higher speed. Aviation is also responsible for approximately 2% of total greenhouse gas emission and is expected to grow around 3% by 2050. The present article aims to use the exergetic analysis of a turboprop engine which should be helpful in designing of such engines and also helps these engine users to regulate and select the operation modes. A gas turbine with film air cooling of turbine blades has been proposed to be the turboprop engine. The engine is analyzed on exergy point of view at different power loading operation modes and the performance is studied. Selected exergetic measures under consideration are Exergy Efficiency, Fuel Exergy Depletion Ratio, Relative Exergy Consumption Ratio, Exergetic Improvement potential and Productivity Lack ratio. The total fuel exergy depletion ratio of the turboprop engine is estimated to be around 64.7 % at 100% loading. Also, among the identified cycle components, combustion chamber is identified as the main source (~35%) of the exergy destruction and, thus is the biggest contributor to the overall irreversibility of the system. The exergy efficiency is observed to be minimum at 75 % mode and maximum for Take-off. The exergetic improvement potential of the thermodynamic inefficiencies increases with increase in fuel-air

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Energy, Exergy and Emission Performance Analysis of Air-Film Blade Cooled Turbo Prop Turbine for Heavy Duty Cargo Aircrafts 2019-01-1389

In the present scenario, when the non-conventional energy resources are still under development stage for their full potential as a source of energy for our fast growing population, gas turbines are one of the most promising power generation technologies. The gas turbine based power utilities are also gaining acceptance across globe, because of increase in extraction of natural gas. Further reduction in the price of natural gas would also result in the number of gas turbine units installed across globe and thus it is important to carry out the environmental analysis of gas turbine based utilities. The gas turbines are employed in power generation in industries, aircrafts and marine propulsion units. The present exercise carries out thermodynamic performance analysis i.e. energy, exergy and emission performance analysis of an air-craft gas turbine. The gas turbine blades of present cycle are assumed to be cooled by air-film blade cooling technique. The present paper carries out the thermodynamic analysis by varying cycle parameters i.e. cycle pressure ratio and turbine-rotor-inlet-temperature. The study further investigates the cycle based on second-law analysis which includes component-wise exergy destruction and rational efficiency, which shows the combustor to be the component with highest exergy destruction ~29%. The analysis further moves to predict emission performance analysis of air-craft gas turbine cycle and show that CO emission decreases with increase in compressor pressure ratio while NO_x emission is found to be increase with increase in compressor pressure ratio. The results of the analysis have been represented in the form of

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2018-09-10

Thermodynamic Analysis of an Evaporative Inlet Air Cooled Combined Cycle for Marine Application 2018-01-1777

The integration of inlet air cooling to gas turbine based power utilities is a well accepted practice as this modification to the utility delivers superior utility performance. However, application of inlet-air cooling to drive turbines and specifically to marine mobility sector is rare in literature. Marine vessels are generally propelled by diesel engines, however large marine vessels specifically cruise ships and high speed naval vessels may have requirements of higher speeds and on-board power requirements which can fulfilled by gas turbine driving the propellers while on-board power needs can be met by steam turbine power generated from gas turbine exhaust heat. Such gas-steam combined cycles have the potential to become popular for high capacity marine vessels. The choice of gas turbine based combined cycle power plant for marine vessels in comparison to diesel engine powered vessel is also superior due to lower emission from the former. Higher ambient temperatures are known to negatively affect gas turbine and hence also marine combined cycle performance. The present article discusses the prospects of using an evaporative inlet air cooled combined cycle as a prime mover for marine application. A parametric study of the effect of compressor pressure ratio, turbine inlet temperature, ambient relative humidity and ambient temperature on energy, exergy and emission performance of combined cycle used in marine application has been carried out. Evaporative inlet cooling integrated to cooled gas-turbine based combined-cycle has been observed to improve the power output by 10.25% and efficiency by 1.55%. This improvement has been observed to be higher at higher ambient temperature and lower ambient relative humidity. Inlet air cooling has also observed to improve emission performance with lower NO_x and CO emission. The overall cycle

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Outline Highlights Abstract Keywords 1. Introduction 2. Experimental 3. Results and discussion 4. Conclusion Declaration of competing interest Nomenclature Credit author statement References Show full outline

Energy Volume 229, 15 August 2021, 120629

Thermal balancing and exergetic performance evaluation of a compression ignition engine fuelled with waste plastic pyrolytic oil and different fuel additives

Amar Kumar Das^a, Dulani Hansdah^b, Achyut Kumar Panda^a

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Abstract

This study aims at evaluating the heat energy and exergy values of waste plastic oil (WPO) blended diesel mixed with different fractions of fuel additives (ethanol as oxygenated fuel additive and nano graphene as nano additive) with a view to establish the thermal balancing of a diesel engine analytically taking experimental data and comparing with neat diesel oil. The research engine used was a four stroke, constant speed, stationary, direct injected, single cylinder, water-cooled compression ignition engine tested at different loading conditions. The thermal balance was prepared in respect of work output, heat loss in cooling, heat loss in exhaust gas, heat loss in lubrication and additional unaccounted heat losses in order to measure the efficiency of the engine in agreement with thermodynamics energy principles. Three test fuels with same plastic oil and different fuel additives concentration (comprising of 80% Diesel+20%WPO, 60% Diesel + 20%WPO+20% Ethanol and 80%Diesel +20% WPO+100 ppm nano graphene) are prepared for the engine test. The addition of ethanol in WPO blended diesel fuel mixture contributes marginal increase in brake thermal efficiency, decrease in brake specific fuel consumption, higher exhaust gas temperature and lower exergetic efficiency as compared to that of diesel. Nano

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Finite Element Analysis of Smart Functionally Graded Beams

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Abstract

This paper presents the analysis of smart Functionally Graded (FG) Beams. The FG beam is integrated with a layer of Active Fiber Composite (AFC) material acting as distributed actuator. The material properties of the beam are assumed to vary along the thickness direction. A finite element (FE) model is developed for this smart FG beam in ANSYS environment and the system of governing equations is shown. Convergence test is carried out and the model is validated by comparing the results with those available in literature. Results are obtained and presented for different boundary conditions. The results suggest the potential use of AFC material as distributed actuator for the deflection control of the FG Beams. The effects of variation of power law exponent in the FG material have also been investigated.

Keywords: Functionally Graded Materials (FGM), FG Beams, Smart FG Beams, Finite Element Methods.

1. Introduction

increasing demand because of smooth variation of material properties along the preferred direction(s). The FG structures exhibit continuous stress distribution along the thickness and thereby considered superior to the conventional laminated composites. During the past few years, research on the buckling analysis, exact solution and thermoelastic analysis of structures made of FG material has been carried out [3-6] and this shows that the FG material can suitably be used for developing high performance advanced structures. When the FG structures are integrated with layers or patches of smart materials, they are customarily known as Smart FG Structures and are said to have self-controlling and self-monitoring capabilities [7]. Researchers have put interest on investigating the performance of the FG plates/beams coupled with piezoelectric actuators [8-9]. It has been stated that the control authority of the piezoelectric materials can be improved by tailoring their piezoelectric stress/strain coefficients and this perhaps led to the development of piezoelectric composites. These piezoelectric composites are composed of epoxy matrix reinforced with fibers of monolithic piezoelectric materials and

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A Review of Solid State Processes in Manufacture of Functionally Graded Materials

Aravind Tripathy, Saroj Kumar Sarapat, And Kumar Chaubey

Abstract Keywords References PDF

Abstract

The demand for materials exhibiting multiple functionalities & having greater relevance to aerospace & other similar applications have led researchers to develop such materials named Functionally Graded Materials, having properties that may be tailored for a definite application. Better stiffness-to-weight ratio characteristic of such material is the main reason of their popularity today. Efforts are also directed to produce such materials in bulks and in a cost-effective manner. An overview of fabrication methods such as Powder metallurgy, Solid Freeform Fabrication, Laser cladding, Selective Laser Sintering, 3-D Printing and Selective Laser Melting etc. are deliberated here. The quality of FGM produced with better awareness, research and patronization at the state level is a continuous process, hence a review of solid state processes in manufacture of Functionally Graded Materials is the need of the hour

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 Published online 2021 Feb 16 doi: 10.1007/978-3-030-60039-6_14

Mobile Technology Solutions for COVID-19

Guest Editor (s): Fadi Al-Turjman², Ajantha Devi,³ and Anand Nayyar⁴
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Abstract

The World Health Organization (WHO) has declared the outbreak of COVID-19 as a pandemic which has led to lockdowns of all sectors like primary education, higher education, industrial sector, logistics, etc. and a complete clamp down on sporting, cultural events, any form of social gathering, etc. The entire world is now striving to combat this pandemic with the aid of different technologies. Emerging technologies are being widely employed across the entire world to curb the outbreak of coronavirus. China has deployed robots for disinfecting hospitals and delivering medical supplies. In Singapore, the government database has enabled study of the outbreak, and in South Korea, the authorities are tracking the potential carriers by using mobile phone satellite technology. In India, drones are being used to monitor the lockdown and also to deliver essential commodities to the citizens. In addition, technology powered by artificial intelligence is enabling us to keep track of the outbreak, deliver supplies to hospitals, develop vaccines, etc. The development of mobile applications that suggest better solutions for personalized healthcare, disease

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Ensemble Comparative Study for Diagnosis of Breast Cancer Datasets

Bibhuprasad Sahu, Sujata Dash, Sachi Nandan Mohanty, Saroj Kumar Rout

Abstract Keywords References PDF

Abstract

Every disease is curable if a little amount of human effort is applied for early diagnosis. The death rate in world increases day by day as patient fail to detect it before it becomes chronic. Breast cancer is curable if detection is done at early stage before it spread across all part of body. Now-a-days computer aided diagnosis are automated assistance for the doctors to produce accurate prediction about the stage of disease. This study provided CAD system for diagnosis of breast cancer. This method uses Neural Network (NN) as a classifier model and PCA/LDA for dimension reduction method to attain higher classification rate. Multiple layers of neural network are applied to classify the breast cancer data. This system experiment done on Wisconsin breast cancer dataset (WBCD) from UCI repository. The dataset is divided into 2 parts train and test. With the result of accuracy, sensitivity, specificity, precision and recall the performance can be measured. The results obtained are this study is 97% using ANN and PCA-ANN, which is better than other state-of-art methods. As per the result analysis this system outperformed then the existing system.

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Research Article

A Hybrid Approach for Breast Cancer Classification and Diagnosis

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Bibhuprasad Sahu^{1*}, Sachi Nandan Mohanty², Saroj Kumar Rout²

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Abstract

Feature selection in breast cancer disease important and risky task for further analysis. Breast cancer is the second leading reason for death among the women. Cancer starts from breast and spread to other part of the body. People are unable to identify their disease before it become dangerous. It can be cured if the disease identified at early stage. Accurate classification of benign tumours can avoid patients undergoing unnecessary treatments. Data Analytics and machine learning methods provides framework for prognostic studies by errorless classification of data instances into relevant based on the cancer severity. In this study we have purposed a prediction model by combining artificial intelligent based learning technique with multivariate statistical method. For automation of the diagnosis process data mining plays a significant role. The data sets available in different repositories are noisy in nature. This study suggests a hybrid feature selection method to be used with PCA (Principal Component Analysis) and Artificial Neural Network (ANN). Preprocessing of data and extracting the most relevant features done by PCA. The proposed algorithm is tested by applying it on Wisconsin Breast Cancer Dataset from UCI Repository of Machine Learning Databases. In classification phase 10 fold cross validation was used. The suggested algorithm was measured against different classifier algorithms on the same database. The evaluation results of the algorithm proposed have achieved better accuracy with sensitivity and F measure comparison with others and by enhancing this concept we can provide a future scope to produce sophisticated learning models for diagnosis.

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A review on various MAC Protocols for Heterogeneous Traffic in Wireless Sensor Networks

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Abstract

Sensors in a Wireless Sensor Networks (WSNs) responsible to collect periodic data, process the data and forward it to the sink node. Among all the challenges in the network like energy constraints, robustness, responsiveness, self-configuration, energy constraint is one of the vital challenge. In order to deal with these challenges, new protocols are designed, one such protocol is the MAC protocol since it influences the transceiver unit of the sensor node. The Quality of Service (QoS) at the MAC layer matters as it rules medium sharing and supports reliable communication. In WSNs nodes generate heterogeneous traffic which has different QoS requirements like reliability and delay deadline with different priority requirements that vary according to the application. In this paper, a variety of MAC protocols for WSNs are investigated and analyzed, with a special focus on traffic classification and priority assignment. In our proposed work we classify the sensed data according to its priority first and allocate slots variably based on its requirement to be sent to the sink node to perform faster rescue operations. A comparison analysis of different MAC protocols is made with various parameters and the observation are mentioned.

Keywords: *Wireless Sensor Networks, energy efficiency, MAC protocol, traffic classification, priority assignment.*

1. Introduction

Wireless Sensor Networks (WSNs) are becoming more popular and they are used in numerous applications like industry, academia,

military, forest fire, medical and health and so on. In all these kinds of applications requires data delivery with QoS as opposed to best-effort-performance in classical monitoring applications. Reliable and real-time delivery of collected data is important in the sensor network operation.

A sensor node has limited battery capacity of < 0.5Ah. With this capacity itself, it plays the role of both data originator as well as data router. Sensing, communicating and processing of data consume battery power. But communication consumes 100 times more power than sensing and processing. [1] So, optimization of energy consumption is required in WSNs to improve the network lifetime.

Medium Access Control (MAC)

MAC is responsible for providing communication link between large numbers of sensor nodes and shares the medium fairly and efficiently. [2] Let us discuss some of the attributes of good MAC protocol. The first is the energy efficiency. Instead of recharging the battery, it is better to replace the sensor nodes. To get access to the channel, many sensor nodes will compete with each other. The MAC protocol should be able to avoid collisions among these nodes.

MAC layer is responsible for correcting the errors occurred at the physical layer. It also performs some activities like framing, physical addressing, and flow and error controls. It resolves the channel access conflicts among different nodes. It also addresses issues like

Analysis of the Soil's Chemical Properties in Traditional Upland Rice Farms

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Abstract

This study was conducted to assess the soil chemical properties of upland rice farms particularly along different gradients (sloping, steep, and flat) in cultivated and uncultivated sites. Sampling was done in the wet and dry seasons. Results showed that soils in the cultivated sites have relatively lower pH than in uncultivated sites. However, pH values taken during the wet season were relatively higher as compared to soil samples taken from the dry season. Organic matter was generally higher in most uncultivated soils and in soil samples taken during the wet season. Phosphorous was generally abundant in uncultivated soils and in soils collected during the dry season. Potassium levels were observed to vary slightly across seasons and slope gradients. Zinc values were generally higher in cultivated soils and in samples taken during the dry season. Soils from uncultivated areas and in the dry season have generally higher Copper concentrations. Manganese concentration was higher in the dry season than in the wet season. For iron, concentration levels were very much higher in cultivated sites. These results show similar values in the cultivated and uncultivated sites for the concentration of the different macro and micronutrients. This may be attributed to fallowing and crop rotation that allows replenishment of lost nutrients. The practice of crop rotation from rice to legumes may have enhanced the positive impacts of fallowing particularly in the recycling of nutrients. Although low pH was observed which is characteristic of mountain soils, cultivated sites showed to be more acidic as compared with uncultivated sites. It is therefore relevant that the management practices involved be closely assessed, as these traditional practices may contain important

inputs in formulating sustainable measures in maintaining the chemical integrity of upland soils.

Keywords: *chemical, soil, traditional, upland*

1. Introduction

The soil is the foundation of agriculture [1] and of ecological sustainability [2] influencing the properties, functions and provision of ecosystem services, and essentially human well-being [3]. However, production practices in agriculture [4] impose varying degree of impact on the complex interactions among soil, water, atmosphere, and soil biota [5] that eventually would reduce the availability of organic matter compromising soil quality and health [6].

As agriculture intensifies due to increased demand and open trade, degradation of the natural resource base that supports it is imminent. In the Philippines alone, agriculture utilize as much as 41.6% of the country's total land area and steadily increasing [7]. Inappropriate agricultural, pastoral, industrial or urban purposes leads to physical, chemical and biological deterioration of the soil [8] resulting in soil loss of about 10 to 40 times the rate at which it can be naturally replenished. If unabated, it would mean a total destruction of the topsoil by 2070 [9].

In soil degradation, assessment of nutrient depletion, organic matter loss, acidification, and chemical pollution is important as soil chemical

Capacity based Clustering Algorithm for a Dense Wireless Sensor Network

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Abstract

Wireless Sensor Network (WSN) is viewed as an effective tool for collecting essential information. Many researchers have proposed various algorithms to design low-cost wireless sensor networks. A sensor network comprises of large number of sensor nodes with each sensor node having limited memory unit. One of the important tasks is to provide a reliable routing of packets from sensor nodes to the base station. Memory unit limitation is one of the barriers in the path of designing efficient routing protocols. In order to design energy efficient algorithms, often nodes are clustered in to non-overlapping clusters. This paper describes the clustering process in WSN and evaluates distributed clustering algorithm Low Energy Adaptive Clustering Hierarchy (LEACH). To overcome the drawbacks of these existing algorithms a distributed clustering model has been proposed for attaining energy efficiency to a larger scale.

Keywords— *Wireless sensor network (WSN), distributed clustering algorithm, coverage based clustering, energy efficiency, network lifetime.*

1. Introduction

Generally a wireless sensor node consists of low power processor, tiny memory, radio frequency module, various kinds of sensing devices and limited powered batteries which finds applicable in target tracking, environmental monitoring and oceanography (figure 1). Much of energy consumption happens during wireless communications [11]. The energy consumption when transmitting one bit of data equals to

several thousands of cycles of CPU operations. Hence the energy efficiency of a wireless communication protocol brutally affects the energy efficiency and lifetime of the network. Many researchers have projected several algorithms for WSNs to improve energy consumption and network lifetime. Since these wireless sensor devices are power-constrained, long-distance communications are not encouraged. Thereby direct communication between the nodes and base station is generally avoided. A proficient way is to arrange the network into several clusters and each individual cluster has a cluster-head (CH). CH is one of the sensor nodes which is affluent in resources. Sensor nodes send their sensed information to the CH during their respective TDMA time-slots. The CH performs data aggregation process and forwards the aggregated data to base station (BS) [3-10]. Clustering follows some advantages like network scalability, localizing route setup within the cluster, uses communication bandwidth efficiently and makes best use of network lifetime. Since clustering uses the mechanism of data aggregation, unnecessary communication between the sensor nodes, CH and BS is avoided. In this paper, a model of distributed clustering algorithm is proposed which is based degree of capacity (DOC) of a node within a cluster. The DOC of a node is the combination of three parameters: the number of tasks assigned to a particular node, remaining energy and coverage with neighboring nodes. The node with highest DOC is selected as a CH for the current round. The primary objective of the proposed algorithm is to attain energy

Challenges, Problems and Opportunities for Smart Grid Growth

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Abstract

The improvement savvy lattices have made the force frameworks arranging and activity more effective by the utilization of environmentally friendly power assets, electric vehicles, two-way correspondence, self-mending, customer commitment, circulation insight, and so forth. The goal of this paper is to introduce a nitty gritty complete survey of difficulties, issues and open doors for the advancement of keen network. Keen lattices are changing the customary method of satisfying the power need and giving the path towards an earth amicable, solid and tough force network. This paper presents different difficulties of shrewd framework advancement including interoperability, network correspondences, request reaction, energy stockpiling and circulation lattice the executives. This paper likewise surveys different issues related with the improvement of brilliant matrix. Nearby, territorial, public and worldwide open doors for the improvement of savvy network are additionally detailed in this paper.

Keywords: Communications
Computational intelligence
Demand response Distribution system
Microgrid Smart grid

1. Introduction

Smart grid (SG) technologies are vital to meet world's vast and growing electricity needs.

Smart grids (SGs) are transforming the traditional way of meeting the electricity demand and providing the way towards an environmentally friendly, reliable and resilient power grid. Micro grids operate at the distribution level, and they are natural innovation zones for the Smart Grid (SG) because they have experimentation scalability and flexibility, and delivers power is a local area. SG contains protection against the cyber attacks, interoperability and designed for pricing in real-time [1]. Super grid is a high voltage DC transmission and capacity to minimize losses and enhance reliability. MGs operates as a standalone or as a grid-connected system. Microgrid (MG) technology is not equipped with automation and communication support. Further work is required to enhance self-healing, reconfigurable, adaptive and predictive capability. MG includes special purpose inverters enabling it to link to the legacy grid and contains special purpose filters build to overcome issues with harmonics, while improving power quality and efficiency [2]. Various characteristics of SG include optimizing the asset utilization and efficient operation is presented in [3]. Increased renewable power penetration, electricity markets participation throughout the world will realize new opportunities for the cost-effective smart grids controls and energy storage at all scales. These changes, coupled with increased consumer awareness and participation will lead to a new paradigm in energy system analysis that must also be accounted for energy security, stability and

Characteristics of Fish Oil Biodiesel with the Impact of Diesel Fuel Addition on a CI Engine

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Abstract

The present study focuses on the optimization in the use of non-petroleum fuel derived from waste fish oil fuels, as a replacement for petroleum diesel fuel for compression ignition engine. The study comprises of comparison between results of fish oil biodiesel-diesel blends in a compression ignition engine. Fuel properties such as viscosity, density, the heat value of fuel, cetane number, and a flash point of fish oil biodiesel and its blends with diesel are studied. The fish oil biodiesel (60, 40, 20, and 0%) diesel (40, 60, 80, and 100%) are blended at volume basis. The results show a reduction in thermal efficiency, temperature, particulate matter, and nitrogen oxides emission; while showing an increase in higher specific fuel consumption, ignition delay, carbon dioxide, and smoke emissions. The biodiesel blend fuel improves BTE by 4.7% and increases CO₂ emissions by 2.56%, while SFC is lowered by 7.92% as compared to diesel fuel. In biodiesel blend, the highest reduction in NO_x by 14.9%, particulate by 4.22%, is observed although smoke emission slightly rises with an increase in fish oil in the blends, as compared to diesel fuel.

Keywords: *Compression ignition, engine, Engine characteristics, Fish oil biodiesel production.*

Introduction

Environmental pollution increases rapidly due to an increase in automobile vehicles in the world.

In this respects, there is a need to clean energy sources due to concerns of destructive ecological pollution such as more emissions of carbon dioxide and greenhouse gases [1]. The development of any country depends on fuel sources, while fossil fuel resources are limited in the world. Nowadays there is a need to eco-friendly and less distractive alternative energy source for full fill demands of energy consumption in the world [2]. Many previous studies reported different alternative energy sources such as fish oil [2-3], palm oil [4], waste cooking oil [5], rubber seed oil [6], linseed oil [7], jatropha [8], mahua oil [9], and alcohol [9, 10].

Adeoti et al. [11] performed experiments on a test engine using fish oil and its blends with bunker oil. The results showed non-newtonian behavior and fuel properties. Rajak and Verma [2] performed numerically on a diesel engine using Diesel RK model. Results showed reduction in smoke emission and particulate matter of five different categories biodiesels. Jiaqiang et al. [3] studied a diesel engine using fish oil biodiesel, and its blends with diesel examined the characteristics of the test engine. Bhaskar et al. [12] studied the characteristics of a test engine using fish oil biodiesel and i

A Novel Approach to Monitor and Control the Water Leakage System Using Zigbee

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Abstract

This paper presents the design of a water leakage monitoring system which includes wireless networked sensors monitored from a Windows based PC. The purpose of such system is to detect possible water leakage for residential water pipes. Utilizing three small Printed Circuit Boards (PCB) s, data from remote sensors of different types (acoustic, pressure, temperature, flow rate, etc.) are collected and monitored on a PC for further processing and analysis. ZigBee technology, which is built on top of the standard, is used for wireless communication in the network.

Keywords: *Water Leakage System, PCB, PC, Zigbee.*

1. Introduction

Increases in residential plumbing, treatment and operational costs make the losses associated with underground water system leakage prohibitive. To combat water loss, many utilities are developing methods to detect, locate, and correct leaks.

In fact, accurate and efficient residential leak detection technology encompasses a wide range of benefits including but not limited to: economic benefits, increased knowledge about the distribution system, more efficient use of existing supplies, delayed capacity expansion, improved environmental quality, reduced property damage, reduced legal liability, reduced insurance and reduced risk of contamination[1].

Hence, this paper strives to delineate design of a water leakage monitoring system to detect possible water leakage for residential water pipes. To that end, the system collects and monitors data on a PC from remote sensors-

located next to pipes for further processing and analysis to detect water leakage. Reliable communication within the network is provided by ZigBee technology, which is built on top of IEEE 802.15.4 standard.

More specifically, to collect and monitor data on a PC, three Printed Circuit Board (PCB) s, populated with the ZigBit 900 RF modules and a matched antenna are used. The ZigBit module featuring ultra small size and superior RF performance enables the board's wireless connectivity and facilitates its functionality as a node in the ZigBee network. The PCBs include temperature sensor. In addition, these PCBs support standard extension connectors to connect to external sensors such as acoustic sensor, pressure sensor and etc. The PCBs are powered by one C-sized battery.

Importantly, this paper is organized as follows: Section 2 presents the basic concepts of Wireless Sensor Network (WSN). Section 3 elaborates on WSN standards including IEEE 802.15.4 and ZigBee standard. Section 4 elucidates the hardware component of the water leakage system. Section 5 discusses software component of the design. Section 6 explains how sensor data displays on PC in GUI format. The conclusion remarks are included in the end.

2. Wireless Sensor Networks

Wireless Sensor Network (WSN) typically consists of small spatially distributed devices to cooperatively monitor physical or environmental conditions, such as temperature, sound, vibration and etc. With WSN connectivity, data from

Survey on Energy efficient Dynamic Duty Cycle Scheduling mechanism for Media Access Control Layer

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Abstract

Wireless Sensor Network (WSN) has a vast application in many areas. The network consists of many sensory nodes which are operated with a battery power during the data transmission process. One of the critical aspects is that to reduce the energy consumption of the nodes so that the life time of the network can be extended. WSN need to provide better performance by reducing the sleep latency, while balancing energy consumption among the sensor nodes. The duty cycle media access control (MAC) scheme have been proposed in WSNs mainly to reduce energy consumption of sensor nodes. There are many mechanisms are available to reduce the energy consumption to increase the life time of the sensor networks. One such mechanism Dynamic Duty-cycle and Dynamic schedule assignment (DDDSA) reduced the number of RTS and CTS packet by dynamically updating duty cycle value to achieve energy efficiency. The duty-cycle scheduling based on residual (DSR) energy reduced the sleep latency while balancing energy consumption among sensor nodes. Similarly duty-cycle scheduling based on prospective (DSP) increase in residual energy to increase the residual energy of nodes using harvesting and DSR. DSP reduce sensor nodes duty cycle to increase the lifetime of the network through harvesting technique.

Keywords: *Medium Access Control (MAC), Duty cycle, Scheduling, Power consumption, Energy efficiency.*

1. Introduction

1. Wireless sensor networking is an emerging technology that has a wide range of potential applications including environment monitoring, smart spaces, medical systems and robotic exploration. Network consists of large number of distributed nodes that organize themselves into

multi-hop wireless routing to perform task. Each sensor consists of one or more sensors, embedded processors and low power radio. The sensing, processing and wireless communication subsystems form the wireless sensor. Each subsystem having the different function such as sensing system sense the data on environment change or according to application requirement, processing system process the acquired data and also stored it in file or database and wireless communication subsystem can used for data transmission over the network. Sensor nodes are normally battery operated. The power source supplies the energy needed by the device to perform the specified task. It is often difficult to recharge or change batteries for nodes, because nodes may be deployed where human beings unable to reach for example in furnace to sense the temperature etc. The network life time can increase long enough to fulfill the application requirement, by minimizing the energy consumption of the nodes [2].

2. The energy consumption is greatly affected by the communication between nodes. So, communication protocols at different layers are designed with the energy conservation in the mind. The medium access control (MAC) layer has been proposed in wireless sensor networks mainly to reduce energy consumption of sensor nodes. MAC plays a vital role for successful working of the networks. Also it is responsible for deciding the manner of wireless communication channel and limited resource allocation of communication among nodes. MAC protocols must fulfill some essential factors, such as energy efficiency, effective collision avoidance, scalability and adaptively, minimum latency and efficient throughput of the

An effective Access Control Mechanism for Wireless Sensor Network

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Abstract

In a sensor network nodes can lose their energy due to data transmission. In order to enhance the network performance, new nodes can be added to the network and in a critical situation it may happen than the hostile nodes can be introduced in the network. To prevent such entry of the hostile node some access control mechanism is needed. This paper proposes an access control model based on elliptic curve cryptography. The described model is a secure and fast method for key distribution. In the evaluation work it is shown that our proposed model is a better one as compared to other models. Another feature of this model is robustness against denial of service attack.

Keywords: *Sensor nodes, Adversary, Hostile node, Access control, Elliptic curve cryptography, key distribution, Denial of service, Node authentication.*

1. Introduction

Wireless sensor networks are being developed. Due to the wireless nature of wireless sensor networks these networks used in many war zones and seismic monitoring environment. Sensor nodes usually have limited memory, small size and low processing power, and its energy are limited. Implement complex encryption algorithms in these networks is very hard. Sent and received on this network is broadcast to all. Thus one can easily receive packets from wireless channel. Access control is mechanism for the prevention of security attacks on wireless sensor networks. Secure access control caused by use of network resources is performed only by authorized nodes. Before sending, each node will receive their certificates from a unit trust. After

receiving the certificate, new node can provide a secure connection with itself neighbors. This access control provide, both authentication and confidentiality requires. In addition to this scheme is robust against denial of service. In this paper we use ECDLP¹ algorithm for issuing and verifying certificates. Because the ECDLP faster than other methods such as the ECDSA

2. Related Work

In 2002 SPINS protocol was introduced. The protocol is for data origin authentication [1]. The main drawback of this protocol is high additional overhead. Model for key distribution in the sensor networks provided in 2004. These models are only resistant to external attacks and in the internal attacks are very disabling [2]. In 2007, Yun Zhou et al.'s was introduced, an access control model in wireless sensor network [3]. Although Yun Zhou et al.'s model is perfect, but dos³ attack can run it, In addition, the proposed model is faster in the generation and distribution of key. In 2009 Huang presented an access control model. Huang's method wasn't dynamic. Moreover, Huang's method is insecure [4].

3. Review of Attacks

Any enemy can be directly deployed malicious nodes in environment. In this case hostile node can hear messages from the other nodes, or inject false messages into the network. Note to figure 1. for further understanding.

Optimal Positioning of Wind Power Units in Order to Maximise Sales and Reduce the Levied Costs due to Instability in the Distribution system

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Abstract

Ongoing advances in the field of new energies, for example, wind turbines, sun oriented force plants, energy components, miniature turbines, and so on, and furthermore the incredible advantages of these force plants for the force organization, pull in the consideration of conveyance organizations towards them. As, today, numerous dispersion organizations are analyzing choices for changing the conveyance network structure to abuse new energies. Meanwhile, wind energy is perhaps the most broadly utilized sorts of appropriated age in the force organization. Furthermore, wind power age has the most changes to different sorts of sustainable power. Circulation network arranging is one of the significant worries of framework fashioners, particularly when wind age units by their arbitrary and variable nature are in framework advancement. Since the legitimate situation of wind units in the organization assumes a fundamental job in improving the presentation of the circulation organization, giving a complete and fitting answer for arrangement of these units in the organization is significant. In this paper, a technique has been introduced that by thinking about the vulnerability in age and utilization and the organization limitations, the situation of wind units in the organization is finished with the point of expanding incomes and diminishing the forced expenses in the dissemination framework,

considering the uncertainty. The calculation utilized in this paper is a hereditary calculation with improved administrators.

Keywords: *Optimal Positioning, Wind Power, Distribution system.*

1. Introduction

In the structured electricity industry, once in a while, we need to change and reformulate the system, although our main destination may still remain unchanged. In a power system, variety of targets must be met at the same time in order to exploit a system optimally and efficiently. Today, factors such as the need for higher flexibility of power systems, changes in the economic contexts and structures of the electricity industry, the need to save and manage energy consumption, and environmental issues, have created a greater incentive to foster and develop Distributed Generation. For this reason, distributed generation will play a major role in the development of power systems in the near future. One of the most widely used types of distributed generation is wind energy, due to its lower cost than other types of renewable energy plants, as well as its many advantages over the last few decades. Given the high potential of our country to exploit this energy and in order to use these resources efficiently, we need to

Transient Analysis of Radiative Hydromagnetic Poiseuille Fluid Flow of Two-Steps Exothermic Chemical Reaction through a Porous Channel with Convective Cooling

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Abstract

In this research, the transient analysis of radiative combustible viscous chemical reactive two-step exothermic fluid flow past a permeable medium with various kinetics, i.e., bimolecular, Arrhenius, and sensitized, are investigated. The hydromagnetic liquid is influenced by periodic vicissitudes in the axial pressure gradient and time along the channel axis in the occurrence of walls asymmetri convective cooling. The convectonal heat transport at the wall surfaces with the neighboring space takes after the cooling law. The non-dimensional principal flow equations are computationally solved by applying convergent and absolutely stable semi-implicit finite difference techniques. The influences of the fluid terms associated with the momentum and energy equations are graphically presented and discussed quantitatively. The results show that the reaction parameter is very sensitive, and it, therefore, needs to be carefully monitored to avoid systems blow up. Also, a rise in the values of the second step term enhances the combustion rate and thereby reduces the release of unburned hydrocarbon that polluted the environment.

Keywords:

Radiation, Hydromagnetic, Poiseuille Flow, Exothermic Reaction, Convective Cooling.

Automobile Working on Addition of HHO Fuel to Improve the Efficiency of IC Engine

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ABSTRACT: In this paper we have studied the basic properties of gas generated through electrolysis of H₂O & then used gas in the bike as a fuel with gasoline by mixing it with air. This results the increased mileage of bike 30 to 60% & reduce the polluting contents from the exhaust gases. Hydrogen gas combined with the standard air/fuel mixture increases the mileage. This form of alternative fuel is provided by a hydrogen generator mounted in the vehicle. Once set up is ready, the hydrogen gas will be produced from water, an electrolyte compound, and electricity supplied from a battery provided. Here we are designing a mixed fuel two wheeler engine. Ie in conventional SI engine we are incorporating traces of hydrogen along with gasoline in order to minimum consumption of gasoline as well as to increase the power of vehicle. Here in addition, a hydrogen generating unit is made to produce hydrogen.. It is actually an electrolysis unit having high grade stainless steel/graphite/semiconductors as electrodes in a closed container and mixture of distilled H₂O & suitable ionic solution (KOH or NaOH) as electrolyte. Power for electrolysis is taken from an additional battery provided (12 V). This battery can be recharged from a dynamo/alternator/motor provided on the vehicle.

KEYWORDS: KAOH, NaOH, SI engine, electrolysis of H₂O, Hydrogen cell.

I. INTRODUCTION

Multifuel, sometimes spelled multi-fuel is any type of engine, boiler, heater or other fuel-burning device which is designed to burn multiple types of fuels in its operation. One common application of multifuel technology is in military settings, where the normally-used diesel or gas turbine fuel might not be available during combat operations for vehicles or heating units. Multifuel engines and boilers have a long history, but the growing need to establish fuel sources other than petroleum for transporting and heating and other uses has led to increased development of multifuel technology for non-military use as well, leading to many flexible-fuel vehicle designs in recent decades. A multifuel engine is constructed so that its compression ratio permits firing the lowest octane fuel of the various accepted alternative fuels. A strengthening of the engine is necessary in order to meet these higher demands. Multifuel engines sometimes have switch settings that are set manually to take different octane, or types, of fuel. Many other types of engines and other heat-generating machinery are designed to burn more than one type of fuel. For instance, some heaters and boilers designed for home use can burn wood, pellets, and other fuel sources. These offer fuel flexibility and security, but are more expensive than are standard single fuel engines.^[7] Portable stoves are sometimes designed with multifuel functionality, in order to burn whatever fuel is found during an outing.^[8] Multifuel engines are not necessarily underpowered, but in practice some engines have had issues with power due to design compromises necessary to burn multiple types of fuel in the same engine. Perhaps the most notorious example from a military perspective is the L60 engine used by the British Chieftain Main Battle Tank, which resulted in a very sluggish performance in fact, the Mark I Chieftain (used only for training and similar activities) was so underpowered that some were incapable of mounting a tank transporter. An equally serious issue was that changing from one fuel to another often required hours of preparation.^[9] The US LD series had a power output comparable to commercial diesels of the time. It was underpowered for the 5-ton trucks, but that was the engine size itself, the replacement diesel was much larger and more powerful. The LD engines did burn diesel fuel poorly and were very smokey, the final LDT-465 model had a turbocharger largely to clean up the exhaust, there was little power increase. Rivaz (1807) of Switzerland invented an internal combustion engine with electric ignition which used the mixture of hydrogen and oxygen as fuel. He designed a car for his engine. On the application of hydrogen gas to produce a moving power in machinery; with a description of an engine which is moved by pressure of the atmosphere upon a vacuum caused by explosion of hydrogen gas and atmospheric air. "In this document, he explained how to use the energy of hydrogen to power an engine and how the hydrogen engine could be built. This is probably one of the most primitive inventions made in hydrogen-fueled engines.

II. THEORY

The oxygen enriched air or the nitrogen enriched air becomes mixed with the ambient air in the mixing chamber and then the mixed air is supplied to the intake of the engine. As a result, the air being supplied to the

Study on Anchorage Bond in High Strength Reinforced Concrete Beams

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ABSTRACT: This paper discusses experimentally the effect of steel bar diameter and embedment length on the bond stresses, bond stress versus slip relation, failure pattern and load versus deflection response of high strength reinforced concrete beams with dimensions (100 mm width x 200 mm height x 1100 mm length). Four beams specimens were provided with three embedment lengths (80 mm), (100 mm) and (120 mm) in addition to two different bar diameters (10mm) and (16mm). The test results concluded that the bond stresses and the relative displacement decrease with increasing the embedment length and bar diameter.

Key words: Bond Stress, slip, high strength concrete, embedded length, bar diameter.

I. INTRODUCTION

Due to importance of bonding failure in concrete structures, several investigations have been developed to enhance the bond strength between steel bar and concrete. Most of the studies that dealt with the effect of development length on bond characteristics concluded that increasing the development length impact positively on the bond characteristics⁽¹⁻⁶⁾.

The effect of bar diameter has been studied by [Mohammad N.S Hadi]⁽⁷⁾ [Kazim Turk et.al]⁽⁸⁾, [Soroushain P. and Choik.]⁽⁹⁾ and [Al-Aukaily A. F.], these investigations concluded that the bond strength decreased with increasing bar diameter.

The increasing of concrete compressive strength have a beneficial effect in improving the bond characteristics and this is what has already been proven by [A. Forough – Asl et.al]⁽¹¹⁾, [Kafeel Ahmed]⁽¹²⁾, [Khodaie and Nahmat]⁽¹³⁾ and [M. Veera Reddy]⁽¹⁴⁾.

In recent decades, studies on the bond characteristic between steel bars and new type of concrete has emerged [Forough – Asl et.al]⁽¹¹⁾ and [M. Mazloom and K. Momeni]⁽¹⁵⁾ studied the bond between reinforcement bars and self-compacting concrete. They concluded that bonding strength was increased when using self-compacting concrete in comparison with normal strength concrete.

Also, the bond between reinforcement bars and reactive powder concrete was studied by [Mahesh Maroliya]⁽¹⁶⁾, [Deng Zong - Cai]⁽¹⁷⁾ and [Lee M. et.al]⁽¹⁸⁾. The improvement of bond characteristics is clear when using reactive powder concrete.

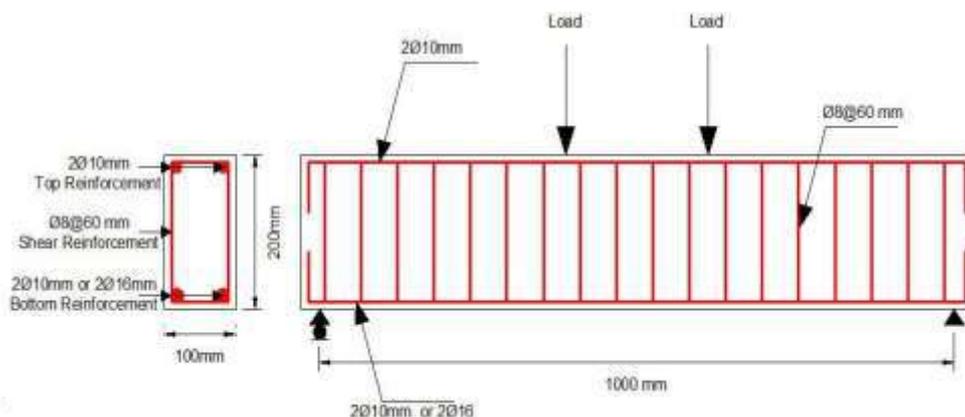


Figure 1 Experimental Detail of Tested Beams

II. EXPERIMENTED PROGRAM

The Experimented program of this study includes casting and examining four high strength

Study on the Air Heating for Injection Mold

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ABSTRACT: Gas-assisted mold temperature control (GMTC) is a new technology in the field of mold temperature control, which can heat and cool a cavity surface rapidly during the injection molding process. In this study, a gas-assisted mold surface heating system was simulated with different heating areas. The temperature distribution of the stamp inserts and the influence of the stamp size was observed. The results show that higher temperatures will occur at the center of the stamp insert due to the location of the gas inlet. In addition, the larger the size of the stamp, the lower heating rate that could be achieved.

KEYWORDS: injection molding, mold heating, dynamic mold temperature control, air heating.

I. INTRODUCTION

Injection molding is a popular technology for manufacturing. However, as parts become thinner and smaller, they become difficult to manufacture using conventional injection molding, because heat transfers rapidly from the melt to mold wall due to the thinness of the parts. Increasing the mold temperature, melt temperature, or packing pressure increases the cycle time. At higher mold surface temperatures, the surface quality of the part will improve [1, 2]. In the injection molding field, micro injection molding is being used to manufacture a variety of polymer components, because of its low cost and potential for high-volume production. Most applications are in the field of micro optics (such as CDs and DVDs) and micro fluidic devices. Production of other molded micro optical components including optical gratings, optical switches and waveguides [3 - 5], and a variety of molded micro fluidic devices including pumps, capillary analysis systems and lab-on-a-chip applications [6, 7].

In general, for improvement of an injection-molded part while minimizing part thickness and injection pressure, a higher mold temperature during injection is needed. However, maintaining a high mold temperature during the filling process, while ensuring it does not exceed the deflection temperature during the post-filling process, without significant increases in cycle time and energy consumption can be challenging. To solve this problem, a variety of dynamic mold temperature controls have been explored in recent years. The goal is to eliminate the heat loss from the melt to the mold, ideally producing a hot mold during the filling stage and a cool mold for the cooling stage. The most inexpensive way to achieve a high mold temperature is to use water at temperatures as high as 90°C or 100°C [8].

Another heating method is local mold heating using an electric heater [9], which can be used to assist high mold temperature control. However, this requires additional design and tooling costs. Furthermore, electrical heating is usually only used as an auxiliary heating method, and it is limited to increases in mold temperature of roughly several tens of degrees centigrade. Other mold surface heating techniques, such as induction heating [10 - 12], high-frequency proximity heating [13, 14], and gas-assisted mold temperature control (GMTC) [15, 16] can provide sufficient heating rates without significant increases in cycle time. In recent years, we provide a systematic study on mold surface heating and mold surface localization heating of the processing characteristics.

GMTC is a new technique in the field of mold temperature control, which can heat and cool the cavity surface rapidly during the injection molding process. In general, the goals of mold temperature control are to increase the mold surface to the target temperature before the filling of melt and cool the melt to ejection temperature. In this study, a GMTC with different heat area designs was simulated to verifying the heating ability of the external gas heating method

Testing System of Multi Working Positions' Switch Design

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ABSTRACT: Aiming at the problems of low automation, low efficiency and poor precision in the test of aviation electrical appliances, a multi-station toggle type avionics switch test system was designed and developed by using the new cam mechanism, the mechanical actuator of the toggle switch was designed, and the 3D model was established in Solidworks to realize the movement of 4 switches.

KEY WORDS: cam mechanism design, mathematical modelling, 3D design

I. INTRODUCTION

Aviation electrical switches are used as high-frequency aerospace components and are often installed on various control panels and used to turn the circuit on or off to achieve the corresponding functions. However, the current technology for the test of avionics switches remains in the manual operation and push-type switches. Jiang Yuanyuan^[1] developed a test system for the fatigue life of button-type low-voltage switches, using ADAMS for mechanical to simulate the stability of the structural motion. Tang Jing^[2] designed an experimental keyboard switch fatigue life test machine, which uses the motor to drive the eccentric wheel to rotate and simulate the finger pressing the keyboard to test the mechanical life of the push-type keyboard switch.

Therefore, based on the analysis of the working principle and technical indicators of the multi-station toggle switch, this paper designs and develops a test device from mechanical structure to provide a practical method to the development of Chinese aviation electrical testing equipment.

II. MECHANICAL DESIGN

To realize the test of the switch, a test system was designed and developed by a mechanical actuator. While, mechanical device includes four parts: switch, mechanical drive, switch installation, mechanical frame, etc. The principle is that the motor drives the reducer, and the rotary cam rotates through the gear pair to drive the push rod to move back and forth, thereby realizing automatic toggle the switch.

2.1 Mathematical Modelling

The toggle of the switch is achieved by cam motion, so the design of the cam is particularly important, which determines the distance and force of the push rod. Before designing the cam curve, you first need to determine the maximum distance the pusher will push. As shown in Fig. 1, the maximum angle at which the switch handle can be pulled is 19° , and the length of the handle is 23 mm. Therefore, the maximum distance that the handle is pushed by the push rod is about 7.4 mm, considering that some of the switches are not automatically return back to the midpoint, so the maximum distance of the push rod should be pushed out twice than the original distance.

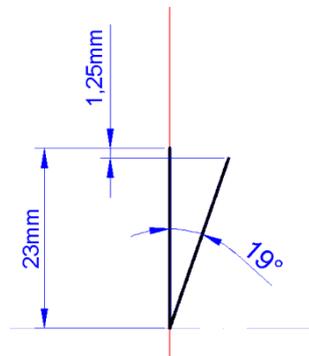


Figure 1 Concept of switch handle thrust design

Novel node monitoring Fellowship Model against Black Hole Attacks in MANET

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ABSTRACT: In mobile ad-hoc network one of the vulnerable threat is the security issues and in the absence of any centralized controller, now a day's these issues are increasing at a high speed. The packet drop attacks are one of those attacks which degrade the network performance. This paper describes a novel node monitoring mechanism with a fellowship model against packet drop attacks by setting up an observance zone where suspected nodes are observed for their performance and behavior. Threshold limits are set to monitor the equivalence ratio of number of packets received at the node and transmitted by node inside mobile ad hoc networks. The proposed fellowship model enforces a binding on the nodes to deliver essential services in order to receive services from neighboring nodes thus improving the overall network performance.

Keywords: Black-hole attack, equivalence ratio, fair-chance scheme, observance zone, fellowship model.

I. INTRODUCTION

Mobile ad-hoc networks are infrastructure less and self organized or configured network of mobile devices connected with radio signals. There is no centralized controller for the networking activities like monitoring, modifications and updating of the nodes inside the network as shown in figure 1. Each node is independent to move in any direction and hence have the freedom to change the links to other nodes frequently. There have been serious security threats in MANET in recent years. These usually lead to performance degradation, less throughput, congestion, delayed response time, buffer overflow etc. Among them is a famous attack on packets known as black-hole attack which is also a part of DoS (Denial of service) attacks. In this, a router relays packets to different nodes but due to presence of malicious nodes these packets are susceptible to packet drop attacks. Due to this, there is hindrance in secure and reliable communication inside network.

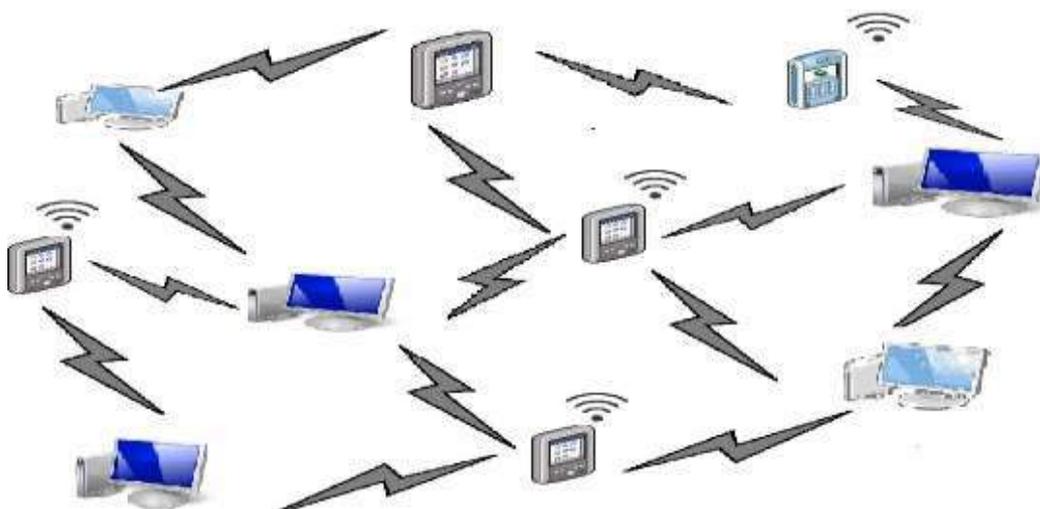


Figure 1. MANET Scenario

Section 2 addresses the seriousness of packet drop attacks and related work done so far in this area. Section 3 elaborates our proposal and defending scheme for packet drop attacks. Section 4 provides concluding remarks.

II. LITERATURE SURVEY

The packet drop loss in ad-hoc network gained importance because of self-serving nodes which fail to provide the basic facility of forwarding the packets to neighboring nodes. This causes an occupational hazard in the functionality of network. Generally there are two types of nodes- selfish and malicious nodes. Selfish nodes

Cloud Computing and Security Issues In the Cloud

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Abstract: *Cloud computing has formed the conceptual and infrastructural basis for tomorrow's computing. The global computing infrastructure is rapidly moving towards cloud based architecture. While it is important to take advantages of cloud based computing by means of deploying it in diversified sectors, the security aspects in a cloud based computing environment remains at the core of interest. Cloud based services and service providers are being evolved which has resulted in a new business trend based on cloud technology. With the introduction of numerous cloud based services and geographically dispersed cloud service providers, sensitive information of different entities are normally stored in remote servers and locations with the possibilities of being exposed to unwanted parties in situations where the cloud servers storing those information are compromised. If security is not robust and consistent, the flexibility and advantages that cloud computing has to offer will have little credibility. This paper presents a review on the cloud computing concepts as well as security issues inherent within the context of cloud computing and cloud infrastructure.*

Keywords: *Cloud computing, cloud service, cloud security, computer network, distributed computing, security.*

I. Introduction

Recent developments in the field of cloud computing have immensely changed the way of computing as well as the concept of computing resources. In a cloud based computing infrastructure, the resources are normally in someone else's premise or network and accessed remotely by the cloud users (Petre, 2012; Ogigau-Neamtii, 2012; Singh & jangwal, 2012). Processing is done remotely implying the fact that the data and other elements from a person need to be transmitted to the cloud infrastructure or server for processing; and the output is returned upon completion of required processing. In some cases, it might be required or at least possible for a person to store data on remote cloud servers. These gives the following three sensitive states or scenarios that are of particular concern within the operational context of cloud computing:

- The transmission of personal sensitive data to the cloud server,
- The transmission of data from the cloud server to clients' computers and
- The storage of clients' personal data in cloud servers which are remote server not owned by the clients.

All the above three states of cloud computing are severely prone to security breach that makes the research and investigation within the security aspects of cloud computing practice an imperative one. There have been a number of different blends that are being used in cloud computing realm, but the core concept remain same – the infrastructure, or roughly speaking, the resources remain International Journal of Network Security & Its Applications (IJNSA), Vol.6, No.1, January 2014

somewhere else with someone else's ownership and the users 'rent' it for the time they use the infrastructure (Bisong & Rahman, 2011; Rashmi, Sahoo & Mehruz, 2013; Qaisar & Khawaja, 2012). In some cases, stored sensitive data at remote cloud servers are also to be counted. Security has been at the core of safe computing practices. When it is possible for any unwanted party to 'sneak' on any private computers by means of different ways of 'hacking'; the provision of widening the scope to access someone's personal data by means of cloud computing eventually raises further security concerns. Cloud computing cannot eliminate this widened scope due to its nature and approach. As a result, security has always been an issue with cloud computing practices. Robustness of security and a secured computing infrastructure is not a one-off effort, it is rather ongoing – this makes it essential to analyse and realize the state-of-the-art of the cloud computing security as a mandatory practice. Cloud is mainly categorized as private cloud, community cloud, public cloud and hybrid cloud (Ogigau-Neamtii, 2012; Singh & jangwal, 2012; Rashmi et al., 2013; Qaisar & Khawaja, 2012; Kuyoro, Ibikunle & Awodele, 2011; Suresh Prasad, 2012; Youssef, 2012) - the discussion in this paper assumes only one category of cloud exists which is public cloud; as this assumption will well satisfy all the characteristics of any other type of cloud. Due to its diversified potentiality, the approach to cloud computing is being thought to be as the 5th utility to join the league of existing utilities water, electricity, gas and telephony (Buyya, Yeo, Venugopal, Broberg & Brandic, 2009) rather than being just another service.

The study presented in this paper is organized with a view to discuss and identify the approach to cloud computing as well as the security issues and concerns that must be taken into account in the deployment towards a cloud based computing infrastructure. Discussion on the technological concepts and approaches to

Wireless sensor network applications in surveillance of the agricultural environment

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Abstract: With the advancement of sensor innovation, MEMS, wireless communications and the wide use of remote sensor, Wireless Sensor Networks have been given extraordinary consideration in industry field and our day by day life. So as to acknowledge farming modernization and rural condition security, this paper plans Agricultural environment monitoring framework dependent on remote sensor systems, and gives the equipment structure of sensor hubs and the flowchart of programming. Analyses have demonstrated that the framework is low force utilization and has stable running and high exactness, which can understand remote ongoing checking for unattended agribusiness condition observing.

Keywords: Agricultural environment monitoring, wireless communications, MEMS;

I. Introduction

As we all know, monitoring point of agricultural environment is remote, individually and widely distributed. In the past, it is very inconvenient for the staff to collect information at the scene. Traditional agricultural environmental monitoring system supplies power and transmits data by cable. Therefore it is very difficult to obtain the real-time information on environmental monitoring, because of laying lines hardly, high investment cost and man-made destruction and so on. In order to solve the problems, we designed a wireless agricultural environmental monitoring system based on wireless sensor network, and the system is mainly used to monitor temperature and humidity.

Wireless sensor network is composed of a large number of micro-sensor nodes which have small volume and low cost. It possesses self-organizing capability by wireless communication. Data acquisition is the central task of the network to obtain information. Compared to the traditional means of environmental monitoring We adopt wireless sensor networks to monitor agricultural environment, it has three significant advantages: (1) It is unnecessary to lay wire, the network is only deployed once, the man-made impact on the control environment is small; (2) the nodes are dense, data acquisition has high accuracy; (3) sensor nodes with a certain calculation, storage capacity, enabling collaboration among nodes is ideal for unattended remote monitoring. Therefore monitoring parameters of agricultural environment is feasible through wireless sensor network it is a direction for environmental monitoring based on wireless sensor networks in the future [1] [2].

II. System architecture

Monitoring system is mainly made up of four parts: sensor node, the sink node, transmission networks and monitoring terminal, the system architecture is shown in figure 1.

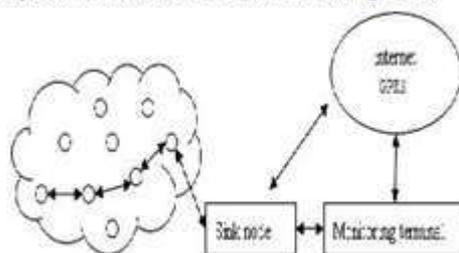


Fig.1. Wireless sensor network system architecture

Environment monitoring system consists of large numbers of dense wireless sensor nodes which are distributed in agricultural environment in order to ensure high precision and reliability of data acquisition. Sensor nodes are responsible for collecting temperature, humidity and other parameter, the collected data is transmitted to sink nodes by multi-hop. Sink nodes which are the core of nodes have

A Fundamental Study of Multi-Dimensional Force/Moment Analysis Dynamometer

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Abstract: The exactness in the measurement estimation of three-dimensional power/second is important for the assembling procedure, for satellite, and in military hardware. The motivation behind this examination is to plan a multi-dimensional multi-point power/second (F/M) estimation MP-M dynamometer model dependent on three-pivot piezoelectric sensors establishment. The FEM reproduction is performed utilizing ANSYS programming and scientific examinations are completed utilizing determined conditions. The deliberate FEA results are predictable with the applied standard power/minutes. The blunder distinction of FEM investigation is under 1%. The FEM reproductions results are roughly 99-100% of the applied hub power, vertical power and pitch second individually. The planned MP-M dynamometer model is able to gauge spatial power/second precisely and reenactment tests are examined.

Key Word: Three-axis piezoelectric sensor, multi-dimensional measurement, SolidWorks design, and FEM simulation.

I. Introduction And Literature Review

This article outlines „Theoretical investigation of multi-dimensional force/moment measurement dynamometer“ is designed at the school of mechanical engineering experimental lab at Dalian university of technology DUT, China. The model is designed and analyzed using FEM analysis [1] and constructed designs have been sent to the manufacturing company. The MP-M dynamometer model can measure both the magnitude and direction of the applied force and the moment vectors in three-coordinates [2]. However, in this model, an axial force and normal force are applied maximum up to 15 kN and a pitch moment is applied maximum up to 11.97 kNm. The dynamometer model mainly consists of a long balance plate dynamometer with eight three-axis piezoelectric sensors uniformly mounted between the clamped plates, a base bed to support the entire model, two hydraulic loaders to apply the force/moment in horizontal and in the vertical directions.

The demand for accuracy in the measurement of multi-dimensional force is increasing with the time in global competition as it has wide applications in experimental work [3] and in real life such as humanoid robots [4], automotive industry [5]-[6] and aerospace industry[7]. The designed multi-point measurement model is capable of measuring the three coordinates of force/torque [8]-[9]-[10]-[11]. The model has been designed by providing an upper and lower plate support type assembly to piezoelectric sensors to reduce assembly error[12] and to provide easiness in the installation of load sensors in the model. Thus, it is essential for force-measuring devices to precisely measure forces with multi-points locations. The studied research is based on designing a rectangle pattern allocation of tri-axial piezoelectric sensors on a long plate dynamometer which can measure six-components force/torque measurement[13]-[14]. The piezoelectric technology has been used in this research is based on converting the mechanical energy into an electric voltage or signal. Moreover, when a quartz wafer[15] is packaged as a mono-axial piezoelectric sensor or tri-axial load sensor[16]-as shown in [Figure 2](#). The measuring range of six-axis force/torque sensors is very wide and sensors survive high overload is more than 100 percent of full-scale output. Therefore piezoelectric force sensors are suitable for measurements in experimental laboratories, industrial measurements, and mechanical robotics [18].

This article is based on installing a rectangle pattern of eight tri-axial piezoelectric sensors on a long dynamometer model. In the experimental system test, a total of eight points are allocated on specific positions to apply the pull and push force/moment (F/M). However, in this paper, the FEM analysis[19]-[4] has been carried only for the selected three points as the MP-M dynamometer model is under the fabricating process. The proposed FEM model describes the static calibration in terms of total deformation, stress and force reactant analyses of the located points using FEA. Further research will be studied after the manufacturing and assembly of the dynamometer model to perform the experimental calibration.

A Research on Carbon Nanotubal Applications in Automobiles

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Abstract: The Automotive business keeps on being a sprouting and developing industry wherein new and creative thoughts and advancements find promising applications intermittently. This audit paper, as it were, will investigate the importance of carbon nanotubes as an approach to improve the exhibition of "out and about" cars in the field of fuel segment frameworks especially to show signs of improvement eco-friendliness. Further the usage of Carbon Nanotubes will be managed top to bottom with an emphasis on car application. Besides, CNTs have been found to have excellent morphological properties and thusly are promising as fortification material in the composite structures alongside polymers for some car applications. This could likewise turn into the reason for weight decrease. Obviously, CNTs can be used for the creation of geometrical, sporadic or complex shapes and structures with genuinely economical and moderately copious crude materials opposite the current regular procedures of manufacture. Hence cost viability and profitability could likewise be accomplished in scale and extension.

Key Word: Carbon Nanotubes, Automobile, Fuel Efficiency, Nanotechnology.

I. Introduction

Carbon nanotubes or CNTs basically consist of rolled up sheets of single layered carbon atoms (graphene). Further Carbon nanotubes can be categorised as [1,14]: Single Wall Carbon Nanotubes (SWCNT) [Fig(1)], Double Wall Carbon Nanotubes (DWCNT) [Fig(2)] & Multi Wall Carbon Nan- otubes (MWCNT) [Fig(3)]. SWCNT can reach diameter less than 1 nanometer. DWCNT has one nanotube nested within another. The nanotube inside has a smaller diameter. The spatial gap between the two diameters results in the varying interactions between the nanotubes. This means that the outer nanotube can be modified without any modifications in the inner nanotube and therefore this results in interesting characteristics. MWCNT consists of several concentrically interlinked nanotubes which can reach diameters more than 100 nanometers.

Historic Mechanical ally, progress of automotive industry is replete with outstanding examples of new materials and usage of their properties to bring about disruption in the trend. Therefore, to have better cars in the future our industry needs to change and it needs to change for the better. The rapid progress of CNTs shows great promise for the betterment of this industry. The main reasons for using CNTs is due to its extraordinary properties are High flexibility without any significant damage, Low Thermal Expansion Coefficient, Very High Tensile Strength. Each of the above mentioned properties in its own respect can merit a lot of usage and in combination can be used to improve the efficiency and structural characteristics of the car.

II. Synthesis Of Carbon Nanotubes

The most popular mode of producing high volume CNTs is by using Chemical Vapour Deposition (CVD) which generally uses fluidised bed reactors as from Fig.(1) that allows uniform gas diffusion and heat transfer to metal catalyst nanoparticles. Scaling up the production can be done with the help of low cost feed stocks [1,6,15].

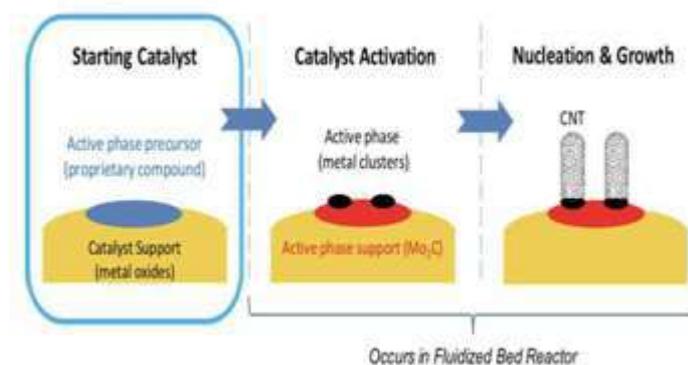


Figure 1 Chemical vapor deposition

Ground water quality status Analysis of Cuttack town of Odisha, India

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Abstract: A qualitative study was carried out to assess the quality of ground water in Cuttack town. It was observed that most of the parameters were below the permissible limit as per BIS & PCB standards. Khan nagar and Tulasipur industrial areas were found to be more polluted. The ground water of the concerned area was safe with respect to TC, FC as none of the locations were above the WHO limit in any seasons. It has been observed from correlation coefficient that TH, Conductivity, Cl, TDS have strong correlation with each other. Iron is negatively correlated with TH and F is negatively correlated with pH.

Key Word: Ground water, Pollution, Physico-chemical parameters, TDS, Hardness, Turbidity.

I. Introduction

Pollution of ground water has been reported for a number of cities throughout the world. Dependence on ground water resources for municipal supply is growing due to paucity and pollution of surface water bodies. Cuttack, the erstwhile state capital of Odisha and is a traditional Indian town organically developed over the time. The huge population of this area use ground water for drinking and other purposes. A number of dug and tube wells have been constructed to meet the short supply of municipality. So it is essential to have a study of ground water quality as it is being polluted. MSW (Municipality Solid Waste) is heterogeneous in nature and contains paper, plastic, rag, metal, glass pieces, ash, composite matter, dead animals, discarded chemicals, paints, hazardous hospital waste and agricultural residues. Presently most of the MSW in Cuttack city is being disposed unscientifically like other cities of India. Generally MSW is collected and deposited in sanitary landfills. During land filling of solid waste continuous pressure results in the quizzing of a contaminated liquid as leachate which contains dissolved, suspended and microbial contaminants from solid waste. The leachate has high organic contents, soluble salts and other constituents capable of polluting ground water. This polluted ground water is unfit for drinking and causes jaundice, nausea, asthma and infertility.

The quality of ground water of this area still remains largely uncharted and a possibility of severe contamination looms large. Keeping this in view a systematic study on the groundwater quality was carried out over a period of two years from January 2009 to December 2010, which include various Physico-Chemical and microbiological parameters.

Description of study area Cuttack having latitude of 20° 29' to 20° 26'N and longitude of 85° 48' to 85° 56' E. River Mahanadi and its major distributaries Kathajodi surrounds the city in north and south boundaries and the city is situated on a doab land. Low lying areas are available centrally. The ground height of the study area varies from 19 to 20 m on the north. The soil beneath the city is composed of unconsolidated alluvium in alternating sequence of sand, silt, and clay, the depth of which continues up to 120m and is placed above Gondwanaland sedimentary rock of Archean crystallines (Mahallick, 1992). The depth of water table changes with monsoon, going down to 4-6 m during pre monsoon and rises to 0 to 3m during monsoon and post monsoon period, (CGWD, 1995). Within a depth of 90 meters besides the water tables two confined aquifers could be identified which are lined by impervious clay minerals. The first confined aquifer lies at a depth of 30 meters with thickness varying from 15 to 40 meters separated from the second confined aquifers by clay bed of 15 to 20 meters thickness. There is a possibility of third confined aquifer below the clay layer overlying the Gondwana basement (Mahallick, 1992).

II. Experimental Section

To have a through idea regarding ground water quality of Cuttack seven different locations were chosen. The locations were chosen keeping in mind that all the areas of Cuttack can be covered properly. The detailed locations of sampling points are described in table-01. From each location a particular tube well was chosen and grab sampling was done quarterly from that particular tube well. The samples were collected in plastic and glass bottles as per requirement. Using these samples different physical, chemical and microbiological parameters such as pH, turbidity, conductivity, total hardness, chloride, total dissolved solids, iron, fluoride, TC, FC were studied. All chemicals/reagents used were of analytical reagent grade. After sample

A Comparative Study on Service Oriented Architecture using Frequent Data Item sets

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Abstract: The Service Oriented Architecture (SOA) is an architectural model for building flexible, modular, and interoperable software applications. The underlying concepts of SOA based on the concepts of software, the object oriented programming, and some other models. The SOA model allows to merging of various of distributed applications regardless of their implementation details, deployment location, and initial objective of their development. The main objective of the SOA architecture is that reusability of software within different applications and processes. Service oriented architecture is essentially based on various collection of services. All the services must be defined to allow to utilize the context those are need for different purposes. Once defined and deployed, services operate independently of the state of any other service defined within the system. The SOA using the Frequent pattern mining techniques helpful to find interesting patterns in massive underlying data. Prior domain knowledge leads to decide appropriate minimum support threshold. This paper describes the service oriented architecture and different frequent pattern mining techniques based on apriori or FP-tree or user define techniques under different computing environments like parallel, distributed or available data mining tools, those will be helpful to determine interesting frequent itemsets. The proposed methodology helps to develop efficient service oriented architecture using frequent pattern mining techniques.

Keywords— Architecute ,frequent, Itemsets, Apriori, pattern.

I. Introduction

The development of information systems and computer technologies has enabled the automation of the activities in every field of the real-world this has induced a fast increase in the information available, the development of high volume data warehouses and finally, the emergence of Data Mining. The latter corresponds in a set of techniques and methods which from the data (typically stored in a data warehouse) extract usable knowledge in various fields such as environment, public health, pharmacy, biology, etc. However, the growing market draws attention to distributed Data Mining because data and software are geographically distributed over a network instead of being located in a single site. Moreover, the cost is another reason for the distribution. To optimize investment, users prefer to use components that respond to their specific needs. However, since the arrival of Web and cloud computing, distributed data is now much easier to access. Furthermore, distributed computing in heterogeneous environments has become much more feasible. At the same time, service-oriented architectures (SOA) are becoming one of the main paradigms for distributed computing. SOA provides solutions for integrating diverse systems that support interoperability, loose coupling and reuse. To full-fill clients need one service invoke another services. It is possible that there is some evolution among these external services. Through an approach based on services, especially service-oriented architecture (SOA), integrated services can be defined to support the distributed data mining tasks in cloud and the Web. Such services can address most aspects taken into account in data mining and knowledge discovery in databases (KDD). Moreover, the most important SOA implementation is represented by web services. The popularity of Web services is mainly due to the fact that they are standardized (adoption of universally accepted technologies, such XML, SOAP, HTTP, WSDL, UDDI.). Web Services are simple, flexible and independent from both platforms and languages. Furthermore, their adoption by a number of communities, including the cloud community, indicates that the development of data mining applications based on Web services is likely be useful to an important user community. Such Web service is particularly met in business environments where time and data intensive transactions are performed between customers and offered services. [1]

SIMPLE OBJECT ACCESS PROTOCOL

SOAP is the protocol that is responsible for routing messages between the client and the server. It is a lightweight XML- based messaging protocol. SOAP is based on XML and thus it provides good interoperability between applications. SOAP implementations provided by vendors typically consist of two pieces: a client side Proxy that handles the SOAP message creation and result message cracking to return the result data, as well as a server piece that implements the Web Service logic. The server piece tends to be an application server that calls out to custom Web Service classes that is created on the server side and that contain the business logic of the

A Convergence Research Journey from Service-Oriented Architecture to Cloud Computing

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Abstract: Cloud computing is one of the emerging technology which is used to deploring essential services without getting the knowledge regarding the infrastructure behind it. It also provides flexibility to releases the burden of maintaining an adequate environment and quality and focusing on the business competency. Service-Oriented Architecture (SOA) is a technology that enables various functions of cloud computing. This paper focuses the main features of SOA. The migration from SOA to cloud computing is discussed. This paper also represents the main features and characteristics of cloud computing

Keywords— SOA; cloud computing.

I. Introduction

In the world where everyone is using computers in day today life, Information Technology plays a crucial role in personal and the business environment. As much as they are used in fulfilling personal needs, they are deployed in the management, operational and the supporting processes in an organization, and hence it became technology centric organization [1]. IT suggests dealing with growing issues such as complexity, flexibility, and maintenance. These numerous issues led clients and vendors to adapt skills to handle various responsibilities that support the requirement for their business technologies.

Service-Oriented Architecture (SOA) is a paradigm of modernized Information Technology. The design of SOA corresponds suggests shifting towards IT and its applications. As such, SOA is a referenced architecture adopted as a standard architecture [2]. In any organization the architecture can be scheme into two ways, one using the scope of the system and the other is using generalization. Figure [1] describes the relationship between the architecture types, where SOA represents the reference architecture which guides and constraints to the solution architecture. The way the reference architecture differs from others by its behavior; which is generic. On the other hand, the architecture points to the specific solution to solve the problem. The figure highlights the reference architecture of different scopes like Enterprise architecture, Project Architecture, Software Architecture, etc.

Each architecture is summarized as

- Enterprise Architecture: Where the architecture deals with the business process and the IT infrastructure focusing on the integration and standardization needs of the organization operating model.
- Project Architecture: Where the architecture states which module of solution architecture has to be considered depending on the project and its scope.

Software Architecture: Where the architecture defines the formation of the software. It is mapped into a particular kind of solution architecture, project architecture.

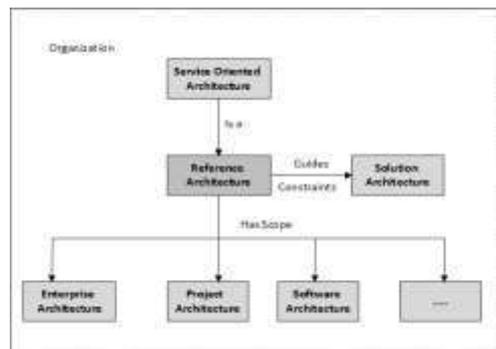


Figure 1: Architecture Model

II. Service – Oriented Architecture

In general, SOA indicates the paradigm of loosely coupled components or services to sustain the requirement for the system development and integration. It is a concept of designing the software and its

A Review of Flyback Micro Inverter for Integration of Fuel Cells with Single Phase Grid

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Abstract: Sustainable power source is going to assume a significant job later on vitality situation. All the current topologies utilize number of middle of the road arranges before change of DC contribution to the AC yield to the lattice side. For this sort of transformation, effectiveness is low and number of intensity parts are likewise extremely high. In this paper, a minimal effort high effectiveness basic DC-AC flyback inverter is proposed. The proposed converter comprises of a straightforward flyback converter followed by a basic full extension inverter with inactive snubber in the essential. The methods of activity of the converter alongside the plan of the converter with the snubber is talked about. Exploratory outcomes from reproductions are introduced too.

Key words: Single Phase Grid, Micro Inverter, Fuel Cells

I. Introduction

Energy crisis in recent times and rising environmental concern are making renewable energy sources more and more important. In the year of 2014, the use of renewable energy was 2610.6 million tons of oil equivalent (Mtoe), responsible for 30% of world energy consumption [1]. The energy produced from maximum available renewable energy or those under research work (like Fuel Cell) is in DC form. The generation system can be locally grid connected or by using long range transmission. If the system is locally connected we need to step up or step down the voltage for a particular voltage level [2-6]. When appliances are connected to the local grid too we need different voltage levels for different applications, thereby necessitating the use of a DC-DC converter.

