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3.2.1

Effect of Stabilizer Addition on Size and Shape of Silver Nanoparticles

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ABSTRACT

Different methods may be used to produce nanoparticles, for instance in 1951 Turkevich and co-workers proposed that silver nanoparticles can be produced from the reaction of trisodium citrate, which acts as a stabilizing and reducing agent, with silver nitrate the source of silver nanoparticles. By silver nitrate, silver nanoparticles can instead be produced. Despite being widely used, there is a debate in the literature on the way the reagent conditions, used for the Turkevich method, effect the addition rate, molar ratio, quantity size, shape and arrangement of silver nanoparticles produced. In the view of this silver nanoparticles have been synthesised through the Turkevich method using different reaction conditions, namely the reaction temperature and concentration of sodium citrate used, time of addition. Characteristic techniques were then used to determine the size and shape of the silver nanoparticles produced. It was found that by keeping the constant temperature, increasing the addition rate of stabilizer increased the size of the nanoparticles through SEM.

Keywords: Silver Nanoparticles, Turkevich method, Addition rate, Characterization.

I. INTRODUCTION

A particles or solid components with any size and shape, having at least one dimension of 100nm or less, called as Nanoparticles (1). Nanoparticles are the smallest and most fundamental component in the production of nanostructure (2). It can be produced by a number of different techniques, including chemicals, physical and biological methods. Properties of nanoparticles are different from properties of big size, large contact surface area to volume ratio, medicinal properties antimicrobial, antifungal activity (1). There are various technique to produce silver nanoparticles, where as we can stabilize the silver ions by using suitable stabilizing agent like sodium borohydrate (3-5), NaBH4 and providing capping of polyvinylpyrrolidone (PVP) or Polyvinylalcohol(PVA) (4-5). Another most widely used method is Turkevich Method, this method used to reduce silver ions where trisodium citrate acts as a reducing and capping agent at 60°C (6-9). Activity of reducing and capping agent trisodium citrate is depends upon temperature hence it is an important parameter in reaction of silver nanoparticles. Also there are various factors which results in different size, shape of silver nanoparticles. For turkevich method, reaction temperature, concentration and amount of reducing agent, rate of addition of reducing agent (10-22). There is a general concord that increases and decrease in temperature effects on enlargement and diminution in size of silver nanoparticles. As mentioned above how other factors are going to affect on size and share of silver nanoparticles. In view of the above, the aim of this study was to investigate that how rate of addition of affects on size of silver nanoparticles by keeping temperature as a constant parameter by turkevich method. In order to characterise the size and shape of the silver nanoparticles produced, where scanning electron microscopy and energy dispersive X-ray spectroscopy.

II. METHOD

1.1 Chemicals used:

1. Extra pure silver nitrate (CAS: 7761-888), produced by Finar chemicals Ltdwith a molecular weight of 169.87gm/mol.
2. Extra pure trisodium citrate dehydrate (CAS: 6132-04-3), produced by Finar Chemical Ltd with a molecular weight of 294.10 gm/mol.
3. HPLC grade water of molecular weight 18 gm/mol.

1.2 Synthesis of Silver Nanoparticles at different addition rate of stabilizer

A 0.0096 mg/ml concentration of silver nitrate solution was first prepared. By ensuring whitish crystalline nature of silver nitrate, it dried at 100°C. 1.44mg of the dried silver nitrate crystal was weighted using a duly calibrated balance (Make: Mettler Toledo). Weighted silver nitrate is then transferred to volumetric flask of 500ml volume and filled with 150 ml of water. All transfers were followed by three washings. This resulted dilute solution having concentration upto 0.0096 mg/ml. A 1% (0.034 mol/dm^3) solution of trisodium citrate dehydrate was prepared by 500mg of trisodium citrate dehydrate into a 100 ml of volumetric flask and filled with 50ml of water. As in the

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Extraction of Pectin from Orange Peels: Optimization, Characterization and Utilization Studies

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ABSRTACT

The aim of this study was to extract pectin from orange peels to increase profit for citrus fruit peels. An orange, specifically, the sweet orange is most commonly grown tree fruit in the world. The present work addresses to the development of the process needed for the extraction of value-added product, pectin and jelly from orange peels. Pectin was extracted from orange peels using two different acids (citric acid and nitric acid)at different temperatures, time and pH viz. (60, 70, 80 °C),(30,45,60 min),(1.5,2 and 2.5 pH) respectively. The outcome of present work highlighted that the sweet orange peels are good source of pectin and does have potential to become important raw material for food processing industries. These results demonstrate the effective release of pectin from orange peels, providing the potential benefits of industrial pectin from an economic and environmental point of view.

KEYWORDS: Pectin extraction, Pectin yield, pH, Temperature, Time.

1. INTRODUCTION

Citrus is one of the world's most popular fruits. Fruits come in six different types (Fortunella, Eremocitrus, Clymendia, Poncirus, Microcitrus, and Citrus), but the most common commercial fruits come from the genus Citrus, which includes oranges, lemons, lemons, almonds, mandarins, and pomeloes [1]. Citrus fruits have a high economic worth as well as a high rate of production. Oranges, in instance, are the most extensively produced tree fruit in the world (Citrus sinensis). In tropical and subtropical climes, oranges are widely grown, peeled and consumed whole, or processed to extract orange juice and scent [2].

Pectin is a structural polysaccharide found in the main cell walls of terrestrial plants [3]. The word "pectin" comes from the Greek word "congealed and curdled." Pectin is a type of complex polysaccharide found in high-grade plant cell walls, where it works as a hydrating agent and a cement-reinforcing agent in the cellulose network [4]. Pectin is a polysaccharide found in every plant tissue and is a naturally occurring component. Pectin is found in varying concentrations on the walls of fruit juices and has crucial nutritional and technical features. Pectin (vegetable agglutinate) is mostly used as a gelling, firming, and firming agent in food. The traditional app has a jelly-like consistency that reminds me of jams, gels, or marmalades, and would make a fantastic juice. Pectin's therapeutic qualities, including as binding, hardness, and suspension, have also been investigated. [5]. Pectin, like other polysaccharides, can be utilised to increase food's nutritional function, such as water and oil absorption, gelling capacity, firming ability, and so on. [6]-[7].

People use pectin for high cholesterol, high triglycerides, and to prevent colon cancer and prostate cancer, used for diabetes and gastro esophageal reflux disease (GERD), used to prevent poisoning caused by lead, strontium, and other heavy metals, and as agglutination in blood therapy. Some health conditions, such as diarrhoea, stomach illnesses, and others, may benefit from the use of pectin in combination with medicinal herbs. [7].

The separation of pectin in orange peels was investigated in this study, and the current work is devoted to the technological development of the procedure required for the extraction of added value products. The findings of this study revealed that sweet orange peel is a good source of pectin and hence has potential economic and environmental benefits for pectin extraction in industry.

1.1 Uses of Pectin

Pectin is fiber found in fruits.It is often used as a preservative in cooking and baking. And it is sometimes used to make medicine.

a. Jams, Jellies and Preserves

The most common foods that use a lot of pectin are jams and jellies. Short fruit methods for releasing juice and pectin by converting proto-pectin to soluble pectin are included in Making Jam. Additional pectin may be added at any time

STABILITY STUDIES ON BREAKAGE AND COALESCENCE OF EMULSION LIQUID MEMBRANE IN MULTIPHASE SYSTEM

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Abstract: The purpose of this study is to explore the emulsion liquid membrane stability of tributylphosphate (TBP) (30% v/v) in dodecane (DD). In this work, the organic phase was prepared by dissolving 30% TBP into DD. The aqueous phase formed by 0.01N HNO3 solution using DM water as a carrier. The stability of the emulsion in terms of surfactant concentration, A/O ratio, phase continuity and homogenization speed was considered for the optimization of parameters. Investigation on the stability of emulsion was carried out by manipulating the concentration of surfactant concentration, A/O ratio, phase continuity and agitation speed. The best condition to produce a very stable emulsion was achieved at 0.5 v/v of surfactantconcentration, with 13000 rpm of agitation speed for 10 min of extraction time with an A/O ratio of 0.33. Repeatability of the measurement technique was checked by estimating td in the manner specified above three times. Repeatability was around 7%.

Keywords - Breakage, Coalescence, ELM, emulsion stability, TBP, phase continuity, Span-80

I. INTRODUCTION

In recent years emulsion liquid membrane (ELM) based technique has created quite a stir in solvent extraction processes. With this technique, both extraction and stripping can be carried out in a single contactor simultaneously which reduces number of processing steps. ELM is known to be one of the most effective methods for separation and concentration when the material being extracted is present in very low concentration. As a result, the ELM has been considered a promising alternative technology for diverse separation processes including removal and recovery of various heavy metals such as copper, zinc, nickel, cadmium, uranium from different media, acids and bases, and pharmaceutical separations. The ELM has also received special interest for the treatment of industrial wastewaters containing a wide range of toxic contaminants such as phenol, chloro-phenol, and nitro-phenol.ELM contains a three-phase dispersion system, which consists of a stripping phase encapsulated by a membrane phase (organic phase), which in turn contains the extractant in organic diluents together with a surfactant to stabilize the emulsion droplet. Thus ELM process involves simultaneous extraction and stripping in one step. The metallic element present in lean solution forms a complex with the extractant at the interface of the emulsion globule and the feed phase. The complex formed is then shuttled through the organic phase to the organic phase-stripping phase interface from where it is stripped into the bulk of the encapsulated stripping phase. In ELM, mass transfer surface area to volume ratio is very high (1000–3000 m2/m3) and internal surface area to volume ratio is still larger (typically 106 m2/m3). Attempts have been made in the past research works on membrane stability, to simultaneously achieve stability, highly selective permeability and ease of de-emulsifications. Due to difficulty in simultaneous achievement of these properties, tradeoffs among such properties have been suggested as the solutions in proper membrane formulations.

Unfortunately, widespread use of the ELM processes has been limited due to poor stability of emulsion globules against fluid shear. Breakup of emulsions and subsequent release of the internal receptor phase to the external donor phase would nullify the extraction process. Poor stability means membrane rupture and leakage. Leakage results in spilling of the entire internal phase into the external continuous phase thereby defeating the very purpose of the liquid membrane-based process. Leakage as a serious problem in liquid membrane-based processes has been pointed out by many researchers. High selective permeability means faster mass transfer and separation of the components. When the separated solute of interest is to be recovered and the membrane phase material is to be recycled on breaking the emulsion, ease of de-emulsification becomes the third most significant property of emulsion liquid membranes.

II. LITERATURE REVIEW

For improving the stability of ELMs, several studies attempt to enhance emulsion stability. Some of these studies used high surfactant concentration [1] and employing highly viscous oil as membrane phase [2-4]. Other studies investigated operational conditions optimization such as stirring speed, com-position of emulsion and temperature [5-7]. Other solutions were recently proposed by conversion of the membrane phase into a suitable non-Newtonian form (i.e., pseudo-plastic) by dissolving high molecular weight polymers such as poly isobutylene [4,8] and using a Taylor vortex column as a contacting device instead of conventional mixing reactors [9,10]. Combination of the last two modifications has been proven for the extraction of a benzoic acid [10] phenol and substituted phenols [11] from a model industrial wastewater.

Dispersion free hollow-fiber contactor (HFC) can be used for ELM process. This arrangement combines the advantages of ELM as an extraction and stripping in one step and non-dispersive HFC. This will reduce the leakage of internal phase into the external aqueous phase in the absence of high shear rate in stirred contactor. Also, swelling of the internal phase can be minimized. This is due to, the pores are of the order of 0.05 mm in diameter, and the internal-phase drops are of the order of 1–10 mm in the emulsion. It is unlikely that the internal droplets of the emulsion will be present in the membrane pores.

A novel extraction technique using an emulsion liquid membrane within a hollow-fiber contactor was developed and utilized to extract copper using LIX 84 extractant [12]. Stability of the liquid membrane is not crucial when used in hollow-fiber contactors; the surfactant in liquid membrane can be reduced or even eliminated without severely impairing the performance. In total-recycle mode experiments, it was shown that the ELM can successfully extract metal even at very low feed concentration. Stability of the

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Intensified synthesis of biodiesel using low-cost feedstock and catalyst via conventional as well as ultrasonic irradiation based approach

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ABSTRACT

In the present work, the synthesis of biodiesel has been investigated using low-cost feedstock and a catalyst using conventional and ultrasonic irradiation based approach. The novelty of the present work is used of calcium oxide (CaO) as a catalyst for the synthesis of biodiesel using frying oil as a feedstock via esterification followed by transesterification process. Reaction parameters such as concentration of catalyst, operating temperature, and a molar ratio of oil to methanol (MROM) have been optimized for esterification and transesterification. Reduced free fatty acid value (FFA) helps in the production of pure biodiesel of utmost quality through the transesterification reaction. Decreasing trends of FFA of oil with the increasing temperature, MROM, and catalyst concentration up to the optimized conditions has been obtained during esterification reaction. The maximum reduction in the FFA of oil up to 0.51 mg KOH/g of oil was obtained in 20 min only at an optimal temperature 55°C, MROM of 1:3 and 1 wt. % of H_2SO_4 during the esterification reaction. The energy required for the conventional based approach was found to be 37.3 kJ/mg. In case of transesterification reaction, it has been observed that the effect of MROM, catalyst concentration, and temperature on yield of biodiesel strongly affects the yield of biodiesel. Decreasing trends of biodiesel yield with increasing range of reaction parameters such as MROM and reaction temperature has been observed for conventional as well as the US irradiation based approach. Furthermore, with increasing heterogeneous CaO catalyst concentration from 0.1 to 0.2 wt. %, yield of biodiesel increases from 72.1 wt. % to 85.7 wt. % and 64.3 wt. % to 68.5 wt. % using a convention-based approach and US-based approach, respectively. The maximum yield of biodiesel as 85.7 wt.% (energy required was 1.8×10^{-4} g/J) was obtained using a conventional based approach and 68.57% (energy required 5.1×10^{-4} g/J) US irradiation based approach at an optimal MROM of 1:8, 0.2 wt. % of CaO and 55°C temperature. Hence, the present study clearly established that significant intensified synthesis of biodiesel can be obtained using optimum MROM, temperature and catalyst concentration via a conventional based approach than the US irradiation based approach.