Our existing single phase grid is compatible with alternating current and the appliances are also made in that fashion. For this type of system we cannot directly integrate the DC generation system or renewable generation system. In order to integrate renewable energy systems with the existing single phase grid, energy conversion is needed from DC to AC. The first step is to make the DC to a particular voltage level using a DC-DC converter and then DC-AC conversion is done using an inverter. The feasibility of the inverter depends upon the DC-DC converter efficiency and the capability to withstand high voltage surge and inrush current. Considering all available topologies [7-9] and existing converter models, it is seen that flyback converter is the most suitable model for the PV micro inverter. With its simplicity and low cost it is the best choice of DC-DC converter for integration with inverters for low power level applications. The operation of conventional flyback inverter [10-13] is very simple and the conduction mode of the primary flyback converter is mainly DCM. The transformer acts like an inductor and provides an added advantage of isolating the high voltage output side from the low voltage input side. The primary side of the transformer charges when the primary side switch is on and it discharges when the primary switch it off and gives supply to the inverter.

In the existing system the main problem is with the efficiency of the overall system and huge stress on the main primary side switch. So to overcome that problem a new micro inverter topology has been proposed and detailed operation, design criterion and feasibility has been discussed in the later sections.

A Review of Heat Transfer Fitted with different RIB geometries in elliptical passage

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Abstract: This paper presents a test examination for heat move upgrade and liquid stream in elliptic al sections fitted with various rib geometries. Limit conditions are: bay coo lant air temperature is 300 K and stream Reeynolds number range (11000, 13500 and 16000). The encompassing steady tourist temperatures was (673 K).Results present the impact of utilizing diverse rib geometries in various circular entry perspective r atio on the liquid stream and warmth move charracteristics. The cooling air temperature appropriation at the section centerline, inward divider surface temperature of the channel, normal Nusselt number, contact factor rattiio, and warm execution factor are p disdained in this paper. I was indicated that normal Nusselt number expanded with in wrinkling Reynolds number, and the most elevated worth was found for utilizing rib 1 and chann el perspective (2).Increasing coolant wind current vellocity diminishes the coolant air temperatur e at channel centerline, so diminishes the inward divider channel temperature. Utilizing ribs d ecreases the inward divider channel temperature and expands the coolant air temperature at channel centerline. Erosion factor rattiio increment with increment Reynolds numberr and the lower pressure drop (lower contact factor proportion) is found for rib 1 at all aspecct proportion.

Keywords: Gas Turbine, Heat Transfer Enhancement, Internal Cooling, Rib Turbulator.

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Nomenclature

Symbol	Description	Units
A	Surface area	m ²
c _p	Air Heat Capacity	J/kg.K
D _h	Hydraulic Diameter	m
e	Rib Height	m
f	Friction Factor	[-]
g	Acceleration of gravity	m/s ²
H	Height of Channel	m
h	Heat Transfer Coefficient	W/m ² .K
k	Thermal Conductivity	W/m.K
L _c	Characteristic Length	m
m _·	Mass Flow Rate	kg/s
Nu	Nusselt Number	[-]
μ	Air Dynamic Viscosity	N s/ m ²
P	Rib Spacing(Pitch)	m
Q	Rate of Heat Transfer	W
p _w	circumference	m
Re	Reynolds Number= $\rho u D/\mu$	[-]
T	Temperature	K
u	Flow Velocity	m/s

A Review of Home Environment Monitoring System using IOT

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Abstract: Today, as an ever-increasing number of families have working individuals, homes are in effect left unmonitored for a few hours every day. There is no arrangement for crisis cautions, robotization systems or observing offices for the home condition conditions. There is colossal potential for mechanical improvement toward this path particularly in view of the progression in the Internet of Things (IoT) [1]. It is conceivable to screen home condition conditions utilizing sensors to distinguish temperature, stickiness, light, stable and gas focuses noticeable all around. It is likewise conceivable to screen altered circumstances, for example, water tanks being full, dustbins being over-burden and fridges left open. The need of great importance is a coordinated answer for have the option to screen nature conditions from a solitary portable application [7]. Some level of mechanization to control the home condition conditions alongside warnings if there should be an occurrence of crisis circumstances, for example, gas spills additionally should be a piece of this single arrangement. This contextual investigation paper is taken to give a solitary coordinated answer for the previously mentioned issue of being not able to keep homes checked for a few hours in the day. The idea is tweaked to screen these conditions and advise the client on his versatile application remotely. Most condition factors can be checked by opening and invigorating the application. Crisis circumstances and altered cautions are scared to the client by sending pop-up messages to his cell phone with the end goal that he can be made mindful of any significant conditions right away. The sensor information is put away on the cloud with the end goal that it tends to be versatile and the information can later be utilized for diagnostic purposes also. The idea worked in this paper is a truly necessary arrangement in this day and age. At the point when most people are out of home during the day time, this arrangement can alarm them if there should be an occurrence of a gas release, over-burden water tanks and can likewise assist them with sparing force by remotely turning on and off the electrical gadget present at home. It is a coordinated and adaptable answer for provide food the fluctuating needs of clients. It helps for observing the whole house on the client's cell phone from any piece of the world.

Keywords: Integrated Development Environment, Internet of Things, Java Development Kit, Light Emitting Diode, Model View Controller, Platform as a Service.

I. Introduction

With the advent of the Internet of Things, there is a rising trend to connect every device, we use in our lives and give us information at our fingertips. We are slowly becoming more aware of the resources available to us and how we can utilize them most efficiently. With the advancement in technology, it is possible to be in control of the environment around us. It is possible to monitor our surroundings to a high degree of accuracy. As more and more families have all-working members, homes are left empty for several hours in the day. It is important that people monitor their houses when they are away for ensuring maximum safety and being in control of the house. There are several aspects of the house that can be monitored, and with this work, the aim is to develop one product that can monitor several of these aspects. The products that exist currently are isolated systems like thermostats to monitor temperature, however the aim is to make a single product that can be used to measure and monitor lighting, humidity, temperature, air quality and sound. The product can also be customized for alerts about things such as the refrigerator being left open or the dustbin being full. The need is for people to be able to keep a complete track of the home environment through a single product that can display the required information on their personal mobile phones.

With the massive increase in the number of nuclear households in urban areas, men and women work for long hours and their homes remain unattended throughout the day. This work helps people to monitor their homes and be alerted in case of any emergency situations such as gas leaks and helps people take appropriate actions to rectify any problematic situation at home. It is also customized to automate electrical 3 devices such as remotely turning off lights to save power when the user is not at home from the user's mobile device. The solution also helps users to activate alerts for situations such as water tanks being full and dustbins being full. Overall this work has immense potential in the direction of home monitoring and automation which is highly required in today's developing world. The technology used is simple and reliable for monitoring home conditions. The importance of this work is evident by the fact that unmonitored homes for long times can lead to hazardous situations that need to be handled in time. This work is designed to ensure safety and optimization of resources being used at home.

Cloud Brokerage Services & Cloud Integration: A Brief Review

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Abstract: Cloud computing is one of the emerging area which offer large potential for various business service. Cloud Broker acts as a mediator between cloud users and cloud service providers. The main functionality of the cloud broker is to select best Cloud Service Providers (CSP) from requirement set defined by cloud user. Request from cloud users are processed by the cloud broker and suited providers are allocated to them. This paper focuses a detailed review of cloud brokerage services and their negotiation methodology with the service providers. This negotiation can be modeled as a middleware, and its services can be provided as application programming interface.

Keywords— Cloud computing, broker, mediator, service provider, middleware

I. Introduction

A cloud refers the interconnection of huge number of computer systems in a network. The cloud provider extends service through virtualization technologies to cloud user. Client credentials are stored on the company server at a remote location. Every action initiated by the client is executed in a distributed environment and as a result, the complexity of maintaining the software or infrastructure is minimized. The services provided by cloud providers are classified into three types: Infrastructure-as-a-Service (IaaS), Software-as-a-Service (SaaS), and Platform-as-a-Service (PaaS). Cloud computing makes client to store information on remote site and hence there is no need of storage infrastructure. Web browser act as an interface between client and remote machine to access data by logging into his/her account. The intent of every customer is to use cloud resources at a low cost with high efficiency in terms of time and space. If more number of cloud service providers is providing almost same type of services, customers or users will have difficulty in choosing the right service provider. To handle this situation of negotiating with multiple service providers, Cloud Broker Services (CBS) play a major role as a middleware. Cloud broker acts as a negotiator between cloud user and cloud service provider. Initially, cloud provider registers with cloud broker about its specification on offerings and user submits request to broker. Based on type of service, and requirements, best provider is suggested to the cloud user. Upon confirmation from the user, broker establishes the connection to the provider.

II. Cloud Brokerage Services (Cbs)

Foued Jrad et al [1] introduced Intercloud Gateway and Open Cloud Computing Interface specification (OCCI) cloud API to overcome lack of interoperability and heterogeneity. Cloud users cannot identify appropriate cloud providers through the assistance of existing Cloud Service Broker (CSB). By implementing OCCI in Intercloud Gateway, it acts as server for service providers and OCCI act as a client in abstract cloud API. Cloud Broker satisfies users of both functional and non-functional requirements through Service Level Agreement (SLA). Intercloud Gateway acts as a front end for cloud providers and interacts with cloud broker. Figure 2.1 shows a generic architecture of the service broker..

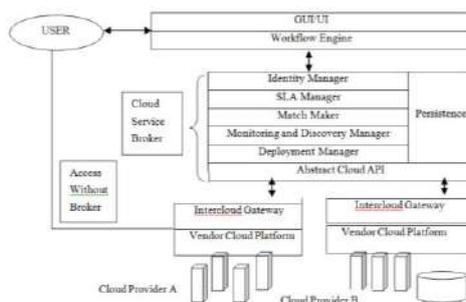


Figure 2.1 A generic architecture for Cloud Service Broker

Identity Manager handles user authentication through unique ID.SLA Manager is responsible for negotiates SLA creation and storing. Match Manager takes care of selecting suitable resources for cloud users. Monitoring and Discovery Manager monitor SLA metrics in various resource allocations. Deployment manager

The Content Analysis of the Research Papers on Foreign Language Education

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Abstract: *The purpose of this study was to determine the trends of recent research papers in foreign language teaching in Turkish context and to give ideas to researchers and policy makers for future studies. Content Analysis method was used in this study. The focus of the study was 189 research papers published between 2009-2013 years in journals indexed in SSCI (94) and the ULAKBIM (95) database in Turkey. Research Papers Classification Form was used as data collection instrument. The papers were scanned in terms of year of the journal, authors, language of the paper, journal index, topic of the paper, research design, data collection tools, sample, sample size and data analysis method. The results revealed that the most frequently studied topics on foreign language teaching and learning from 2009 to 2013 were concept analysis, teaching and learning, the highest number of articles were published in 2013, most of the authors were Turkish, majority of the articles were published in English, quantitative method was used more than qualitative method in research design, undergraduates were the focus of attention as sample group and 31-100 sample size was preferred more than others.*

Key words: *Content analysis, Analysis of research papers, Analysis of papers on language teaching, foreign language teaching, paper classification*

I. Introduction

The history of foreign language education in Turkey dates back to 19th century. Since then, different languages have dominated as a foreign language in Turkish education system and various policies, methods and approaches have been adapted and followed through time. With the increasing number of universities and foreign language teaching departments especially towards the end of the 20th century, foreign language teaching was placed on more scientific basis. Several journals have appeared, many articles have been published in both national and international journals, several researches have been conducted and a lot of seminars and conferences on foreign language teaching have been held both in Turkey and abroad. However, there has been no research studying the content analysis of the articles published on foreign language teaching though there have been some content analysis studies on math and science education in Turkey and abroad. Therefore, it is necessary to make an inventory of the articles published on foreign language education in terms of topic, research methods, data collection instruments, data analysis, years of publication, authors and the language of the articles published in Turkey to shed light on future studies in this field.

Sarıçoban & Sarıçoban (2012) classifies the development of foreign language education in Turkish education system into three main periods. The first phase can be named as The Tanzimat Period which is the beginning of Westernization movements. At that time, French was the dominant language as an important part of the curriculum in military schools, Medical Schools and the School of Political Sciences (Kirkgoz, 2005). However, the establishment of Robert College in İstanbul in 19th century influenced the destiny of French language in Turkish education system. Since the medium of instruction in this institution was English and this school attracted many different non-muslim population. Through time, the graduates of this school took important positions at the state mechanism and this made these types of schools more popular. It was reported that there were more than 400 American schools and nearly twenty thousand students were taking education at these schools. The total number of foreign schools on Turkish territory was almost 2000 at the beginning of 20th century (Sezer, 1999).

The second phase was called as The Republic of Turkey (1923-1997). During this period, Atatürk's efforts to modernize the Turkish society in many aspects including the change of alphabet also increased the demand for foreign language learning. Because, the introduction of the Latin alphabet in Turkish language made foreign language learning faster and easier. In addition, at this time, Anatolian High Schools assumed an important role in Turkish education system, because they were considered to be the best path to distinguished universities. In these schools, math and science lessons were presented in English and also English occupied an important place in the school curriculum. After 1980s, with the concept of globalization all over the world, English became the global language. This phenomenon also influenced Turkish education system and the number of universities that used English as the medium instruction increased and became more popular day by

Enhancement of the Voltage Profile in the Distribution Network using STATCOM Static Synchronous Compensator

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Abstract: STATCOM is one of FACTS devices that used as regulator for transmission and distribution systems which works for reactive power compensation. STATCOM utilisation in distribution system mostly for enhancing the profile of voltage, where used for adjusting the disturbance voltage by injecting into the system a controllable voltage. This paper present a Fuzzy controller based on STATCOM to enhance the voltage profile in distribution network. The controller of STATCOM has simulated for different types of abnormal load conditions of balance and unbalance load. The results of simulation show ability of proposed design to enhance the load voltage which was 96% of the nominal value.

I. Introduction

STATCOM is one of the most important devices can be used in power flow control and power quality, which permit a utilise function in the prepared in the manner that without any loss the performance expectation. The equipments such as transformer, motor, computer, printer, equipment of communication and all types of house machines. These equipments mentioned were affect to the quality of power negatively [1]. When a large load in the network the reactive power unable to be transmitted even though with essential of buses voltage magnitude [2]. Voltage instability cause complete or partial discontinuation in the network. The STATCOM advantage is that can regulate efficiently the injected current in to the bus [3]. Also STATCOM has several applications in compensation of the conditions of sag/swell, the Suppressing in harmonics of line currents and improve the power factor in the load, and reactive power compensation in transmission line also in the load also STATCOM mitigate the fluctuations of the bus voltage [4, 5]. STATCOM with storage energy is advisable for controlling the injected voltage in its magnitude and also the angle by VSC "Voltage Source Converter" for controlling the powers "active and reactive" of STATCOM [6]. Many works have been suggested for the implementation of voltage profile enhancement in the literature. Improving Voltage Profile using PI Controller in [7]. Whereas [8] presents Optimal location of UPFC to enhance voltage profile. In [9] presents Enhancement of voltage profile using SVC. The use of PI controller in [7], has many drawbacks that needs tuning at each operating point, slow in response and less smoother. The use of UPFC in [8], needs settings and controllers for both STATCOM and also for SSSC. The use of SVC in [9], have passive parameters that affect to the tuning of the system and make some oscillation in response. The new proposed of STATCOM for voltage profile enhancement with Fuzzy logic control is a high-speed response and smoother than conventional controller also the proposed system use VSC instead of passive element in SVC. The use of d-q theory to calculate the reactive power and the bus voltage for compensation added another feature of small-time calculation of about one cycle compared with previous works [7],[8] and[9] that takes more than one cycle for calculation the peak amplitude, and need more peripherals design.

II. Voltage Regulation And Compensation

The shunt device connections for regulation of bus voltage are shown in Figure 1. The model contains power transmission line, supply (Vs), and load where the injection was in the middle of the line. Phasor diagram, shows that line current angle has relation with the load side, which means that the active component of current (IC) is injects to enhance the line current (Isc) and then the load voltage. The device of current source is used for compensating the load reactive component this done by inject or absorb current (IC) to or from the network. This lead to enhance regulation of voltage and also reduced reactive component of the source current. Figure 2 shows Q-V characteristics of STATCOM, where the inductive load requires enough reactive current for appropriate working so, the source should be feeding it; and this will increase the line current from the generating area. If the feeding of reactive power is near load area, the supply current may be reduced thus improving the voltage regulation (load side) [10]. Three methods can improve the regulation; first by using a bank of capacitor, by using VSI "voltage source inverter" or by using CSI "current source inverter" [11]. The STATCOM provide voltage for supporting the system under huge abnormal condition through that the bus voltage would be deviate from the compensator normal range [12]. The main advantage of the use of voltage source converter VSC that reactive power can be generate (instead of using capacitors) independent to the line

Improved MPPT strategy focused on the regulation of sliding mode for a PV device

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Abstract: The energy produced using a photovoltaic (PV) is mainly dependent on weather factors such as temperature and solar radiation. Given the high cost and low yield of a PV system, it must operate at maximum power point (MPP), which varies according to changes in load and weather conditions. This contribution presents an improved maximum power point tracking (MPPT) controllers of a PV system in various climatic conditions. The first is a sliding mode MPPT that designed to be applied to a buck converter in order to achieve an optimal PV array output voltage. The second MPPT is based on the incremental conductance algorithm or Perturb-and-Observe algorithm. It provides the output reference PV voltage to the sliding mode controller acting on the duty cycle of the DC-DC converter. Simulation is carried out in SimPower toolbox of Matlab/Simulink. Simulation results confirm the effectiveness of the sliding mode control MPPT under the parameter variation environments and shown that the controllers meet its objectives.

I. Introduction

Photovoltaic systems use solar cells or a group of them to convert sunlight directly into electricity. The power produced by photovoltaic systems depends on the irradiation and temperature of the solar cells [1]. Habitually, the energy produced by solar cells is used to provide power to a load and the remaining energy is stored in batteries. The nonlinear current voltage (I-V) characteristic of PV presents a major challenge in their usage, which leads to a single maximum power point MPP in the power voltage (P-V) curve [2, 3]. This point varies with temperature and solar radiation that makes it harder to achieve.

The major principle of MPPT is to extract the maximum available power from PV module by making them operate at the most efficient voltage (maximum power point) [4-6]. Moreover, the maximum power varies according to the level of solar radiation, the ambient temperature and the temperature of the photovoltaic cells [7]. The MPPT functions as an integrated system, including a combination of a hardware part constituted by a DC-DC converter, and the control algorithm acting as a software part of the MPPT. This combination determines the value of the PV system [8].

Indeed, the role of the MPPT is tuning the operating point of the PV system, so as to extract the maximum power provided by the PV system. The design of an efficient MPPT scheme must ensure accurate and robust tracking, overcoming the presence of modeling errors, the non-linearity of the current-voltage characteristic curves of the photovoltaic cell and the rapid changes in temperature and solar insolation. To reach the MPP, many papers have been presented with different control schemes which can extract maximum of solar power as much as possible. So, several methods have been implemented, namely tracking systems Perturb and Observe (P&O) [9-11], incremental conductance [12], open circuit voltage, and short circuit current [13]. In order to enhance their performance and to minimize the material, modified techniques have been proposed.

The P&O method is extensively used due to its simple implementation. It consists in the perturbation of the panel voltage periodically; by the variation (increasing and decreasing) of the cyclical ratio of the converter to reach MPPT. In incremental conductance, the voltage and current of the solar panel are measured to augur the effect of the variation of the voltage on the output power. The MPPT algorithms above can be implemented with a convergent stability guaranteed. However, in both methods rapid convergence requires a large step of perturbation resulting more chattering around MPP. In addition, the output power change reflects not only the effect of the variation of the voltage perturbed because the power can be changed by changing meteorological conditions [14].

Others MPPT control systems based on fuzzy logic have been introduced [15-18]. The fuzzy logic controllers (FLCs) are successfully applied in the implementation of MPPT. They offer better performance. Their control is robust and does not require exact prior knowledge of the mathematical model of the system. Fuzzy-based MPPT algorithms surpass those using P & O and incremental conductance because of their robustness [19]. An artificial neural network (ANN) has also been used with the FLC for the MPPT of the PV module [20, 21]. The Fuzzy and ANN-based MPPT algorithms exceed all others because of their robust response. However, the cost of calculation, the complexity of the implementation and the tendency to converge towards the local maxima in case of partial shading are the disadvantages.

Review of Methods of Retinal Image Processing for Diabetic Retinopathy with Research Datasets

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Abstract: From the recent studies, the automatic extraction of features and lesions from the input retinal image can result into the early detection of disease and hence the screening of disease called as Diabetic Retinopathy (DR). The DR is consisting of lesions characteristic group extracted from the retinal image of individual person had diabetes for several years. In this paper we are aiming to present the different techniques for automatic localization of different retinal features as well as lesions. As this is first review paper, during this paper we are discussing the process of automated retinal disease recognition in DR in terms of different steps involved. Further this paper address different research retinal images datasets those are widely used by researchers for evaluation of their different techniques. The survey is presented on various methods used for the identification of macular edema as well. The detection of macular edema assists ophthalmologists in order to apply proper treatments which resulted into the elimination of disease completely or minimize its severity. 2mg. (10)

Key Word: Diabetic Retinopathy, Retinal Image, Features Extraction, Blood Vessels, Exudates, Optic Disc, Macular Edema, World Health Organization

I. Introduction

Recently the World Health Organization (WHO) overall in world, there are about 135 million people have diabetes mellitus. And this number may increase up to 300 million by 2025. The analysis of medical image is growing research area which attracts number of researcher's interests for new methods and algorithms for different purpose. This approach is composed of digital images study with aim of providing computational tools. These tools further assist the quantification as well as visualization of anatomical structures and interesting pathology. Progress in this area has been achieved in recent years; medical care is available for that type of patients improved significantly.

Diabetes care for serious progress is current health of the biggest immediate challenges. The number of people affected a startling wall List rate continues to grow. According to a recent survey, 4% of the country's population have been diagnosed diabetic disease alone and it has been recognized and is a main cause of blindness in the country as accepted if not properly treated and. early detection and diagnosis to obtain a reduction in the percentage of visual way as Have been identified with emphasis on medical routine due to diabetes with loss that examine the use special features to detect and monitor the said disease.

A lot of approaches have been suggested and identified as means of reducing the stress caused by this constant check up and screening related activities among which is the use medical digital image processing for diagnosis of diabetes related disease like diabetic retinopathy using images of the retina. Diabetic retinopathy can be broadly classified as non-proliferative diabetic retinopathy (NPDR) and proliferative diabetic retinopathy (PDR). Therefore, regular screening of diabetic patient's retina is very important. And, automated or computer assisted analysis of diabetic patients retina can help eye care specialist to screen larger populations of patients. Since from last decade, there are many research work presented by different authors over the automatic detection of diabetic retinopathy by making use of different kinds of features as well as methods. Below we are discussing some of these recently presented methods.

In [3], author have analyzed the performance of three different template matching algorithms in respect of the detection of blood vessels in the retinal images for both gray level and color images. Blood vessels detection using the proposed 2D Gaussian matched filtering gives the complete and continuous vessel map of the blood vessels.

[4], the author is a computational model, the retinal vasculature and proposed to remove from the eye funds images and then retinal vessels bifurcations and crossover points to locate their facilities. [5], the author to remove vascular network, using akariki operators proposed. [6], the authors proposed that fluoresceinlabeled retinal blood vessels of 27 were automatically segmented digital images using Gabor Wavelet transform and traditional features such as Categorized using the area, perimeter and an additional five morphological features based on the derivatives of the Gaussian Wavelet obtained data.

Effect of Foreign Direct Investment on Indian Stock Market

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Abstract

The paper researches the effect of FDI on the financial exchange advancement of India. The key premium rotates around the correlative or subbing job of FDI in the financial exchange improvement of India. The investigation additionally looks at the other major contributing components towards the advancement of securities exchange. An ARDL bound testing approach is utilized for long run relationship among variables and the mistake amendment model is utilized for short run elements. Our outcomes bolster the correlative job of FDI in the financial exchange improvement of India. Other macroeconomic factors influencing financial exchange improvement are household investment funds, GNP per capita, and inflation.

Keywords: FDI, Stock Market, GNP, Inflation.

1. Introduction

It is generally recognized that a strong financial system guarantees the economic growth and stability. Stock market is an integral part of the financial system of the economy. It is a source of financing a new venture based on its expected profitability. The stock market is replica of the economic strength of any country.

Savings and economic growth, the development of stock market is imperative and cannot be ignored in any economy. Theoretical work shows the positive effect of stock market development on economic growth (Demirguc-

Kunt and Levine 1996a; Sing, 1997; and Levine and Zervos, 1998)). The development of stock market is the outcome of many factors like exchange rate, political stability, (Gay, 2008), foreign direct investment, and economic liberalization (Adam and Anokye et al, 2008).

In the era of globalization, FDI is a major source of capital inflow in most of developing economies where it bridges the gap of capital, technology, managerial skill, human capital formation and more competitive business environment. The role of FDI in economic development is found mixed in economic literature. It is argued on the one hand, that FDI in developing countries transfers business know-how and technology (Romer (1993). On the other hand, some predict that FDI in the presence of pre-existing trade, price, financial, and other distortions will hurt resource allocation and hence slow economic growth (Brecher and Diaz-Alejandro, 1977; Brecher, 1983; Boyd and Smith, 1999). Some studies show that FDI does not exert any independent influence on economic growth (Carkovic and Levine, 2002). FDI inflows have a positive effect on host country's economic growth in developing but not in developed economies (Johnson 2005). Thus, theory produces ambiguous predictions about the growth effects of FDI.

Some models suggest that FDI will only promote economic growth under certain policy

Dynamic Response of a Pelton Turbine Shaft under the Impact of Water Jet

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Abstract

The performance and reliability of any rotating machine can be studied by proper dynamic analysis of the machine. This paper presents a method to study the dynamic response of a Pelton turbine shaft due to the impact of a water jet. Equations of motion for the bending vibration of the Pelton turbine assembly, in two transverse directions, are developed using the Lagrange equation of motion with the help of assumed mode's method. The Pelton wheel is assumed as a rigid disk attached to an Euler-Bernoulli shaft. The impact provided by the water jet is represented in the form of a Fourier series. Critical speeds of the system are determined by performing free vibration analysis and presented in the form of the Campbell diagram. The response plots due to the impact of water are generated by performing forced response analysis. Both free and forced analyses are carried out by considering the first three modes of vibration.

Keywords: Pelton turbine, Flexible shaft, Free response, Forced response, Impact of jet.

1. Introduction

Most of the power-producing and power-consuming units consist of a disk attached to a shaft. One of the most common examples of such units is a Pelton turbine unit used for electricity generation in hydropower plants. Pelton turbines are high head turbines used for both small and large power generation. These rotating turbines are subjected to highly hostile working conditions. The design and manufacturing challenges are concerned with improvement in performance, life, and reduction in weight without loss of reliability. There are numerous possibilities of excitation by external disturbances and the behavior of the system under those disturbances can be predicted to

some extent by the appropriate dynamic analysis.

The dynamic response of such a shaft-disk system depends upon many components and operating parameters. Different researchers investigated different aspects of a rotodynamic system by modelling the system as an assembly of a rigid disk attached to an Euler-Bernoulli shaft. Sabuncu et al. [1] investigated the critical speed of a rotor consisting of a single disc on a solid shaft by treating the shaft as a rotating beam element using a transfer matrix-finite element model. Rajalingham et al. [2] investigated the influence of external damping on rotor response to an imbalance of gravity excitations and showed that sufficient amount of

Parametric Study on Axial Compressor Performance in Design Condition

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Abstract

In this paper, a parametric study of compressor performances is performed by the streamline curvature method. Effects of three input parameters in the design process, e.g., number of blades, distribution of blade thickness, and blade sweep angles, on the main objective parameters in the aerodynamic design, e.g., velocity distribution, efficiency, and pressure ratio, are investigated in the parametric study. Initially, a certain two-stage axial compressor is designed by the streamline curvature method. Validation of the results is confirmed by comparing the obtained results with the experimental ones. Regarding various values for the aforementioned input parameters, the first stage of the axial compressor is redesigned, and the output parameter is established. Therefore, the sensitivity of the design results to each of the aforementioned parameters is recognized. Results show that increasing the blades sweep angle causes the flow behavior, such as efficiency and pressure ratio in the axial fan, to improve while reducing it provides a completely contrary result. Also, reducing the rotors blades number leads to an increase in the pressure ratio and efficiency while its increase causes a contrary result. It is concluded that a reduction in the number of the blades has a stronger effect on the performance parameters than when it increases. The results also show that the effect of the thickness in the hub is greater than the thickness of the tip, and its increase leads to reduce both Efficiency & pressure ratio.

Keywords: Axial compressor, Streamline curvature method, Blade geometry, Design condition.

1. Introduction

Recently, several attempts have been made to enhance the performance of turbomachinery by using parametric study and optimization methods with the help of the computational power and expensive experimental setup. Applying the parametric study leads to better design of turbomachines to enhance the performance in terms of increasing efficiency,

pressure ratio, and reducing weight and flow loss, etc.

Several investigations have been studied on the performance of an axial compressor by using parametric study. Sweep, lean and skew angles which form the 3D shape of the blades are considered as the most important parameters for optimization. These parameter can lead to a significant effect on overall compressor performance, loss coefficient, and flow structure. In this regard, Gallimore, et al. [1]

Inclined Lorentzian Force Effect on Tangent Hyperbolic Radiative Slip Flow Imbedded Carbon Nanotubes: Lie Group Analysis

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Abstract

The presentation of single-parameter group (Lie group) transformations reduce the independent variable number by one, and hence the partial differential governing equations with the supplementary atmospheres into an ordinary differential equation with the appropriate suitable conditions. The obtained ordinary differential equations are then numerically solved by employing the fourth-order Runge-Kutta technique along with the shooting method. The effects of the various parameters governing the flow field are presented with the help of graphs. The investigation reveals that the non-Newtonian MWCNTs Tangent hyperbolic nano-liquid reduces the friction near the stretching sheet contrasting SWCNTs. This combination can be used as a friction lessening agent/factor. The usage of CNTs shows an excellent performance in enhancing the thermal conductivity of the nano liquid and that single-wall carbon nanotubes (SWCNTs) have a higher thermal conductivity in comparison to multi-wall carbon nanotubes (MWCNTs) even in the presence of radiative heat transfer and heat source. The comparison with existing results available in the literature is made.

Keywords: *Aligned Lorentzian force, Navier slip, Thermal slip, Carbon nanotubes, Lie group analysis.*

1. Introduction

Warmth exchange in the recent era has become an inevitable one as increased productivity of compact objects. This warmth exchange liquid assumes a key part in the advancement of vitality proficient warmth exchange hardware including

electrons, transportation and HVAC & R. The role of nanomaterials has turned top in handling such type of products. The non-Newtonian nanofluids groups better long haul solidness and rheological properties when contrasted with millimeter or micrometer measured molecule suspensions. Nanotubes are from the fullerene

Data falsification attack for cognitive Internet of Things

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Abstract

Internet of Things is considered the future network to support wireless communications. To realize an IoT network, sufficient spectrum should be allocated for the rapidly increasing IoT devices. Through cognitive radio, unlicensed IoT devices exploit cooperative spectrum sensing (CSS) to opportunistically access a licensed spectrum without causing harmful interference to licensed primary users (PUs), thereby effectively improving the spectrum utilization. However, an open access cognitive IoT allows abnormal IoT devices to undermine the CSS process. Herein, we first establish a hard-combining attack model according to the malicious behavior of falsifying sensing data. Subsequently, we propose a weighted sequential hypothesis test (WSHT) to increase the PU detection accuracy and decrease the sampling number, which comprises the data transmission status-trust evaluation mechanism, sensing data availability, and sequential hypothesis test. Finally, simulation results show that when various attacks are encountered, the requirements of the WSHT are less than those of the conventional WSHT for a better detection performance.

KEYWORDS

cognitive internet of things, cognitive radio, Internet of Things, sensing data falsification attack, weighted sequential hypothesis test

1 | INTRODUCTION

The Internet of Things (IoT), first proposed by Ashton [1], describes the future scenario where daily physical objects will be connected to the Internet and be able to identify themselves to other devices. The IoT is a new revolution of the Internet and things or objects, such as radio frequency identification tags, sensors, actuators, and mobile phones, which through unique addressing schemes can interact with each other and cooperate with their neighbors to reach typical goals [2]. To realize the IoT network paradigm, a large number of IoT devices must be deployed. However, with the increasing number of IoT devices, the amount of spectra

for these devices is insufficient. Moreover, owing to the interference owing to spectrum overuse by IoT devices, the transmission performance will be degenerated significantly. Therefore, it is highly important to improve the spectrum utilization in an IoT network [3].

1.1 | Related studies

M. Zhang and others presented the concept of cognitive IoT (CIoT) by integrating intelligent thoughts into the IoT to address the lack of intelligence, modeled the CiOT network topology, and designed cognition process-related technologies

A Study on Generation of Employment via Outsourcing and Areas of Sustainable Development of SSI Units

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Abstract

Reevaluating is the demonstration of one organization contracting with another organization to offer types of assistance that may somehow be performed by in-house representatives. Frequently the errands that are rethought could be performed by the organization itself, however by and large there are monetary points of interest that come from re-appropriating. Numerous enormous organizations currently reevaluate occupations be it in help area or assembling. These positions are dealt with by independent organizations that work in each such administrations or activities.

Keywords: Paper main parts, Articles, Paper Specifications

1. Introduction

Small firms, with limited opportunities, limited markets and limited resources, must use every means available for improving performance and insuring survival. Although many human resource management (HRM) practices are advocated as leading to firm improvement and/or survival, little research in this area pertains to small businesses.

The future success of any organization relies on the ability to manage a diverse talent that can bring innovative ideas, perspectives and views to their work. The challenge and problems faced of workplace diversity can be turned into a strategic

organizational asset if an organization is able to capitalize on this melting pot of diverse talents.

When Total Quality Management (TQM) first broke onto the management scene, it was hailed as a revolutionary idea that would speed up production, increase efficiency, and generally bring success to any organization that pledged allegiance to it. TQM was supposed to bring quality to the whole organization, changing cultures and breaking down departmental barriers.

And for some organizations, this did indeed turn out be the case. TQM was introduced, adopted and sustained to create tangible business results. However, for many more this concept simply failed to deliver. Why? Because in their haste to introduce this culture or mindset to their businesses, senior managers forgot about the key factor that would make or break this initiative; people.

Many executives simply did not grasp the fundamental ethos behind TQM – that you could not introduce systems and procedures to overcome resistance and that diagrams or flow charts would not equate to culture change. TQM is all about empowering people to make the necessary changes towards quality and to incorporate this way of working into their everyday tasks. Whilst it is relatively easy to introduce TQM to a business, the real test comes in sustaining these practices and making them part of a culture rather than something people feel they “have to do”. In

Awareness of the retailer's Brand: An Exploratory Approach

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Abstract

Reason for the examination: This exploration paper planned to realize how the purchaser responds to the retailer's image. This is additionally an endeavor that to recognize the impact of retailers brand on the buying choice of the buyers. Approach/Design: An example of 500 respondents was drawn from the hypermarkets who are the incessant purchasers of food supplies. Comfort inspecting method will be utilized to gather the information from the clients. The chose areas of the hypermarket depend on the 5 significant region/zones in Bangalore city, to be specific East region, West region, North region, South region and focal region. Discoveries: According to this overview, it's been seen that the clients are intrigued to know retailer's image particularly who are the maker/maker of the items. The clients know about the items and the brand and furthermore have the away from of the appropriately connected brand with the specific item.

As clients are keen on buying the marked items and accordingly marked items are getting a charge out of the benefit on the lookout. The great net revenue is foreseen in some food supplies fragment; even nearby

1. Introduction

In today's competitive environment customers are keen observer of market, marketers and of course on the products and services as customers have more number of alternatives to move upon. It has been

observed that the marketers are trying different tactics to attract the customers and also by offering best products and the services to satisfy the customer. Even though this is the situation where the marketers are providing more alternatives to the customer, it is difficult to expect the good response by the customers.

Brand plays very pivotal role in the purchasing of products. Customers are keen interested in buying the branded products rather than the local/ private labels or tags. Few of the customers perceive that if they own branded products, it increases the standard of living and projects the high status. It has been noticed that the concept of brand is more effective when the consumers make a purchase, consumers show interest in buying the branded products especially when it comes to the less/ affordable prices.

Brand awareness is an important factor where the potential customers identify the brand and they will be rightly associated with the particular product of the brand. Normally customers are cleverer in this type of the situation where their past experiences make the purchase of the desired products under the brand and brand image. In brand development, brand awareness is an essential tool which helps the brand to stand out in the marketplace. This is an attempt that to know whether the customers are aware of the retailer's brand. It also focuses on the demographic variables are effective enough to

Progressive Review of Literature Employee Engagement

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Abstract

Though frameworks for understanding engagement vary, the concept is commonly understood to capture levels of commitment and discretionary effort exhibited by employees.

In a world that is changing both in terms of the global nature of work and the diversity of the workforce, engaged employees may be a key to competitive advantage. To improve employee engagement and to give full play to the employee potential ability is a magic weapon to obtain success.

Employee engagement is a relatively new but extremely popular concept in the field of Human Resource Development. It has been discussed by many of HRD practitioners lately because it is believed to have positive impacts toward performance, work attitude and work behavior.

It has become a topic of immense interest in the organizational literature in recent years and has also been acknowledged as a vital factor contributing to organizational success and could have positive implications in all aspects of any business. It combines elements of belonging, commitment, motivation, readiness and productivity. We theorize that engagement, conceptualized as the investment of an individual's complete self into a role, provides a more comprehensive explanation of relationships with performance than do well-known

concepts that reflect narrower aspects of the individual's self.

Employee engagement is a strategic approach for driving improvement and encouraging organizational change. Organizations have the potential to gain considerable benefits from incorporating engagement into their culture. Engaged employees contribute to the foundation line of any business and their engagement is echoed in their services to clients and customers.

This paper makes an attempt to study the different theoretical dimensions of employee engagement with the help of review of literature. This can be used to provide an overview and references on some of the conceptual and practical work undertaken in the area of the employee engagement. Through this paper, we also aim to provide a comprehensive account of how employee engagement needs to be integrated within the HRM fabric of an organization if engagement is to yield sustainable competitive advantage.

Key words: Commitment, Behavior, Performance, Discretionary Effort, Involvement.

1. Introduction

Employee engagement is a concept that has become increasingly mainstreamed into management thought over the last decade. It has been the focus of growing interest in recent years as research in positive organizational phenomena has expanded. Employee engagement is a positive, enthusiastic, and affective connection with work that motivates an employee to invest in getting the job done, not just "well" but

Load Bearing Capacity of a Reinforced Concrete Frame

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Abstract

Numerous strategies have been created so as to consider the effect conduct of solids and structures. Two basic strategies are limited component and exploratory technique. The nonlinear limited component technique is one the best strategies for foreseeing the conduct of RC bars from zero-burden to disappointment and its crack, yield and extreme qualities. The benefit of this technique is its capacity to make this expectation for all segments of the surveyed RC bar and all phases of stacking. This paper thinks about the test results acquired for a RC outline with the numerical outcomes determined by ABAQUS programming, and plots the two arrangements of results as hysteresis–dislodging charts. This examination shows that the numerical FEM actualized by means of ABAQUS programming produce legitimate and dependable outcomes for load bearing limit of RC outlines exposed to cyclic burdens, and hence has noteworthy expense and time productivity favorable circumstances over the elective methodology

KeyWords: ABAQUS; Reinforced Concrete Frame; Displacement Force Diagrams; Pushover Analysis.

1. Introduction

Earthquakes around the world have shown the importance of the rehabilitation of existing buildings; especially those were built before the modern codes of seismic design were issued [1]. Many traditional methods have been used for strengthening the RC structures such as adding of RC infill walls, precast panels, steel bracing, and concrete jacketing of the frame member [2]. Simulation of impact behaviour of solids and structures still poses significant difficulties on computational methods and constitutive models [3]. Finite element method is the numerical approach which is used to solve approximately partial differential equations[4]. The reinforced concrete (RC) moment-resisting frames with masonry infill walls are widely used in buildings. It has been well recognized that the arrangement and constructional detail of infill walls have significant effects on the seismic performance of RC frames [5]. The “behavior factor” is widely recognized as the most important parameter of seismic design. The nonlinear

finite element method is one the most popular and effective methods of assessing the exact behavior of RC beams from zero load until failure, and obtaining its fracture, yield and ultimate strengths. The advantage of this method is its ability to predict the behavior of all sections of the assessed RC beam at all stages of loading [6]. ABAQUS is finite element software with extensive use in engineering applications, mostly because it lacks the flaws of other software developed for this purpose. This software consists of three main components: i) ABAQUS/Standard for solving all linear and nonlinear static and dynamic problems, ii) ABAQUS / Explicit for modeling the transient dynamic problems such as collisions, impacts as well as quasi-static problems, and iii) ABAQUS/CAE, which is a GUI designed to facilitate the procedure of defining the model, the boundary conditions, and the loading process. In a study by Bolea (2016), author used the laboratory of University of Bucharest to examine the seismic response of RC frames with masonry infill panels [7]. Jiang et al. (2015) studied the seismic behavior of RC frames with masonry infill panels under cyclic loads. They analyzed the influence of constructional details of infill walls on the seismic behavior of RC frames. It is found that with the addition of masonry infill wall rigidly connected to the frame, the lateral strength, the stiffness and the energy-dissipation capacity of the bare RC frame increase significantly while the displacement ductility ratio decreases significantly [5]. The study conducted by Shafei et al. (2013) assessed the effects of flexible joints on the lateral response of reinforced RC frames. Seismic effects were modelled in the OpenSees software framework and a modified joint element for analysis of multi-storey frames was used [8]. In the study conducted by Mondal et al. (2013), authors assessed the behavior factor of 2, 4, 8 and 12 story RC structures. Their research focuses on estimating the actual values of ‘response reduction/modification factor’ (R) for realistic RC moment frame buildings designed and detailed following the Indian standards for seismic and RC designs and for ductile detailing, and comparing these values with the value suggested in the design code [9]. Piera. (2005), also studied the Performance evaluation of masonry-

A Novel approach for the node monitoring Fellowship Model against Black Hole Attacks in MANET

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Abstract

In mobile ad-hoc network one of the vulnerable threat is the security issues and in the absence of any centralized controller, now a day's these issues are increasing at a high speed. The packet drop attacks are one of those attacks which degrade the network performance. This paper describes a novel node monitoring mechanism with a fellowship model against packet drop attacks by setting up an observance zone where suspected nodes are observed for their performance and behavior. Threshold limits are set to monitor the equivalence ratio of number of packets received at the node and transmitted by node inside mobile ad hoc networks. The proposed fellowship model enforces a binding on the nodes to deliver essential services in order to receive services from neighboring nodes thus improving the overall network performance.

Keywords— Black-hole attack, equivalence ratio, fair-chance scheme, observance zone, fellowship model.

1. Introduction

Mobile ad-hoc networks are infrastructure less and self organized or configured network of mobile devices connected with radio signals. There is no centralized controller for the networking activities like monitoring, modifications and updating of the nodes inside the network as shown in figure 1. Each node is independent to move in any

direction and hence have the freedom to change the links to other nodes frequently. There have been serious security threats in MANET in recent years. These usually lead to performance degradation, less throughput, congestion, delayed response time, buffer overflow etc. Among them is a famous attack on packets known as black-hole attack which is also a part of DoS(Denial of service) attacks. In this, a router relays packets to different nodes but due to presence of malicious nodes these packets are susceptible to packet drop attacks. Due to this, there is hindrance in secure and reliable communication inside network.

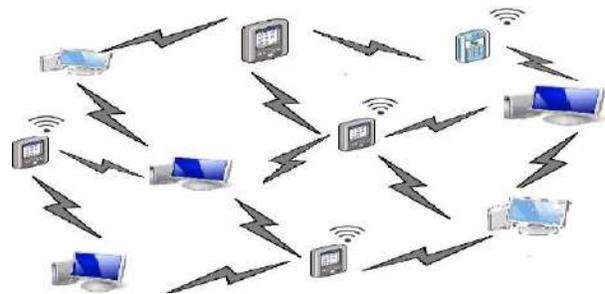


Figure 1. MANET Scenario

Section 2 addresses the seriousness of packet drop attacks and related work done so far in this area. Section 3 elaborates our proposal and defending scheme for packet drop attacks. Section 4 provides concluding remarks.

Entropy Generation Analysis of MHD Forced Convective Flow through a Horizontal Channel

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Abstract

Entropy generation are derived and solved by using the analytical method. In addition, the skin friction coefficient and Nusselt number are calculated numerically and their values are presented through the tables for the upper and the bottom wall of the channel. It was concluded that the total entropy generation rate and Bejan number are reduced due to a rise in the inclination angle of the magnetic field. Also, an increment in the heat source props up the fluid temperature and total entropy generation rate. This study will help to reduce the energy loss due to reversible process and heat dissipation. The results are also useful for chemical and metallurgy industries.

Keywords: MHD, Forced Convection, Heat Source, Inclined Magnetic Field, Entropy Generation.

1. Introduction

Magnetohydrodynamic flow has a notable interest in diverse fields of industries and engineering. Agriculture industries, groundwater hydrology, filtration and separation process in the chemical and petroleum industries, metallurgy, oceanography, plasma physics, designing of cooling devices, cooling of nuclear and power plant, cooling of electronic devices, MHD power generator, etc. are various applications in science and technology. In the last few decades, it is found that MHD flow has dominated the industries due to its wide use and dependency in every field of science and technology. Hannes Alfvén, a plasma physicist was the first scientist who used the term MHD and for it, he received a prestigious Nobel Prize in physics in year 1970. The MHD flow through different geometries has been widely studied in the last half-century. In the literature, we found

that Raptis [1] contributed to the two-dimensional natural convective flow through the porous medium. Vanka et al. [2] investigated the three-dimensional magnetohydrodynamic fluid flow in the channel. In the continuation, Ghosh et al. [3] inspected the hydromagnetic fluid flow in a rotating system. Krishna et al. [4] discussed the MHD convective fluid flow in a rotating discussed by Singh [5] using the perturbation method. In their study, they found that a rise in the magnetic field and permeability reduces the fluid velocity.

Mhone et al. [6] surveyed the MHD flow through the diverging channel in the existence of an applied transverse magnetic field. In this study, it is seen that the high strength of the applied magnetic field slows down the motion of the fluid. MHD Couette flow in the rotating channel under the influence of the magnetic field was reported by Seth et al. [7]. It is viewed that the amplification in the strength of the magnetic field reduces the fluid motion, whereas the effect of inclination angle reflects adversely. Later, Seth et al. [8] expanded their previous work and discussed the Hall Effect in a rotating system. The effect of the inclined magnetic field in MHD Poiseuille flow through the two-plate channel was explained by Manyonge et al. [9] and validated the results discussed by other researchers for magnetic field and velocity profile. Later, Joseph et al. [10] examined the impact of the inclined magnetic field in MHD Couette flow through parallel plate channel. They noticed that the velocity of fluid and coefficient of skin friction diminish with the increment in the stability of the inclined magnetic field parameter. Raju et al. [11] explored the MHD forced convective flow through the horizontal porous channel in the existence of the viscous

A Design Model Offering Collaborative Services using Service Oriented Architecture

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Abstract

Now- a- days the demand for flexible, user-friendly and effective collaborative services is becoming an important aspect in the marketing scenario. Enterprises need to be more dynamic in terms of collaboration with partners and for competitors. The Service Oriented Architecture (SOA) is a distributed computing paradigm which offers solutions that are extendible, flexible and compatible with legacy systems. This paper proposes and investigates the use of SOA in the construction of collaborative services. The paper describes the idea of a Service Oriented Architecture and also gives a description of collaborative services. A generic model of a collaborative service is analysed to identify the basic collaborative functions and a Service Oriented Architecture Framework for collaborative service is presented.

Keywords: *Service Oriented Architecture, Design Model, Collaborative Services.*

1. Introduction

Organizations constantly search for innovative applications and services to improve their business processes and to enrich the collaborative work environments of their distributed and mobile knowledge workers. It is increasingly becoming apparent that a limiting factor in the support of more flexible work practices offered by systems today lies in:

1. Their inherent assumptions about technical infrastructures in place (hardware, software, and communication networks),

2. Their assumptions about interaction patterns of the users involved in the processes.

Emerging new ways of flexible and mobile teamwork on one hand and dynamic and highly agile (virtual business) communities on the other hand require new technical as well as organizational support, which current technologies and infrastructures do not cater for sufficiently. Service Oriented Architecture (SOA) is a new paradigm in distributed systems aiming at building loosely-coupled systems that are extendible, flexible and fit well with existing legacy systems. By promoting the re-use of basic components called services, SOA will be able to offer solutions that are both cost-efficient and flexible. In this paper, we propose to investigate the feasibility of using SOA in the construction of innovative and advanced collaborative services. The paper starts with a short introduction of the Service Oriented Architecture and then gives a description of collaborative services. A generic model of a collaborative service is analysed to identify the basic collaborative functions. A Service Oriented Architecture Framework for collaborative service is presented thereafter.

2. Overview of the service oriented architecture

There are currently many definitions of the Service Oriented Architecture (SOA) which are rather divergent and confusing. The World Wide Web consortium [1] defines as follows:

A Service Oriented Architecture (SOA) is a form of distributed systems architecture that is typically characterized by the following properties:

A Parametric Experimental Design Study of Abrasive Water Jet Machining

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Abstract

In this research work, Grey Relational Analysis was selected to determine the optimal combination of various input parameters of Abrasive Water Jet. A L9 orthogonal array was employed to study the performance characteristics of cutting operation on Al-6061. With the help of Grey Relational Analysis we were able to obtain optimal combination of process parameters for maximum Material Removal Rate (MRR) and minimum Surface Roughness (Ra).

Keywords: *Abrasive Water Jet, Grey Relational Analysis, MRR, Orthogonal Array, Surface Roughness.*

1. Introduction

In Abrasive Water Jet, a narrow stream of water carrying abrasive particles, under controlled conditions, is impinged on work piece. The material is removed from the work piece due to small fracture created by the abrasive particles. Abrasive Jet Machining is used for drilling, deburring, etching, and cleaning of hard and brittle metals, alloys, and non-metallic materials. To achieve optimal machining performance the machining parameters should be chosen properly.

Grey Relational analysis is a part of Grey Theory established by Dr. Deng in 1989. Grey relational analyses provide an efficient and valid conclusion to an experiment or model which has incomplete information by establishing a relationship between two discrete sequences. This purpose of this paper is to use Grey relational analysis to obtain optimal combination of machining parameter for maximum material removal rate (MRR) and minimum surface roughness (SR) and to find the individual effect of each machining parameter on material removal rate and surface roughness.

2. Experimental Details

Material

In the present study, Al 6061 was used as work piece material. Al 6061 possesses high toughness and hardness. Al 6061 finds its application in aerospace components, marine fittings etc.

Design of Experiment

Design of Experiment is a systematic approach to solve engineering problems that applies principles and techniques of data collection stage so as to generate the best combinations of factors by establishing a relationship between factors affecting a process and the output of the process. In this study, three control variable were used namely, pressure, nozzle distance and disk flow rate. In machining parameter design, three level machining parameters were selected, shown in table 2.1.

Comparative Study of Various Bitmap Indexing Techniques Used in Data Warehouse

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Abstract

For running complex query, performing aggregated function and handling huge no of data in data warehouse the bitmap indexing has become the most popular indexing technique recently. We study different type of bitmap indexing techniques (simple bitmap and encoded bitmap) & perform aggregated operation on query with the help of both simple & encoded bitmap indexing and analyses the result, which was really interesting.

Keywords: Query, aggregate function, bitmap indexing, encoded bitmap.

1. Introduction

1.1 What is Data warehouse?

A Data Warehouse is a subject-oriented, integrated, non- volatile, and time variant collection of data in support of management's decision. A Data Warehouse system consists of a back-end database server, (an OLAP engine) and a front-end tool set. OLAP and Data Warehousing are usually used interchangeably. However, Data Warehousing includes tasks such as data extraction, indexing, query processing and optimization, and other services that a DBMS provides, while OLAP denotes the services, which support decision making, built on top of those services provided by a Data Warehouse. A logical architecture of a data warehouse system is depicted in Figure:

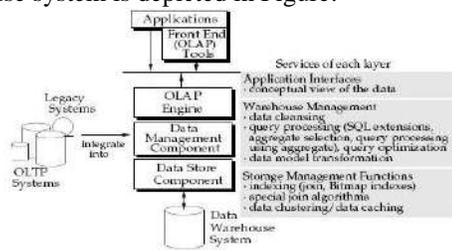


Fig. 1

1.2 Different type of indexing use data warehouse

B-Tree Index

The B-Tree Index is the default index for most relational database systems. The top most level of the index is called the root. The lowest level is called the leaf node. All other levels in between are called branches. Both the root and branch contain entries that point to the next level in the index. Leaf nodes consisting of the index key and pointers pointing to the physical location (i.e., row ids) in which the corresponding records are stored. A B-Tree Index for Student (Table 1) and their respective Marks (Table 2) is shown below in fig 2.

Student (Table 1)

Student id	City	Gender
P10	Kolkata	F
P11	Asansol	F
P12	Malda	F
P13	Burdwan	M
P14	Asansol	M
P15	Burdwan	M
P16	Malda	F
P17	Kolkata	M
P18	DumDum	F
P19	Kolkata	F
P20	Kolkata	M
P21	Barasat	M
P22	Malda	F

Marks (Table 2)

Student id	Marks
P10	70
P11	50
P12	50
P13	40
P14	44
P15	30
P16	35
P17	20
P18	23

Secure Data in Cloud Environment using AES

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Abstract

Cloud computing is a future generation technology for IT enterprise. It has different characteristics like virtualization, multi-user, scalability and many more. It also provides on demand computational infrastructure which has the power to reduce the cost to build the IT based services. It can provide different types of service over the internet. One of the important services provided by the cloud is storage where users can keep their data as per the requirement. It is a challenging issue for the user as all the data are stored in some inter-connected resource pool but this resource pool is situated over different places of the world. An unauthorized user may be access this data through the virtual machines. So, it is the dark side of cloud data storage. This insecurity creates a big problem for users. Therefore data security in cloud computing is a major problem. Currently, AES is regarded as the most popular symmetric cryptographic algorithm. It is very significant to develop high performance AES to further broaden its widespread application..

Keywords: Cloud Computing, Data Security, AES.

1. Introduction

Cloud refers to storing the user's data in a remote database instead of storing it in the hard disk of their own computer. Cloud delivers computing resources as a service in a scalable manner to the clients by means of Internet which eliminates the need of setting up company's own data center or server. These resources are offered on demand and customers pay for their level of usage.

National Institute of Standards and Technology (NIST) defines Cloud as "a model for enabling ubiquitous, convenient, on demand network access to a shared pool of configurable resources that can be rapidly provisioned and released with minimal management effort or

service provider interaction". There are five essential characteristics of cloud, three cloud service models and four cloud deployment models [1][2].

Five essential characteristics of cloud are [8]:

- Broad Network access: Resources available over the network are open to users by means of their phones, laptops and so on.
- Rapid Elasticity: Elasticity refers to scalability of resources according to the need of the user.
- Measured Service: The cloud provider monitors or measures and controls the services for various reasons like billing, resource optimization and planning.
- On-demand self-service: A user will cater the resources based on his requirement without interacting directly with every provider.
- Resource Pooling: Resources are shared to aid many customers based on multi-tenant model. The resources are allocated and reallocated in a dynamic manner according to user's necessity.

The various deployment models in cloud are as follows [8]:

- Public: The cloud infrastructure functions for common public and is possessed by an organization promoting cloud services. Services are available for general user over the internet.
- Private: The cloud infrastructure functions for a private business. It's like a virtualized datacenter operating within firewall.
- Community: The cloud infrastructure is made common to several organizations with the same principles and agreement consideration. It is possessed, administered, and controlled by a single or others of the organization in the community or a third party and it shall be on or off site.

Bambusa Vulgaris High Voltage Durability as a bio-composite material

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Abstract

This investigation is directed to gauge and recognize the capacity of a bio-composite material to the high voltage. As per it, the created bio-composite material is tried to guarantee the greatest voltage that the material can hold. The bio - composite material which produced using a combination of Bambusa Vulgaris and a chose polymer named as High Density Polyethylene (HDPE). The Bambusa Vulgaris experiencing a few cycles before combined with HDPE utilizing wood plastic composite (WPC) method which likewise comprises of a few phases. There are a few examples of bio-composite substance are created. The distinction among them is the organization of the crude materials (Bambusa Vulgaris and HDPE) utilized. In this exploration, the high voltage estimation which likewise called as breakdown voltage estimation of the bio-composite material is analyzed by utilizing proper investigations. All the exploratory outcomes are introduced and talked about in this paper.

Keywords: *Bambusa Vulgaris* Bio-composite Breakdown voltage Green technology Wood plastic composite

1. Introduction

Wood plastic composite (WPC) is a material combination technique of natural plant and polymer. Natural plant such as pulp and bamboo which is in sawdust from fibre filler is mixed with new or waste polymer such as polypropylene, polyvinyl and

polyethylene using associated processes. Currently, WPC products are very demanding in many applications such as in building constructions. Many of them used WPC to replace the usage of solid wood in current building structures. This is because WPC can grant good strength even not stiff as a solid wood but the strength is acceptable to be used in their applications. In addition, WPC is becoming well known because of its other advantages such as low maintenance, environmental friendly, low cost and high durability. Furthermore, WPC technology not only needs to use good wood but it also can use decayed wood to produce bio-composite material [1]. This significant finding good for the many countries that faced the problem of lack of woody raw material because of their unproductive forest area to get expand in WPC field. WPC is very familiar in wood technology industry. However, it is never applied in the electrical industry. So, hopefully this research can give the new ideas to explore WPC technology in the electrical field.

In this research, a kind of bamboos is selected as raw material to be manipulated. Bamboo is considered as woody grass family [2]. Based on a report that has been made, over 1500 species of bamboos were available in this world such *Phyllostachys Edulis*, *Pseudosasa Japonica* and *Sinobambusa Tootsik*. Every kind of bamboos has their special properties and usefulness for living thing. Furthermore, bamboos need humid surroundings, good moisture and fertile soil in order to get larger. Southeast Asia is one of the locations which have the best environment for bamboos [2]-[3]. Many of

A brief review of precast Construction

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Abstract

Most of the construction activities in India take place by conventional cast in situ method of construction. But still there is a huge demand for housing in India. So the construction activity has to take place in a much faster way. This cannot be achieved by conventional method of construction. It can be done possible with precast concrete construction. Moreover there are more advantages of precast concrete construction over conventional one. So various literatures are studied and a reviewed, some of those have been given in this paper. Precast engineering's unique approach to constructions brings a new facet to civil engineering as well as contributes opportunities to the transportation sector of the country. Undoubtedly it is one of the most beneficial techniques in constructions and hopefully shall become a leader in the development of housing and metropolitans of our country. The following study analyses different aspects including precast construction materials, designing and calculations as well as economic advantages and limitation of precast construction engineering

Keywords: - Prefabrication, Precast, conventional, Construction management

INTRODUCTION

The concept of precast (also known as "prefabricated") construction includes those buildings, where the majority of structural components are standardized and produced in plants in a location away from the building, and then transported to the site for assembly. These components are manufactured by industrial methods based on mass production in order to build a large number of buildings in a short time at low cost. The precast concrete industry is largely dominated by Government initiated projects for infrastructural development. However, these are also being extensively used for residential (low and high rise) and commercial constructions because of their various favorable attributes. The efficiency, durability, ease, cost effectiveness, and sustainable properties of these products have brought a revolutionary shift in the time consumed in construction of any structure. Construction industry is

a huge energy consuming industry, and precast concrete products are and will continue to be more energy efficient than its counterparts. The wide range of designs, colours and structural options that these products provide is also making it a favorable choice for its consumers. Precast concrete is a construction product produced by casting concrete in a reusable mold or "form" which is then cured in a controlled environment, transported to the construction site and lifted into place. Many state and federal transportation projects in the United States require precast concrete suppliers to be certified by either the Architectural Precast Association (APA), National Precast Concrete Association (NPCA) or Precast Prestressed Concrete Institute (PCI). Materials used for precast concrete structures are concrete, steel reinforcement, structural steel & bolts and Non cementitious material (Elastomeric bearings for Neoprene, rubbers & mastics are used for soft bearings pads, backing strips, etc). If one sees from the beginning, **Dr Jacqueline Glass (1994)** found that in the historical background of precast concrete, mainly of European countries, different features like fire resistance, thermal mass, durability, acoustic insulation of precast concrete on building got discussed. There are many different types of precast concrete forming systems for architectural applications, differing in size, function, and cost. In 2002, **M S Palanichamy et al.** the maximum carpet area for the same plinth area is achieved by the use of lesser thickness of wall panels. By 2012(**Ng Ban Kiong, Zainal Abidin Akasah**) it was finally found that common problem was the connection between the beam to column and column to base due to poor connection. **Bindurani, P, A. Meher Prasad et al., (2013)** observed that the model, which was not considering any shear transfer through the vertical joints, tend to provide conservative results in terms of amount of steel requirement. The emulative monolithic wall system seems to be adequate in moderate seismic zones. **Rinkesh Patel et al.,** The prefabrication is light weight and has a thermal insulation property, easy workability, and economy in cost, easy availability. **Prof. U.J Phatak et al., (April 2014)** the study of problems which area rising during the pre-cast construction and remedies to overcome those problems to increase the productivity and also indirectly the economy of India.

Protection of Smart Local Backup for Smart Substation

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Abstract

This paper presents a novel shrewd nearby reinforcement insurance SLBP utilized for the help and reinforcement of the defensive transfers in a savvy substation. The proposed SLBP depends on the IEC61850 principles and the idea comprises of the securing of Generic Object Oriented Substation Event GOOSE utilized for stumbling and interlocks trade between Intelligent Equipment Devices IEDs and the perusing of the Sampled Value SV existing in the process transport coming from M ergin Units M U or Non-Conventional Instrument Transformers NCIT. A few legitimate plans to ensure various zones of the substation are introduced and how might be coordinated utilizing information in the substation computerization framework. The SLBP was created utilizing an open source library and free working framework. M oreover, a minimal effort model is introduced to assess the proficiency and the activity of the SLBP under different situations of the proposed coherent defensive plans such us breaker disappointment and overcurrent security.

Keywords: Backup protection GOOSE
IEC61850 Process bus Smart Substation

1. Introduction

The power systems become more loaded and complex especially with the energy and environmental challenges of the 21th century. The majority of power systems operate within their limits, therefore; a simple fault in the electrical power system which is not isolated at right time or a trip that doesn't respect selectivity can cause a blackout to the entire grid example of the blackout of Northeast United States and Canada in 14 August 2003 and the blackout of Italy in 28 September 200 [1].

Nowadays, substations use numerical protective relays for the protection of the primary

equipment of the substation, each relay contains several protection functions such as overcurrent, overvoltage and distance protection. In the most cases the relay works independently from other relays existing in the substation, the relays trip after detecting a fault by respecting setting of thre shold and time. This traditional concept suffers from several weakness of redundancy and reliability, because a mal operation of a relay such as a no tripping after a fault, a no respect of setting or a problem in the relay itself can cause severe damage s to the substations. Thus, a necessity of backup and hierarchical structure of the protections [2].

With the integration of smart substations many concept of protection has been presented in literature such as wide area protection [3],[4] which protects a certain area of the grid nevertheless these concepts need a robust communication infrastructure which is not available in most cases. Furthermore, some backup Protections used to support the protection of substation based on direction comparison principle and current differential protection principle were presented [5-8] however, those algorithms are complexes to be implemented in SAS (Substation Automation System) more than that no experimental tests or prototypes have been presented. In [9] authors present a prototype based on the current differential principle scheme and IEC61850 implemented in an RTDS (Real Time Digital power system Simulation) and some special Backup Protection) used to support and backup of the substation's relays, The SLBP is based on simple logical protective schemes used to protect specific zones of the substation, those logics schemes can be implemented easily in the SAS. The SLBP has been developed using an open access library of protocol IEC61850 and it has been implemented on an industrial computer us ing the free operating system Linux. Moreover, a

Social Media Marketing

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Abstract

Social Media is the use of social media platforms and websites to promote product and services. Marketers are always in search of media that improve their targeted marketing efforts. The latest option, being actively explored and experimented with, is social media. Biggies in social media are partnering advertisers, as this opens up another revenue stream for them. Face book, for example, lets its partners such as Coca-Cola access to its database of members so that targeted advertising can be attempted. Research by Shawandra Hill, professor, operations and information management at Wharton Revels that “network-based marketing – the type the Face book is pursuing – can be more effective because it finds customers who would otherwise be overlooked.

Keywords: Product and services, Social Media, Advertiser, Customers.

1. Introduction

In an era where technology prevails, entrepreneurs as well as marketers see the need up with the fast phase of change of risk being outdated. It is practically impossible to design a marketing strategy without considering social networks. Social media had become really important in the gradient in today’s marketing mix in general and in promotion in particular. The emergence of internet, allows one with unlimited amount of things the individual can do on the internet these days. Adapting some form of marketing online through social media is a key node for all business, especially in an industry where trends constantly change. Social media marketing is used as a branding tool and can increase conversion, sales tracking, page views and add exposure. It is simple and low cost way if increasing sale and to bring traffic to the website. It increases the site popularity and prevails to bring the potential customers to our niche area. By using the following famous Social networking sites we can increase the site traffic and to get potential customers.

- Face book
- Twitter
- LinkedIn
- Other medias (Faves, Delicious, etc.)

FACE BOOK

Side banner showing the company details such as what we are, what we do, contact us etc. we can include our new product details – banner. We can publish notes and create groups. We can create page for products, organization, celebrity etc. we can upload photos, post links that direct to our site/blog. We can create events like recent activities, upcoming events etc. we can create multiple admin for a page .We can apply theme for the fan pages based on product introduction, product description etc. we can send links, products details to the members, groups for getting opinion, reviews etc.

TWITTER

Focus on brand production and micro blogging (140 characters). Build strong and powerful relationship with prospective customers. Filling up the page with quick techniques and tips. We can easily gain followers by following active members in twitter. When we follow 100 members we get will get at least 70 followers. We can create banner bout products, organization etc. use search.twitter.com and twellow.com to find more users.

LINKDIN

We can create group and make others to follow as. We can request for the opinion and suggestion. We can expose our skill set. We can create a professional network ask for opinion and reviews etc. improve your visibility, connect ability, Google page rank. Increase the relevancy of your job search. Make your interview go smoother. Ask for advice (LinkedIn answers).

OTHER MEDIAS

FAVES

We can use faves for promoting new products with images. We can invite experts, friends etc. we can ask opinions review about the product , pages etc., we can create adds on faves.

VHDL Implementation on 128 Bit AES System: A Survey

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Abstract

The Advanced Encryption Standard (AES) was endorsed by the National Institute of Standards and Technology in 2001. It was designed to replace the aging Data Encryption Standard (DES) and be useful for a wide range of applications with varying throughput, area, power dissipation and energy consumption requirements. Though they are highly flexible, FPGAs are often less efficient than Application Specific Integrated Circuits (ASICs); There have been many AES implementations that focus on obtaining high throughput or low area usage, but very little research done in the area of low power or energy efficient based AES; in fact, it is rare for estimates on power dissipation to be made at all.

This thesis introduces new efficient hardware implementations for the Advanced Encryption Standard (AES) algorithm. Two main contributions are presented in this thesis, the first one is a high speed 128 bits AES encryptor, and the second one is a new 32 bits AES design. In first contribution a 128 bits loop unrolled sub-pipelined AES encryptor is presented. In this encryptor an efficient merging for the encryption process sub-steps is implemented after relocating them. The second contribution presents a 32 bits AES design. In this design, the S-BOX is implemented with internal pipelining and it is shared between the main round and the key expansion units. Also, the key expansion unit is implemented to work on the fly and in parallel with the main round unit. These designs have achieved higher FPGA (Throughput/Area) efficiency comparing to previous AES designs.

Keywords: VHDL, AES, DES, ECC, ATM Machines.

1. Introduction

1.1 Motivation

Nowadays cryptography has a main role in embedded systems design. As the number of devices and applications which send and receive

data are increasing rapidly, the data transfer rates are becoming higher. In many applications, this data requires a secured connection which is usually achieved by cryptography.

Many cryptographic algorithms were proposed, such as the Data Encryption Standard (DES), the Elliptic Curve Cryptography (ECC), the Advanced Encryption Standard (AES) and other algorithms. Many researchers and hackers are always trying to break these algorithms using brute force and side channel attacks. Some attacks were successful as it was the case for the Data Encryption Standard (DES) in 1993, where the published cryptanalysis attack [22] could break the DES.

The Advanced Encryption Standard (AES) is considered nowadays as one of the strongest published cryptographic algorithms, where it was adopted by the National Institute for Standards and Technology (NIST) after the failing of the Data Encryption Standard (DES). Moreover, it is used in many applications such as in RFID cards, ATM Machines, cell-phones and large servers.

Due to the importance of the AES algorithm and the numerous applications that it has, the main concern of this thesis will be presenting new efficient hardware implementations for this algorithm.

Hardware implementations for the AES algorithm vary according to the application. While some applications require very high throughputs as in e-commerce servers, others require medium throughput range as in designs for cell phones [17]. Some others require very low area implementations to be used in low power application as in RFID cards.

Many hardware designs were suggested for the AES algorithm. Some of these designs targeted high speed applications as in the loop unrolled 128 bits designs [2], [3] and [5], while

CBR and Its Regression Model on Time Dependent Field

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ABSTRACT: In the present paper a series of California Bearing Ratio (CBR) tests has been performed in both soaked and unsoaked condition on field samples collected from road subgrade. Four rural roads in West Bengal, India have been considered for collection of field CBR sample. From the experimental data it is found that with time the values of CBR in soaked and unsoaked condition increases irrespective of types of road subgrade. Based on the present experimental data a nonlinear power model has been developed to predict field soaked CBR value with time (CBR_{fst}), in terms of field soaked CBR value at 0 days (CBR_{fs0}) and time 't'.

Key words: Field CBR, Time, Soaked, Unsoaked, Regression analysis, Subgrade, Rural road.

I. INTRODUCTION

Nowadays one of the important parameter for evaluation of performance of any types of roads such as rural roads, highways is field CBR. Most of the designer design the road based on soaked CBR value but after construction of roads these CBR value may not remain same rather increases due to simultaneous effect of consolidation and compaction of subgrade soil. The post construction subgrade CBR value is necessary in case of stabilization of soft subgrade soil with Limited Life Geotextiles (LLG) such as jute geotextile, geotextile made of coir, kenaf etc. Sarsby [1] reported that LLG as reinforcing fabrics that are working for a limited time in many civil engineering applications such as roads, and embankment etc. Pandit et al. [2] also evaluated the use of jute and coir in pavement system. Basu et al. [3] found the considerable increase in field CBR value after 18 month of construction of unpaved rural road reinforced with jute synthetic blended geotextile. Choudhury and Sanyal [4] suggested that JGT last for a limited period of time but its effect on enhancing performance for soil property continues for longer time. Choudhury and Sanyal [4] also further reported that in 18 months CBR can enhance about 1.5 to 3.0 times. Khan et al. [5] conducted field investigation on five numbers of JGT reinforced rural road section and observed that the subgrade CBR value has been increased with passage of time. Khan et al. [5] also reported that the load carrying capacity of the road sections increase from 1.5 to 7 times over a range of time. Sanyal [6] reported that for JGT reinforced rural road within 7 to 12 month subgrade CBR value has been increased by 1.5 times. From the above literatures it has been clearly observed that the subgrade CBR value is increasing with time. A numbers of researchers also [7-10] have been studied on laboratory CBR in both soaked and unsoaked condition in the remoulded soil sample to correlate the CBR value with other soil properties only. But detail study on field CBR of road subgrade with respect to time is scarce. In the present investigation an attempt has been made to study the effect of time on subgrade CBR value in both soaked and unsoaked condition. An attempt also has been made to develop a regression model to estimate the time dependent field soaked CBR (CBR_{fst}) of subgrade soil based on the initial field soaked CBR (CBR_{fs0}) value of subgrade soil.

II. SELCTION OF RURAL ROAD

Based on the importance to study the subgrade CBR value with time four JGT reinforced rural road section has been considered and regularly field CBR samples has been collected. Four rural roads such as Kanksa to Bati (8.10 km) , Nihinananagar to Hazratpur (7.90 km), Udal to Chakrabramha (4.75 km) and Bagdimarimulo Barada to Damkal Kheya Ghat (8.70 km) in the west Bengal, India have been selected for the present investigation. The above roads may be designated as (JKB) (JNH) (JUC), (JBD) for Kanksa to Bati, Nihinananagar to Hazratpur, Udal to Chakrabramha and Bagdimarimulo Barada to Damkal Kheya Ghat respectively.

Table 1 Engineering properties of subgrade soil of four different roads

Engineering Properties	Property value			
	JNH	JUC	JKB	JBD
Sand Content(%)	2.00	14.00	4.00	5.00
Silt Content (%)	70.00	50.00	72.00	67.00
Clay Content (%)	28.00	36.00	24.00	28.00

Fiber Reinforced Reactive Powder Concrete Columns' Behavior after Exposure to Fire and Improvements Made To Improve Column Resistance against Fire

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ABSTRACT: This paper offers a test examination of the fiber strengthened responsive powder solid sections' conduct after introduction to fire and upgrades made to improve segment opposition against fire. This examination is for the most part meant to contemplate the test conduct of mixture strengthened segments created by receptive solid powder (RPC) and presentation to the fire of fire at one side and exposed to erratic burden. The test technique comprises of sixteen RC segments that sorted out into four gatherings dependent on the factors utilized in this examination: (SF) steel strands, (PP) polypropylene filaments, (HB) half and half filaments, (PPC-SF) crossover cross-segment (steel fiber responsive powder solid center with polypropylene fiber receptive powder solid spread). All sections were tried under 60 mm capricious burden and the consume segments were presented to fire for various length (1, 1.5 and 2) hours. The outcomes showed that (SF-RPC, PP-RPC, HB-RPC, PPC-SFRPC) sections presented to a fire for the period 2 hours, lost from their heap limit by about (54.39, 40.03, 34.69 and 30.68) % separately. The primary finish of this paper is that the best imperviousness to fire of the segment acquired when utilizing a half breed cross-area (steel fiber responsive powder solid center with polypropylene fiber receptive powder solid spread).