1. Introduction

Day by day, depletion of fossil fuels occurs due to an unstoppable population and limitations for the alternative conventional sources of energy. Hydrocarbon fuel (mainly, Diesel fuel) plays a significant role in the transportation of goods. After the burning of such fuel, a problem of pollution arises. This has encouraged researchers to pay attention to finding out other sources to change the crude oil-based fuels. It has been observed that biodiesel obtained from vegetable oil is a good substitute for diesel fuel (Sharma et al., 2008).

Biodiesel can be synthesized from any plant or animal-derived oils. Some examples for such types of oil are Nagchampa, Karanja, Jatropha, linseed seeds oil, waste cooking oil, soyabean oil, palm oil, sunflower oil, canola oil, and many others. Not all types of oils are equally suitable for making biodiesel. The FFAs in the oil mainly decide its suitability for synthesizing biodiesel. The oil having high FFA, requires esterification prior to transesterification. The minimum FFA value of 2 mg KOH/g of oil can undergo trans-esterification process whose products are biodiesel and glycerol (Gole and Gogate, 2012).

In developing countries like India, the feedstock under consideration for biodiesel production has been mainly non-edible vegetable oils like Jatropha curcas, Pongamia Pinnata, Nagchampa, etc. (Ayoob and

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ORIGINAL ARTICLE

Optimization of esterification of palm fatty acid distillate using conventional approach and its comparison with ultrasonic and microwave irradiation

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Abstract The current work deals with the process intensification of esterification reaction via ultrasonic (US) and microwave (MW) irradiations using the cheapest feedstock, such as Palm Fatty Acid Distillate (PFAD). Systematic studies have been done by conventional methods to find the optimum parameters, such as molar ratio of PFAD to methanol, temperature, type of catalyst, and catalyst loading. In order to enhance the rate of reaction, experiments were carried out using approaches based on ultrasound and microwave irradiations at optimal parameters obtained from the conventional approach. Significant enhancement in extent of equilibrium conversion and rate of reaction is observed in the presence of microwave irradiation than any other method used in the current study. The maximum reduction in acid value obtained using MW irradiation, US irradiation, and conventional approaches was 98.8% (for 25 min of reaction time), 97.8% (for 150 min of reaction time), and 97.6% (for 180 min of reaction time), respectively. The kinetic rate constants (activation energy) for the reaction using MW irradiation, US irradiation, and conventional approach were 0.7089 (9.6×10^4 kJ/mg), 0.2063 (1.7×10^5 kJ/mg), and 0.1629 (2.1×10^5 kJ/mg) l/mol/min, respectively.

Keywords Palm fatty acid distillate · Ultrasonic irradiation · Microwave irradiation · Acid value · Energy consumption

List of symbols

PFAD	Palm fatty acid distillate
US	Ultrasound
wt%	Weight percent
MW	Microwave
$[A]$	Final concentration of free fatty acid, mol/l
$[A]_0$	Final concentration of free fatty acid, mol/l
k	Second-order rate constant, l/mol/min
m	Mass of reaction mixture, kg
C_p	Specific heat, J/kg K
ΔT	Change in temperature, K
kJ	Kilojoules
mg	Milligram
J	Joule
FFA	Free fatty acid

1 Introduction

Currently, owing to a rapid increase in population and industrialization, there is a great demand for unconventional fuel. Since non-renewable sources of energy require a large amount of time to replenish, substitution of

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Influence of reaction parameters on oxalic acid crystallization using conventional and ultrasonication: Doehlert matrix

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ABSTRACT

The present work aims to optimize the yield of crystallization using conventional and ultrasonic irradiation by using surface response methodology. The experiments were designed with the help of a Doehlert matrix which has not been previously reported. Initially, the solubility curve, induction time estimation and the metastable zone width have been thoroughly investigated. Later, using surface response obtained from statistics software, the effects of initial concentration and saturation temperature, stirring speed and initial concentration, and cooling temperature and stirring speed on yield of crystallization were compared using the conventional method and ultrasound- assisted crystallization. When compared to conventional methods, ultrasound-assisted crystallization has been shown to minimize the maximum reduction of MSZW and induction time. In ultrasound-assisted crystallization, the initial concentration, saturation temperature and stirring speed have been found to have a significant effect on the yield of crystallization than cooling temperature. The maximum yield of crystallization was 96.8% using ultrasound and 75.0% using conventional methods, respectively at an optimal condition of 1200 rpm, 15 °C cooling temperature, 80 °C saturation temperature and initial concentration of oxalic acid 75 g/50 mL of water. In comparison to the ultrasound method, the conventional method produced twice the average crystal size and irregular shape. Overall, the work has clearly established that ultrasound-assisted crystallization gives significant results as compared to the conventional method in terms of yield, metastable zone width, induction time and crystal characteristics.

1. Introduction

The Crystallization process is very important in the separation and purification of the desired product from the solution. It is widely used in many important industrial processes such as chemical processing, specialty and fine chemicals, and pharmaceutical industries to get the desired yield, morphology, polymorphism, and particle size. The crystallization operation is mainly driven by nucleation, supersaturation, and the growth of crystals [1,2]. The most commonly used crystallization methods reported in the literature were cooling crystallization [3], seeding crystallization [4] and anti-solvent crystallization [5]. Cooling crystallization is used where the solubility of the components increases with temperature and is not suitable for those compounds whose solubility is less temperature-dependent [6] and usually requires a large induction time for nucleation. However, this problem can be mitigated with addition of seeding in the crystallization process. But the problem associated with seeding crystallization is the production of fine crystals and formation of crystals in different shapes and sizes [7]. The disadvantage of anti-solvent crystallization is that it is highly dependent on mixing performance, the appearance of undesirable solid forms, and high local supersaturation, which induces excess primary nucleation and, as a result, fine crystals forms that tend to agglomerate [8].

A milling operation is carried out in the post crystallization process. If the crystallization process is designed effectively to produce a fine crystal size distribution in situ, downstream milling operations can be avoided, improving yield, reducing energy consumption, and avoiding safety hazards associated with milling. Thus, the drawbacks associated with cooling, anti-solvent, and other crystallizations, such as low rate and non-uniform supersaturation in the mixture can be overcome using ultrasound-assisted crystallization techniques. It has been observed that ultrasound-assisted crystallization can efficiently intensify the process and modify the crystalline product properties [9]. Ultrasound can be

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Improvements in crystallization of copper sulphate using ultrasound and comparison with conventional method

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ABSTRACT

The present work aims to demonstrate the beneficial effect of using ultrasound on the metastable zone width (MSZW), induction time, yield and the crystal morphology for copper (II) sulphate pentahydrate. Effect of saturation temperature, initial concentration, stirring speed, cooling temperature, and cooling media on performance of crystallization process was investigated using conventional and US based method (both ultrasonic horn and ultrasonic bath). It was observed that the highest yield of 98.7% was obtained for US horn followed by 97.6% using US bath and 79.3% using conventional methods under optimized conditions. The metastable zone width and induction time significantly reduced due to ultrasound. Uniform and smaller size crystals were also seen in the case of ultrasound assisted approach whereas agglomeration of crystals appeared in the case of conventional approach. The energy requirement showed the trend of US horn < US bath < conventional approach. Overall, the application of ultrasound for crystallization of copper (II) sulphate pentahydrate was found promising to improve the process of crystallization in terms of MSZW, induction time, yield and the crystal behavior.

1. Introduction

Crystallization is a process to purify or separate the components from the solution and forms an important step in deciding the final product characteristics. Most of the industries related to pharmaceuticals, speciality chemicals, food, agrochemical and cosmetics sectors have more than 70% of all the products as solids obtained using final processing step of crystallization. Properly executed crystallization operation gives very high purity of products along with the required morphology [1]. Generally, crystallization involves recovery of solid from liquid phase based on the induced supersaturation by evaporating the solvent or cooling of solution. Crystallization is typically classified as cooling, evaporative or antisolvent crystallization based on the mode used for applying supersaturation as well as two other types as melt crystallization and reactive crystallization. From the industrial point of view, the most frequently used crystallization types are cooling, antisolvent or reactive (precipitate formation based on reaction) crystallization. The selection of the crystallization type depends on the properties of the compounds and thermodynamics of the system [2]. For low solubility compounds or for those showing negligible effect of temperature on solubility, usually reactive or antisolvent crystallization is preferred whereas for the compounds with higher solubility or variation with temperature, evaporative or cooling crystallization is favoured. Generally, when the solubility is highly dependent of temperature, cooling crystallization is recommended [3] whereas if the solubility does not show strong impact on temperature, evaporative crystallization is applied. In the case of cooling crystallization, with a decrease in solution temperature, the solubility of compound decreases which induces the supersaturation leading to nucleation and subsequent growth of crystals. Evaporative crystallization involves evaporation of the solvent which induces supersaturation leading to nucleation such as in the case of crystallization of sugar and salt. The effectiveness of crystallization mainly depends on two important aspects of nucleation and crystal growth which are further affected by thermodynamic and chemical properties. Nucleation is the step where solute molecules diffuse out from the solution and start to gather in the form clusters at

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Research Article

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Effect of additives on degradation of poly vinyl alcohol (PVA) using ultrasound and microwave irradiation

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Abstract: The degradation of polyvinyl alcohol (PVA) has been investigated using ultrasonic (US) as well as microwave (MW) irradiation techniques with the approach of process intensification based on different additives, such as Titanium Dioxide (TiO_2), Sodium Lauryl Sulphate (SLS), Zinc Oxide (ZnO) and air. The effects of sonication time, initial polymer concentration, and temperature on the extent of reduction in viscosity have been thoroughly investigated using US as well as MW irradiation approaches. Basically, the degradation process has been optimized by utilizing two different ultrasonic reactors in a combined approach of ultrasonic horn and bath. The maximum extent of degradation of PVA was found to be 69.33% using MW irradiation with a required energy of 0.321 g/JL, and 62.47% using US horn with a required energy of 0.054 g/JL when operated at 0.1 g/L of TiO_2 catalyst. The combination of US horn and US bath results in same degradation as 0.1 g/L of TiO_2 catalyst with US horn. It has also been observed that the maximum degradation of PVA was obtained with a minimum treatment time of 3 min using MW irradiation, whereas the US horn required 40 min. Moreover, a lower extent of PVA degradation was obtained when additives were used, such as surfactants (SLS) and air. As a result, it can be inferred that the MW-assisted approach in the presence of process-intensifying additives/catalysts is the best approach for the degradation of PVA with a minimum energy consumption.

Keywords: microwave irradiation; polymer degradation; PVA; surfactant; ultrasound.

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1 Introduction

Polymers play a very important role in our everyday lives and, hence, polymer-based materials are observed everywhere in the environment. Polymer debris in the form of parent polymer, additives, fragmented particles, composites, and release of subsequent products into the environment after degradation may cause environmental pollution. The polymer-based material is an important pollution source, and it is difficult to remove easily (Erren et al. 2009). It has also been observed that the polymer-based materials are considered a food source by birds or aquatic animals (Page et al. 2004; Petry et al. 2009). Hence, it is a prime focus to remove or degrade the polymers that are widely used or found in the environment.

PVA (polyvinyl alcohol) is one of the polymers that is of great interest because of its numerous useful properties, particularly in the pharmaceutical and biomedical industries. It is widely used as a supportive emulsifier in polymerization (Zhang et al. 2013). It is also used as a shielding colloid for polyvinyl acetate dispersions. The polymer degradation process is significant for biomedical and drug delivery applications (Rivera-Hernández et al. 2021). Also, due to the excessive use of PVA over the years as an adhesive, thickener in paints, PET bottles, etc., it has an adverse effect on environmental pollution. PVA solutions with

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Degradation of dye in a continuous zig-zag flow pattern photocatalytic reactor using a Doehlert matrix

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ABSTRACT

Rhodamine B-containing wastewater was thoroughly treated in a photocatalytic reactor operated in a continuous mode with a zig-zag type of flow pattern. The effect of operating parameters such as pH (1–9) and initial dye concentration (10–40 ppm) on Rhodamine B degradation was studied at 1 g/L of TiO_2 and H_2O_2 in order to determine the optimal operating parameters for combined treatment schemes. At a concentration of 10 ppm and a loading of 1 g/L TiO_2 and H_2O_2 at a pH of 3, the maximum rate of degradation was 94.02%, and 96.68% obtained and follows pseudo-first order kinetics, respectively. Further studies of the influence of initial dye concentration and solution pH were investigated using an optimized range of TiO_2 and H_2O_2 loading based on the surface response of the Doehlert matrix design. Based on the surface response, it was observed that the lower initial concentration with a higher loading of TiO_2 and H_2O_2 accelerates the production of hydroxyl radicals and thereby, higher degradation of pollutants was achieved. Complete degradation with 84.76% COD reduction of Rhodamine B was observed at 0.8 g/L of H_2O_2 and 2 pH of dye solution with a total treatment cost of US $0.009/L. Overall, the current study found that the novel photocatalytic reactor operated in a continuous mode can treat large volumes of waste water using hybrid methods with optimum catalyst loading, has high potential, and may be successfully applied for the removal of hazardous dyes from aqueous solutions with intensification benefits.