Keywords: Reactive Powder Concrete (RPC); Hybrid Cross Section Column; Hybrid Fibers (HB); Exposed to Fire and Eccentric Load.

I. INTRODUCTION

The reinforced concrete column is a structural member utilized mainly for standing compressive loads, consisting of concrete with an embedded steel frame for reinforcement purposes. There are rarely axially loaded columns in practice since there is always some bending. The moments that happened in the continuous construction along with unavoidable building imperfections will cause eccentricities and then caused a bending in the member. The strength of the column is controlled by the strength of the used material (in particular, the compression strength of the concrete) and the cross-section geometry [1]. The demand for stronger, products with lower space-consuming has increased as construction and material costs increase. Newly, in Bouygues, France, developed a very high strength and high ductility cement-based composite, known as reactive powder concrete (RPC) [2]. RPC is a cemented material characterized by high-performance characteristics for example low shrinkage creep and permeability, ultra-high strength and increased protection against corrosion [3]. However, the need for high-strength structures always comes with an issue in fire resistance for the structure. It was disclosed collectively that the greater strength of the blend will cause a reduction in the composition's fire resistance. In high temperature, the high-performance concrete compositions which are usually denser tend to be more likely to fail because of their high brittleness. High performance concrete shows greater deterioration than ordinary strength concrete, for example concrete spalling and cracking [4]. Nowadays, many fire accidents have occurred around the world, with the use of fresh cement developments (lately RPC) to build load-carrying members for high-rise structures composed of beams and columns, and the fire safety design of these structures has become crucial. This is because the fire resistance of these members is the recent line defense, if other means is failed in extinguish the fire [5]. Also, secure constructions must be designed with a minimum danger for both individuals and property as potential [6, 7].

Nevertheless, the previous study concentrated only on the efficiency of the concrete columns during the fire, whereas the performance of these columns after cooling was very crucial since most concrete buildings subjected to fire circumstances did not collapse and could be recycled using appropriate methods for repairing [8]. In spite of that, it is not easy to decide whether it is more economical to repair the fire-exposed buildings or to demolish and repair them. This choice requires a full understanding of the conduct of these constructions after exposure to fire to determine whether the residual load-bearing capability of the load-bearing members is adequate. The previous researches indicated that the main cause of the crash was steel reinforcement failure for most of the concrete buildings that were damaged by fire [9, 10]. The reason is that the position of the reinforcement is generally near to the surface of the concrete member. Therefore, the steel reinforcement initially deteriorates due to its higher transfer rate of heat compared to the concrete

Research on Beam Deformation Based on Absolute Node Coordinate Method

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ABSTRACT: This paper takes the flexible multi-body system with absolute node coordinates as the research background, relaxes the assumption of the traditional beam theory. After the beam is loaded, the cross-section will be deformed. Based on the absolute node coordinate method, the beam element displacement model analyzes the beam section deformation. Using Fortran software programming calculations, the displacement of the selected point of the beam section is obtained, the figure is simulated, and the deformation of the beam section is analyzed.

Keywords — Absolute nodal coordinates, section deformation, shared undetermined coefficient method, five-point displacement analysis, displacement model

I. INTRODUCTION

Because the deformation of the flexible body will have a great influence on the dynamic behavior of the system, the modeling of the flexible multi-body system will be put on the agenda. In the development of flexible multibody dynamics, the floating reference frame method [1], the incremental finite element method [2], the large rotation vector method [3] and so on have appeared successively. However, these methods describe the deformation and movement of a rigid body through a reference frame fixed on the flexible body. Therefore, there are highly nonlinear terms in the motion equations of these methods. Until 1996, Shabana proposed the absolute nodal coordinate method to greatly reduce the nonlinearity of the motion equation. Shabana's absolute nodal coordinate method for multibody systems is more accurate than the floating coordinate method proposed by previous scholars. The degree of simplicity is more advantageous.

II. MODELING OF BEAM ELEMENTS BASED ON ABSOLUTE NODE COORDINATES.

Displacement mode is an approximate expression of the displacement of any point within a unit by the displacement of a unit node. It has been found that there are differences in the analysis of beam cross-sections using high-order interpolation displacement modes and low-order interpolation displacement modes [4]. The use of high-order interpolation displacement modes can more clearly capture changes in beam cross-sections, including the tensile values of beam sections. The change [5,6]. Using the method of shared undetermined coefficients, the y_2 and x terms are introduced in the form of shared undetermined coefficients to create a longitudinal high-order interpolated displacement model [7]. The y_2 interpolated displacement model can more clearly capture the cross-section deformation.

The beam element proposed by Omar and Shabana is shown in Fig. 1. Each node has 6 position coordinates defined in the global coordinate system.

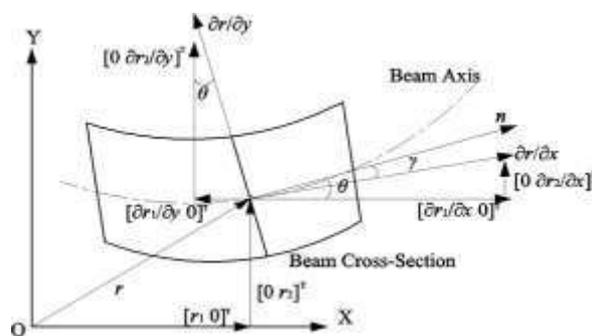


Fig. 1

Properties of Self Compacting Concrete (SCC) Due to Addition of Fly-Ash and Use of Un-Crushed Coarse Aggregate (CA)

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ABSTRACT: This exploration paper talks about the adjustment in the usefulness and quality attributes of Self Compacting Concrete (SCC) because of expansion of fly-debris and utilization of un-squashed Coarse Aggregate (CA). Lab based exploratory work was done by getting ready 12 SCC blends among which six blends contained squashed total and other six blends contained un-squashed coarse total. A sum of 550 kg/m³ cover content and fixed Water-Binder (W/B) proportion as 0.35 were utilized. Two blends were constrained by utilizing Portland Cement (PC) and other ten blends contained PC and Fly Ash (FA). Droop stream time, droop stream distance across and J-ring tallness tests were led to contemplate the new properties of SCC. Besides, compressive quality was determined at 7, 14 and 28 days of restoring. The results demonstrated that the droop stream time, droop stream breadth and J-Ring stature for all the blends are inside the cutoff points indicated by EFNARC rules. The compressive quality of SCCs relies on measurements of fly debris. Compressive quality for SCCs with squashed CA was better than got in the event of un-squashed CA. The most extreme compressive-qualities were seen as 64.58 MPa and 58.05 MPa for SCC with squashed and un-squashed CA individually.

Keywords: Self-Compacting Concrete; SCC; Fly Ash; Un-crushed Coarse Aggregates; Fresh Properties; Compressive Strength.

I. INTRODUCTION

Compaction at narrow places is one of the major problems observed in reinforced concrete construction. However, the SCC is the best option in such situations. SCC is the one that flows through its own weight and hence is very effective in pouring at heavily-reinforced, narrow and deep sections without any vibrational efforts required [1-3]. SCC is the mixture of cement, aggregates, water, admixtures and some mineral additives analogous to the normal concrete. Unlike normal concrete, SCC requires more amount of fillers materials and Super Plasticizers (SP) to give better strength and workability. SCC results in reduction of labour work and also economizes the cost of concreting [4-8]. High quantity of fine-materials such as fly-ash is utilized for acquiring required workability to SCC. This also reduces the issue of segregation and bleeding while transportation and placement of concrete. Many researchers concerned with environmental conservation have criticized the use of cement as a binding material.

Since the demand of cement in concrete production is amplified, it has caused resource depletion, environmental damages and huge amount of carbon-dioxide (CO₂) emission during cement manufacturing process [9]. This has made serious concern of the practitioners and researchers to bring alternative materials of cement such as fly ash. These types of materials are considered safer for emitting. Thus, investigating symbolic properties of these waste materials open new possibilities for concrete development [10]. Use of such waste material in concrete is also very useful in enhancing the properties of concrete and also enhancing durability values [11-14]. Hence, this study has focused to conduct symbolic work for studying behaviour of fly ash in SCC. Fly ash generated from burnt coal is waste material and available at huge amount worldwide which creates more chances to use it as an alternate for cement concrete works. When the fly ash is inserted in concrete, it forms Calcium Hydrated Silicate Gel due to its reaction with calcium hydroxide during process of hydration at ambient temperature. Research works has highlighted that availability of Fly ash can provide the opportunity of replacing OPC up to 60% of its mass [9].

Several researchers have proposed and tested fly ash as mineral admixture for improving the properties at fresh and hardened state as well as the durability of the SCCs. Phathak and Siddique (2012) investigated of SCC with class F Fly ash by replacing cement with (0%, 30%, 40% and 50%) of fly-ash while temperature variation was considered as 20°C, 100°C, 200°C and 300°C. Test results revealed that compressive strength was in between 21.43 MPa and 40.68 MPa while tensile strength was recorded in between 1.35 MPa (min) and 3.60 MPa (max). The authors concluded that 28 days curing caused increment in compressive as well as tensile strength. Further, it was noted that compressive strength had improvement at the temperature of 200°C to 300°C while tensile strength was slightly reduced when temperature was raised above 20°C [15]. Fernando et al. (2018) developed SCC with reduced amount of cement. They added metakaolin and fly-ash as cementitious materials in SCC for evaluating flow ability and strength characteristics of concrete. From research work, it can be argued

Cable Online Temperature Monitoring System

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ABSTRACT: With the advent of the era of smart power grids urbanization, distributed optical fiber temperature measurement technology has become a hot research which can be applied on the cable fault detection. For a start, introduce the overall design of the architecture of distributed optical fiber temperature measurement system in briefly. And then combined with the latency phenomenon that online temperature monitoring system often occurs when the page data is updated, can not guarantee real-time communication. For such problems, analyzes and summarizes the technical features and advantages of Ajax technology, two pages application aspects mainly in historical inquiry and dynamic temperature curve shows. After measurement found that the application of this technology apply to the client browser of distributed fiber optic temperature monitoring systems, just can effectively solve the problem of real-time data. The last details of the introduction of the designing of online monitoring system after bring in Ajax technology.

Keywords: Real-Timing, Distributed Optical Fiber Temperature Measurement, Ajax Technology, Online Monitoring

I. INTRODUCTION

With the rapid development of urbanization, growing demand for urban rail transit, which leads to a growing demand for electricity load, relative to some developed countries, China's cable failure rate is relatively high, the effective temperature of the cable line system the lack of detection technology is an important reason leading to high failure rates. The current domestic technology undoubtedly more effective distributed optical fiber temperature measurement system, but because the system is just emerging in recent years, technology has not yet reached the stage of maturity, especially the real-time data publishing system could be improved.

In this paper, based on the browser/server (hereinafter referred to as B/S) structure built AJAX technology cable line temperature monitoring system design, the design for the current performance of the existing real-time distributed temperature measurement system aspects significantly upgrade, and the user mode of operation is simple, but the main thing is time for the maintenance personnel to locate the fault and repair to provide a higherguarantee.

II. ARCHITECTURE OF TEMPERATURE MEASUREMENT SYSTEM

Distributed optical fiber sensing temperature measurement system utilizing fiber optic temperature sensing field temperature signal acquisition range of each segment, and then transmitted to the host temperature, host module makes the collected signal storage, processing, upload the data to the central unit via a bus, and then via the Web server to upload to the remote client monitoring client browser via Ethernet or GPRS^[1]. As shown in Figure 1.

System is composed of three modules, namely the Field equipment, data acquisition layer and application layer.

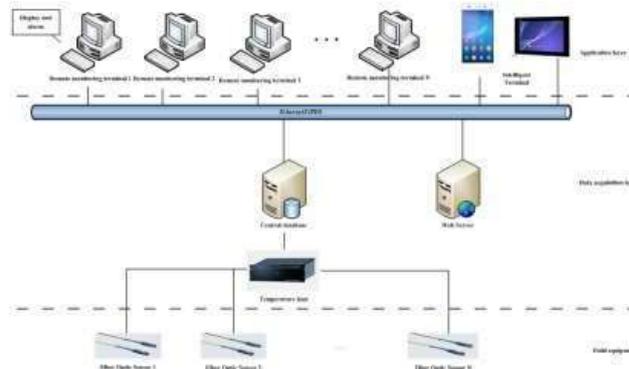


Figure 1 Architecture of temperature measurement system

Field equipment that is used as a temperature signal acquisition and transmission of temperature sensing fiber. In a distributed fiber optic temperature measurement systems, optical fiber is both transmission

AI Technology Based Grocery Shopping

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ABSTRACT: As per the Regional Human Development Report of the United Nations Development Programme (UNDP) on April 26, 2016, India's working population between the ages of 15-64 will rise above 1 billion by 2050. Working in a professionally driven environment is highly cumbersome at times; especially, when the individual is surrounded with the office and household responsibilities. Household responsibilities include various things such as taking care of the grocery stocks, paying various bills on time and other basic daily chores. While fulfilling official duties, it is common for the working individual to be oblivious to his household responsibility. While it is difficult to take care of others' professional work, domestic work can be easily taken care. Through this project, we intend to reduce the significant amount of time devoted by people on replenishing their groceries by providing them with the concept of 'Smart jar'. Apart from refilling the items, through the A.I. model this project not only selects the desired quality, but also a type of delivery based on an individual's buying pattern at the least possible price. This new concept can be a revolutionary as it intends for a paradigm shift in the conventional grocery shopping technique.

Keywords: Piezoelectric, Ultrasonic, Smart Jar, Neural Networks, Training, Epoch, GPRS and Levenberg-Marquardt algorithm.

I. INTRODUCTION

According to the Time Use Institute, the average shopping trip takes 41 minutes. If you multiply that by the 1.5-trip per week average, that's over 53 hours per year you're spending in the grocery store. Due to the unavoidable rush on weekends, this same time increases by 17%. This spurge on weekends is mostly due to the salaried class spending their valuable weekend on grocery shopping. This inefficient use of time and forgetting to replenish the groceries marks the first problem. Secondly, to save few bucks or to avail any special discount they wander from store to store just to buy a couple of items. According to the USA Today reports, half of the supermarket shoppers visit three or more stores to purchase bread, milk and household products. This adds to the total time spent, thereby leading to wasting time. This project also takes care of this secondary issue through the use of A.I.model.

The primary issue of forgetting to refill the grocery and spending valuable time in the supermarket is resolved with the help of piezoelectric sensor, ultrasonic sensors and a MCU with GPRS based communication module. Selection of desired quality at the best possible price is taken care through the neural network model which trains itself based on the buying patterns of the individual.

II. OVERVIEW

1.1. Block Diagram

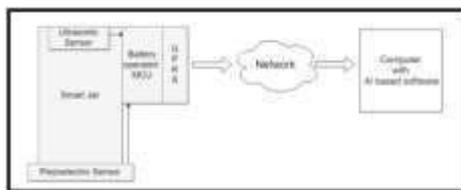


Figure 1 Explaining the Major blocks involved in the Smart Jar

As explained in the above block diagram(Figure 1), the complete system consists of a Piezoelectric sensor, Ultrasonic sensor, battery operated MCU with GPRS interface and a computer at the grocery shop running with a customized AI based software to display the output.

Each Jar will consist of a set of Piezoelectric and Ultrasonic sensors which will be given to the MCU. After receiving the data from Piezoelectric and Ultrasonic sensors; based on a predefined logic MCU will communicate to the GPRS Module via UART and the pertinent data will be sent to the intended PC at the grocery shop. Exclusive software running on the PC will identify the user based on its SIM number and it will generate an output with the help of a pre-trained neural network. Since each customer's buying pattern is

Wind Flow and Temperature Variation in High-Rise Apartment's Analysis

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ABSTRACT: As the rapid expansion of cities as a result of economic development, many people flowed into the cities, and the structure of the cities became overcrowded, resulting in a higher density of buildings. And the disordered arrangement buildings causes changes in the wind flow and reduces the amount of wind. This study performed a numerical analysis with the STAR-CCM+ program on the relationship of wind field formation in an apartment complex according to the housing form, number of floors, and direction of layout of high-rise apartments that significantly affect wind path to adapt to climate changes, and the temperature distribution in the apartment complex was analyzed. A numerical results show that the temperature is increased by 2°C at the back of the group C in the 90° swing arrangement and the 45° swing arrangement except for the parallel arrangement in the 60th floor apartment complex, whereas in apartments on the 15th and 30th floors, the temperature at the building has dropped significantly, except for the tower-type with 45° swing arrangement in the 30th floor apartment complex. This study will carry out a detailed study on fine dust in the apartment complex in the future.

Keywords: Climate change, STAR-CCM+, Wind field, Temperature distribution

I. INTRODUCTION

Recently, many population flow into the city due to the industrialization and urbanization and as a high-rise and high-density building is being built, it is now feared to be development thoughtless for the environment¹.

In reality, it is not very much to conduct wind environment assessment of a building from its planning stage². Hence, deteriorating wind environment is not only adversely affecting the outdoor environment in the apartment complex, but also significantly impacting the indoor environment³.

This study is utilize the STAR-CCM+ program to establish the main building types, floors, the relationship between wind direction and wind field formatting by layout direction of high-rise apartments that have a influence on the wind path when planning the layout of apartment in the apartment complex.

Then, this study presents the best apartment complex layout method for reducing greenhouse gas emission by comprehensively analyzed the flow, ventilation performance, generation of turbulence energy and distribution of temperature in the apartment.

II. RESEARCH METHODS

Numerical analysis condition

Cheonan city and Asan city is analyzed for climate change adaptation. Cheonan city and Asan city area are northwesterly wind with the average speed of 1.6m/s⁴.

The height of the apartment is 1,000m and the height is 500m including the apartment complex applied to this study. The shape of the apartment is arranged as flat type and tower type. The height of the apartment is 2.9m and the climatic condition, the numerical analysis was performed. The temperature condition is 298K in the apartment complex, and the temperature of the wind and the temperature of the calculation area is 288K. The layout of the apartments was numerically analyzed as shown in Fig.1.

Waste Plastic Fibre Reinforced Concrete Using Red Mud: An Experimental Investigation

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ABSTRACT: The field of concrete Technology is under going immense changes in nowadays. A wide range of kinds of cements are altering the development business. Among them the fiber fortified solid, ferro cement, polymer solid, prepared blend concrete and so forth are assuming significant job. The fiber fortified cement in which the strands are scattered haphazardly has numerous applications in structural designing field.

The plastic is causing an ecological contamination since it is a non-biodegradable material. The plastics are causing the ecological contamination. The plastics being non biodegradable material don't rot and it even ruin the richness of land, comparatively another contamination causing modern waste is Red mud. Red mud is a buildup from aluminum manufacturing plants where bauxite is utilized as metal for the creation of aluminum. The removal of this red mud has become an issue to the businesses. Alongside this it causes ecological contamination. This Paper presents the consequences of waste plastic fiber strengthened solid when red mud is included it. Various rates of waste plastic strands are utilized in the solid containing red mud. The quality properties of waste plastic filaments fortified solid like Compressive quality, Tensile quality, Flexural quality and Impact quality are concentrated alongside functionality attributes.

The field of concrete

Keywords: Fibre reinforced concrete, waste plastic, Red mud, Strength and workability characteristics.

I. INTRODUCTION

Plain concrete is weak in tension and has limited ductility and little resistance to cracking. Microcracks are present in concrete and because of its poor tensile strength; the cracks propagate with the application of load, leading to brittle fracture of concrete. Microcracks in concrete are formed during its hardening stage. A discontinuous heterogeneous system exists even before the application of any external load. When the load is applied, microcracks start developing along the planes, which may experience relatively low tensile strains, at about 25-30% of the ultimate strength in compression. Further application of the load leads to uncontrolled growth of microcracks. The low resistance to tensile crack propagation in turn results in a low fracture toughness, and limited resistance to impact and explosive loading. The low tensile strength of concrete is being compensated for in several ways, and this has been achieved by the use of reinforcement bars and also by applying prestressing methods and the introduction of fibres to form fibre reinforced concrete (FRC). The fibre reinforced concrete is one in which the fibres are dispersed uniformly throughout the mass of concrete. Many types of fibres like steel fibres, G-fibres, glass fibres, and asbestos fibres etc. can be used in the production of fibre reinforced concrete.

Alternatively waste plastic can be made use in production of fibre reinforced concrete. This is a non-biodegradable material. It is causing environmental pollution in different ways. The plastic is a non-perishable material. It cannot be dumped in soil. If dumped in soil it causes soil pollution. It cannot be disposed in water. If disposed in water, it causes water pollution. It cannot be burnt also. If burnt, it causes air pollution by releasing many toxic gases. For many countries the disposing of plastic is becoming a big headache.

Red mud is a waste product of aluminium industry, which uses bauxite as ore. This red mud is causing the problem of storing and disposal to the aluminium industry, this red mud is alkaline in nature with little cementation property.

There are many industrial wastes, which are causing environmental pollution. The safe disposal of these industrial wastes is a big problem to the industrialists as well as to environmentalists. These industrial wastes, if used in building construction as a construction material, it is a welcoming step.

II. MATERIALS USED

Cement: Ordinary Portland Cement-

53 grade was used having a specific gravity of 3.15 and it satisfies the requirements of IS: 12269-1987 specifications. The physical properties of tested cement are given in Table 2.1

Table 2.1: Physical properties Ordinary Portland Cement-53 grade (IS: 12269-1987)

Properties	Results	Permissible limit as per IS: 12269-1987
Fineness	30 $3m^2$	Should not be more than 22.5 m^2/N
Normal consistency	30	-

Latest Developments and Advancements in Composite Materials

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Abstract: - The importance of materials in modern world can be realized from the fact that much of the research is being done to apply new materials to different components. However it is natural for a design engineer to rely on trusted and tested materials, but now the world is changing .Today composite materials have changed all the material engineering. The evolution of composite materials has given an opportunity to various designers to use new and better materials resulting in cost reduction, increase in efficiency and better utilization of available resources. Composite materials are finding their applications in aerospace industry, automobile sector, manufacturing industries etc. This paper focuses on the importance of composite materials in mechanical engineering, terminology used in composite materials, various definitions, classification and the latest developments in composite materials in different parts of the world.

Keywords: - Aerospace industry, automobile sector, composite materials, latest developments, research

I. INTRODUCTION

This paper introduces basic concepts of stiffness and strength underlying the mechanics of fiber-reinforced advanced composite materials. This aspect of composite materials technology is sometimes termed “micromechanics” because it deals with the relations between macroscopic engineering properties and the microscopic distribution of the material’s constituents, namely the volume fraction of fiber. This paper will deal primarily with unidirectionally-reinforced continuous fiber composites, and with properties measured along and transverse to the fiber direction.

1.1 Materials

The term composite could mean almost anything if taken at face value, since all materials are composed of dissimilar subunits if examined at close enough detail. But in modern materials engineering, the term usually refers to a “matrix” material that is reinforced with fibres. For instance, the term “FRP” (Fiber Reinforced Plastic) usually indicates a thermosetting polyester matrix containing glass fibres, and this particular composite has the lion's share of today's commercial market. Fig.1 shows a laminate fabricated by “crossplying” unidirectionally reinforced layers in a 0-90° stacking sequence.

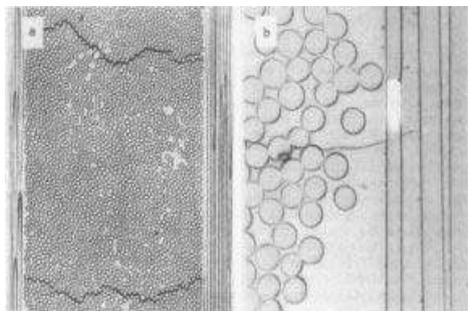


Fig. 1: A crossplied FRP laminate, showing non uniform fiber packing and microcracking (from Harris, 1986).

Many composites used today are at the leading edge of materials technology, with performance and costs appropriate to ultra demanding applications such as spacecraft. But heterogeneous materials combining the best aspects of dissimilar constituents have been used by nature for millions of years. Ancient society, imitating nature, used this approach as well: the Book of Exodus speaks of using straw to reinforce mud in brick making, without which the bricks would have almost no strength.

Table 1: Properties of Composite Reinforcing Fibers.

Material	E (GPa)	σ_b (GPa)	ϵ_b (%)	P (Mg/m ³)	E/ ρ (MJ/kg)	σ_b / ρ (MJ/kg)	Cost (Rs/kg)
E-Glass	72.4	2.4	2.6	2.54	28.5	0.95	61.6
S-Glass	85.5	4.5	2.0	2.49	34.3	1.8	1232-1848

Plan, operation and Performance Analysis of the adhesive factory commissioning Cooling Tower

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Abstract- 60 m³/h nominal capacity cooling tower was designed, based on the required cooling water parameters in process of the adhesive production in the "Chemis d.o.o." factory. For the chosen type and capacity of the cooling tower an analysis of its operation at various operating conditions was done.

Special attention is dedicated to the choice of the atmospheric air design parameters, so that designed (and built) tower can meet the needs of the production process in challenging summer conditions, and also to provide an opportunity for expansion of factory production in the future.

The project was carried out at the plant "Chemis d.o.o." Aleksinac and it is in operation since November 2014.

Keywords- cooling tower, atmospheric air, design parameters.

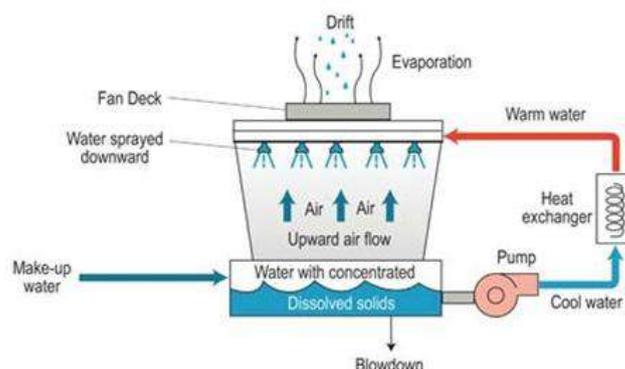
I. INTRODUCTION

Industrial process cooling towers recirculate water to cool hot process fluids. Cooling towers are heat exchangers that are used to dissipate large heat loads to the atmosphere [1, 2]. They are used in a variety of settings, including process cooling, power generation cycles, and air conditioning cycles. All cooling towers that are used to remove heat from an industrial process or chemical reaction are referred to as industrial process cooling towers (IPCT). Cooling towers used for heating, ventilation, and air conditioning (HVAC), are referred to as comfort cooling towers (CCT). Cooling towers are classified as either wet towers or dry towers. Dry towers use a radiator like cooling unit instead of water evaporation. Dry cooling towers, HVAC, and CCT are not included in this report.

Most plants use indirect contact cooling (Fig. 1). Hot process fluids pass through one or more heat exchangers, condensers, etc., which allow heat to be transferred from the process fluids to the cooling tower water without any contact with the process materials. Some industries use direct contact cooling. Cooling is achieved by placing the water in direct contact with hot materials, picking up surface contaminants like oils and dirt. The warmed water is then is collected, cleaned, (e.g. sent through an oil water separator,) then returned to the cooling tower.

Cooling towers cool the warm water by contacting it with ambient air. The warm water is pumped to the top of the IPCT and is distributed across the distribution deck where it flows through a series of nozzles onto the top of the tower's fill material. Fill material is used in cooling towers to create as much water surface as possible to enhance evaporation and heat transfer. As the water flows down the fill material, it contacts air that is drawn or forced across the fill material by one or more fans at the top of the tower. A small percentage of the water evaporates, cooling the circulating water and heating the air. A smaller portion of the water is entrained in the air stream as droplets of water which are called "drift" if they leave the tower.

The warm, moist air then passes through the drift eliminator and exits the tower through the fan stack(s), carrying some residual drift out of the tower. The cooled water falls into a cold water basin, which typically is at the base of the IPCT. From there, the water in the cold water basin is pumped back to the processes served by the tower [3].



Improving the power quality transmitted from WECS to the grid on the basis of a PMSG control model

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Abstract: Renewable energy has become one of the most energy resources nowadays, especially, wind energy. It is important to implement more analysis and develop new control algorithms due to the rapid changes in the wind generators size and the power electronics development in wind energy applications. This paper proposes a grid-connected wind energy conversion system (WECS) control scheme using permanent magnet synchronous generator (PMSG). The model works to improve the delivered power quality and maximize its value. The system contained one controller on the grid side converter (GSC) and two simulation packages used to simulate this model, which were PSIM software package for simulating power circuit and power electronics converters, and MATLAB software package for simulating the controller on Simulink. It employed a meta-heuristic technique to fulfil this target effectively. Mine-blast algorithm (MBA) and harmony search optimization technique (HSO) were applied to the proposed method to get the best controller coefficient to ensure maximum power to the grid and minimize the overshoot and the steady state error for the different control signals. The comparison between the results of the MBA and the HSO showed that the MBA gave better results with the proposed system

I. Introduction

The worldwide demand for energy is increasing gradually. Renewable energy could be a useful power source to reduce the fossil fuel consumption and its corresponding pollution. Wind energy is a powerful renewable source, which could be used in many areas. Various types of wind generators have been used in WECS, for example, double-fed induction generator (DFIG), the wound rotor synchronous generator, squirrel-cage induction generator, high-temperature-superconducting synchronous generator, and permanent magnet synchronous generator (PMSG). To extract the maximum power from systems with variable speed wind turbines (VSWT), different power converters and control topologies could be used. The advantages of VSWT compared with fixed speed generators are that the extracted energy could be increased, operating at maximum power point is possible, and the efficiency along with the power quality could be improved [1]. Using a direct drive PMSG could improve meaningfully the dependability of VSWT. Although many types of generators could be used in WECS, the PMSG plays a chief role in the market [2, 3]. Modelling and control of this system has been implemented for grid-tie [4-7] or stand-alone system [8]. Also, proportional resonant controllers were used to help in the elimination of steady-state error and enhance the performance of the reference tracking of the converter [9]. The advantages of PMSG are the possibility of multi-pole design that ensures, gearless WECS construction possibility, operating with slow speed, and free maintenance operation as no brushes exist. The significant disadvantage of PMSG is that the output voltage depends on the speed of rotation. Many applications and control systems were applied on this system [10-19]. Also, many algorithms were used to such problems [20-25]. It is possible that the minimum voltage and maximum voltage difference could reach four times in the applications of VSWT [26]. This disadvantage could be simply overcome with the help of a suitable interfacing converter. Optimum power/torque tracking strategies are commonly used as they help to achieve optimum wind energy extraction. They use the velocity of the wind in order to determine the required shaft speed to vary the speed of the generator. However, anemometer based control strategy decreases the system reliability and increases cost. This control strategy may not suit or may be with high cost for a small scale wind turbine system. In this paper, a proposed system was introduced containing a fully controlled inverter. MBA optimization technique [27] was implemented to get the maximum power under a certain grid voltage. A comparison of the proposed system results with the results of the same system using HSO technique [28] was carried out to identify the best technique. The comparative analysis of the results showed that the MBA was the better one. Section 2 introduces the materials and methods including the mathematical model and the optimization algorithms. The results and the discussion are presented in section 3. Section 4 will introduce the conclusions of the work.

Software Reliability Growth Models To Analyze the Products and To Predict

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Abstract: In progress of a product, programming mistakes are unavoidable. For expectation of the imperfections in a product, we need to create programming unwavering quality development models to investigate the items and to anticipate them. A similar development model can't be utilized for all the information. Subsequently different programming unwavering quality development models are utilized for which the information is isolated into a few sections and distinctive development models are utilized for every datum part. Later they are recombined. By consolidating all the conventional unwavering quality development models we get a multistage dependability development model. At each stage, the best Software Reliability Growth Model is to be applied. There are a few rules to assess the imperfections. The RSS proportion is utilized to choose the best Reliability Growth Model. The Multi Stage Reliability Growth Model is a blend of some modern models. These model shave to give the product dependability and could support to take care of issues which are difficult to determine by utilizing Traditional programming unwavering quality development models.

Key words: Software reliability, Software Reliability Growth Models, Defects, RSS Ratio, probit model.

I. Introduction

The vital part of software is Software Reliability because it guarantees quality. Software Reliability can be defined as the occurrence of no error functioning of a real system over a particular time in a particular environment for a particular reason. Because during software development errors are expected, it is of most significant to recommend a methodology to analyse and predict software and hardware reliability. For detecting the probable failures, reliability growth model is used as an indication and is the best solution. Since last several years, most companies used software growth models to improve software quality.

In certain cases defects get executed by the tester during testing then it results into a failure which is known as software failure. The software reliability growth models are divided into two classes, concave and S-shaped. The significance of both models is they have asymptotic behaviour i.e. the error prediction and detection rate reduces as the number of possible errors detected and predicted increases and the total number of errors and failures detected asymptotically reaches a finite value. Numbers of models were available for defect detection. One reliability growth will not fit the growth model well always.

Software Reliability Growth Models are used to detect and predict the number of failures before the software has been shipped to market. The reliability growth models use the data of system to detect and predict the number of failures in the software. The software reliability growth models to relate the failures in the set of code contained in the software use parameters. By knowing the parameter and the number of failures, we will know how many more defects are remaining in the code.

The residual defects helps us to decide whether the code is ready to be shipped and whether more testing is required if we decided the code is not ready to be shipped. The estimate of the number of defects that the software customers will encounter when operating and using the software.

To assess and forecast the software reliability of products, several software reliability growth models (SRGM's) are examined and used. Famous models are dependent on non-homogeneous Poisson process (NHPP), like the exponential Goel Okumoto model and s-shaped model. Gompertz model and a logistic model are also used as exponential reliability software growth models.

Presently OSS (Open Source Software) products are getting more accepted for both personal and business use. Since the use of OSS products, its developed body and process are expected to have more complexity. The pragmatic work determines an appliance of growth model curves to clarify and to foresee progress of open source system products. In spite of it, there will be a complexity left over to explain the total available of code modulation procedures with only one growth curve; it also tough to design the whole developing latest with one growth curve because of the difficult open source system developing method. So as to create a model that is casually and widely applicable, we use only growth curve data that are available from open code repositories and do not need any particular data method.

Role of Databases in the Security Maintenance Activity for Data Transmission between Two Communication Points

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Abstract: Keeping and controlling the security and secrecy of database data is significant in the cutting edge time as long as there are a ton of methods for entrance, surveillance, and access to information on the Internet. The significance of database security is a higher priority than the significance of information to be ensured. There are numerous available resources of security that help keep up the security of data and encryption to the level that meets the prerequisites of database security. It is notable that every office or division has its own strategy to shield its information from robbery or harm in relation to the size and sort of information notwithstanding the hand that works on such information and that the data security circumstance is in accordance with the foundation of the database.

Key Words: Information systems, data exchange, data classification, data encryption, ports.

I. Introduction

Modern technologies for computers and networks have revolutionized and continue to revolutionize the world of use, dissemination, and transmission of information. The standards of behavior that databases use in the transfer and linking of databases around the world must force users to respect rights and responsibilities. We can consider information to be a source of strength, and it is the key to prosperity for users who have access to it.

Do not forget that the information is a treasure to the hackers of the computer must be protected from Pirates of information, Do not forget that the information is a treasure to the hackers of the computer must be protected from them, the data and information must be protected whether stored in the database or transmitted directly through the channel connection on both ends of computers, one of them sent to data and other data receiver.

The electronic systems should reach the majority of international institutions, companies, workplaces and private life. Therefore, new ethical and legal decisions must be made to achieve balance and guarantee the rights of all.

II. The Ethical Issue Of Electronic Information Systems

The ethical issue is the accepted standards of behavior and the rules governing members of the profession, including information control, access, privacy and misuse of data. These extend to electronic networks and electronic databases, and more specifically, electronic information systems[1].

2.1. Electronic Copyright Law

The ease with which information is being pumped increasingly on networks is causing confusion and how copyright and intellectual property rights can be applied to electronic files. With the growing growth of networks, especially social networks, and the dissemination of information on them and the ease of sharing and use of information published without reference to the His idea, It became necessary to provide explanations on how to use electronic files, the ease with which the distribution of electronic files and the nature of some electronic information create problems under the law of copyright and intellectual property rights.

2.2. Unintended Consequences of Data Exchange

The consequences of data exchange are quite complex and point to many problems. Therefore, the database administrator must balance the security required for the data set with access to it by designing information systems carefully to prevent inappropriate access to all data or part of the data While at the same time allowing access to information exchange. However, many basic problems arise with how information is handled, stored and manipulated in digital formats.

For us not to forget to point out here the unintended consequences of data exchange are the dissemination of errors, errors can reach the database in an unintended way shortening an employee or intentional way by pirating information and penetrating sites and publishing specific, intended and targeted data

Application of Smart Prepaid Energy metering Unit in designing energy theft detection: A real-time monitoring activity

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Abstract:- Electricity theft remains a huge loss incurred by electricity distribution companies. This theft arises majorly because of activities carried out by consumers such as energy-meter by-passing, energy-meter tampering etc. This research study offers an approach for handling energy meter by-passing and tampering. The system design is based on the monitoring of the readings of two current sensors by a programmed microcontroller. While one of the current sensors monitors the current drawn by the user's load, the latter installed before the meter monitors current drawn by all loads. Any discrepancy between the values read, indicates theft. A momentary switch is also installed in the meter to trigger the meter once it is tampered with. Furthermore, the user is provided with a remote access to the energy meter for recharging energy units and for monitoring energy consumption. It was observed that the system accurately measured load consumption and detect any attempt to by-pass or tamper with the energy meter. Lastly, all unscrupulous attempts were reported using GSM technology.

I. Introduction

It is impossible for an electric power system to be 100% free from theft. In 1999, Transparency International revealed that close to 15% of the generated power is lost as a result of electricity theft. For instance, between 1998 and 1999, in Bangladesh, the Bangladesh Power Development Board (BPDB), after generating about 14,600 MWhr of electricity, could only account for 11,462 MWhr of billed energy, reflecting a total loss of about 22% [1]. In developing countries like Nigeria, electricity theft remains one of the major problems being faced by the power sector of which the government has little or no control over due to lack of the required technology. While the implementation of Automatic Metering Infrastructure (AMI) has eliminated the need for meter readers, it has adversely increased non-technical losses incurred by power utility companies [2]. It is estimated that Nigeria's grid has a total transmission and distribution (T&D) losses of about 40% which is tremendously high when compared to United States whose T&D losses are at 7% [3, 4]. Electricity theft is a form of non-technical loss. According to [5], any form of interference done by complete or partial bypassing of the meter to adulterate its values is referred to as electricity theft. The Non-technical losses are caused by human error. This error is an external action that has nothing to do with the characteristics of the power system. These activities include meter tampering, bypassing of meter, billing irregularities and unpaid bills [4, 6, 7]. To respond to the electricity theft and growth trend, the country needs to take appropriate initiatives not only to boost its power generation capacity but also to make residential sector more energy smart and efficient [8].

Analogue meters which are still widely used in most parts of the nation, pose lots of challenges for monitoring the power consumed by users. In addition, with the analogue meters, operators must go to the consumer's house to disconnect his power supply if he does not pay up his bills. Even in most cases, the operators accept bribes from the consumer so that their supply will not be disconnected. Consumers also have been known to tamper with the energy meters in order to reduce or stop the meter from reading without the knowledge of the operators. With traditional analogue meters, consumers have no way of disconnecting power in their houses when they travel and forget to disconnect or turn off their appliances. This leaves the meter running, incurring more payment for the energy consumer. Prepaid meters have provided a better way of monitoring power consumption by users. The motivation of this study is based on the fact that electricity theft as a result of energy meter by-passing and energy meter tampering has constituted a major problem to the power supply stabilization and has also resulted in a huge loss of revenue to the Nigerian power sector.

This study aims at developing a system with energy meter theft and tampering detection systems that can accurately measure and monitor the supply and distribution of power. In addition, it provides a remote energy management system for the consumer to disconnect or connect his load at free will. The rest of this paper is organized as follows. Section 2 reviews the previous researches related to energy theft detection and meter tampering that have been carried out earlier. Section 3 discusses the methodology for this study. The implementation and results are presented in section 4. In section 5, recommendations for future works are given.

Review of the Kosovo Power System under the Frequency Load Shedding Program based on ENTSO-E Requirements

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Abstract: Under-frequency load shedding (UFLS) is designed to protect the power system when the frequency drops below given thresholds by switching off certain amounts of the load aiming thus to balance generation and load. This paper presents a review of the existing UFLS (Under Frequency Load Shedding) program in compliance with recently revised Police-5 of Operational Handbook of ENTSO-e. The proposed review of the current UFLS program for Kosovo Power System has considered the main standards requirements and guidelines for UFLS set by ENTSO-E. This work examine system performance by conducting dynamic simulations of UFLS schemes subject to different imbalances between load and generation, and includes three power system island mode scenarios with different equivalent inertia of the system, respectively different size of the systems. With aim to define the best program of UFLS, which fits to the Kosovo Power System frequency behavior, two different UFLS programs are analyzed and results are compared. The proposed program is tested using a large scale PSS/E model which represents interconnected power system area of Southeast Europe.

I. Introduction

Under-frequency load shedding (UFLS) is defined as a coordinated set of controls using under frequency relays which results in the decrease of electrical loads in the power system, with aim to recover the system frequency. Load shedding as the last resort to avoid a major power system breakdown has been utilized for a long time. It is mainly triggered by under-frequency or under-voltage protection relays and actuated by distribution system circuit breakers. Proper design of load shedding schemes which include proper settings of under-frequency protection is most relevant issue to ensure smooth load relief, in situations where the power system otherwise would go unstable. The current revised program requirements for UFLS are presented in Operational Handbook of ENTSO-E/Police-5.

Each TSO shall implement the ENTSO-E RG CE general UFLS scheme as followed:

Frequency in the range 49.0 to 48.0 Hz:

- a. At least an amount of demand corresponding to 5% of the total load shall be disconnected at 49.0 Hz.
- b. In total, an amount of demand corresponding to 45% +/- 7% of the total load shall be disconnected between 49.0 and 48.0 Hz.

The UFLS scheme shall be implemented stepwise taking into account following considerations:

- a. The number of disconnection steps shall be minimum 6 (including the step triggered at 49.0 Hz),
- b. For each step, an amount of demand corresponding to 10% of total load shall be disconnected at maximum.
- c. Additional df/dt function in UFLS relays is allowed in the range 49.8 – 49.0 Hz.
- d. No intentional time delay shall be set in UFLS relays.
- e. Maximum disconnection delay shall be 150 ms including breakers operation time [1].

The existing UFLS program which is operational in Kosovo Power System, was established based on previous recommendation of ENTSO-E, including only four steps with different amount of load disconnections and with additional time delay included in under-frequency relays [2]. The main factors that ENTSO-E has initiated the UFLS review are:

- a. System implementation ensures the affectivity of UFLS: it means a minimal necessary shedding of load,
- b. Compensate disconnection of dispersed generation at unfavorable frequencies,
- c. Avoid over frequency (overcompensation), overvoltage and power transients that can lead to an additional loss of generation.

1.1. Theoretical Background of under Frequency Load Shedding Protection (UFLS)

Each part of the power system can be unbalanced if the load exceed the generation. Such a change between the generated power and the load power is known as generator imbalance. In such cases generators

Studies On the Energy Absorption Capacity Metal Tubes

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Abstract: *Effect energy absorbers are superfluous mechanical auxiliary components, which are brought energetically to disseminate the active vitality in case of an undesirable crash. These go about as mechanical wires to constrain the heaps, which may follow up on the primary structure following a crash. The utilization of aluminum tubes and cylindrical structures for use as effect vitality safeguards in various designing applications is empowering. This is a direct result of their prepared accessibility in various cross areas and sizes, and furthermore has high energy retention limit under semi static and dynamic burdens. In this current investigation, tests are led on roundabout aluminum tubes under semi static, hub pressure. The various methods of twisting of these cylinders are analyzed in two separate cases. Case 1: when the cylinders packed pivotally between a level platen and molded bites the dust of various radii. Case 2: when the cylinders compacted pivotally between two level platens. Bites the dust of various radii are utilized to assess the effective method of twisting. The energy ingestion limit under semi static stacking conditions is assessed in the above cases to assess the energy retention limit and to analyze the vitality assimilation of aluminum tubes dependent on the distinctive distortion modes. The consequences of the investigation are helpful in the plan of effect energy absorbers*

I. Introduction

The major challenge in the design of impact energy absorbers (IEA) is to establish the relation between the specified force level to the geometric and material properties of the impact energy absorber.

The selection of an appropriate energy absorber depends very much on its application and the desired response upon impact. So, for an IEA to perform effectively it should possess the following qualities:

- Undergo large plastic deformations at controlled rates.
- A predictable flat load-deformation characteristic under quasi-static and dynamic loading conditions.
- High specific energy absorbing capacity (energy absorbed per unit mass). This makes it ideally suitable for applications in automobile and aircraft industries.

High energy-dissipation density (or energy absorbed per unit volume). This is required as for protective claddings in static structures or to absorb the kinetic energy of a falling lift.

1.1. Aluminium Tubes as Impact Energy Absorbers

Circular tubes are used extensively as energy absorbing elements, the main attraction being their ready availability in a wide range of dimensions and materials as well as the wide range of deformation modes which can be generated. Depending upon the mode of deformation, it is possible to obtain behavior ranging from a low force-long stroke characteristic to a high force - short stroke characteristic from the same tube.

Basically tubes can be subjected to diametral (or lateral) compression or axial compression. The lateral compression modes which produce the relatively low force-long stroke deformation characteristics have been reviewed by Reid et al [1] and a particularly efficient variant of this mode has been described by Reid et al. [2]. With regard to axial compression, the tube may be subjected to compression between two flat plates or between a flat plate and a shaped die. In the former case, which has been studied by many authors, the tube deforms by progressive buckling in an ax-symmetric, concertina mode or in diamond-fold patterns [3].

Stronge et al. [4, 5] have examined the behavior of square-sectioned tubes pressed on to a shaped die. Fractures are initiated at the corners and cracks propagate along the edges of the tube while the flat strips so formed curl up as the compression continues. It was observed that such an energy absorbing device has a long stroke and operates at a load which increases mildly as the deformation progresses.

1.2. Aluminium Tubes under Axial Compression

The behaviour of an axially compressed tube depends on the end fixtures provided. For example a tube may be fixed at both its end; or it may be provided simply supported conditions by placing the tubes in suitable grooves; or it may be compressed between two flat plates; or it may be compressed between two shaped die fixtures; and any combinations of these are possible. Tubes crushed under axially applied lodes through two flat plates show a progressive plastic folding behaviour. The end conditions of the tube only affect their behaviour during the first part of the crush displacement.

Multi-hop trust based Routing Mechanism for VANET

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Abstract: Vehicular ad-hoc network (VANET) is a wireless technology that operates in an environment where vehicle to vehicle (V2V) framework enables vehicles to share real time traffic status information. VANET provides self-organized and self-configured wireless technology without the need of gateways. Security threat is one of the critical challenges in this domain. Attack like packet drop obstructs the performance and reliability of the communication. The paper focuses at enhancing multi-hop communication by proposing Trust-Based routings scheme, the approach introduces the mechanism of portioning the communication signal into regions and zones and acknowledgment technique to provide holistic control and tracking of the packet flow from source node to the destination node.

Keywords: multihop, packet drop, VANET, V2V, wireless

I. Introduction

In Vehicle to Vehicle (V2V) communication, the vehicle communicates wirelessly with one another via wireless medium [1], V2V is purely wireless communication between vehicles in ad-hoc mode; it enables data exchange platform for the vehicle to communicate and share information with other vehicle within a communication range [2]. In V2V communication, each vehicle is a node and can work as a source, a destination and/or a router to re-transmit traffic related information to other vehicles. The vehicles communicate either directly or indirectly, this mean, the nodes within the same signal range communicate directly and for the nodes that are out of the same signal range communication via an intermediate nodes by establishing route in multihop mode [3], this enables forwarding of data to an individual or group of node [4].

Multihop communication enables message propagations in vehicular networks based on the principles of mediator approaches, through carry-forward process by neighbouring vehicles until the desired dissemination target node is reached [5], the packet propagations are accomplishing through intermediary vehicles when a source vehicle send a message to destination vehicle. However, due to high mobility of vehicles and multipath propagation, communications in vehicular networks suffer from severe channel mutilations which make quality-of-service (QoS) provisioning in the networks seriously challenging. These have highlighted that, improving and securing the transmission reliability is critical issues in vehicular network [6].

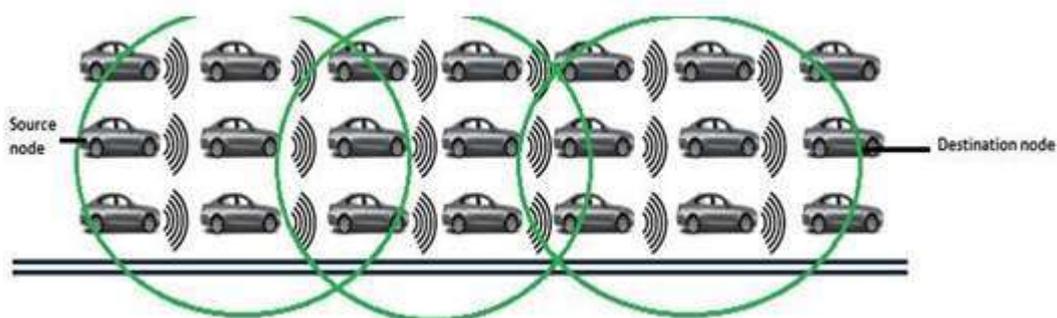


Figure 1: MultiHop communication in vehicular network

Fig. 1 represents multiHop communication in vehicular networks, the source node communicates with the destination node, these nodes are not within the same signal range and the remaining nodes are the intermediary nodes residing in different signal range that forward transmission in multihop mode, they provide relay services by re-broadcasting the packet sent from source node to reach the target destination node.

Structural Behavior, Analysis & Design of Dapped-End Beams

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Abstract: The flexure conduct of fortified cement dapped-end pillars (D-E) is relegated in this paper. Strengthened solid D-E pillars, that flopped in flexural have been investigated utilizing the ABAQUS programming. The ABAQUS model speaks to the nonlinearity, for example, post breaking malleable firmness of the solid, stress move transversely the broke squares of cement. The disappointment method of D-E shafts is exhibited genuinely well utilizing the present numerical model, and the greatest burden expected is close to the disappointment heap of test outcomes. In this investigation elucidated some of parametric examination, for example, shear length to profundity proportion (a/d), concrete compressive quality, and the fundamental D-E fortification on the conduct of the pillars. The fundamental steel sum has the most huge impact on the exhibition of flexural quality of RC D-E bars. Most extreme burden and uprooting for different kinds of flexural disappointments in bars have been spoken to. When all is said in done this examination exhibits that the D-E pillars flexural quality is affected by the previous parameters.

Key words: Finite element, shear span, Dapped-end beam, flexural Failure, ABAQUS software.

I. Introduction

The D-E beams permit the development depth of a readied concrete floor or roof structure to be diminished, by recessing the supporting corbels into the depth of the beams supported [1]. They are for the most part utilized as a part of drop-in beams between corbels, as a feature of beam to-beam association and in suspended traverses between cantilevers, as appeared in figure (1) below. The utilization of D-E beams encourages the gathering of a precast concrete structure, because of the greater lateral stability of a protected D-E beam than that of a desolate beam supported at its bottom face [2]. The RC D-E beams are generally used in concrete bridge girders and prepared concrete buildings.

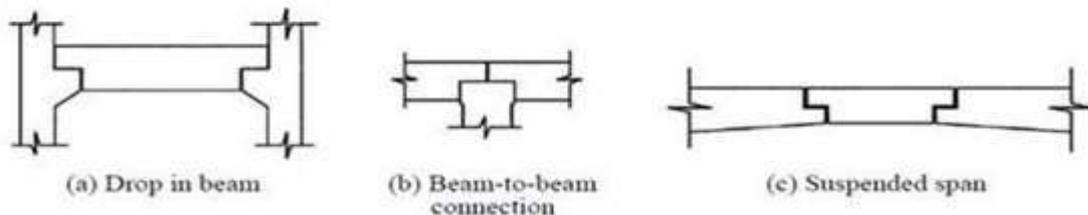


Figure 1 Cases of reinforced D-E beams

This paper is to study the ultimate flexural behavior of a D-E beams using ABAQUS software. For this purpose, three beams with span to depth ratio (1.2) were analyses in numerical solutions were gotten by this software [3]. The experimental and numerical modeling results are compared numerically and graphically.

II. Test information

Three reinforced concrete D-E beams were tested by Wen-Yao Lu et al, [4] with shear span-to-depth ratio more than unity under vertical load only. Variables considered were compressive strength of concrete, main dapped-end reinforcement, as well as horizontal and vertical stirrups.

Figure (2) shown that the D-E beam were formed on opposite ends of 3600mm, long rectangular prismatic beams. All the nibs had 500 mm, long and an overall height of, 260 mm. The reinforcement of the nibs contained from main bars, horizontal and vertical stirrups as shown in Figure (2). The sizes and amounts of the main bars, horizontal stirrups, vertical stirrups, and hanger bars in each specimen are listed in Table (1).

The main bars of the main body of the test beams consisted of 4-#6 straight bars. Shear reinforcement was provided within the middle and end span of the main body of the test beams to prevent premature failure. Dimensions of the main body of the specimen are itemized in Table (2).

The D-E beam was independently experienced by supportive the beam at one end of the D-E beam, and under the beam lowest face at the reverse end.

The Usage of Selinux Operating System for the Development of Trusted and Secure Web Application

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Abstract: This research paper proposes the Secure Web Application Development and SELinux based distributed Trusted Operating System for maintaining the security aspect in web applications. Unlike the conventional methods of adding more and more security layers at the kernel level, in this proposed design, we are suggesting two subsystems like object manager and security server. This model allows system administrators to skip or disable some unnecessary security checks in SELinux trusted operating systems through which they can effectively balance their performance needs without compromising the security of the system. This paper suggests UML 2.0 based class-based software development and the integration of security engineering into a model-driven software development.

Keywords: Security enhanced version of Linux (SELinux), SPF, UML 2.0, object oriented Model Driven Development (OOMDD), Distributed trusted operating System (DTOS)

I. Introduction

In the last decade, there has been vast growth in the field of networking, sharing of data worldwide. And then comes the most extensively used thing Internet have made cyber security a very crucial aspect of research and development. Its matter of concern for both the common users and researchers connected all over the world. Despite of lot of works undergoing we are still unable to get something that reliable and silver bullet that it may provide us with complete security for our systems. Being so advanced we still lack the basic potential to create such a system that is capable of stopping viruses and accessing our confidential data from our systems[1][2].

The security methods developed, researched till yet are implemented in the application layer of the computers which is making our systems more prone to data insecurity. These methods includes encryption using a key i.e. cryptography, using firewalls, access control using authentication, and application layer access control [3].

It is believed that security measures in kernel are much more effective than the application layer. In fact, after lot of research such operating systems have been developed which have much more mechanisms inside the OS kernel providing us very good level of security thus securing our systems [4][5]. In reality, trusted operating systems are better choice for web applications to maintain the security concern.

The Security is not something expected not only by big organizations but also by common consumers so now concerns are being there on this and many vendors are trying hard to fix the issue. This paper suggests UML 2.0 based class-based software development and the integration of security engineering into a model-driven software development [6]. Integration of presented web services has become more and more accepted in the development of new web applications [7][8]. This type of web applications can be classified as the composition of web services around UI flow. In this paper, for the development of user-centric web applications, the author has presented the application of model-driven techniques [9]. This research paper proposes the Secure Web Application Development and SELinuxbased distributed Trusted Operating System for maintaining the security aspect in web applications. This SPF based improved version of secure systems can be used for desired web application. Due to excellent performance of SPF based SELinux for web development; we are suggesting the same for the implementation of web applications[10][11].

II. Secure Web Application Development And Solution Methodology

First we will be talking about the basic principles of Secure Operating Systems. Trusted OS is interpreted differently and vary from one company to another software company. During system programming, company develops the system software according to the requirement of end users. But there are some important features in all Trusted Operating Systems. They are as follows Least Privilege, Mandatory Access Control (MAC), Discretionary Access Control (DAC) and auditing[12][13].

The essential structural design of distributed trusted operating systems (DTOS) and Flask is revealed in Figure 1. Unlike the conventional methods of adding more and more security layers at the kernel level, we are suggesting two supplementary or extra subsystems in this structural design [14]. The responsibility of object

Energy Optimized Sleep Scheduling Protocol for Data Aggregation in WSN

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Abstract: *Wireless Sensor Network (WSN) consists of various nodes or devices those are operated on batteries. These nodes or devices have inadequate amount of initial energy which are consumed during the data transmission process. In sleep scheduling algorithms most of the sensor nodes are turn to sleep state to preserve energy and improve the network life time. This paper focuses an Energy Efficient Sleep Scheduling (EE-SS) protocol for WSN. In the initial phases, the network is divided into small clusters and these clusters are managed by the Cluster Heads (CHs). The CHs are elected based on the highest residual energy criteria. The sleep scheduling approach helps to allocate the slots to forward data from the source to base station. The nodes which are having the highest residual energy are selected as the forwarding nodes. This paper compares the performance of the proposed method with the standard LEACH protocol and CL model in terms of various factors. The result of this paper proves that the proposed method has higher network lifetime than the existing approaches.*

Keywords— *Base Station, Cluster Heads (CHs), Low Energy Adaptive Clustering Hierarchy (LEACH), Residual Energy, Sleep Scheduling, Wireless Sensor Networks (WSNs)*

I. Introduction

Wireless Sensor Network (WSN) is composed of a huge number of sensor nodes disseminated over a certain region. Each node notices its surrounding area and collects the application specific information. It transmits the gathered data to the gateway (master node). The gateway processes the data and perform necessary actions if necessary. A sensor node may require to function for long periods of time relying on a small battery. Hence, it is essential to optimize the energy efficiency of all sensor processes. It includes sensing, communication and computation. This requests for planning the communication protocols which are energy-efficient in the sense of demanding the low transmission power and low-complexity processing. Lesser the computational complexity of communication protocols is essential due to its reduced energy consumption and hardware cost.

It is identified that the energy requisite to communicate a definite amount of information is exponential to the inverse of the transmission time. The corresponding delay-energy tradeoff principle is applied to the strategy of energy-efficient packet-scheduling protocol. It accomplishes filtering or smoothing on the packet arrival-time intervals, resulting in an output packet traffic which is less bursty than the input traffic and it leads to the significant energy savings. A discretized form of the “lazy scheduling protocol” is applied to a network, where the channel gains among the different users are expected to be identical. Some of the primary implications of reliability in the effect of cost and energy influences in WSN scheme are as follows:

- **Sensing reliability:** All the sensor nodes in WSN applications cooperate together to observe physical phenomena of interest through the sensor field. As the individual nodes can sense the suitable physical occurrences inside their sensing range only, significant events may be distorted by all sensor nodes due to the possible insufficient sensing coverage. Henceforth, providing comprehensive sensing coverage needs node deployment schemes and careful network planning. The redundant sensors may entered to the sensor network which need an additional reliability for sensing the area. Though, tradeoffs should be weighed based on network management complexity and per node costs.
- **Hardware reliability:** It is associated to the tendency of the onboard hardware components in submitting to the failure at the time of normal WSN operations. While the particulars on WSN hardware design to maximize the reliability.
- **Communication reliability:** The complete traffic profile is very easy as the packets only drift from the sensor nodes to the data destination and vice versa, with very lesser inter-node exchanges. Although this simplicity in traffic flows, the sensor network is still estimated to provide the data and control messages with high fidelity in a timely manner. Apart from the effect of packet loss across the unstable links, the intrinsic multihop nature of network communications present extra uncertainty in assuring the packet transport reliability. It remains a considerable challenge to maintain the network connectivity in combination with low-duty cycle sleep-scheduling schemes anticipated for maximum energy preservation.

A Novel Approach to Monitor and Control the Water Leakage System Using Zigbee

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Abstract

This paper presents the design of a water leakage monitoring system which includes wireless networked sensors monitored from a Windows based PC. The purpose of such system is to detect possible water leakage for residential water pipes. Utilizing three small Printed Circuit Boards (PCB) s, data from remote sensors of different types (acoustic, pressure, temperature, flow rate, etc.) are collected and monitored on a PC for further processing and analysis. ZigBee technology, which is built on top of the standard, is used for wireless communication in the network.

Keywords: *Water Leakage System, PCB, PC, Zigbee.*

1. Introduction

Increases in residential plumbing, treatment and operational costs make the losses associated with underground water system leakage prohibitive. To combat water loss, many utilities are developing methods to detect, locate, and correct leaks.

In fact, accurate and efficient residential leak detection technology encompasses a wide range of benefits including but not limited to: economic benefits, increased knowledge about the distribution system, more efficient use of existing supplies, delayed capacity expansion, improved environmental quality, reduced property damage, reduced legal liability, reduced insurance and reduced risk of contamination[1].

Hence, this paper strives to delineate design of a water leakage monitoring system to detect possible water leakage for residential water pipes. To that end, the system collects and monitors data on a PC from remote sensors-

located next to pipes for further processing and analysis to detect water leakage. Reliable communication within the network is provided by ZigBee technology, which is built on top of IEEE 802.15.4 standard.

More specifically, to collect and monitor data on a PC, three Printed Circuit Board (PCB) s, populated with the ZigBit 900 RF modules and a matched antenna are used. The ZigBit module featuring ultra small size and superior RF performance enables the board's wireless connectivity and facilitates its functionality as a node in the ZigBee network. The PCBs include temperature sensor. In addition, these PCBs support standard extension connectors to connect to external sensors such as acoustic sensor, pressure sensor and etc. The PCBs are powered by one C-sized battery.

Importantly, this paper is organized as follows: Section 2 presents the basic concepts of Wireless Sensor Network (WSN). Section 3 elaborates on WSN standards including IEEE 802.15.4 and ZigBee standard. Section 4 elucidates the hardware component of the water leakage system. Section 5 discusses software component of the design. Section 6 explains how sensor data displays on PC in GUI format. The conclusion remarks are included in the end.

2. Wireless Sensor Networks

Wireless Sensor Network (WSN) typically consists of small spatially distributed devices to cooperatively monitor physical or environmental conditions, such as temperature, sound, vibration and etc. With WSN connectivity, data from

Secure Data in Cloud Environment using AES

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Abstract

Cloud computing is a future generation technology for IT enterprise. It has different characteristics like virtualization, multi-user, scalability and many more. It also provides on demand computational infrastructure which has the power to reduce the cost to build the IT based services. It can provide different types of service over the internet. One of the important services provided by the cloud is storage where users can keep their data as per the requirement. It is a challenging issue for the user as all the data are stored in some inter-connected resource pool but this resource pool is situated over different places of the world. An unauthorized user may be access this data through the virtual machines. So, it is the dark side of cloud data storage. This insecurity creates a big problem for users. Therefore data security in cloud computing is a major problem. Currently, AES is regarded as the most popular symmetric cryptographic algorithm. It is very significant to develop high performance AES to further broaden its widespread application..

Keywords: *Cloud Computing, Data Security, AES.*

1. Introduction

Cloud refers to storing the user's data in a remote database instead of storing it in the hard disk of their own computer. Cloud delivers computing resources as a service in a scalable manner to the clients by means of Internet which eliminates the need of setting up company's own data center or server. These resources are offered on demand and customers pay for their level of usage.

National Institute of Standards and Technology (NIST) defines Cloud as "a model for enabling ubiquitous, convenient, on demand network access to a shared pool of configurable resources that can be rapidly provisioned and released with minimal management effort or

service provider interaction". There are five essential characteristics of cloud, three cloud service models and four cloud deployment models [1][2].

Five essential characteristics of cloud are [8]:

- Broad Network access: Resources available over the network are open to users by means of their phones, laptops and so on.
- Rapid Elasticity: Elasticity refers to scalability of resources according to the need of the user.
- Measured Service: The cloud provider monitors or measures and controls the services for various reasons like billing, resource optimization and planning.
- On-demand self-service: A user will cater the resources based on his requirement without interacting directly with every provider.
- Resource Pooling: Resources are shared to aid many customers based on multi-tenant model. The resources are allocated and reallocated in a dynamic manner according to user's necessity.

The various deployment models in cloud are as follows [8]:

- Public: The cloud infrastructure functions for common public and is possessed by an organization promoting cloud services. Services are available for general user over the internet.
- Private: The cloud infrastructure functions for a private business. It's like a virtualized datacenter operating within firewall.
- Community: The cloud infrastructure is made common to several organizations with the same principles and agreement consideration. It is possessed, administered, and controlled by a single or others of the organization in the community or a third party and it shall be on or off site.

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Abstract Details

Title: Advanced Composite Materials for Aerospace Industry: A Future Perspective

Author: Amar Kumar Das, Chandrabhanu Malla, Prajna Kar and Babita Meher

Keywords: Composites, Material Development, Physical Properties.

Abstract: The advancement in material properties has helped us to grow quickly and inexpensively in the world, by improving the performance and operations of modern aircraft. In the first part of this study the composites materials with their pro and cons is described. Airbus and its innovation in composite materials are introduced in the second part of the thesis. Composite technology continues to advance, and the advent of new types such as nanotube forms is certain to accelerate and extend composite usage. Anyway, a continuing movement in material development is the improvement in processing and production of incumbent materials to either improve physical properties or to allow their application in new areas and roles for further usage in the future.

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Abstract Details

Title: 1-D Simulation for Ethanol Operated 1-Cylinder CI Engine

Author: Ayusman Nayak, Bidyut Prava Jena, Deepikarani Swain and Srikant Kumar Sahoo

Keywords: One-dimensional, Ethanol, Diesel engine, Biodiesel.

Abstract: This study intended to perform the one-dimensional simulation for single cylinder diesel engine. The one-dimensional numerical analysis of GT-Power software is used to simulate the commercial single cylinder diesel engine. The diesel engine is simulated to study the characteristic of engine performance when the engine is operating with alcohol as alternative fuel. The simulation results were compared with the data from the diesel engine operating with conventional diesel. It is found that the performance of diesel engine operating with alcohol (ethanol) demonstrate lower engine performance and engine efficiency. The simulations are conducted at full load condition for the engine operating with ethanol and conventional diesel. The simulation results show that the brake power and brake torque reduced maximum of 38.84% and 37.67% respectively for the engine operating with ethanol as compared to conventional diesel. Nowadays, the ethanol is able to compete with standard diesel and the economics have become much more favourable in it production. The decrease of low heating value resulted to increase brake specific fuel consumption and reduces the brake thermal efficiency of engine performance at full load.

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Abstract Details

Title: Scope of Nanotechnology Application for Cancer Treatments

Author: Dr Prabhu Prasad Mishra, Bibhuti Busan Sahoo, Satyajcet Mohanty and Ranjan Kumar

Keywords: Nanotechnology, cancer, lopsomes, toxicity.

Abstract: The use of nanotechnology for malignant growth treatment has gotten significant consideration as of late. Disease nanotechnology (an interdisciplinary territory of research in science, designing and prescription) is an up and coming field with broad applications. It gives an exceptional methodology and complete innovation against malignant growth through early finding, forecast, anticipation, customized treatment and medication. Target-explicit medication treatment and techniques for early determination of pathologies are the need inquire about regions in which nanotechnology would have a crucial influence. This audit centers on the methodologies of malignancy nanotechnology in the progression of disease treatment.

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Abstract Details

Title: A Context Aware Requirement Model for Domain Based System

Author: Dr. Chinmaya Ranjan Pattanaik, Anil Kumar Mishr, Sushree Sangita Jena, Dr. Tanmaya Kumar Pattnaik

Keywords: Context, context elements, context awareness, domain ontology, contextual information and coalition.

Abstract: Mobile applications are software programs that can be based on different mobile devices and operating systems such as android, ios, symbians etc. These are not only just desktop applications reformatted for a small display but also has the ability to communicate to anywhere to make essential changes and to show how user interact with an application needs to be dealt with. This paper presents a requirement model for specifying different contexts in a comprehensive and integrated manner. It also constitutes a model that shows a conceptual and logical approach that combines different ontology and different context parameters. This paper explores and evaluates to present how information can be provided through mobiles via different contexts. This paper also comprises how the required information will be given to farmers through mobile applications to some extent.

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Abstract Details

Title: Building Learning Model for Mobile Apps

Author: Dr. Sachi Nandan Mohanty, G Samba Siva Rao, Gyanendra Kumar Pallai and Jui Pattanaik

Keywords: Building Learning Model, Mobile Apps, RDF.

Abstract: With information and communications technology becoming portable and individual-oriented, we are today experiencing the first level of effective mobile learning as it was envisioned decades ago. Mobile technologies have the power to promote and foster collaboration and communication, which are deemed essential for twenty-first century success. Mobile devices allow students to gather, access, and process information outside the classroom. They can encourage learning in a real-world context, and help bridge school, after school, and home environments. This paper discusses a transition between e-learning and m-learning. It also explains the social aspects as one of the context that accounts for mobile learning. Overall it suggests an M-learning framework using different contexts of mobile learning through a RDF data model.

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Abstract Details

Title: Designing Context Data through Ontology in Mobile Web

Author: Dr. Sasmita Pani, Laxmi, Rakhi Jha, Nilamani Samal

Keywords: Context, mobile contexts, ontology, OWL DL, class and property axioms, property restrictions.

Abstract: Mobile devices have obtained a significant role in our life providing a large variety of useful functionalities and features. Mobile applications are the software programs that can be based on different mobile devices and operating systems. Mobile apps provide information to any user at any place at any time. The user can also access the mobile phone at anywhere and anytime. Mobile devices can also be used in any domain like agriculture system, healthcare system and learning. There are many agriculture information systems like e-choupal, IKSL, m-krisi which provide information to farmers. But the data in these information systems are not designed semantically. Those information systems don't provide context information to farmers. The paper shows a process to build ontology for agricultural system and designing the context data in a semantic way for mobile web apps by using web ontology language description logic (OWL DL) with the help of protégé 5.0 beta framework for achieving data consistency in an agricultural system.

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Abstract Details

Title: Modeling Social Aspects of E-agriculture System using Semantic Modeling

Author: Satyabrata Dash, Prakash Chandra Jena, D. Bright Anand, Prakash Dehury

Keywords: E-agriculture, Semantic Web, ontology, OWL DL, ontology graph, asserted model.

Abstract: There exists various web based agriculture information systems. These systems provide the required information to farmers about different crops, soil, different farming techniques etc. These web based agriculture information systems deal with numerous kinds of data but they don't maintain consistency and the semantics of the data. Hence an OWL (Web Ontology Language) is used for designing required information in the web which provides meaningful annotations and vocabulary of the terms about a certain domain area to achieve the semantics for the web based systems. Here in this paper we are building ontology of an agriculture system which is modeled in web ontology language (OWL) in protégé 5.0 framework, for semantic web apps. In this paper, the usages of the farmer's or user's aspect of various components of the e-agriculture systems are analyzed, with respect to the social web components for easy access through the semantic web.

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Survey on Energy efficient Dynamic Duty Cycle Scheduling mechanism for Media Access Control Layer

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Abstract

Wireless Sensor Network (WSN) has a vast application in many areas. The network consists of many sensory nodes which are operated with a battery power during the data transmission process. One of the critical aspects is that to reduce the energy consumption of the nodes so that the life time of the network can be extended. WSN need to provide better performance by reducing the sleep latency, while balancing energy consumption among the sensor nodes. The duty cycle media access control (MAC) scheme have been proposed in WSNs mainly to reduce energy consumption of sensor nodes. There are many mechanisms are available to reduce the energy consumption to increase the life time of the sensor networks. One such mechanism Dynamic Duty-cycle and Dynamic schedule assignment (DDDSA) reduced the number of RTS and CTS packet by dynamically updating duty cycle value to achieve energy efficiency. The duty-cycle scheduling based on residual (DSR) energy reduced the sleep latency while balancing energy consumption among sensor nodes. Similarly duty-cycle scheduling based on prospective (DSP) increase in residual energy to increase the residual energy of nodes using harvesting and DSR. DSP reduce sensor nodes duty cycle to increase the lifetime of the network through harvesting technique.

Keywords: *Medium Access Control (MAC), Duty cycle, Scheduling, Power consumption, Energy efficiency.*

1. Introduction

1. Wireless sensor networking is an emerging technology that has a wide range of potential applications including environment monitoring, smart spaces, medical systems and robotic exploration. Network consists of large number of distributed nodes that organize themselves into

multi-hop wireless routing to perform task. Each sensor consists of one or more sensors, embedded processors and low power radio. The sensing, processing and wireless communication subsystems form the wireless sensor. Each subsystem having the different function such as sensing system sense the data on environment change or according to application requirement, processing system process the acquired data and also stored it in file or database and wireless communication subsystem can used for data transmission over the network. Sensor nodes are normally battery operated. The power source supplies the energy needed by the device to perform the specified task. It is often difficult to recharge or change batteries for nodes, because nodes may be deployed where human beings unable to reach for example in furnace to sense the temperature etc. The network life time can increase long enough to fulfill the application requirement, by minimizing the energy consumption of the nodes [2].

2. The energy consumption is greatly affected by the communication between nodes. So, communication protocols at different layers are designed with the energy conservation in the mind. The medium access control (MAC) layer has been proposed in wireless sensor networks mainly to reduce energy consumption of sensor nodes. MAC plays a vital role for successful working of the networks. Also it is responsible for deciding the manner of wireless communication channel and limited resource allocation of communication among nodes. MAC protocols must fulfill some essential factors, such as energy efficiency, effective collision avoidance, scalability and adaptively, minimum latency and efficient throughput of the

Automobile Working on Addition of HHO Fuel to Improve the Efficiency of IC Engine

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ABSTRACT: In this paper we have studied the basic properties of gas generated through electrolysis of H₂O & then used gas in the bike as a fuel with gasoline by mixing it with air. This results the increased mileage of bike 30 to 60% & reduce the polluting contents from the exhaust gases. Hydrogen gas combined with the standard air/fuel mixture increases the mileage. This form of alternative fuel is provided by a hydrogen generator mounted in the vehicle. Once set up is ready, the hydrogen gas will be produced from water, an electrolyte compound, and electricity supplied from a battery provided. Here we are designing a mixed fuel two wheeler engine. Ie in conventional SI engine we are incorporating traces of hydrogen along with gasoline in order to minimum consumption of gasoline as well as to increase the power of vehicle. Here in addition, a hydrogen generating unit is made to produce hydrogen.. It is actually an electrolysis unit having high grade stainless steel/graphite/semiconductors as electrodes in a closed container and mixture of distilled H₂O & suitable ionic solution (KOH or NaOH) as electrolyte. Power for electrolysis is taken from an additional battery provided (12 V). This battery can be recharged from a dynamo/alternator/motor provided on the vehicle.