1. Introduction

The disposal of textile industry effluents is a major concern because it contains coloured dyes that are carcinogenic, mutagenic and harmful to the environment posing a serious short-term and long-term threat to the environment. Dyes are the synthetic or natural chemicals which impart colour to the solvent due to the presence of Chromophore and Auxochrome functional groups. The Chromophore functional group provides colour of the dye whereas Auxochrome functional groups enhances the colour as it forms a bond between the dye molecules and the clothing fibres (Chauhan et al., 2022). Natural dyes are biodegradable and environmentally friendly as they are generally derived from

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Research Article

Application of soft computing in water treatment plant and water distribution network

Dnyaneshwar Vasant Wadkar, Rahul Subhash Karale &
Manoj Pandurang Wagh

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Abstract

Analysis of traditional water distribution network (WDN) is more time-consuming and less effective to predict the problem related to water supply systems such as water quality, coagulant dose, and residual chlorine in developing countries. In the present paper water quality neural network, coagulation dose neural network, and residual

neural network model were implemented. The performance of the Cascade Feed Forward Neural Network (CFFNN) and Feedforward neural network (FFNN) was

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TECHNICAL PAPER

Bearing Capacity of Reinforced Embankment Slope Models of Fly Ash and Furnace Slag

Vidya Nitin Patil[1] · Hemant Sharad Chore[2] · Vishwas Abhimanyu Sawant[3]

Accepted: 15 July 2021 / Published online: 13 August 2021

Abstract

This paper presents the strength evaluation of geogrid and rubbergrid reinforced embankment slope made of two different pozzolanic waste materials (fly ash and ground granulated blast furnace slag). The strength of the embankment slopes was studied in terms of bearing capacity response of a strip footing placed on the top of the slopes, through small-scale model tests in a laboratory. The tests were conducted by varying the parameters such as location and embedment depth of a layer of the reinforcement considered in the study and also location of footing relative to the slope crest and slope angles. Based on the critical slope angle and optimum embedment depth of the reinforcement obtained from investigation on geogrid reinforced fly ash slope, the study was carried out for fly ash embankment slope reinforced with rubbergrid and ground granulated blast furnace slag (GGBFS) embankment slope reinforced with geogrid as well as rubbergrid. The results obtained from the experimental investigation are presented in terms of bearing capacity improvement ratio, and they, further, indicate that several parameters studied have an important effect on the strength of the embankment slopes. The improvement in ultimate bearing capacity of the footing resting on the top of the either slope is observed with the presence of reinforcement. The rubbergrid is found to perform better than the geogrid. The study reiterates the utilization of the pozzolanic waste materials like fly ash (FA) and GGBFS as a fill material in embankment and discarded tyres as a reinforcing material in the most effective manner.

Keywords Industrial waste · Pozzolanic material · Fly ash (FA) · Ground granulated blast furnace slag (GGBFS) · Geogrid · Rubbergrid · Bearing capacity · Strip footing

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Structural Control and Health Monitoring / Volume 29, Issue 4 / e2924

RESEARCH ARTICLE

Performance of RC elevated liquid storage tanks installed with semi-active pseudo-negative stiffness dampers

Manisha V. Waghmare, Suhasini N. Madhekar, Vasant A. Matsagar

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Summary

The effect of semi-active pseudo-negative stiffness dampers (SAPNSDs) on the seismic response mitigation in the reinforced concrete (RC) elevated liquid storage tanks is investigated. The SAPNSDs are operated in two modes: Passive-ON and Passive-OFF. The effect of placement (location) of the dampers is also studied by placing the dampers in three different configurations. Two aspect ratios of the tanks, viz., 0.5 and 2.0, are considered to study the effect of the variable level of the liquid in the container. Time history analysis is carried out for total of 18 different earthquake ground motions. The differential equations of motion are solved by the state-space approach. The response quantities such as peak base shear, overturning moment, container level displacements, and bracing level displacements, along with the damper forces, are obtained. It is found that the SAPNSDs (Passive-ON) effectively control the response of the RC elevated liquid storage tanks. Further, seismic energy input to the structure without SAPNSDs and the percentage energy dissipated by SAPNSDs is obtained. The placement of the dampers plays a significant role in response reduction during ground motion with high peak ground acceleration (PGA) than that with low PGA. The SAPNSDs installed at alternate levels (Configuration II) is the most efficient configuration for response control of the RC elevated liquid storage tank installed with the SAPNSDs. The seismic input energy reduces considerably by the installation of the semi-active pseudo-negative stiffness dampers (SAPNSDs).

Open Research

DATA AVAILABILITY STATEMENT

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International Conference on Advances in Civil Engineering

↳ ACE 2020: **Recent Advancements in Civil Engineering** pp 569–579

Investigation of Gabion Wall Failures and Recommendations

Ganesh Chikute & Ishwar Sonar

Conference paper | First Online: 15 December 2021

Part of the Lecture Notes in Civil Engineering book series (LNCE,volume 172)

Abstract

Gabion retaining walls are very much popular in present era, due to its simplicity in construction, high speed of construction, flexible in nature, release of water pressure due to voids in stones of Gabion wall and eco-friendly nature. Though Gabion wall is famous, there are some failures are also observed in Gabion walls. Till date, very less literature works are available on failures of Gabion walls. Failure analysis is a very important tool to identify causes of failures, which is useful in possible modifications in Gabion wall not only to avoid Gabion wall failure, but also avoid loss of human life and cost. This paper represents field investigation of eleven existing Gabion wall sites from Pune district, India. Different types of failures, along with reasons of failures of Gabion walls, are reported in this paper. Remedies to avoid such failures are also suggested to modify Gabion wall. Author[1] is doing research on modification of Gabion of wall is also explained.

Keywords

Field investigation **Failures** **Gabion wall** **Modification**

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Seismic Analysis of Steel Frame using Soil Structure Interaction Considering BRB

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Abstract - *In the present work carried out, it is understood that, overcome the practical difficulties and to understand actual behavior of soil and structure using BRB and without BRB model are considered, so there are 12 models has been created using various shapes of braces and soil type. It has contain X bracing model , V bracing ,Y bracing model and without BRB along with 3 type of soil are considering sand,silt and clay each one will make 4 model and total will have 12 model to perform. Building considered are G + 6 stories having height of 21 m and seismic zone 4 has been considered. Earthquake load combination will be taken account on multi-story steel frames installed with BRBs and without it. It is investigated through linear dynamic analyses using ETABS17. Results illustrate the variation of different parameters such as story displacement, story drift, story stiffness and story shear of the structure for seismic excitation against its seismic forces. From the result, it concluded that as the soil type changes story displacement, story drift, story stiffness changes drastically and various shapes of BRB contribute differently to resist deformation. That implies that soil structure interaction along with X BRB must be preferred against seismic excitation.*

Key Words: *BRB, multi-story steel frames, ETABS17, seismic excitation.*

1.INTRODUCTION

The process in which the response of the soil influences the motion of the structure and the motion of the structure influences the response of the soil is termed as SSI. In this case neither the structural displacements nor the ground displacements are independent from each other.

Multi-story steel frames are popular building structures. For those with insufficient seismic resistance, their seismic capacity can be improved by installing buckling-restrained braces (BRBs), which are known for high energy dissipation capacity. However, BRBFs are frequently criticized because of excessive residual deformations after earthquakes, which impede the post-event repairing work and immediate occupancy. These were invented with a particular purpose of eliminating residual deformation for the protected structures, underwent fast development in recent years. Therefore, this aims to combine these two different braces to form a BRB. A total of Shapes BRBs are proposed to seek an optimal solution. The multi-story steel frames installed with BRB are numerically investigated through linear dynamic analyses. Interested seismic response parameters refer to the maximum story drift ratios, maximum story displacement, and base shear.

The phrase 'soil-structure interaction' may be defined as influence of the behavior of soil immediately beneath and around the foundation on the response of soil-structure subjected to either static or dynamic loads".

This research is aimed to compare the seismic behavior of different damping systems in steel buildings. This research will present the analysis of multi-story building considering soil structure interaction. A three dimensional modeling and analysis of the structure will carried out with the help of software. Equivalent static analyses will carried out on all structures. This analysis will compare with practical model of multi-story building with the help of shake table test. In this work BRB damping system are consider & it is compare with simple model.

2. LITERATURE REVIEW

Hector Guerrero et al. (2017) it has been widely recognized that the source of damping on structures is not viscous. However, an equivalent viscous damping, that generates similar dynamic response of structures, is used for simplification purposes. Under such consideration, this paper presents the experimental measurements of damping on structures equipped with Buckling-Restrained Braces (BRBs) working within their linear-elastic range. For comparison purposes, tests were also conducted on bare structures (without BRBs) and on a structure fitted with a conventional brace. All the experiments were conducted on a shaking table. The results show that, while the test with conventional brace did not show increase of the damping ratio, BRBs significantly did. This happened even when both, the main structure and the BRBs, exhibited linear-elastic response. A model is proposed to account for the dissipative forces observed on the experiments. The findings of this study are significant as they show that BRBs start dissipating energy at low levels of displacement; and this energy dissipation must be taken into account in the context of performance-based seismic design, so that the dynamic

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Strengthening of Deep Beam with Openings Using Steel Plates

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Abstract - *Reinforced concrete deep beams have many useful applications in building structures such as transfer girder, wall footing, foundation pile caps, floor diaphragms etc. For reinforced concrete beams with the same shear and flexural reinforcements, shear failure is most likely to occur in deep beams rather than in regular beam. Thus, retrofitting of deep beams with shear deficiencies is of great importance. This study aimed at examining the potential use of strengthening reinforced concrete (RC) deep beams that had web openings by steel plates. Experiments were conducted to test 8 deep beams under point loading with horizontal rectangular openings. Every tested beam had a cross section of 100 mm x 350 mm and a total length of 700 mm. Two openings, one in each shear span, were placed symmetrically about the midpoint of the inclined compressive strut. Test included using strengthening steel plates of 10 mm. Constructing horizontal rectangular openings led to decrease ultimate shear capacity about 7.68% in comparison with the reference solid beam. While strengthening those openings via steel plates was found very effective in upgrading the RC deep beam shear strength. The strength gained in beams that had strengthened, horizontal rectangular openings was about 9.68% in comparison with the unstrengthened openings. Furthermore, adding studs to the strengthening plates caused a strengthening gain 15% in comparison with the unstrengthened openings.*

***Key Words*: Deep beams, openings, strengthening, steel plate, stud connector.**

1.INTRODUCTION

According to the Indian Standard Code IS: 456-2000, beam is considered deep, when the ratio of effective span to overall depth (l/D) is less than 2.0 for simply supported members and 2.5 for continuous members. For the previous time, the deep beams have been designed according to the slender beam semi-empirical methods. Nevertheless, some analytical reports and experimental results have specified that internal forces redistribution before failure, internal force mechanisms and shear strength in deep beams are totally different from those occurred in slender beams. Openings are mainly constructed in deep beams to facilitate air conditioning, conduits, computer network cables and electricity. The shear capacity will be reduced If an opening interrupts the natural loading path that joins the loading and supporting points [2, 3]. There is no obvious design procedure for deep beams that have openings regardless of the important effects of these openings on the deep beam structural behavior. Many researchers have studied the different main parameters involved such as cross sectional properties, shear span-to-depth ratio, web reinforcement amount, and opening location, shape and size in addition to concrete strength [4-6]. [7] Tested 32 deep beam specimens that had rectangular openings. The specimens had different sizes of the opening, different concrete strengths, and the shear span-to-depth ratio ranged between 1 and 0.5. The authors concluded that the effect of concrete compressive strength significantly decreased in deep beams with openings in comparison with solid reference beams. [9] Investigated new shear strengthening technique, designated as Embedded through Section (ETS) technique, has been developed to retrofit existing reinforced concrete elements. In this technique the bars of steel or Fibre Reinforced Polymer (FRP) material are introduced into the beam section through the drilled holes and bonded with the adhesive to surrounded concrete. The ETS shear strengthened deep beams have 23.84% to 67.69% increase in load carrying capacity when strengthened with 8mm,10mm and 12mm ETS bars with L/4 and L/6 spacing, compared to the un strengthened deep beam Up to 17.69% increase in ultimate load is found when the diameter of ETS bars increased from 8mm to 12mm. [10] have stated in their research, nine simply supported reinforced concrete deep beams with large web openings strengthened by using external post – tensioning strands have been cast and tested up to failure under one-point load. These beams were divided into three groups according to strengthening schemes by using external strands. Each of these groups consisted of three beams having different opening ratios (0.4, 0.6 and 0.8). The results show that increasing openings ratio caused a decreasing in first cracking and ultimate loads and increasing in mid span deflection for all beams. While, for same openings ratio, the strengthening using horizontal post – tensioning strands scheme was more effective than using vertical strengthening scheme in increasing the first cracking and ultimate load capacities and reducing the deflection [11] have analyzed (RC) deep beams that had web openings by 6mm steel plates. Experiments were conducted to test thirteen deep beams under two point loading with square, circular, horizontal and vertical rectangular openings. Every tested beam had a cross section of 100 mm x 400 mm and a

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SUITABILITY OF LEAD RUBBER BEARING OF HIGHRISE BUILDINGS

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Abstract: Earthquake is basically a naturally phenomenon which causes the ground to shake. The earth's interior is hot and in a molten state. As the lava comes to the surface, it cools and new land is formed. The lands so formed have to continuously keep drafting to allow new material to surface. According to the theory of plate tectonics, the entire surface of the earth can be considered to be like several plates, constantly moving. These plates brush against each other or collide at their boundaries giving rise to earthquakes. Therefore regions close to the plate boundary are highly seismic and regions further from the boundaries exhibit less seismicity. Earthquakes may also be caused by other actions such as underground explosions.

Meanwhile, in the present study obtained from the gap analysis we came to know that, by taking 7 different models of area 400 m^2 with aspect varying from 1 to 4 and applying the properties of both fixed and LRB base. Seismic (Response spectrum analysis) analysis of all models with fixed and isolated base is carried out and results are compared. A separated model based on journal is created in ETABS and comparison is done for parameter given in journal and software model. It has been concluded that Seismic parameters are increasing with increasing number of bays. Square configuration with building aspect ratio 1 perform better as they possess lesser seismic parameters. Increase in lateral displacement is due to frictional behavior of the LRB under seismic loads. Due to increase in time period, structure experiences less amount of seismic forces. Story stiffness, base shear and over-turning moment are reduced to significant amount due to use of LRB.

Index Terms **–Earthquake, Lead Rubber Bearing, lava, Seismic Analysis.**

I. INTRODUCTION

1.1 Earthquake

Earthquake is basically a naturally phenomenon which causes the ground to shake. The earth's interior is hot and in a molten state. As the lava comes to the surface, it cools and new land is formed. The lands so formed have to continuously keep drafting to allow new material to surface. According to the theory of plate tectonics, the entire surface of the earth can be considered to be like several plates, constantly moving. These plates brush against each other or collide at their boundaries giving rise to earthquakes. Therefore regions close to the plate boundary are highly seismic and regions further from the boundaries exhibit less seismicity. Earthquakes may also be caused by other actions such as underground explosions.

An earthquake is the result of a sudden release of energy in the earth's crust that creates seismic waves. The seismic activity of an area refers to the frequency, type and size of earthquake experienced over a period of time. At the earth's surface, earthquake occurs itself by shaking and sometimes displacement of the ground. When the epicenter of a large earthquake is located offshore, the sea bed may be displaced sufficiently to cause a tsunami. Earthquakes can also trigger landslides and occasionally volcanic activities. An earthquake is measured by seismometers. An earthquake having magnitude of less than 5 are generally measured by Richter magnitude scale & that of magnitude up to 9 or more than 9 is measured by modified Mercalli scale. In its most general sense, the word earthquake is used to describe any seismic event, whether natural or caused by humans that generate seismic waves. Earthquakes are caused mostly by rupture of geological faults, but also by other events such as volcanic activities, landslides, blasts and nuclear tests. An earthquake's pint of initial rupture is called its focus or hypocenter. The epicenter is the point at ground level directly above the hypocenter. At the time of earthquake occurrence certain waves are generated which causes destruction of human life & property. Waves generated from earthquake are of two type's body waves (P-waves & Swaves) & surface waves (Rayleigh waves, Love waves, Stoneley waves). As these waves are destructive in nature causing damages or destruction of structures, therefore it is necessary to provide effective provision to resist an earthquake.

The method of base isolation was developed in an attempt to mitigate the effects of earthquakes on buildings during earthquakes and has been practically proven to be the one of the very effective methods in the past several decades. Base isolation consists of the installation of support mechanism which decouples the structure from earthquake induced ground motions. Base isolation allows to filter the input forcing functions and to avoid acceleration seismic forces on the structure. If the structure is separated from the ground during an earthquake, the ground is moving but the structure experienced little movement.

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Study and Improvement of Structure by using Self Healing Concrete

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Abstract - *Self Healing Concrete is a very new concept in the construction industry and not many people are familiar with it. Due to the low tensile strength of concrete, cracks are a regular occurrence in concrete. These fissures reduce the durability of concrete by providing a convenient conduit for the passage of liquids and gases that may potentially contain harmful compounds. If micro-cracks become large enough to reach the reinforcement, not only will the concrete be harmed, but the reinforcement will also be corroded. As a result, it's critical to keep the crack width under control and to cure the cracks as quickly as feasible. Since the expenses involved in maintaining and repairing concrete structures are typically expensive, this research study focuses on developing low-cost self-healing concrete. Self-healing of cracks in concrete will indeed enhance the service life of concrete structures, making the material not only more sustainable but also more durable.*

***Key Words*: Self healing concrete 1, fly ash 2, cracks 3, comprehensive strength 4, cost effective 5.**

1.INTRODUCTION

Concrete is one of the most widely utilized construction mat erial. Because of raw material availability, compressive strength, durability, and cost affordability. Crack occurrence in reinforced concrete should be avoided as much as possible for both longevity of structure and cost considerations, as crack repair is expensive. Concrete autogenous repair, or self-healing, would save a significant amount of money by reducing the need for manual inspection and crack repair. As a result, not only would a dependable self-healing mechanism for concrete result in more durable structures, but it would also benefit the global economy. This research looked into the possibility of using calcite-precipitating bacteria as a crack-healing agent.

Numerous factors, such as shrinkage, freeze-thaw reactions, and mechanical compressive-and tensile stresses, can cause cracks in concrete structures. Although microcracks may not always result in considerable concrete strength loss, the intrusion of water and other reactive chemicals such as chloride and water may represent a threat to steel reinforcement since these chemicals substances strongly intensify its corrosion rate.

Most concrete structures, on the other hand, will undoubtedl y deteriorate and degrade over time. This really is due to water penetration into the concrete, which has a negative impact on the concrete's efficiency. One of these sources of deterioration is the establishment of macro and micro cracks, which provide a pathway for water ingress, dissolved particles in liquids, and undesirable acidic gases. As a result, undesirable contaminants and other things seep into the concrete, compromising its strength and longevity. Few cracks will emerge at the tiny scale, making them undetectable and difficult to approach. The size and number of cracks grow as a result of material ex pansion, contraction, and penetration. Infrastructure maintenance and inspection approaches must be given top priority in this regard. Continuous inspection and maintenance of large-scale infrastructures, however, is challenging due to financial constraints. Other considerations, such as the location of the damage within the afflicted building, may make the restoration difficult.

A unique mending technology based on microorganisms is b eing developed to tackle the aforementioned challenges. Self-healing concrete has the potential to tackle the problem of concrete constructions deteriorating much before their service lives are over.

As a result, the bacterial method appears to be a very promis ing mechanism for facilitating self-healing in concrete structures.

1.1 Problem Statement

Cracks are becoming one of major problem in Construction industry which can decrease the strength of structure resulting in failure of structure. Cement possess self healing property but it cannot heal cracks larger than 0.02mm. In that case Self Healing Concrete becomes useful in which certain bacteria performs chemical reaction which can heal cracks larger than 0.02mm and increases the life of structure. But it becomes much expensive for construction firms to use this technique in construction projects. Hence in this research waste materials are used to replace the quantity of cement which reduces the initial cost of construction.

1.2 Materials

Cement –A construction material that hardens, sets, and attaches to other materials to tie them together. Concrete is made with ordinary Portland cement with a grade of 53. The cement used was tested in accordance with IS 4031-1988.

Fine aggregate – It is used to fill gaps between aggregates. By shaping the bulk, it reduces the cost of mortar or concrete.

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Study of Structural Irregularities in different Seismic Zones using Response Spectrum Analysis

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Abstract: ***The Indian Standard code IS-1893: 2002 (Part-I) defines various types of structural irregularities. The code suggests a special approach of study for irregular structures. The earthquake effect leads to the damage the property and many people loss their life. So, we've to understand the structural performance under seismic load before construction. In this study varying plan irregularities which are often inevitable thanks to building requirements and architectural imperatives, and having a serious impact on building costs are investigated.***
The objective of the project is to carry out Response spectrum analysis of two RCC buildings is to be done in four different seismic zones of India (i.e., Zone-2, Zone-3, Zone-4, Zone-5). ETABS model of G+10 RCC with Varying Geometry plan is considered in this analysis. The analysis is done using Extended Three-Dimensional Analysis of Building System software. Various response parameters like lateral force, story drift, Displacement are often determined. The evaluation of response of structures subjected to lateral loading with the help of frequency and the magnitude of stress resultant, is also included in the scope of this paper.
Keywords: Plan irregularity, Vertical geometric irregularities Response spectrum method, ETABS, Structural Irregularities, Lateral Loading, Non-Linear Analysis, Storey Drift, Storey Displacement.

I. INTRODUCTION

The structural irregularities that affect the behavior of the structure under static and dynamic loads or its resistance to these loads vary widely with the design. The failure of any structure starts at points of weakness, during an earthquake. This weakness arises thanks to discontinuity in mass, stiffness and geometry of structure. The structures having these discontinuities are called as Irregular structures. Irregular structures contribute an outsized portion of urban infrastructure. Plan irregularities are one of the major reasons of failures of structures during earthquakes. The behavior of a building during an earthquake depends on several factors like stiffness, lateral strength, and ductility, simple and regular configurations. The buildings with uniformly distributed mass, stiffness and regular geometry, suffer much less damage compared to irregular configurations. But nowadays as trend is changing, the preference of new generation engineers is towards an irregular configuration for better aesthetic perspective. The role and use of Non-linear Analysis in Seismic Design while buildings are usually designed for seismic resistance using elastic analysis, most will experience significant inelastic deformations under large earthquakes. Modern performance- based design methods require ways to work out the realistic behavior of structures under such conditions. As there are advancements in computing technologies and available data, nonlinear analysis provides the means for calculating structural response beyond the elastic range, including stiffness and strength deterioration associated with inelastic material behavior and large displacements. As such, nonlinear analysis can play a crucial role within the design of latest and existing buildings. Nonlinear analysis involves significantly more effort to perform and should be approached with specific objectives in mind.
In the current study, two different shapes of building are studied to stipulate the effect of plan irregularity. The following parameters are considered and studied: Storey Displacement, Storey Drift, and Time Period.

II. OBJECTIVES

A. The main objective of this project is to study seismic response of the multi-storey buildings (G+10) with varying plan irregularities.
B. To Study & Analyse the behavior of irregular building subjected to lateral loading with the help of frequency, therefore the magnitude of stress resultant.
C. To find the structural behavior of multi storey buildings like storey drift, storey displacement, and time period.

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Strengthening of RC Column Using GFRP

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Abstract: ***In construction industry, engineers try to find new, better, economical material. Today there are several new techniques observed in the industry. In recent years, the construction industry has seen an increasing demand to reinstate, rejuvenate, strengthen and upgrade existing concrete structures. This may be attributed to various causes such as environment degradation, design inadequacies, poor construction practices, lack of regular maintenance, revision of codes of practice, increase in loads and seismic conditions etc. One of the technique used is the wrapping of damaged and newly constructed columns with GFRP. As GFRP has the properties like high strength, light weight, resistance towards chemicals and salt water, it can be moulded into complex shapes, requires low maintenance etc. The behaviour of fibre reinforced polymer on different shapes of column has been extensively studied, but much less is known about concrete in FRP confined damaged columns. In this project a total of 21 columns are casted, out of which 3 columns are conventional columns, 9 columns are damaged & 9 are newly constructed columns. The columns are wrapped with single, double and triple layer of GFRP. An average increase of 33.21% is observed in damaged single layer wrapped GFRP column and 51.64% in damaged double layer wrapped GFRP column and 62% in damaged triple layer wrapped GFRP column. Similarly, 46.93% of increase in newly constructed single layer wrapped GFRP column and 72.56% of increase in newly constructed double layer wrapped GFRP column and 90.23% of increase in newly constructed triple layer wrapped GFRP column.***

Keywords: GFRP, damaged column, newly constructed column.

I. INTRODUCTION

The construction industry has seen an increasing demand to reinstate, rejuvenate, strengthen and upgrade existing concrete structures. From past many years engineers have used different methods and techniques to retrofit existing structures by providing external confining stresses. Externally applied jackets were used as a reinforcement to contain concrete for different reason. Engineers have used different materials such as steel, wood, concrete to confine and improve the structural behaviour of concrete. Fiber reinforced polymers (FRP) has emerged over the last decade as a new material to be used in structural engineering, due to its attractive mechanical properties. Fibre Reinforced Polymer (FRP) composite is defined as a polymer that is reinforced with fibre. It represents a class of materials that fall into a category referred to as composite materials. Composite materials are made by dispersing particles of one or more materials in another material, which forms a continuous network around them. The primary function of fibre reinforcement is to carry the load along the length of the fibre and to provide strength and stiffness in one direction. It replaces metallic materials in many structural applications where load-carrying capacity is important.

II. AIMS AND OBJECTIVES

The present work is aimed to study the strengthening of reinforced concrete columns using glass fiber reinforced polymer (GFRP) with the following objectives.

1) To investigate the effect of increase in layer of GFRP on strength of newly constructed column.
2) To explore the effect of increase in layer of GFRP on strength of damaged column.

III. MATERIALS AND METHODOLOGY

A. Materials

1) Sand - Sand is a granular material composed of finely divided rock and mineral particles. It is defined by size, being finer than gravel and coarser than silt.
2) GFRP fibre sheet - Glass fibres are basically made by mixing silica sand, limestone, folic acid and other minor ingredients.
3) Ordinary Portland cement (OPC) of 53 grade is used for experimental work.
4) Natural coarse aggregate of 10 mm and 20 mm were used for the preparation of concrete.
5) ISO Resin - ISO Resin is a medium viscosity, medium reactive polyester resin based on Isophthalic acid and superior glycols. It exhibits good mechanical and electrical properties together with good chemical

RESEARCH ARTICLE

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Dynamic Analysis of Cantilever Retaining Wall

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ABSTRACT

Retaining walls are relatively stiff walls used for supporting soil laterally. Study of seismic behavior of retaining wall is important for safe design and to know the behaviour of how the response of soil influences the motion of the structure. This paper presents static and dynamic analysis of cantilever retaining wall by 3D finite element analysis using ANSYS software. Aim of this study is to investigate seismic behaviour of wall. For that purpose, soil modeling is done by direct method of analysis carried out by bonding of wall and soil together. Study contains three-parts, modal analysis is carried out after static analysis, mode shapes and natural frequencies of the wall is calculated and then nonlinear time history analysis is done by using three different earthquake ground motions. The influences of parameter are discussed such as dynamic characteristics of wall and soil, shear stresses, equivalent stresses. From this analysis it is observed that maximum displacement occurs at top of the wall and wall does not fail under given loading condition. The significant effect on seismic behaviour of retaining wall has been found in the soil. Also, the Equivalent (Von Mises) stress distribution for retaining wall supporting clayey soil, the lowest Von Mises stress values are detected near the ground level and increases at bottommost of retaining wall and higher stress detected amongst the base slab and the stem of the retaining wall in the soil cover zone.