KEYWORDS: KAOH, NaOH, SI engine, electrolysis of H₂O, Hydrogen cell.

I. INTRODUCTION

Multifuel, sometimes spelled multi-fuel is any type of engine, boiler, heater or other fuel-burning device which is designed to burn multiple types of fuels in its operation. One common application of multifuel technology is in military settings, where the normally-used diesel or gas turbine fuel might not be available during combat operations for vehicles or heating units. Multifuel engines and boilers have a long history, but the growing need to establish fuel sources other than petroleum for transporting and heating and other uses has led to increased development of multifuel technology for non-military use as well, leading to many flexible-fuel vehicle designs in recent decades. A multifuel engine is constructed so that its compression ratio permits firing the lowest octane fuel of the various accepted alternative fuels. A strengthening of the engine is necessary in order to meet these higher demands. Multifuel engines sometimes have switch settings that are set manually to take different octane, or types, of fuel. Many other types of engines and other heat-generating machinery are designed to burn more than one type of fuel. For instance, some heaters and boilers designed for home use can burn wood, pellets, and other fuel sources. These offer fuel flexibility and security, but are more expensive than are standard single fuel engines.^[7] Portable stoves are sometimes designed with multifuel functionality, in order to burn whatever fuel is found during an outing.^[8] Multifuel engines are not necessarily underpowered, but in practice some engines have had issues with power due to design compromises necessary to burn multiple types of fuel in the same engine. Perhaps the most notorious example from a military perspective is the L60 engine used by the British Chieftain Main Battle Tank, which resulted in a very sluggish performance in fact, the Mark I Chieftain (used only for training and similar activities) was so underpowered that some were incapable of mounting a tank transporter. An equally serious issue was that changing from one fuel to another often required hours of preparation.^[9] The US LD series had a power output comparable to commercial diesels of the time. It was underpowered for the 5-ton trucks, but that was the engine size itself, the replacement diesel was much larger and more powerful. The LD engines did burn diesel fuel poorly and were very smokey, the final LDT-465 model had a turbocharger largely to clean up the exhaust, there was little power increase. Rivaz (1807) of Switzerland invented an internal combustion engine with electric ignition which used the mixture of hydrogen and oxygen as fuel. He designed a car for his engine. On the application of hydrogen gas to produce a moving power in machinery; with a description of an engine which is moved by pressure of the atmosphere upon a vacuum caused by explosion of hydrogen gas and atmospheric air. "In this document, he explained how to use the energy of hydrogen to power an engine and how the hydrogen engine could be built. This is probably one of the most primitive inventions made in hydrogen-fueled engines.

II. THEORY

The oxygen enriched air or the nitrogen enriched air becomes mixed with the ambient air in the mixing chamber and then the mixed air is supplied to the intake of the engine. As a result, the air being supplied to the

Study on Anchorage Bond in High Strength Reinforced Concrete Beams

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ABSTRACT: This paper discusses experimentally the effect of steel bar diameter and embedment length on the bond stresses, bond stress versus slip relation, failure pattern and load versus deflection response of high strength reinforced concrete beams with dimensions (100 mm width x 200 mm height x 1100 mm length). Four beams specimens were provided with three embedment lengths (80 mm), (100 mm) and (120 mm) in addition to two different bar diameters (10mm) and (16mm). The test results concluded that the bond stresses and the relative displacement decrease with increasing the embedment length and bar diameter.

Key words: Bond Stress, slip, high strength concrete, embedded length, bar diameter.

I. INTRODUCTION

Due to importance of bonding failure in concrete structures, several investigations have been developed to enhance the bond strength between steel bar and concrete. Most of the studies that dealt with the effect of development length on bond characteristics concluded that increasing the development length impact positively on the bond characteristics⁽¹⁻⁶⁾.

The effect of bar diameter has been studied by [Mohammad N.S Hadi]⁽⁷⁾ [Kazim Turk et.al]⁽⁸⁾, [Soroushain P. and Choik.]⁽⁹⁾ and [Al-Aukaily A. F.], these investigations concluded that the bond strength decreased with increasing bar diameter.

The increasing of concrete compressive strength have a beneficial effect in improving the bond characteristics and this is what has already been proven by [A. Forough – Asl et.al]⁽¹¹⁾, [Kafeel Ahmed]⁽¹²⁾, [Khodaie and Nahmat]⁽¹³⁾ and [M. Veera Reddy]⁽¹⁴⁾.

In recent decades, studies on the bond characteristic between steel bars and new type of concrete has emerged [Forough – Asl et.al]⁽¹¹⁾ and [M. Mazloom and K. Momeni]⁽¹⁵⁾ studied the bond between reinforcement bars and self-compacting concrete. They concluded that bonding strength was increased when using self-compacting concrete in comparison with normal strength concrete.

Also, the bond between reinforcement bars and reactive powder concrete was studied by [Mahesh Maroliya]⁽¹⁶⁾, [Deng Zong - Cai]⁽¹⁷⁾ and [Lee M. et.al]⁽¹⁸⁾. The improvement of bond characteristics is clear when using reactive powder concrete.

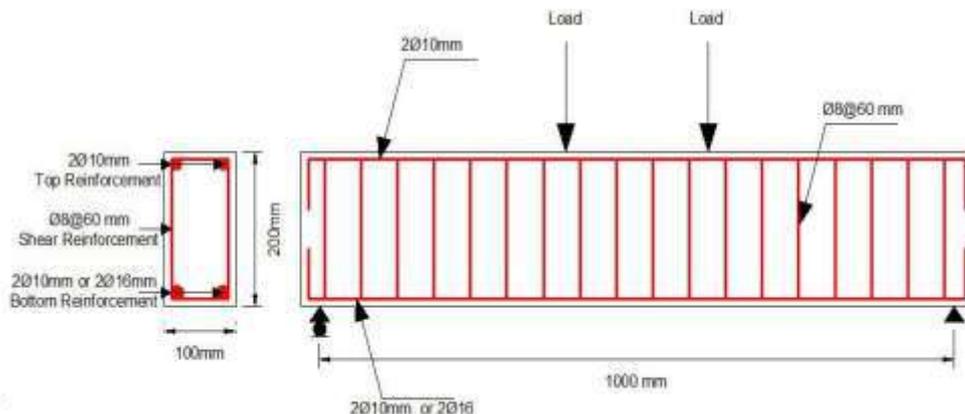


Figure 1 Experimental Detail of Tested Beams

II. EXPERIMENTED PROGRAM

The Experimented program of this study includes casting and examining four high strength

Study on the Air Heating for Injection Mold

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ABSTRACT: Gas-assisted mold temperature control (GMTC) is a new technology in the field of mold temperature control, which can heat and cool a cavity surface rapidly during the injection molding process. In this study, a gas-assisted mold surface heating system was simulated with different heating areas. The temperature distribution of the stamp inserts and the influence of the stamp size was observed. The results show that higher temperatures will occur at the center of the stamp insert due to the location of the gas inlet. In addition, the larger the size of the stamp, the lower heating rate that could be achieved.

KEYWORDS: injection molding, mold heating, dynamic mold temperature control, air heating.

I. INTRODUCTION

Injection molding is a popular technology for manufacturing. However, as parts become thinner and smaller, they become difficult to manufacture using conventional injection molding, because heat transfers rapidly from the melt to mold wall due to the thinness of the parts. Increasing the mold temperature, melt temperature, or packing pressure increases the cycle time. At higher mold surface temperatures, the surface quality of the part will improve [1, 2]. In the injection molding field, micro injection molding is being used to manufacture a variety of polymer components, because of its low cost and potential for high-volume production. Most applications are in the field of micro optics (such as CDs and DVDs) and micro fluidic devices. Production of other molded micro optical components including optical gratings, optical switches and waveguides [3 - 5], and a variety of molded micro fluidic devices including pumps, capillary analysis systems and lab-on-a-chip applications [6, 7].

In general, for improvement of an injection-molded part while minimizing part thickness and injection pressure, a higher mold temperature during injection is needed. However, maintaining a high mold temperature during the filling process, while ensuring it does not exceed the deflection temperature during the post-filling process, without significant increases in cycle time and energy consumption can be challenging. To solve this problem, a variety of dynamic mold temperature controls have been explored in recent years. The goal is to eliminate the heat loss from the melt to the mold, ideally producing a hot mold during the filling stage and a cool mold for the cooling stage. The most inexpensive way to achieve a high mold temperature is to use water at temperatures as high as 90°C or 100°C [8].

Another heating method is local mold heating using an electric heater [9], which can be used to assist high mold temperature control. However, this requires additional design and tooling costs. Furthermore, electrical heating is usually only used as an auxiliary heating method, and it is limited to increases in mold temperature of roughly several tens of degrees centigrade. Other mold surface heating techniques, such as induction heating [10 - 12], high-frequency proximity heating [13, 14], and gas-assisted mold temperature control (GMTC) [15, 16] can provide sufficient heating rates without significant increases in cycle time. In recent years, we provide a systematic study on mold surface heating and mold surface localization heating of the processing characteristics.

GMTC is a new technique in the field of mold temperature control, which can heat and cool the cavity surface rapidly during the injection molding process. In general, the goals of mold temperature control are to increase the mold surface to the target temperature before the filling of melt and cool the melt to ejection temperature. In this study, a GMTC with different heat area designs was simulated to verifying the heating ability of the external gas heating method

Testing System of Multi Working Positions' Switch Design

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¹ Department of Mechanical Engineering ,Gandhi Engineering College , Odisha , India
²Department of Mechanical Engineering ,Gandhi Institute For Technology , Odisha , India

ABSTRACT: Aiming at the problems of low automation, low efficiency and poor precision in the test of aviation electrical appliances, a multi-station toggle type avionics switch test system was designed and developed by using the new cam mechanism, the mechanical actuator of the toggle switch was designed, and the 3D model was established in Solidworks to realize the movement of 4 switches.

KEY WORDS: cam mechanism design, mathematical modelling, 3D design

I. INTRODUCTION

Aviation electrical switches are used as high-frequency aerospace components and are often installed on various control panels and used to turn the circuit on or off to achieve the corresponding functions. However, the current technology for the test of avionics switches remains in the manual operation and push-type switches. Jiang Yuanyuan^[1] developed a test system for the fatigue life of button-type low-voltage switches, using ADAMS for mechanical to simulate the stability of the structural motion. Tang Jing^[2] designed an experimental keyboard switch fatigue life test machine, which uses the motor to drive the eccentric wheel to rotate and simulate the finger pressing the keyboard to test the mechanical life of the push-type keyboard switch.

Therefore, based on the analysis of the working principle and technical indicators of the multi-station toggle switch, this paper designs and develops a test device from mechanical structure to provide a practical method to the development of Chinese aviation electrical testing equipment.

II. MECHANICAL DESIGN

To realize the test of the switch, a test system was designed and developed by a mechanical actuator. While, mechanical device includes four parts: switch, mechanical drive, switch installation, mechanical frame, etc. The principle is that the motor drives the reducer, and the rotary cam rotates through the gear pair to drive the push rod to move back and forth, thereby realizing automatic toggle the switch.

2.1 Mathematical Modelling

The toggle of the switch is achieved by cam motion, so the design of the cam is particularly important, which determines the distance and force of the push rod. Before designing the cam curve, you first need to determine the maximum distance the pusher will push. As shown in Fig. 1, the maximum angle at which the switch handle can be pulled is 19° , and the length of the handle is 23 mm. Therefore, the maximum distance that the handle is pushed by the push rod is about 7.4 mm, considering that some of the switches are not automatically return back to the midpoint, so the maximum distance of the push rod should be pushed out twice than the original distance.

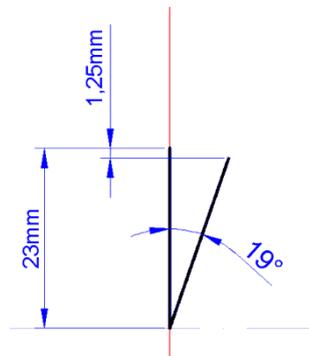


Figure 1 Concept of switch handle thrust design

Novel node monitoring Fellowship Model against Black Hole Attacks in MANET

Sasmita Padhy¹, Smrutiranjana Swain²

¹ Department of Computer Science & Engineering, Gandhi Engineering College, Odisha, India

² Department of Computer Science & Engineering, Gandhi Institute For Technology, Odisha, India

ABSTRACT: In mobile ad-hoc network one of the vulnerable threat is the security issues and in the absence of any centralized controller, now a day's these issues are increasing at a high speed. The packet drop attacks are one of those attacks which degrade the network performance. This paper describes a novel node monitoring mechanism with a fellowship model against packet drop attacks by setting up an observance zone where suspected nodes are observed for their performance and behavior. Threshold limits are set to monitor the equivalence ratio of number of packets received at the node and transmitted by node inside mobile ad hoc networks. The proposed fellowship model enforces a binding on the nodes to deliver essential services in order to receive services from neighboring nodes thus improving the overall network performance.

Keywords: Black-hole attack, equivalence ratio, fair-chance scheme, observance zone, fellowship model.

I. INTRODUCTION

Mobile ad-hoc networks are infrastructure less and self organized or configured network of mobile devices connected with radio signals. There is no centralized controller for the networking activities like monitoring, modifications and updating of the nodes inside the network as shown in figure 1. Each node is independent to move in any direction and hence have the freedom to change the links to other nodes frequently. There have been serious security threats in MANET in recent years. These usually lead to performance degradation, less throughput, congestion, delayed response time, buffer overflow etc. Among them is a famous attack on packets known as black-hole attack which is also a part of DoS (Denial of service) attacks. In this, a router relays packets to different nodes but due to presence of malicious nodes these packets are susceptible to packet drop attacks. Due to this, there is hindrance in secure and reliable communication inside network.

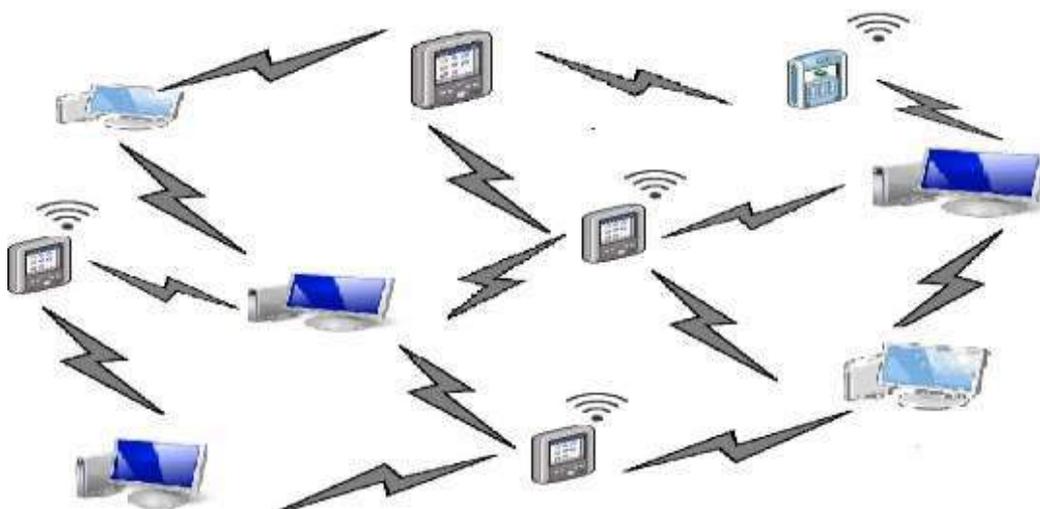


Figure 1. MANET Scenario

Section 2 addresses the seriousness of packet drop attacks and related work done so far in this area. Section 3 elaborates our proposal and defending scheme for packet drop attacks. Section 4 provides concluding remarks.

II. LITERATURE SURVEY

The packet drop loss in ad-hoc network gained importance because of self-serving nodes which fail to provide the basic facility of forwarding the packets to neighboring nodes. This causes an occupational hazard in the functionality of network. Generally there are two types of nodes- selfish and malicious nodes. Selfish nodes

CBR and Its Regression Model on Time Dependent Field

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ABSTRACT: In the present paper a series of California Bearing Ratio (CBR) tests has been performed in both soaked and unsoaked condition on field samples collected from road subgrade. Four rural roads in West Bengal, India have been considered for collection of field CBR sample. From the experimental data it is found that with time the values of CBR in soaked and unsoaked condition increases irrespective of types of road subgrade. Based on the present experimental data a nonlinear power model has been developed to predict field soaked CBR value with time (CBR_{fst}), in terms of field soaked CBR value at 0 days (CBR_{fs0}) and time 't'.

Key words: Field CBR, Time, Soaked, Unsoaked, Regression analysis, Subgrade, Rural road.

I. INTRODUCTION

Nowadays one of the important parameter for evaluation of performance of any types of roads such as rural roads, highways is field CBR. Most of the designer design the road based on soaked CBR value but after construction of roads these CBR value may not remain same rather increases due to simultaneous effect of consolidation and compaction of subgrade soil. The post construction subgrade CBR value is necessary in case of stabilization of soft subgrade soil with Limited Life Geotextiles (LLG) such as jute geotextile, geotextile made of coir, kenaf etc. Sarsby [1] reported that LLG as reinforcing fabrics that are working for a limited time in many civil engineering applications such as roads, and embankment etc. Pandit et al. [2] also evaluated the use of jute and coir in pavement system. Basu et al. [3] found the considerable increase in field CBR value after 18 month of construction of unpaved rural road reinforced with jute synthetic blended geotextile. Choudhury and Sanyal [4] suggested that JGT last for a limited period of time but its effect on enhancing performance for soil property continues for longer time. Choudhury and Sanyal [4] also further reported that in 18 months CBR can enhance about 1.5 to 3.0 times. Khan et al. [5] conducted field investigation on five numbers of JGT reinforced rural road section and observed that the subgrade CBR value has been increased with passage of time. Khan et al. [5] also reported that the load carrying capacity of the road sections increase from 1.5 to 7 times over a range of time. Sanyal [6] reported that for JGT reinforced rural road within 7 to 12 month subgrade CBR value has been increased by 1.5 times. From the above literatures it has been clearly observed that the subgrade CBR value is increasing with time. A numbers of researchers also [7-10] have been studied on laboratory CBR in both soaked and unsoaked condition in the remoulded soil sample to correlate the CBR value with other soil properties only. But detail study on field CBR of road subgrade with respect to time is scarce. In the present investigation an attempt has been made to study the effect of time on subgrade CBR value in both soaked and unsoaked condition. An attempt also has been made to develop a regression model to estimate the time dependent field soaked CBR (CBR_{fst}) of subgrade soil based on the initial field soaked CBR (CBR_{fs0}) value of subgrade soil.

II. SELCTION OF RURAL ROAD

Based on the importance to study the subgrade CBR value with time four JGT reinforced rural road section has been considered and regularly field CBR samples has been collected. Four rural roads such as Kanksa to Bati (8.10 km) , Nihinananagar to Hazratpur (7.90 km), Udal to Chakrabramha (4.75 km) and Bagdimarimulo Barada to Damkal Kheya Ghat (8.70 km) in the west Bengal, India have been selected for the present investigation. The above roads may be designated as (JKB) (JNH) (JUC), (JBD) for Kanksa to Bati, Nihinananagar to Hazratpur, Udal to Chakrabramha and Bagdimarimulo Barada to Damkal Kheya Ghat respectively.

Table 1 Engineering properties of subgrade soil of four different roads

Engineering Properties	Property value			
	JNH	JUC	JKB	JBD
Sand Content(%)	2.00	14.00	4.00	5.00
Silt Content (%)	70.00	50.00	72.00	67.00
Clay Content (%)	28.00	36.00	24.00	28.00

Fiber Reinforced Reactive Powder Concrete Columns' Behavior after Exposure to Fire and Improvements Made To Improve Column Resistance against Fire

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ABSTRACT: This paper offers a test examination of the fiber strengthened responsive powder solid sections' conduct after introduction to fire and upgrades made to improve segment opposition against fire. This examination is for the most part meant to contemplate the test conduct of mixture strengthened segments created by receptive solid powder (RPC) and presentation to the fire of fire at one side and exposed to erratic burden. The test technique comprises of sixteen RC segments that sorted out into four gatherings dependent on the factors utilized in this examination: (SF) steel strands, (PP) polypropylene filaments, (HB) half and half filaments, (PPC-SF) crossover cross-segment (steel fiber responsive powder solid center with polypropylene fiber receptive powder solid spread). All sections were tried under 60 mm capricious burden and the consume segments were presented to fire for various length (1, 1.5 and 2) hours. The outcomes showed that (SF-RPC, PP-RPC, HB-RPC, PPC-SFRPC) sections presented to a fire for the period 2 hours, lost from their heap limit by about (54.39, 40.03, 34.69 and 30.68) % separately. The primary finish of this paper is that the best imperviousness to fire of the segment acquired when utilizing a half breed cross-area (steel fiber responsive powder solid center with polypropylene fiber receptive powder solid spread).

Keywords: Reactive Powder Concrete (RPC); Hybrid Cross Section Column; Hybrid Fibers (HB); Exposed to Fire and Eccentric Load.

I. INTRODUCTION

The reinforced concrete column is a structural member utilized mainly for standing compressive loads, consisting of concrete with an embedded steel frame for reinforcement purposes. There are rarely axially loaded columns in practice since there is always some bending. The moments that happened in the continuous construction along with unavoidable building imperfections will cause eccentricities and then caused a bending in the member. The strength of the column is controlled by the strength of the used material (in particular, the compression strength of the concrete) and the cross-section geometry [1]. The demand for stronger, products with lower space-consuming has increased as construction and material costs increase. Newly, in Bouygues, France, developed a very high strength and high ductility cement-based composite, known as reactive powder concrete (RPC) [2]. RPC is a cemented material characterized by high-performance characteristics for example low shrinkage creep and permeability, ultra-high strength and increased protection against corrosion [3]. However, the need for high-strength structures always comes with an issue in fire resistance for the structure. It was disclosed collectively that the greater strength of the blend will cause a reduction in the composition's fire resistance. In high temperature, the high-performance concrete compositions which are usually denser tend to be more likely to fail because of their high brittleness. High performance concrete shows greater deterioration than ordinary strength concrete, for example concrete spalling and cracking [4]. Nowadays, many fire accidents have occurred around the world, with the use of fresh cement developments (lately RPC) to build load-carrying members for high-rise structures composed of beams and columns, and the fire safety design of these structures has become crucial. This is because the fire resistance of these members is the recent line defense, if other means is failed in extinguish the fire [5]. Also, secure constructions must be designed with a minimum danger for both individuals and property as potential [6, 7].

Nevertheless, the previous study concentrated only on the efficiency of the concrete columns during the fire, whereas the performance of these columns after cooling was very crucial since most concrete buildings subjected to fire circumstances did not collapse and could be recycled using appropriate methods for repairing [8]. In spite of that, it is not easy to decide whether it is more economical to repair the fire-exposed buildings or to demolish and repair them. This choice requires a full understanding of the conduct of these constructions after exposure to fire to determine whether the residual load-bearing capability of the load-bearing members is adequate. The previous researches indicated that the main cause of the crash was steel reinforcement failure for most of the concrete buildings that were damaged by fire [9, 10]. The reason is that the position of the reinforcement is generally near to the surface of the concrete member. Therefore, the steel reinforcement initially deteriorates due to its higher transfer rate of heat compared to the concrete

Research on Beam Deformation Based on Absolute Node Coordinate Method

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ABSTRACT: This paper takes the flexible multi-body system with absolute node coordinates as the research background, relaxes the assumption of the traditional beam theory. After the beam is loaded, the cross-section will be deformed. Based on the absolute node coordinate method, the beam element displacement model analyzes the beam section deformation. Using Fortran software programming calculations, the displacement of the selected point of the beam section is obtained, the figure is simulated, and the deformation of the beam section is analyzed.

Keywords — Absolute nodal coordinates, section deformation, shared undetermined coefficient method, five-point displacement analysis, displacement model

I. INTRODUCTION

Because the deformation of the flexible body will have a great influence on the dynamic behavior of the system, the modeling of the flexible multi-body system will be put on the agenda. In the development of flexible multibody dynamics, the floating reference frame method [1], the incremental finite element method [2], the large rotation vector method [3] and so on have appeared successively. However, these methods describe the deformation and movement of a rigid body through a reference frame fixed on the flexible body. Therefore, there are highly nonlinear terms in the motion equations of these methods. Until 1996, Shabana proposed the absolute nodal coordinate method to greatly reduce the nonlinearity of the motion equation. Shabana's absolute nodal coordinate method for multibody systems is more accurate than the floating coordinate method proposed by previous scholars. The degree of simplicity is more advantageous.

II. MODELING OF BEAM ELEMENTS BASED ON ABSOLUTE NODE COORDINATES.

Displacement mode is an approximate expression of the displacement of any point within a unit by the displacement of a unit node. It has been found that there are differences in the analysis of beam cross-sections using high-order interpolation displacement modes and low-order interpolation displacement modes[4]. The use of high-order interpolation displacement modes can more clearly capture changes in beam cross-sections, including the tensile values of beam sections. The change[5,6]. Using the method of shared undetermined coefficients, the y_2 and x terms are introduced in the form of shared undetermined coefficients to create a longitudinal high-order interpolated displacement model[7]. The y_2 interpolated displacement model can more clearly capture the cross-section deformation.

The beam element proposed by Omar and Shabana is shown in Fig. 1. Each node has 6 position coordinates defined in the global coordinate system.

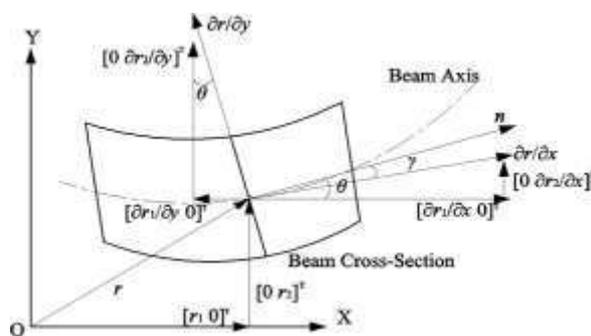


Fig. 1

Properties of Self Compacting Concrete (SCC) Due to Addition of Fly-Ash and Use of Un-Crushed Coarse Aggregate (CA)

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ABSTRACT: This exploration paper talks about the adjustment in the usefulness and quality attributes of Self Compacting Concrete (SCC) because of expansion of fly-debris and utilization of un-squashed Coarse Aggregate (CA). Lab based exploratory work was done by getting ready 12 SCC blends among which six blends contained squashed total and other six blends contained un-squashed coarse total. A sum of 550 kg/m³ cover content and fixed Water-Binder (W/B) proportion as 0.35 were utilized. Two blends were constrained by utilizing Portland Cement (PC) and other ten blends contained PC and Fly Ash (FA). Droop stream time, droop stream distance across and J-ring tallness tests were led to contemplate the new properties of SCC. Besides, compressive quality was determined at 7, 14 and 28 days of restoring. The results demonstrated that the droop stream time, droop stream breadth and J-Ring stature for all the blends are inside the cutoff points indicated by EFNARC rules. The compressive quality of SCCs relies on measurements of fly debris. Compressive quality for SCCs with squashed CA was better than got in the event of un-squashed CA. The most extreme compressive-qualities were seen as 64.58 MPa and 58.05 MPa for SCC with squashed and un-squashed CA individually.

Keywords: Self-Compacting Concrete; SCC; Fly Ash; Un-crushed Coarse Aggregates; Fresh Properties; Compressive Strength.

I. INTRODUCTION

Compaction at narrow places is one of the major problems observed in reinforced concrete construction. However, the SCC is the best option in such situations. SCC is the one that flows through its own weight and hence is very effective in pouring at heavily-reinforced, narrow and deep sections without any vibrational efforts required [1-3]. SCC is the mixture of cement, aggregates, water, admixtures and some mineral additives analogous to the normal concrete. Unlike normal concrete, SCC requires more amount of fillers materials and Super Plasticizers (SP) to give better strength and workability. SCC results in reduction of labour work and also economizes the cost of concreting [4-8]. High quantity of fine-materials such as fly-ash is utilized for acquiring required workability to SCC. This also reduces the issue of segregation and bleeding while transportation and placement of concrete. Many researchers concerned with environmental conservation have criticized the use of cement as a binding material.

Since the demand of cement in concrete production is amplified, it has caused resource depletion, environmental damages and huge amount of carbon-dioxide (CO₂) emission during cement manufacturing process [9]. This has made serious concern of the practitioners and researchers to bring alternative materials of cement such as fly ash. These types of materials are considered safer for emitting. Thus, investigating symbolic properties of these waste materials open new possibilities for concrete development [10]. Use of such waste material in concrete is also very useful in enhancing the properties of concrete and also enhancing durability values [11-14]. Hence, this study has focused to conduct symbolic work for studying behaviour of fly ash in SCC. Fly ash generated from burnt coal is waste material and available at huge amount worldwide which creates more chances to use it as an alternate for cement concrete works. When the fly ash is inserted in concrete, it forms Calcium Hydrated Silicate Gel due to its reaction with calcium hydroxide during process of hydration at ambient temperature. Research works has highlighted that availability of Fly ash can provide the opportunity of replacing OPC up to 60% of its mass [9].

Several researchers have proposed and tested fly ash as mineral admixture for improving the properties at fresh and hardened state as well as the durability of the SCCs. Phathak and Siddique (2012) investigated of SCC with class F Fly ash by replacing cement with (0%, 30%, 40% and 50%) of fly-ash while temperature variation was considered as 20°C, 100°C, 200°C and 300°C. Test results revealed that compressive strength was in between 21.43 MPa and 40.68 MPa while tensile strength was recorded in between 1.35 MPa (min) and 3.60 MPa (max). The authors concluded that 28 days curing caused increment in compressive as well as tensile strength. Further, it was noted that compressive strength had improvement at the temperature of 200°C to 300°C while tensile strength was slightly reduced when temperature was raised above 20°C [15]. Fernando et al. (2018) developed SCC with reduced amount of cement. They added metakaolin and fly-ash as cementitious materials in SCC for evaluating flow ability and strength characteristics of concrete. From research work, it can be argued

An effective Access Control Mechanism for Wireless Sensor Network

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Abstract

In a sensor network nodes can lose their energy due to data transmission. In order to enhance the network performance, new nodes can be added to the network and in a critical situation it may happen that the hostile nodes can be introduced in the network. To prevent such entry of the hostile node some access control mechanism is needed. This paper proposes an access control model based on elliptic curve cryptography. The described model is a secure and fast method for key distribution. In the evaluation work it is shown that our proposed model is a better one as compared to other models. Another feature of this model is robustness against denial of service attack.

Keywords: *Sensor nodes, Adversary, Hostile node, Access control, Elliptic curve cryptography, key distribution, Denial of service, Node authentication.*

1. Introduction

Wireless sensor networks are being developed. Due to the wireless nature of wireless sensor networks these networks used in many war zones and seismic monitoring environment. Sensor nodes usually have limited memory, small size and low processing power, and its energy are limited. Implement complex encryption algorithms in these networks is very hard. Sent and received on this network is broadcast to all. Thus one can easily receive packets from wireless channel. Access control is mechanism for the prevention of security attacks on wireless sensor networks. Secure access control caused by use of network resources is performed only by authorized nodes. Before sending, each node will receive their certificates from a unit trust. After

receiving the certificate, new node can provide a secure connection with itself neighbors. This access control provide, both authentication and confidentiality requires. In addition to this scheme is robust against denial of service. In this paper we use ECDLP¹ algorithm for issuing and verifying certificates. Because the ECDLP faster than other methods such as the ECDSA

2. Related Work

In 2002 SPINS protocol was introduced. The protocol is for data origin authentication [1]. The main drawback of this protocol is high additional overhead. Model for key distribution in the sensor networks provided in 2004. These models are only resistant to external attacks and in the internal attacks are very disabling [2]. In 2007, Yun Zhou et al.'s was introduced, an access control model in wireless sensor network [3]. Although Yun Zhou et al.'s model is perfect, but dos³ attack can run it, In addition, the proposed model is faster in the generation and distribution of key. In 2009 Huang presented an access control model. Huang's method wasn't dynamic. Moreover, Huang's method is insecure [4].

3. Review of Attacks

Any enemy can be directly deployed malicious nodes in environment. In this case hostile node can hear messages from the other nodes, or inject false messages into the network. Note to figure 1. for further understanding.

Cable Online Temperature Monitoring System

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ABSTRACT: With the advent of the era of smart power grids urbanization, distributed optical fiber temperature measurement technology has become a hot research which can be applied on the cable fault detection. For a start, introduce the overall design of the architecture of distributed optical fiber temperature measurement system in briefly. And then combined with the latency phenomenon that online temperature monitoring system often occurs when the page data is updated, can not guarantee real-time communication. For such problems, analyzes and summarizes the technical features and advantages of Ajax technology, two pages application aspects mainly in historical inquiry and dynamic temperature curve shows. After measurement found that the application of this technology apply to the client browser of distributed fiber optic temperature monitoring systems, just can effectively solve the problem of real-time data. The last details of the introduction of the designing of online monitoring system after bring in Ajax technology.

Keywords: Real-Timing, Distributed Optical Fiber Temperature Measurement, Ajax Technology, Online Monitoring

I. INTRODUCTION

With the rapid development of urbanization, growing demand for urban rail transit, which leads to a growing demand for electricity load, relative to some developed countries, China's cable failure rate is relatively high, the effective temperature of the cable line system the lack of detection technology is an important reason leading to high failure rates. The current domestic technology undoubtedly more effective distributed optical fiber temperature measurement system, but because the system is just emerging in recent years, technology has not yet reached the stage of maturity, especially the real-time data publishing system could be improved.

In this paper, based on the browser/server (hereinafter referred to as B/S) structure built AJAX technology cable line temperature monitoring system design, the design for the current performance of the existing real-time distributed temperature measurement system aspects significantly upgrade, and the user mode of operation is simple, but the main thing is time for the maintenance personnel to locate the fault and repair to provide a higherguarantee.

II. ARCHITECTURE OF TEMPERATURE MEASUREMENT SYSTEM

Distributed optical fiber sensing temperature measurement system utilizing fiber optic temperature sensing field temperature signal acquisition range of each segment, and then transmitted to the host temperature, host module makes the collected signal storage, processing, upload the data to the central unit via a bus, and then via the Web server to upload to the remote client monitoring client browser via Ethernet or GPRS^[1]. As shown in Figure 1.

System is composed of three modules, namely the Field equipment, data acquisition layer and application layer.

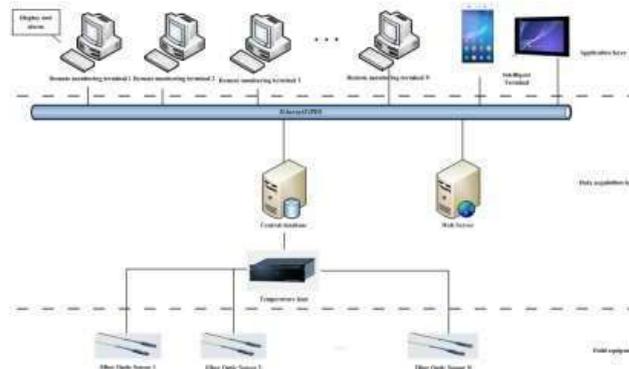


Figure 1 Architecture of temperature measurement system

Field equipment that is used as a temperature signal acquisition and transmission of temperature sensing fiber. In a distributed fiber optic temperature measurement systems, optical fiber is both transmission

Optimal Positioning of Wind Power Units in Order to Maximise Sales and Reduce the Levied Costs due to Instability in the Distribution system

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Abstract

Ongoing advances in the field of new energies, for example, wind turbines, sun oriented force plants, energy components, miniature turbines, and so on, and furthermore the incredible advantages of these force plants for the force organization, pull in the consideration of conveyance organizations towards them. As, today, numerous dispersion organizations are analyzing choices for changing the conveyance network structure to abuse new energies. Meanwhile, wind energy is perhaps the most broadly utilized sorts of appropriated age in the force organization. Furthermore, wind power age has the most changes to different sorts of sustainable power. Circulation network arranging is one of the significant worries of framework fashioners, particularly when wind age units by their arbitrary and variable nature are in framework advancement. Since the legitimate situation of wind units in the organization assumes a fundamental job in improving the presentation of the circulation organization, giving a complete and fitting answer for arrangement of these units in the organization is significant. In this paper, a technique has been introduced that by thinking about the vulnerability in age and utilization and the organization limitations, the situation of wind units in the organization is finished with the point of expanding incomes and diminishing the forced expenses in the dissemination framework,

considering the uncertainty. The calculation utilized in this paper is a hereditary calculation with improved administrators.

Keywords: *Optimal Positioning, Wind Power, Distribution system.*

1. Introduction

In the structured electricity industry, once in a while, we need to change and reformulate the system, although our main destination may still remain unchanged. In a power system, variety of targets must be met at the same time in order to exploit a system optimally and efficiently. Today, factors such as the need for higher flexibility of power systems, changes in the economic contexts and structures of the electricity industry, the need to save and manage energy consumption, and environmental issues, have created a greater incentive to foster and develop Distributed Generation. For this reason, distributed generation will play a major role in the development of power systems in the near future. One of the most widely used types of distributed generation is wind energy, due to its lower cost than other types of renewable energy plants, as well as its many advantages over the last few decades. Given the high potential of our country to exploit this energy and in order to use these resources efficiently, we need to

Transient Analysis of Radiative Hydromagnetic Poiseuille Fluid Flow of Two-Steps Exothermic Chemical Reaction through a Porous Channel with Convective Cooling

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Abstract

In this research, the transient analysis of radiative combustible viscous chemical reactive two-step exothermic fluid flow past a permeable medium with various kinetics, i.e., bimolecular, Arrhenius, and sensitized, are investigated. The hydromagnetic liquid is influenced by periodic vicissitudes in the axial pressure gradient and time along the channel axis in the occurrence of walls asymmetri convective cooling. The convectonal heat transport at the wall surfaces with the neighboring space takes after the cooling law. The non-dimensional principal flow equations are computationally solved by applying convergent and absolutely stable semi-implicit finite difference techniques. The influences of the fluid terms associated with the momentum and energy equations are graphically presented and discussed quantitatively. The results show that the reaction parameter is very sensitive, and it, therefore, needs to be carefully monitored to avoid systems blow up. Also, a rise in the values of the second step term enhances the combustion rate and thereby reduces the release of unburned hydrocarbon that polluted the environment.

Keywords:

Radiation, Hydromagnetic, Poiseuille Flow, Exothermic Reaction, Convective Cooling.

Entropy Generation Analysis of MHD Forced Convective Flow through a Horizontal Channel

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Abstract

Entropy generation are derived and solved by using the analytical method. In addition, the skin friction coefficient and Nusselt number are calculated numerically and their values are presented through the tables for the upper and the bottom wall of the channel. It was concluded that the total entropy generation rate and Bejan number are reduced due to a rise in the inclination angle of the magnetic field. Also, an increment in the heat source props up the fluid temperature and total entropy generation rate. This study will help to reduce the energy loss due to reversible process and heat dissipation. The results are also useful for chemical and metallurgy industries.

Keywords: MHD, Forced Convection, Heat Source, Inclined Magnetic Field, Entropy Generation.

1. Introduction

Magnetohydrodynamic flow has a notable interest in diverse fields of industries and engineering. Agriculture industries, groundwater hydrology, filtration and separation process in the chemical and petroleum industries, metallurgy, oceanography, plasma physics, designing of cooling devices, cooling of nuclear and power plant, cooling of electronic devices, MHD power generator, etc. are various applications in science and technology. In the last few decades, it is found that MHD flow has dominated the industries due to its wide use and dependency in every field of science and technology. Hannes Alfvén, a plasma physicist was the first scientist who used the term MHD and for it, he received a prestigious Nobel Prize in physics in year 1970. The MHD flow through different geometries has been widely studied in the last half-century. In the literature, we found

that Raptis [1] contributed to the two-dimensional natural convective flow through the porous medium. Vanka et al. [2] investigated the three-dimensional magnetohydrodynamic fluid flow in the channel. In the continuation, Ghosh et al. [3] inspected the hydromagnetic fluid flow in a rotating system. Krishna et al. [4] discussed the MHD convective fluid flow in a rotating discussed by Singh [5] using the perturbation method. In their study, they found that a rise in the magnetic field and permeability reduces the fluid velocity.

Mhone et al. [6] surveyed the MHD flow through the diverging channel in the existence of an applied transverse magnetic field. In this study, it is seen that the high strength of the applied magnetic field slows down the motion of the fluid. MHD Couette flow in the rotating channel under the influence of the magnetic field was reported by Seth et al. [7]. It is viewed that the amplification in the strength of the magnetic field reduces the fluid motion, whereas the effect of inclination angle reflects adversely. Later, Seth et al. [8] expanded their previous work and discussed the Hall Effect in a rotating system. The effect of the inclined magnetic field in MHD Poiseuille flow through the two-plate channel was explained by Manyonge et al. [9] and validated the results discussed by other researchers for magnetic field and velocity profile. Later, Joseph et al. [10] examined the impact of the inclined magnetic field in MHD Couette flow through parallel plate channel. They noticed that the velocity of fluid and coefficient of skin friction diminish with the increment in the stability of the inclined magnetic field parameter. Raju et al. [11] explored the MHD forced convective flow through the horizontal porous channel in the existence of the viscous

A Design Model Offering Collaborative Services using Service Oriented Architecture

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Abstract

Now- a- days the demand for flexible, user-friendly and effective collaborative services is becoming an important aspect in the marketing scenario. Enterprises need to be more dynamic in terms of collaboration with partners and for competitors. The Service Oriented Architecture (SOA) is a distributed computing paradigm which offers solutions that are extendible, flexible and compatible with legacy systems. This paper proposes and investigates the use of SOA in the construction of collaborative services. The paper describes the idea of a Service Oriented Architecture and also gives a description of collaborative services. A generic model of a collaborative service is analysed to identify the basic collaborative functions and a Service Oriented Architecture Framework for collaborative service is presented.

Keywords: *Service Oriented Architecture, Design Model, Collaborative Services.*

1. Introduction

Organizations constantly search for innovative applications and services to improve their business processes and to enrich the collaborative work environments of their distributed and mobile knowledge workers. It is increasingly becoming apparent that a limiting factor in the support of more flexible work practices offered by systems today lies in:

1. Their inherent assumptions about technical infrastructures in place (hardware, software, and communication networks),

2. Their assumptions about interaction patterns of the users involved in the processes.

Emerging new ways of flexible and mobile teamwork on one hand and dynamic and highly agile (virtual business) communities on the other hand require new technical as well as organizational support, which current technologies and infrastructures do not cater for sufficiently. Service Oriented Architecture (SOA) is a new paradigm in distributed systems aiming at building loosely-coupled systems that are extendible, flexible and fit well with existing legacy systems. By promoting the re-use of basic components called services, SOA will be able to offer solutions that are both cost-efficient and flexible. In this paper, we propose to investigate the feasibility of using SOA in the construction of innovative and advanced collaborative services. The paper starts with a short introduction of the Service Oriented Architecture and then gives a description of collaborative services. A generic model of a collaborative service is analysed to identify the basic collaborative functions. A Service Oriented Architecture Framework for collaborative service is presented thereafter.

2. Overview of the service oriented architecture

There are currently many definitions of the Service Oriented Architecture (SOA) which are rather divergent and confusing. The World Wide Web consortium [1] defines as follows:

A Service Oriented Architecture (SOA) is a form of distributed systems architecture that is typically characterized by the following properties:

A Parametric Experimental Design Study of Abrasive Water Jet Machining

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Abstract

In this research work, Grey Relational Analysis was selected to determine the optimal combination of various input parameters of Abrasive Water Jet. A L9 orthogonal array was employed to study the performance characteristics of cutting operation on Al-6061. With the help of Grey Relational Analysis we were able to obtain optimal combination of process parameters for maximum Material Removal Rate (MRR) and minimum Surface Roughness (Ra).

Keywords: *Abrasive Water Jet, Grey Relational Analysis, MRR, Orthogonal Array, Surface Roughness.*

1. Introduction

In Abrasive Water Jet, a narrow stream of water carrying abrasive particles, under controlled conditions, is impinged on work piece. The material is removed from the work piece due to small fracture created by the abrasive particles. Abrasive Jet Machining is used for drilling, deburring, etching, and cleaning of hard and brittle metals, alloys, and non-metallic materials. To achieve optimal machining performance the machining parameters should be chosen properly.

Grey Relational analysis is a part of Grey Theory established by Dr. Deng in 1989. Grey relational analyses provide an efficient and valid conclusion to an experiment or model which has incomplete information by establishing a relationship between two discrete sequences. This purpose of this paper is to use Grey relational analysis to obtain optimal combination of machining parameter for maximum material removal rate (MRR) and minimum surface roughness (SR) and to find the individual effect of each machining parameter on material removal rate and surface roughness.

2. Experimental Details

Material

In the present study, Al 6061 was used as work piece material. Al 6061 possesses high toughness and hardness. Al 6061 finds its application in aerospace components, marine fittings etc.

Design of Experiment

Design of Experiment is a systematic approach to solve engineering problems that applies principles and techniques of data collection stage so as to generate the best combinations of factors by establishing a relationship between factors affecting a process and the output of the process. In this study, three control variable were used namely, pressure, nozzle distance and disk flow rate. In machining parameter design, three level machining parameters were selected, shown in table 2.1.

Comparative Study of Various Bitmap Indexing Techniques Used in Data Warehouse

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Abstract

For running complex query, performing aggregated function and handling huge no of data in data warehouse the bitmap indexing has become the most popular indexing technique recently. We study different type of bitmap indexing techniques (simple bitmap and encoded bitmap) & perform aggregated operation on query with the help of both simple & encoded bitmap indexing and analyses the result, which was really interesting.

Keywords: Query, aggregate function, bitmap indexing, encoded bitmap.

1. Introduction

1.1 What is Data warehouse?

A Data Warehouse is a subject-oriented, integrated, non- volatile, and time variant collection of data in support of management's decision. A Data Warehouse system consists of a back-end database server, (an OLAP engine) and a front-end tool set. OLAP and Data Warehousing are usually used interchangeably. However, Data Warehousing includes tasks such as data extraction, indexing, query processing and optimization, and other services that a DBMS provides, while OLAP denotes the services, which support decision making, built on top of those services provided by a Data Warehouse. A logical architecture of a data warehouse system is depicted in Figure:

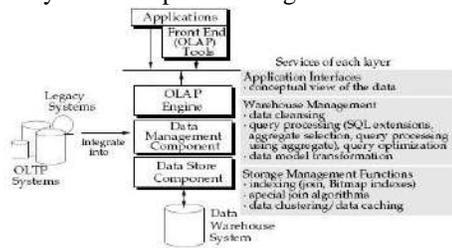


Fig. 1

1.2 Different type of indexing use data warehouse

B-Tree Index

The B-Tree Index is the default index for most relational database systems. The top most level of the index is called the root. The lowest level is called the leaf node. All other levels in between are called branches. Both the root and branch contain entries that point to the next level in the index. Leaf nodes consisting of the index key and pointers pointing to the physical location (i.e., row ids) in which the corresponding records are stored. A B-Tree Index for Student (Table 1) and their respective Marks (Table 2) is shown below in fig 2.

Student (Table 1)

Student id	City	Gender
P10	Kolkata	F
P11	Asansol	F
P12	Malda	F
P13	Burdwan	M
P14	Asansol	M
P15	Burdwan	M
P16	Malda	F
P17	Kolkata	M
P18	DumDum	F
P19	Kolkata	F
P20	Kolkata	M
P21	Barasat	M
P22	Malda	F

Marks (Table 2)

Student id	Marks
P10	70
P11	50
P12	50
P13	40
P14	44
P15	30
P16	35
P17	20
P18	23

Cloud Computing and Security Issues In the Cloud

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Abstract: *Cloud computing has formed the conceptual and infrastructural basis for tomorrow's computing. The global computing infrastructure is rapidly moving towards cloud based architecture. While it is important to take advantages of cloud based computing by means of deploying it in diversified sectors, the security aspects in a cloud based computing environment remains at the core of interest. Cloud based services and service providers are being evolved which has resulted in a new business trend based on cloud technology. With the introduction of numerous cloud based services and geographically dispersed cloud service providers, sensitive information of different entities are normally stored in remote servers and locations with the possibilities of being exposed to unwanted parties in situations where the cloud servers storing those information are compromised. If security is not robust and consistent, the flexibility and advantages that cloud computing has to offer will have little credibility. This paper presents a review on the cloud computing concepts as well as security issues inherent within the context of cloud computing and cloud infrastructure.*

Keywords: *Cloud computing, cloud service, cloud security, computer network, distributed computing, security.*

I. Introduction

Recent developments in the field of cloud computing have immensely changed the way of computing as well as the concept of computing resources. In a cloud based computing infrastructure, the resources are normally in someone else's premise or network and accessed remotely by the cloud users (Petre, 2012; Ogigau-Neamtii, 2012; Singh & jangwal, 2012). Processing is done remotely implying the fact that the data and other elements from a person need to be transmitted to the cloud infrastructure or server for processing; and the output is returned upon completion of required processing. In some cases, it might be required or at least possible for a person to store data on remote cloud servers. These gives the following three sensitive states or scenarios that are of particular concern within the operational context of cloud computing:

- The transmission of personal sensitive data to the cloud server,
- The transmission of data from the cloud server to clients' computers and
- The storage of clients' personal data in cloud servers which are remote server not owned by the clients.

All the above three states of cloud computing are severely prone to security breach that makes the research and investigation within the security aspects of cloud computing practice an imperative one. There have been a number of different blends that are being used in cloud computing realm, but the core concept remain same – the infrastructure, or roughly speaking, the resources remain International Journal of Network Security & Its Applications (IJNSA), Vol.6, No.1, January 2014

somewhere else with someone else's ownership and the users 'rent' it for the time they use the infrastructure (Bisong & Rahman, 2011; Rashmi, Sahoo & Mehruz, 2013; Qaisar & Khawaja, 2012). In some cases, stored sensitive data at remote cloud servers are also to be counted. Security has been at the core of safe computing practices. When it is possible for any unwanted party to 'sneak' on any private computers by means of different ways of 'hacking'; the provision of widening the scope to access someone's personal data by means of cloud computing eventually raises further security concerns. Cloud computing cannot eliminate this widened scope due to its nature and approach. As a result, security has always been an issue with cloud computing practices. Robustness of security and a secured computing infrastructure is not a one-off effort, it is rather ongoing – this makes it essential to analyse and realize the state-of-the-art of the cloud computing security as a mandatory practice. Cloud is mainly categorized as private cloud, community cloud, public cloud and hybrid cloud (Ogigau-Neamtii, 2012; Singh & jangwal, 2012; Rashmi et al., 2013; Qaisar & Khawaja, 2012; Kuyoro, Ibikunle & Awodele, 2011; Suresh Prasad, 2012; Youssef, 2012) - the discussion in this paper assumes only one category of cloud exists which is public cloud; as this assumption will well satisfy all the characteristics of any other type of cloud. Due to its diversified potentiality, the approach to cloud computing is being thought to be as the 5th utility to join the league of existing utilities water, electricity, gas and telephony (Buyya, Yeo, Venugopal, Broberg & Brandic, 2009) rather than being just another service.

The study presented in this paper is organized with a view to discuss and identify the approach to cloud computing as well as the security issues and concerns that must be taken into account in the deployment towards a cloud based computing infrastructure. Discussion on the technological concepts and approaches to

History of Cosmology

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1.1 NEWTONIAN COSMOLOGY: THEORETICAL MODELS

Cosmologists have preferred using relativity as the basis of cosmology. Indeed, pioneering work in theoretical cosmology by Einstein, de Sitter, Friedman, Lemaitre, Eddington, etc. was done with in relativistic framework. However, the level at which this text is aimed precludes the use of general relativity. We will therefore revert to Newtonian gravity on grounds of simplicity. Moreover, in 1935, E.A. Milne and W.H. McCrea showed that with suitable reinterpretation, Newtonian gravity does yield models very similar to those of relativistic cosmology. We will follow the treatment of Milne and McCrea.

1.2 SIMPLIFYING POSTULATE

We shall use two postulates to simplify the above model construction. The first is known as the Weyl postulate and the second, the cosmological principle.

1.2.1 THE WEYL POSTULATE

Proposed by Hermann Weyl in the early days of relativistic cosmology, this postulate states that the trajectories of a special class of observers, to be identified with galaxies, form a bundle of non-intersecting lines in space-time so that there is a unique line passing through each point in space at any given time.

Figure:1 illustrates the special kind of motion implied by Weyl's postulate. In the space-time diagram shown in fig. 1(b), we see the trajectories distributed in a streamlined fashion. No two members intersect. Thus, there is a unique member of the set passing through any given point in space-time. In Fig.1(a) on the other hand, the trajectories are in disordered with intersections permitted. In this case, it is not possible to identify a unique trajectory through each point. Galactic motion approximates to the idealized case of Fig. 1(b). We may identify a unique observer for each galaxy. Such observers are called *fundamental observers*.

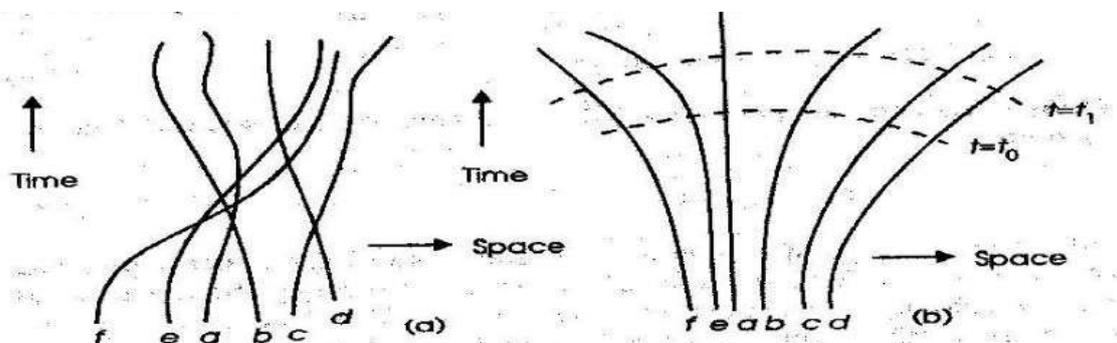


Figure: 1 shows the special kind of motion implied by Weyl's postulate.

Thus, we may have a continuum of such trajectories of fundamental observers given in the space-time plot with Cartesian coordinates (\mathbf{r}, t) as

$$\mathbf{r} = \mathbf{F}(t, \mathbf{r}_0) \quad (1)$$

Cloud Computing: Session Passwords Authenticity for Data Sharing

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ABSTRACT

Cloud computing is sharing of resources as needed basis which is consumed over the internet. A major feature of the cloud services is that users' data are usually processed remotely in unknown machines that users do not own or operate. Users' fear is mainly concerned of loss of control. To address this problem, in this paper, we propose a highly decentralized information accountability framework to keep track of the actual usage of the user's data in the cloud. The LOG file is created which keeps track of the actual usage of the user once authentication is triggered. Auditing mechanism which is done distributed strengthens users' control. We provide extensive experimental studies that demonstrate the efficiency and effectiveness of the proposed approaches.

Keywords-Cloud computing, data sharing, accountability.

I. INTRODUCTION

A. Cloud Computing

Cloud computing is heavily based on a more traditional technology: grid computing, which has been researched for more than 20 years. Cloud computing focuses on the sharing of information and computation in a large network of nodes, which are quite likely to be owned by different vendors/companies. It is believed that cloud computing has been one of the sources for success in several major companies such as Google and Amazon. Cloud computing is expected to be the platform for next generation computing, in which users carry thin clients such as smart phones while storing most of their data in the cloud and submitting computing tasks to the cloud. A browser serves as the interface between clients and the cloud.

The data processed on clouds are outsourced, that leads to many issues: accountability. Such problem becomes a barrier to adopt cloud. To avoid this problem owner should be able to track their usage in the cloud. For example, user's data are handled by Service Level Agreement (SLA) which is made at the time of registration in the cloud. Conventional access control approaches were developed for closed domains which are not apt for certain environment due the features: First, data handling is outsourced by the Cloud Service Provider (CSP) to other members in the cloud and these members can also delegate the tasks to others, and so on. Second, members are allowed to join and leave the cloud in their need basis. Finally, data handling in the cloud creates a complex and dynamic hierarchical service chain which does is absent in conventional environments. To overcome the above problems, we propose an approach called Cloud Information Accountability (CIA), which is based on the notion of information accountability. CIA keeps track of actual usage of the user which purely done on a distributed fashion. CIA, does not check the service-level agreements. Along with the CIA two modes were created for auditing purpose: push mode and pull mode. The push mode refers to logs being periodically sent to the data owner or stakeholder while the pull mode refers to an alternative approach whereby the user (or another authorized party) can retrieve the logs as needed.

II. LITERATURE SURVEY

A. Provable Data Possession at Untrusted Stores

G. Ateniese et al [1]. Focused retaining a file from the outsourced storage data. As part of pre-processing, the client may be stored at the server side. The client may expand the file or add data which is stored in the server side. Before deleting a local copy of file data possession makes sure whether that file is stored in the server. Clients encrypt a file prior to out-sourcing the storage. The client may ask proof for all the file blocks, making the data possession guarantee deterministic. Interestingly, when the server deletes a fraction of the file, the client can detect server misbehaviour with high probability by asking proof for a constant amount of blocks, independently of the total number of file blocks.

Nanotechnology: A prospective solution for Environment

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Abstract

Nanotechnology is an upcoming technology that can provide solution for combating pollution by controlling shape and size of materials at the nanoscale. This review provides comprehensive information regarding the role of nanotechnology in pollution control at three different steps viz. Source reduction or pollution prevention, remediation or degradation of pollutants and sensing of pollutants. Due to its large surface area and high surface energy, the nanoparticles have the ability to absorb large amount of pollutants or catalyze reactions at a much faster rate, thus reducing energy consumption during degradation or helps in preventing release of contaminants. The nanosize of the particles also make it possible to reach otherwise inaccessible areas and hence promote in-situ remediation rather than ex-situ remediation. The ability of the nanoparticles to be coated with various ligands and control of surface area to volume ratio by changing the shape of the nanoparticles enables the design of sensors with high selectivity, sensitivity and specificity.

Keywords: environment, nanotechnology, pollution, remediation, sensing, prevention

I. INTRODUCTION

The term “Pollution” has many definitions, one being “the presence of a substance in the environment whose chemical composition or quantity prevents the functioning of natural processes and produces undesirable environmental and health effects” (United States Environmental Protection Agency, 2008). With growing urbanization and increasing population, pollution has become the biggest environmental challenge. Moreover, the technological advancement has also given rise to new pollutants which are increasing at an alarming rate and are above the self remediating ability of the environment. There is an urgent need to find technologies that would reduce these rates/pollution levels to risk-free status in quick and easy manner. Nanotechnology is being explored to provide new solution for cleaning environment and improving the performance of conventional technologies. This technology is also explored for combating pollution by reducing the release or preventing the formation of pollutants. US National Nanotechnology initiative has identified “Environmental improvement” as one of the eight crosscutting areas of nanotechnology (Tratnyek & Johnson, 2006). Nanotechnology is the science of petite particles with dimensions in the order of 10-9 m. These minuscule particles are subject to the physical and chemical laws, that otherwise; do not apply to the particles of larger sizes. Due to enormous surface area to mass ratio, nanoparticles exhibit exclusive properties. The unique properties of these nanosized materials have resulted in the use of nanoparticles in various fields like biomedicine, pharmaceuticals, cosmetics, and environment.

The focus of the review lies in the emerging role of nanotechnology in addressing environmental problems, which though interesting and creditworthy, is underutilized. It has been applied to the three key areas associated with Pollution, namely—Sensing, Remediation and Pollution Control.

Remediation

Remediation is the science of removal or reduction of pollutants from the environment using chemical or biological means. Recent advancements have made the control and reduction of contaminants in soil, sediments and water the major environmental issue. The conventional techniques like disposal to landfill, isolation are somewhat effective but expensive and take a long time to achieve target goals (Salipira, Mamda, Krause, Malefetse, & Durbach, 2007). These techniques also produce undesirable by-products, like during trichloroethylene in-situ remediation where dichloroethylenes and vinyl chloride are usually intermediate by-products. Also, contaminants like chlorinated hydrocarbons migrate to the water table, and sometimes reach the underlying zone making it extremely difficult to remediate aquifers with standard existing procedures. All these limitations can be effectively targeted by nanotechnology (Masciangioli & Zhang, 2003). Nanoparticles offer numerous advan-

Joint Angle Optimization of Industrial Robot using Artificial Neural Network

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Abstract: A neural network based inverse kinematics solution of a robotic manipulator is presented in this paper. Inverse kinematics problem is generally more complex for robotic manipulators. Many conventional solutions are inadequate, if the joint arrangement of the manipulator is more complicated. In Inverse kinematics problem, the neural computation have to find the coordinates by giving the joint angles for a given Cartesian position and orientation of the end effectors. Many initial and final points are generated in the work volume of the robotic manipulator by solving the neural network. The entire real-world coordinates (x, y, z) as per the angles recorded in a file named as training set of neural network model. The designed neural model has specified the correct coordinates according to the certain angles of Cartesian coordinate. The inverse kinematics problems of industrial robot manipulator are solved by using Artificial Neural Network (ANN) algorithm. The 6R robot manipulator is selected as industrial robot manipulator because geometric feature of this robot does not allow for solving inverse kinematics problems analytically.

Keywords: Inverse kinematics, Artificial Neural Network, 6-D.O.F, Industrial Robot

I. INTRODUCTION

A neural network based inverse kinematics solution method yields multiple and precise solutions with an acceptable error and it is suitable for real time adaptive control of robotic manipulators. Neural networks are competent of learning and building of complex functions, which led to their use in different applications such as recognition, approximation, fitting of data, and dynamic systems to be checked. The Nonlinear dynamic systems included with the robots for executing tasks repetitively, are shown to advantage from the use of neural network controllers. The results are reported in the literature demonstrated that neural network is valuable in many problems in of inverse kinematics problem. In this work inverse kinematics solution using neural networks is presented with theoretical background of neural model. A neural network is the preliminary data processing structure of interest in neuron computing. A parallel, distributed information processing structure composed of a number of simple, processing elements to be interconnected similar to neurons in the human nervous system is defined. The processing elements interact locally through a set of unidirectional weighted connectors. The neural network trains itself to generalize a mapping or functional relationship from example sets of input vectors and consequent output. The neural network then stores the connection strengths (weights) between processing units. The weights correspond to the strength between neurons and are adjusted during the learning process. The information of the model is internally represented by the values of the weights and the topology of the connections. The network is able to solve for unknown output when new input is displayed. The neural network in contrast with established methods where the specific relationships between input and output must be supplied by user defined algorithms. Self-organization, fault tolerance, optimization, association, generalization etc. are allowed in the neural network characteristics.

1.1 Related work

Nan et al [1] presents a new method for the inverse kinematics of 6-DOF manipulator based on dual quaternion which uses dual quaternion to respect both rotation and translation vector. The simulation is provided to verify the feasibility and precision of the proposed new method. Vasilyev et al [2] presents analytical solution to Inverse Kinematic Problem for 6-DOF Robot-Manipulator. In this paper the solution technique based on deriving the system of nonlinear equations and solving it in the general view. Mashhadany et al [3] proposed a cognitive architecture for solution of inverse kinematics problem (IKP) of 6- DOF elbow manipulator with spherical wrist by Locally Recurrent Neural Networks (LRNNs) and simulated the solution by using MATLAB/Simulink This design is aimed to allow the manipulator system to perform complex movement operations by solving the Inverse Kinematic Problem (IKP) with LRNNs by using the position and orientation

Passive cooling concepts of a building structure

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Abstract

Step by step human solace is raising its criticalness. Human solace is that state of psyche, which communicates fulfillment with the warm condition according to the American Society of Heating, Refrigeration and Air Conditioning Engineers. The traditional methods for accomplishing warm solace is the vitality devouring mechanical forced air systems framework and the refrigerant utilized is destructive to the natural framework. The vitality is a significant issue. Remembering this factor, the current work has been tried to lessen the cooling heap of a current structure by utilizing latent cooling ideas as opposed to utilizing the mechanical cooling framework to disperse heat for warm solace. Among the latent cooling, interior and outer concealing ideas have been actualized for the fenestrations and a practical course of action of earthen pots have been considered for the rooftop cooling. It has been seen that the cooling heap of the structure has been decreased about 47% because of concealing and up to 56% because of use of earthen pots when utilized independently.

Keywords: passive cooling; shading; earthen pots, cooling load, building

I. INTRODUCTION

Energy is one of the most important building blocks in human development, and, as such acts as a key factor in determining the economic development in all countries. As the world becoming more advance in technology, more energy is being used to keep up with the changing requirements. At the current rate at which energy is being used, the world is shortly come to an end of fossil fuel which is the world's primary energy resource. Fossil fuels provide around 95% of the world's total energy demands (including heating, transport, electricity generation and other use). Many research works had been conducted for different alternative fuel which could replace the fossil fuels [1-4]. Energy consumption of buildings is about 48% of all energy consumed, with 40% for the operation of buildings and 8% for the construction of buildings in the World. Most of the energy is for the provision of lighting, heating, cooling and air-conditioning. This energy is mostly derived from fossil sources that produce the global warming and also buildings are involved in producing about 40% of the sulfur dioxide and nitrogen oxides that cause the acid rain and smog formation. Building energy use also produces 33% of all annual carbon dioxide emissions, significantly contributing to the climate changes brought about by the accumulation of this heat-trapping gas [5].

Hence, the major focus of researchers, policy makers, environmentalists and building architects has been on the conservation of energy and its utilization in buildings. It is further established that alternative energy sources, techniques and systems can be used to satisfy a major portion of cooling needs in buildings.

A number of research works have been carried out with passive cooling in naturally ventilated buildings. The techniques of passive solar building design were practiced for thousands of years, before the advent of mechanical heating and cooling. It has remained a traditional part of vernacular architecture in many countries. Fully developed solar architecture and urban planning methods were first employed by the Greeks and Chinese who oriented their buildings toward the south to provide light and warmth. Nearly two and a half millennia ago, the ancient Greek philosopher Aeschylus wrote: "Only primitives and barbarians lack knowledge of houses turned to face the winter sun" [6]. Although earlier experimental solar houses were constructed using a mixture of active and passive solar techniques. The concept of passive houses was first introduced by Professor Bo Adamson from Lund University in Sweden. He developed this concept through an energy efficient houses project he had for Chinese Government in late 80s [7]. After that, passive houses spread rapidly all over the world. The passive house has a standard for minimum energy consumption and a high level of comfort. Therefore, a passive house should have very good insulation and air tightness of building envelope, in which

Analysis of Quantum Transport for a Graphene by the Help of Gold Electrodes

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Abstract: Ab initio quantum transport calculations based on the method of numeric localized atomic orbitals, pseudopotentials and Density Functional Theory have been performed, using SIESTA & TranSIESTA codes, for a graphene nanostructure using gold electrodes. Non equilibrium Green's Functions method have been used in conjunction with Density Functional Theory, as implemented in TranSIESTA, for calculations of transmission function, density of states and voltage-current characteristic. Transmission function and density of states show a discrete band structure which varies with applied voltage. In the voltage-current characteristic current shows non-linear fluctuating pattern with increase in voltage and lies in the pico-ampere range.

Keywords: Graphene, Transport properties, Density functional theory, SIESTA, TranSIESTA, Transmission Function.

PACS: 73.22. Pr, 05.60.Gg, 31.51.E

I. INTRODUCTION

Carbon based materials such as graphene (a single lot of interest due to their exotic electronic properties unique two dimensional (2D) energy dispersion along for next generation of faster & smaller electronic devices.

Study of transport properties of nanostructures performed first principle quantum transport gold electrodes using TranSIESTA [7,8] which Green's function approach. Transmission functions, electron density of states, projected density of states and current-voltage characteristic have been calculated (see Figure 1).

hexagonal structure of carbon atoms) have generated a [1-3]. Novel condensed matter effects arising from it with superior properties make it a promising material

is current research interest [4-7]. In this paper we have calculations for graphene nanostructure attached to calculate transport properties using nonequilibrium

electron density of states, projected density of states and current-voltage characteristic have been calculated (see Figure 1).

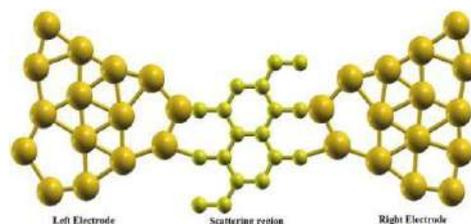


FIGURE 1. Schematic view of graphene nano structure along with gold electrodes. Central part is the scattering region, left and right parts are gold electrodes.

II. SIMULATION DETAILS

We have performed ab initio calculations within the [8]. Troullier Martin, norm conserving, relativistic gold. The exchange and correlation energies are (GGA) according to the Perdew, Burke and Ernzerhof optimization, numerical atomic orbitals with single energy of 0.01 Ry were used. The Brillouin zone was Pack scheme with a $1 \times 1 \times 40$ mesh for the calculations and 250 Ry mesh

framework of DFT as implemented in SIESTA code pseudopotentials have been used for both carbon and treated with the generalized gradient approximation (PBE) parameterization. Throughout the geometry zeta polarization (SZP) basis set with confinement sampled using Monkhorst-cutoff energy was used. An interaction between

3D Modeling and Analysis of an Alloy Wheel Rim of Car by using Solid Works & ANSYS: A Review

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Abstract- The essence of car wheel rim provides a firm base on which to fit the tire. Its dimensions, shape should be suitable to adequately accommodate the particular tire required for the vehicle. In this paper a tire of car wheel rim belonging to the disc wheel category is considered. Design is an important industrial activity which influences the quality of the product. The wheel rim is modeled by using SOLID WORKS software. Later this SOLID WORKS model is imported to ANSYS for analysis work. ANSYS is the latest software used for simulating the different forces, pressure acting on the component and also calculating and viewing the results. By using ANSYS software reduces the time compared with the method of mathematical calculations by a human. ANSYS static analysis work is carried out by considered two different materials namely aluminium alloy and Magnesium alloy and their relative performances have been observed respectively. In addition to wheel rim is subjected to model analysis, a part of dynamic analysis is carried out its performance is observed. In This paper by observing the results of static analysis obtained Magnesium steel is suggested as best material.

Keywords:- ANSYS, Solid Works, Stress Analysis, Wheel Rim

I. INTRODUCTION

The most significant discovery in old edged claimed as wheel. Safety is a crucial parameter in the vehicle design. So the vehicle is design according to the very stricked rules for the passenger safety. The range starts from steel to non ferrous alloys like Aluminium and magnesium is considered as most sophisticated materials to produce wheel. In ancient age wood and steel with spoke design have evolved. But today's modern vehicles use casted metals and forged Aluminium rings. Experimental stress measurement techniques have been initiated in the late seventies.

In recent years, the procedures have been improved by a variety of experimental and analytical methods for structural analysis (finite element method).

Fatigue life prediction with durability analysis and various reliability methods are used to predict the inherent variation in the engineering structure is also applied for the wheel design. [2] Breaking performance shows effect on the wheel rim parameters: size, weight, design and materials. The wheel rim size governs how much space there is between the rim and brake rotor. If the diameter of the wheel rim is higher there will be a more scope for air flow around the brakes and therefore effective cooling is achieved. The weight of the wheel rim is also an important parameter. Light weight vehicles are easy to handle.

For the effective breaking system the rotational inertia is also an important factor which goes up with the more weight. Another factor in handling has to do with wheel strength and flex. A more rigid wheel will reduce wheel flex. This is essentially important with low aspect ratio, high performance tires that can generate high cornering forces. Car wheels are classified in to two main groups, steel wheels and alloy wheels. Alloy wheels are frequently fitted typical during the manufacturing of modern vehicles. All steel wheels to be made up of two pressed components, the rim and the wheel disc, which are welded together.

II. THEORY OF WHEELS

The tire works as a wheel only after it is set up on the rim and is inflated therefore: the tire and wheels assembly affect the function and performance of the vehicle. The tire is designed and manufactured to suit a usual rim and once installed on correct rim the tire will perform up to the preferred level.

A. Rim Nomenclature

1. Wheel: Wheel is generally constituted of rim and disc.
2. Rim: This is a part where the tire is installed.

A Novel Scheme for Evidence Congregation in Windows Setting

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ABSTRACT

With the increase in internet technology cyber-attacks have also increased, most of the sufferers from these cyber-attacks are novice windows end users. Windows is more popular due to the ease in use, and effective GUI; due to the unavailability of windows component source code the crime investigations in windows environment is a tedious and hectic job for law enforcement agencies. The unsystematic organization of the available sources of evidence in a windows environment makes the integration of these evidences a difficult task. In this paper a prototype model is developed and implemented to extract the various sources of evidence in windows environment. Investigation issues in Windows and Linux environment are also presented.

Keywords

Log File; Windows Registry Analysis; Operating System Forensics; Windows Event Logs; Evidence Collection.

I. INTRODUCTION

Computer forensics is concerned with the analysis of a computer system and a network suspected of being involved in criminal activity. The major target of the investigation is to find data and information that are important for the case under study or investigation. The main emphasis is the investigation is on the “convicting information present in the system” and “entry points for the convicting information”.

Windows Forensics Process analyses the evidences gathered from the operating system activity. These evidences are generally present in Event Logs, Slack Space, Windows Registry and Temporary Files. Files that are related to the Windows Environment are collected with utmost Importance. The Event Logs captures data related to all of the events which may or may not affect the system, e.g. Change of Permission, User Logon/Logoff etc. The Windows Registry keeps a track recently accessed files/folders, user's preferences. The Windows Operating System has many places from where evidence can be extracted.[1],[2].

II. REQUIREMENT OF FORENSICS IN WINDOWS ENVIRONMENT

Windows Forensics adds the ability of providing sound computer forensics. This helps to ensure the overall integrity and survivability of network infrastructure. If you consider computer forensics as a new basic element i.e. “defense-in-depth” approach to network and computer security then you can help in an organization's data integrity. The computer forensics must be practiced responsibly otherwise, there is a risk of destroying vital evidences or forensic evidence ruled inadmissible in the court of law. Also, you or your organization may run afoul of new laws that mandate regulatory compliance and assign liability if certain types of data are not adequately protected.

Identification, collection, presentation and analysis of data such that integrity of evidence collected is preserved and can be presented effectively in the court of law. This is the major task performed in computer forensics. There are two typical aspects of a computer forensic investigation. Firstly, the investigators have to understand the kind of potential evidence they are looking for such that they may identify the areas to be searched. Digital crimes have a large spectrum of variation in criminal activities from child pornography to theft of personal data to destruction of intellectual property. Secondly, the tools to be used for investigation are given proper importance. Recovery of detailed damaged or encrypted files is required so investigator must be familiar with all such approaches.

The collection of ephemeral data is one of the important tasks that are required to be performed by an investigator. The data which is present in hard disk and secondary storage is persistent but the data present in RAM, registers, cache is volatile. This volatile data is ephemeral and is to be taken care of.[3],[4]

A Study on Anonymous Routing Protocols in MANET

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ABSTRACT

Mobile Ad hoc Networks (MANET) use anonymous routing protocols that hide node identities and routes from outside observers in order to provide anonymity protection. Existing anonymous routing protocols relay on hop by hop encryption or redundant traffic by generation high cost. The high cost exacerbates the inherent resource constraint problem in MANETs. Existing anonymous routing protocols provides full anonymity for the data sources, destinations, routing path with increased cost, delay. It consumes the bandwidth of the network. In proposed multicast routing scheme, the network field is partitioned into multicast zones and each zone has a zone head. The data packets will be transferred through the nodes which satisfies the position verification test and the zones through with the packet is transferred is dynamic. Routing misbehavior is mitigated using witness nodes. The proposed system is evaluated in terms of interruption, packet delivery ratio and energy consumption.

KEYWORDS- MANET, Packet delivery ratio, interruption.

I. INTRODUCTION

A mobile ad hoc network is a self-configuring infrastructure-less network of mobile devices connected by wireless. Ad hoc is Latin and means "for this purpose". MANET is an autonomous collection of mobile users that communicate over relatively bandwidth-constrained wireless links. Network topology changes rapidly and unpredictably over time due to the mobility of the nodes. There arises the need of incorporating the routing functionality into nodes. MANETs are vulnerable to malicious entities that aim to tamper and analyze data and traffic analysis by communication eavesdropping or attacking routing protocols. Anonymous routing protocols are crucial in MANETs to provide secure communications by hiding node identities and preventing traffic analysis attacks from outside observers. An ideal anonymous routing protocol for MANETs should have the following properties:

- (1) We should not assume the knowledge of topological information about the network as accessing the topological information renders the system vulnerable to attacks.
- (2) The identities and locations of the nodes in the route, and in particular, those of the source and the destination, should be hidden and protected.
- (3) Multiple paths should be established to increase the difficulty of traffic analysis and avoid broken links due to node mobility.

Anonymous protocols provide full anonymity for the data sources, destinations, and routes. An anonymous routing protocol does not consider the delay involved in the transfer of packets and bandwidth consumption. Limited resource is an inherent problem in MANETs, in which each node labors under an energy constraint. In order to reduce the delay in the transfer of packets, the routing path with the minimum number of hops must be selected. Verification tests are done to verify whether the selected hops are not malicious nodes. When the packet is transmitted through the shortest path, delay is reduced and the bandwidth of the other nodes will be saved.

II. LITERATURE REVIEW

A. Anonymous Gossip: Improving Multicast Reliability in Mobile Ad-Hoc Networks

Ranveer Chandra et.al (2001) proposed a method that improves the packet delivery ratio of the multicast routing protocol and decreases the variation in the number of packets received by different nodes. Gossip as a general technique has been used to solve several problems such as network news dissemination (NNTP), replicated data management, and failure detection. This method works in two phases, in the first phase, any suitable protocol is used to broadcast the message to the group of nodes. In the second concurrent phase, the gossip protocol tries to recover the lost messages. This gossip protocol is called Anonymous gossip. Anonymous

A Study on Software Quality Assurance in a recent trend

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ABSTRACT

Software quality is basic and essential in different types of organizations. When the quality of software is low may lead to damage of human life, mission disappointment, permanent injury, and financial loss in software engineering especially real-time software, control systems. SQA is a process that guarantees the developed software meets and complies with defined or standardized quality specifications. Successful SQA highly dependent on software quality measurements (metrics). Software quality model and software metrics are linked together through quality factors in order to offer measure method for software quality assurance. Software quality metrics emphasis on the quality aspects of the product, process, and project. Generally, software metrics are more closely related to the process and product metrics rather than project metrics.

Keywords- Software Quality Assurance, Software Metric, Software Quality Factor

I. INTRODUCTION

1.1 Background

Software Quality assurance (SQA) is a method to help accomplish quality. SQA can monitor that the software engineering process and methods used to guarantee quality. Software metrics manage the estimation of software product and software development process and it guides and evaluates software development [1]. SQA consists of three concepts: quality, software quality, and software quality assurance. Quality assurance has its root in guaranteeing the quality of an industrial physical software product, this is accomplished by inspection of the product and assessing its quality near is accomplishment or at the different stages of productions. Software, however, isn't as tangible as more physical products. Normally, a software artifact is its functionality and not its usage. There is no physical software product to assess; there is code and not continuously going with documentation. This "invisibility" nature of software adds to the difficulties of evaluating its quality. "Manufacturing products are visible; software products are invisible. Most of the faults in software products are invisible, as in the fact that parts of a software bundle may be absent from the beginning" [2].

Software quality estimation is about measuring to what degree the system or software processes desirable attributes. To guarantee software quality, we undertake software quality assurance and software quality control. Quality assurance differs from quality control in that quality control is a set of activities designed to evaluate the quality of a developed or industrial product. The assessment is conducted during or after the production of the product. Quality assurance, however, decreases the cost of assuring quality by a variety of activities performed during the development and manufacturing process.

1.2 Quality Attributes

Quality attributes are the general factors that affect the run time behavior, system design, and client experience. Every quality attribute can be used to quantify the product performance. Quality can be characterized differently. The quality definition may vary from individual to individual. But finally, there should be some standard. Quality is defined as [8].

- ❖ Fitness of reason-Edward Deming
- ❖ Degree of excellence-Oxford dictionary
- ❖ Best for user's usage and marketing value- Feigenbaum
- ❖ The totality of attributes of an element that bears on its capability to satisfy stated or implied needs-ISO

Fuzzy Application for Industrial Robot

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ABSTRACT

The robot inverse kinematic controller does not give the shut frame arrangement. Henceforth Mechanical controller can accomplish end effectors position in more than one arrangement. To accomplish correct arrangement of the joint angle has been the fundamental worry in the research work. In this paper the analytical solution has been done using D-H method. The method gives the 6 DOF industrial robot with D-H Parameter value which will be the best uses for any inverse kinematics algorithm. Levenberg-Marquardt algorithm is used to solve inverse kinematic of 6-DOF industrial robot arm and the result has been simulated with different soft computing method like ANN and Fuzzy logic . A comparison is taken between both the result obtain from different sources.

Key words- Inverse Kinematics, ANN , Fuzzy logic, Industrial Robot, forward kinematics, D-H parameters

I. INTRODUCTION

The robot manipulator is made out a consecutive chain of unbending connections associated with each one other by rotational or prismatic joints. The rotational joint pivots about a movement pivot and a prismatic joint go down along a movement pivot. Every robot joint area is more often than are not characterized with respect to neighbouring joint. The connection involving progressive joints is depicted by 4*4 homogeneous change frameworks that have introduction and position information of robots. This numbers of changes frameworks decides the degree of flexibility of robot.

In forward kinematics the end-effector's area in the Cartesian position, that is its location and introduction, is resolved in view of the joint factors. The joint factors are the points among the connections, on account of rotational joints, or the connection augmentation, on account of kaleidoscopic joints. Alternately, specified end-effector location and introduction, the backwards kinematics issue alludes to discover the estimations of the joint factors that enable the controller to achieve the specified area. The connection amongst forward and backwards kinematics, and in addition the connection among joint location and Cartesian location. Tackling the reverse kinematics issue for mechanical controllers is a troublesome and furthermore very difficult assignment. The intricacy of this issue is specified by the robot's configuration and the nonlinear geometric conditions that portray the map among the Cartesian position and the joint position

$$\Theta=f(q)$$

Where θ is represent the joint angle and q represented as end effectors position of the six degree of freedom robot.

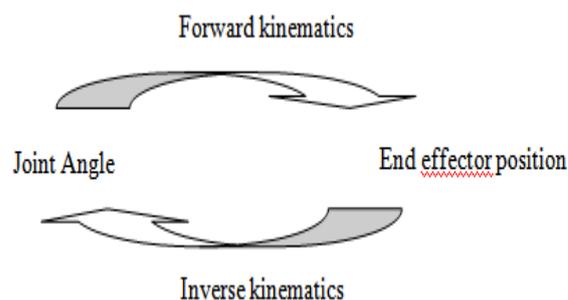


Figure-1: Architecture Kinematics

In spite of the fact that a shut frame for this issue is best in numerous applications, more often than not this is difficult to discover. Different approaches to decide the answer for the Inverse kinematics issue are anticipated. These incorporate, along with others, geometrical arrangements (anywhere conceivable), numerical calculations in light of enhancement methods, transformative registering or neural systems neural systems have for quite some time been perceived as having the capacity to speak to non-straight connections that happen amongst information and yield information. Their capacity to be trained by case makes them a decent possibility to give the map among the Cartesian position and the joint position vital by the reverse kinematics issue. In a few neural system structures utilized for tackling the opposite kinematics issue are broke down. These incorporate back spread prepared bolster neural systems

A Study on Industrial Robots

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ABSTRACT

A robot is re-programmable, multi-functional controller intended to move material, parts, instruments, or concentrated gadgets through factor modified movements for the execution of an assortment of assignments. Robotics can be characterized as the science or investigation of the innovation essentially connected with the plan, manufacture, hypothesis, and use of robots. Robotics is a science using the continuing advancements of mechanical engineering, material science, sensor fabrication, manufacturing techniques, and advanced algorithms. While different fields contribute to the science, the strategies, and the segments, mechanical autonomy make the enchanted finished result. The practical applications of robots drive the development of robotics and drive advancements in other sciences in turn. Crafters and analysts in mechanical autonomy think about something other than apply autonomy. Robots hold the confirmation of moving and changing materials as per program feed in the controller memory.

I. INTRODUCTION

HISTORY OF ROBOTS IN INDUSTRIES

Robots have for quite some time been the focal point of sci-fi, Physics, and writing, however, it wasn't until late decades that they turned into a feasible piece of our workforce. While created utilizing fiction, these gauges practically portray our robots today. The change of Numerically Controlled machines, and the rising reputation of the PC both acknowledged out the fundamental present-day robots.

OBJECTIVES OF THE STUDY

To understand the logic and conceptual of Robotic automation and its requirements in industrial automation development. Initially, fuel and electrical engine were used and it had four to five-axis of rotation. After a decade robot was introduced and make them fully automatic.

Essential Characteristics For Robots:

Part sensing: Robots has capability to sense the parts and material and detect as per the programm feed sensor: light sensor, touch and Pressure sensor, sonar sensor,

ROBOT FUNCTION

- Create a particular movement of joints
- Incorporate tooling and sensors

ROBOT PROCESSES

- Way following
- Dell Setup moves
- Tele robotics
- Target moves versus educated moves

SOME KEY EXPRESSION OF ROBOTS

Repeatability - changeability in returning to the same beforehand taught position/configuration

Exactness - changeability in moving to a target in space that has not been previously taught

Device speed - Straight speed ability when instrument moving along a curvilinear path

Screw speed - Rotational speed when the tool is being rotated about an axis in space

Joint interpolated motion - Movement where the joint setting aside longest opportunity to roll out the joint improvement oversees the movement and alternate joints are hindered in extent with the goal that all joint finish their joint changes at the same time

TCF - Tool or terminal control frame

TCP - Tool /terminal control point

Joint limits - Either the software or physical hardware limits which constrain the operating range of a joint on a robot. The software limits have a smaller range than the hardware limits.

Joint speed limits - Speed restrain for robot joints, which restrict how quick the connections of a robot may interpret or rotate.

Point-to-point motion - Described by beginning and halting between arrangements or as the apparatus is moved between targets.

Continuous path motion - Portrayed by mixing of movement between arrangements or targets, for the most part with the loss of way exactness at the objective changes, as the robot moves between arrangements/targets.

Interpolation (kinematic) capabilities - Robot typically fit for both forward and backwards

Can Electric Vehicle (EV) replace conventional vehicle, and its future

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ABSTRACT:

Electric vehicles (EV), including Battery Electric Vehicle (BEV), Hybrid Electric Vehicle (HEV), Plug-in Hybrid Electric Vehicle (PHEV), Fuel Cell Electric Vehicle (FCEV), are becoming more commonplace in the transportation sector in recent times. As the present trend suggests, this mode of transport is likely to replace internal combustion engine (ICE) vehicles in the near future. Each of the main EV components has a number of technologies that are currently in use or can become prominent in the future. EVs can cause significant impacts on the environment, power system, and other related sectors. The present power system could face huge instabilities with enough EV penetration, but with proper management and coordination, EVs can be turned into a major contributor to the successful implementation of the smart grid concept. There are possibilities of immense environmental benefits as well, as the EVs can extensively reduce the greenhouse gas emissions produced by the transportation sector. However, there are some major obstacles for EVs to overcome before totally replacing ICE vehicles. This paper is focused on reviewing all the useful data available on EV configurations, battery energy sources, electrical machines, charging techniques, optimization techniques, impacts, trends, and possible directions of future developments. Its objective is to provide an overall picture of the current EV technology and ways of future development to assist in future researches in this sector.

I. INTRODUCTION:

In recent times, electric vehicles (EV) are gaining popularity, and the reasons behind this are many. The most eminent one is their contribution in reducing greenhouse gas (GHG) emissions. In 2009, the transportation sector emitted 25% of the GHGs produced by energy related sectors [1]. EVs, with enough penetration in the transportation sector, are expected to reduce that figure, but this is not the only reason bringing this century old and once dead concept back to life, this time as a commercially viable and available product. As a vehicle, an EV is quiet, easy to operate, and does not have the fuel costs associated with conventional vehicles. As an urban transport mode, it is highly useful. It does not use any stored energy or cause any emission while idling, is capable of frequent start-stop driving, provides the total torque from the startup, and does not require trips to the gas station. It does not contribute either to any of the smog making the city air highly polluted. The instant torque makes it highly preferable for motor sports. The quietness and low infrared signature makes it useful in military use as well. The power sector is going through a changing phase where renewable sources are gaining momentum. The next generation power grid, called 'smart grid' is also being developed. EVs are being considered a major contributor to this new power system comprised of renewable generating facilities and advanced grid

systems [2,3]. All these have led to a renewed interest and development in this mode of transport.

EV Types

EVs can run solely on electric propulsion or they can have an ICE working alongside it. Having only batteries as energy source constitutes the basic kind of EV, but there are kinds that can employ other energy source modes. These can be called hybrid EVs (HEVs). The International Electrotechnical Commission's Technical Committee 69 (Electric Road Vehicles) proposed that vehicles using two or more types of energy source, storage or converters can be called as an HEV as long as at least one of those provide electrical energy [4]. This definition makes a lot of combinations possible for HEVs like ICE and battery, battery and flywheel, battery and capacitor, battery and fuel cell, etc. Therefore, the common population and specialists both started calling vehicles with an ICE and electric motor combination HEVs, battery and capacitor ones as ultra-capacitor-assisted EVs, and the ones with battery and fuel cell FCEVs [2-4]. These terminologies have become widely accepted and according to this norm, EVs can be categorized as follows: (1) Battery Electric Vehicle (BEV) (2) Hybrid Electric Vehicle (HEV) (3) Plug-in Hybrid Electric Vehicle (PHEV) (4) Fuel Cell Electric Vehicle (FCEV)

HEV Setup

Application of data mining with on cloud computing

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ABSTRACT. With the rapid increase of data storage capacity, massive data processing and massive data calculation has become an important problem in the field of data mining. Cloud computing is good at dealing with large-scale data and large-scale computing. If the data mining algorithm can be cooperated to the cloud computing platform, the large computational problems in the field of data mining will be solved. In this paper, the author introduces the basic characteristics and process of cloud computing and data mining, and summarizes the various methods of data mining in detail, including neural network method, genetic algorithm, decision tree method, statistical analysis, rough set method. Finally, the application of data mining based on cloud computing is summarized.

I. INTRODUCTION

The data processed by modern society is massive. Before the advent of cloud computing, when

conducting data mining in the past, the high-performance machine or a larger computing device were expected to deal with it. In the context of massive data, the data mining process requires a good development environment and application platform. In such circumstances, the use of

cloud-computing-based approach for data mining is more appropriate. And because of the lack of the current parallel classification algorithm and large-scale data sets being increasingly large, the traditional data mining system cannot be used for efficient mining and utilization. Therefore, how to improve the parallelism and efficiency of the algorithm is the urgent issue to be solved. By sorting out the development and application of data mining based on cloud computing, we hope to provide some help for future data mining research.

II. THE CONCEPT OF CLOUD COMPUTING

Cloud Computing [1] is an Internet-based computing approach, in which shared hardware and software resources and information can be provided to the computer and other equipment on demand. Cloud computing describes an Internet-based new IT service addition, usage, and delivery model that provides dynamic, scalable, and often virtualized resources over the Internet. Cloud Computing [2,3] is a computing platform which is distributed in large-scale data centers, and can dynamically provide various server resources to meet the needs of research, e-commerce and other

fields. Cloud computing is the development of Distributed Computing [4], Parallel Computing [5],

and Grid Computing [6], and the integrated evolution result of Virtualization [7], Utility

Computing [8], IaaS (infrastructure as a service), PaaS (platform as a service), and SaaS (Software as a service).

III. THE FEATURES OF CLOUD COMPUTING

3.1. Verification of the Finite Element Model

Cloud computing provides the most reliable and secure data storage center, users need not worry about data loss, virus invasion and other troubles. The "Cloud" uses data replica fault tolerant and interchangeable compute nodes to protect the high reliability of service so that using cloud computing is more reliable than using local computers.

3.2. Virtualization Technology

The most important feature of the existing cloud platform is virtualization technology, which can realize virtualization management, dispatch and application of hardware resources of servers through virtualization technology. Cloud computing allows users to access applications at any place and from a variety of terminals. The requested resource comes from the cloud, not the fixed tangible entity. Applications are running somewhere in the cloud, but in fact, users don't need to understand nor worry about where the application will run. With just one laptop or a mobile phone, you can do everything you need, including even supercomputing, through web services.

A Circularly Polarized Substrate Integrated Waveguide Antenna of Dual-Band Dual-Sense type

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ABSTRACT—A dual-band dual-sense circularly polarized (CP) antenna is presented in substrate integrated waveguide technology. The proposed antenna consists of four V-shaped asymmetrical resonators that are placed on a circular substrate symmetrically with respect to its center. The antenna is excited by a probe on the central axis. A dual-band CP antenna is designed and fabricated. The antenna provides left-hand circular polarization (LHCP) in the lower band and right-hand circular polarization (RHCP) in the upper band. Total size of the antenna is 1963.5 mm² on a 0.787 mm thick RT/Duroid 5880 substrate. Measured axial ratios are below 3 dB over 8.78–8.90 and 9.52–9.66 GHz. Over the bands, the return loss is more than 10 dB. Measured cross-polarization levels are 31.1 and 24.65 dB, and front-to-back ratios are 14.93 and 18.35 dB over the LHCP and RHCP bands, respectively. Depending on application requirements, the band ratio can be tuned. Also, the sense of polarization can be interchanged. The antenna does not use any ground plane perturbation. Thus, it can be directly attached to a micro wave circuit.

Index Terms—Circularly polarized (CP) antenna, dual-band, dual-sense, substrate integrated waveguide (SIW).

I. INTRODUCTION

Circularly polarized (CP) antennas are popular due to their capability to avoid adverse effects caused by Faraday rotation, multipath propagation, and polarization mismatch due to misalignments between transmitting and receiving antennas. Printed CP antennas are preferred as they have low profile, low cost, and ease of fabrication [1], [2]. Dual-band CP antennas [3], [4] minimize the requirement of using two antennas for two bands. Moreover, extra features of polarization diversity can be incorporated in dual-band antennas by keeping polarization of two bands opposite to each other. Recently, many dual-band, dual-sense CP antennas are reported [5]–[11]. However, most of them provide bidirectional radiation patterns. Also, the tunability of the bands is not shown in [5]–[8] and [10]. Good radiation characteristics in low-profile antennas can be obtained when antennas are designed in substrate integrated waveguide (SIW). SIW-based linearly polarized antennas are reported in

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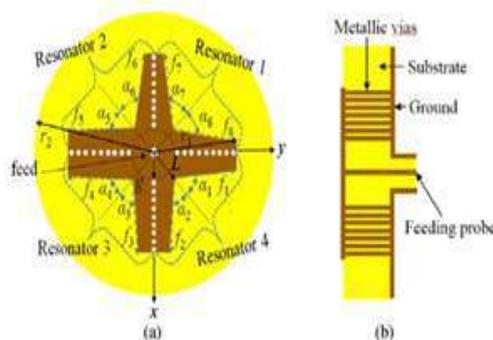


Fig. 1. Geometry of basic dual-band dual-sense antenna. (a) Top view and (b) side view. ($\alpha_1 = 47.7$, $\alpha_2 = 49.67$, $\alpha_3 = 51.2$, $\alpha_4 = 45$, $\alpha_5 = 50.2$, $\alpha_6 = 57.8$, $\alpha_7 = 57.8$, $\alpha_8 = 60.25$; unit: degrees), ($f_1 = 12.85$, $f_2 = 13.0$, $f_3 = 13.13$, $f_4 = 12.65$, $f_5 = 13.0$, $f_6 = f_7 = 13.71$, $f_8 = 13.95$, $r_1 = 19$, $r_2 = 25$, $g = 4.0$, $L = 8.48$; unit: millimeters).

The Impact of Strategic Human Resource Management on Organizational Performance in 21st Century

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ABSTRACT:

The business landscape in 21st century is fast changing as the firms must compete in a complex, dynamic and challenging context that is being transformed by many factors ranging from globalization, technological advancement, changes in customer tastes and preferences, to rapid environmental changes. Organizational performance is getting more and more important, especially in a market with greater competition and dynamic. Organizational performance is measured through different indicators and it guarantees the continuity of the organization to be competitive in a global marketplace. Human resources are the key for keeping the organization in the market so competitive. These human resources need to be managed effectively to achieve the required performance of the organization. It is necessary to manage strategically the human resources and to adapt its strategy in tune with organizational strategy.

Strategic human resource management in a way has emerged as the key contributor to the success of an organization in such competitive environment. Strategic Human Resource Management covers the concepts and practices that guide and align Human Resource Management philosophy, tactical planning and practice with the strategic and long term goals of the organization, with a particular focus on human capital. The foundation for strategic HRM is the real advantage of having an agreed basis for developing methodologies to people management in the longer term, and this is how a company can achieve a competitive advantage. SHRM is a complex integration of human resource to the strategic management of the organization with the objective of achieving the organizations goals efficiently and effectively. The aim of this study is focused on the impact of the strategic management of human resource in achieving organizational performance.

Key Words: Human Resource Management, Strategy, Strategic HRM, Organizational Performance, Performance Outcomes.

I. INTRODUCTION:

As the business environment becomes more competitive, firm's human resources (HRs) become more imperative to the firm's success. In recent years, the field of Human Resource Management (HRM) is experiencing abundant pressures for change in the dynamic business environment. It is due the shifts in globalization, economy, workforce diversity and technology, which have created greater demands for organizational redesigning and restructuring and drove the Human Resource Management practices in some completely new directions. Organizations are seeking to create much competition between them, taking more market, more customers, more sales, etc. Swift changes stemming from globalization, advancement of information systems and other factors have caused higher competition. Many organizations are driven by the market to set their goals in their performance. Some of the goals are: cost reduction, achieving sales levels, increasing the number of customers, increasing the market percentage, improving productivity and quality, innovative products. The realization of these goals will be achieved through the human

resources management in organizations. Workforce, as the key to success, will enable the achievement of organizational performance.

Human resources management is more significant than other competitive resources because these people use other assets in organization, create competitiveness and realize objectives. Thus organizations must understand the expectations of their workforce in order to achieve the desired performance. The realization of the expectations of employees will enable the desired behavior of employees in the organization. Some of the desired outcomes of the organization in managing their workforce are: competence, cooperation of employees with managers, cooperation of employees between them, showing the capabilities of employees; motivation, commitment and satisfaction; attitude and presence; employee behaviors.

The overall goal of performance management is to create a culture as high performance in which individuals and teams to take responsibility for the continuous improvement of business processes and their skills and contribute in achieving the targets set by managers. In particular,

Cluster Analysis for Gene Expression Data: A Survey

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Abstract

DNA microarray technology has now made it possible to simultaneously monitor the expression levels of thousands of genes during important biological processes and across collections of related samples. Elucidating the patterns hidden in gene expression data offers a tremendous opportunity for an enhanced understanding of functional genomics. However, the large number of genes and the complexity of biological networks greatly increase the challenges of comprehending and interpreting the resulting mass of data, which often consists of millions of measurements. A first step toward addressing this challenge is the use of clustering techniques, which is essential in the data mining process to reveal natural structures and identify interesting patterns in the underlying data.

Cluster analysis seeks to partition a given data set into groups based on specified features so that the data points within a group are more similar to each other than the points in different groups. A very rich literature on cluster analysis has developed over the past three decades. Many conventional clustering algorithms have been adapted or directly applied to gene expression data, and also new algorithms have recently been proposed specifically aiming at gene expression data. These clustering algorithms have been proven useful for identifying biologically relevant groups of genes and samples.

In this paper, we first briefly introduce the concepts of microarray technology and discuss the basic elements of clustering on gene expression data. In particular, we divide cluster analysis for gene expression data into three categories. Then we present specific challenges pertinent to each clustering category and introduce several representative approaches. We also discuss the problem of cluster validation in three aspects and review various methods to assess the quality and reliability of clustering results. Finally, we conclude this paper and suggest the promising trends in this field.

I. INTRODUCTION

Introduction to Microarray Technology

Measuring mRNA levels

Compared with the traditional approach to genomics research, which has focused on the local examination and collection of data on single genes, microarray technologies have now made it possible to monitor the expression levels for tens of thousands of genes in parallel. The two major types of microarray experiments are the cDNA microarray [54] and oligonucleotide arrays (abbreviated oligo chip) [44]. Despite differences in the details of their experiment protocols, both types of experiments involve three common basic procedures [67]:

Chip manufacture: A microarray is a small chip (made of chemically coated glass, nylon membrane or silicon), onto which tens of thousands of DNA molecules (probes) are attached in fixed grids. Each grid cell relates to a DNA sequence.

Target preparation, labeling and hybridization: Typically, two mRNA samples (a test sample and a control sample) are reverse-transcribed into cDNA (targets), labeled using either fluorescent dyes or radio active isotopes,

and then hybridized with the probes on the surface of the chip.

The scanning process: Chips are scanned to read the signal intensity that is emitted from the labeled and hybridized targets.

Generally, both cDNA microarray and oligo chip experiments measure the expression level for each DNA sequence by the ratio of signal intensity between the test sample and the control sample, therefore, data sets resulting from both methods share the same biological semantics. In this paper, unless explicitly stated, we will refer to both the cDNA microarray and the oligo chip as microarray technology and term the measurements collected via both methods as gene expression data.

Pre-processing of gene expression data

A microarray experiment typically assesses a large number of DNA sequences (genes, cDNA clones, or expressed sequence tags [ESTs]) under multiple conditions. These conditions may be a time-series during a biological process (e.g., the yeast cell cycle) or a collection of different tissue samples (e.g., normal versus cancerous tissues). In this paper, we will focus on the cluster analysis

Weather Forecasting Techniques using Artificial Neural Networks

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ABSTRACT

Weather forecasting has become an important field of research in the last few decades. In most of the cases the researcher had attempted to establish a linear relationship between the input weather data and the corresponding target data. But with the discovery of nonlinearity in the nature of weather data, the focus has shifted towards the nonlinear prediction of the weather data. The advent of new satellite imaging technologies has made satellite images more accessible. These images can be utilized for weather predictions. This work proposes a simple approach for weather prediction that relies on satellite images and weather data as inputs. The method is divided into two parts. The first part involves the use of image processing techniques such as image segmentation on the satellite images to extract the cloud cover. On basis of the cloud cover obtained, percentage cloud cover is calculated and this calculated percentage value is stored, which is later used in the second stage of the approach. The second part involves the use of the cloud cover percentage along with other inputs such as temperature, humidity and wind speed to train an artificial neural network.

Keywords-Satellite Images, Image Processing, Artificial Neural Networks

I. INTRODUCTION

The interpretation of satellite weather imagery has generally required the experience of a well-trained meteorologist. However, it is not always possible, or feasible to have an expert meteorologist on hand when such interpretation is desired. Therefore, the availability of an automated interpretation system would be quite desirable. Also, to take advantage of this available data in a reasonable and useful time increment, the system must be efficient and have low implementation cost. There are 3 main types of satellite images available - Visible,

Infrared and Water Vapor. Visible images are obtained only during the day. They are used to determine the thickness of the clouds. Infrared images are obtained using special infrared sensors. The major advantage of this type is that it can be obtained even during night. It can be used to measure temperature of cloud top. Water Vapor images indicate the moisture content or humidity. The brighter areas tend to have high chances of rainfall.

In recent years the exponential increase in processing power has revived machine learning algorithms like artificial neural networks, linear and logistic regression. This has resulted in wide range development of machine learning algorithms for nearly every application, from handwriting recognition to solve crimes or predicting the stock market. Weather prediction using machine learning techniques is a field where much research has not been done. Predicting the weather is one of the

most important and challenging aspects of remote sensing due to a large number of factors affecting it.

There has been significant progress in the area of remote sensing of satellite images using image processing methods. One of the strategies used for image retrieval and feature extraction is using fuzzy SOM strategy for satellite image retrieval and information mining projected by yopinghung, t sun-wei and li-jenkao [1]. They proposed a model for efficient satellite image retrieval and knowledge discovery. It has two major parts. First, it uses a computation algorithm for off-line satellite image feature extraction, image data representation and image retrieval. A self-organization feature is used to create a two-layer satellite image concept hierarchy. The events are stored in one layer and the corresponding feature vectors are categorized in the other layer. Another strategy proposed by Craig M. Wittenbrink et al is Feature extraction of clouds from GOES satellite data for integrated model measurement visualization [2]. The paper suggests a de-correlating transformation to the spectral images using Karhunen-Loeve Transformation (KLT) (more properly known as the Hotelling transform). The KLT has been widely used in remote sensing for multispectral imagery, and is also known as principal component analysis. The principal components are obtained, and the first n are selected. The choice of n is a trade-off between low analysis complexity and accurate representation. The three main components are then

Sterility of Modern Man in T.S.Eliot's "The Hollow Men"

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ABSTRACT

Alienation, uncertainty, and complexity of the modern age drive its writers to do something in one way or another. T.S. Eliot (1888–1965), one of the most influential modernist poets of his time, dedicates major of his poetry to expose the modern individual's inability that he sees in himself and in his society. According to some critics, "The Hollow Men" (1925), is one of Eliot's most difficult poems. It is a dramatisation of a state of spiritual and emotional sterility, in which Eliot tragically presents a group of men aware of the shallowness of the society which they conform.

This study is an attempt to convey Eliot's mood and theme through "The Hollow Men" to discuss specifically the state of spiritual and emotional sterility. Accordingly, the study starts with an introduction which sheds light on the poet's thought and the poem, and revolves around the insignificance of the individual in the modern age. Then, it traces Eliot's themes of emptiness, hollowness, and spiritual and emotional sterility. Finally, the study summarizes the reasons of spiritual and emotional sterility, and its results on the modern individuals. The study ends with notes and bibliography.

Thomas Stearns Eliot (26 Sept. 1888 - 4 Jan. 1965), poet, critic, and editor, was born in St. Louis, Missouri. He is considered one of the well acknowledged representative figures of the twentieth century whose literary talent speaks of itself so boldly and vividly through his remarkable and distinguished poetry. His literary career extended over a period of forty-five years. He dominated the English literary scene with a wide poetic authority and influence. He tried his hand at poetry, drama, criticism, both literary and social, and at journalism. He achieved eminent success in each of these fields. His greatness is a recognized fact which no longer requires any assertion. F.R. Leaves remarks:

"Eliot's genius is that of the great poet who has a profound and acute apprehension of the difficulties of his age".¹

Eliot is quite different from any other modern English poet and is held as the most influential literary person of 20th century not only for his uniqueness in his style and subject matter of his poetry but it is the use of philosophy which is the most stunning feature in his poems. Eliot's poetry has always portrayed the crude, harsh war-torn world, where humanity has reached the zenith of its sterility.²

In all his poems, Eliot made an attempt to

express the bitterness of modern and materialistic life. The spiritual degeneration of man can be seen in his poems. Eliot is a true writer of his age. The fact is that he was a spokesman of his age. Eliot's view on the Modern Man as depicted in "The Waste Land" which is, according to F.R. Leaves, "great and positive achievement" is the best depiction of modern human's life. Modern people's problems especially after the World War, have become extremely intricate. As the natural world has become barren outwardly because of massive death and destruction, the internal state of humans has become complex as well as perverted. They are going through a life-in-death situation, always in fear of death. Moral values have lost dignity. Perverted sex has become a part and parcel in their daily lives. In fact, innocence is considered as perversion. Every modern human is hopeless. Faith in God is overshadowed by the power of money and personal enjoyment.³ "The Hollow Men" also is a shorter but still a nice portrayal of modern people. Modern men suffer from spiritual paralysis, spiritual decay: "Shape without form.../Paralysed force". Man suffers an impoverishment of emotional vitality. He lives according to the rules of the empty social conventions and those of a decadent culture. Man's life is partly sordid and sensual. He feels himself entangled in a corrupt, decaying, ugly Society. The duplicity of man, lack of communication among men, and man's isolation are three basic predicaments of man, making him more and more alienated, although, these motifs are common to Eliot's poetry.⁴

T. S. Eliot was one of the most important poets of the twentieth century; as literary critic and commentator on culture and society. His writing continues to be profoundly influential. Every student of English must engage with his writing to

Data Mining in the field of Library and Information Science

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ABSTRACT: Data Mining refers to the extraction or “Mining” knowledge from large amount of data or Data Warehouse. To do this extraction data mining combines artificial intelligence, statistical analysis and database management systems to attempt to pull knowledge form stored data. This paper gives an overview of this new emerging technology which provides a road map to the next generation of library. And at the end it is explored that how data mining can be effectively and efficiently used in the field of library and information science and its direct and indirect impact on library administration and services.

Keywords : Data Mining, Data Warehouse, OLAP, KDD, e-Library

I. INTRODUCTION

An area of research that has seen a recent surge in commercial development is data mining, or knowledge discovery in databases (KDD). Knowledge discovery has been defined as “the non-trivial extraction of implicit, previously unknown, and potentially useful information from data” [1]. To do this extraction data mining combines many different technologies. In addition to artificial intelligence, statistics, and database management system, technologies include data warehousing and on-line analytical processing (OLAP), human computer interaction and data visualization; machine learning (especially inductive learning techniques), knowledge representation, pattern recognition, and intelligent agents.

One may distinguish between data and knowledge by defining data as corresponding to real world observations, being dynamic and quite detailed, whereas knowledge is less precise, is more static and deals with generalizations or abstraction of the data [2]. A number of terms have been used in place of data mining, including information harvesting, data archaeology, knowledge mining, and knowledge extraction. The knowledge is stored in data warehouse, which is the central store house of data that has been extracted from operational data over a time in a separate database. The information in a data warehouse is subject oriented, non-volatile and historic in nature, so they contain extremely large datasets [3].

Libraries also have the big collection of information and in e-Library there are organize collection of information which serves a rich resource for its user communities. E-Library includes all the processes

and services offered by traditional libraries though these processes will have to be revised to accommodate difference between digital and paper media. Today’s e-Libraries are built around Internet and Web technologies with electronic books and journals as their basic building blocks. Here Internet serves as a carrier and provides the contents delivery mechanism and Web technology provides the tools and techniques for content publishing, hosting and accessing. The availability of computing power that allow parallel processing, multitasking and parallel knowledge navigation with increasing popularity of Internet and development in Web technologies are the main catalyst to the concept of e-Library. Data Mining is relatively new term in the world of library and information science though it is being used by both commercial and scientific communities since a long time. There are three main reasons for that. First both the number and size of databases in many organizations are growing at a staggering rate.

Terabyte and even petabyte databases, once unthinkable, are now becoming a reality in a variety of domains, including marketing, sales, finance, healthcare, earth science, molecular biology (e.g. the human genome project), and various government applications. Second organizations have realized that there is valuable knowledge which is buried in the data which, if discovered, could provide those organizations with competitive advantage. Third, some of the enabling technologies have only recently become mature enough to make data mining possible on large datasets.

A Fundamental Study of Multi-Dimensional Force/Moment Analysis Dynamometer

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Abstract: The exactness in the measurement estimation of three-dimensional power/second is important for the assembling procedure, for satellite, and in military hardware. The motivation behind this examination is to plan a multi-dimensional multi-point power/second (F/M) estimation MP-M dynamometer model dependent on three-pivot piezoelectric sensors establishment. The FEM reproduction is performed utilizing ANSYS programming and scientific examinations are completed utilizing determined conditions. The deliberate FEA results are predictable with the applied standard power/minutes. The blunder distinction of FEM investigation is under 1%. The FEM reproductions results are roughly 99-100% of the applied hub power, vertical power and pitch second individually. The planned MP-M dynamometer model is able to gauge spatial power/second precisely and reenactment tests are examined.

Key Word: Three-axis piezoelectric sensor, multi-dimensional measurement, SolidWorks design, and FEM simulation.

I. Introduction And Literature Review

This article outlines „Theoretical investigation of multi-dimensional force/moment measurement dynamometer“ is designed at the school of mechanical engineering experimental lab at Dalian university of technology DUT, China. The model is designed and analyzed using FEM analysis [1] and constructed designs have been sent to the manufacturing company. The MP-M dynamometer model can measure both the magnitude and direction of the applied force and the moment vectors in three-coordinates [2]. However, in this model, an axial force and normal force are applied maximum up to 15 kN and a pitch moment is applied maximum up to 11.97 kNm. The dynamometer model mainly consists of a long balance plate dynamometer with eight three-axis piezoelectric sensors uniformly mounted between the clamped plates, a base bed to support the entire model, two hydraulic loaders to apply the force/moment in horizontal and in the vertical directions.

The demand for accuracy in the measurement of multi-dimensional force is increasing with the time in global competition as it has wide applications in experimental work [3] and in real life such as humanoid robots [4], automotive industry [5]-[6] and aerospace industry[7]. The designed multi-point measurement model is capable of measuring the three coordinates of force/torque [8]-[9]-[10]-[11]. The model has been designed by providing an upper and lower plate support type assembly to piezoelectric sensors to reduce assembly error[12] and to provide easiness in the installation of load sensors in the model. Thus, it is essential for force-measuring devices to precisely measure forces with multi-points locations. The studied research is based on designing a rectangle pattern allocation of tri-axial piezoelectric sensors on a long plate dynamometer which can measure six-components force/torque measurement[13]-[14]. The piezoelectric technology has been used in this research is based on converting the mechanical energy into an electric voltage or signal. Moreover, when a quartz wafer[15] is packaged as a mono-axial piezoelectric sensor or tri-axial load sensor[16]-as shown in [Figure 2](#). The measuring range of six-axis force/torque sensors is very wide and sensors survive high overload is more than 100 percent of full-scale output. Therefore piezoelectric force sensors are suitable for measurements in experimental laboratories, industrial measurements, and mechanical robotics [18].

This article is based on installing a rectangle pattern of eight tri-axial piezoelectric sensors on a long dynamometer model. In the experimental system test, a total of eight points are allocated on specific positions to apply the pull and push force/moment (F/M). However, in this paper, the FEM analysis[19]-[4] has been carried only for the selected three points as the MP-M dynamometer model is under the fabricating process. The proposed FEM model describes the static calibration in terms of total deformation, stress and force reactant analyses of the located points using FEA. Further research will be studied after the manufacturing and assembly of the dynamometer model to perform the experimental calibration.

A Research on Carbon Nanotubal Applications in Automobiles

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Abstract: The Automotive business keeps on being a sprouting and developing industry wherein new and creative thoughts and advancements find promising applications intermittently. This audit paper, as it were, will investigate the importance of carbon nanotubes as an approach to improve the exhibition of "out and about" cars in the field of fuel segment frameworks especially to show signs of improvement eco-friendliness. Further the usage of Carbon Nanotubes will be managed top to bottom with an emphasis on car application. Besides, CNTs have been found to have excellent morphological properties and thusly are promising as fortification material in the composite structures alongside polymers for some car applications. This could likewise turn into the reason for weight decrease. Obviously, CNTs can be used for the creation of geometrical, sporadic or complex shapes and structures with genuinely economical and moderately copious crude materials opposite the current regular procedures of manufacture. Hence cost viability and profitability could likewise be accomplished in scale and extension.

Key Word: Carbon Nanotubes, Automobile, Fuel Efficiency, Nanotechnology.

I. Introduction

Carbon nanotubes or CNTs basically consist of rolled up sheets of single layered carbon atoms (graphene). Further Carbon nanotubes can be categorised as [1,14]: Single Wall Carbon Nanotubes (SWCNT) [Fig(1)], Double Wall Carbon Nanotubes (DWCNT) [Fig(2)] & Multi Wall Carbon Nan- otubes (MWCNT) [Fig(3)]. SWCNT can reach diameter less than 1 nanometer. DWCNT has one nanotube nested within another. The nanotube inside has a smaller diameter. The spatial gap between the two diameters results in the varying interactions between the nanotubes. This means that the outer nanotube can be modified without any modifications in the inner nanotube and therefore this results in interesting characteristics. MWCNT consists of several concentrically interlinked nanotubes which can reach diameters more than 100 nanometers.

Historic Mechanical ally, progress of automotive industry is replete with outstanding examples of new materials and usage of their properties to bring about disruption in the trend. Therefore, to have better cars in the future our industry needs to change and it needs to change for the better. The rapid progress of CNTs shows great promise for the betterment of this industry. The main reasons for using CNTs is due to its extraordinary properties are High flexibility without any significant damage, Low Thermal Expansion Coefficient, Very High Tensile Strength. Each of the above mentioned properties in its own respect can merit a lot of usage and in combination can be used to improve the efficiency and structural characteristics of the car.

II. Synthesis Of Carbon Nanotubes

The most popular mode of producing high volume CNTs is by using Chemical Vapour Deposition (CVD) which generally uses fluidised bed reactors as from Fig.(1) that allows uniform gas diffusion and heat transfer to metal catalyst nanoparticles. Scaling up the production can be done with the help of low cost feed stocks [1,6,15].

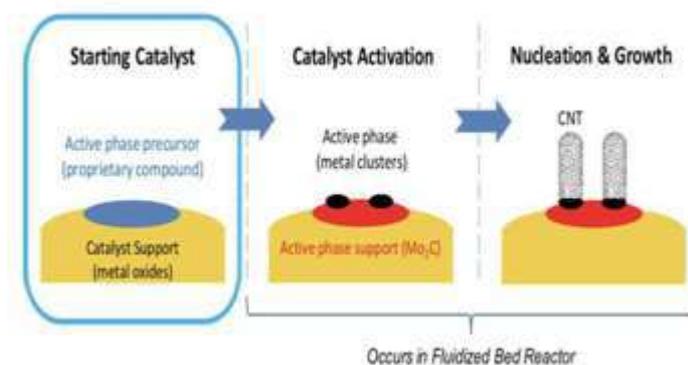


Figure 1 Chemical vapor deposition

Ground water quality status Analysis of Cuttack town of Odisha, India

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Abstract: A qualitative study was carried out to assess the quality of ground water in Cuttack town. It was observed that most of the parameters were below the permissible limit as per BIS & PCB standards. Khan nagar and Tulasipur industrial areas were found to be more polluted. The ground water of the concerned area was safe with respect to TC, FC as none of the locations were above the WHO limit in any seasons. It has been observed from correlation coefficient that TH, Conductivity, Cl, TDS have strong correlation with each other. Iron is negatively correlated with TH and F is negatively correlated with pH.

Key Word: Ground water, Pollution, Physico-chemical parameters, TDS, Hardness, Turbidity.

I. Introduction

Pollution of ground water has been reported for a number of cities throughout the world. Dependence on ground water resources for municipal supply is growing due to paucity and pollution of surface water bodies. Cuttack, the erstwhile state capital of Odisha and is a traditional Indian town organically developed over the time. The huge population of this area use ground water for drinking and other purposes. A number of dug and tube wells have been constructed to meet the short supply of municipality. So it is essential to have a study of ground water quality as it is being polluted. MSW (Municipality Solid Waste) is heterogeneous in nature and contains paper, plastic, rag, metal, glass pieces, ash, composite matter, dead animals, discarded chemicals, paints, hazardous hospital waste and agricultural residues. Presently most of the MSW in Cuttack city is being disposed unscientifically like other cities of India. Generally MSW is collected and deposited in sanitary landfills. During land filling of solid waste continuous pressure results in the quizzing of a contaminated liquid as leachate which contains dissolved, suspended and microbial contaminants from solid waste. The leachate has high organic contents, soluble salts and other constituents capable of polluting ground water. This polluted ground water is unfit for drinking and causes jaundice, nausea, asthma and infertility.

The quality of ground water of this area still remains largely uncharted and a possibility of severe contamination looms large. Keeping this in view a systematic study on the groundwater quality was carried out over a period of two years from January 2009 to December 2010, which include various Physico-Chemical and microbiological parameters.

Description of study area Cuttack having latitude of 20° 29' to 20° 26'N and longitude of 85° 48' to 85° 56' E. River Mahanadi and its major distributaries Kathajodi surrounds the city in north and south boundaries and the city is situated on a doab land. Low lying areas are available centrally. The ground height of the study area varies from 19 to 20 m on the north. The soil beneath the city is composed of unconsolidated alluvium in alternating sequence of sand, silt, and clay, the depth of which continues up to 120m and is placed above Gondwanaland sedimentary rock of Archean crystallines (Mahallick, 1992). The depth of water table changes with monsoon, going down to 4-6 m during pre monsoon and rises to 0 to 3m during monsoon and post monsoon period, (CGWD, 1995). Within a depth of 90 meters besides the water tables two confined aquifers could be identified which are lined by impervious clay minerals. The first confined aquifer lies at a depth of 30 meters with thickness varying from 15 to 40 meters separated from the second confined aquifers by clay bed of 15 to 20 meters thickness. There is a possibility of third confined aquifer below the clay layer overlying the Gondwana basement (Mahallick, 1992).

II. Experimental Section

To have a through idea regarding ground water quality of Cuttack seven different locations were chosen. The locations were chosen keeping in mind that all the areas of Cuttack can be covered properly. The detailed locations of sampling points are described in table-01. From each location a particular tube well was chosen and grab sampling was done quarterly from that particular tube well. The samples were collected in plastic and glass bottles as per requirement. Using these samples different physical, chemical and microbiological parameters such as pH, turbidity, conductivity, total hardness, chloride, total dissolved solids, iron, fluoride, TC, FC were studied. All chemicals/reagents used were of analytical reagent grade. After sample

Optimization Mechanism for Multi-User Detection of SDMA-OFDM Systems

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Abstract: In recent studied we found that there are many optimization methods presented for optimal multiuser detection in SDMA-OFDM system, however each method is suffered from limitations. Hence in this paper we are presenting new method which is combination of two recent methods such as Genetic Algorithm and Partial Swarm Optimization (PSO). This approach is presented to overcome this limitations associated with existing methods of detecting multiuser in SDMA-OFDM systems. This two methods GA and PSO are easy to simulate as well as less complexity. These techniques are shown to provide a high performance as compared to the other detectors especially in a rank-deficient scenario where numbers of users are high as compared to the base station (BS) antennas. The proposed hybrid multiuser detection system (MUD) is simulated and its performance is compared against two MUDs such as MMSE (minimum mean square error) and ML (Maximum Likelihood). From the practical results it is cleared that proposed approach for MUD is performing better as compared to existing methods.

Keywords: OFDM, SDMA, Multiuser Detection, Spectral efficiency, ML, MMSE, GA, PSO, BER.

I. Introduction

In the introduction we are first discussing about the concept of smart antennas which is vital for any communication system. The mechanism of using the several antenna elements as well as innovative signal processing in order serve more intelligently the wireless communications is introduced since from long time. In the defense systems, already the concept of smart antenna applied which is of varying degrees and relative costly [1]. Still to the date, such barrier of cost of using the smart antennas was prevented in commercial applications. The DSPs (Digital Signal Processors) which is low cost and powerful advent as well as innovative software oriented signal processing tools made the intelligent antenna systems for the real time deployment in wireless communication systems. Now days, as the solutions which are spectrally efficient are enhancing the business imperative, such systems are supporting for the wider coverage area, interference rejection highly, as well as substantial capacity improvements. Thus, the solutions of smart antenna required as the interference, number of users, and the propagation complexity growing out. [2] [3]

The wireless communication system's exponential growths as well as the limited availability of bandwidth for those systems are creating several problems for the big organizations working. Recently the advances in central processing unit as well as digital signal processor resulted into the more improvements in the algorithms and smart antenna system's experimental validations build the environment where the use of cost effective smart antennas is feasible in different kinds of wireless markets. [3]

Due to the various activities involved in the smart antenna systems that are provided by them space of smart antenna is quite busy. First thing is that multipath fading effect in the wireless communication systems can be reduced significantly. As the quality and reliability of the wireless communications system is heavily based on the rate and depth of fading, such variation reduction of the signal means the fading results into the higher robust communication link. After that the second thing is that, battery life for the handsets which is used for transmitting the base station is less as compared to the one required for conventional systems [4]. This is only because of fact that base station antenna array achieving the diversity gain as well as nullifying gain, and hence needed transmit signal is reduced for the handset. The third thing, the QoS (Quality of Service) of communication network is improved by the smart antenna via the range extension, better building presentation and whole filling. Thus, the benefits of QoS in smart antenna systems infrastructure costs decrease as a result. at last, smart antenna system, frequently head (to intervene) is limited by the ratio used to enhance the proportion of wireless communication systems is Sir by smart antenna systems and therefore increases the system enough [4].

On other hand, Orthogonal frequency division multiplexing (OFDM), which is the fundamental unit of all multi-carrier communication systems, has been receiving wide interest especially for high data-rate broadcast applications because of its robustness in frequency selective fading channel Transmitter and receiver, which is widely referred to as MIMO technology to both employ multiple antennas on high throughput wireless communication [1] [3] constitutes a cost-effective approach for SDMA technology as wireless communication

Software Reliability Growth Models To Analyze the Products and To Predict

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Abstract: In progress of a product, programming mistakes are unavoidable. For expectation of the imperfections in a product, we need to create programming unwavering quality development models to investigate the items and to anticipate them. A similar development model can't be utilized for all the information. Subsequently different programming unwavering quality development models are utilized for which the information is isolated into a few sections and distinctive development models are utilized for every datum part. Later they are recombined. By consolidating all the conventional unwavering quality development models we get a multistage dependability development model. At each stage, the best Software Reliability Growth Model is to be applied. There are a few rules to assess the imperfections. The RSS proportion is utilized to choose the best Reliability Growth Model. The Multi Stage Reliability Growth Model is a blend of some modern models. These model shave to give the product dependability and could support to take care of issues which are difficult to determine by utilizing Traditional programming unwavering quality development models.

Key words: Software reliability, Software Reliability Growth Models, Defects, RSS Ratio, probit model.

I. Introduction

The vital part of software is Software Reliability because it guarantees quality. Software Reliability can be defined as the occurrence of no error functioning of a real system over a particular time in a particular environment for a particular reason. Because during software development errors are expected, it is of most significant to recommend a methodology to analyse and predict software and hardware reliability. For detecting the probable failures, reliability growth model is used as an indication and is the best solution. Since last several years, most companies used software growth models to improve software quality.

In certain cases defects get executed by the tester during testing then it results into a failure which is known as software failure. The software reliability growth models are divided into two classes, concave and S-shaped. The significance of both models is they have asymptotic behaviour i.e. the error prediction and detection rate reduces as the number of possible errors detected and predicted increases and the total number of errors and failures detected asymptotically reaches a finite value. Numbers of models were available for defect detection. One reliability growth will not fit the growth model well always.

Software Reliability Growth Models are used to detect and predict the number of failures before the software has been shipped to market. The reliability growth models use the data of system to detect and predict the number of failures in the software. The software reliability growth models to relate the failures in the set of code contained in the software use parameters. By knowing the parameter and the number of failures, we will know how many more defects are remaining in the code.

The residual defects helps us to decide whether the code is ready to be shipped and whether more testing is required if we decided the code is not ready to be shipped. The estimate of the number of defects that the software customers will encounter when operating and using the software.

To assess and forecast the software reliability of products, several software reliability growth models (SRGM's) are examined and used. Famous models are dependent on non-homogeneous Poisson process (NHPP), like the exponential Goel Okumoto model and s-shaped model. Gompertz model and a logistic model are also used as exponential reliability software growth models.

Presently OSS (Open Source Software) products are getting more accepted for both personal and business use. Since the use of OSS products, its developed body and process are expected to have more complexity. The pragmatic work determines an appliance of growth model curves to clarify and to foresee progress of open source system products. In spite of it, there will be a complexity left over to explain the total available of code modulation procedures with only one growth curve; it also tough to design the whole developing latest with one growth curve because of the difficult open source system developing method. So as to create a model that is casually and widely applicable, we use only growth curve data that are available from open code repositories and do not need any particular data method.

Role of Databases in the Security Maintenance Activity for Data Transmission between Two Communication Points

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Abstract: Keeping and controlling the security and secrecy of database data is significant in the cutting edge time as long as there are a ton of methods for entrance, surveillance, and access to information on the Internet. The significance of database security is a higher priority than the significance of information to be ensured. There are numerous available resources of security that help keep up the security of data and encryption to the level that meets the prerequisites of database security. It is notable that every office or division has its own strategy to shield its information from robbery or harm in relation to the size and sort of information notwithstanding the hand that works on such information and that the data security circumstance is in accordance with the foundation of the database.

Key Words: Information systems, data exchange, data classification, data encryption, ports.

I. Introduction

Modern technologies for computers and networks have revolutionized and continue to revolutionize the world of use, dissemination, and transmission of information. The standards of behavior that databases use in the transfer and linking of databases around the world must force users to respect rights and responsibilities. We can consider information to be a source of strength, and it is the key to prosperity for users who have access to it.

Do not forget that the information is a treasure to the hackers of the computer must be protected from Pirates of information, Do not forget that the information is a treasure to the hackers of the computer must be protected from them, the data and information must be protected whether stored in the database or transmitted directly through the channel connection on both ends of computers, one of them sent to data and other data receiver.

The electronic systems should reach the majority of international institutions, companies, workplaces and private life. Therefore, new ethical and legal decisions must be made to achieve balance and guarantee the rights of all.

II. The Ethical Issue Of Electronic Information Systems

The ethical issue is the accepted standards of behavior and the rules governing members of the profession, including information control, access, privacy and misuse of data. These extend to electronic networks and electronic databases, and more specifically, electronic information systems[1].

2.1. Electronic Copyright Law

The ease with which information is being pumped increasingly on networks is causing confusion and how copyright and intellectual property rights can be applied to electronic files. With the growing growth of networks, especially social networks, and the dissemination of information on them and the ease of sharing and use of information published without reference to the His idea, It became necessary to provide explanations on how to use electronic files, the ease with which the distribution of electronic files and the nature of some electronic information create problems under the law of copyright and intellectual property rights.

2.2. Unintended Consequences of Data Exchange

The consequences of data exchange are quite complex and point to many problems. Therefore, the database administrator must balance the security required for the data set with access to it by designing information systems carefully to prevent inappropriate access to all data or part of the data While at the same time allowing access to information exchange. However, many basic problems arise with how information is handled, stored and manipulated in digital formats.

For us not to forget to point out here the unintended consequences of data exchange are the dissemination of errors, errors can reach the database in an unintended way shortening an employee or intentional way by pirating information and penetrating sites and publishing specific, intended and targeted data

Application of Smart Prepaid Energy metering Unit in designing energy theft detection: A real-time monitoring activity

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Abstract:- Electricity theft remains a huge loss incurred by electricity distribution companies. This theft arises majorly because of activities carried out by consumers such as energy-meter by-passing, energy-meter tampering etc. This research study offers an approach for handling energy meter by-passing and tampering. The system design is based on the monitoring of the readings of two current sensors by a programmed microcontroller. While one of the current sensors monitors the current drawn by the user's load, the latter installed before the meter monitors current drawn by all loads. Any discrepancy between the values read, indicates theft. A momentary switch is also installed in the meter to trigger the meter once it is tampered with. Furthermore, the user is provided with a remote access to the energy meter for recharging energy units and for monitoring energy consumption. It was observed that the system accurately measured load consumption and detect any attempt to by-pass or tamper with the energy meter. Lastly, all unscrupulous attempts were reported using GSM technology.

I. Introduction

It is impossible for an electric power system to be 100% free from theft. In 1999, Transparency International revealed that close to 15% of the generated power is lost as a result of electricity theft. For instance, between 1998 and 1999, in Bangladesh, the Bangladesh Power Development Board (BPDB), after generating about 14,600 MWhr of electricity, could only account for 11,462 MWhr of billed energy, reflecting a total loss of about 22% [1]. In developing countries like Nigeria, electricity theft remains one of the major problems being faced by the power sector of which the government has little or no control over due to lack of the required technology. While the implementation of Automatic Metering Infrastructure (AMI) has eliminated the need for meter readers, it has adversely increased non-technical losses incurred by power utility companies [2]. It is estimated that Nigeria's grid has a total transmission and distribution (T&D) losses of about 40% which is tremendously high when compared to United States whose T&D losses are at 7% [3, 4]. Electricity theft is a form of non-technical loss. According to [5], any form of interference done by complete or partial bypassing of the meter to adulterate its values is referred to as electricity theft. The Non-technical losses are caused by human error. This error is an external action that has nothing to do with the characteristics of the power system. These activities include meter tampering, bypassing of meter, billing irregularities and unpaid bills [4, 6, 7]. To respond to the electricity theft and growth trend, the country needs to take appropriate initiatives not only to boost its power generation capacity but also to make residential sector more energy smart and efficient [8].

Analogue meters which are still widely used in most parts of the nation, pose lots of challenges for monitoring the power consumed by users. In addition, with the analogue meters, operators must go to the consumer's house to disconnect his power supply if he does not pay up his bills. Even in most cases, the operators accept bribes from the consumer so that their supply will not be disconnected. Consumers also have been known to tamper with the energy meters in order to reduce or stop the meter from reading without the knowledge of the operators. With traditional analogue meters, consumers have no way of disconnecting power in their houses when they travel and forget to disconnect or turn off their appliances. This leaves the meter running, incurring more payment for the energy consumer. Prepaid meters have provided a better way of monitoring power consumption by users. The motivation of this study is based on the fact that electricity theft as a result of energy meter by-passing and energy meter tampering has constituted a major problem to the power supply stabilization and has also resulted in a huge loss of revenue to the Nigerian power sector.

This study aims at developing a system with energy meter theft and tampering detection systems that can accurately measure and monitor the supply and distribution of power. In addition, it provides a remote energy management system for the consumer to disconnect or connect his load at free will. The rest of this paper is organized as follows. Section 2 reviews the previous researches related to energy theft detection and meter tampering that have been carried out earlier. Section 3 discusses the methodology for this study. The implementation and results are presented in section 4. In section 5, recommendations for future works are given.

Review of the Kosovo Power System under the Frequency Load Shedding Program based on ENTSO-E Requirements

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Abstract: Under-frequency load shedding (UFLS) is designed to protect the power system when the frequency drops below given thresholds by switching off certain amounts of the load aiming thus to balance generation and load. This paper presents a review of the existing UFLS (Under Frequency Load Shedding) program in compliance with recently revised Police-5 of Operational Handbook of ENTSO-e. The proposed review of the current UFLS program for Kosovo Power System has considered the main standards requirements and guidelines for UFLS set by ENTSO-E. This work examine system performance by conducting dynamic simulations of UFLS schemes subject to different imbalances between load and generation, and includes three power system island mode scenarios with different equivalent inertia of the system, respectively different size of the systems. With aim to define the best program of UFLS, which fits to the Kosovo Power System frequency behavior, two different UFLS programs are analyzed and results are compared. The proposed program is tested using a large scale PSS/E model which represents interconnected power system area of Southeast Europe.

I. Introduction

Under-frequency load shedding (UFLS) is defined as a coordinated set of controls using under frequency relays which results in the decrease of electrical loads in the power system, with aim to recover the system frequency. Load shedding as the last resort to avoid a major power system breakdown has been utilized for a long time. It is mainly triggered by under-frequency or under-voltage protection relays and actuated by distribution system circuit breakers. Proper design of load shedding schemes which include proper settings of under-frequency protection is most relevant issue to ensure smooth load relief, in situations where the power system otherwise would go unstable. The current revised program requirements for UFLS are presented in Operational Handbook of ENTSO-E/Police-5.

Each TSO shall implement the ENTSO-E RG CE general UFLS scheme as followed:

Frequency in the range 49.0 to 48.0 Hz:

- a. At least an amount of demand corresponding to 5% of the total load shall be disconnected at 49.0 Hz.
- b. In total, an amount of demand corresponding to 45% +/- 7% of the total load shall be disconnected between 49.0 and 48.0 Hz.

The UFLS scheme shall be implemented stepwise taking into account following considerations:

- a. The number of disconnection steps shall be minimum 6 (including the step triggered at 49.0 Hz),
- b. For each step, an amount of demand corresponding to 10% of total load shall be disconnected at maximum.
- c. Additional df/dt function in UFLS relays is allowed in the range 49.8 – 49.0 Hz.
- d. No intentional time delay shall be set in UFLS relays.
- e. Maximum disconnection delay shall be 150 ms including breakers operation time [1].

The existing UFLS program which is operational in Kosovo Power System, was established based on previous recommendation of ENTSO-E, including only four steps with different amount of load disconnections and with additional time delay included in under-frequency relays [2]. The main factors that ENTSO-E has initiated the UFLS review are:

- a. System implementation ensures the affectivity of UFLS: it means a minimal necessary shedding of load,
- b. Compensate disconnection of dispersed generation at unfavorable frequencies,
- c. Avoid over frequency (overcompensation), overvoltage and power transients that can lead to an additional loss of generation.

1.1. Theoretical Background of under Frequency Load Shedding Protection (UFLS)

Each part of the power system can be unbalanced if the load exceed the generation. Such a change between the generated power and the load power is known as generator imbalance. In such cases generators

A review on various MAC Protocols for Heterogeneous Traffic in Wireless Sensor Networks

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Abstract

Sensors in a Wireless Sensor Networks (WSNs) responsible to collect periodic data, process the data and forward it to the sink node. Among all the challenges in the network like energy constraints, robustness, responsiveness, self-configuration, energy constraint is one of the vital challenge. In order to deal with these challenges, new protocols are designed, one such protocol is the MAC protocol since it influences the transceiver unit of the sensor node. The Quality of Service (QoS) at the MAC layer matters as it rules medium sharing and supports reliable communication. In WSNs nodes generate heterogeneous traffic which has different QoS requirements like reliability and delay deadline with different priority requirements that vary according to the application. In this paper, a variety of MAC protocols for WSNs are investigated and analyzed, with a special focus on traffic classification and priority assignment. In our proposed work we classify the sensed data according to its priority first and allocate slots variably based on its requirement to be sent to the sink node to perform faster rescue operations. A comparison analysis of different MAC protocols is made with various parameters and the observation are mentioned.

Keywords: *Wireless Sensor Networks, energy efficiency, MAC protocol, traffic classification, priority assignment.*

1. Introduction

Wireless Sensor Networks (WSNs) are becoming more popular and they are used in numerous applications like industry, academia,

military, forest fire, medical and health and so on. In all these kinds of applications requires data delivery with QoS as opposed to best-effort-performance in classical monitoring applications. Reliable and real-time delivery of collected data is important in the sensor network operation.

A sensor node has limited battery capacity of < 0.5Ah. With this capacity itself, it plays the role of both data originator as well as data router. Sensing, communicating and processing of data consume battery power. But communication consumes 100 times more power than sensing and processing. [1] So, optimization of energy consumption is required in WSNs to improve the network lifetime.

Medium Access Control (MAC)

MAC is responsible for providing communication link between large numbers of sensor nodes and shares the medium fairly and efficiently. [2] Let us discuss some of the attributes of good MAC protocol. The first is the energy efficiency. Instead of recharging the battery, it is better to replace the sensor nodes. To get access to the channel, many sensor nodes will compete with each other. The MAC protocol should be able to avoid collisions among these nodes.

MAC layer is responsible for correcting the errors occurred at the physical layer. It also performs some activities like framing, physical addressing, and flow and error controls. It resolves the channel access conflicts among different nodes. It also addresses issues like

Data falsification attack for cognitive Internet of Things

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Abstract

Internet of Things is considered the future network to support wireless communications. To realize an IoT network, sufficient spectrum should be allocated for the rapidly increasing IoT devices. Through cognitive radio, unlicensed IoT devices exploit cooperative spectrum sensing (CSS) to opportunistically access a licensed spectrum without causing harmful interference to licensed primary users (PUs), thereby effectively improving the spectrum utilization. However, an open access cognitive IoT allows abnormal IoT devices to undermine the CSS process. Herein, we first establish a hard-combining attack model according to the malicious behavior of falsifying sensing data. Subsequently, we propose a weighted sequential hypothesis test (WSHT) to increase the PU detection accuracy and decrease the sampling number, which comprises the data transmission status-trust evaluation mechanism, sensing data availability, and sequential hypothesis test. Finally, simulation results show that when various attacks are encountered, the requirements of the WSHT are less than those of the conventional WSHT for a better detection performance.

KEYWORDS

cognitive internet of things, cognitive radio, Internet of Things, sensing data falsification attack, weighted sequential hypothesis test

1 | INTRODUCTION

The Internet of Things (IoT), first proposed by Ashton [1], describes the future scenario where daily physical objects will be connected to the Internet and be able to identify themselves to other devices. The IoT is a new revolution of the Internet and things or objects, such as radio frequency identification tags, sensors, actuators, and mobile phones, which through unique addressing schemes can interact with each other and cooperate with their neighbors to reach typical goals [2]. To realize the IoT network paradigm, a large number of IoT devices must be deployed. However, with the increasing number of IoT devices, the amount of spectra

for these devices is insufficient. Moreover, owing to the interference owing to spectrum overuse by IoT devices, the transmission performance will be degenerated significantly. Therefore, it is highly important to improve the spectrum utilization in an IoT network [3].

1.1 | Related studies

M. Zhang and others presented the concept of cognitive IoT (CIoT) by integrating intelligent thoughts into the IoT to address the lack of intelligence, modeled the CIoT network topology, and designed cognition process-related technologies

Analysis of the Soil's Chemical Properties in Traditional Upland Rice Farms

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Abstract

This study was conducted to assess the soil chemical properties of upland rice farms particularly along different gradients (sloping, steep, and flat) in cultivated and uncultivated sites. Sampling was done in the wet and dry seasons. Results showed that soils in the cultivated sites have relatively lower pH than in uncultivated sites. However, pH values taken during the wet season were relatively higher as compared to soil samples taken from the dry season. Organic matter was generally higher in most uncultivated soils and in soil samples taken during the wet season. Phosphorous was generally abundant in uncultivated soils and in soils collected during the dry season. Potassium levels were observed to vary slightly across seasons and slope gradients. Zinc values were generally higher in cultivated soils and in samples taken during the dry season. Soils from uncultivated areas and in the dry season have generally higher Copper concentrations. Manganese concentration was higher in the dry season than in the wet season. For iron, concentration levels were very much higher in cultivated sites. These results show similar values in the cultivated and uncultivated sites for the concentration of the different macro and micronutrients. This may be attributed to fallowing and crop rotation that allows replenishment of lost nutrients. The practice of crop rotation from rice to legumes may have enhanced the positive impacts of fallowing particularly in the recycling of nutrients. Although low pH was observed which is characteristic of mountain soils, cultivated sites showed to be more acidic as compared with uncultivated sites. It is therefore relevant that the management practices involved be closely assessed, as these traditional practices may contain important

inputs in formulating sustainable measures in maintaining the chemical integrity of upland soils.

Keywords: *chemical, soil, traditional, upland*

1. Introduction

The soil is the foundation of agriculture [1] and of ecological sustainability [2] influencing the properties, functions and provision of ecosystem services, and essentially human well-being [3]. However, production practices in agriculture [4] impose varying degree of impact on the complex interactions among soil, water, atmosphere, and soil biota [5] that eventually would reduce the availability of organic matter compromising soil quality and health [6].

As agriculture intensifies due to increased demand and open trade, degradation of the natural resource base that supports it is imminent. In the Philippines alone, agriculture utilize as much as 41.6% of the country's total land area and steadily increasing [7]. Inappropriate agricultural, pastoral, industrial or urban purposes leads to physical, chemical and biological deterioration of the soil [8] resulting in soil loss of about 10 to 40 times the rate at which it can be naturally replenished. If unabated, it would mean a total destruction of the topsoil by 2070 [9].

In soil degradation, assessment of nutrient depletion, organic matter loss, acidification, and chemical pollution is important as soil chemical

Capacity based Clustering Algorithm for a Dense Wireless Sensor Network

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Abstract

Wireless Sensor Network (WSN) is viewed as an effective tool for collecting essential information. Many researchers have proposed various algorithms to design low-cost wireless sensor networks. A sensor network comprises of large number of sensor nodes with each sensor node having limited memory unit. One of the important tasks is to provide a reliable routing of packets from sensor nodes to the base station. Memory unit limitation is one of the barriers in the path of designing efficient routing protocols. In order to design energy efficient algorithms, often nodes are clustered in to non-overlapping clusters. This paper describes the clustering process in WSN and evaluates distributed clustering algorithm Low Energy Adaptive Clustering Hierarchy (LEACH). To overcome the drawbacks of these existing algorithms a distributed clustering model has been proposed for attaining energy efficiency to a larger scale.

Keywords— *Wireless sensor network (WSN), distributed clustering algorithm, coverage based clustering, energy efficiency, network lifetime.*

1. Introduction

Generally a wireless sensor node consists of low power processor, tiny memory, radio frequency module, various kinds of sensing devices and limited powered batteries which finds applicable in target tracking, environmental monitoring and oceanography (figure 1). Much of energy consumption happens during wireless communications [11]. The energy consumption when transmitting one bit of data equals to

several thousands of cycles of CPU operations. Hence the energy efficiency of a wireless communication protocol brutally affects the energy efficiency and lifetime of the network. Many researchers have projected several algorithms for WSNs to improve energy consumption and network lifetime. Since these wireless sensor devices are power-constrained, long-distance communications are not encouraged. Thereby direct communication between the nodes and base station is generally avoided. A proficient way is to arrange the network into several clusters and each individual cluster has a cluster-head (CH). CH is one of the sensor nodes which is affluent in resources. Sensor nodes send their sensed information to the CH during their respective TDMA time-slots. The CH performs data aggregation process and forwards the aggregated data to base station (BS) [3-10]. Clustering follows some advantages like network scalability, localizing route setup within the cluster, uses communication bandwidth efficiently and makes best use of network lifetime. Since clustering uses the mechanism of data aggregation, unnecessary communication between the sensor nodes, CH and BS is avoided. In this paper, a model of distributed clustering algorithm is proposed which is based degree of capacity (DOC) of a node within a cluster. The DOC of a node is the combination of three parameters: the number of tasks assigned to a particular node, remaining energy and coverage with neighboring nodes. The node with highest DOC is selected as a CH for the current round. The primary objective of the proposed algorithm is to attain energy

Challenges, Problems and Opportunities for Smart Grid Growth

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Abstract

The improvement savvy lattices have made the force frameworks arranging and activity more effective by the utilization of environmentally friendly power assets, electric vehicles, two-way correspondence, self-mending, customer commitment, circulation insight, and so forth. The goal of this paper is to introduce a nitty gritty complete survey of difficulties, issues and open doors for the advancement of keen network. Keen lattices are changing the customary method of satisfying the power need and giving the path towards an earth amicable, solid and tough force network. This paper presents different difficulties of shrewd framework advancement including interoperability, network correspondences, request reaction, energy stockpiling and circulation lattice the executives. This paper likewise surveys different issues related with the improvement of brilliant matrix. Nearby, territorial, public and worldwide open doors for the improvement of savvy network are additionally detailed in this paper.

Keywords: Communications
Computational intelligence
Demand response Distribution system
Microgrid Smart grid

1. Introduction

Smart grid (SG) technologies are vital to meet world's vast and growing electricity needs.

Smart grids (SGs) are transforming the traditional way of meeting the electricity demand and providing the way towards an environmentally friendly, reliable and resilient power grid. Micro grids operate at the distribution level, and they are natural innovation zones for the Smart Grid (SG) because they have experimentation scalability and flexibility, and delivers power is a local area. SG contains protection against the cyber attacks, interoperability and designed for pricing in real-time [1]. Super grid is a high voltage DC transmission and capacity to minimize losses and enhance reliability. MGs operates as a standalone or as a grid-connected system. Microgrid (MG) technology is not equipped with automation and communication support. Further work is required to enhance self-healing, reconfigurable, adaptive and predictive capability. MG includes special purpose inverters enabling it to link to the legacy grid and contains special purpose filters build to overcome issues with harmonics, while improving power quality and efficiency [2]. Various characteristics of SG include optimizing the asset utilization and efficient operation is presented in [3]. Increased renewable power penetration, electricity markets participation throughout the world will realize new opportunities for the cost-effective smart grids controls and energy storage at all scales. These changes, coupled with increased consumer awareness and participation will lead to a new paradigm in energy system analysis that must also be accounted for energy security, stability and

Characteristics of Fish Oil Biodiesel with the Impact of Diesel Fuel Addition on a CI Engine

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Abstract

The present study focuses on the optimization in the use of non-petroleum fuel derived from waste fish oil fuels, as a replacement for petroleum diesel fuel for compression ignition engine. The study comprises of comparison between results of fish oil biodiesel-diesel blends in a compression ignition engine. Fuel properties such as viscosity, density, the heat value of fuel, cetane number, and a flash point of fish oil biodiesel and its blends with diesel are studied. The fish oil biodiesel (60, 40, 20, and 0%) diesel (40, 60, 80, and 100%) are blended at volume basis. The results show a reduction in thermal efficiency, temperature, particulate matter, and nitrogen oxides emission; while showing an increase in higher specific fuel consumption, ignition delay, carbon dioxide, and smoke emissions. The biodiesel blend fuel improves BTE by 4.7% and increases CO₂ emissions by 2.56%, while SFC is lowered by 7.92% as compared to diesel fuel. In biodiesel blend, the highest reduction in NO_x by 14.9%, particulate by 4.22%, is observed although smoke emission slightly rises with an increase in fish oil in the blends, as compared to diesel fuel.