Keywords : retaining wall, static and dynamic analysis, ANSYS.

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INTRODUCTION

Retaining walls are relatively stiff walls used for supporting soil laterally so that it can be retained at altered levels on the 2 sides. Study of seismic behavior is vital for design of cantilever retaining wall. The objective in seismic design of structure is to make sure the structure has adequate performance when it is subjected to ground motion.

The accessible literature review demonstrates that Mohammad Saeed Ramezani et al. (2016) proposed analytical model for estimating natural frequencies of retaining wall considering effect of backfill soil interaction. Author considered retaining wall with variable and equivalent cross-section with different wall height. The results are acquired from the suggested formulas and are compared with numerical analysis using the ANSYS software and a decent arrangement was noticed. Susumu Nakajima et al. (2020) study the effects of backfill cohesion on the seismic behaviour of retaining wall on the basis of a series of 1 g shaking table model tests. Author has performed a detailed analysis by measuring seismic active earth pressure acting on retaining wall. Backfill consist cohesive (Clay) and cohesionless (Sand) soil in unsaturated condition. The model test results express that a retaining wall having cohesive backfill soil is more constant than a wall without it. Tufan Cakir (2013) study the three dimensional backfill-structure interaction

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RESEARCH ARTICLE

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Analysis of Initial Rotational Stiffness for Different Section of Semi-Rigid Connection

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Abstract

Structural frames are designed for gravity loads. For rigid connections, the entire 100% intensity of the beam section is not used, this is because the end support moment of the beam at the end is always greater than the midspan moment. The end moment value of the beam is reduced by using a semi-rigid connection. In this paper we have analyzed semi rigid connections for different sections. The results of the study indicatethat the formula in the paper appropriately stated the initial rotational stiffness of the top and seat angle connections. The type of semi-rigid connection is usually chosen based on stiffness of connection. In this paper initial connection stiffness (Rki) of an unstiffened top and set angle with double web angle semi-rigid connection of G+3 steel structure is estimated and result obtained are validated using theLiu Wei and Shu Ganping.

Keywords: Semi rigid connection, top and seat angle with double web angle, initial rotational stiffness.

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Introduction

Steel structural frameworks are built to withstand vertical loads and provide connection stability. Because support moments are always greater than span moments, the entire power of the beam section is never completely used, and so section selection is based on support moments. Support moments can be lowered and span moments can be raised when connection flexibility is provided, resulting in smaller sections and cost savings. Semi-rigid connections can be used to accomplish this. The semi-rigid connection's initial stiffness must be determined first, and then a Moment-Rotation relationship curve for the semi-rigid connection must be produced. Moment required to motive unit rotation is known as "Rotational Stiffness." As we know, in pinned connection, at supports, moment is continually zero in order that stiffness of a pinned connection is always zero. Similarly, in inflexible connection, at supports, angle of rotation is continually zero in order that stiffness of an inflexible connection is infinity [1]. But in semi-inflexible connection, at supports, moment and angle of rotation will now no longer be identical to zero. This method moment and angle of rotation each may be exist collectively with having a specific value[2]. Consider the steel frame structure to indicate connection flexibility in steel frames. Connections between the beam BC and the supporting columns can be made in different ways.

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RESEARCH ARTICLE

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Seismic Analysis of Unsymmetrical Buildings Compering with Regular Building

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ABSTRACT

Structural analysis of building is taken into account for finding out the behaviors of a structure when subjected to some external force acting on building. Building structural design for seismic loads is critical for structural safety during large ground movementsBuildings with symmetrical and unsymmetrical plan geometry, strength, and stiffness are also varied. During earthquakes, structures with a symmetric distribution of stiffness and strength in plan experience combined lateral and torsional motions.Previous earthquakes, in which many reinforced concrete structures were badly damaged or collapsed, highlighted the need to assess building seismic performance. Earthquakes can cause irregular distribution of mass, stiffness and strengths i.e., unsymmetrical buildings may cause heavy damage in structural members. Buy referring this paper it is concluded that symmetric buildings perform better than un-symmetric buildings when subjected to earthquake forces.

Keywords: Unsymmetrical building, mass, stiffness, deflection of building, irregular shapes.

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INTRODUCTION

The response of buildings to earthquakes is a complicated, it is difficult due to limitations in technology and depth of understanding the problem due to this many problems are created for analysis.

The building is designed as SMRF for better performance it just has to be constructed to withstand lower force then it is designed as an OMRF. Asymmetry can be reason for a building's poor performance under severe seismic loading. The buildings with vertical setbacks and L, H, U or T shaped in plans are more affected during seismic event. The poor performance of building under strong seismic loading can be attributed to structural asymmetry. Seismological data from many earthquakes were collected and analysed to map and understand the phenomena of earthquakes.

Loading on buildings can vary from normal commercial loads to heavy loads for special buildings used for specific purpose, such as Data canter buildings.

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Plan layout of all the analytical models is kept same for symmetrical buildings on plain grounds and asymmetrical buildings on sloping grounds for better results. To understand the seismic effects of symmetrical and asymmetrical models, seismic analysis is performed using linear dynamic (Response spectrum method) and nonlinear static methods (Pushover analysis) equivalent static analysis and Nonlinear dynamic analysis.

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RESEARCH ARTICLE

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Investigation on Seismic Performance of Outrigger Structure For High Rise Building

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Abstract

As of today's growing population, tall buildings are now being built, with various sorts of high-rise buildings in terms of lateral resisting systems. Outriggers are one of the most effective lateral load resisting techniques for increasing the stiffness and seismic capabilities of a building. Shake table tests are effective ways of determining a building's seismic capacity in seismic engineering. Due to the limited size and capacity of existing shake tables, scale structural models will be required. However, to know the real effect of a building and because of the limited capacity of shake table, we can use software to analyze building's seismic performance. In this paper, an investigation of the seismic performance of past experimental work has been performed in the software Etab, and to validate the result same method has been applied. A software tool was used to do modal analysis on the prototype structure, and the experimental data was compared with the software results to acquire a better understanding of the building's seismic performance. In past experimental study, free vibration test was carried out to know the time period of the structure. In order to observe the same result, modal analysis is performed in software to find out modal period and the damping ratio was calculated manually. After comparing the software result and experimental values of time period and damping, it was clear that the software application and the experimental findings were in good concordance.

Keywords - Shake table test, high-rise building, outrigger, ETABS

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Introduction And Literature Review

As of today's growing population and limited horizontal space, tall buildings are becoming increasingly necessary. However, as building height increase, we must choose the appropriate structural system for a tall structure. Tall structures are subjected to a variety of loads. It's crucial to choose the right structural system for a tall building that will be subjected to horizontal loads. The responsiveness of tall structures to horizontal loads is a fundamental aspect that influences their design.

In modern tall buildings, moment resisting frame structures, shear wall structures, braced frame structures, and tubular structures may not provide enough stiffness to resist lateral loads for structures taller than a certain height, so outriggers between the core walls and exterior columns are used to provide adequate lateral stiffness to the structure. Outriggers

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RESEARCH ARTICLE

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Ultrasonic Pulse Velocity Test on Hybrid Fiber Reinforced Concrete

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ABSTRACT

Concrete is a material of high importance in infrastructure and development projects. Concrete is characterized as a brittle material. In order to minimise the brittle failure, it is beneficial to add the fibers to the concrete mix without compromising the quality of concrete. The length of polypropylene fibers (PPF) and steel fiber (SF) used in concrete mixtures are 50 mm and 35 mm respectively. The aim of this paper is to learn the quality of concrete and dynamic modulus of elasticity by using Ultrasonic Pulse Velocity (UPV). The percentages of polypropylene fiber are 0%, 0.3%, 0.6%, 0.7%, 1% and steel fiber are 0%, 0.1%, 0.4%, 0.7%, 1%. Comparison of conventional and Hybrid fiber-reinforced concrete (HFRC) is studied further. Experimental investigation is carried out on 18 cubes of M40 grade concrete of size 150X150X150 mm for Ultrasonic Pulse Velocity (UPV) and compression test. The results show that conventional as well as fiber-reinforced concrete are of excellent and of good quality with 28-day strength of 60.74 MPa. Conventional concrete has the highest pulse velocity and dynamic modulus of elasticity of 5.1903 5Øß5Ø'Ü and 62.43 GPa. Next to it C-3-5 has a pulse velocity of 4.886 5Øß5Ø'Ü, dynamic modulus of elasticity as 48.61 GPa and compressive strength of 61.77 MPa. Among FRCs Polypropylene fiber-reinforced concrete with 1% fiber volume fraction showed appreciable value of pulse velocity and elastic modulus. In hybrid fiber-reinforced concrete C-3-3 with 0.7% SF and 0.3% PPF has proven to have better quality as compared with other HFRCs.

Keywords- Hybrid fiber-reinforced concrete, Dynamic modulus of elasticity, Quality of concrete, UPV

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INTRODUCTION

According to the necessity of the construction industry, it has become the trend of development in nearer future to implement the cheap price and performance of fiber-reinforced concrete. The fibers are divided into organic, organic, metal, synthetic, natural etc. the improvement of use of fibers in concrete is shown in aspects mentioned below, first is organic synthetic fiber with less strength can productively reduce the crack's forming initially while the curing of concrete. Secondly fibers with high strength constructively disperse the loads to improve the strength of FRC. HFRC is said to be a composite material, consisting of two or more types of fibers which are added simultaneously. The performance of FRC is enhanced by using different characteristics of fibers.

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Non-destructive testing (NDT) is a valuable tool for determining concrete qualities (mechanical or physical). In the case of structural optimization and productivity of budget, is a technique for determining

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RESEARCH ARTICLE

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Regular and Equal Water Supply System

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Abstract

Water scarcity is a severe problem in many Indian villages and cities. The urban water supply system is under immense strain in order to provide enough drinkable water to India's rapidly growing population. In order to achieve self-sufficiency, villages require a significant amount of pure or high-quality water delivery. For that we created water distribution systems that supply equal and of high-quality water. As a result, in our automated regular, equal, and quality water distribution unit, quality testing sensors and various pressure sensors are used. The water distribution system's equitable and quality water supply automation is versatile. It may be deployed in different ways in villages and metropolitan areas, depending on customer needs. This automation is also achievable in residential, industrial, and commercial buildings and rural locations. It is an effective strategy for reducing water scarcity and preventing health problems because it monitors water quality. It is an interdisciplinary framework in which Electronic & Telecommunications (E&TC) and Information and Communications Technologies (ICT) are combined with the Internet of Things (IoT) to provide effective and useful operation of water resources, water distribution, and water quality.

Keywords: Fully Automated System, Communication technology, Equal, and Quality Water Distribution, Internet of things, water pipeline, Water tank, sensors, Solenoid valve, Arduino UNO.

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Introduction

One of the most critical issues in human civilization has been the provision of sufficient water, of acceptable quality and quantity, and the challenge of meeting user demands has grown as the population has grown. Cities and towns are currently experiencing water scarcity, poor water distribution, and leakage issues. Furthermore, different floors in residential apartments and public buildings, different stores or industrial units, and various lanes in villages face challenges with equal or uniform water distribution systems, which are provoking huge disputes, particularly during the hot or rainy season.

In traditional water supply and distribution operations, professional operators who are familiar with the facilities forecast daily demand based on date and weather data and operate the entire facility. However, due to the mass retirement of skilled operators and municipal mergers, more efficient water supply and distribution operations and infrastructure maintenance and management have recently become necessary. As a result, there is a strong demand for a proper water distribution system to maintain an adequate and consistent water supply.

Many research has attempted to build a general water supply system to aid decision-makers in designing more reliable and continuous systems for a long-term operating period when water demand increases in the current water supply system. The National Rural Drinking Water Program (NRDWP) was established in 2009 with the goal of providing safe and sufficient water for drinking, cooking, and other household requirements to all rural residents on a long-term basis. A municipal corporation in a city has also started utilizing some software to implement water distribution. However, water leakage and improper water supply are severe issues with the same water supply source in many rural and urban areas in the country. As a result, this problem was observed. After much research and dealing with technology, we reached a technological solution and made a working system or prototype to overcome the existing problem. Our equitable distribution system aims to provide water of adequate quality, quantity, and pressure to end users, which is completely automated. In this system, information that we will get from the sensors will be on the web in offices. Also, emergency alerts will be on cell phones through GSM service and on the web application.

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Literature Review

Design and automation with the Internet of Things (IoT) is a key source to monitor and control the water supply. For

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JOURNAL OF EMERGING TECHNOLOGIES AND INNOVATIVE RESEARCH (JETIR)

An International Scholarly Open Access, Peer-reviewed, Refereed Journal

STUDY ON UTILIZATION OF NATURAL FIBRE AS A COMPOSITE MATERIAL IN CEMENT MORTAR TILES

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Abstract : *In order to optimize the cost of construction, engineers have always been on the lookout for efficient which require minimum maintenance and labour to install. Fibre has potential as a raw material for the production of flooring materials like carpet and tiles. The main objective is produce cost effective flooring tiles without compromising their quality by replacing cement up to 15% using natural fibre. On the basis of pervious results, a composite with a fibre volume of 12% was considered to be the optimum composite. A comparison of material cost indicated that this composite tile was substantially cheaper than the ordinary cement concrete tile. The experimental investigations uptill now have concluded the use of coconut fibres in composite cement tiles by replacing some percentage of cement with coir fibre. The project associated with partial replacement of cement with natural fibre for the production of cement flooring tiles. The various tests are performs as per the Indian standard specifications for tiles. Fibres proves to be a better replacement for cement considering in natural availability. The tiles are easy to manufacture and install. The fibre composite cement tiles are compared with the normal tiles and result obtained. These types of tiles reduce the cost and waste generated, easily recycle the wastes and reuse them in innovative way by modern techniques.*

Key words: *Cement mortar tiles, coir fibre cost effective , high strength, flooring tiles.*

1.INTRODUCTION

Coconut fibre has potential as a raw material for the production of flooring material like carpet and tiles. The main objective is to produce cost effective flooring tiles without compromising their quality be replacing cement up to 15% using natural fibre. On the basis of the previous results, a composite with a fibre volume of 10% was considered to be the optimum composite. The project associate with partial replacement of cement with natural fibre for the production of cement flooring tiles .Coconut tree, coconut and coconut fibres research for different purposes. There is huge difference in some properties, for example , diameter of coconut fibres is approximately same and magnitudes of tensile strength are quite different. Coconut fibre is extracted from the outer shell of a coconut. The common name, scientific name and plant family of coconut fibre is Coir, Cocos nucifera and Arecasa (Palm), respectively. Coconut cultivation is concentrated in the tropical belts of Asia and East Africa.There are two types of coconut fibres, brown fibre extracted from matured coconuts and white fibres extracted from immature coconuts. Coconut fibres are stiff and tough and have low thermal conductivity Coconut fibres are commercial available in three forms, namely bristle (long fibres), mattress (relatively short) and decorticated (mixed fibres).