Keywords: *Compression ignition, engine, Engine characteristics, Fish oil biodiesel production.*

Introduction

Environmental pollution increases rapidly due to an increase in automobile vehicles in the world.

In this respects, there is a need to clean energy sources due to concerns of destructive ecological pollution such as more emissions of carbon dioxide and greenhouse gases [1]. The development of any country depends on fuel sources, while fossil fuel resources are limited in the world. Nowadays there is a need to eco-friendly and less distractive alternative energy source for full fill demands of energy consumption in the world [2]. Many previous studies reported different alternative energy sources such as fish oil [2-3], palm oil [4], waste cooking oil [5], rubber seed oil [6], linseed oil [7], jatropha [8], mahua oil [9], and alcohol [9, 10].

Adeoti et al. [11] performed experiments on a test engine using fish oil and its blends with bunker oil. The results showed non-newtonian behavior and fuel properties. Rajak and Verma [2] performed numerically on a diesel engine using Diesel RK model. Results showed reduction in smoke emission and particulate matter of five different categories biodiesels. Jiaqiang et al. [3] studied a diesel engine using fish oil biodiesel, and its blends with diesel examined the characteristics of the test engine. Bhaskar et al. [12] studied the characteristics of a test engine using fish oil biodiesel and i

Effect of Foreign Direct Investment on Indian Stock Market

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Abstract

The paper researches the effect of FDI on the financial exchange advancement of India. The key premium rotates around the correlative or subbing job of FDI in the financial exchange improvement of India. The investigation additionally looks at the other major contributing components towards the advancement of securities exchange. An ARDL bound testing approach is utilized for long run relationship among variables and the mistake amendment model is utilized for short run elements. Our outcomes bolster the correlative job of FDI in the financial exchange improvement of India. Other macroeconomic factors influencing financial exchange improvement are household investment funds, GNP per capita, and inflation.

Keywords: FDI, Stock Market, GNP, Inflation.

1. Introduction

It is generally recognized that a strong financial system guarantees the economic growth and stability. Stock market is an integral part of the financial system of the economy. It is a source of financing a new venture based on its expected profitability. The stock market is replica of the economic strength of any country.

Savings and economic growth, the development of stock market is imperative and cannot be ignored in any economy. Theoretical work shows the positive effect of stock market development on economic growth (Demirguc-

Kunt and Levine 1996a; Sing, 1997; and Levine and Zervos, 1998)). The development of stock market is the outcome of many factors like exchange rate, political stability, (Gay, 2008), foreign direct investment, and economic liberalization (Adam and Anokye et al, 2008).

In the era of globalization, FDI is a major source of capital inflow in most of developing economies where it bridges the gap of capital, technology, managerial skill, human capital formation and more competitive business environment. The role of FDI in economic development is found mixed in economic literature. It is argued on the one hand, that FDI in developing countries transfers business know-how and technology (Romer (1993). On the other hand, some predict that FDI in the presence of pre-existing trade, price, financial, and other distortions will hurt resource allocation and hence slow economic growth (Brecher and Diaz-Alejandro, 1977; Brecher, 1983; Boyd and Smith, 1999). Some studies show that FDI does not exert any independent influence on economic growth (Carkovic and Levine, 2002). FDI inflows have a positive effect on host country's economic growth in developing but not in developed economies (Johnson 2005). Thus, theory produces ambiguous predictions about the growth effects of FDI.

Some models suggest that FDI will only promote economic growth under certain policy

Dynamic Response of a Pelton Turbine Shaft under the Impact of Water Jet

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Abstract

The performance and reliability of any rotating machine can be studied by proper dynamic analysis of the machine. This paper presents a method to study the dynamic response of a Pelton turbine shaft due to the impact of a water jet. Equations of motion for the bending vibration of the Pelton turbine assembly, in two transverse directions, are developed using the Lagrange equation of motion with the help of assumed mode's method. The Pelton wheel is assumed as a rigid disk attached to an Euler-Bernoulli shaft. The impact provided by the water jet is represented in the form of a Fourier series. Critical speeds of the system are determined by performing free vibration analysis and presented in the form of the Campbell diagram. The response plots due to the impact of water are generated by performing forced response analysis. Both free and forced analyses are carried out by considering the first three modes of vibration.

Keywords: Pelton turbine, Flexible shaft, Free response, Forced response, Impact of jet.

1. Introduction

Most of the power-producing and power-consuming units consist of a disk attached to a shaft. One of the most common examples of such units is a Pelton turbine unit used for electricity generation in hydropower plants. Pelton turbines are high head turbines used for both small and large power generation. These rotating turbines are subjected to highly hostile working conditions. The design and manufacturing challenges are concerned with improvement in performance, life, and reduction in weight without loss of reliability. There are numerous possibilities of excitation by external disturbances and the behavior of the system under those disturbances can be predicted to

some extent by the appropriate dynamic analysis.

The dynamic response of such a shaft-disk system depends upon many components and operating parameters. Different researchers investigated different aspects of a rotodynamic system by modelling the system as an assembly of a rigid disk attached to an Euler-Bernoulli shaft. Sabuncu et al. [1] investigated the critical speed of a rotor consisting of a single disc on a solid shaft by treating the shaft as a rotating beam element using a transfer matrix-finite element model. Rajalingham et al. [2] investigated the influence of external damping on rotor response to an imbalance of gravity excitations and showed that sufficient amount of

Parametric Study on Axial Compressor Performance in Design Condition

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Abstract

In this paper, a parametric study of compressor performances is performed by the streamline curvature method. Effects of three input parameters in the design process, e.g., number of blades, distribution of blade thickness, and blade sweep angles, on the main objective parameters in the aerodynamic design, e.g., velocity distribution, efficiency, and pressure ratio, are investigated in the parametric study. Initially, a certain two-stage axial compressor is designed by the streamline curvature method. Validation of the results is confirmed by comparing the obtained results with the experimental ones. Regarding various values for the aforementioned input parameters, the first stage of the axial compressor is redesigned, and the output parameter is established. Therefore, the sensitivity of the design results to each of the aforementioned parameters is recognized. Results show that increasing the blades sweep angle causes the flow behavior, such as efficiency and pressure ratio in the axial fan, to improve while reducing it provides a completely contrary result. Also, reducing the rotors blades number leads to an increase in the pressure ratio and efficiency while its increase causes a contrary result. It is concluded that a reduction in the number of the blades has a stronger effect on the performance parameters than when it increases. The results also show that the effect of the thickness in the hub is greater than the thickness of the tip, and its increase leads to reduce both Efficiency & pressure ratio.

Keywords: Axial compressor, Streamline curvature method, Blade geometry, Design condition.

1. Introduction

Recently, several attempts have been made to enhance the performance of turbomachinery by using parametric study and optimization methods with the help of the computational power and expensive experimental setup. Applying the parametric study leads to better design of turbomachines to enhance the performance in terms of increasing efficiency,

pressure ratio, and reducing weight and flow loss, etc.

Several investigations have been studied on the performance of an axial compressor by using parametric study. Sweep, lean and skew angles which form the 3D shape of the blades are considered as the most important parameters for optimization. These parameter can lead to a significant effect on overall compressor performance, loss coefficient, and flow structure. In this regard, Gallimore, et al. [1]

Inclined Lorentzian Force Effect on Tangent Hyperbolic Radiative Slip Flow Imbedded Carbon Nanotubes: Lie Group Analysis

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Abstract

The presentation of single-parameter group (Lie group) transformations reduce the independent variable number by one, and hence the partial differential governing equations with the supplementary atmospheres into an ordinary differential equation with the appropriate suitable conditions. The obtained ordinary differential equations are then numerically solved by employing the fourth-order Runge-Kutta technique along with the shooting method. The effects of the various parameters governing the flow field are presented with the help of graphs. The investigation reveals that the non-Newtonian MWCNTs Tangent hyperbolic nano-liquid reduces the friction near the stretching sheet contrasting SWCNTs. This combination can be used as a friction lessening agent/factor. The usage of CNTs shows an excellent performance in enhancing the thermal conductivity of the nano liquid and that single-wall carbon nanotubes (SWCNTs) have a higher thermal conductivity in comparison to multi-wall carbon nanotubes (MWCNTs) even in the presence of radiative heat transfer and heat source. The comparison with existing results available in the literature is made.

Keywords: *Aligned Lorentzian force, Navier slip, Thermal slip, Carbon nanotubes, Lie group analysis.*

1. Introduction

Warmth exchange in the recent era has become an inevitable one as increased productivity of compact objects. This warmth exchange liquid assumes a key part in the advancement of vitality proficient warmth exchange hardware including

electrons, transportation and HVAC & R. The role of nanomaterials has turned top in handling such type of products. The non-Newtonian nanofluids groups better long haul solidness and rheological properties when contrasted with millimeter or micrometer measured molecule suspensions. Nanotubes are from the fullerene

Pattern recognition: Advanced development, techniques and application for Image Retrieval

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ABSTRACT. Objective of our paper is to discuss latest pattern recognition applications, techniques and development. Pattern recognition has been demanding field from many years. We are also discuss driving force behind its swift development, that is pattern recognition is used to give human recognition intelligence to machine which is soul of today's many modern application. It acts as wheel of many techniques and applications in different fields. Pattern Recognition is recognition process which recognizes a pattern using a machine or computer. It is a study of ideas and algorithms that provide computers with a perceptual capability to put abstract objects, or patterns into categories in a simple and reliable way. The development and demand of pattern recognition technology is very fast and applications of pattern recognition are increase day by day. To fulfill this need, more and more researchers and scientists are evolved new pattern recognition techniques and apply them to many real life applications such as agriculture, robotics, biometrics, medical diagnosis, life form analysis, image processing, process control, information management systems, aerial photo interpretation, weather prediction, sensing of life on remote planets, behavior analysis, , Speech recognition, automatic diseases detection system in the infected plants, cancer detection system etc. with combination of other technology. Particular, in image retrieval system, pattern recognition play important for improving accuracy of image retrieval by using variety of recent techniques and their combination

I. INTRODUCTION

Pattern recognition is a branch of artificial intelligence which study of recognition of patterns and regularities in data. It is closely related machine learning. Pattern recognition techniques widely used in computer vision. Pattern recognition is closely related to machine learning, data mining and knowledge discovery. Pattern recognition is used in many fields, including psychology, psychiatry, ethology, cognitive science, traffic flow and computer science. In simple term, pattern is nothing but description of an object. Depending on nature of pattern, recognition divided into two types, recognition of concrete items and recognition of abstract items. When we decompose word "recognition", we get re + cognition, here, cognition means process of knowing an entity or simply the process of knowing or gaining knowledge about something or knowledge or feeling that the present particular object.

There is threefold motivation behind the swift development of pattern recognition technique as follows; first, we already know that pattern recognition is crucial part of artificial Intelligence that tries to give human intelligence to machine. Second motivation, pattern recognition has capacity to provide high quality and intelligent

analysis and classification of measurements, which computer are used to solve problems in science, engineering, and real world problems. Third, pattern recognition techniques presents a unified frame work to support various area such as data mining, knowledge discovery, mathematics, psychiatry, ethologic, cognitive science and computer science.

II. PATTERN RECOGNITION FUNDAMENTALS

In this section, we discuss some fundamental components of pattern recognition, features, patterns and classifiers.

Feature

Feature is any distinctive aspect, quality or characteristic of image data. Features may be figurative like color or numeric like height. The combination of d features is represented as a d-dimensional column vector called a feature vector. The d-dimensional space defined by the feature vector is called feature space. Objects are represented as points in feature space. This representation is called a scatter plot.

ANN Approach to Solve Inverse Kinematics of Industrial Robot

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ABSTRACT:An organized artificial neural-arrange (ANN) approach has been proposed here to control the movement of a robot controller. Numerous neural-organize models use edge units with sigmoid exchange capacities and angle plunge type learning rules. The learning conditions utilized are those of the back propagation calculation. In this work, the arrangement of the kinematics of a six- degrees-of-opportunity robot controller is actualized by utilizing ANN. Work has been embraced to and the best ANN congurations for this issue. Both the situation and direction points of a robot controller are utilized to the reverse kinematics arrangements.

I. INTRODUCTION

The robot control issue can be isolated into two fundamental zones: kinematics control (the coordination of the connections of kinematics chain to deliver wanted movements of the robot), and dynamic control (driving the actual- pinnacles of the system to follow the directed positions/speeds). In the essential plan methodology of a modern robot, the originator ought not just develop an optimal math for the controller, yet in addition needs to plan the control calculation, including the formulation of both the kinematics conditions and the dynamic conditions. The control techniques utilized in most robots include positions coordination in Cartesian space by an immediate/reverse kinematics strategy. Backwards kinematics (IK) contain the calculations expected to and the joint plots for a given Cartesian position and direction of the end-effectors. principal to the control of robot arms, yet it is very difficult to compute an IK answer for a robot. It is, all in all, a non-direct logarithmic calculation, which has been appeared for the overall instance of a six- degrees-of-opportunity (DOF) arm to require the arrangement of a sixteenth-request polynomial condition. Most indispreliminary robot arms are planned so that the guideline of wrist parcelling can be utilized, where the three wrist-joint tomahawks cross at a solitary point, diminishing the issue to that of a second-request solution. IK detailing has for quite some time been an extremely intriguing favourable to problem for kinematicians. Pieper scientifically tackled the opposite issue for robots with three con- current joint tomahawks. Duey (1980) further discovered a few uncommon mathematical controllers, which can explain the same issue diagnostically. From that point forward, numerous strategies have been introduced to tackle

the IK issue: Paul homogeneous change; Lee by a mathematical technique; Yang and Pennock (1985) by a double number methodology; and Tsai and Morgan (1984) by a continuation technique. Be that as it may, the issue includes the illuminating of exceptionally non-direct conditions. Numerous papers have introduced calculations giving analytically

1. The Denavit–Hartenberg method .

One of the most fundamental problems in describing a working environment in which one or more robots operate together with supporting equipment, is how to explain the relative positions of the various pieces of equipment. For example, a robot has to pick up a part from a certain location, put it down in another lo- cation, change-end eRectors by collecting a diRerent gripper from yet another location, and so on. The study of kinematics reveals that a method exists which allows these positions to be defined in a consistent and unambiguous manner. The method consists of attach- ing coordinate frames to each object or location of interest, so that when the object moves, so does the frame. In the analysis of kinematics structures consist- ing of serial links and joints, accepted methods for defining the position and orientation of one link with respect to another are in common use. In this way, the spatial orientation of quite complex kinematics struc- tures may be specified in a unified, straightforward method. The Denavit–Hartenberg method involves the allocation of coordinate frames to each link, using a set of rules to locate the origin of the frame and the orientation axes (Mooring et al., 1991). The positions of subsequent links are then defined by the homo- geneous transformation matrix, which transforms the frame attached to link $i - 1$ into a

Improving Performance of An Air Film Cooled Gas Turbine: An Analysis

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ABSTRACT. The improvement in gas turbine power plants by integrating a mechanical chiller to it for cooling the inlet air is the prime objective of this study. The bucket cooling method adopted in this study to cool the turbine buckets has been chosen as film cooling. The selected input parameters have been varied to analyze the power plant output and efficiency at varying conditions and then select the best alternative which will help the design engineers. The integration of mechanical chiller significantly augments the plant output and efficiency. This improvement is more pronounced in hot and humid climates. It was observed that as the compressor inlet temperature is reduced the bucket coolant mass flow rate decreases and the mass of fuel energy input increases. The increase in specific work and efficiency is calculated to be 14.59 % and 4.46 % respectively when the ambient temperature drops to 283K. The work ratio increases with increase in value of ratio of inlet temperatures (r_{IT}) upto 5.6 after which it starts decreasing. There is an optimum r_{IT} at any pressure ratio ($r_{p,c}$) at which the work ratio is maximum. The heat rate increases with increase in r_{IT} and decrease in $r_{p,c}$.

Keywords: Mechanical Chiller; film blade cooling; gas turbine performance; inlet-air cooling; ambient;

I. INTRODUCTION

One of the major parameter that effects the performance of gas turbine plant is inlet air cooling. As the inlet air temperature increases not only that we suffer a reduction in gas turbine performance but also the pollutants increases. Since the benefit of reducing the inlet air cooling is multifold, the technique has been widely adopted in the power plant industries and is further investigated in this study. The most significant and well-known technique to cool the inlet air of the gas turbine is cooling with: absorption chillers, Mechanical chillers and evaporation systems

Gord and Dashtebayaz [1], suggested that the performance and efficiency of gas turbine can be improved by using turbo-charger. In that approach, a comparative study between a common air cooling and a turbo-air cooling method using turbo-expanders has been portrayed. The mechanical efficiency of a plant can be increased using a mechanical Chiller where as efficiency in electricity production enhanced significantly high by using turbo-expander as reported. According to Popliet. al [2], an absorption cooling system integrated with a conventional evaporative coolers and mechanical vapor compression chillers powered by waste heat produces better power output. A gas turbine of evaporative cooling system, power output and energy efficiency has been enhanced by 4.2% and 1.6% respectively. In comparison, in a vapor absorption cooling, an increase of 23.2% by power output and 13% by

energy efficiency has been reported. However, vapor compression cooling established an annual saving of 2MW electric power.

Gas turbines used in plants, mostly faced an adverse effect in power output when ambient temperature increased. It has been reported that gas turbine power generation declined 15% of the rated power when the ambient temperature increased from 15⁰ C to 36⁰ C [3]. In order to compensate such power loss, new technology has been introduced. Inlet air cooling is regarded as a promising method for improving gas turbine efficiency up to 30% at one third cost of new turbine and half that of a peaking plant.

Inlet air cooling techniques to gas turbine during combined cycle was addressed a subject matter to improve plant efficiency. Najjar et al[4] investigated on inlet air chilling effect in gas turbine by introducing a cooling coil and reported that the turbine output improved by 10% and 18% during cold humid conditions and hot humid conditions respectively. Amell and Cadavid [5] have discussed the effect of the relative humidity on the atmospheric air-cooling thermal load, for gas powered thermal station installed in Colombia, when implementing cooling techniques such as: vapor compression and ice storage. G Srivastava and R Yadav [6] investigated collaboratively on the influence of relative humidity on the performance of a combined cycle using vapor compression refrigeration system. It has been reported that cooling the inlet air by 20 K using

Effect of Ambient and Operating Parameter on the Performance Parameters of Cooled Gas Turbine Cycle

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ABSTRACT: A systematic and comprehensive first law analysis of a cooled gas turbine cycle subjected to vapor compressor inlet air cooling (VC-IAC) has been conducted in our study. Film air cooling technique has been implemented to cool the gas turbine (GT) buckets. The gas turbine is subjected to variation of various operating and ambient parameters and the corresponding effect is analyzed to find out the optimal one. The integration of VC-IAC has been reported to further enhance the plant specific work and plant efficiency of gas turbine cycle, the enhancement being higher in regions having a hot and dry climate. This increase in cycle performance due to VC-IAC has been found superior in case of bucket cooled GT cycle when compared to uncooled one. It has further been witnessed that the plant specific work increases by more than 0.35 % and the plant efficiency increases by little above 0.1 % for every 1° C drop in CIT. The work ratio representing the excess of work of turbine over work of compression has been observed to improve when the ratio of inlet temperatures (r_{IT}) is increased or pressure ratio ($r_{p,c}$) is decreased. For every turbine inlet temperature, an optimal $r_{p,c}$ has been reported to exist at which, the plant efficiency is maximized.

Keywords: compressor inlet temperature; film blade cooling; gas turbine performance; inlet-air cooling; vapor compression;

I. INTRODUCTION

From the United States energy information administration (EIA) survey, it has been reported that Fossil fuels played a significant role in supplying 80% energy demand of world by 2040 where as the remained demand would be fulfilled by renewable and nuclear power resources [1]. International Energy outlook, 2013 revealed that, consumption of energy demand in developing countries reported 56% by 2040. So there is a need for adopting modern techniques which can improve electrical efficiency as well as specific power outputs (kJ/kg air) for controlling GHG emissions, investment cost, operating and maintenance costs for a sustainable use of the available fuels.

Gas turbines used in plants, mostly faced an adverse effect in power output when ambient temperature increased. It has been reported that gas turbine power generation declined 15% of the rated power when the ambient temperature increased from 15° C to 36° C [1]. In order to compensate such power loss, new technology has been introduced. Inlet air cooling is regarded as a promising method for improving gas turbine efficiency up to 30% at one third cost of new turbine and half that of a peaking plant.

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turbine by introducing a cooling coil and reported that the turbine output improved by 10% and 18% during cold humid conditions and hot humid conditions respectively. Amell and Cadavid [3] have discussed the effect of the relative humidity on the atmospheric air-cooling thermal load, for gas powered thermal station installed in Colombia, when implementing cooling techniques such as: vapor compression and ice storage. G Srivastava and R Yadav [] investigated collaboratively on the influence of relative humidity on the performance of a combined cycle using vapor compression refrigeration system. It has been reported that cooling the inlet air by 20 K using vapor compression refrigeration system, improves the plant specific work and plant efficiency by around 4% and 0.39% respectively. Lucia et al. [5] have investigated on air cooling system and portrayed a comparative study of Cogeneration of gas turbine power plant and concluded that in the Italian climate, the turbine power output may increase by 18% to 19% if the compressor inlet air is cooled to 10°C. This may be due to reducing the loss of energy due to excess heating. Al-Ansari and Ali [6] discussed on a hybrid turbine inlet air cooling (TIAC) system and reported that there was an enhancement of more than 10% of power. Sanaye et al. [7] have performed a thermo-economic analysis of ice thermal energy storage system for gas turbine inlet cooling application. The addition of inlet air cooling has been reported to enhance

Fuzzy Controlled Anti-Lock Braking System

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ABSTRACT: This thesis describes an intelligent approach to control an **Antilock Braking System (ABS)** employing a **fuzzy controller**. Stopping a car in a hurry on a slippery road can be very challenging. Anti-lock braking systems (ABS) take a lot of the challenge out of this sometimes nerve-wracking event. In fact, on slippery surfaces, even professional drivers can't stop as quickly without ABS as an average driver can with ABS. Anti-lock Brake improves the controllability of vehicles in compare with brake systems lacking ABS. Fuzzy is a multi-valued logic developed to deal with imprecise or vague data. Classical logic holds that everything can be expressed in binary terms: 0 or 1; in terms of Boolean algebra, everything is in one set or another but not in both. **Fuzzy logic** allows for partial membership in a set, values between 0 and 1. When the approximate reasoning of fuzzy logic is used with an expert system, logical inferences can be drawn from imprecise relationships.

Fuzzy anti-lock Braking systems were developed to reduce skidding and maintain steering control when brakes are used in an emergency situation. Fuzzy controllers are potential candidates for the control of non-linear, time variant and complicated systems. There are many **control algorithms** for ABS systems and they are partially responsible for their performance. Here, in this paper we have discussed how Anti-Lock Braking system is controlled using Fuzzy Logic.

I. INTRODUCTION TO FUZZY LOGIC

Fuzzy logic is a mathematical technique for dealing with imprecise data and problems that have many solutions rather than one. Although it is implemented in digital computers which ultimately makes yes-no decisions, fuzzy logic works with ranges of values, solving problems in a way that more resembles human logic. Fuzzy logic, a more generalized data set, allows for a "class" with continuous membership gradations. It is rigorously structured in mathematics. One advantage is the ability to describe systems **linguistically** through rule statements.

FUZZIFICATION

The fuzzy controller takes input values from real world. These values referred to as "crisp" values. Since they are represented as single number, not a fuzzy one. In order for the fuzzy controller to understand the input, the crisp input has to be converted to a fuzzy number. This process is called fuzzification.

DEFUZZIFICATION

It is the process of producing a quantifiable result in fuzzy logic. Typically, a fuzzy system will have a number of rules that transform a number of variables into a "Fuzzy" result, that is result is described in terms of membership in fuzzy set. Simplest but least useful defuzzification method is to choose the set with highest membership. Once all the rules are evaluated, their

output are combined in order to provide a single value that will be fuzzified.

FUZZY CONTROL

A fuzzy control system is a real-time expert system, implementing a part of human operator's which does not lend itself to being easily expressed in PID-parameters or differential equations but rather in situation/action rules. Fuzzy control has been so successful in areas where classical control theory has been dominant for so many years. It differs from classical control theory in several aspects. One main feature of fuzzy control system is their existence at two distinct levels: First, there are symbolic if-then rules and qualitative, fuzzy variables and values such as "If pressure is high and slightly increasing then energy supply is medium negative" Here 'slightly increasing' and 'pressure is high' are fuzzy values and 'and' is a fuzzy operator. The IF part is called the "antecedent" and the THEN part is called the "consequent".

Fuzzy control aims at replacing differential equation based techniques and solving the whole problem with artificial intelligence methods. One way to combine fuzzy and PID-control is to use a linear PID system around the set-point, where it does its job, and to 'delinearize' the system in other areas by describing the desired behavior or control strategy with fuzzy rules. Fuzzy controllers are very simple conceptually.

Improvement of the Quality Parameters of a Small Scale Industry by Application of FMEA

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ABSTRACT— Despite the many improvements in the manufacturing industry during the past years, Quality plays a vital role in almost all small scale industries. Their customers are the major industries who are highly concerned about the quality, cost and the time concerned about the product. Since all these factors are to be considered before ordering quality is the main factor which dominates the products significance. This paper aims to identify and eliminate current and potential problems from the major process of a case company. Ishikawa diagram and the Failure mode effect analysis is aimed to reduce errors and shorten the development duration, increased product reliability. It also creates knowledge base in small scale manufacturing company. So potential risks and current risks are identified, current controls are evaluated and risk reducing actions are defined in advance. Furthermore, some measures are suggested which require to be taken as soon as possible to avoid potential risks.

Index Terms—Bending process, Failure mode effect analysis, Ishikawa diagram, precision press parts, press brake, product reliability, potential risk, sheet metal parts.

I. INTRODUCTION

Press brake set up needs to be both efficient and accurate in order to eliminate rework and waste in both time and materials (Dale B.G. 1999). The most expensive part of any operation is in the setup as from a production point of view, no parts are being made. To achieve both accuracy and speed, proper training and operating procedures for repetitive jobs through a standard setup process can help deliver superior results (Melan E.H.1995). The press brake can be one of the most difficult machines to run in a precision metal fabrication shop.

Despite all the technology improvements, the operator needs the knowhow and skills to think through the steps to create the part and anticipate problems ahead of time (Pande S.2000). Modern press brakes have many features to take the guesswork and art out of bending with thickness compensators, automatic spring-back adjustments, and so forth. While these features are invaluable, the feature richness just adds to the knowledge needed by the operator to understand the setup possibilities. Metal fabrication shops today face the demands of many small runs and tighter tolerance demands by their customers.

FMEA is a step by step approach for identifying all possible failures during process—Failure modes means the way or modes in which something might fail.

Failures are any defects or errors, especially ones that affect the customer and can be potential or actual. Effect Analysis refers to

studying the consequences of those failures (Pyzdek T.2003). Failures are prioritized according to how serious their consequences are, how frequently they occur, and how easily they can be detected. The purpose of FMEA is to take actions to eliminate or reduce failures, starting with the highest priority number (Florina C.F.2002).

Implementing standard operating procedures and proper training in process execution go a long way towards achieving consistency in producing high quality parts with minimal waste. This is especially true when comparing part variations produced by multiple operators with different skill levels (Gowen 2002).

II. BRIEF ABOUT THE COMPANY

The company is a medium scaled company and is involved in manufacturing of precision sheet metal parts as per the orders of the customers. More than 2500 different parts are produced per annum. Machinery like CNC Laser Cutting, CNC Punching and CNC Press Brakes are used for production. Bending workstation contributes with 87 out of 221 customer complaints in the year 2011.

The customer complaints for these components were as follows:

- 1) Fitment Problem with mating part
- 2) Aesthetically poor
- 3) Cracks

With these data, decision is taken to concentrate the efforts on the part families contributing maximum number of customer complaints.

Effect of Fogging Cooling On the Performance Parameters of Cooled Gas Turbine Cycle

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ABSTRACT

The study provides a computational analysis of the effects of compressor pressure ratio, turbine inlet temperature, ambient relative humidity and ambient temperature on the performance parameters of an air cooled gas turbine cycle with evaporative cooling of inlet air. The blade cooling method selected is air film cooling. The analysis indicates that the mass of coolant required for blade cooling is reduced with increase in temperature drop across the humidifier. Both decrease in ambient temperature and ambient relative humidity results in an increase in plant efficiency and plant specific work. The highest efficiency is obtained at a turbine inlet temperature of 1500K for all range of ambient relative humidity and ambient temperature after which it decreases. The compressor pressure ratio corresponding to the maximum plant specific work however varies with both ambient relative humidity and ambient temperature. The increase in specific work due to drop in ambient relative humidity is more pronounced at higher pressure ratios. Similarly the increase in efficiency due to ambient temperature drop is prominent at higher turbine inlet temperatures. Finally a design monogram is presented which may be used to determine find out the design parameters corresponding to best efficiency and specific work desired.

I. INTRODUCTION

Gas turbines have gained widespread acceptance in the power generation, mechanical drive, and gas transmission markets. I.G. Wright, T.B. Gibbons [1] have thoroughly reviewed the recent developments in gas turbine materials and technologies. Consequently, thermal efficiencies are currently very attractive, with simple cycle efficiencies ranging between 32% and 42 % and combined cycle efficiencies reaching the 60% mark. The efficiency of the gas turbine cycle has been improved mainly due to enhanced gas turbine performance through advancements in materials and cooling methods in recent years.

The two important methods of improving the gas turbine performance are by inlet air cooling and gas turbine blade cooling.

By the addition of an air-cooling system at the compressor intake, the inlet air can be conditioned to lower temperatures than ambient, thus improving plant performance at high ambient temperatures. As the inlet air temperature drops compressor work decreases and so the net work and cycle efficiency increases. In addition to this, air density increases with drop in inlet air temperature, which results in an increase in mass flow rate of air entering the compressor and so the power output is

enhanced. Work in this area has been done by De Lucia et al. [2], Bassily [3, 4], and Karakas et al. [5].

The search for a better performance of gas turbine engines has also led to higher turbine inlet temperatures. The objective of the blade cooling is to keep the blade temperature to a safe level, to ensure a long creep life, low oxidation rates, and low thermal stresses. The universal method of blade cooling is by air bled from compressor flowing through the internal passages in the blades. Work in this area has been done by Louis et al. [6], El-Masri [7], Bolland and Stadaas [8], and Sanjay et. al. [9-20]. The present work is an attempt in this direction dealing with the combined effect of turbine blade cooling and evaporative inlet air-cooling on the performance of basic gas turbine cycle. The effects of compressor pressure ratio, turbine inlet temperature, ambient relative humidity and ambient temperature have been analyzed on the thermodynamic performance parameters of the cycle. Figure 1 shows the schematic diagram of a basic gas turbine cycle with inlet air humidifier and is being called air humidifier integrated gas turbine (AHIGT).

Production and Characterization of Mahua Biodiesel

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ABSTRACT-- The oils obtained from expeller were used for biodiesel production. Degumming process was carried out for Neem and Polanga oil to nullify the gum effect. Then the oils were analysed for determination of their acid values by titrating against a known strength of KOH solution.

In this study, biodiesel is produced from *Madhuca indica* seeds commonly known as Mahua by using transesterification process using a low capacity pressure reactor and by-product of transesterification is glycerol, which is used in preparation of soaps. Mahua Oil Ethyl Ester (MOEE) was produced from the Mahua oil and is mixed with diesel to get different ratios of blends. Biodiesel fuels are characterised by a number of physiochemical properties. Some of these are FFA, density, kinematic viscosity, calorific value, flash point, fire point, cloud point, pour point, cetane no, carbon residue, copper strip corrosion, iodine value, saponification number and moisture content. Although most of the biodiesel properties are similar to those of diesel, there are considerable differences in some of the basic fuel properties such as calorific values, density and viscosity. Biodiesel properties should meet the IS 15607, ASTM D-6751 and EN 14214 specifications.

Index Terms— Mahua, biodiesel, fuel properties, mahua oil methyl ester

I. INTRODUCTION

One of the most essential preconditions for the overall development of a society is the efficient use of energy resources. The conventional energy sources like fossil fuels are widely used for production of energy. However, in the present day scenario, the attention has been shifted to non-conventional energy sources considering the pros and cons of

conventional energy resource utilization. The sources of such non-conventional energy are renewable in nature, and hence origin cyclically, safeguarding the sustainability of the globe, driven majorly by modernized needs of human beings.

Today worldwide energy demand is the most critical challenge directly or indirectly in the entire process of evolution, growth and survival of all living beings. It plays a vital role in the socio-economic development and human welfare of a country. Energy has come to be known as a 'Strategic Commodity' and any uncertainty about its supply can threaten the livelihood and economy of a country. The world is using energy at a rate of 2.4 kW per person as per [1]. Energy demand appears to have gradually gained momentum. The world energy consumption is increasing day by day and will be double in a period of 20 years by 2035 as also stated in [2]. Fossil fuel still represents over 80% of total energy supplied in the world. The increasing industrialisation and motorisation of the world has led to a steep rise in the demand of

petroleum products. There are limited resources and the petroleum fuels are irreplaceable.

These finite resources and high consumption of petroleum fuel has given rise to frequent disruptions and uncertainties in its supply as well as hike in price. This higher international oil prices lead to domestic inflation increased input costs, an increase in the budget deficit which invariably drives up interest rates and slows down the economic growth. Geologists are searching for the unexplored deposits of petroleum resources. The new resources appear to grow arithmetically while the consumption is progressing geometrically. Under this situation, when consumption overtakes discovery, the world will lead to an ecological disaster. In this paper mahua biodiesel is prepared from mahua oil by esterification and transesterification method. Fuel properties are determined and compared with diesel.

II. METHODOLOGY

Mahua oil is extracted from mahua seed by mechanical expeller. First the dry fruits were collected in a drum, and the kernels were separated. Later the kernels were dried and then fed into the oil extraction machine. The oil obtained by pressing is collected in a drum. Then filtration is done to remove the unwanted particles left in the extruded oil in order to obtain the pure vegetable oil.

The oils obtained from expeller were used for biodiesel production. Degumming process was

Performance and Emission Analysis of a C.I Engine Fuelled with Neem and Mahua Biodiesel

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ABSTRACT-- The present research is aimed at exploring technical feasibility of sample biodiesel in compression ignition research engine without any substantial hardware modification. The investigations were performed on Compression Ignition engine at C.V. Raman College of Engineering, Bhubaneswar, India. The instruments fitted to the test bed were properly calibrated to minimize the possible errors during experimentation. The investigations were carried out by using selected blends of biodiesel and conventional diesel. The performances and emissions were investigated for the blends at different loads from no load to full load conditions and compared with diesel.

Index Terms—Neem, Mahua, Biodiesel, Performance, Emission, Diesel engine

I. INTRODUCTION

THE petroleum fuel causes severe environmental pollution due to combustion in vehicular engines. The fossil fuel mainly constitute of carbon and hydrogen in addition to traces of sulphur. It produces various gases, like CO, HC, NO_x, soot, lead compounds and other organic compounds during combustion which is released into atmosphere causing degradation of air quality as reflected in [1]-[2]. A light vehicular engine discharges 1 to 2 kg of pollutants during a day and heavy automobile discharges 660 kg of CO during a year. The carbon monoxide is highly toxic and the exposure for a couple of hours can cause impairments to physiological functions. Oxides of nitrogen and unburned hydrocarbons from the exhaust can cause environmental fouling by forming photo-chemical smog.

For India's economic growth achieving energy security is of fundamental importance. An energy balance gives a more complete picture of the gap between supply and use of energy. India was the fourth largest consumer of oil and petroleum products in the world in 2011. It was also the fourth largest importer of oil and petroleum products.

To meet the present energy crisis, one of the important strategies need to be adopted is to develop and promote appropriate technology for utilizing non-traditional energy resources to satisfy the present energy requirements.

Biodiesel is a clean burning alternative bio-fuel produced from domestic renewable resources. It contains no petroleum, but it can be blended at any level with diesel to create a biodiesel blend. It can be used in existing oil heating systems and diesel

engines without making any alterations. Biodiesel has gained popularity due to its sustainability, low contributions to the carbon cycle and in some cases emissions of lower amounts of greenhouse gases. Other characteristics of biodiesels are that they are biodegradable, non-toxic and essentially free of sulphur and aroma. The better lubricating properties of biodiesel increase functional engine efficiency. Technically biodiesel fuel is composed of mono-alkyl esters of long chain fatty acids derived from vegetable oils or animal fats and is designated as B100. It meets the requirements of ASTM (American Society for Testing & materials) D6751 and European Standard EN-14214. In India the Standard was adopted by the Bureau of Indian Standards (BIS-15607). The major difference between diesel and biodiesel is that Diesel is extracted from crude oil and refined to different levels whereas biodiesel is extracted from plant, seed and animal fats. Diesel is a non-renewable fossil fuel by product while biodiesel is renewable. The use of biodiesel in a conventional diesel engine results in a substantial reduction of emissions of unburnt hydrocarbons, carbon monoxide and particulate matter compared to emissions from diesel fuel. The ozone forming potential of biodiesel hydrocarbons is 50% more than that of diesel fuel. The exhaust emissions of sulphur oxides and sulphates (major components of acid rain) from biodiesel are essentially eliminated. The exhaust emissions of carbon monoxide (a poisonous gas) from biodiesel are on average 48% lower than that of diesel. The exhaust emissions of particulate matter from biodiesel are about 47% lower than overall particulate matter emissions from diesel.

Design and Simulation of Robot Manipulator

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ABSTRACT:

Inverse kinematics of a robot is extremely basic to locate the joint factors that fulfill the ideal posture of the robot during its control. This is utilized in controlling the robot position, movement of the robot, and so on. In this paper, bit by bit clarification and correlation of two broadly utilized techniques, in particular, opposite kinematics and Jacobian backwards strategies, for robot control are introduced. For this reason a six levels-of-opportunity wrist-parceled modern robot KUKA KR5 Arc was utilized to show the strategies. A tale approach has been proposed for choosing the suitable arrangement of joint points among the few converse kinematic arrangements. It depends on weight of each connection and manipulability. The correlation of these methodologies for direct and round direction is introduced. Their focal points, restrictions, applications, and calculations included are likewise featured.

I. INTRODUCTION

The objective of a robot regulator is to create a satisfactory movement of the end-effector by decisively inciting its joints for a predetermined errand. To examine the math of movement without considering its motivation goes under the subject of kinematics. Robot kinematics is separated into forward and converse kinematics which are portrayed in Figure 1. Forward kinematics (FK)

uses kinematic conditions to discover the posture, i.e., position and direction of the end-effector (EE), given the joint points, while the converse kinematics (IK) processes the joint plots for an ideal posture of the EE. Joint points are then contribution to the actuators connected to move the connections of the robot as indicated by the predefined direction. So there is a necessity of exact joint point esteems for exact.

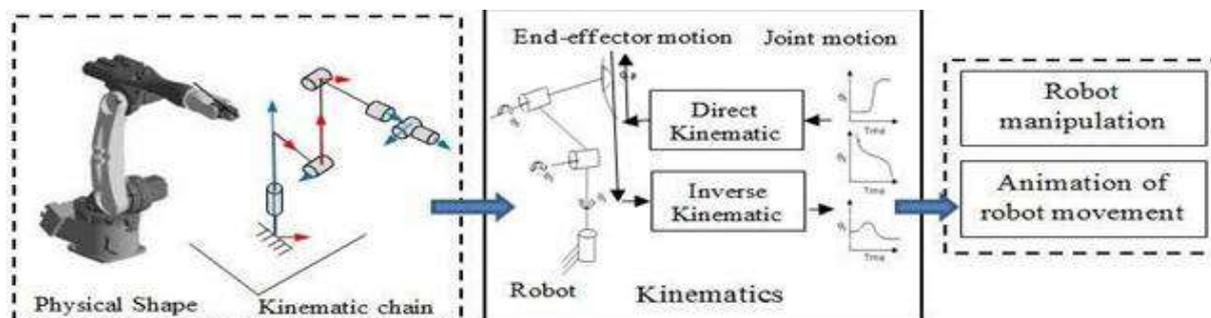


Fig.1

robot control or potentially kinematic movement. For sequential robots, FK is clear, which has novel arrangement, while the converse kinematics has numerous arrangements fulfilling a specific posture. One way to deal with the reverse kinematics issue is to locate a shut structure arrangement utilizing logarithmic or mathematical technique. Another methodology is to locate a mathematical arrangement by a progressive guess calculation. In spite of the fact that the previous methodology is commonly more alluring in applying the answer for constant control of robots, it isn't generally conceivable to acquire the shut structure answers for the controllers with subjective

designs [1]. There exist a few techniques for demonstrating and tackling IK of a robot. The kinematic demonstrating of sequential chain robots are generally done utilizing the Denavit-Hartenberg (DH) boundaries [2]. The scientific technique for explaining backwards kinematics for six levels of opportunity (DOF) robot controller with three successive tomahawks either crossing or equal was accounted for in [3]. Such design have eight opposite kinematic arrangements. An overall six DOF robots, have sixteen arrangements [4]. The quantity of systematic answers for various levels of opportunity robots are recorded in Table 1. Thus, for nonstop movement of a robot, a precise

Soft Computing Applications for Intrusion Detection on Computer Network Security

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ABSTRACT---In today's competitive world, computer security is at a boom due to tremendous amount of intruders. To prevent such intruders, detection is required at all levels of a network security. Computer hackers have destroyed voluminous data for which computer security uses a secured tool that helps in detecting attacks in order to harm the computer. These intrusion detections are programmed to detect malicious attacks by anomalous activity. This paper presents new technique of detecting network intrusions using soft computing techniques.

Keywords- Soft Computing, Network intrusions, web semantics, fuzzy rules.

I. INTRODUCTION

Intrusion have been applied in various areas of education. Specifically Web Semantics have been used in teaching and learning using fuzzy rules. Fuzzy rules being one of the applications of Soft Computing techniques.[1] Intrusion detection is an important problem of computer network security. Based on the observed findings, the Signature based attacks have become obsolete. Due to this reason new methodologies are required for finding out the anomalies in the attacks

Intrusion detection is the process of monitoring the events occurring in a computer network system and analyzing them for signs of intrusions [3]. On different situations intrusions have been defined as a hazardous entry into a network that will destroy the valuable data in a authorised network. An Intrusion Detection System does not eliminate the use of preventive mechanism but it works as the defensive mechanism in securing the system [4].

Many required data collected and analysis engine processes of IDS to identify intrusive activities which include statistical [5], machine learning [6], data mining [7] and immunological inspired techniques [8]. There are two main Intrusion Detection Systems. There are two types of intrusions:

- Anomaly Based
- Signature Based

This paper we provide the new technique for solved problem, Independent Component Analysis (ICA) aims at extracting unknown hidden factors/components from multivariate data using only the assumption that the unknown factors are mutually independent.

The SVM is one of the techniques of soft computing that would also facilitate the process of detecting the intrusions in a network.

The rest of this paper is organized as follows: In Section 2, we discuss the related works and introduction to Independent Component Analysis, an explanation on Support Vector Machines. The experimental design and setup are shown in section 3. An Experimental Result is shown in Section 4.

II. RELATED WORK

There are some important features that an Intrusion Detection System should possess/include.

Most attacks make their way by network protocols which are the major loop holes of attacking a network. Twycross [10] proposed a new paradigm in immunology, Danger Theory, to be applied in developing an intrusion detection system.

A. Independent Component Analysis (ICA) ICA is a computation for separating a multivariate signal into additive subcomponents supposing the mutual statistical independence of the non-Gaussian source signals. Thus the motivation of a feature selector is first, simplifying the classifier by the selected features.

But many SC techniques have produced the following results: 1) the components are mutual independent; 2) each component observes nongaussian distribution. By $X = AS$, we have $S = A^{-1}X = WX$ (where $W = A^{-1}$).

$$X = AS \quad (1)$$

Business process efficiency measurement

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ABSTRACT

Business processes such as maintenance do the same or similar things day after day and for that reason, their performance must be measured on a regular basis. Measures of performance are needed in order to determine the productivity and the efficiency of an organization. Performance measurement also plays an important role in identifying and tracking progress against organizational goals. Data Envelopment Analysis (DEA) is one of the excellent tools to measure efficiency of business processes and DEA has been widely applied to perform efficiency analysis in many sectors.

Keywords: Performance measurement, Overall Equipment Effectiveness, Data Envelopment Analysis

I. INTRODUCTION

Every business activity is a production process and an organization is a complex set of processes with multiple inputs, production processes, outputs, and customers. Business processes are much like machines; they do the same or similar things day after day and for that reason, their performance must be measured on a regular basis. Measuring work inputs and product outputs is necessary to determine the work capacity and productivity of a process. Measures of performance have been used by management for centuries to review current operational capabilities such as departmental and corporate performance, as well as trend performance achieved based on organizational plan. These measures are needed in order to determine not only if resources and costs have been managed accurately based on achieved production and to determine whether the assets or plant remain in good health. Performance measurement also play an important role in identifying and tracking progress against organizational goals as well as to identifying opportunities for improvement (U.K Department of Trade and Industry, 2006).

One of the excellent tools to measure efficiency of business processes is Data Envelopment Analysis (DEA). DEA has been widely applied to perform efficiency analysis in many sectors including banks, university, hotel, power plant, and hospital etc (Schaffnit, Rosen, Paradi, 1997; Pestana Barros, 2005; Johnes, 2006; Sommersguter- Reichmann, 2006; Ballesteroa & Maldonado, 2004; Cooka & Green, 2005). DEA is a technique of analyzing the efficiency of the organization using linear programming. In DEA, the organization under study is called the DMU

(Decision Making unit). DMU refer to the collection of private firms, non-profit organizations, departments, administrative units, and groups with the same (or similar) goals, functions, standards and market segments. A DMU is regarded as the entity responsible for converting inputs into outputs and DEA measures the efficiency of the conversion process. Rather than the conventional one input to one output, DEA evaluates multiple inputs and multiple output systems on the basis of what is most excellent in the efficiency value. The DMU is most efficient if the efficiency obtains a score of one and is inefficient if the score is less than one. Therefore, for every DEA calculation, the objective is to maximize the value of the efficiency. Meanwhile, Overall Equipment Effectiveness (OEE) is a key measurement of TPM. It indicates how effective the machines are running. OEE breaks the performance of a machine into three separate but measurable components: Performance Rate (PR), Quality Rate (QR) and Availability (A). Tracking OEE regularly can spot the patterns and influences that cause problems for the machines. Furthermore, measuring OEE can show us the result of our efforts to help the machines perform better. (The productivity Development Team, 2004). This paper applies DEA to measure the efficiency of measurable components of OEE for the activity that had been conducted in six periods. The objectives of this paper are to observe performance trends of the activity over time sequence and to determine the best performing period. This paper is organized as follows; Section two describes the general knowledge about Data Envelopment Analysis. Section three applies DEA to measure the efficiency of measurable components of OEE in six periods. Finally, we

Soil Moisture Mapping Over Odisha

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ABSTRACT: This paper presents a complete methodology to process SMAP surface soil moisture data to develop monthly average soil moisture maps of the state Odisha. The paper also defines the utility of SMAP soil moisture product (L4_SM product) to identify the soil moisture variations over Odisha by analysing daily soil moisture data for entire duration (June-October, 2018) covering the monsoon season of the year. In order to determine the developed methodology the year 2018 was selected wherein a total of 153 SMAP daily data files (ascending pass) surface soil moisture for the desired duration were processed and analysed. It has been observed that the soil moisture variations are in proportion to the seasonal changes as well as the rainfall variations.

I. INTRODUCTION

1.1. Background

Soil moisture is one of the few straight noticeable hydrological variables that plays an significant role in water and energy budgets used in climate studies. The quantity of water present in the soil is essentially important to agriculture and it has an consequence on the rate of actual evaporation, groundwater recharge, and generation of runoff. Soil moisture is of various types such as profile, root zone and surface soil moisture. At the present time there is no practical approach for measuring and monitoring soil moisture at the frequency and scale needed for a large scale analysis. Utilization of passive microwave remote sensing in estimating soil moisture provides an optimum solution for large scale basis. The remotely sensed soil moisture microwave data products have immense potential to be used for different applications in the field of agriculture and in meteorological parameters study, for this each available data product should be understood to develop a methodology to generate maps and extract meaningful information. Passive microwave remote sensing data product of SMAP (SOIL MOISTURE ACTIVE PASSIVE) data has been studied in this paper. A detailed methodology to process it and generate monthly average soil moisture maps for the entire state of Odisha has been studied in this paper.

1.2. Soil Moisture Retrieval through Microwave Remote Sensing

The conventional methods used for measuring soil moisture are point specific and labour intensive. In contrast to the conventional methods, remote sensing techniques can play a vital role in soil moisture estimation on routine basis. Different portions of electromagnetic spectrum such as optical, thermal and microwave can be used for soil moisture retrieval using remote sensing

techniques. Among all these bands, microwave remote sensing is the finest option for soil moisture retrieval because of its high penetration ability and high dielectric constant of water i.e. 80 at microwave frequency [Srivastava et al. 2015]. The in-situ methods are very precise in estimating the soil moisture but it has a constraint that the information is confined to that certain location. Remote sensing methods offer rapid data collection of soil moisture over large areal extent with a high temporal resolution with a statistic that the penetration depth is proportional to the wavelength i.e. penetration is directly varied with the wavelength.

1.3. SMAP (Soil Moisture Active Passive)

The SMAP satellite mission was launched on January 31, 2015 by National Aeronautics and Space Administration (NASA). The observatory was established for providing global mapping of high-resolution soil moisture and freeze-thaw state in every two to three days using an L band radar (active) and an L-band radiometer (passive). After an irrecoverable hardware failure of the radar on July 7, 2015, the radiometer-only soil moisture product became the only operational soil moisture product for SMAP. This mission has been providing global observations of L-band (1.4 GHz) passive microwave brightness temperature since 31 March 2015 at about 40-km resolution from a 685-km, near-polar, sun-synchronous orbit [Entekhabi et al. 2010a; Piepmeier et al. 2017]. These observations are highly sensitive to surface soil moisture and temperature, which impact the land surface water and energy balance through, for example, the segregating of rainfall into runoff and infiltration, and the net radiation into latent and sensible heat fluxes. The resulting measurements of SMAP are likely to advance our understanding of the processes that relate the terrestrial water,

English Language Teaching (ELT) and Inclusion of Media Technology

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ABSTRACT

The most innovative endeavor the teachers of English have undertaken so far is to integrate media technology in ELT classroom, in order to improve learners' motivation, integrated language skills and self-learning environment.. The aim of this study is to statistically explore EFL learners' response towards media technology in general and its impact in improving accentual patterns of individual English words in particular. It also explores the impact of internet and teacher's role in improving learners' writing skill. Three statistical surveys were undertaken at JCC, King Abdul Aziz University, KSA and the result of using electronic devices was found marvelous and interesting.

Keywords: media technology, power point presentation, chat forums, audio-visual presentation, , significant performance

I. INTRODUCTION

Over the past several decades, technology has become a fixture in many homes around the world. Its influence has permeated into all facets of life, including English language teaching. The aim of this study is to explore the impact of integrating media technology in ELT classrooms and to statistically analyze how much it assists learners in acquiring four language skills namely listening, speaking, reading and writing. Integration of media technology began in the 1950s when small language schools began to use the phonograph, movies and the tape recorder as tools in English language teaching. In the '70s and '80s, audio and video courses were improved through the added use of video projectors and slide shows. By the late '80s and early '90s, language labs were part of many of the more expensive language schools throughout the world. However, by the mid '90s many multimedia language programs became available for teachers on the Internet. In modern era of English language teaching, media technology such as video, pictures, animation and interactive games, CDs or DVDs, the use of internet, chat rooms and video conferencing and Apple's iPad have narrowed distance and turned the whole world into a global community. It provides opportunities to learners to converse not only with local community but with global community as well. It has revolutionized learning and teaching methodologies thereby turning them more enjoyable and productive.

According to (Balaaco 1996) digital learning is "just in time" and on-demand delivering knowledge when and where the employees need it. This concept of "anywhere-anytime" is serving

learners on the larger scale.

II. LITERATURE REVIEW

According to study conducted by Jackson et al. (2006), it has been found that students who used the internet more, got higher scores and grades. According to the research activities, the internet changes the interaction between learners and teachers (Kern, 1995): there is less teacher and more learner talk in computer classes. Furthermore, it changes teacher and students' roles (Peterson, 1997) and makes learning more students centered. (Warschauer, Turbee, and Roberts, 1996). Vision and hearing are the two dominant senses that media technology can provide to the students and present greater opportunities for learning linguistic inputs. (Linfors, 1987). As Pope and Golub (2000) asserted, it is also important for English educators to model effective practices of teaching with technology. As students perform diverse task with the computer, they broaden their repertoire of metacognitive, cognitive and effective learning. AsKajder (2003) wrote, "Focus has to be placed on learning with the technology rather than learning from or about the technology". He further claims that with the help of hypermedia (e.g. World Wide Web), multimedia becomes a more powerful tool for language learning. He maintains that one of the advantages of using hypermedia for language teaching is that it provides learners with a more authentic learning environment, as, for example, listening can be combined with seeing. The second study (Chandrasegaran and Kong, 2006) focused on the potential of discussion forums to harness learners' argumentation skills – that is, to raise learners' awareness of their ability to present

A Brief Study on Cause and Effect of Environmental Pollution

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ABSTRACT - The foremost vital and problematic reason of the surrounding degradation and thence international environmental is that the reality of degrading the connection between man and environment thanks to several reasons like speedy rate of destruction of natural resources, technological development and industrial growth. Because of the surplus of monoxide or fluorocarbon gas there's a hole made within the layer as a result the ultraviolet illumination rays area unit coming back towards the planet cause many sorts of skin issues . Because of the surplus production of various industrial wastes, soil pollution and pollution area unit increasing tons that successively cause completely different health issues and our surroundings is begrime day by day. The buildup of inexperienced house gases can cause important changes within the weather patterns within the close to future resulting in heating. The destruction of layer and also the more warming of the planet surface threaten harmful consequences like eruption of cancerous and tropical diseases, disruption of oceans organic phenomenon, rising of ocean levels, submersion of the many islands, melting of tiny land-based glaciers, flooding in several low lying coastal areas and harvest loss etc. These area unit making fearful signals to shield the surroundings else everybody at risk.

Keywords: Green technology, Environmental pollution, Renewable energy

I. INTRODUCTION

The concept of environment is as old as the concept of the nature itself. It is a composite term referring to conditions in which organisms consisting of air, water, food, sunlight etc., thrive and become living sources of life for- all the living and non-living beings including plant life. The term also includes atmospheric temperature, wind and its velocity.

II. ENVIRONMENTAL POLLUTION

Before understanding what "Environmental Pollution" is it is equally necessary to-know what "pollution" is. The Royal Commission on Environmental Pollution in U.K. in its third report gave the following definition to the term "Pollution", namely: The introduction by man into the environment of substances or energy liable to cause hazards to human health, harm to living resources and ecological systems, damage to structure or amenity or interference with legitimate uses of the environment. Pollution occurs when there is the potential for harm[1]. Harm of man is not confined to physical injury but encompasses offence caused to any of his senses or harm to his property, therefore smells and noise which I may not cause injury can constitute pollution. Harm to living organisms can include harm to their health or interference with the ecological systems of which they form a part.

KINDS OF POLLUTION Environmental pollution may broadly be classified into: (1) Natural pollution;

(2) Man-made pollution. 1. Natural Pollution: Environment is polluted often by natural phenomenon, such as earthquakes, floods, drought, cyclones, etc. 2. Man-made Pollution: Human activities. The environmental pollution can also be classified further as, Air pollution, water pollution, land pollution, food pollution, noise pollution and radio-active pollution, etc.

III. FACTORS OF ENVIRONMENTAL PROBLEMS

The „environmental crisis“ is caused due to environment and ecological changes as a result of developmental process of the 'economic and technological man" of the present century. In fact if the present century is marked by socio-economic, scientific and technological development on the one hand, it is plagued by serious problems of environmental problems on the other hand. The environmental crisis arising out of the environmental deterioration caused by several forms of pollution, depletion of natural resources because of rapid rate of their exploitation and increasing dependence on energy consuming and ecologically damaging technologies, the loss of habitats due to industrial, urban and agricultural expansion, reduction and loss of ecological populations due to excessive use of toxic pesticides and herbicides and loss of several species of plants due to practice of monoculture removal of habitats through forest clearance has now become of global concern. The life of common man is being so rapidly adversely affected by environmental degradation caused by

A Brief Study on Renewable Energy Sources and its Impact on Climate

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ABSTRACT-The world is fast becoming a global village due to the increasing daily requirement of energy by all population across the world while the earth in its form cannot change. The need for energy and its related services to satisfy human social and economic development, welfare and health is increasing. Returning to renewables to help mitigate climate change is an excellent approach which needs to be sustainable in order to meet energy demand of future generations. The study reviewed the opportunities associated with renewable energy sources which includes: Energy Security, Energy Access, Social and Economic development, Climate Change Mitigation, and reduction of environmental and health impacts. Despite these opportunities, there are challenges that hinder the sustainability of renewable energy sources towards climate change mitigation. These challenges include Market failures, lack of information, access to raw materials for future renewable resource deployment, and our daily carbon footprint. The study suggested some measures and policy recommendations which when considered would help achieve the goal of renewable energy thus to reduce emissions, mitigate climate change and provide a clean environment as well as clean energy for all and future generations.

I. INTRODUCTION

The world is fast becoming a global village due to the increasing daily requirement of energy by all population across the world while the earth in its form cannot change. The need for energy and its related services to satisfy human social and economic development, welfare and health is increasing. All societies call for the services of energy to meet basic human needs such as: health, lighting, cooking, space comfort, mobility and communication and serve as generative processes [1]. Securing energy supply and curbing energy contribution to climate change are the two-over-riding challenges of energy sector on the road to a sustainable future [2].

Historically, the first recorded commercial mining of coal occurred in 1,750, near Richmond, Virginia. Momentarily, coal became the most preferred fuel for steam engines due to its more energy carrying capacity than corresponding quantities of biomass-based fuels (firewood and charcoal). It is noteworthy that coal was comparatively cheaper and a much cleaner fuel as well in the past centuries [4]. The dominance of fossil fuel-based power generation (Coal, Oil and Gas) and an exponential increase in population for the past decades have led to a growing demand for energy resulting in global challenges associated with a rapid growth in carbon dioxide (CO₂) emissions. A significant climate change has become one of the greatest challenges of the twenty-first century. Its grave impacts may still be avoided if efforts are made to transform current energy

systems. Renewable energy sources hold the key potential to displace greenhouse gas emissions from fossil fuel-based power generating and thereby mitigating climate change [5]

II. RENEWABLE ENERGY SOURCES AND SUSTAINABILITY

Renewable energy sources replenish themselves naturally without being depleted in the earth; they include bioenergy, hydropower, geothermal energy, solar energy, wind energy and ocean (tide and wave) energy.

In spite of the outstanding advantages of renewable energy sources, certain shortcoming exists such as: the discontinuity of generation due to seasonal variations as most renewable energy resources are climate-dependent, that is why its exploitation requires complex design, planning and control optimization methods. Fortunately, the continuous technological advances in computer hardware and software are permitting scientific researchers to handle these optimization difficulties using computational resources applicable to the renewable and sustainable energy field .

III. RENEWABLE ENERGY AND CLIMATE CHANGE

Presently, the term "climate change" is of great interest to the world at large, scientific as well as political discussions. Climate has been changing since the beginning of creation, but what is alarming is the speed of change in recent years and it may be one of the threats facing the earth.

Re-reading Toni Morrison: A Reader-response Approach

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ABSTRACT: Toni Morrison, one of the most well-known American writers of the literary world, has been both appreciated and criticized from various viewpoints as most writers are. Her works are triumphs of language and imagination, and are considered mastered classics of modernism. Furthermore, her works are studied for their depiction of sensitive issues such as racism, slavery, sexuality, human drives, relationships, and mental trauma. However, fewer studies have analyzed her text from a reader-response perspective. Hence, this paper evaluates the plots, scenes, and themes of her texts using a reader-response approach. I will analyze three texts by Morrison using different arguments made by Iser. Further, I will study the dynamics of interpretation considering the aspects of race, class, and sex. Lastly, I will move toward the conclusion discussing Stanley Fish's concept of interpretive communities.

Keywords: Reader-response, Interaction between reader and text, Critical theory.

I INTRODUCTION

Reader-response criticism is defined as a school of literary theory that considers the reader a medium through which a text achieves actual existence and gains complete meaning through the reader's interpretation. In general, under this theory, critics claim that for understanding a text, one must consider the processes that readers use to create their own meaning and experience. One of such critics is Wolfgang Iser (1926-2007), who, in his essay *Interaction Between Text and Reader*, talks about such areas of a plot wherein the reader can get confused and hence, can fill them up with his/her interpretations. He calls these areas gaps or blanks.

My choice of a reader-response approach to study Toni Morrison's texts is a result of reading Iser's theory and ideas. Hence, his essay *Interaction Between Text and Reader* would be the base for my study to highlight the empty spaces and blanks in Morrison's *Beloved*, *Sula*, and *The Bluest Eye*.

Analysis

In the use of epic themes for her works, Morrison does not identify her works as feminist, although most of them typically concentrate on black women. She has stated that "it's off-putting to some readers, who may feel that I'm involved in writing some kind of a feminist tract. I don't subscribe to patriarchy, and I don't think it should be substituted with matriarchy. I think it's a question of equitable access, and opening doors to all sorts of things." [1] Simultaneously, emotional, close, strong, and unconditional bonds exist between Morrison's female characters, but again, lesbianism does not seem to be exposed by her

because every single character is heterosexual, as Barbara Smith rightly says in her critical essay "Towards a Black Feminist Criticism." She writes, "In both the works, *The Bluest Eye* and *Sula*, relationships between girls and women are essential, yet, at the same time physical sexuality is overtly expressed only between men and women. (...) Consciously or not, Morrison's work poses both lesbian and feminist questions about Black women's autonomy and their impact upon each other's lives." [2]

On this basis, we can recognize the uncertainty of Morrison's intention in constructing her stories. On the one hand is Morrison's denial. On the other hand are her women characters: bold and central. Such a situation matches up to the idea of the two poles of a literary work proposed by Iser in the essay, which "we might call the artistic and the aesthetic: the artistic pole is the author's text and the aesthetic is the realization accomplished by the reader." [3] This applies both to the ending and the beginning of a text because a reader develops not only a certain image of the text before reading it but also a highly dissimilar view after reading it. Therefore, we can say that the title *Beloved* is to a large extent a marker of a love story; however, after reading it, one realizes its actual meaning. Furthermore, as a reader, when it came to my knowledge that the story is based on a real-life story of a lady called Margaret Garner, my interpretation of the text as a purely fictional work changed. Along these lines, in consideration of Morrison's *Sula*, it can be argued that *Sula* means peace literally, but Morrison's *Sula* has a very messy, aggressive, and disturbed life. And thus, the

An Investigation on the Effect of Asymmetry in Pushover Analysis by Seismic Interpretation

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ABSTRACT

Pushover analysis is a static, nonlinear procedure in which the magnitude of the structural loading is incrementally increased in accordance with a certain predefined pattern. It helps in evaluating the real strength of the structure. With the increase in the magnitude of the loading, weak links and failure modes of the structure are found. Structural asymmetries are commonly found in constructions. In this paper an attempt is made to study the applicability of Pushover Analysis to frames having different types of asymmetries with seismic interpretation and developing a method for arriving at failure loads based on spectral stiffness and to take care of asymmetries in PO analysis. Reference graphs developed yield the accurate results for the effect of asymmetry without doing pushover analysis repeatedly for different asymmetries. A need for interpretation in terms of seismic loads exists as it will help in assessing damage and rehabilitation methods on site, without resorting to sophisticated analysis. It gives indicators on safety of the frame with asymmetry, with the original frame designed for a specific zone. In this study SAP2000, a state-of-the-art, general purpose, three dimensional structural analysis program, is used as a tool for performing non linear static analysis.

KEYWORDS: Pushover analysis, Seismic Interpretation, Seismic Loads.

I. INTRODUCTION

Structural asymmetries play a vital role in catastrophe during earthquakes. This is commonly found in construction due to design requirement, damage of a component due to age or excess load, settlement of foundation. Analytical methods are broadly classified as linear static, linear dynamic, nonlinear static and nonlinear dynamic analysis. In these the first two is suitable only when the structural loads are small and at no point the load will reach to collapse load. During earthquake loads the structural loading will reach to collapse load and the material stresses will be above yield stresses. So in this case material nonlinearity and geometrical nonlinearity should be incorporated into the analysis to get better results. Non Linear Static analysis or Push-over analysis is a technique by which a computer model of the building is subjected to a lateral load of a certain shape (i.e., parabolic, triangular or uniform). The intensity of the lateral load is slowly increased and the sequence of cracks, yielding, plastic hinge formations, and failure of various structural components is recorded. The performance criteria for pushover analysis are generally established as the desired state of the building, given roof-top displacement amplitude. The non-linear static analysis is then revisited to determine member forces and deformations at target displacement or performance point. Base shear versus top displacement curve of the structure, called pushover curves, are essential outcomes of pushover analysis. The generation of

the pushover curve also provides the nonlinear behaviour of the structure under lateral load. Capacity spectrum is the seismic interpretation of pushover curve. In this paper an attempt is made to develop a method to provide seismic interpretation of the frame incorporate with the effect of asymmetry parameters using spectral stiffness. It includes development of curves for variation in spectral stiffness – defined as spectral acceleration/spectral displacement. (as mass remains constant) with respect to the normal frame for the asymmetry cases. Thereby to check whether the frame which is designed and safe in one zone will continue to be safe with asymmetry using the results of the original frame.

II. LITERATURE REVIEW

De La Llera and Chopra (1995) studied on the design of torsionally insensitive structures, i.e. structures with an arrangement of stiffness elements adequate for the control of torsional deformations. Michael Mehrain and Farzad Naeim (2003) presented a modelling technique by which a complete three dimensional structural analysis of a structure can be performed using two-dimensional models, and hence 2-D software. The approach includes the effect of torsion, walls perpendicular and inclined to the direction of motion as well as walls with L, T, and H shapes in plan. The method can be used with linear and nonlinear analysis. Applied technology council; California; (1996) had conducted studies on nonlinear behaviour of

CO₂ Scrubbing Concrete Roads

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ABSTRACT:

An experimental investigation was carried out to evaluate capacity of concrete roads to absorb carbon dioxide using natural zeolite (NZ). To overcome serious climate change, deep reduction in CO₂ emission will be required in next coming years. Global warming can be control by the CO₂ absorption technique. Global warming is caused by large greenhouse gases (CO₂, NH₄, etc.) emission by human activities. In construction sector, CO₂ emission dominantly occurs from cement production. Capturing of CO₂ from source, from polluted air and reducing atmospheric CO₂ concentration by using Zeolite material and Zeolite sand. Concrete roads with Zeolite as coat can absorb large quantity of CO₂. By coating Zeolite material on the concrete roads absorbs CO₂ from the atmosphere hence it will be eco-friendly as well as beneficial to the environment. Absorb CO₂ and reduces the air pollution, Keep environment clean and full of oxygen. Zeolite. This material is easily available. The direct partial replacement of cement by zeolite resulted in the slight decrease of compressive strength, especially the early strength and tensile splitting strength. Study of effect of zeolite on the strength of concrete made in this study by Choosing M30 Grade of Concrete and Replacement of Cement With 25% of zeolite and Also Project Conducted Compressive Test and Acid Attack Test.

Keywords-Experimental Study, Absorption, CO₂, M40 Concrete, Zeolite

I. INTRODUCTION

Zeolites occur naturally but are also produced industrially on a large scale. As of September 2016, 232 unique zeolite frameworks have been identified, and over 40 naturally occurring zeolite frameworks are known. Every new zeolite structure that is obtained has to be approved by the International Zeolite Association Structure Commission and receives a three letter designation. It is also possible to produce zeolite structures that do not appear in nature. Zeolite A is a well-known example. Since the principal raw materials used to manufacture zeolites are silica and alumina, which are among the most abundant mineral components on earth, the potential to supply zeolites is virtually unlimited. Zeolites are widely used as ion-exchange beds in domestic and commercial water purification, softening, and other applications. In chemistry, zeolites are used to separate molecules (only molecules of certain sizes and shapes can pass through), and as traps for molecules so they can be analyzed. Zeolites are also widely used as catalysts and sorbents. Their well-defined pore structure and adjustable acidity make them highly active in a large variety of reactions. Zeolites have the potential of providing precise and specific separation of gases, including the removal of H₂O, CO₂ and SO₂ from low-grade natural gas streams. Other separations include noble gases, N₂, O₂, Freon and formaldehyde.

II. HISTORY

On-board oxygen generating systems (OBOGS) and Oxygen concentrators use zeolites in conjunction with pressure swing adsorption to remove nitrogen from compressed air in order to supply oxygen for aircrews at high altitudes, as well as home and portable oxygen supplies. Global warming resulted from the emission of greenhouse gases has received widespread attention. Among the greenhouse gases, CO₂ contributes more than 60% to global warming because of its huge emission amount. The CO₂ concentration in atmosphere now is closed to 400 ppm which is significantly higher than the preindustrial level of about 300 ppm. To mitigate global warming, Kyoto Protocol urges 37 industrialized nations and European Union to reduce their greenhouse gas emissions to a level of 5.2% on average lower than those of 1990 during the period of 2008 to 2012. Copenhagen Accord also requests the global temperature increase be limited to 2°C above the pre-industrial level by 2100. International Energy Agency (IEA) pointed out to achieve the ± 2°C goal, CO₂ capture and storage (CCS) technology is required and the contribution would be 19% in 2050. It is therefore essential to develop the CCS technologies to cope with the global demand of CO₂ reduction. Among these technologies, chemical absorption using aqueous alkanolamine solutions is proposed to be the most applicable technology for CO₂ capture before 2030.

A Survey on Visual Content-Based Video Indexing and Retrieval

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ABSTRACT Video indexing and retrieval have a wide spectrum of promising applications, motivating the interest of researchers worldwide. This paper offers a tutorial and an overview of the landscape of general strategies in visual content-based video indexing and retrieval, focusing on methods for video structure analysis, including shot boundary detection, key frame extraction and scene segmentation, extraction of features including static key frame features, object features and motion features, video data mining, video annotation, video retrieval including query interfaces, similarity measure and relevance feedback, and video browsing. Finally, we analyze future research directions.

Index Terms— Feature extraction, video annotation, video browsing, video retrieval, video structure analysis.

I. INTRODUCTION

MULTIMEDIA information indexing and retrieval [44] are required to describe, store, and organize multimedia information and to assist people in finding multimedia resources conveniently and quickly. Dynamic video is an important form of multimedia information. Videos have the following characteristics: 1) much richer content than individual images; 2) huge amount of raw data; and 3) very little prior structure. These characteristics make the indexing and retrieval of videos quite difficult. In the past, video databases have been relatively small, and indexing and retrieval have been based on keywords annotated manually. More recently, these databases have become much larger and content-based indexing and retrieval are required, based on the automatic analysis of videos with the minimum of human participation. Content-based video indexing and retrieval have a wide range of applications such as quick browsing of video folders, analysis of visual electronic commerce (such as analysis of interest trends of users' selections and orderings, analysis of correlations between advertisements and their effects), remote instruction, digital museums, new search analysis [96], intelligent management of web videos (useful video search and harmful video tracing), and video surveillance. It is the broad range of applications that motivates the interest of researchers worldwide. The following two examples of research activity are particularly noteworthy. 1) Since 2001, the National Institute of Standards and Technology has been sponsoring the Annual Text Retrieval Conference (TREC) Video Retrieval Evaluation (TRECVID) to promote progress in video analysis and retrieval. Since 2003, TRECVID has been independent of TREC. TRECVID provides a large scale test collection of videos, and dozens of participants apply their content-based video retrieval algorithms to the collection [260], [263], [266]. 2) The goal of video standards is to ensure

compatibility between description interfaces for video contents in order to facilitate the development of fast and accurate video retrieval algorithms. The main standard

for videos are the moving picture experts group (MPEG) and the TV Anytime Standard [254]. There exist many investigations that adopt the MPEG7 to extract features to classify video contents or to describe video objects in the compressed domain [78].

A video may have an auditory channel as well as a visual channel. The available information from videos includes the following [66], [67]: 1) video metadata, which are tagged texts embedded in videos, usually including title, summary, date, actors, producer, broadcast duration, file size, video format, copy-right, etc.; 2) audio information from the auditory channel; 3) transcripts: Speech transcripts can be obtained by speech recognition and caption texts can be read using optical character recognition techniques; 4) visual information contained in the images themselves from the visual channel. If the video is included in a web page, there are usually web page texts associated with the video. In this paper, we focus on the visual contents of videos and give a survey on visual content-based video indexing and retrieval.

The importance and popularity of video indexing and retrieval have led to several survey papers, which are listed in Table I, together with the publication years and topics. In general, each paper covers only a subset of the topics in video indexing and retrieval. For example, Smeaton et al. [263] give a good review of video shot boundary detection during seven years of the TRECVID activity. Snoek and Worring [262] present a detailed review of concept-based video retrieval. They emphasize semantic concept detection, video search using semantic

Lipreading with Local Spatiotemporal Descriptors

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ABSTRACT—Visual speech information plays an important role in lipreading under noisy conditions or for listeners with a hearing impairment. In this paper, we present local spatiotemporal descriptors to represent and recognize spoken isolated phrases based solely on visual input. Spatiotemporal local binary patterns extracted from mouth regions are used for describing isolated phrase sequences. In our experiments with

817 sequences from ten phrases and 20 speakers, promising accuracies of 62% and 70% were obtained in speaker-independent and speaker-dependent recognition, respectively. In comparison with other methods on AVLetters database, the accuracy, 62.8%, of our method clearly outperforms the others. Analysis of the confusion matrix for 26 English letters shows the good clustering characteristics of visemes for the proposed descriptors. The advantages of our approach include local processing and robustness to monotonic gray-scale changes. Moreover, no error prone segmentation of moving lips is needed.

Index Terms—Lipreading, local binary patterns, spatiotemporal descriptors, visual speech recognition.

INTRODUCTION

It is well known that human speech perception is a multi-modal process. Visual observation of the lips, teeth, and tongue offers important information about the place of pronunciation articulation. A human listener can use visual cues, such as lip and tongue movements, to enhance the level of speech understanding. The process of using visual modality is often referred to as lipreading which is to make sense of what someone is saying by watching the movement of his lips. In some research, lipreading combined with face and voice is studied to help biometric identification [4], [12], [13], [21]. There is also a lot of work focusing on audio-visual speech recognition (AVSR) [2], [3], [5]–[7], [11], [14], [15], [18], [26], [27], [29], [32], trying to find effective ways of combining visual information with existing audio-only speech recognition systems (ASR). The McGurk effect [23] demonstrates that inconsistency between audio and visual information can result in perceptual confusion. Visual information plays an important

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COVID-19: Mask Crisis In India

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ABSTRACT

The arrival of the coronavirus in India, with its third month in India, forced many. The coronavirus has made many changes in the country, whether it is new health department policies and guidelines or educational material for the general public. The tragic situation has created a worldwide panic, especially in Italy and China, due to COVID-19, and India is not excluded. This has contributed to a shortage of important goods, including hand sanitizers and facemasks. Regardless of the real need, individuals choose to purchase, select and store the best available masks for themselves, leaving a massive shortage of N-95 and surgical masks for health care professionals on the market. Despite the number of health care providers and the general public advising on the use of masks, the dismay among the latter does not seem to stop. Data has been taken from various government websites, WHO int., papers, studies, released and unpublished data for the writing of this review article. Several instructions and teaching videos by national and international organisations to make homemade masks were made in an effort to curb the panic among individuals about the Mask. The N95 masks are scarce in quantity and should be left for use by health care providers, and home-made cloth masks may be used by the general public. This paper discusses the current masks available and the guidelines on the use of masks by various organisations.

Keywords: coronavirus, facemask, pandemic, policies, respirators, mask crisis, COVID-19

I. INTRODUCTION

The world got its first case of novel coronavirus also known as COVID 19 on 30th December 2019 from Wuhan city of China when a case of pneumonia from unknown origin was notified by China to the World Health Organization. ^[1,2] India registered its first corona virus-positive case on 30th January 2020 from Kerala. ^[3] The WHO declared the coronavirus infection as a public health emergency of international concern on 30th January 2020. ^[2] By 8th April 2020 the country had registered 5194 cases (4643 active cases, 401 cured/discharged, 149 deaths and migrated). ^[4]

With the exponential rise of cases in India, the panic among people regarding the essential items has been seen. ^[5] Despite the nationwide address by the honorable prime minister of India regarding the list of things that will remain operational during the 21 days lockdown the people are still apprehensive about the COVID 19 pandemic and are making every effort to hoard the things which have led to a shortage of some of the things such as face mask, hand sanitizers, etc. ^[6,7]

From time to time the Advisories by World Health Organization, Government of India and Ministry of Health and Family Welfare has been there on the internet and social media groups for educating the

people regarding the containment of the

spread of transmission of Coronavirus infection. The WHO has released advice regarding basic protective measures against new coronavirus which includes washing hands frequently, maintaining social distancing of 1 meter, avoiding touching eyes, nose and mouth, practicing respiratory hygiene and seeking medical care in case if one has a fever, cough and difficult breathing. ^[8]

Sources for review articles:

The authors have tried their best search for the authentic data to be reviewed and published for adding to the existing knowledge regarding the use of the mask in COVID 19 pandemic. Following sources were taken into consideration while writing the current review paper such as, the website of Ministry of Health and Family Welfare, Government of India, website of World Health organization, the website of Centre for Disease Control and Prevention, advisories by the Government of India released from time to time, the website of Canadian centre for occupational health, various online newspaper for daily changes in advisories and current situation of logistics in the country.

Review of existing mask in India:

India is the second-largest populous country in the world and hence the demand for personal protective equipment in the current

Hardware/Software Co-design Approach for a DCT-Based Watermarking Algorithm

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ABSTRACT— The rapid increase in the distribution of digital multimedia data over networks creates the need for copyright protection. Watermarking is one of the techniques that can be used for this copyright protection. Many authors have proposed pure software or hardware solutions for the implementation of watermarking algorithms. In this paper we propose a hardware/software co-design approach for the implementation of the watermarking algorithm. Processes that demand high performance are implemented in hardware while those that are not computationally expensive are implemented in software. As a result, power consumption is reduced since only portion of the algorithm is implemented in hardware. In this paper we implement a DCT-based visible watermarking algorithm. Our system is implemented on a Xilinx Virtex-II Pro board. 21% of the slices were utilized with a maximum frequency of 131.092MHz

I. INTRODUCTION

With the development of new technologies, and the advent of the internet, data are now accessible to any person who knows how to use a computer. This development even though beneficial, is accompanied with problems such as the non-authorized use or reproduction of others works, and piracy. To protect their works, authors are nowadays using copyright, which is a form of protection grounded in the U.S. Constitution and granted by law for original works of authorship fixed in a tangible medium of expression. Copyright covers both published and unpublished works.

An approach for data protection is the use of watermark. A watermark is a secondary image which is overlaid on a primary image, in order to provide a means of protecting it. Digital watermarking can be divided into four different categories: visible, dual, invisible-robust, and invisible-fragile [3]. Watermarking could also be used for Fingerprinting Broadcast Monitoring and Covert Communication (Steganography).

In this paper, we present a hardware/software watermarking system implemented on an FPGA platform, using a hardware on the FPGA to run the software part, and a DCT/IDCT hardware block for the hardware part, since implementing the DCT/IDCT functionality in software would have led to a poor performance. Our system is able to embed visible information such as label and watermark into a multimedia object, in order to protect it.

RELATEDWORK

In the recent years, several multimedia watermarking technologies have been developed [1]. Few deal with hardware approach to digital watermarking. The authors in [1] and [2] presented watermarking techniques such as a DCT (Discrete Cosine Transform) domain visible watermarking for image protection and their implementations. The authors in [2] discussed a dual watermarking technique for images, in which a visible watermark and an invisible watermark are combined in order to increase the robustness of the watermarking. On the other hand, in order to increase the performance of the available watermarking techniques, the authors in [4] are proposing two different methods. The first approach consist of using the Graphics Processing Unit (GPU) available on the modern graphics cards for the complex mathematical computations, whereas the second alternative is to implement a dedicated processor chip, a coprocessor for the GPU, to accomplish the task. There are several factors that encourage designers to opt for a hardware implementation. The authors in [5] explained that hardware watermarking solution is often more economical because adding the watermarking component takes up a small dedicated area of silicon. The authors in [6] and [8] emphasize the advantages of a hardware implementation by introducing a new approach to watermarking on the FPGA board. The use of FPGA as design tool is also emphasized in [7] where, due to its low-cost, its flexibility, adaptability, reprogrammability and speed is preferred over other tools. In [8], a real-time watermarking processor for 2d-DWT (2-

Photonic crystal fiber is a future paradigm in the field of medical Science

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ABSTRACT

The present communication presents a noteworthy application pertaining to biomedical application related to the generation of 16 types of different laser beams which has been applying in various medical operations now-a-days. The said laser beams have been created with the help of single photonic structure where photonic structure deals with the plasmonic based photonic crystal fiber (PCF) with having 5×5 periodic air holes with defect at centre. The principle of generation of surgical laser beams relies on both physics and mathematics of photonic crystal fiber in such a way that physics deals with structure and configuration of proposed PCF including lattice spacing and diameter of air holes where mathematics manipulates with plane wave expansion method to find out the electric field distribution in the fiber. Finally the outcomes of the works disclose that suitable configuration of plasmonic structure with respect to green signal generates different type of laser beams which could be used for bio-medical application.

Keywords: Photonic crystal fiber; biomedical laser; plasmonic material; plane wave expansion method

I. INTRODUCTION

Nevertheless the research on science and technology is burgeoning in hasty manner now-a-days, research related to medical field needs to improve in swift manner to solve various problems for the necessity of society. To envisage the same, the field of electronics via vis biotechnology and bioscience have been focused by the researchers from both government and non-government sectors. Again considering the medical diagnosis, the field of optoelectronics and laser technology revolution is the investigation of diagnosis and clinical medicine. Further moving to laser based light wave technology, it brings contact free and keeps little impact in the integrity of living matter, which can easily be deployed for medical operation [1]. Furthermore the advanced optical technologies such as femtosecond laser have been used now-a-days to detect and monitor the cellular biochemistry, integrity of organs and characterizes the tissues. Moreover the optical tags have been used to make the label DNA cells and the properties of blood. Again the hi-tech laser technology have been deployed now-a-days to make the diagnosis the structure of retina and optic nerve of human body. Apart from this the optical coherence tomography has been employed in medical science to detect the precise information of retina vessel and its pigments of epithelium and choroid etc. Furthermore the photonics with endoscopic technology evaluate the dysfunction of swallowing and phantom. Asidethis, lasertechnology have been extensively used for the sake of medical therapy

and operation to minimize the complication. To realise the above said medical diagnosis and medical operation, the different types of laser beams such as gas laser (excimer ArF, ArCl, XeCl, XeF), solid state laser (KTP/Nd: YAG, Ruby, Alexandrite, Te: sapphire, Ho: YAG, Er: YAG), semiconductor laser (GaAs) and free electron laser have been generated in this research. As far as the applications of above said laser is concerned, gas lasers deal with the many surgical applications related to ionizes molecule in tissues, ophthalmology and UV radiation etc. Similarly solid state laser is concerned, it deals with medical applications related to human skin, ophthalmologist (retina), controlling of haemoglobin, removal of tattoos and hair follicles, urology, pulmonology, gastroenterology and implant treatment etc have been made using the aforementioned laser. Beside this, different types of bio-medical applications such as ablation of tissues in ophthalmology, wound healing and neurosurgery etc [2]. To understand the same lucidly, the current paper discloses a figure 1, which explains the wavelength and its applications of the aforementioned lasers; Keeping the importance of above said application the present paper presents the method of generation of such kind of lasers with the help of single photonic structure which deals with photonic crystal fiber. Further the current works

Corporate Social Responsibility & Corporate Sustainability in special reference to India

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ABSTRACT:

Corporate social responsibility is the heart of business practices in today's era. It can be defined as "The persisting commitment by business to behave ethically and achieve its development by improving the standard of life of its labour force and their families as well as of the local community and society at large". We all have responsibilities towards society, community and country. Same forms the very base of corporate responsibility. It is a voluntary act of the companies. It can be said that the main aim of a business organization is to keep people happy i.e. the Society. If this end is not achieved, it cannot survive for long. Today it is being exercised at both national and international level as merits of providing CSR programmes is being realized at large.

In today's context, concept of Corporate social responsibility has been widened from mere profit making formula to economic and social development of society and to encourage affirmative action through its behavior on the environment, consumers, employees, communities, stakeholders and all other members of the society.

This article reviews the different definitions of corporate social responsibility (CSR) and corporate sustainability (CS) used over time to reveal points of difference and congruence between the two terms. Management literature uses both CSR and CS to refer to social and environmental management issues, but there is no clear distinction between the two terms. The aim of the paper is to expose the role of CSR in country's development.

Keywords: Corporate Social Responsibility, Corporate Sustainability, Sustainable Development,

I. INTRODUCTION:

India being among the top 5 economies of the world at present has challenges to mitigate its rising social burden and burgeoning income inequality along with huge pressure on its natural resources and the environment.

It is the responsibility of every individual as well as institutions in the country to work and contribute to address this issue. In view of the gathering, world wide momentum regarding CSR, sustainable development and the initiative being taken on various fronts by different organizations, it has become incumbent to highlight the developments that are taking place and understand the initiatives undertaken by Indian Corporate sector so as to raise the level of awareness and focus of those lagging behind.

CSR aims to embrace responsibility for corporate actions and to encourage a positive impact on the environment and stakeholders including consumers, employees, investors, communities, and others. CSR is a means to sort out problems to some extent because business is a part of society. Earning more and more profits is a natural phenomenon of every business unit but social responsibility is an obligation to the people living inside and outside the business organizations. Business comes in contact with

various groups of society such as owners, employees, customers, government, suppliers etc. The responsibility of business, which includes satisfaction of these parties along with the owner, is called social responsibility of business.

SD (Sustainable Development) is a development that meets the needs of the present without compromising the ability of future generations to meet their own needs. It contains within it two key concepts: the concept of "needs", in particular the essential needs of the world's poor, to which overriding priority should be given; and the idea of limitations imposed by the state of technology and social organization of the environment's ability to meet present and future needs.

In recent years, the discussion about sustainability has risen above average. In an international context, the number of articles focusing on these subjects has increased year by year and the terms Sustainable Development (SD) and Corporate Social Responsibility (CSR) have become popular. Often visible differentiation between these terms is made. This leads to a very broad and unspecified discussion about this topic.

II. LITERATURE REVIEW:

Corporate Social Responsibility:

Grid Connected Rooftop Solar Pv- Building the Future of Clean Energy

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ABSTRACT

While the Jawaharlal Nehru National Solar Mission (JNNSM) opened up the solar electricity sector in India, the focus has primarily been on large-scale grid-connected power plants. With the drastic fall in prices of solar photovoltaic (PV) modules and balance of systems (BOS) Roof top PV(RTPV) systems can offer substantial benefits in terms of providing peaking supply of power, reducing T&D losses, improving tail end voltages, and creating local jobs. Roof top PV system is ideally suited for India, since it is socially equitable, economically viable, and environmentally sustainable (through the use of solar PV, a renewable resource in the grid-connected mode, thus avoiding the use of batteries). In this paper, we discuss the need for and advantages of emphasizing rooftop PV with net-metering as a self consumption power source in India, especially in large cities.

I. INTRODUCTION

Renewable energy resources have attracted public, governmental, and academic attention due to the global energy crisis. An important technical challenge is the integration of renewable resources into the existing utility grid such that reliable power is injected without violating the grid codes and standards. There is an increasing focus on the development of solar energy in India for a variety of reasons, including our limited conventional energy reserves, their local environmental and social impacts, energy security, and climate change and energy access. Rooftop PV (RTPV) systems are PV systems installed on rooftops of residential, commercial or industrial premises. The electricity generated from such systems could either be entirely fed into the grid at regulated feed-in-tariffs, or used for self consumption with the net-metering approach. A net-metering mechanism allows for a two-way flow of electricity wherein the consumer is billed only for the 'net' electricity (total consumption – own PV production) supplied by the DISCOM. Such RTPV systems could be installed with or without battery storage, and with one integrated net meter or two separate meters (one for export to grid and one for consumption). SOLAR INDIA IN VISION OF JNNSM

The National Action Plan on Climate Change also points out: "India is a tropical country, where sunshine is available for longer hours per day and in great intensity. Solar energy, therefore, has great potential as future energy source. It also has the advantage of permitting the decentralized distribution of energy, thereby empowering people at the grassroots level". Based on this vision Jawaharlal Nehru National Solar Mission was launched under the brand name "Solar India". India

is endowed with abundant solar energy, which is capable of producing 5,000 trillion kilowatts of clean energy. Country is blessed with around 300 sunny days in a year and solar insolation of 4-7 kWh per Sq. m per day. If this energy is harnessed efficiently, it can easily reduce our energy deficit scenario and that to with no carbon emission. Many States in India have already recognised and identified solar energy potential and other are lined up to meet their growing energy needs with clean and everlasting solar energy. In near future Solar energy will have a huge role to play in meeting India's energy demand.

The Mission adopted a 3-phase approach, spanning the period of the 11th Plan and first year of the 12th Plan (up to 2012-

PV'S ON BUILDINGS

For commercial buildings, the use of PVs may significantly influence the geometry, positioning and orientation of the building to maximize their viability. For domestic properties there is normally a part of the building, usually the roof that lends itself to the location of PVs. However, if the opportunity exists it is worth thinking about the building design where it can be 13TH as Phase 1, the remaining 4 years of the 12th Plan (2013-17) as Phase 2 and the 13th Plan (2017-22) as Phase 3. At the end of each plan, and mid-term during the 12th and 13th Plans, there will be an evaluation of progress, review of capacity and targets for subsequent phases, based on emerging cost and technology trends, both domestic and global.

The selection of Solar PV projects of 500 MW capacity was decided to be undertaken in two batches over two financial years of Phase 1 i.e., 2010-2011 and 2011-2012. The size of PV projects

A Novel Control Strategy for Hybrid Ac/Dc Micro Grid Systems

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ABSTRACT: The smart grid design aims to provide overall power system monitoring, protection and control strategies to maintain system performance, stability and security. This paper develops control strategies for smart hybrid micro grid systems. A hybrid AC/DC micro grid is simulated and integrated to the AC system with appropriate control capability. The converter control strategies for grid connected and islanding mode are presented. A real-time energy management algorithm in hybrid micro grid systems is proposed to evaluate the effects of using energy storage resources and their use in mitigating heavy load impacts on system stability and operational security. MATLAB/SIMULINK is used to create and simulate the proposed system.

Key words: Hybrid power systems, micro grid, power management strategies, smart grid.

I. INTRODUCTION

The smart grid concept is currently prevailing in the electric power industry [1-5]. The objective of constructing a smart grid is to provide reliable, high quality electric power to digital societies in an environmentally friendly and sustainable way. The dc micro grid has been proposed [6]-[7] to integrate various distributed generators. One of the most important features of a smart grid is the advanced structure which can facilitate the connections of various ac and dc generation systems, energy storage options, and various ac and dc loads with the optimal asset utilization and operation efficiency. To achieve these goals, power electronics technology plays a most important role to interface different sources and loads to a smart grid. A hybrid ac/dc micro grid is proposed in this paper to reduce processes of multiple reverse conversions in an individual ac or dc grid and to facilitate the connection of various renewable ac and dc sources and loads to power system. Since energy management, control, and operation of a hybrid grid are more complicated than those of an individual ac or dc grid, different operating modes of a hybrid ac/dc grid have been investigated. The coordination control schemes among various converters have been proposed to harness maximum power from renewable power sources, to minimize power transfer between ac and dc networks, and to maintain the stable operation of both ac and dc grids under variable supply and demand conditions when the hybrid grid operates in both grid-tied and islanding modes.

II. MODELING OF COMPONENTS

A. Modeling of PV Panel:

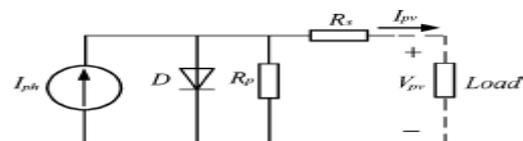


Fig. 1. Equivalent circuit of a solar cell

Fig 1 shows the equivalent circuit of a PV panel with a load. The current output of the PV panel is modeled by the following three equations.

$$I_{pv} = n_p I_{ph} - n_p I_{sat} \times \left[\exp \left(\left(\frac{q}{AkT} \right) \left(\frac{V_{pv} + I_{pv} R_s}{n_s} \right) \right) - 1 \right]$$

(1)

$$I_{ph} = (I_{sso} + k_i (T - T_r)) \cdot \frac{S}{1000}$$

(2)

$$I_{sat} = I_{rr} \left(\frac{T}{T_r} \right)^3 \exp \left(\left(\frac{qE_{gap}}{kA} \right) \cdot \left(\frac{1}{T_r} - \frac{1}{T} \right) \right) \quad (3)$$

B. Modeling of Battery:

Two important parameters to represent state of a battery are terminal voltage v_b and state of charge (SOC) as follows

$$V_b = V_0 + R_b \cdot i_b - K \frac{q}{q + \int i_b dt} + A \cdot \exp(B \int i_b dt)$$

(4)

$$SOC = 100 \quad (5)$$

inductance, is the flux linkage, u and i

A Study on Self Healing Bacterial Concrete as a Sustainable Construction Material

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ABSTRACT: The right selection of building materials plays an important role when designing a building to fall within the definition of sustainable development. One of the most commonly used construction materials is concrete. Its production causes a high energy burden on the environment. Concrete is susceptible to external factors. As a result, cracks occur in the material. Achieving its durability along with the assumptions of sustainable construction means there is a need to use an environmentally friendly and effective technique of alternative crack removal in the damaged material. Bacterial self-healing concrete reduces costs in terms of detection of damage and maintenance of concrete structures, thus ensuring a safe life time of the structure. Bacterial concrete can improve its durability. However, it is not currently used on an industrial scale. The high cost of the substrates used means that they are not used on an industrial scale. Many research units try to reduce production costs through various methods; however, bacterial concrete can be an effective response to sustainability.

Keywords: sustainable; self-healing; concrete; bacteria

I. INTRODUCTION

Rapidly developing construction, particularly in developing countries, contributes to environmental pollution, high energy consumption and natural resources. These actions have a direct impact on the comfort and health of building inhabitants [1,2]. Already in the 1970s, research was commenced into the harmful effect of building materials on users' health. As a result of these research, ecological materials were introduced, e.g., silicate blocks, materials based on gypsum binders, paints, wood, etc. These materials are intended to promote human health. Additionally, they are supposed to be of only a minimal burden to the environment. Their burden and life cycle consist of several stages. It begins with the sourcing of raw materials for their production. The next stage is operation, during which they can be renewed or preserved. The final stage is the disposal and recycling of materials. Therefore, green (sustainable) [3] building materials should be designed and used in such a manner as to minimize the sources of pollution. Throughout the life cycle of buildings and constructions [4], they should save energy and be safe for human health. The energy of building materials is an important factor for the new energy efficient building system [5]. In the European construction industry, the right choice of building materials is an important factor in achieving sustainable development [1]. The European Union promotes actions aimed at sustainable development. The priority is to reduce the consumption of energy and natural resources as well as to reduce the production of waste and pollution that may be caused by the transport of materials. Principles of sustainable development are

being introduced for the entire life cycle of buildings. This may ensure a compromise between economic, as well as environmental and social performance [6,7]. All the building designs that are being implemented should be functional with regard to increasing the durability, technical and materials performance, and to reducing the life cycle cost of the building [8]. Sustainable building materials are such materials that:

- reduce the consumption of resources;
- minimise the impact on the environment;
- do not pose a threat to human health.

These are materials that help in sustainable and escape design strategies as well as materials from companies that pursue sustainable social, as well as environmental and corporate policies.

The building materials should be investigated because they play an important role from the moment of conceiving the concept of constructing a building until the end of the building when it is to be dismantled, so that the materials might be recycled. Planners and architects, as well as engineers and builders, are researching for new materials and technologies to be used in new or future structures which will bring benefits such as energy efficiency, water resources and protection, improved air quality indoors, reduced life cycle costs and durability. In order to achieve these effects, it is important to apply the latest developments to various technologies, including the development of material studies and environmentally friendly building materials, and to achieve energy efficiency during the production of such materials. Furthermore, the inclusion of sustainable building materials in construction projects will reduce the environmental impact of building

Aesthetic And Cognitive Values Of Seamus Heaney's Wintering Out: A Fryean Approach To Selected Poems

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ABSTRACT

Purpose of the study: This study investigates the relevance of the aesthetic values to the cognitive values in the poetry of the Anglo-Irish poet Seamus Heaney 1939-2013. It examines "The Tollund Man," "Servant Boy," "Gifts of Rain" and "Limbo" from his poetry collection Wintering Out (1972), and focuses on their treatment of rebirth imagery and archetypes aiming to address their aesthetic and conceptual features.

Methodology: The study approaches the poetry of Seamus Heaney using Northrop Frye's critical archetypal approach to literature. It is based on examining the mythical aspects and archetypes of the literary text as a way to highlight its value, whether the aesthetic which is concerned with the artistic side of literature or the cognitive which is related to its epistemological value.

Main Findings: The study concludes with the assumption that Heaney's poetry, which is part of the modern poetic tradition, occasionally resorts to mythology as a way of intensifying its both aesthetic and cognitive values. The reason lies in the beauty mythology adds to the poetic creation, and the focus it sheds on the thematic features of the work.

Applications of this study: This study proposes a creative-critical model that can help the scholars of literature, particularly those who study the cognitive value of literature and the literary archetypal theory to employ while dealing with literary texts that utilize mythical archetypes so as to distinguish their aesthetic and cognitive features.

Novelty/Originality of this study: This study proposes an application of Frye's theories to Heaney's poetry which forms scholarship on Heaney, and to the best of my knowledge, hasn't examined. Besides, Frye's archetypal theory is applied in a creative way seeking to examine the mythical aspects of Heaney's poetry aiming to emphasize aspects that are not only cognitive and thematic but also cultural and aesthetic.

Keywords: Cognition, Aestheticism, Seamus Heaney, Northrop Frye, Wintering Out, Rebirth Archetypes.

I. INTRODUCTION

This study examines the relevance of the aesthetic values to the cognitive values in the poetry of the Anglo-Irish poet Seamus Heaney 1939-2013, with a focus on his poetry that employs mythical archetypes and imagery of rebirth. It approaches Heaney's poems "The Tollund Man," "Servant Boy," "Gifts of Rain" and "Limbo" from his poetry collection Wintering Out (1972) using Northrop Frye's critical archetypal theory. A great deal of Northrop Frye's critical thought is dependent on the investigation of the use of mythical imagery and archetypes in the literary work. An important site of the significance of the Fryman archetypal approach to literature is the emphasis it places on the aesthetic and cognitive values that mythology brings to the literary work where it is employed, and the inseparability of these two substantial concepts in the literary works that utilize mythology. It is against this background that the Fryean archetypal approach to literature can be purposefully applied to examine and highlight the cognitive and aesthetic significance of

any literary work that relies on mythical symbolism to convey beauty and thought.

Historical background

The aesthetic and cognitive values of poetry have been essential literary features common in poetry overages. They have acquired different names over time. The Roman poet Horace (1989) argues in *Ars Poetica* (c. 10–8 BC) that successful poetry combines particular qualities that make it "utile et dulce,"¹ meaning useful and sweet. Chaucer shows awareness of these concepts in *The Canterbury Tales* (1400) where he states in his hypothetical commentary on the best tale that it is the one demonstrating the "best sentence and most solaaas;"² in other words, it is the work that best teaches and amuses. Arnold (1882) uses the phrase "sweetness and light," signifying beauty and intelligence, to highlight the essential features of good literature. These views among others have emphasized the importance of the integration of concepts of beauty, related to aestheticism, and knowledge, related to cognition, in works of literature. As part of the global poetic corpus,

Design and implementation of Smart Greenhouse using IOT

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ABSTRACT— Greenhouse Automation System is the technical approach in which the farmers in the rural areas will be benefitted by automatic monitoring and control of greenhouse environment. It replaces the direct supervision of the human. In this paper the different papers have been reviewed and developed the proposed system based on the limitation in the present monitoring system. It also focuses on the Generic Architecture which can be applied for many other Automation Application. Greenhouse is a building where plants are grown in a controlled manner. Nowadays due to urbanization and lack of land availability there is a great need to construct the Greenhouses which will be reserved mainly for growing crops. With the advancement of technology we can control and monitor the multiple Greenhouses using IOT from the central location wirelessly.

Keywords— Arduino ATmega328, Atmospheric sensors, DC motor controlled sprinkler system.IOT.

I. INTRODUCTION

In this paper, the Design had been aimed data acquisition in greenhouse for multiple sensors to use data for simulation or processing to achieve the better enhancement of growth in greenhouse, this data has effect on the climate of greenhouse. Graphical User Interfaces (GUI) had been used through LabVIEW, firmware of arduino as software and arduino board and sensors as hardware. by using arduino mega board provides multiple inputs analogs and I/O digitals to made read data sensor easy to take temperature, humidity, CO₂ gas, also measuring the soil moisture that needed for irrigation plants and the intensity of lights that applied for greenhouse . These factors has the major effect on increase in growth of plants. Greenhouse environments monitoring different changes to parameters, the system for this purpose had been provided and given ability to control on climate of greenhouse.

The crop agriculture in greenhouse is higher affected by the surrounding conditions. The significant environmental factors for the quality and better productivity of the plants growth are temperature, relative humidity, Lighting, moisture soil, and the CO₂ amount in greenhouse. Continuous monitoring of these factors gives relevant information pertaining to the individual effects of the various factors towards obtaining maximum crop production [J. H. Shin et al., 1998]. Arduino is an open-source electronics prototyping platform based on flexible, easy-to-use hardware and software. It's intended for artists, designers, hobbyists, and anyone interested in creating interactive objects or environments. [David et al., 2007]. Arduino can sense the surroundings by

receiving input signal from a variety of sensors and can affect its environment via controlling heater, Water pump, and other actuators. The AVR Atmega2560 on the board is programmed using the Arduino programming language (depended on Wiring) and the Arduino development environment (depended on processing). Arduino projects can be stand-alone or they can communicate with software running on a computer (e.g. Flash, Processing, MaxMSP) A greenhouse is seen as a multivariable process presents a nonlinear nature and is influenced by biological processes [Herrero et al., 2007]. The five most important parameters must be taken into consideration when design a greenhouse are temperature, relative humidity, ground water, illumination intensity and CO₂ concentration. This parameters is important to realize that the five parameters mentioned above are nonlinear and extremely interdependent [Fourati et al., 2007; Blasco et al., 2007; Putter and J. Gouws, 1996]. the computer control system for the greenhouse involves the series steps [Melrolho, 1999]:

1. Acquisition of data through sensors.
2. Processing of data, comparing it with desired states and finally deciding what must be done to change the state of system.
3. Actuation component carrying the necessary action.

IOT Based Design and Implementation of Smart Surveillance System using Arduino IOT

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ABSTRACT

Internet of Things offers user interoperability and connectivity between devices, systems, services, networks and in particularly control systems. This paper details the design and development of IoT based security surveillance system using Raspberry Pi Single Board Computer (SBC) with Wi-Fi network connectivity. Adding wireless fidelity to embedded systems will open up various feasibilities such as worldwide monitoring and control, reliable data storage etc. This system comprises of sensor nodes and a controller section for surveillance. Remote user alerts, video streaming, and portability are the prime features of the system. Wi-Fi enabled microcontroller processes the sensor-based events upon receiving the event notification, the controller enables the camera for capturing the event, alerts the user via email and SMS and places the video of the event on client mail. Raspberry Pi eliminates the need for a wireless transceiver module in a sensor node, thus it makes the node compact, cost- effective and easy to use. The biggest advantage of the system is that the user can seek surveillance from anywhere in the world and can respond according to the situations.

Keyword: Internet of Things (IoT), Raspberry Pi, Picamera, PIR sensor, Twilio.

I. INTRODUCTION

In today's day to day, life engineers play a crucial role and became the greatest part of our society. The aim of this proposed project is to provide security and privacy using IoT and automation which is being expanded because of straightforwardness through smart phones, internet, and wireless communication. The aim of this project is achieved by programming an embedded system (microcontroller). These embedded systems are designed to do a specific task, unlike general purpose computers. The quality of services is getting improved by automation and Internet of Things [1]. Internet of Things (IoT) is a system of interrelated computing devices, mechanical and digital machines, objects, animals or people that are provided with unique identifiers and the ability to transfer data over a network without requiring human-to-human or human-to-computer interaction [2]. Mostly used platforms for these IoT applications are Raspberry Pi and Arduino.

Raspberry Pi is a complete Linux credit card sized low price affordable computer that can provide all functionalities of a computer/laptop, at even low power consumption [3]. Arduino is no longer used in application platform due to the dispatch of Raspberry pi which provides easy use support and documentation. In this system, passive infrared ray sensor is used to trigger the motion using pyro electric principle. This principle is about detecting the change in the infrared levels emitted

by the surrounding objects. This system is developed by integrating Raspberry Pi with Pi camera and PIR sensor establishing a wireless network by transmitting a time-bounded video via Email and SMS alert through an online platform called as Twilio [4].

II. WORKFLOW

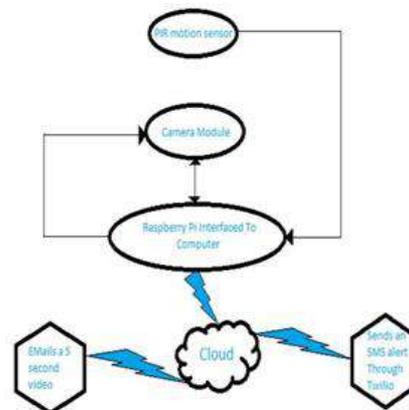


Fig.2.1: Design Flow of Proposed System

The above process is an infinite flow that starts from PIR sensor. The PIR sensor shown in the ellipse is used to detect motion. If the motion is detected the camera module starts detecting and a 5-second video is captured, E-Mailed and the process is repeated and if the motion is not detected the process is repeated [5].

Hybrid Multilayer Perceptron Back Propagation Using Channel Equalization in Neural Networks

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ABSTRACT

In most digital communication systems, bandwidth limited channel along with multipath propagation causes ISI (Inter Symbol Interference) to occur. This phenomenon causes distortion of the given transmitted symbol due to other transmitted symbols. With the help of equalization ISI can be reduced. This paper presents a solution to the ISI problem by performing blind equalization using ANN (Artificial Neural Networks). The simulated network is a multilayer feed forward Perceptron ANN, which has been trained by utilizing the error back-propagation algorithm. The weights of the network are updated in accordance with training of the network. This paper presents a very effective method for blind channel equalization, being more efficient than the pre-existing algorithms. The obtained results show a visible reduction in the noise content.

KeyWords: Blind Channel Equalization, Neural Networks, Noisy Signal, Multi Layer Perceptron, Error-Back Propagation.

I. INTRODUCTION

With the passage of time, digital communication has almost prevailed analog communication. Prominent factors behind the current situation are the escalating demand and falling prices of digital equipment. Digital communication basically includes transferring of certain digital information for instance voice, images or data from the transmitting end to the receiving end, but the data transferred should be received in the actual form [12]. Practically this cannot be achieved. ISI is one of the most influential problems faced practically in digital communication. This causes distortion to some of the transmitted symbols due to other transmitted symbols. Performing equalization on the channel can minimize the ISI. The two major reasons of ISI in a channel are as follows:

- (1) As the channel used for communication has a limited bandwidth, it causes the pulse waveform passing through it, to disperse or spread. If we consider a channel with a much larger bandwidth in comparison to the pulse bandwidth, the spread or dispersing of the pulses should be minimal. On the other hand when the bandwidth of the channel is almost same as the signal bandwidth, the spreading will exceed the symbol duration and cause the signal pulses to overlap [2-4]. This overlapping of symbols is called interference between symbols.
- (2) Multipath is a signal propagation phenomenon due to which signals may reach the receiving antenna by two or more paths. This causes the transmitted signal to be dispersed in time, which

results in overlapping of different transmitted symbols. This is also known as ISI, which can cause high error rates, if not compensated [2,4].

The ISI problem can be solved by devising a means to offset or minimize the ISI at the receiving end before detection. An equalizer can be used as a compensator for the ISI. Many equalization techniques have been proposed and implemented. In some techniques, there is a need to transmit a training sequence prior to signal transmission and some perform equalization without using a training sequence [5-6]. Studying the previous techniques showed the presence of noise even after the equalization process. This motivated us to propose a method which would reduce the noise to a minimal level. This can be achieved using ANNs, which has the advantage of accuracy and provides us with faster response. In the following section we have discussed channel equalization and its types.

II. CHANNEL EQUALIZATION AND BLIND EQUALIZATION

One of the most prominent functions for the receivers in many data communication systems is channel equalization. The requirement for data communication is that a specific analog medium be used to transmit the digital signals from the source to the receiver. Practical restraints in analog channels make them imperfect and may cause undesired distortions to be introduced [7-8]. In linearly distorted channels, the distortion can be effectively removed and compensated with the help of channel equalization. In other words inter symbol inter-

Line-Voltage-Regulators Optimization in Electric Power Quality

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ABSTRACT

The rapid expansion of distributed energy resources in the low voltage grid causes voltage limit violations, especially in rural areas with little electric load. To solve this issue without costly grid reinforcement, one approach is the use of smart devices such as line-voltage-regulators. However, the majority of these devices carry out stepped voltage adjustments, which cause a negative effect on the dynamic voltage characteristic. For this reason, this paper deals with a novel line-voltage-regulator and its power quality optimized control. The novel setup enables a continuous voltage regulation in a robust way by using variable inductors. The control design focuses on mitigating side-effects like harmonic distortion emission and increased grid impedance. Finally, a laboratory analysis evaluates the novel line-voltage regulator in comparison to a stepped one with regard to power quality.

Keywords: Line-voltage-regulation Low voltage grid Power quality Variable inductor Voltage control

INTRODUCTION

The rapid expansion of distributed energy resources (DER) in the low voltage grid and the resulting reverse power flow cause voltage limit violations [8, 22], especially in rural grids with little electric load. To keep the voltage within the limits specified by EN50160 [1], but not to slow down this expansion, the low voltage grid needs to be improved. Grid reinforcements can be partly avoided using innovative devices, such as on-load tap changers and line-voltage-regulators (LVR) [18]. These devices control the line voltage directly without changing the reactive power flow. The majority of these devices carry out stepped voltage adjustments, such as those presented in [6] and [16]. However, this type of adjustments causes rapid voltage changes and thus leads to flicker effects [5]. Further negative effects due to rapid voltage changes are motor braking/acceleration, malfunction of control systems acting on the voltage angle and impairment of electronic equipment [19]. Alternatively, LVRs can be based on power electronics to enable a continuous voltage adjustment [3, 4, 7]. These devices can be quite powerful as they have a high control speed and can compensate various voltage issues. However, these devices usually emit high frequency harmonics [7]. Furthermore, power electronics have a relatively high failure rate [23]. Therefore, more maintenance and repairs have to be expected, which leads to high operating costs.

In this context, the InLiNe project analyzed the use of variable inductors (VI) as a novel technique for LVRs. The VI technique can merge a continuous voltage adjustment with a robust, cost effective design by avoiding power electronics. However, in a naive design the device

increases the grid impedance and emits harmonic distortions. To mitigate these effects an improved setup is constructed in laboratory [11]. Building on the constructed setup, this paper focuses on a control approach that provides a power quality (PQ) optimized operation. The control approach enables a continuous voltage regulation and mitigates the side effects of the novel LVR. To identify a suitable controller, a detailed model is constructed that considers the nonlinear behavior of the setup. A laboratory analysis validates the control system and evaluates remaining side effects with regard to PQ. Moreover, the results are compared to a measured, stepped voltage-regulation to illustrate the advantages of the continuous voltage-regulation.

All in all, this paper provides the setup and the controller development for a novel, PQ optimized LVR, which can be an effective application for the

The Impact of Foreign Direct Investment on External Debt of India: An Empirical Analysis

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ABSTRACT

Capital formations have always been a challenge for the developing country. They are unable to generate sufficient resources over and above their consumption requirement during the initial phases of their economic development. As a result, they look for help from external sources in order to overcome the vicious circle of low capital formation and growth. Even if internal resources are sufficient for the development needs of a country, foreign capital is imminent for importing of improved machinery and technology. So, foreign capital fulfills the twin objectives i.e. generation of capital formation and foreign exchange for developing countries.

India, a developing country, whose gross domestic investment is low, requires good amount of foreign capital for its growth and development. Out of different sources of foreign capital, foreign direct investment and external debt play very important role as they contribute significant portion of the required capital. FDI usually takes the form of capital inflows, plants and machineries, know-how and the investors take the advantage of market, natural and physical resources, infrastructure and economic environment of the recipient countries, whereas the external debt help the recipient country in fulfilling the short term and long term project finance. At the same time, excess reliability of external debt affects the sovereignty of the recipient country.

In this context, the research article will focus on the importance of FDI in downsizing the external debt in India.

Key words: Capital formations, foreign exchange, FDI, external debt.

I. INTRODUCTION

Among the developing countries India continues to be less vulnerable with its external debt indicators, comparing well with other indebted developing countries. However, among BRICS economies, India is at fourth position after China, Brazil, and Russia in terms of the total debt stock and in third position in terms of the share of short term debt to total debt. The basic reason for which India could maintain external debt within manageable limit is the prudent external debt policy and Foreign Direct Investment Policy pursued by the Government of India. As per the RBI, at end-March 2018, India's external debt witnessed an increase of 12.4 per cent over its level at end-March 2017, due to continuous rise in commercial borrowings, short-term debt and non-resident Indian (NRI) deposits. Apart from that external debt is also increasing on account of valuation loss resulting from the depreciation of the US dollar against major currencies. Most importantly, the external debt to GDP ratio stood at 20.5 per cent at end-March 2018, higher than its level of 20.0 per cent at end-March 2017.

The major facts pertaining to India's external debt:

- India's external debt was placed at US\$ 529.7 billion, recording an increase of US\$ 58.4

billion over its level at end-March 2017 vis-à-vis March 2018,

- The depreciation of Indian rupee vis-à-vis major currencies (viz., euro, SDR, Japanese yen and pound sterling) has reached to US\$ 5.2 billion.
- The major component of external debt has been rapid change of commercial borrowings with a share of 38.2 per cent, followed by NRI deposits (23.8 per cent) and short-term trade credit (19.0 per cent).
- The long-term debt (with original maturity of above one year) was placed at US\$ 427.5 billion, recording an increase of US\$ 44.3 billion over its level at end-March 2017.
- The share of long-term debt (original maturity) in total external debt at end-March 2018 was 80.7 per cent, lower than its level of 81.3 per cent at end-March 2017.
- The share of short-term debt (with original maturity of up to one year) in total external debt increased to 19.3 per cent at end-March 2018 from 18.7 per cent at end-March 2017.
- The short-term debt on a residual maturity basis (i.e., debt obligations that include long-term debt by original maturity falling due over the next twelve months and short-term debt by original maturity) constituted 42.0 per cent of total external debt at end-March 2018 (41.6 per cent at end-March 2017).

Augmenting Gas Turbine Performance through Inlet Air Cooling

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ABSTRACT. The improvement in gas turbine power plants by integrating a mechanical chiller to it for cooling the inlet air is the prime objective of this study. The bucket cooling method adopted in this study to cool the turbine buckets has been chosen as film cooling. The selected input parameters have been varied to analyze the power plant output and efficiency at varying conditions and then select the best alternative which will help the design engineers. The integration of mechanical chiller significantly augments the plant output and efficiency. This improvement is more pronounced in hot and humid climates. It was observed that as the compressor inlet temperature is reduced the bucket coolant mass flow rate decreases and the mass of fuel energy input increases. The increase in specific work and efficiency is calculated to be 14.59 % and 4.46 % respectively when the ambient temperature drops to 283K. The work ratio increases with increase in value of ratio of inlet temperatures (r_{IT}) upto 5.6 after which it starts decreasing. There is an optimum r_{IT} at any pressure ratio ($r_{p,c}$) at which the work ratio is maximum. The heat rate increases with increase in r_{IT} and decrease in $r_{p,c}$.

Keywords: Mechanical Chiller; film blade cooling; gas turbine performance; inlet-air cooling; ambient;

I. INTRODUCTION

One of the major parameter that effects the performance of gas turbine plant is inlet air cooling. As the inlet air temperature increases not only that we suffer a reduction in gas turbine performance but also the pollutants increases. Since the benefit of reducing the inlet air cooling is multifold, the technique has been widely adopted in the power plant industries and is further investigated in this study. The most significant and well-known technique to cool the inlet air of the gas turbine is cooling with: absorption chillers, Mechanical chillers and evaporation systems

Gord and Dashtebayaz [1], suggested that the performance and efficiency of gas turbine can be improved by using turbo-charger. In that approach, a comparative study between a common air cooling and a turbo-air cooling method using turbo-expanders has been portrayed. The mechanical efficiency of a plant can be increased using a mechanical Chiller where as efficiency in electricity production enhanced significantly high by using turbo-expander as reported. According to Popliet. al [2], an absorption cooling system integrated with a conventional evaporative coolers and mechanical vapor compression chillers powered by waste heat produces better power output. A gas turbine of evaporative cooling system, power output and energy efficiency has been enhanced by 4.2% and 1.6% respectively. In comparison, in a vapor absorption cooling, an

increase of 23.2% by power output and 13% by energy efficiency has been reported. However, vapor compression cooling established an annual saving of 2MW electric power.

Gas turbines used in plants, mostly faced an adverse effect in power output when ambient temperature increased. It has been reported that gas turbine power generation declined 15% of the rated power when the ambient temperature increased from 15⁰ C to 36⁰ C [3]. In order to compensate such power loss, new technology has been introduced. Inlet air cooling is regarded as a promising method for improving gas turbine efficiency up to 30% at one third cost of new turbine and half that of a peaking plant.

Inlet air cooling techniques to gas turbine during combined cycle was addressed a subject matter to improve plant efficiency. Najjar et al[4] investigated on inlet air chilling effect in gas turbine by introducing a cooling coil and reported that the turbine output improved by 10% and 18% during cold humid conditions and hot humid conditions respectively. Amell and Cadavid [5] have discussed the effect of the relative humidity on the atmospheric air-cooling thermal load, for gas powered thermal station installed in Colombia, when implementing cooling techniques such as: vapor compression and ice storage. G Srivastava and R Yadav [6] investigated collaboratively on the influence of relative humidity on the performance of a combined cycle using vapor

Experimental Detail Of Resonant Raman scattering Effect On Various Cross Section By using Synchrotron Radiation

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Introduction

At incident photon energies in the vicinity of the L_i ($i=1-3$) sub-shell absorption edge-energies for a given element, the near-edge processes such as X-ray absorption fine structure (XAFS/EXAFS) [1] and the resonant Raman scattering (RRS) [2] becomes predominant. The RRS occurs at energies just below the absorption edge energies and the XAFS just above the absorption edge energies. At the incident photon energies slightly less than (a few eV) the shell / sub-shell binding energy, the RRS process proceeds by creation of a virtual hole in the respective shell / sub-shell (intermediate state) with the corresponding electron excited to an unoccupied state. This virtual hole is filled by some outer shell / sub-shell electron thereby resulting in emission of a photon having energy equal to the difference between the final and initial holes states. Different theoretical aspects of the RRS process are discussed elsewhere [3]. The experimental data on the L_i ($i=1-3$) sub-shell RRS cross sections are scarce [4]. The reported RRS cross sections were measured for a few medium Z elements only at single incident photon energy using quasi monochromatic photon beams. In the present work, the differential cross sections for the (L_i-S_j) ($i=1-3$ and $S_j=M_1, M_4, M_5, N_4$) RRS peaks have been measured at different incident photon energies slightly less than (a few eV) the L_i ($i=1-3$) absorption edges of ^{74}W .

2. Experimental Details

The present measurements were performed using the micro-focus X-ray fluorescence beam-line (BL-16) of INDUS-2 synchrotron radiation facility. The salient features of BL-16 beam-line and details of the X-ray fluorescence (XRF) setup are given elsewhere [5]. The electron storage ring at INDUS-2 was operated at 2.53 GeV with a nominal current of 100 mA. A Si (111) double crystal monochromator (DCM) capable of tuning the photon energy in the range 4-15 keV with energy resolution $\sim 10^{-3}-10^{-4}$ was used to obtain a monochromatic photon beam of desired energy on the sample position. The target holder was placed at 45° with respect to the incident beam direction.

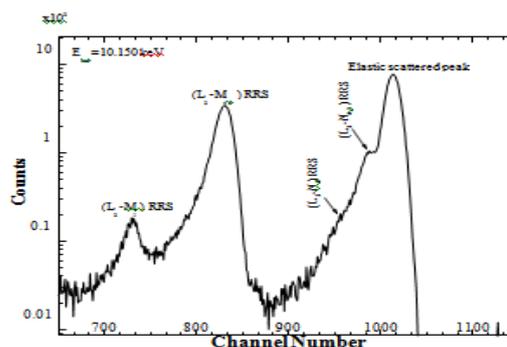


Figure 1: A typical spectrum of ^{74}W target at 10.150 keV incident photon energy (64 eV below the L_3 edge energy) depicting the L_3 sub-shell RRS peaks.

The monochromatic beam was allowed to pass through an ionization chamber (aperture size: 10 mm \times 6 mm; FMB OXFORD, UK) before reaching the target in order to monitor the incident photon beam intensity (I_0). The X-ray detector was placed at 90° with respect to the incident beam direction. Spectroscopically pure self-supporting ^{74}W metallic foil of thickness 96 mg/cm² procured from Sigma-Aldrich was used as the target. The fluorescent/scattered X-rays emitted from the target were detected using a Vortex-EX90 silicon drift detector (50 mm² \times 350 m, FWHM \sim 140 eV at 5.89 keV, Be window thickness \sim 1 mil, SII Nano Tech. Inc., USA) coupled to a digital pulse processor (XIA LLC, USA). At 10.150 keV incident photon energy (64 eV below the L_3 edge) the observed (L_3-S_j) ($S_j=M_1, M_4, M_5, N_1$ and $N_{4,5}$) RRS peaks are shown along with the elastic scattered peak in Figure 1. It may be mentioned that the energies of different (L_i-S_j) RRS peaks have been determined as $(E_{inc}-E_{S_j})$, where E_{inc} represents the incident photon energy (below the L_i sub-shell absorption edge) and E_{S_j} , the binding energy of the sub-shell containing the final hole.

Medicinal Herbs and Hydroponics

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Abstract: Increased population, sub urbanization of forest, improper agricultural practices like excessive use of pesticides and fertilizers have lead to the decrease in fertility of the soil. Also due to the global warming and climate changes there is a very less rain fall which has lead to water scarcity. Apart from these problems the forest remains the only source of many herbal medicines and we find it difficult to get these herbal plants because of the urbanization of the forest. As a solution for the above mentioned complications hydroponics is said to be a better alternative. Hydroponics is the soil less growth of plants in which water mixed with nutrients is used for the cultivation of plants. Hydroponics has been used for the cultivation of food crops in western countries. As the consumption of herbal medicine is increasing worldwide, hydroponics can be used for the cultivation of medicinal plants without losing its originality and medicinal values. This method of cultivation will decrease the necessity to relay on forest as the only source for herbal medicine. The hydroponics is considered to be a costly approach so we are planning to build a cost efficient system having a better yield. We have chosen three plants for this study namely Karisalankanni, Siriyangai, and Marigold. We are also planning to build a cost efficient hydroponic system. We have designed natural media for the hydroponics suitable to grow the plants.

Keywords: Hydroponics, Vermicompost Extract, Cattle shed soil Extract.

I. Introduction

In 20th century, there was an immense growth in the field of agriculture due to the advent of many useful equipment and various agriculture practices. On the other hand, human civilization and population explosion started to exploit various resources which play essential role in agriculture such as water, land etc. Due to rapid industrialization, the environment was greatly affected which made the fertile land to be not suitable for any sort of cultivation. To overcome these conflicts we have to develop a new trend that would make agriculture to be carried out in a most efficient manner. One such method is Hydroponics. Hydroponics is soilless agricultural practice in which the plants were grown in a medium consisting of nutrient solution. The word “Hydroponics” was first coined by Dr. W. F. Gericke in 1936. This term was derived from two Greek words „Hydro” and „ponos” in which „hydro” means water and „ponos” means labor. The first commercial practice of hydroponics was done by Dr. W. F. Gericke for growing tomatoes, lettuce and some other vegetables. The major advantages of hydroponics are as follows: a) More product yield can be obtained when compared to traditional agriculture practice, b) Usage of chemical pesticides and fertilizers can be prevented, c) Soil borne diseases can be eliminated, d) Comparatively healthy and fresher products can be obtained, e) Water scarcity can be overcome, f) No need for larger space for cultivation as like traditional practice and g) Plants will get balanced supply of air, water and nutrients[1]. Apart from the advantages, there are some limitations associated while employing hydroponics [1]. They are as follows: a) The investment is very high while adopting for a commercial purpose, b) A constant supply of water is needed for some type of systems, c) Constant power supply is needed in case of some flowering plants and d) Commercial scale requires well trained technicians. In traditional agricultural practice, the field medicinal herbs and plants were grown along with the food crops. Those people used those herbs for medicinal value. These herbs can provide permanent cure but takes long time. In the last century, a conventional medicine called molecular medicine was introduced and they can target the protein or the enzyme associated with the particular ailments. These conventional medicines can exhibit rapid cure of diseases but they are not said to be a permanent cure. It also has some side effects. But during the past decade people again started to practice folk herbal medicines. Nowadays, these herbs have a great demand among the markets. So, we should take some measures regarding these issues. Hydroponics can do some miracles with the development of medicinal herbs [1]. There are different types of hydroponic system available commercially in markets. They are simple wick system, water culture, ebb and flow system, drip system (recovery/non recovery), Nutrient Film Technique (NFT) and aeroponic system. In this background, a hydroponics system was developed with natural means. It was planned to grow the medicinal herbs such as a) Ecliptaprostrata, b) Andrographispaniculata and c) Tagetes erecta in a hydroponics system which was designed in-house

A Study on Particle Swarm Optimization in Wireless-Sensor Networks

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Abstract—Wireless-sensor networks (WSNs) are networks of autonomous nodes used for monitoring an environment. Developers of WSNs face challenges that arise from communication link failures, memory and computational constraints, and limited energy. Many issues in WSNs are formulated as multidimensional optimization problems, and approached through bioinspired techniques. Particle swarm optimization (PSO) is a simple, effective, and computationally efficient optimization algorithm. It has been applied to address WSN issues such as optimal deployment, node localization, clustering, and data aggregation. This paper outlines issues in WSNs, introduces PSO, and discusses its suitability for WSN applications. It also presents a brief survey of how PSO is tailored to address these issues.

Index Terms—Clustering, data aggregation, localization, optimal deployment, particle swarm optimization (PSO), Wireless-sensor networks (WSNs).

I. Introduction

WIRELESS SENSOR networks (WSNs) are an emerging technology [1] that has potential applications in surveillance, environment and habitat monitoring, structural monitoring, healthcare, and disaster management [2]. A WSN monitors an environment by sensing its physical properties. It is a network of tiny, inexpensive autonomous nodes that can acquire, process, and transmit sensory data over wireless medium. One or more powerful base stations serve as the final destination of the data. The properties of WSNs that pose technical challenges included dense ad hoc deployment, dynamic topology, spatial distribution, and constraints in bandwidth, memory, computational resources, and energy.

WSN issues such as node deployment, localization, energy-aware clustering, and data aggregation are often formulated as optimization problems. Traditional analytical optimization techniques require enormous computational efforts, which grow exponentially as the problem size increases. An optimization method that requires moderate memory and computational resources and yet produces good results is desirable, especially for implementation on an individual sensor node. Bioinspired optimization methods are computationally efficient alternatives to analytical methods. Particle swarm optimization (PSO) is a popular multidimensional optimization technique [3]. Ease of implementation, high quality of solutions, computational efficiency, and speed of convergence are strengths of the PSO. Literature is replete with applications of PSO in WSNs. The objective of this paper is to give a flavor of PSO to researchers in WSN and to give a qualitative treatment of optimization problems in WSNs to PSO researchers in order to promote PSO in WSN applications.

The rest of this paper is organized as follows: PSO and its relative advantages are briefly outlined in Section II. Sections III-V discuss applications of PSO in optimal deployment, localization, clustering, and data aggregation (also referred to as data fusion). In each of these sections, a specific WSN issue is introduced and a brief description of how PSO is applied to address the particular issue is presented.

Finally, a projection of future PSO applications in WSNs and concluding remarks are given in Section VII.

PSO: A BRIEF OVERVIEW

A. PSO Algorithm

PSO models social behavior of a flock of birds [3]. It consists of a swarm of candidate solutions called particles, which explore an n -dimensional hyperspace in search of the global solution (n represents the number of optimal parameters to be determined). A particle i occupies position $X_{i,d}$ and velocity $V_{i,d}$ in the d th dimension of the hyperspace, $1 \leq i \leq N$ and $1 \leq d \leq n$. Each particle is evaluated through an objective function $f(x_1, x_2, \dots, x_n)$, where $f: \mathbb{R}^n \rightarrow \mathbb{R}$. The cost (fitness) of a particle close to the global solution is lower (higher) than that of a particle that is farther.

PSO strives to minimize (maximize) the cost (fitness) function. In the global-best version of PSO, the position

where the particle i has its lowest cost is stored as $(pbest_{i,d})$. Besides, $gbest_d$, the position of the best particle. In each iteration k , velocity V and position X are updated using (1) and (2). The update process is iteratively repeated until either an acceptable $gbest$ is achieved or a fixed number of iterations k_{max} is reached.

Study of Big data Using Data Mining

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Abstract: Big data is a buzzword, or catch-phrase, used to describe a massive volume of both structured and unstructured data that is so large it is difficult to process using traditional database and software techniques. In most enterprise scenarios the volume of data is too big or it moves too fast or it exceeds current processing capacity. Despite these problems, big data has the potential to help companies improve operations and make faster, more intelligent decisions. This paper presents a HACE theorem that characterizes the features of the Big Data revolution, and proposes a Big Data processing model, from the data mining perspective. This data-driven model involves demand driven aggregation of information sources, mining and analysis, user interest modeling, and security and privacy considerations.

Keywords: Big Data, Data Mining, Heterogeneity, Autonomous Sources, Complex and Evolving Associations

I. Introduction

Dr Yan Mo won the 2012 Nobel Prize in Literature. This is probably the most controversial Nobel prize of this category. Searching on Google with “Yan Mo Nobel Prize,” resulted in 1,050,000 web pointers on the Internet (as of 3 January 2013). “For all praises as well as criticisms,” said Mo recently, “I am grateful.” What types of praises and criticisms has Mo actually received over his 31 year writing career? As comments keep coming on the Internet and in various news media, can we summarize all types of opinions in different media in real-time fashion, including updated, cross-referenced discussions by critics? This type of summarization program is an excellent example for Big Data processing, as the information comes from multiple, heterogeneous, autonomous sources with complex and evolving relationships, and keeps growing. Along with the above example, the era of Big Data has arrived [29,34,37]. Every day, 2.5 quintillion bytes of data are created and 90 percent of the data in the world today were produced within the past two years [26]. Our capability for data generation has never been so powerful and enormous ever since the invention of the information technology in the early 19th century. As another example, on 4 October 2012, the first presidential debate between President Barack Obama and Governor Mitt Romney triggered more than 10 million tweets within 2 hours [46]. Among all these tweets, the specific moments that generated the most discussions actually revealed the public interests, such as the discussions about Medicare and vouchers. Such online discussions provide a new means to sense the public interests and generate feedback in real-time, and are mostly appealing compared to generic media, such as radio or TV broadcasting. Another example is Flickr, a public picture sharing site, which received 1.8 million photos per day, on average, from February to March 2012 [35]. Assuming the size of each photo is 2 megabytes (MB), this requires 3.6 terabytes (TB) storage every single day. Indeed, as an old saying states: “a picture is worth a thousand words,” the billions of pictures on Flickr are a treasure tank for us to explore the human society, social events, public affairs, disasters, and soon, only if we have the power to harness the enormous amount of data. The above examples demonstrate the rise of Big Data applications where data collection has grown tremendously and is beyond the ability of commonly used software tools to capture, manage, and process within a “tolerable elapsed time.” The most fundamental challenge for Big Data applications is to explore the large volumes of data and extract useful information or knowledge for future actions [40]. In many situations, the knowledge extraction process has to be very efficient and close to real-time because storing all observed data is nearly infeasible. For example, the square kilometer array (SKA) [17] in radio astronomy consists of 1,000 to 1,500 15-meter dishes in a central 5-km area. It provides 100 times more sensitive vision than any existing radio telescopes, answering fundamental questions about the Universe. However, with a 40 gigabytes (GB)/second data volume, the data generated from the SKA are exceptionally large. Although researchers have confirmed that interesting patterns, such as transient radio anomalies [41] can be discovered from the SKA data, existing methods can only work in an offline fashion and are incapable of handling this Big Data scenario in real time. As a result, the unprecedented data volumes require an effective data analysis and prediction platform to achieve fast response and real-time classification for such Big Data. The remainder of the paper is structured as follows: In Section II, we propose a HACE theorem to model Big Data characteristics. Section III summarizes the key challenges for Big Data mining.

Optimizing Electrical Power with Artificial Neural Networks and Genetic Algorithm

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Abstract: In this paper the power consumption of an A.C. induction motor was optimized. To achieve this, various parameters of motor and outputs were obtained through tests by using artificial neural network, the relations between input and output parameters were determined. Subsequently, for obtaining the minimum energy consumption with the maximum output, the parameters were optimized in three cases of maximum load, without load and average load (50% of the load capacity) using the genetic algorithm. Finally, the input parameters optimized values were entered into the trained model and optimized power values were calculated. The obtained values were tested in practice in all three cases and it was observed that the presented method could predict the optimized power for three cases of maximum load, without load and average load with 4.5% of accuracy.

Keywords: Electrical Motor-Neural Network-Genetic Algorithm-Optimization -Power Consumption

I. Introduction

Application of electrical motors for accurate systems is increasing day by day in the present world. Considering the competitive conditions, designing systems which consume minimum energy and have maximum output seems to be of significance. Since producing and testing such motors are costly, using methods which consume minimum time and cost are being considered. By using artificial neural networks and genetic algorithm, electrical motors are one of the most common torque systems for various systems, because they can achieve high torque in a very compact size, they are easy to control and they are very low in noise and air pollution.

A.C. Electrical motors are most used for industrial control systems and also some home appliances. The main beneficial points of these Electrical motors are their simple and tenacious design, low cost, low maintenance cost and also they use a full connection to power supply simply. But in some cases because of their high level of energy consumption, they are not so popular. One of the basic issues is the high current intake in the rudiment torque gaining period, which is directly relevant to the Electrical motor's energy consumption.

To solve such problems, the relationship between non-linear parameters and their effects should be clearly detected. Defining the effect of effective parameters in power consumption and torque by taking advantage of the Neural Networks, due to their ability in modeling of complex processes, is strongly recommended. But sometimes these neural networks may be a little hard to use and may not be economical, due to the huge amount of data needed to train and test of neural networks. In most situations that even analytical methods are not able to build relevant models, neural network will be beneficial. Determining the regulatory parameters for taking the lowest energy is crucial in order to have Electrical motor's with maximum power output. Using the genetic algorithm to optimize these parameters, suits the situation because it has a very simple structure and it is useful for calculating the optimum outcome. There have been lots of research activities in the field of optimizing Electrical motors parameters. For example Bagden Prymak et al. [1] minimized the energy wastage by considering the speed and torque. M. W. Turner et al. [2] have optimized the energy consumption of an Electrical motor by 20%, only by using a phase logic based system, as a result they have shown that the electrical motor's energy intake has been reduced into 80% of what was taken earlier, and the shaft rotation speed was controlled by 0.5 RPM deviation.

A. Betka et al. [3] have optimized a photovoltaic pump, which uses a 3-phase Electrical motor, only by utilizing SQP (a non-linear algorithm) and Matlab software. MR. Seydi Vakkas Ustun et al. [4], optimize the Electrical motor by 15% of the nominal power, by taking advantage of the genetic algorithm. MR. Spiegel et al. [5], showed the usage of the Expert systems in accordance with Electrical motor. MR. Fang Lin Lou et al. [6], have researched the effective parameters in Electrical motor's energy consumption. In most cases, the used tools were complex and the effect of two close parameters (like motor's controlling voltage and constant voltage) were not of much consideration. Regarding this point, in this article, controllable A.C. Electrical motor energy consumption optimized by voltage by a Neural network and Genetic Algorithm. To do so, different levels of input data were calculated, and a combination of inputs were programmed with regard to the two levels of no-load and full-load network, and with the help of trained network the output level of energy was

Cuckoo Search: A Classification Technique a study

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Abstract: Data classification is one of the major tasks in data mining that organizes data in the proper manner to provide enhanced functionality to extract useful information from that data. There are various supervised and unsupervised machine learning techniques like FNN (Fuzzy Neural Network) presented by the researchers to provide an enhanced classification of the dataset. But the performance of the classification highly depends on the selection of the parameters, which is used to classify the dataset. Enhanced subset of parameters can provide enhanced classifiers to classify data. There are various optimization techniques like ACO (Ant Colony Optimization) and some others which are used to provide optimized parameters to classify data. But Cuckoo search is an optimization technique which provides a simple and easy functionality to optimize parameter rather than the other techniques. A review over the various hybrid classification techniques which are used to classify and also uses Cuckoo Search based parameter optimization technique, is presented in this paper. It shows that Cuckoo Search provides enhanced and easy tune with other techniques to enhance performance of the classification. A BDT-SVM and Cuckoo Search based technique is presented for the future to provide enhanced classification for the data.

Keywords: Classification, Cuckoo Search, Machine Learning, Fuzzy neural Network.

I. Introduction

Classification is the process of categorizing the data. In nature, data is present in heterogeneous form thus proper categorization of the data is required to provide better performance for extracting useful information from the data. In machine learning, data classification is the problem of categorizing dataset into various classes or subsets used to perform various data extraction tasks, for that a training dataset or a predefined classified dataset is used to provide better classification for the new observations. Algorithms which are used to classify the data are known as classifiers. The performance of the classifiers depends on the selection of the parameters. Optimized parameters are required to generate better classifiers for the data.

There are various parameter optimization techniques like particle swarm optimization, Ant colony optimization, and Bee colony optimization etc. are present in nature which used to provide optimized parameter to classify the data and generate optimized classifiers. But these techniques do not have easy adaptability to the other technique which degrades the performance of the whole system.

A. Cuckoo Search

Cuckoo search is a parameter optimization technique which came into existence in 2009. The obligate brood parasitism of some cuckoo species inspired this technique. These birds lay their eggs in other bird's nest. Some host birds can recognize that egg; in that case these birds either throw that egg or simply leave their nest and construct a new one.

Cuckoo Search is mainly based on three rules:

1. Each cuckoo lays one egg at a time, and dumps its egg in a randomly chosen nest;
2. The best nests containing high quality of eggs will carry over to the next generation.
3. The number of available host's nests is constant, and the host bird discovers the egg laid by a cuckoo with probability p . Discovering operates on some set of worst nests, and discovered solutions dumped from further calculations.

Levy Flight: Levy flight is a random walk in which step length is distributed according to the heavy tailed probabilities. The random walk can be linked similarity between cuckoo's egg and host's egg. Here the step size determines how far a random walker can go for a specified number of iterations. The generation of Levy step size is often tricky, and a comparison of three algorithms (including Mantegna's) was performed by Leccardi who found an implementation of Chambers et al.'s approach to be the most computationally efficient due to the low number of random numbers required.

The new solution generated will be too far away from the old solution (or may jump out side of the bounds) if s is too large. Such a move is unlikely to be accepted. And if s is too small, the change is too small to be significant, and therefore such search is not efficient. Thus a proper step size is important to maintain the search as efficient

Cuckoo Search: A Classification Technique a study

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Review Study of Web Data Mining Techniques and Tools

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Abstract: Web data mining is usually a technique of data mining which is utilized for serving web-based applications by using web data over World Wide Web. It is a technique of retrieving information over the World Wide Web that contains web based documents, hyper documents, web links to various web pages and other resources over the Web. It evolves three main techniques such as structure mining, content mining, and usage mining. In this paper we have been presented that how web data mining is to be used, to be implemented, and to be obtained useful information from the Web. A survey of different web data mining techniques and tools has also been shown. Further, we have been tried to identify the research domain in web data mining where further future work can be continued.

Keywords: Web Data Mining, WWW, Web Mining, Techniques, Tools

I. Introduction

Today World Wide Web (WWW) has become a complex universe as it updates regularly. WWW is basically a source of huge amount of information that provides all the needful sources of data mining [1]. WWW is a vast resource of multiple types of information in various formats which is very useful in the analysis of business progress that is very much important to stand in the competition of business now days. WWW is an online system that contains interlinked files such as images, videos, audios and other form of multimedia data [2]. Web data mining has been frequently used all over the world from a small scale business to a large scale business. This technique of data mining is used for web based applications and is the major need of each and every field. Web data mining is a term used for a technique, through which various web resources are used for collecting the useful information that makes it easy for an individual or a company for utilizing these resources and information in their best interest. One of the important challenges is to mine the web data as the data available on the World Wide Web is increasing continuously, thus it is difficult to retrieve information without data mining. Data Mining, usually called Web mining when applied to the Internet, is a process of extracting hidden predictive information and discovering meaningful patterns, profiles, trends from huge databases. Data mining of the World Wide Web is mainly designed for the comfort of the developers and the users of web data system. As a major source of information the web serves as a resource provider for the researchers of web data mining domain. Out of the given information deriving only the required information of data is the main target of web mining. WWW contains massive information which can be utilized easily by anyone, anywhere and anytime.

The rest of paper is organized as follows: Section II presents an overview of web data mining and its taxonomy. Section III covers literature review. Section IV describes the complete proposed methodology. Section V explores several data mining tools. Section VI provides important research issues in web data mining. Section VII concludes the paper while references are mentioned in the last.

II. Web Data Mining – An Overview

In 1996, Etizoni [3] was the first person who has introduced the term Web mining. He initially started by making a hypothesis that information on web is sufficiently structured and outlines the subtasks of web mining. According to him web mining is the technique of extracting the required information from the World Wide Web documents and web services [3]. The World Wide Web has been serving as a huge distributed global information service centre for news, advertisements, consumers, e-commerce, education, individual, company, etc. Also, the WWW has a rich and dynamic collection of hyperlinks, hyperdocuments, providing rich source for data mining and web mining. Extracting knowledge from the web is the main task of web mining.

A. Taxonomy of Web Mining

The various web data mining techniques can be classified into the following categories, each category is shown in fig.1.

Document Clustering using GA enabled k-Means Algorithm

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Abstract: There are two important problems worth conducting research in the fields of personalized information services based on user model. One is how to get and describe user personal information, i.e. building user model, the other is how to organize the information resources, i.e. document clustering. It is difficult to find out the desired information without a proper clustering algorithm. Several new ideas have been proposed in recent years. But most of them only took into account the text information, but some other useful information may have more contributions for documents clustering, such as the text size, font and other appearance characteristics, so called visual features. In this paper we introduce a new technique called Closed Document Clustering Method (CDCM) by using advanced clustering metrics. This method enhances the previous method of cluster the scientific documents based on visual features, so called VF -Clustering algorithm. Five kinds of visual features of documents are defined, including body, abstract, subtitle, keyword and title. The thought of crossover and mutation in genetic algorithm is used to adjust the value of k and cluster center in the k-means algorithm dynamically. Experimental result supports our approach as better concept. The main aim of this paper is to eliminate the redundant documents and set priority to each document in the cluster. In the five visual features, the clustering accuracy and steadiness of subtitle are only less than that of body, but the efficiency is much better than body because the subtitle size is much less than body size. The accuracy of clustering by combining subtitle and keyword is better than each of them individually, but is a little less than that by combining subtitle, keyword and body. If the efficiency is an essential factor, clustering by combining subtitle and keyword can be an optimal choice. The proposed system outperforms than the previous system.

Keywords: Document Clustering; k-Means; Visual Features; Genetic Algorithm

I. Introduction

In recent years, personalized information services play an important role in people's life. There are two important problems worth researching in the fields. One is how to get and describe user personal information, i.e. building user model, the other is how to organize the information resources, i.e. document clustering. Personal information is described exactly only if user behavior and the resource what they look for or search have been accurately analyzed. The effectiveness of a personalized service depends on completeness and accuracy of user model. The basic operation is organizing the information resources. In this paper we focus on document clustering. At present, as millions of scientific documents available on the Web. Indexing or searching millions of documents and retrieving the desired information has become an increasing challenge and opportunity with the rapid growth of scientific documents. Clustering plays an important role in analysis of user interests in user model. So high-quality scientific document clustering plays a more and more important role in the real word applications such as personalized service and recommendation systems. Clustering is a classical method in data mining research. Scientific document clustering [6, 8-9] is a technique which puts related papers into a same group. The documents within each group should exhibit a large degree of similarity while the similarity among different clusters should be minimized.

In general, there are lots of algorithms about clustering [1,5,10,13], including partitioning methods [5], (k-means, k-medoids etc), hierarchical methods [16], (BIRCH, CURE, etc), density-based methods (DBSCAN, OPTICS, etc), gridbased methods (STING, CLIQUE, etc) and model-based methods, etc. In 1967, MacQueen first put forward the k-means [2-4,7], clustering algorithm. The k-means method has shown to be effective in producing good clustering results for many practical applications. However it suffers from some major drawbacks that make it inappropriate for some applications. One major disadvantage is that the number of cluster k must be specified prior to application. And another is the sensitivity to initialization. The two drawbacks of kmeans not only affect the efficiency of the algorithm but also influence clustering accuracy. There are many existing document representation approaches [11], including Boolean Approach, Vector Space Model (VSM), Probabilistic Retrieval Model and Language Model. At present the most popular document representation is Vector Space Model (VSM). The most important goal of this paper is to develop a technique which will guide the user to get desired information with proper clustering of scientific documents in web or information retrieval systems.

Review on ‘Medium manganese steels’

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The global automotive industry has been desperately striving to address the challenge of weight reduction in automobiles in order to decrease the carbon footprint and increase fuel efficiency. Since sheet steels remain as the major structural material for use in the auto-mobiles, development of stronger steels is the primary approach adopted by material scientists to meet the demands from the automotive industry, although alternative avenues to decrease the density of steels [1,2] or increase the Young's modulus [3] to counter the stiffness loss due to excessive down-gauging of steel sheets are also being investigated.

Third-generation advanced high strength steels (3GAHSS) offer the possibility of down-gauging by combining high strength with high ductility [4,5]. 3GAHSS usually contain high amounts of retained austenite (RA) in their microstructures to derive their high elongation, and also partly the strength, from the classical transformation induced plasticity (TRIP) effect emanating from the deformation-induced transformation of RA to martensite [6]. Austenite retention in steels in most processing strategies is achieved by enrichment of interstitial carbon in austenite [7–9]. However, austenite stabilisation can also be achieved through diffusion of substitutional elements such as Ni and Mn into austenite during high temperature processing. Austenite stabilisation by enrichment of Ni has been extensively studied in the past for cryogenic applications of stainless steels [10–13]. Austenite stabilisation through Mn partitioning in low carbon steels was first observed by Miller in 1970s while developing ultrafine-grained dual-phase steels [14]. Miller investigated different Mn and Ni containing steels to extend the ($\alpha + \gamma$) two phase region to relatively low temperatures to achieve ultrafine-grained microstructures from heavily cold rolled steels, and showed that it is possible to achieve high fractions of RA by an intercritical annealing treatment in an Fe–0.11C–5.7Mn (wt-%) steel (Figure 1).