1.1 Natural fibre :Natural reinforcing materials can be obtained at low levels of energy using local manpower and technology. Utilization of natural fibres as a form of concrete enhancement is of particular interest to less developed regions where conventional construction materials are not readily are too expensive.

1.2 Coconut fibre-Coir or coconut fibre, is a natural fibre extracted from the outer husk of coconut and used in products such has

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THE DESIGN AND COST ANALYSIS OF NET ZERO ENERGY RESIDENTIAL BUILDING

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Abstract - *Zero Energy Buildings is very crucial because they produce Energy that is beneficial for the environment and cost effective for the owners of the house. These types of buildings generate Equivalent amounts of input and output energy leading to a self-sustaining house with zero net energy. For this project, we are taking efforts to utilize and apply the engineering design we learned in 3-4 years of engineering in order to build a zero-energy building that meets a certain customer Zero Energy Buildings are very crucial because they produce Energy that is beneficial for the environment and cost effective for the owners of the house. These types of buildings generate Equivalent amounts of input and output energy leading to a self-sustaining house with zero net energy.*

For this project, we are taking efforts to utilize and apply the engineering design processes we learned in 3-4 years of engineering in order to build a zero-energy building that meets a certain customer need analysis. Working in team of four we each researched and familiarized ourselves with the topic of Zero Energy Buildings (ZEB). We Used the information we acquired by doing some research to Design, a ZEB mode that explores several passive-solar design Strategies for facilitating the most heat retention with the need's analysis.

Key Words **- Net Zero Energy Residential Building, NZEB, Cost Analysis, Solar Energy, Payback Period, Electric Load, Energy.**

INTRODUCTION

Self-sustaining energy is the key to building a better future. One of the biggest problems Towering over and gripping our nation today is the profuse and heavy consumption of Resources that are not only ridiculously expensive but also extremely Harmful to the environment[1](Szu-Chi-Kuan). To prevent the inevitable demise of our planet, many concerned Individuals have adopted eco-friendly polices integrating them into their Everyday lives. Although activities such as recycling paper, growing Organic food, and minimizing use of water and electricity have over the Years proved to be beneficial, none have provided a significant solution to This modern-day problem the way Zero Energy Buildings have [2] (K. Kahayan).

With so many different terms and so many ways to look at zero energy buildings there are inevitably many different definitions available. One of the basic definitions may be as follows: "A net zero-energy building (NZEB) is a residential or commercial building with greatly Reduced energy needs through efficiency gain the building is said to be a NZEB" [3] (Shanti Pleiss and Paul Tortellini).

- If its Total energy consumption = 0; i.e.
- Total energy use – Renewable energy =0
- If its Total energy consumption = 0; i.e.
- Total energy use – Renewable energy =0

[4].

As a group of four we firstly tried to collect as many as research papers and articles which are related with the concept of net zero energy building or green building. Then we went through the articles of various authors to get an overall idea of the concept. After getting enough idea we considered some important software which can be helpful in our project such as: 'Autodesk AutoCAD, Autodesk Revit'. The reason behind choosing Revit as our main software is it enables us to elaborate our thoughts on design of net zero energy building and it an integrated energy analysis feature which helped us to analyze the energy need of building. The problem of housing stock energy efficiency improvement becomes very important. Transition to low energy consumption buildings construction becomes a trend which in the nearest future will transform to the task of Applied Research in the field of design and construction [5-6]. Such exploration object is to design Buildings with zero energy consumption or close. The novelty of the project consists in an integrated approach of the

Strengthening of Concrete by Utilization of Hypo Sludge and Fly Ash as Partial Replacing Material of Cement.

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Abstract

For sustainable development, protection of environment is one of the major challenges. The concrete is an important material in construction. The major element in concrete is cement. The production process of cement from its raw material produces a lot of CO2 which causes environmental pollution and global warming. About 7% of world carbon dioxide emission comes from Cement producing factories. To reduce the emission of CO2 during cement manufacturing process, alternatives like fly ash, hypo sludge etc. can be utilized. The utilization of thermal industry waste fly ash and hypo sludge can reduce the consumption of natural resources, decrease of pointless land filling & environmental pollution.

This paper shows, proportionate use of hypo sludge and fly ash in M25 Mix Grade with respective varying percentage as: 5% + 5%, 10% + 10%, 15% + 15%.

Concrete mixtures were produced, tested and compared in terms of compressive strength to the conventional concrete. These tests were carried out to evaluate the mechanical properties for the test results for compressive strength up to 28 days are taken.

Keywords: *Hypo Sludge, Fly Ash, Compressive Strength, Environmental Pollution.*

1. INTRODUCTION

Enhanced construction activities, shortage of conventional building materials and abundantly available industrial wastes have promoted the development of new building materials.

The most basic building material for construction is concrete. A significant quantity of cement is utilized in making of concrete. Use of cement in producing conventional concrete, creates environmental problems. The study is done on concrete with the use of Hyposludge & Flyash as the partial replacement of cement to solve the problems of environmental pollution and at the same time to build structures economically by utilizing industrial wastes.

Hypo Sludge, a waste derived from paper industry is plentiful in India causing health, environment and dumping problems. About 300 kg of sludge is produced for each tonne of recycled paper. Hypo Sludge concrete makes a 'greener' building material and the discarded natural wastes can be re-utilized, avoiding otherwise wasteful landfill and harmful open incineration. To make value added concrete for development of sustainable infrastructure there is a great need to study the technical details concerned with various industrial wastes in concrete and to reduce environmental hazards. It also reduces

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Use of Recycled Concrete Aggregate in Construction

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Abstract

Today Worldwide, sustainability is need of the hour in the construction industry and towards this end, use of waste material in construction is being increasingly encouraged so as to reduce environmental impact. In the highway infrastructure, a large number of originate materials and technologies have been invented to determine their suitability for the design, construction and maintenance of these pavements. waste concretes are one of them.

The main aim of this study is to focus on using the available waste/recycled concrete present in abundant which can be used economically and conveniently. The use of these materials in construction proves eco-friendly and economical with appropriate proportion.

Waste concrete can be used as aggregate in Buildings and Pavement construction which can replace content of natural aggregate.

Keywords: Recycled Concrete Aggregate, Sustainability, Waste Concrete, Natural Aggregate.

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1. INTRODUCTION

The greatest potential for reusing old concrete at a high value is to use it as aggregate in new concrete. Many times, this old concrete sits in unsightly piles, is land filled or is used as random fill or sub-base material. On the other hand, natural aggregates, which consist of crushed stone or gravel and sand, constitute the major component of pavement concrete, occupying from 70% to 80% of the volume of concrete mixtures. Natural aggregate resources are vast but finite, and aggregate resources are being depleted, especially near urban areas. Environmental regulations and land use policies further limit the opening of new quarries or the expansion of existing aggregate quarries.

Natural aggregate costs are expected to rise with scarcity of sources and increasing haul distances. Using recycled concrete aggregate (RCA) as a substitute for natural aggregates is a way to potentially address these economic and environmental concerns.

2. MATERIAL PROPERTIES

Recycled Concrete Aggregate:
The aggregates we used as raw material were extracted from demolished building in Baramati. The demolished building was a Bus Station owned by MSRTC.

Cement:
The most commonly used is Ordinary Portland Cement. The OPC 53 grade compatible to IS 8112 – 1989 was the standard followed in the mix.

Coarse Aggregate:
The fractions from 20 mm to 4.75 mm are used as coarse aggregate. The Coarse Aggregates was made from locally available resources.

Fine Aggregate:
Water is an important ingredient of concrete as it actively participated in chemical reaction with cement. Here Water-Cement ratio is maintained at 0.42

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Effect of hydrogen peroxide and ferrous ion on the degradation of 2-Aminopyridine

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Pharmaceutical compounds 2-Aminopyridine were detected in drinking water, surface water, and groundwater. 2-Aminopyridine is a colourless solid used for manufacturing drugs, sulphapyridine which is extremely poisonous and carcinogenic. Its appearance in drinking water needs prior treatment to dispose of safely. Fenton, Photo-Fenton oxidation processes were carried out to degrade 2-Aminopyridine. Parameters like pH, the dosage of Hydrogen peroxide, and Iron are optimized for the effective degradation of a 2-Aminopyridine compound in water. The effect of the initial concentration (10-80) mg/L of a 2-Aminopyridine pharmaceutical compound on degradation was studied. Drug at initial concentration of 10 mg/L, 40 mg/L and 80 mg/L is 100% degraded in 30 mins,45 mins and 120 mins respectively. Similarly, COD removals of 94.6%, 88.6% and 81% were detected at 10 mg/L, 40 mg/L and 80 mg/L of initial drug dosage. The degradation was enhanced by photo-Fenton oxidation. Both the drug degradation and COD reduction were improved by UV-C-assisted photo-Fenton oxidation processes.

Keywords: 2-Aminopyridine; chemical oxygen demand; degradation; Fenton oxidation; photo-Fenton oxidation; pharmaceutical compound

1. Introduction

Sparkling, clean water is the basic need for all living creatures and human beings. But its availability is a major problem nowadays. This problem is increasing due to global industrialization and population growth. Normal water is polluted by domestic, industrial, and agricultural wastes. Hence, it is very important to remove the pollutants and pathogens from the wastewater to make it reusabl for irrigation, industrial and domestic purposes. Pharmaceutical compounds are detected in surface water, groundwater, sewage effluents (Adukia 2014), and drinking water (Babuponnusami and Muthukumar 2011). Advances in systematic treatment technology have been helpful in their augmented detection. Many surveys and studies have detected pharmaceuticals in municipal wastewater and effluents, which are as a major source in drinking water (Bai et al. 2009; Bidhan et al. 2009; Bach et al. 2010; Bernabeu et al. 2012; Bokhove et al. 2012; Bai 2013 and 2013). The results indicated the adverse health impacts on humans from exposure to the trace concentrations of pharmaceuticals found in drinking water (Sun et al. 2007; Grebel et al. 2010; Chaubey and Pandey 2011; Cuevas 2011; Damodhar and Reddy 2013; Jihyun et al. 2014). The up-to-date approach to the management of wastewatersresults from quantity minimization and in-situ pollution prevention. Despite the use of the best available technologies, the generation of wastewaters in industrial processes is sometimes unavoidable. Also, the discharges of pyridine compounds exhibit toxic characteristics with high carcinogenic and mutagenic activity (Lataye et al. 2008; Jiquan et al. 2012; Jihyun et al. 2014). Also, pharmaceutical agents, such as isoniazid, cetyl pyridinium bromide, analgesic dermal, and cephalexin, are manufactured using pyridine as a catalyst (Lindqvista et al. 2005; Li et al. 2009; Lin et al. 2010). Therefore, a large amount of pyridine-containing wastewater as effluents is released by various industries. Numerous pyridine compounds are dangerous and prevalent for a longer time in the environment, as they are poor substrates to indigenous microorganisms. The removal of pyridine from the water stream is, therefore, of great importance (Malhotra et al. 2005; Malesic et al. 2006; Luis et al. 2009; Loures et al. 2013). To remove most of the organic load, biological processes are usually used, because they are more economical than the physical and chemical ones. Most physical methods like adsorption are very sensitive to the pH of the wastewater. Other methods, such as Thermal incineration and Ultrafiltration, are not economical. Biological methods are environment-friendly, using optimized natural pathways to eradicate pollution and transform it into another form (Niu

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Effect of Structural Shape on Seismic Response of Air Traffic Control Tower

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Abstract

Air Traffic Control Towers (ATCT) is one of the obligatory infrastructures for the airport to control the takeoff and landing of airplanes. The primary purpose of ATCT is to prevent collisions and shape the flow of air traffic. Due to a lack of adequate information about the seismic analysis, the performance of ATCT is generally considered to be the same as that of normal structures. However, the performance and demands of ATC towers differ significantly from common structures. In the present study, the analysis of ATCT for different structural shapes (viz., Hexagonal, Octagonal, Pentagonal, Square) with a height of 55m has been investigated. The structural performance of these models has been studied by different time history analysis using commercial software ETABs. The results exhibited that the performance of octagonal and hexagonal configurations was effectively better for seismic loads as compared to the pentagonal and square configuration in respect of story displacement, story drifts, story shear, and time periods. The seismic analysis also shows that the octagonal shape attracted larger base shear than pentagonal, hexagonal, and square shaped ATCT. However, due to more lateral resisting capacity, the drifts and displacements are found to be least.

Keywords: Air Traffic Control Tower, Structural shape, Structural configurations, Time history Analysis.

1. Introduction

The prime services available at the airports are often the facilities to store and maintain aircraft, and a control tower. Airports are among the most important infrastructures that should keep their serviceability during and after severe earthquakes to manage their crucial workload and critical role. One of the most important facilities at an airport with a direct influence on the serviceability is the air traffic control tower (ATCT). To have organized air traffic, each airport is usually served by one or more control towers. Therefore, no landing or takeoff may take place if the control tower is shut down, and the whole functionality of the airport will be halted temporarily. If the control tower cannot operate properly, due to structural or non-structural damages during earthquakes, the airport may experience some long-term disabilities.

Despite the significant role that ATCT plays in the functionality of airports, only a few researchers have studied the seismic performance of these structures. Mohammadreza Vafaei, Azlan Bin Adnan, Ahmad Baharuddin Abd. Rahmanstudied the seismic performance of Kuala Lumpur International ATC tower, with a height of 120m was investigated. It was concluded that conventional linear and pushover analysis did not accurately reflect the seismic behavior of the tower investigated over the course of this study. In the future, special care should be paid when using linear and pushover analysis for the seismic evaluation of air traffic control towers.[1]

It was observed byMohammadrezaVafaei and Sophia C. Alih, that records with a low PGA/PGV ratio imposed the highest level of damage to the towers. Results indicated that the intensity of seismic-induced damage to the tallest tower was significantly more than that of the shortest tower. It was concluded that only the shortest tower could satisfy the expected seismic performance objectives.[2]

Sassan Eshghi and HoomanFarrokhistudied the concentrated loads located at the top of the structure, and with increasing these loads, the cracking in the tower was traced. The first cracks initiate in the floor slabs at a very small proportion of the ultimate lateral displacement capacity of the tower and broaden quickly with the increase of the lateral load. The cracking pattern in the pushover analysis showed that the floor diaphragms do not have enough stiffness to connect the wings correctly. By increasing the stiffness of slabs (increasing thickness), the maximum deformation capacity of the structure can be greatly modified. They concluded that it was unwise to consider them as rigid diaphragms which constraint side wings together at

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Effect of Frequency Content of Earthquake Ground Motions on Structures with Varying Dimension

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Abstract

An earthquake is a catastrophe which is always a topic of concern for structural designers and civil technocrats. Not only it causes physical damage to the structures but also successful to impart psychological disorder in human minds for long-run. In order to mitigate the devastating effects of earthquake on society, it is eminent to study the dynamic characteristics in detailed manner i.e. to examine how the structure responds owing to the seismic characteristics. The various ground motion characteristic includes time-duration and velocity, frequency content and amplitude, displacement, incremental velocity and incremental displacement, peak ground accelerations (PGAs), etc. Out of these, effect of frequency content and maximum amplitude value of earthquake ground motions on the seismic response of structures is often underestimated. This paper investigates the effect of frequency content and maximum amplitude value on the seismic response of structures which is dominant of all characteristics. The study proceeds with recording time-history of acceleration obtained from conventional unidirectional harmonic shake table. Further, FFT (Fast Fourier Transform) analysis of applied time-history is done and the effect of frequency content and the maximum amplitude value of applied time-history on the seismic responses of structures is investigated and studied. For this, structures with varying dimensions (height, length, and width) are modelled and time-history analysis of structural models has been carried out in SAP2000v19. Seismic responses of analysed structures are represented in the form of fundamental natural frequency, storey displacement, and base shear. It is reported that out of many earthquake indices, frequency content and amplitude of earthquake ground motions are the most dominating. It is reported that the resonance phenomena occurs for the less height structure and thus it shows maximum displacement and base shear responses. Also, as height, length, and width of structure increases; displacement, base shear, and fundamental time-period of structureincreases.

Keywords: FFT analysis, frequency content of earthquake ground motions, resonance, and Time-history analysis,

1. Introduction

The frequency content of earthquake ground motion is often not considered while assessing the seismic response of structures, although it is assumed to be mostly governed by the magnitude of the earthquake event and its peak ground acceleration (PGA) component. However, research and studies conducted progressively stated that the seismic damage is also governed by the dynamic characteristics of earthquakes along with its magnitude and PGA. It was also observed that the seismic response of structures were more influenced by various ground motion characteristics such as its time-duration and velocity, frequency content and amplitude, displacement, incremental velocity and incremental displacement rather than the PGAs [1, 2, 3, and 4]. Further research studies have been performed and it was reported that the frequency content and the highest amplitude values were the key parameters in the earthquake resistant design of structures [5 and 6]. Studies have been performed on various structures such as liquid storagetanks, long-span bridges, stone masonry structures, multi-storied building, experimental models, etc. to check the influence of frequency characteristics and maximum amplitude value of the various earthquake events. Similar conclusions can be extracted claiming the dominance of frequency content on the seismic response of structures [7, 8, 9, 10, 11, 12, and 13]. When the dominating frequency of earthquake ground motions matches the natural frequency of structure, the seismic response of structure is greatly influenced and causes severe damage. This phenomenon is called Resonance [14].

This paper studies the effect of frequency on the seismic response of structures having varying dimensions. In first phase, time-history of acceleration is recorded for frequency ranging from 0-25 Hz obtained from the installed horizontal shake table, and FFT analysis of recorded time-history is carried out where the dominating frequency content is examined. In second phase, to study the effect of the varyingdimensions on the seismic response the structures, three single storey space frame structures with varying height, length, and width are modelled in SAP2000v19. Further, seismic responses of structure with varying dimensions arerecorded, and results are checked for the influence of frequency content and maximum amplitude value of earthquake ground motions,

2. Recorded Acceleration Time-History Data

Recorded acceleration time-history data is applied to the

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Non-linear Dynamic Analysis of RC Structures Under Earthquake Sequences

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Abstract

Earthquakes in active seismic regions usually occur in a series of medium to strong intensity ground motions at small intervals of times. A large intensity mainshock (MS) is often followed by a series of aftershocks (AS) or even preceded by smaller foreshocks. This sequence type of mainshock-aftershock (MS-AS) ground motions with varying intensity pose major seismic hazardas there is limited scope of repair and retrofitting between seismic events. Due to continuous and repeated seismic ground motions over a brief period of time, the damages in the structure gets accumulated and structure collapse. This study navigates the behaviour of reinforced concrete structures under such seismic sequences. For this purpose, the nonlinear response of three 12 storey reinforced concrete buildings (regular plan, mass irregularity and diaphragm irregularity) is evaluated. The buildings are subjected to five real seismic sequences from previous earthquakes. Nonlinear dynamic analyses are carried out to study the response of buildings under MS and MS-AS sequences considering: a) material and geometric non linearities and b) irregularities. A single highest aftershock is considered in the present study. The results in this study indicates that MS-AS seismic sequence considering both material and geometric nonlinearities has significant effect on the response of structure. It also showed that seismic sequences significantly alter the response of irregular structure.

Keywords: Seismic sequences, mainshock-aftershock, nonlinearities, irregularities.

1. Introduction

In the past it has been observed that a large mainshock is followed by numerous aftershocks, these aftershocks occur because of the complex stress interactions in the fault systems. Generally, the stress on the earthquake fault drops drastically during mainshock and small distributions of stress and frictional strength cause that fault to produce most of the aftershocks [1]. Thus, buildings situated in active seismic regions are generally subject to mainshock-aftershock sequence. Aftershocks poses a major seismic hazard, damages of structures due to seismic sequences has been reported in recent earthquakes including Tohoku (Japan, 2011), Christchurch (New Zealand, 2010-2011), Chile (2010), Nepal (2015) and most recent in Kumamoto (Japan,2016) [2]. The 2012 East Azerbaijanearthquake hit northeast of Tabriz on August 11, 2012, and the strongest aftershock measured at M6.3 occurred 11 minutes after the M6.4 mainshock. The mainshock-aftershock sequence caused at least 327 deaths and more than 3000 other injuries [3]. The great Tohoku earthquake on March 11, 2011 in Japan triggered 60 aftershocks with magnitude 6.0 or greater and three over M7.0. The total economic loss in Japan is estimated at $309 billion [4]. The magnitudes of aftershocks are generally less than the mainshock but an aftershock may have a higher peak ground acceleration (PGA), longer duration than the mainshock. While the magnitude of aftershocks is smaller than mainshock, structures can be particularly vulnerable to aftershocks due to their high rate of occurrence and reduction in the lateral load-carrying capacity caused by damage induced by mainshock. Nonlinear behaviour of SDOF systems under multiple earthquakes indicates that the effects of multiple seismic events implied considerable accumulation of damage [5]. The behaviour of reinforced concrete structures under repeated ground motions of 2D bare frame models was investigated and found that multiple earthquakes were shown to require increased displacement demands in comparison with single seismic events. The study suggested that traditional seismic design procedure which is essentially based on single 'design earthquake' needed to be reconsidered [6].

It was also found that the use of real seismic ground motion data was crucial for evaluating the performance of structures under seismic sequences to consider the source mechanisms. Artificial seismic sequences lead to overestimation of responses [7]. Sequences of earthquakes increases the damage at structural members and the whole structure more than single seismic events when planar frames of reinforce concrete structures were analysed for five real seismic

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Nonlinear Seismic Analysis of RC Elevated Liquid Storage Tanks

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Abstract

Liquid storage tanks are strategically important due to their essential requirement of service in the post-earthquake situation. Numerical modeling of the liquid storage tank needs special attention and cannot be done in the same manner as that of the conventional buildings. In the present paper, a numerical simulation of the RC elevated liquid storage tank is presented. The staging of the tank is modeled as a multi-degree freedom system, and the container with contained liquid is modeled as a two-mass system. Free vibration analysis of the tank is carried out, and mode shapes are extracted. Further, to study the seismic response of the tank, nonlinear time history analysis is carried out. The tank is subjected to time histories of real earthquake ground motions. The varying level of the liquid in the container is another characteristic feature of tanks. The filled condition of the tank is taken into account by considering the aspect ratio (S), defined as the ratio of height of the liquid to the radius of the container. The response of the tanks with two different aspect ratios viz. 0.5 (broad) and 2.0 (slender) is studied. The linear modal analysis also carried out to understand the significance of nonlinear analysis, particularly in liquid storage tanks. Displacement, velocity, and acceleration response at the bracing levels, as well as at container levels, are obtained. Additionally, the base shear response is also obtained. The effect of aspect ratio on the free vibration analysis and the seismic response of the tanks are presented. Liquid storage tanks are special structures that have typically low fundamental natural frequencies. The nonlinear time history response of the tank showed that the higher displacement and velocity response occurs at the convective level. It is found that the linear modal analysis significantly underestimates the response of the liquid storage tank.

Keywords: Seismic analysis, RC elevated liquid storage tank, nonlinear analysis, linear modal analysis

1. Introduction

Earthquakes are the most commonly occurring natural disasters. Concerning the performance of structures during and after earthquakes, many research works are being carried out globally. Liquid storage tanks are lifeline structures as they have to remain functional even after the natural disasters. Numerical modelling of the liquid storage tank needs special attention and cannot be done in the same manner as that of conventional buildings. The varying level of the liquid in the container is another characteristic feature of tanks. Many researchers have carried out work in the field of seismic analysis and design of ground supported liquid storage tanks [1, 2, 3, 4, 5, 6, 7, 8]. International codes such as ACI 350.3 [9], EN 1998-4 [10], and IS 1893-2 [11], specify the guidelines for seismic analysis and design of RC liquid storage tanks. Housner [1,2]; and Haroun [3] carried out vibration studies on deformable cylindrical water tanks, and derived parameters of the mechanical model. Ibrahim et al. [4] carried out an extensive review of recent advances in fluid sloshing dynamics; further, mass-spring dashpot and pendulum models for modelling sloshing were discussed [5]. Jain and Jaiswal [12] and; Tung and Kiremidjian [13] Shenton III and Hampton [14], Shrimali and Jangid [15, 16], Panchal and Jangid [17, 18] worked on elevated liquid storage tanks. The primary assumption in all these studies is the staging of the tank is considered as a single degree of freedom system.

In the present study, a brief idea of the mathematical model for a multi-degree freedom system of the staging of the RC elevated tank, and two-mass system for container and the contained liquid is presented. Further, the governing equation of motion and its solution by the state-space method is also described. The results of the free vibration analysis, linear modal, and nonlinear time history analysis are obtained and presented in the subsequent sections.

2. Mathematical Modelling

Housner [1] proposed a two-mass model which is adopted by several researchers. The modified Housner's model presented in the ACI: 350,03 [6] is used in the present study. Figure 1 displays the schematic diagram of the tank model showing the total height of the liquid inside the tank (H) and the radius of the circular tank (R). In this model, the convective mass (m_c) of the liquid is considered to be connected to the solid tank wall with stiffness (k_c) at height H_c from the base of the container, whereas the rigid mass (m_r) is connected rigidly to the tank wall with stiffness

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Experimental investigation of Magneto-rheological damper

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Paper ID - 180175

Abstract

In recent years, intensive research works are concentrated on the development of semi-active control devices. A semi-active control system can also be explained as a system that mainly requires a small external power source for functioning and applies the motion of the structure to generate the control forces. A semi-active control system typically begins from a passive control system, which is followed by a change to permit the flexibility of mechanical properties. The mechanical properties of the semi-active control devices may be modified depending upon the response from the excitation and/or from the calculated reaction. Magneto-rheological (MR) dampers are a type of a semi-active control device that, in the presence of Magneto-rheological (MR) fluid, responds to the applied vibrations. This type of damper has copper winding in it, forming an electronic circuit internally with a combination of MR fluids. The effectiveness of MR damper greatly depends on the command voltage to the copper winding. In the present study, the response of MR Damper to the command voltage, and the excitation frequency is experimentally evaluated. MR damper is supported by a wall mounting rigid fixture and connected to a shake table by a fixing unit. The voltage is varied from 0 V - 10 V with an interval of 2 V. Command voltages is applied to the MR damper with the help of voltage regulator and digital multi meter. The effect of excitation frequency is also studied (1 Hz – 8 Hz). While conducting the experimental work, acceleration values are obtained through the Data acquisition system. These acceleration values are integrated to get the velocity and displacement response. The relation between the displacement, velocity, acceleration of the MR damper, and the frequency of shake table and command voltage is studied. From the experimental work, it is observed that the displacement response of the damper is effectively controlled by increasing the command voltage.