In 1980s, Furukawa [15] investigated a series of Fe–C–Si alloys containing 1–5 wt-% Mn aiming for austenite retention in dual-phase steels to improve elongation and strain hardening, and found that particularly the 5 wt-% Mn containing alloys exhibited high combinations of tensile strength and elongation. In the 1990s, the same research group [16] reported detailed results on 0.1C–5Mn (wt-%) steel about the link between the RA fraction and tensile properties, the effects of annealing time and post-annealing cooling rate. Then, in the first decade of this century, Merwin [17,18] extended this work to develop both hot and cold rolled Mn-TRIP steels via batch annealing of Fe–0.1C–(5–7)Mn (wt-%) alloys.

Based on the above early research, the cheaper option of Mn addition for austenite retention has received considerable attention in the following years from both industry and academia for sheet steel development, as evidenced by a recent conference [19], special issues [20,21] and a book chapter [22] fully or partly devoted to the topic. Today, the steels where Mn content is lower than in high Mn twinning induced plasticity (TWIP) steels, but higher than usually added in low carbon sheet steels are referred to as ‘medium manganese’ steels. These steels contain approximately between 3 and 12 wt-% Mn and have emerged as candidate materials for achieving the strength–ductility combinations characteristic of 3GAHSS.

The understanding of medium manganese steels has progressed, which has been documented in review articles [23–25]. However, the full spectrum of knowledge pertaining to their alloying, microstructure evolution, structure–property relationships, effects of processing steps and post-manufacturing performance is not mature yet. Moreover, processing of medium manganese steels in industrial scale remains a challenge due to their relatively high alloy contents, albeit easier than highly alloyed second-generation advanced high strength steels (2GAHSS) such as TWIP steels or austenitic stainless steels. Thus it is necessary to advance the existing knowhow of these steels if the benefits of their high strength–ductility combinations are to be realised in practice. Furthermore, the positive effects of high amounts of RA on ductility usually found in 3GAHSS sheet microstructures also led to

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Drawback of Ultra High Strength Steel -a 3rd Generation Steel in Automotive Industry

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Abstract: Automotive industry relentlessly in a quest for higher performance of vehicles in several aspects such as increased fuel efficiency and hence reduced tailpipe emissions, improved aerodynamic and driving performance, elevated safety precautions such as crash energy absorption, etc. All these concerns should be addressed with minimal weight increase and without compromising from passenger safety. This manuscript, first gives an overview for world auto industry and projections, and then reviews benefits and problems encountered in development and implementation of high strength steels particularly in automotive industry.

Keywords: Auto steels, AHSS, formability, die wear, springback, weldability

I. Introduction

1.1 Overview auto industry

Since the first mass-produced car Oldsmobile Curved Dash in the beginning of 20th century, auto industry has made a tremendous progress as one of driving power in technological innovation. These progresses included vehicle design, manufacturing technologies, new materials, improved performance, reduced tailpipe emission etc. Today, according to Plunkett Research, there are more than 1 billion registered vehicles worldwide and USA has the highest number of vehicles (around 250 million). China is the largest producer of motor vehicles by 19.3 million (including cars, light and heavy commercial vehicles and heavy buses) in 2012. Car production constitutes 63 million out of total 84 million motor vehicle production, and Toyota is biggest manufacturer with 10.1 million motor vehicles, and followed closely by General Motors, and Volkswagen [1].

1.2 Material trends in auto industry

Since 1920's, steel has been main material in automotive industry. According to Ducker Worldwide, a market research and consulting company, the steel content in lightweight vehicles will remain at 60% levels and a slight increase is expected for aluminum use as presented in Table 1. In the meantime, most of the mild steel applications in current vehicle designs will be replaced by ultra/advanced high strength steels as can be seen in Figure 1.

Table 1. Lightweight vehicle material trend according to Ducker Worldwide (After [2,3])

Material	% Content (in 2009)	% Content (in 2015)
Ferrous based (flat steel, iron, other steels)	66.5	60.2
Aluminum	7.8	9.6
Other metals (copper, lead, zinc, Mg, platinum, titanium)	4.3	4.3
Non-metallic materials (polymers, glass, wood, rubber, coatings, textiles, and fluids)	21.4	25.9

MRR in EDM Utilizing Copper Electrode And Electrode With Negative Polarity

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Abstract: The traditional machining techniques are often incapable to machine the titanium alloy economically. Electrical discharge machining (EDM) is a relatively modern machining process having distinct advantages over other machining processes and can machine Ti- alloys effectively. This paper attempts to develop optimization model and investigate the effects of peak current, pulse on time and pulse off time on EDM performance characteristics of titanium alloy Ti-6Al-4V utilizing copper as electrode and negative polarity of the electrode. A mathematical model for correlating influence of process variables and the response of material removal rate is developed in this paper. The optimal machining set-up in favor of material removal rate is estimated and verified. Design of experiments (DOE) method and response surface methodology (RSM) techniques are implemented. Analysis of variance (ANOVA) has been performed for the validity test of the fit and adequacy of the proposed models. The obtained results evidence that the material removal rate increases with ampere and pulse on time and in contrast decreasing tendency is observed while the pulse off time increase. The result leads to desirable process outputs (MRR) and economical industrial machining by optimizing the input parameters.

Keywords: EDM, RSM, MRR, Ti-6Al-4V, Peak current, Copper, Negative polarity.

I. Introduction

The usage of titanium and its alloys is increasing in many industrial and commercial applications because of these materials' excellent properties such as a high strength– weight ratio, high temperature strength and exceptional corrosion resistance (Hascalik and Caydas, 2007). The most common titanium is the $\alpha+\beta$ type two phase Ti–6Al–4V alloy among several alloying types of titanium. In aerospace industry, titanium alloys have been widely used because of their low weight, high strength or high temperatures stability (Fonda et al., 2008). Titanium and its alloys are difficult to machine materials due to several inherent properties of the material. In spite of its more advantages and increased utility of titanium alloys, the capability to produce parts products with high productivity and good quality becomes challenging. Owing to their poor machinability, it is very difficult to machine titanium alloys economically with traditional mechanical techniques (Rahman et al., 2006).

The EDM is a well-established machining choice for manufacturing geometrically complex or hard material parts that are extremely difficult-to-machine by conventional machining processes (Ho and Newman, 2003). Its unique feature of using thermal energy to machine electrically conductive parts regardless of hardness has been its distinctive advantage for manufacturing of mold, die, automotive, aerospace and surgical components (Ponappa et al., 2010). Thus, titanium and titanium alloy, which is difficult-to-cut material, can be machined effectively by EDM (Yan et al., 2005). Proper selection of the machining parameters can result in a higher material removal rate, better surface finish, and lower electrode wear ratio (Lin et al., 2002). Several researches have been carried out for improving the process performance and for detection optimum parameters as follows. The electrical discharge machining (EDM) of titanium alloy (Ti– 6Al–4V) with different electrode materials has been accomplished to explore the influence of EDM parameters on various aspects of the surface integrity of Ti6Al4V (Hascalik and Caydas, 2007). The experimental results reveal that the material removal rate, surface roughness, electrode wear and average white layer thickness increase with the increasing of current and pulse duration. The graphite electrode is beneficial on material removal rate, electrode wear and surface crack density but relatively poorer surface finish. A study has been carried out to develop a mathematical model for optimising the EDM characteristics on matrix composite Al/SiC material (Habib, 2009). In order to obtain optimum circumstances low values of peak current, pulse off time and voltage for good surface finish and likewise high values of peak current and voltage to get high MRR and also to attain low electrode wear high pulse off time and low peak current should be used. To investigate the relationships and parametric interactions

User experience Design and its Future optimal approaches

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Abstract : *Modern business web applications are faced with rapidly changing requirements. Users can choose from a wide variety of systems and have a distinct preference when it comes to usability. The forced or required use of one single system is becoming unacceptable. So are systems with poor user experience, even if the business logic behind it is implemented well. Business users demand apps that are effective, intuitive and efficient. They must have fast performance and 24/7 availability.*

Keywords : *User Interface, Business Logic, Requirement*

I. Introduction :

User Experience (UX) has become the major reason for rejecting a system during end user tests or even worse: after go-live. Users have high expectations, based on the frequent use of social media applications, and expect the same standard for their own business systems. Users expect an easy to use interface, fast interface response time, usage on a variety of different devices, easy login and offline availability. To be able to meet these expectations, software developers require short development cycles and full test coverage to support agile development cycles, seamless support for multiple platforms and devices, secure transactions and easy decoupling from backend systems. And during operations, systems managers, need to be prepared for the unpredictable timing and growth of the visitors of business applications. In some cases the system and hosting platforms need to be able to support a burst in demand or the exponential growth of the user community without drastic changes to the application architecture. This also requires a productive development environment with massive scalability for both the number of developers and eventually the number of concurrent end users. Frameworks with an intrinsic agile capability to modify and expand the functionality with a very short time to market. We feel there is no one-size-fits-all solution for UX requirements. We see a shift from technology derived designs towards user centric designs facilitating every end user with a personalized, timely, effective interface. This kind of approach will lead to more effective, easy to use and enjoyable applications. This whitepaper gives an overview of user experience guidelines. These guidelines translate to additional UX requirements when designing and building a new user interface on modern systems. We will also discuss the two major architectural paradigms for user interface development, followed by an overview of the major frameworks and technologies used for implementing this architecture. Finally we will give a number of business examples and the preferred technology for implementing the requirements. User experience is not only about graphic design. User Experience enables end users to effectively do their job. A good user interface design is a small part of a successful user experience. The interface defines the ‘face’ of the application and the user experience defines the impression the application makes on the end user. Successful user experience leaves a pleasant impression with the user when using the application. A successful UX is often taken for granted, while a bad UX is noticed immediately. Therefore it is advisable to include UX verification and UX testing as a formal activity in your application development process.

User interface design (UID) involves interaction from users with any devices such as mouse and keyboard. It is the foremost and replaceable components of any software [1]. The aim is to produce the interface that is easy to use and easy to understand, which also meet the desires of the future users and provision users in the chores they wish to undertake [2]. UID for Web applications involve users who use the Web to complete required tasks on the Website. Web applications offer the simple interface for accessing Web facilities over the Internet [3]. UID specifies what users need in term of look and feel of a software system and what software engineers understand based on user requirements. However, sometimes software engineers develop user interfaces with little or few supports or guidance from professional user interface designers [4]. Besides, UID is an overwhelming process basic to the achievement of a software system such that planning interactive system, which is attractive, accessible, and easy to use is a challenging task [5]. Occasionally, software engineers do not have enough time to study the UID that also leads to the misunderstanding of what users want. For example, Nasir et al. [6] state that MyEG as one of the G2C Web portal has been overwhelmed with UID problem that leads to complications in using the Web portal and causes the negative perceptions on MyEG UID. UID is the design of interfaces that users can see from any devices such as computers and tablets. Galitz [7] defines UID as

Algorithms in Data Mining: Top 5

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Abstract: This paper presents the top 10 data mining algorithms identified by the IEEE International Conference on Data Mining (ICDM) in December 2006: C4.5, k-Means, SVM, Apriori, EM, PageRank, AdaBoost, kNN, Naive Bayes, and CART. These top 10 algorithms are among the most influential data mining algorithms in the research community. With each algorithm, we provide a description of the algorithm, discuss the impact of the algorithm, and review current and further research on the algorithm. These 10 algorithms cover classification, clustering, statistical learning, association analysis, and link mining, which are all among the most important topics in data mining research and development.

I. Introduction

In an effort to identifying some of the most influential algorithms that have been widely used in the data mining community, the IEEE International Conference on Data Mining (ICDM, <http://www.cs.uvm.edu/~icdm/>) identified the top 10 algorithms in data mining for presentation at ICDM '06 in Hong Kong.

As the first step in the identification process, we invited the ACM KDD Innovation Award and IEEE ICDM Research Contributions Award winners in September 2006 to each nominate up to 10 bestknown algorithms in data mining. All except one in this distinguished set of award winners responded to our invitation. We asked each nomination to come with the following information: (a) the algorithm name, (b) a brief justification, and (c) a representative publication reference. We also advised that each nominated algorithm should have been widely cited and used by other researchers in the field, and the

nominations from each nominator as a group should have a reasonable representation of the different areas in data mining.

After the nominations in Step 1, we verified each nomination for its citations on Google Scholar in late October 2006, and removed those nominations that did not have at least 50 citations. All remaining (18) nominations were then organized in 10 topics: association analysis, classification, clustering, statistical learning, bagging and boosting, sequential patterns, integrated mining, rough sets, link mining, and graph mining. For some of these 18 algorithms such as k-means, the representative publication was not necessarily the original paper that introduced the algorithm, but a recent paper that highlights the importance of the technique. These representative publications are available at the ICDM website (<http://www.cs.uvm.edu/~icdm/algorithms/CandidateList.shtml>). In the third step of the identification process, we had a wider involvement of the research community.

We invited the Program Committee members of KDD-06 (the 2006 ACM SIGKDD International Conference on Knowledge Discovery and Data Mining), ICDM '06 (the 2006 IEEE International Conference on Data Mining), and SDM '06 (the 2006 SIAM International Conference on Data Mining), as well as the ACM KDD Innovation Award and IEEE ICDM Research Contributions Award winners to each vote for up to 10 well-known algorithms from the 18-algorithm candidate list. The voting results of this step were presented at the ICDM '06 panel on Top 10 Algorithms in Data Mining.

At the ICDM '06 panel of December 21, 2006, we also took an open vote with all 145 attendees on the top 10 algorithms from the above 18-algorithm candidate list, and the top 10 algorithms from this open vote were the same as the voting results from the above third step. The 3-hour panel was organized as the last session of the ICDM '06 conference, in parallel with 7 paper presentation sessions of the Web Intelligence (WI '06) and Intelligent Agent Technology (IAT '06) conferences at the same location, and attracting 145 participants to this panel clearly showed that the panel was a great success.

Alpha Analysis of Cloud Security Enhancement Using Machine Learning Approach

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Abstract: Cloud security is usually essential for both business and personal users. Everyone desires to understand that their information is usually secure and secure and businesses possess legal responsibilities to maintain customer data secure, with particular industries having more strict guidelines about data storage. The development of impair displays no indicators of decreasing, many of businesses right now using it for at least some of their procedures. But despite developing cloud adoption, many of experts still emphasize as the main region of vulnerability within their business. Therefore, this paper talks about the need of cloud security and part of machine learning algorithms to improve the impair security.

I. Introduction

The situations of security breaches possess been rising exponentially. Some security breaches compel businesses to deactivate their websites and cellular applications temporarily, whereas others make businesses drop a significant percentage of their annual turnover [1]. No business can fight growing data breaches and cyber security problems without applying a strong impair security technique. Cyber security [2,3,4] systems create substantial quantities of data more than any human being group could ever sort through and evaluate. Machine learning technologies make use of all of this data to identify threat occasions. The more data prepared the more patterns it picks up and discovers which it after that uses to place changes in the regular pattern circulation. These adjustments could become internet risks [5]. The core security elements are depicted in figure1.



Figure 1: Security elements for Cloud data security

Design and implementation of Smart Parking using IOT

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Abstract: In the past, there have been many works done on smart parking system approach in gan even smarter system in where researches have been done and still being done to create a system which is not technologically savvy but also ease. This paper proposes a design of smart parking system where it helps the users to reserve parking slots using Android application. This project is aimed to create a system that helps people with personal vehicles to find for parking easily at selected areas. Both software and hardware platform have been developed in this system.

I. Introduction

In this current era of modern world, almost everyone owns a personal vehicle and it has become a basic need for the humans. Hence, it has been proven statistically that the usage of vehicles is increasing rapidly yearly [1]. Due to the growth, it is very difficult to find parking slots in cities, especially during the peaktime.

This creates a necessity to introduce an automated system that allows users to book their spot just by making a few clicks through a custom made Android Mobile Application. This serves to hassle free situation for each and every users. The main motivation behind the Smart Parking System is to help the drivers to find areas where parking is available in that area [2]. Prior to his expected arrival, drivers can book a slot in the area if it is available. Drivers can search the parking slot through the mobile application installed and book the available slot. Besides that, user can also view the duration of parking usage through the application and charges can be calculated through the online application sent to the user for notification. Not only this, user can opt to extend their duration by simply requesting on the application by few clicks. All you need is a working Internet.

The system works primarily on the detection of parking slots through sensors that are mounted on every parking slots which facilitates the information. Then this is then processed by microcontroller which helps to serve as a medium of communication between those peripherals or devices. The final stage would be when user uses their smart phones to retrieve the slot occupancy in selected areas prior to reservation

II. Literature Review

According to previous related works, there are several methods used to develop the system. It is highly crucial to have knowledge on the systems that have been developed in order to ensure a better enhancement of the proposed system in this project. In some studies [3], image processing is given more importance instead of sensor based system. Driver's number plate is captured by Image processing is used to capture the number plate of the drivers and the information is stored in database. This is to avoid theft and illegal car entry. The users must register first before using the Android application. This application consists of basic information of the drivers which will be stored for future references. After registration, the driver is required to select the parking location and the server will immediately process the data received and sends back the information needed to the user.

Next, an innovative approach came as a solution for the reservation traffic in where QR code is taken into account for reservation confirmation. In research paper [4] "Smart Parking System based on Reservation", states that the expansion of monetary conduct for every day com forth as rapidly increases the ratio of people who owns vehicles giving boost to busy cities traffic. This is commonly why traffic congestion and air pollution occurs. The management will system will broadcast the details on the available parking slots to drivers.

Then, the drivers will select a particular parking slot to book. As soon as the driver reserve the slot, the server generates a unique QR code and quickly sends it to the drivers. After placing the reservation, the host will demand for the QR code sent to the user to verify details sent before and let the user to use the reserved place. This code stores information such as parking charge and the availability of the slot for the both user and provider for reference. The hardware part of this system is divided into three main parts; QR scanner, server and mobile phone. Figure 1 illustrates the layout of the parking system in brief.

Design of Low-Power Truncated Multiplier for DSP Applications

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Abstract: FIR digital filter is one of the fundamental components in many digital signal processing and communication systems. In this work, a low-power finite impulse response (FIR) is designed using truncated multipliers, which consumes less power and low cost. MCMA (Multiple constant multiplication/ accumulation) in a direct FIR structure is implemented using an proposed truncated multiplier design. The MCMA module is realized by accumulating all the PP (partial products) where unnecessary PP bits (partial product bits) are removed without affecting the final precision of the outputs. Comparisons with previous FIR design approaches shows that the proposed design achieve the best area and power results. The numbers of operations used by stages are reduced in proposed truncated multiplier design. The simulation results indicate that the power is saved about 15% using truncated multiplier when compared to the conventional multiplier.

Index terms – Digital signal processing (DSP), finite impulse response (FIR), truncated multipliers, Multiple constant multiplication/ accumulation (MCMA), VLSI design.

I. Introduction

Finite impulse response (FIR) digital filter is widely used as a basic tool in various digital signal processing and image processing applications. It is also used in many portable applications with less area and power consumption. A general FIR filter of order M can be denoted as,

$$y[n] = \sum_{i=0}^{M-1} a_i x[n - i].$$

There are two basic FIR structures, direct form and transposed form, as shown in Fig. 1. In the direct form in Fig.1(a), the multiple constant multiplication (MCM)/ accumulation (MCMA) module performs the concurrent multiplications of individual delayed signals and respective filter coefficients, followed by accumulation of all the products obtained. Thus, the operands of the multipliers in MCMA are delayed input signals $x[n - i]$ and coefficients a_i .

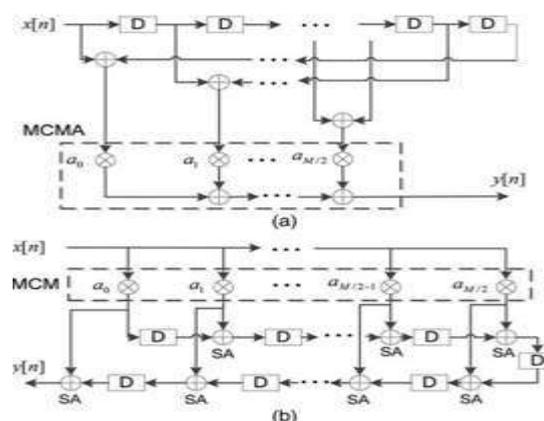


Fig.1. Structures of FIR filters: (a) Direct form and (b) transposed form.

Teeth Segmentation Analysis using Level Set Method

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Abstract: The three dimensional shape information of teeth from cone beam computed tomography images provides important assistance for dentist performing implant treatment, orthodontic surgery. This paper describes the tooth root of both anterior and posterior teeth from CBCT images of head. The segmentation is done using level set method with five energy functions. The edge energy used to move the curve towards border of the object. The shape prior energy provides the shape of the contour. The dentine wall energy provides interaction between the neighboring teeth and prevent shrinkage and leakage problem. The test result for both segmentation and 3D reconstruction shows that the method can visualize both anterior and posterior teeth with high accuracy and efficiency.

Keyword: Level set, cone beam computed tomography, tooth segmentation

I. Introduction

1.1 Related work

Dental x-rays provide two dimensional shapes of the teeth. The two dimensional view of tooth root do not provide an accurate shape. In dental treatment, the accurate shape of teeth and root plays an important role. Hence, three dimensional views of teeth used to represent an accurate spatial orientation of tooth roots which is used for dental treatments such as orthodontic treatment. The crown and root information must be clear which avoids treatment simulation. Thus we use tomography scan image. In orthodontic treatment, dentists will gradually move teeth from original position to target position. The Multi Slice Computed Tomography (MSCT) is used to obtain 3D images with high amount of ionizing radiation which may lead to cancer. Nowadays, the dentists using Cone Beam Computed Tomography (CBCT) image for treatment due to lower radiation.

There are various segmentation algorithms to extract root from the teeth. In adaptive threshold method [5] under segmentation or over segmentation problem occur due to non homogeneous intensity distribution inside teeth. Edge based segmentation methods [11] fails to segment the tooth boundary. The region based segmentation [2] fails to separate the object when region inside the region of interest has similar intensity value. The intensity distributions and edge information are combined in hybrid segmentation method [8] so tooth boundary can be easily segmented. It fails to avoid shrinking and leakage problem. The extraction of root of the teeth is designed by distance regularized level set evolution (DRLSE) [7]. This method is applied for orthodontic treatment but it fails to segment the small portion of the root [1].

The level set method [3] with five energy function is applied to segment the anterior teeth. In our proposed system we applied these energy functions for both anterior teeth and posterior teeth.

II. Energy Based approach

The adjacent teeth segmentation problem can be avoided by external edge energy which gives the desired edge of the teeth. The tooth root is segmented into tooth pulp and tooth dentine. The energy based approach computationally derives to segment the object. Figure 1 shows the methodology to segment the teeth.

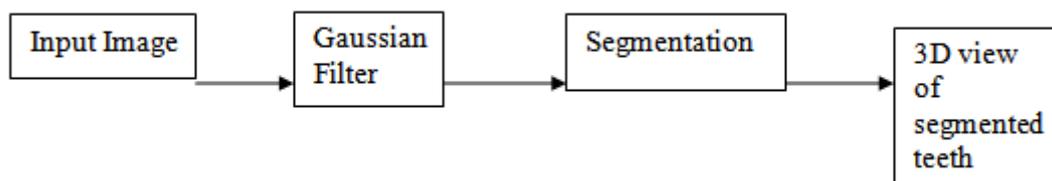


Figure 1. System model for segmenting the teeth

Simulation of A H Bridge Multilevel Inverter and its comparison with conventional H bridge Multilevel Inverter

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Abstract—In this paper, a new asymmetric topology based on cascaded H-bridge has been proposed which can generate a output voltage of 19 level using a very less component. The proposed basic unit is asymmetric in nature. It can produce the given levels by using only 12 unidirectional power switches and 3 dc sources of magnitude V, 3V, 0.5V. It is capable of generating both integral and fractional output levels. The basic unit is connected symmetrically in a cascade manner. Proposed topology is compared with other MLI topologies that have been recently developed in terms of number of switches, gate driver circuits, diodes and dc link. It is observed that this topology uses less number of components at a given level among in comparison to other topologies. Simulation of the proposed basic unit is done in MATLAB/SIMULINK. The circuit is verified for different load conditions such as R-L, L and sudden load change conditions. Total Harmonic Distortion of both output current and output voltage is also determined. This topology is found to generate output levels with very low Total Harmonic Distortion.

Keywords—asymmetric; cascaded H-bridge; total harmonic distortion; voltage level

I. Introduction

Nowadays, the application of multilevel inverter (MLI) increases significantly in different fields such as motor drive applications, renewable energy conversion systems, electric vehicle, UPS system etc due to its inherent features [1]-[4]. MLI generates staircase output voltage waveform from capacitive sources or multiple dc sources. Due to the staircase nature of the output waveform, the quality of output waveform improves and follows the near sinusoidal nature. As compared to classic two level inverters MLI has a number of benefits such as it gives improved output voltage waveform, Lower stress voltage across switch, More power handling capacity, Lower electromagnetic interference, Lower output filter size.

The classic multilevel inverter topologies are cascaded H-bridge (CHB), Diode clamped, Flying capacitor (FC). The basic version of CHB MLI come in the year of 1975 [9]. After that in 1981, the diode clamped MLI came into existence [5]-[6]. After one decade 1991, the flying capacitor MLI has been introduced [7]-[8]. In diode clamped MLI, the input voltage is split into multiple lower voltage level by capacitor bus. The different switch voltages are clamped through the diode. This inverter is very popular in industrial application due to its simple structure but above three level of output voltage, the structure requires large number of clamping diodes. Further the capacitor voltage balancing is becomes very complex as the level of inverter increase. Flying capacitor is more flexible in nature compared to DCM MLI unlike DCM, FC clamped the switch voltages by flying capacitor. This structures requires large number of flying capacitor as the output voltage level increase more than three. CHB generates multilevel output voltage waveform by adding or subtracting different dc voltage sources. This topology does not require any clamping diodes or flying capacitors. The topology is modular in nature and simple in structure but the topology requires a large number of isolated dc sources as the output voltage level increase.

To mitigate the different limitations of classical multilevel inverter topologies, the researchers are introducing different new structures of MLI in recent years. The topological improvement of classical MLIs are becomes an interesting and hot research area in the field of power electronics.

In paper [10], a new arrangement of cascaded MLI has been presented. The main advantage of this topology is that it uses only unidirectional switches to generate a particular level. Therefore, it uses of less quantity of components like IGBTs and driver circuits. The downside of this topology is that the stress voltage across switches is more. In paper [11] another new arrangements of cascaded MLI has been employed. The limitations of this topology is that only symmetric source configuration can be employed. So, to generate higher number of levels it requires more number of dc links. In paper [12] an asymmetric type MLI is presented which uses ten unidirectional switches to only generate nine output voltage level. So, for given voltage level this topology has high device count. This topology also incurs high switching losses. As this topology possess high

A Review on wide Spectrum of Waste and its Management

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Abstract: *Several studies and researches have been conducted on the sources and characteristics of wastes as well as the possible adverse effect of inappropriate handling and best international practices. One thing that is still not clear however is what exactly constitutes a waste? How much do we know about what should be classed as waste? What are the historical contexts of waste managements? The present paper seeks to examine these vital questions with a view to providing answers from previous studies. The paper employed a desktop approach to provide answers to the research objectives. Specifically, the paper uses a descriptive approach to gather information from peer reviewed publications such as, journal articles, environmental organizations reports and books. It was found that, waste is to a large extent subjective in meaning as a substance can only be regarded as a waste when the owner labels it as such. This is particularly true because one individual may regard a substance as a waste, while another may view the same substance as a resource. Nevertheless, it was argued that there is a need to clearly define what constitute wastes as this form the basis for regulation.*

Keywords: *environment, waste, wastes classification*

I. The Concept of Waste

Most human activities generate waste (Brunner and Rechberger, 2014). Despite that, the production of wastes remain a major source of concern as it has always been since pre historic period (Chandler et al, 1997). In recent times, the rate and quantity of waste generation have been on the increase. As the volume of wastes increases, so also does the variety of the waste increases (Vergara and Tchobanoglous, 2012). Unlike the pre historic period where wastes were merely a source of nuisance that needed to be disposed of. Proper management was not a major issue as the population was small and a vast amount of land was available to the population at that time. In those days, the environment easily absorbed the volume of waste produced without any form of degradation (Tchobanoglous et al, 1993).

A substantial increase in volume of wastes generation began in the sixteenth century when people began to move from rural areas to cities as a result of industrial revolution (Wilson, 2007). This migration of people to cities led to population explosion that in turn led to a surge in the volume and variety in composition of wastes generated in cities. It was then that materials such as metals and glass began to appear in large quantities in municipal waste stream (Williams, 2005). The large population of people in cities and communities gave rise to indiscriminate littering and open dumps. These dumps in turn formed breeding grounds for rats and other vermin, posing significant risks to public health. The unhealthy waste management practices resulted in several outbreaks of epidemics with high death tolls (Tchobanoglous et al, 1993). Consequently, in the nineteenth century public officials began to dispose waste in a controlled manner in order to safe guard public health (Tchobanoglous et al, 1993).

Most developed countries passed through a period when they were developing environmentally. Today, however, most of these countries have effectively addressed much of the health and environmental pollution issues associated with wastes generation. In contrast, the increasing rate of urbanisation and developments in emerging countries is now leading to a repeat of the same historical problems that developed countries have had to address in the past (Wilson, 2007).

An important question in modern day wastes management is – what exactly is a waste? Waste is the useless by product of human activities which physically contains the same substance that are available in the useful product (White et al, 1995). Wastes have also been defined as any product or material which is useless to the producer (Basu, 2009). Dijkema et al, (2000) pointed out that, wastes are materials that people would want to dispose of even when payments are required for their disposal. Although, waste is an essential product of human activities, it is also the result of inefficient production processes whose continuous generation is a loss of vital resources (Cheremisinoff, 2003).

A substance regarded as a waste to one individual, may be a resource to another. Therefore, a material can only be regarded as a waste when the owner labels it as such (Dijkema et al, 2000). Despite this subjective nature of wastes, it is important to describe clearly, what constitutes a waste because. This is because the classification of a material as a waste will form the foundation for the regulations required to safeguard the populace and the environment where the wastes are being processed or disposed of (DEFRA 2009).

An analysis of Training Need of Executive employees in special reference to Jindal Steel

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Abstract: *Business sustainability can be best maintained with competent employees who support and effectively contribute towards achievement of organizational goal. Thus competency gap of employees need immediate intervention through training. This study aims to develop a competency frame work for an operation department of an automobile parts manufacturing company. The competencies were mapped on the basis of skill relevance to perform a specific job in operation. Standard scoring was developed to evaluate four major competencies: behavioral, managerial, functional, and personnel of 37 line employees. The result indicated that there was a wide managerial competency gap and minor gaps in personnel competency. Immediate intervention for competency gap through training of the employees had helped the company to gain its competitiveness in defect-less production and enhancing service quality. The study was focused on a manufacturing unit only, whereas the research approach had huge scope to be implemented in service industries also. The paper is an original piece of study where a unique research approach has been applied to resolve training issues of manufacturing industries. The approach could be used form icrotolarge organizations.*

Keywords: *Training Need Analysis, Training, Competency Mapping and Competency Gap.*

JEL Classification: *P4, P46*

Paper Classification: *Research Paper*

I. Introduction

Employees were always considered to be most important human capital of organization. It was also observed that every organization wanted to be loaded with maximum competent employees so as to achieve its vision and mission and rapid cumulative growth rate (Bennis, 1973; Cameron, 1974). More competent employees mean more productivity. To maintain a good ratio of competent employees, many organizations do hire job-fit talents or train existing employees to make them more competent. Past researches indicated that organization's investment in training and development lead to competitive advantage (Chadwick 1986; Constable & McCormik 1987; Handy 1987; Hussey 1990). A research by Cosh, Duncan & Hughes (1998) specified that training facilitates expansion, development and also increase profitability of an organization. There were cases, which practically tested that training of existing employees was more favourable than hiring a new talent for organizations, as existing employees already know the organization culture, working pattern and their colleagues. So they could easily adjust themselves to new requirements after training and seemed to be more confident about their career growth. Thus, training need analysis played a key role for organization to motivate employees for their better career growth and performance. Misanchuk (1984) said that three main components such as competency, skill of individual and individual's training desire were required to understand training need analysis. According to Agut, Grau & Peiró (2003) study, competency mapping was vital for analysing training needs; which was defined as the gap between current and required performance (Rossett, 1987). However, gap between desired & current performance did not always require further training (Wright & Geroy, 1992). On the other hand, there were few authors who consider that performance gap arising out of skill deficiency requires training (Mitchell & Hyde, 1979; Swierczek & Carmichael, 1985; Wright & Geroy, 1992). The need for training might occur due to various reasons such as differences in values or culture (Sargent & Stupak, 1989). Rossett (1995) defined training need as a gap between current state of performance and desired state of performance, mapped after training need analysis. Few authors defined training need as gap between the degree of knowledge, skills and abilities of a person which he/she had, that did not match the standards specified for a job to perform in an effective manner (Goldstein, 1993; McEnery & McEnery, 1987). From above discussion it might be concluded that gap between present and desired state direct towards training so that gap can be minimised. According to Evarts (1988), competency mapping was a way of defining gap between the desired and current performance of employees. Reid & Barrington (1994) argued that finding the right reason for the gap is extremely

E-Waste: A Hazard to Environment

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Abstract - The current acts of e-waste the executives in India experience the ill effects of many inconveniences like suitable stock, unfortunate states of casual reusing, deficient enactment, poor mindfulness and hesitance on part of the corporate to address the basic issues included. In that capacity, these lead to harmful materials entering the waste stream with no unique precautionary measures to stay away from the known unfriendly consequences for nature and human well-being and recoverable bye-items are wasted when financially important materials are dumped or unfortunate conditions are created during the casual reusing. This paper endeavours to give a short understanding into this idea of ewaste, its age in India and the ecological and well-being concerns joined to it. Further, it features the e-waste reusing economy in the current casual and the early conventional division and the quick requirement for a progressively characterized enactment and systems to handle this issue.

Key Words: E-waste, Bye-items, ill Effects, Harmful Materials, Nature, Recoverable.

I. Introduction

E-waste comprises of wastes generated from used electronic devices and house hold appliances which are not fit for their unique intended use and are destined for recovery, recycling or removal. Such wastes encompass a wide range of electrical and electronic devices, for example, computers, handheld cellular phones, personal stereos, including large household appliances, for example, refrigerators, climate control systems etc. E-wastes contain over 1000 different substances a considerable lot of which are poisonous and potentially risky to the environment and human health. These risky substances present in e-waste affect human life a lot. E-waste or electronic waste is created when an electronic item is discarded after the end of its useful life. The fast expansion of technology and the utilization driven society results in the creation of a very large measure of ewaste every minute. The electronic business in the previous decade has developed on a very large scale, leading to more number of items in the hands of people, yet what befell the previous one which they were utilizing. Very few are concerned about this question; it is an emerging problem just as a business chance of increasing significance, given the volumes of e-waste being generated and the content of both harmful and valuable materials in them. The division of ewaste includes iron, copper, aluminium, gold and other metals in e-waste is over 60%, while plastics represent about 30% and the risky poisons comprise just about 2.70% [1]. In India, waste management was already a troublesome errand however the increasing e-waste has made it more complex to manage it properly, given the way that the majority of it considers it as a business. They take out what they need and they toss the rest with the typical waste and a large portion of it reaches to the landfills after the extraction from it which is very vulnerable to the environment just as the person who is doing it, however every one of these concerns are suppressed because money is involved in it. Ewaste from developed countries finds an easy path into developing countries in the name of free trade and is further muddling the problems associated with e-waste management. This paper features the issues and strategies associated with this emerging problem as initiatives taken in India.

II. E-Waste In India

Due to the non-accessibility of separate collection mechanism of the e- generated by obsolete or broken down electronic and electrical equipment in India has been estimated to be 1,46,000 tons per year (CII, 2006)[2-3]. Furthermore considerable quantities of e-waste are reported to be imported. However, no confirmed figures as a large portion of such trade in e-waste is camouflaged and conducted under the context of acquiring 'reusable' equipment or 'gifts' from developed countries. The government information does not recognize imports of new and old computers, TV, mobiles, printers, etc. what's more, parts thus it is hard to follow what share of imports are used electronic products.

III. Management And Impacts Of E-Waste

Unsafe materials, for example, lead, mercury and hexavalent chromium in one structure or the other are present in such wastes basically comprising of Cathode ray tubes (CRTs), Printed board assemblies, Capacitors, Mercury switches and relays, Batteries, Liquid crystal displays (LCDs), Cartridges from copying machines, Selenium drums (photocopier) and Electrolytes. Landfilling of e wastes can lead to the leaching of lead into the

Next Generation of Optical Fibers

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Abstract: In present situation, applications of optical fibers have considerably reached with great levels of research which having been focused on the development of not only new generations of optical fiber materials and designs, but also on new processes for their preparation. Here the latest developments in advanced materials for optical fibers ranging from silica, to semi-conductors, to particle-containing glasses, to chalcogenides and also in process-related innovations are discussed.

Keywords: Total internal reflection, Step Index & Graded Index, Silica-based optical fibers; Nanoparticle-doped glasses; semiconductor core optical fibers; chalcogenide optical fibers.

Optical Fiber- Communication may be defined as the transfer of information from one point (Source) to another (destination). For the information to be transmitted over a distance, a communication system is usually required.

I. Fiber-Optic System-

Communication system that uses light as the carrier of information from a source to a destination through a guided cable (glass or plastic) are called Fiber-optic system.

Optical fiber is the technology associated with data transmission using light pulses traveling along with a long fiber which is usually made of plastic or glass. Metal wires are preferred for transmission in optical fiber communication as signals travel with fewer damages. Optical fibers are also unaffected by electromagnetic interference. The fiber optical cable uses the application of total internal reflection of light. The fibers are designed such that they facilitate the propagation of light along the optical fiber depending on the requirement of power and distance of transmission. A single mode fiber is used for long-distance transmission while multimode fiber is used for shorter distances. The outer cladding of these fibers needs better protection than metal wires.

Types of Optical Fibers-

The types of optical fibers depend on the refractive index, materials used and mode of propagation of light.

The classification based on the refractive index is as follows:

- **Step Index Fibers:** It consists of a core surrounded by the cladding which has a single uniform index of refraction.
- **Graded Index Fibers:** The refractive index of the optical fiber decreases as the radial distance from the fiber axis increases.

The classification based on the materials used is as follows:

- **Plastic Optical Fibers:** The polymethylmethacrylate is used as a core material for the transmission of the light.
- **Glass Fibers:** It consists of extremely fine glass fibers.

The classification based on the mode of propagation of light is as follows:

- **Single Mode Fibers:** These fibers are used for long-distance transmission of signals.
- **Multimode Fibers:** These fibers are used for short-distance transmission of signals.

The mode of propagation and refractive index of the core is used to form four combination types of optic fibers as follows:

- Step index-single mode fibers
- Graded index-Single mode fibers
- Step index-Multimode fibers
- Graded index-Multimode fibers

How Does an Optical Fibre Work-

The optical fiber works on the principle of **total internal reflection**. Light rays can be used to transmit a huge amount of data but there is a problem here – the light rays travel in straight lines. So unless we have a straight long wire without any bends at all, harnessing this advantage will be very tedious. Instead, the optical cables are designed such that they bend all the light rays' inwards (using TIR). Light rays travel continuously, bouncing off the optical fiber walls and transmitting end to end data. Although light signals do degrade over progressing distances, depending on the purity of the material used, the loss is much less compared to using metal cables. A Fibre Optic Relay System consists of the following components:

Parameters Affecting Heat Transfer Rate in the Hydrogen Fueled Engine

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Abstract: In this work, effect of the inlet conditions for the intake charge on the in-cylinder heat transfer characteristics for port injection Hydrogen Fueled Engine H₂ICE are investigated through steady state simulation. One-dimensional gas dynamics was used to describe the flow and heat transfer in the components of the engine model. Firstly a brief demonstration for the model description was inserted; followed by the model governing equations. The engine model is simulated with variable engine speed and AFR with influence of the variation of intake charge conditions (pressure and temperature). Engine speed varied from 2000 rpm to 5000 rpm with increments equal to 1000 rpm, while AFR changed from stoichiometric to lean limit. The inlet pressure is varied from 0.95 bar to 1.05 bar with 0.05 interval and the inlet temperature varied from 290 to 310 with 10 interval. The combined effects for the intake charge conditions with variation of AFR and the engine speed on the in-cylinder heat transfer characteristics for port injection H₂ICE are presented in this paper. The baseline engine model is verified with existing previous published result. The results show that the heat transfer characteristics to be more affected by changes in the intake pressure than in the temperature. It is also found that the effect of change for the intake charge pressure disappeared for lean mixture. Beside that the acquired results are presented by examining the dependency of in-cylinder heat transfer rate on the engine speed and AFR.

Keywords: heat transfer, hydrogen fueled engine, intake conditions, port injection.

I. Introduction

As a result of the developments in the modern era, where new technologies are introduced every day, transportation's energy use increases rapidly. Fossil fuel particularly petroleum fuel is the major contributor to energy production and the prime fuel for transportation. Rapidly depleting reserves of petroleum and decreasing air quality raise questions about the future. Due to limited reserves of crude oil, development of alternative fuel engines has attracted more and more concern in the engine community. The introduction of alternative fuels is beneficial to help alleviate the fuel shortage and reduce engine exhaust emissions (Huang et al. 2006; Saravanan et al. 2007). One of the alternative energy is hydrogen. Hydrogen, as alternative fuel, has unique properties of significant advantage over other types of fuel. Hydrogen can be used as a clean alternative to petroleum fuels and its use as a vehicle fuel is promising in the effects to establish environmentally friendly mobility systems. Extensive studies were investigated on hydrogen fueled internal combustion engines (Kahraman, et al. 2007; Rahman et al. 2009; Stockhausen et al. 2000). With increasing concern about the energy shortage and environmental protection, research on improving engine fuel economy, hydrogen fueled engine is being developed into a hydrogen fueled engine with different type of fuel supply method (Eichlseder, et al. 2003; Kim, et al. 2005; Ganesh,, et al. 2008).

It is well known that the performance of an engine is influenced by the intake charge conditions. The most important intake conditions affecting gas engine performance are the intake pressure and temperature (Soares and Sodre, 2002; Sodre and Soares, 2003). But the effect of the conditions for the intake charge on the in-cylinder heat transfer is not well recognized. The aim of the research work presented in this paper is to assess the potential of inlet charge conditions (temperature and pressure) for in-cylinder heat transfer reduction of port injection H₂ICE.

II. Materials And Methods

A single cylinder port injection hydrogen fuel model was developed utilizing the GT- suite software. The injection of hydrogen was studied in the midway of the intake port. The computational model of single cylinder hydrogen fueled engine is shown in Fig. 1. The engine specifications used to make the model (A) are listed in Table 1. The intake and exhaust ports of the engine cylinder are modeled geometrically with pipes and the air enters through a bell-mouth orifice to the pipe. The discharge coefficients of the bell-mouth orifice were set to 1 to ensure smooth transition. The intake runners were linked to the intake ports with 0.04 m diameter and

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Effect of Using Biodiesel as a Fuel in C I Engine

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Abstract: Biodiesels are fuels that are made from renewable oils that can usually be used in diesel engines without modification. These fuels have properties similar to fossil diesel oils and have reduced emissions from a cleaner burn due to their higher oxygen content. The present work investigates the performance of three types of biodiesel and diesel fuels in a Mitsubishi 4D68 4 in-line multi cylinder compression ignition (CI) engine using transient test cycle. The test results that will obtain are brake power, specific fuel consumption (SFC), brake thermal efficiency and exhaust emissions. An instrumentation system also will be developed for the engine testing cell and controlled from the control room. Biodiesel was also tested against diesel fuel in Exhaust Gas Recirculation (EGR) system. Thus it is possible that biodiesel fuels may work more effectively than fossil diesel in certain applications.

Keywords: Biodiesel, CI engine, transient, Instrumentation, EGR

I. Introduction

Biodiesel, is the generic terms for all types of Fatty Acid Methyl Ester (FAME) as one among other organic renewable alternative fuel that can be used directly in any conventional diesel engine without modification. They are transesterified vegetable oils that have been adapted to the properties of fossilized diesel fuel and considered to be superior since they have a higher energetic yield been combusted in the diesel engine (Adams 1983) . Current compression ignition (diesel) engines are able to operate upon a wide range of fuels due to its specific characteristic which is internal combustion under a variety of operating conditions. In a world of resources, it seems prudence to focus upon fuels which are potentially efficient and renewable, like bio-fuels. Besides this advantage in fuel flexibility, compared to those of spark ignition (petrol) engine, diesel engine can offer better engine durability, higher thermal efficiency and more economical fuel consumption. Through centuries, diesel engine was used in many sectors such as in transportation and industries. Diesel engine is used in heavy industries, automotives, ships, locomotive, transportation such as truck and buses, and also farm equipments such as lawnmowers and tractors. The latter relates to fuel economy savings that can potentially produce less carbon dioxide (CO₂) emission. Diesel engines are therefore, part of a long term solution to global warming

Diesel engine use fossilized fuel in its combustion process. However it is estimated that the fossil fuel supply will decrease in the future. This is happens due to maximum production of the fuel which cause fuel reserve been decrease drastically to a minimum level. Eventually it leads to demand succeed supply and finally increase the fossil fuel price. Beside that fossil fuel use also leads to environmental problems such as toxic emission and releasing of harmful particles. This particulate matter (PM) generated from the unburned hydrocarbon which forms black soot. It is found that the particulates can result cancer, respiratory diseases and others that can affect the health of human (Beggs 2001). In order to solve those problems, many researchers trying to discover new technology such as solar cars, hybrid cars, hydrogen fuel cell cars and such on to replace most of the internal combustion engine including diesel engine. Even though many successful findings been recorded years ago, but still expensive in terms of cost, impractical and need better research to improvise it.

The most preferred solution is using the renewable alternative fuels that can support the diesel engine. Those alternative fuels are not been produced by the fossil fuel distillation but been extracted through a chemical process called transesterification process to produce methyl ester or ethyl ester that fueled the diesel engine without any modification. Those fuel properties similar to diesel fuel but produce less emission and same or higher performance than the diesel fuel itself.

Internal Combustion Engine Background

Internal combustion engine has been developed since 1876 when Nicolaus Otto introduce spark ignition engines and in 1911 when Rudolf Diesel presented the world with the compression ignition engine, which at that time did not have a specific fuel. Diesel claimed that the engine could be fed by vegetable oils which his engine running on peanut oil. According to Heywood (1988), internal combustion engine development is evolving due to increase knowledge on the engine operation, new technology, and the demand on new engines that less affecting the nature. In an internal combustion engine, mechanical power is generated

Application of Taguchi's Orthogonal Array and Overall Evaluation Criteria in Turning of AISI D2 Tool Steel

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Abstract Optimization of process parameters is an important technique in machining sector. In the present work, an experimental study has been performed in turning of AISI D2 steel using coated carbide tool in dry and forced air-cooled environment. Taguchi's orthogonal array L9 has been used for running the experiments considering cutting speed, feed rate and depth of cut as process parameters and surface roughness, flank wear and cutting force as performance parameters. To optimize the performance parameters together in a single setting, an overall evaluation criterion (OEC) has been used. Analysis of variance (ANOVA) and average performance value of OEC is also analyzed. It is found that from the predicted setting of the average performance value of OEC, the surface roughness, flank wear and cutting force is reduced in both dry turning (DT) and forced air-cooled turning (ACT) as compared to the optimum value obtained from the experimental run.

Keywords Taguchi's overall evaluation criteria · Dry turning · Air-cooled turning

I. Introduction

The machining operation is an important area in manufacturing sector. In order to manufacture products at competitive price, selection of proper cutting tool as well as process parameter is an important aspect. The process parameter setting plays an important role in obtaining optimum values of performance parameters. The hard machining operations can provide equivalent surface finish with grinding and better complex parts in less time and cost as compared to grinding operations. The researchers have focused mainly on machining of hard materials using coated carbide, ceramics and CBN inserts, mentioned by Bartarya and Choudhury [1]. Shao et al. mentioned the machinability of stellite 12 alloys with the application of coated and uncoated carbide tools in dry environment [2]. They suggested that the coated carbide tool was better as compared to uncoated carbide tool in minimizing flank wear. Strenkowski et al. used CBN and advanced ceramic cutting tool materials in machining hardened steel [3]. The different wear behaviors of CBN tool was studied by Chou et al. in machining of hardened AISI 52100 steel [4]. The authors reported that the performance of low CBN content tool was better in terms of surface roughness and flank wear as compared to high CBN content tool. The machinability of AISI 4340 steel and AISI D2 steel using coated carbide tool and mixed alumina insert, respectively, were studied by Lima et al. [5]. It was reported that machining of AISI D2 steel using mixed alumina inserts gave equivalent surface finish comparable to cylindrical grinding.

In machining, due to the high friction between the tool and work piece generates high strain rates. Due to this temperature, generation is high at the tool work piece junction. Generally, liquid coolants are applied at the tool work piece junction to minimize the heat as well as for lubrication purposes. Dry machining is an important aspect considering it to be environmentally friendly. Klocke and Eisenblatte worked on dry machining; Weinert et al. mentioned the concept of near-dry machining (NDM) [6, 7]. Dixit et al. mentioned the green manufacturing concepts

and its application in manufacturing area [8]. Now a day, the use of forced air-cooling is a new alternative to avoid the use of harmful coolants in machining. Sarma and Dixit studied the application of compressed air in machining of grey cast iron with mixed oxide ceramic tool [9]. Air-cooled turning was found to be better in terms of machining performances than dry turning. Similar observation was mentioned by Liu et al. [10]. The use of statistical analysis is an important tool in machining sector. The statistical tool helps in modeling and optimizing the machining parameters. Among the different statistical tool, Taguchi's optimization technique is widely used by the researchers. It helps the experimenters to give an optimal solution with less number of experiments. Panda et al. used Taguchi's L9 orthogonal array in hard turning of EN 31 steel using multilayer coated carbide inserts [11]. The authors observed feed and depth of cut as the significant parameters. Das et al. found minimum tool wear using Taguchi's L9 orthogonal array in machining AISI D2 steel with coated carbide inserts at a cutting speed of 150 m/min, feed 0.25 mm/rev and depth of cut 0.5 mm [12].

Mechanical Synthesis and Characterization of MMC with Graphite and Silicon Carbide

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Abstract - The present work deals with the preparation and mechanical characterization of aluminum 6063 metal matrix reinforced with silicon carbide and graphite. Silicon carbide and graphite can be considered in different percentages like (1+2), (3+2), (5+2). By using these materials to prepare and investigate the mechanical characteristics like ultimate tensile strength, breaking strength, Rockwell hardness, Brinell hardness, compression strength and toughness. Aluminum metal composites have various properties which makes it to be applicable into various places like automobile, military industries, aerospace, building constructions and others due to light weight, thermal properties, stiffness, high mechanical strength, corrosion resistance. During the analysis of the composite matrix of aluminum the properties / characteristic were investigated.

Key words; AMMC's, stir casting, mechanical properties aluminum 6063.

I. Introduction.

Composite:-

The composites are defined as the combinations of two or more materials which include reinforcement and matrix material, this provides the addition of some other characteristics which were not present before. The combinations of two or more material improves the properties of new material and makes it unique.

Purpose of composites;

Material properties such as weight, tensile strength, corrosion resistance, performance, thermal and electrical properties and others have been the main driving force towards development of various composite materials. Due to technological advancement and modern ways of manufacturing various products aims at providing the most economical and affordable price products hence composites addresses this problem. The utilization of Aluminum material matrix composite in aerospace and automotive industries improves the performance and they are economic.

Classification composites and reinforcement;

There are three main classification of composite materials which are ceramic matrix, metal matrix and polymer matrix composites. Fibers, flakes, particulate and whisker comes under reinforcement as shown in figure 1..

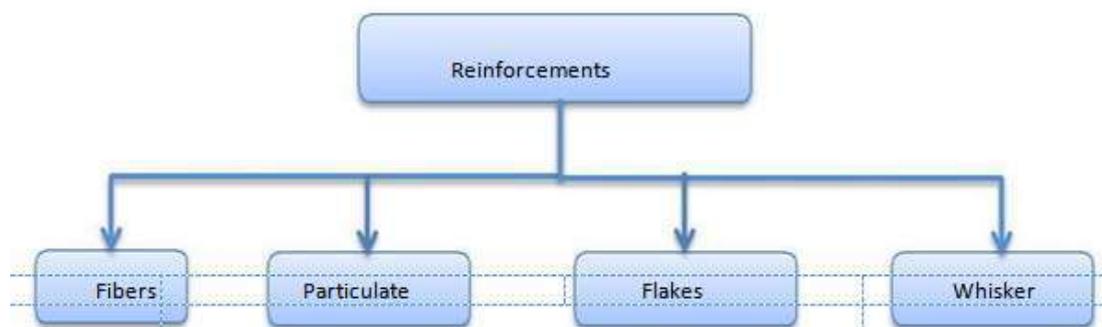


Figure 1.classification of reinforcements.

Data Mining Techniques in Weather Data Analysis

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Summary: Weather analysis has been playing its vital role in meteorology and become one of the most challengeable problems both scientifically and technologically all over the world from the last century. This study carries historical weather data collected locally at Faisalabad city, Pakistan that was analyzed for useful knowledge by applying data mining techniques. Data includes ten years' period [2007-2016]. It had been tried to extract useful practical knowledge of weather data on monthly based historical analysis. Analysis and investigation was done using data mining techniques by examining changing patterns of weather parameters which includes maximum temperature, minimum temperature, wind speed and rainfall. After preprocessing of data and outlier analysis, K-means clustering algorithm and Decision Tree algorithm were applied. Two clusters were generated by using K-means Clustering algorithm with lowest and highest of mean parameters. Whereas in decision tree algorithm, a model was developed for modeling meteorological data and it was used to train an algorithm known as the classifier. 10-fold cross validation used to generate trees. The result obtained with smallest error (33%) was selected on test data set. While for the number of rules generated of the given tree was selected with minimum error of 25%. The results showed that for the given enough set data, these techniques can be used for weather analysis and climate change studies.

Key words: Data Mining, K Mean Clustering, Decision Trees, Weather Data Analysis

I. Introduction

In present era weather forecasting and analysis has become a challenging problem around the world from the last century. The reason behind are the two main factors: Firstly, it is useful for many human activities like agriculture sector, tourism and natural disaster prevention. Secondly, due to various technological advances like the growth of computational power and ongoing improvements in measuring systems.

All over the world, major challenges faced by meteorologist are the accuracy of weather analysis and its prediction. On the other hand, researchers had tried to predict different meteorological parameters by utilizing different data mining techniques. While some of these techniques are more precise than others. Over the past few decades the availability of climate data has been increased. Such sources of climate data like observational records, understudy data, etc. makes it more important to find tools with higher accuracy rate to analyze different patterns from massive data. Therefore, meteorological data mining is a form of mining which is concerned with finding hidden patterns inside massive data available. So, the information extracted can be transformed into practical knowledge. This knowledge plays a vital role to understand the climate change and prediction. Having Knowledge of meteorological data is the key for variety of application to perform analysis and prediction of rainfall and it also does good job for prediction of temperature, humidity and irrigation system.

In this research, we have gathered useful knowledge on historical weather data that was collected locally at Faisalabad city. The data comprise ten year of period. While the records obtained include maximum temperature, minimum temperature, wind speed and rainfall observation. After data pre-processing we applied the outlier analysis, clustering algorithm and classification techniques. After utilizing these techniques and algorithm we have represented and described the importance of meteorological field by extracted knowledge.

Data mining objectives is to provide accurate knowledge in the form of useful rules, techniques, visual graphs and models for the weather parameters over the datasets. This knowledge can be used to support the decision-making for various sectors. The goals for data analysis are those which involve weather variations that affect our daily runtime changes in min and max temperature, humidity level, rainfall chances and speed of wind. This knowledge can be utilized to support many important areas which are affected by climate change includes Agriculture, Water Resources, Vegetation and Tourism. Studies shows that human society is affected in different ways by weather affects. For example, water resources are the main sources of irrigation in production of agriculture crops and the amount of rain is one of them that affects the crops abruptly due to climate change. It is also directly related to the different human activities. Moreover, poor growth and low quality is due to negative effects of weather resulting in failure of high production. Hence, changes in weather conditions are risky.

ProFi's Process for Multi-modal Fission System

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ABSTRACT: Human beings continuously adapt their way of communication to their surroundings and their communication partner. Although context aware ubiquitous systems gather a lot of information to maximize their functionality, they predominantly use static ways to communicate. In order to fulfill the user's communication needs and demands, the sensor's diverse and sometimes uncertain information must also be used to dynamically adapt the user interface. In this article we present ProFi, a system for Probabilistic Fission, designed to reason on adaptive and multimodal output based on uncertain or ambiguous data. In addition, we present a system architecture as well as a new meta model for multimodal interactive systems. Based on this meta model we describe ProFi's process of multimodal fission along with our current implementation.

Categories and Subject Descriptors

H.5.2 [Information Interfaces and Presentation]: User Interfaces—

Theory and methods, User interface management systems (UIMS); D.2.11

[Software Engineering]: Software Architectures

General Terms

Algorithms, Design, Theory

Keywords: probabilistic multimodal fission, modality arbitration, adaptive user interface, multimodal interaction

I. Introduction

Since every behavior is a kind of communication, “one cannot not communicate” [21]. The power to communicate and the competence to adapt the style of communication in each possible situation is one of the most remarkable human abilities. But what capabilities do our digital gadgets encompass? The attribute smart seems to be restricted to these devices' underlying function. Until now, however, they are not very smart in how they offer and communicate their function. We – as human beings – own the ability to reason about the way we express ourselves. We inspect our surroundings, judge the information to be communicated, and monitor our communicative counterpart. We gather lots of information from our surroundings, which we permanently interpret to adapt our verbal and non-verbal communication. In doing so, we try to meet our communication partners' needs, our surroundings' demands, and last but not least we take into account the constraints of the information which shall be communicated.

1.1 Motivation

With respect to the evolution chain from distributed computing to mobile computing through to ubiquitous computing [19], it becomes obvious, that up to now, technical systems focus on providing a maximum of functionality to the user. Although advances of multimodal systems and multimodal interaction are manifold (see [5, 16, 18]), the aforementioned adaption of communication that is carried out by humans is still not very prominent. Research into Companion Systems is about to change this. These cognitive technical systems are continually available and attempt to adapt their behavior to the users' preferences, needs, capabilities, emotional state, and situation. In comparison to the paradigm of ubiquitous computing there are three criteria that set a companion system apart: intention-awareness, artificial intelligence planning, and adaption by learning (cf. Figure 1).

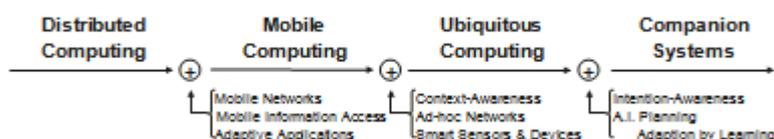


Figure 1: The evolution chain towards Companion Systems inspired by [19]

Within our collaborative research center we developed technical components to realize a multi-sensor companion system. A simplified architecture scheme is depicted in Figure 2. Such a system is aware of its user

The Opportunities and Challenges of Fog Computing on Networking of IoT Components.

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Abstract— Fog is an emergent architecture for computing, storage, control and networking that distributes these services closer to end users along the Cloud-to-Things continuum. It covers both mobile and wireline scenarios, traverses across hardware and software, resides on network edge but also through access networks and among end users, includes both data plane special cases like cloudlets and control plane special cases such as crowd-sensing. As an architecture, it supports a growing variety of applications, including those in the Internet of Things (IoT), Fifth-Generation (5G) wireless systems, and embedded artificial intelligence (AI). This survey article summarizes the opportunities and challenges of Fog, focusing primarily on the networking context of IoT.

Index Terms—fog, fog computing, fog networking, fog storage, fog control, edge computing, edge storage, edge networking, IoT, Internet of Things.

I. Introduction

Over the past decade, moving computing, control, and data storage into the Cloud has been the trend. In particular, computing, storage, and network management functions are shifted to centralized data centers, backbone IP networks, and cellular core networks. Today, however, Cloud computing is encountering growing challenges in meeting many new requirements in the emerging Internet of Things (IoT).

At the same time, there has been a surging number and variety of powerful end-user, network edge, and access devices: smartphones, tablets, smart home appliances, small cellular base stations, edge routers, traffic control cabinets along the roadside, connected vehicles, smart meters and energy controllers in a smart power grid, smart building controllers, manufacturing control systems, just to name a few. Many more smart clients and edge devices, such as information-transmitting light-bulbs, computers on a stick, and button-sized Radio Frequency tuners, are following right behind.

It has therefore become feasible and interesting to ask: “What can be done close to the end users?” Can your car become your primary data store? Can a single appliance in your house integrate the different services and applications that have been provided by separate systems such as TV set-boxes, home media centers, Internet access routers, and smart energy control boxes? What if smartphones themselves can collectively perform radio network control functions that are performed by gateways in the LTE core networks today? What can a crowd of nearby smart endpoints and network edge devices collectively accomplish through a distributed and self-organized network on the edge? Can smart edge devices collectively enable ultra-low or even deterministic latency to support delay-sensitive applications such as real-time data analytics on the edge, mining of streaming data, and industrial control functions?

What these questions point to is a pendulum swinging now back from “click” toward “brick,” from “more centralization” to “more immersive distribution,” from clouds “bigger and farther away” to not just smaller clouds but computation and control closer to sensors, actuators and users. The pendulum between centralization and distribution is decades-old, with two distinct flavors of “distribution”: first is the end-to-end principle as exemplified by TCP congestion control and perhaps Peer-to-Peer (P2P) multicast overlay, and second is leveraging local proximity as in Ethernet and sensor networks. Fog embodies and further accelerates this click-to-brick swing-back from the second angle.

This paper starts with the range of new challenges in the emerging IoT and the difficulty to address these challenges with today’s computing and networking models. The paper then discusses why we will need a new architecture – Fog computing, Fog networking, Fog storage, Fog control, or collectively Fog, for simplicity – and how it can fill the technology gaps and create new business opportunities.

Architecture is about functionality allocation: deciding who does what and how to “glue” them back together. Unlike the more mature technology fields such as serial computation, digital communication, and the Internet, where strong and solid architectural foundation has been laid, we are still searching for architectural principles for many emerging systems and applications such as IoT, cyber-physical systems, and embedded AI.

Removal of the Fog from the Image Using Filters and Colour Model

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Abstract: Images captured in poor weather conditions is often get degraded due to suffering from poor contrast and loss of color characteristics. Poor visibility becomes a major problem for most outdoor vision applications. Visibility enhancement in bad weather is important in many applications. To restore both contrast and color we propose following methods 1) Low pass and High pass filters; 2) Hue Intensity Saturation (HIS) Model; 3) Homomorphic filter; 4) Masking with histogram equalization. Fog removal algorithm has a wide application in tracking and navigation, entertainment industries, and consumer electronics.

Keywords- fog removal; image enhancement; HSI model; low pass filter; high pass filter; homomorphic filter; masking; histogram equalization fog image and he removes the fog by maximizing the local contrast of the restored image. The results are visually compelling but may not be physically valid. Fattal estimates the scene and then infers the medium transmission, under the assumption [1][7][8][9].

I. Introduction

Bad weather caused by atmospheric particles, such as fog, haze, mist etc may significantly reduce the visibility and distorts the colors of the scene [4]. The degree of degradation increases exponentially with the distance of scene points from the sensor. The low quality images are a nuisance for object detection algorithms. They generally fail to correctly detect objects due to low visibility. Thus it is very essential to make these vision algorithms robust to weather changes. Foggy conditions drop atmospheric visibility and brings whitening effect on the images causing poor contrast that is called as air light [6]. Hence basic challenge is to nullify the whitening effect thereby improving the contrast of the degraded image. However, fog removal is a challenging problem because the fog is dependent on the unknown depth information.

II. Fog, Mist And Haze

From the atmospheric point of view, weather conditions differ mainly in the types and sizes of the particles present in the space. A great effort has gone into measuring the size of these particles [3].

Condition	Particle type	Radius (μm)
Air	Molecule	10^{-4}
Haze	Aerosol	$10^{-2} - 1$
Fog	Water droplet	1-10
Cloud	Water droplet	1-10
Rain	Water droplet	$10^2 - 10^4$

Table 1: Weather conditions and associated particle types and sizes.

Fabric Detection using various Techniques: A Review

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Abstract-In the textile production, defect detection is an important factor on quality control process. The investment in automated texture defect detection becomes more economical reducing labor cost. The cost of fabric is often affected by the defects of fabric that represent a major problem to the textile industry. Manual inspections have the problems as lack of accuracy and high time consumption where early and accurate fabric defect detection is an important phase of quality control. Therefore automate fabric inspection i.e. computer vision based inspection is required to reduce the drawbacks discussed above. Robust and efficient fabric defect detection algorithms are required to develop automated inspection techniques. From last two decades so many computer vision based methods have been proposed. This paper attempts to categorize and describe these algorithms. Categorization of fabric defect detection techniques is useful in evaluating the qualities of identified features.

Key Words: fabric defect, automated visual inspection, quality control, defect detection, textile inspection

I. Introduction

ONE of the important aspects of the textile fabric is quality. To maintain the quality of fabric automated inspection system is required by the textile industry. Fabric defect detection system based on computer vision and artificial intelligence has been developed in the last 20 years. The significant advantages of the automatic defect detection system compared to human inspection are high efficiency, reliability and consistency [1].

It has been observed [2] that price of the textile fabric is reduced by 45% to 65% due to defects. Manual defect detection in a fabric quality control system is a difficult task to be performed by inspectors. The work of an observer is very tedious and time consuming. They have to detect small details that can be located in a wide area that is moving through their visual field. The identification rate is only about 70% [3]. Moreover, the effectiveness of visual inspection decreases earlier with the fatigue. Digital image processing techniques have been increasingly applied to textured sample analysis over the past several years. Nickoloy et al. [4] have shown that the investment in the automated fabric inspection is economically attractive when reduction in the personnel cost and associated benefits are considered. Textile quality control involves, among other tasks, the detection of defects that cause a distortion of fabric structure of the material, which commonly shows a high degree of periodicity. Inspection of 100% of fabric is necessary first to determine the quality and second to detect any disturbance in the weaving process to prevent defects from reoccurring.

II. Textile defects

A portion of the textile fabric [5] that has not met the requirement or an attribute of a fabric is said to be a defect which leads to customer dissatisfaction. The fabric quality is affected by yarn quality and loom defects. There are many kinds of fabric defects. Much of them caused by machine malfunctions and has the orientation along pick direction (broken pick yarn or missing pick yarn), they tend to be long and narrow. Other defects are caused by faulty yarns or machine spoils. Slubs are mostly appeared as point defects; machine oil spoils are often along with the direction along the wrap direction and they are wide and irregular. An automated defect detection and identification system enhances the product quality and results in improved productivity to meet both customer needs and to reduce the costs associated with off-quality. Fig. 1 shows some examples of defects in various fabric materials.

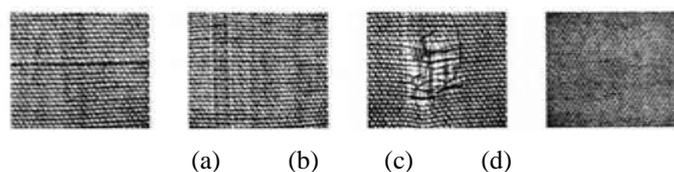


Fig -1: fabric defect samples: (a) double yarn; (b) missing yarn; (c) broken yarn; (d) variation of yarn

Assessment of Structural Characteristics of Ferro – Vermiculite Composite Sheets

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Abstract: The developments in the field of construction raise the need for concrete with less weight. This is beneficial for different applications starting from the less load applied to foundations and soil. Light weight concrete proved also to be more impact and fire resistant. The revolution of structural engineering from the last century there exists as many as developed eco-friendly components. One among such components is Ferro-vermiculite wall panels. The wall panel consists of vermiculite board in its core part which is a mixture of different grades of exfoliated vermiculite as per Indian Standard specification. Why vermiculite? Vermiculite is a very versatile mineral because of its thermal stability and inertness. It is clean to handle, odourless and mould resistant, vermin resistance, heat resistance up to 1200°C, light weight, good fillers and also sterile due to the high temperature. Vermiculite board into two different categories i.e. vermiculite mix with and without coconutfibre. Vermiculite board will be covered by Ferro-cement techniques

.Wall panel in a frames structure generally be a non-load bearing components

.Various testing has been done in the wall panels such as compressive strength, flexural strength, split tension and ultra-sonic pulse velocity test and the panel is compared with market available asbestos wall panels to find out the clear result.

Key words: Eco – Friendly, Ferro – Vermiculite Panels, Heat Resistance, Light Weight Panel, Uniaxial Compression Test.

I. Introduction

Vermiculite is a mica mineral comprised of magnesium, Aluminium, iron, silicate. Exfoliated vermiculite, produced by the application of heat, is generally used for thermal insulation. It is suitable for use in the temperature range of –50°C to 750°C.

When used as an aggregate with Portland cement it forms an ultra-light weight concrete with an open structure ideal for void filling, suitable for use in most light industrial and domestic applications where thermal insulating and fireproof properties are required. Vermiculite can also be used as a fire proof tiles and in chimney linings also.

Here, the vermiculite of different grades is mixed with PPC to form light weight panel as a core surrounded by mesh work covered with cement mortar. The grades which has been used here are as follows:

Table 1 Details of various grades of vermiculite used

Grade	Size (mm)	Bulk Density (Kg/m ³)
I	2.60 - 8	56-120
IV	0.355 - 1	80-144

1.1. Objectives

To reduce the dead load of the structure especially in prefabricated buildings.

- To overcome the usage of asbestos wallpanel.
- To create an Eco-friendly, thermal insulated, energy efficient structural component.
- To ease the complication of transportation and erection of wallpanels.

II. Experimental investigation

1.2. Mixratios

The mix design we adopted consists of cement with vermiculite in the ratios of 1:0.5. The vermiculite used here were a combination of grade I and grade IV vermiculite as per the Indian standard. The vermiculite combined ratios are 0.5: 0.5 i.e. for 1 kg of vermiculite 0.5 kg belongs to Grade I and Grade IV respectively.

Application of Fuzzy Logic in Academic Setup

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Abstract: In past fuzzy logic has been used mostly for classification and control. In electrical engineering to deal with such problems, fuzzy logic use for control of Rotary cranes, hybrid system controller and vector control method has been optimized by using fuzzy controller, Multi factorial Fuzzy Approach for the Assessment of Ground water Quality. Fuzzy logic has been used with great success to control machines and consumer product. Fuzzy logic is not the answer of all technical problems but for control problem so in this paper we have been use fuzzy logic in academic setup in which we deal with logical variables if age is a variable and we say 60 years age person is old. Is age of 59 years and 3 month person is young? Such type of problems we can solve by using fuzzy logic technique and fuzzy logic is best one with dealing of such variables, And we discuss Fuzzy logic technique, and why this is important for some logical variables and we take a issue of academic performance of students, many variables have effect on students performance (GPA) but we discuss only such variables where fuzzy logic is required, and these variables are previous marks, study timing and their final GPA. We have estimate student GPA at any point by using fuzzy logic with the help of fuzzy rules based on information of previous marks and study timing.

I. Introduction

Why concept of fuzzy logic is required. In everyday life most of problems involved imprecise concept and order to handle the imprecise concepts, the conventional methods of set theory and numbers are insufficient and need to be some other concept and fuzzy logic is one of the concepts for this purpose.

Fuzzy logic systems are widely used for control, system identification and pattern recognition, but in this paper we use fuzzy logic for social variables, such variables which a computer can't explain better. Computers are very well known for counting numbers, applying various arithmetic operations, like multiply, division, subtraction also use for reasoning and also for detecting reasons. Detecting reasoning in which case either given values are true or false but truth values are given. In our daily life we have a lot of concert. That we have humans can easily describe, understand and explain to others but traditional mathematics including the set theory, fails to handle in a rational way, the concept "young" is an example for any specific person his/her age is precise. However, relating a particular age to "young" involves fuzziness and is sometimes confusing and difficult. What age is young and what age is not?

The nature of such question is deterministic and has nothing to do with stochastic concepts such as probability or possibility. Why is it that a 34.9 year old person is completely "young" while a 35.1 year old person is not "young" at all? Fuzzy logic is a new way of express the probability. Fuzzy logic is specifically designed to deal with imprecision of facts.

Prof. Manohar Lal says, fuzzy logic handles this type of variables for example "a healthy person" if we say a person is depress, so there are no. of reasons, and degree of depress is again a variable so depression is not something which can be deterministic, we take a example of everyday Old and Young, now we can't say person is old on a particular age, we can't say a person is young at 25 year old and next day he will be old, never. And he says how language can vary? Dinosaurs lived at the earth for a long period (about millions of years). It has not rained for a long period (say about six month). I had to wait for the doctor for a long period (about six hours). So how much variation in period representation by fuzzy logic we make a computer precise for these types of words.

The concept of Fuzzy Logic (FL) was conceived by Lotfi Zadeh, a professor at the University of California at Berkley, and presented not as a control methodology, but as a way of processing data by allowing partial set membership rather than crisp set membership or non-membership. This approach to set theory was not applied to control systems until the 70's due to insufficient small-computer capability prior to that time. Professor Zadeh reasoned that people do not require precise, numerical information input, and yet they are capable of highly adaptive control. If feedback controllers could be programmed to accept noisy, imprecise input, they would be much more effective and perhaps easier to implement.

Fuzzy logic deals with uncertainty in engineering by attaching degree of certain to the answer to logical questions. Commercially fuzzy logic has been used with great success to control machines and consumer products, fuzzy logic systems are simple to design, can be understood and implemented by non-specialist in control theory. Fuzzy logic is not the solution of all technical problems but for speed of implementation is