Keywords: Magneto-rheological (MR) damper, semi-active control device, command voltage, excitation frequency.

1. Introduction

For structural stability of civil structures from seismic response there are several techniques which provide safety to the structures. Some techniques involved in seismic response stability are base isolation, active stability process, passive control process, and semi-active process. So far there have been many works carried out in the above mentioned topics. MR damper comes under the category of semi-active control device. MR dampers are basically used in building structures, cable stayed bridges and vehicles which act as a shock absorbing device.

Carlson (1994); Carlson and Weiss (1994); Carlson, *et al.* (1995) have explained from their study that, MR fluids are the magnetic analogs of electro-rheological fluids and mostly consists of micron sized , magnetically polarizable particles scattered in a carrier medium such as mineral or silicone oil [Carlson, *et al.* (1996)]. When a magnetic field is applied to the fluids, particle chains form, and the fluid becomes a semi-solid and exhibits visco-plastic behavior similar to that of ER fluids. Transition to rheological equilibrium can be achieved in a few milliseconds, allowing the construction of devices with high bandwidth. From their research work it is explained that recently developed MR fluids show very well compatibilty for use in controllable fluid dampers. Additionally, Carlson and Weiss (1994) indicated that the achievable yield stress of an MR fluid is an order of magnitude greater than its ER counterpart and that MR fluids can operate at temperatures from –40°C to 150°C with only slight variations in the yield stress.

Moreover, MR fluids are not sensitive to impurities which are commonly encountered during manufacturing and usage, and little particle/carrier fluid separation takes place in MR fluids under common flow conditions.

Further a wider choice of additives (surfactants, dispersants, friction modifiers, anti-wear agents, *etc.*) can generally be used with MR fluids to enhance stability, seal life, bearing life, *etc.*, since electro-chemistry does not affect the magneto-polarization mechanism.

Kori and Jangid, (2009) have explained that MR dampers had proven that using a small amount of external power can reduce the structural response due to an earthquake. The performance of MR damper depends upon the control law applied. The damper force is directly

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Study on Properties of Self Curing Concrete

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ABSTRACT:
The increase in population has resulted in a rapid increase of construction activities and also caused an imbalance in water management, water being a major requirement in construction used in mixing and curing of concrete and governs hydration of cement. Majority of the water is used in curing of concrete, conventional curing is carried out from the exposed part of concrete to its inner part whereas the contrast is performed at self-curing which also helps in minimizing the wastage of water, where the hydration of cement occurs due to additional water available which is not part of the mixing water. The present study reviews mechanism of self-curing, different self-curing methods and various researches and their impact on utilization of PEG-400 as self-curing agent in order to produce eco-friendly self-curing concrete.

The curing of concrete requires high water demand. In this study reinforcement corrosion protection of self-curing concrete (SC) mixtures incorporating two water-soluble polymers; polyethylene glycol (PEG) and polyacrylamide (PAM) have been evaluated. Durability indices, electrical resistivity, chloride ion penetrability and water permeability, were evaluated and compared to that of control concrete mixture with no self-curing agents under different curing regimes.Self-curing concrete represents a step towards a new construction material due to its lower demand for curing water and hence can reserve the limited water resources in many parts of the world.

Keywords:- Self Curing Concrete(SC),Polyethylene Glycol(PEG),PEG-400,Conventional Method ,Compressive strength.

I. INTRODUCTION :

Curing of concrete plays a major role in developing the concrete microstructure. According to the ACI 308R, Guide to Curing Concrete, "the term 'curing' is frequently used to describe the process by which hydraulic cement concrete matures and develops hardened properties over time as a result of the continued hydration of the cement in the presence of sufficient water and heat". Thus, the role of curing practice lies in reducing water evaporation from concrete to maintain satisfactory moisture content inside concrete which is essential for the continuation of hydration of the cement, and consequently the development of concrete microstructure, pore structure, and needed properties. Proper curing is vital for structures to meet their designed life and minimize maintenance cost. However, good curing is not always practical in many cases. Several studies concluded that increasing the water retention in the mixture can act as internal curing . Several researchers introduced the concept of self-curing concrete .

Self-curing concrete can be produced by incorporating self-curing agents in the concrete mixture . The self-curing agents were mainly chemicals that can absorb and retain water inside the concrete mixture which will reduce water evaporation from the concrete mixture. As the cement hydration proceeds and the internal relative humidity decreases, the self-curing agent will release the absorbed water as an internal water curing source. Hydrophilic water-soluble polymers were successful as self-curing agents. Hence the use of self-curing concretes would be of great benefit in areas where water is not adequately available and will shift the concrete construction to a new level of sustainability

II. MOTIVATION:

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Research Article

Nonlinear Network Speech Recognition Structure in a Deep Learning Algorithm

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As a result of the fast rise of globalization, people in China are learning English at a rapid pace. However, there is a severe shortage of English teachers in the region, which is a major hindrance. To address these concerns, a deep learning-based algorithm is proposed that can not only check English pronunciation but also help learners distinguish between phonemic and quality phonemic while listening and differentiating, as well as correct phonemic errors, thereby increasing their language learning capacity. In order to study the application of nonlinear network identification technology in English learning, this paper evaluates the English pronunciation quality through the deep learning algorithm of deep learning combined with the related contents of neural network data model, and the experimental results of speech recognition structure are analyzed and discussed in detail. The concordance between machine and manual intonation evaluation is 80%, the concordance rate of adjacent intonation evaluation is 98.33%, and the Pearson correlation coefficient is 0.627 that shows the technique is reliable. The method of English pronunciation and speech identification model is sensible and dependable, which can give beginners a punctual, exact and impartial judgment and response guidance, assist learners to get on the differences between their phonemic and standard phonemic, and correct phonemic mistakes, in order to enhance the ability of oral English learning.

1. Introduction

Machine-learning technology controls numerous elements of modern life, from Internet searches to social media, content filtering to e-commerce web suggestions, and it is progressively present in consumer items such as cameras and smart phones. Machine-learning algorithms are used to recognize objects in photos, convert voice into text, match news articles, messages, or products with interests for users, and choose appropriate search outcomes [1, 2]. With the globalization and the improvement of China's internationalization level, the desire of the Chinese people for English learning is increasing day by day. However, due to the significant difference between Chinese and English pronunciation features, the domestic English learning environment remains untapped.

There is a dearth of English teachers, and traditional classroom instruction cannot meet the needs of English learners owing to time and place constraints, among other things. All kinds of reasons have caused English teaching and learning become a major problem that puzzles the Chinese people, and English learning has also become one of

sensors

MDPI

Article

Support Vector Regression for Mobile Target Localization in Indoor Environments

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Abstract: Trilateration-based target localization using received signal strength (RSS) in a wireless sensor network (WSN) generally yields inaccurate location estimates due to high fluctuations in RSS measurements in indoor environments. Improving the localization accuracy in RSS-based systems has long been the focus of a substantial amount of research. This paper proposes two range-free algorithms based on RSS measurements, namely support vector regression (SVR) and SVR + Kalman filter (KF). Unlike trilateration, the proposed SVR-based localization scheme can directly estimate target locations using field measurements without relying on the computation of distances. Unlike other state-of-the-art localization and tracking (L&T) schemes such as the generalized regression neural network (GRNN), SVR localization architecture needs only three RSS measurements to locate a mobile target. Furthermore, the SVR based localization scheme was fused with a KF in order to gain further refinement in target location estimates. Rigorous simulations were carried out to test the localization efficacy of the proposed algorithms for noisy radio frequency (RF) channels and a dynamic target motion model. Benefiting from the good generalization ability of SVR, simulation results showed that the presented SVR-based localization algorithms demonstrate superior performance compared to trilateration- and GRNN-based localization schemes in terms of indoor localization performance.

Keywords: trilateration; received signal strength (RSS); wireless sensor network (WSN); localization and tracking (L&T); support vector regression (SVR); Kalman filter (KF); generalized regression neural network (GRNN)

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1. Introduction

Target localization has been widely researched in recent years, especially to meet the demands of location based services (LBS) for various applications [1–3]. A number of examples of LBS can be given that are useful for uplifting the living standards of society. For instance, in a bike sharing service, a rider can rent a bike using a mobile app and drop it anywhere for the next user once the purpose of hiring is over. The exact locations of all available shared bikes are needed by interested riders in order to look for the nearest bike. Wearable devices such as smart watches can provide their owners with services such as activity monitoring, tracking, and emergency messages. In the retail industry, localization can help raise profits by finding customer locations and even guide them to specific products of interest. This certainly results in an improved shopping experience from the customer's point of view and a gain in revenue from the owner's point of view.

IoT-based smart parking system in smart city

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Abstract: With increase in population along with urbanisation, artificial intelligence technology is playing a vital role in managing resources to make operations easier. Internet of Things has converted the dream of smart city into possibility. In smart city IoT devices work together to make daily tasks such as transportation and parking easier and more efficient. With limited parking spots available and continuously growing vehicle consumption rate, finding a parking location is being a major problem faced by vehicle owners. In this paper, an IoT-based parking system is proposed that can help drivers get an idea of parking availability at a particular location before even reaching the same. The system comprises IoT devices that help in monitoring the parking areas along with server and application that will help vehicle owners to view and reserve the parking spot for their vehicle at desired destination.

Keywords: IoT; internet of things; Nodemcu; mesh-network; micro-services; CCTV; Golang.

Reference to this paper should be made as follows: Gaikwad, D.P., Agarwal, A., Rajale, O., Agrawal, R. and Ranalkar, S. (2022) 'IoT-based smart parking system in smart city', *Int. J. Vehicle Information and Communication Systems*, Vol. 7, No. 3, pp.306–320.

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Development of artificial neural network to predict the performance of spark ignition engine fuelled with waste pomegranate ethanol blends

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ABSTRACT

In this study, an artificial neural network (ANN) is developed to predict the performance of a spark-ignition engine using waste pomegranate ethanol blends. A series of experiments on a single-cylinder, four-stroke spark-ignition engine yielded the data needed for neural network training and validation. 70 percent of the experimental data was used to train the network using the feed-forward back propagation (FFBP) algorithm. The developed network model's performance was evaluated by contrasting its output with experimental results. Input parameters included engine speed, ethanol blends, and output parameters included indicated and brake power, thermal, volumetric, and mechanical efficiencies. Training and testing data had regression coefficients that were almost identical to one. The research revealed that the ANN model can be a better option for predicting engine performance with a higher level of accuracy.

1. Introduction

Many developing countries with agricultural economies face a major problem: agro-waste. There has been an increase in agro-waste as a result of environmental degradation and the limited availability of resources such as transportation and the cold chain. The disposal of agro-waste is also a major concern for municipal authorities. Ethanol production from agricultural waste could be a viable option in this scenario. Ethanol-based biofuels have become increasingly popular in recent years because of their environmental friendliness [1,2]. Humanity has been forced to look for alternatives to depleting and environmentally unfriendly petroleum fuels as a result of rapid urbanization and industrialization [3,4]. Fossil fuel combustion waste products are to blame for environmental damage [5]. Biofuels are an excellent alternative to petroleum-based fuels. Biofuels with higher oxygen content produce lesser harmful emissions. For biofuels, a mixture of 10–20% bio-oils is blended with petroleum-based fuels [6–8]. In the last few decades, ethanol production has tripled [9,10], and the demand for bioethanol is increasing at a rapid rate. This has necessitated the discovery and development of new ways to produce ethanol. Various non-edible sources are used as biomass for the production of ethanol [11–16]. To separate ethanol from feedstock, a variety of tech-

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Advance genetic algorithm-based PID controller for air levitation system

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Abstract: In industrial control systems, PID controllers are being widely used owing to their simple working principles. Many control and instruments engineers and operators use PID controllers in daily life. PID controllers allows for many variations which can cope with a wide range of systems and conditions. For increasing performances of PID controller, fine tuning of its parameters are required. Many authors have used different optimisation algorithms to tune parameters of PID controllers. These optimisation algorithms offer less performance. In this paper, the fine-tuned PID controller have proposed for the air levitation system. Advanced genetic algorithm is used for tuning parameters of PID controllers. For demonstration of efficiency and applicability of the proposed PID controller, simulation-based experimentations have been conducted. The proposed PID design method has been linked with other three optimisation techniques. Ant colony optimisation, particle swarm optimisation and fuzzy logic have been used for performances comparison of advanced genetic algorithm-based PID controllers. In experimental results, we have got very smallest value of IAE, ISE and ITAE using proposed method. It indicates that the proposed PID design method offers better performances than other three optimisation-based PID design methods and other existing methods.

Keywords: PID; integrating; process model; tuning, stability.

Reference to this paper should be made as follows: Gaikwad, D.P., Patil, B.S. and Patil, L.S. (2022) 'Advance genetic algorithm-based PID controller for air levitation system', *Int. J. Modelling, Identification and Control*, Vol. 41, No. 3, pp.243–255.

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Prediction of spark ignition engine performance with bioethanol-gasoline mixes using a multilayer perception model

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ABSTRACT:
The current study examines the impact of bioethanol blends on spark-ignited engine performance using multilayer perception modeling. Waste pomegranate fruits (WPF) from a nearby fruit market are used to make bioethanol. After 72 hours, the fruit juice mixture yielded 1.1 ± 0.3 mLgm^{-1} ethanol. Each of four ethanol mixes was tested at different speeds to determine the engine's indicated and braking power, volumetric, thermal, and mechanical efficiency. The addition of ethanol increased volumetric efficiency by up to 25% and indicated power by up to 20%. In contrast, ethanol proportions showed thermal efficiency variations. In order to forecast performance parameters, a multilayer perception model with feed forward back propogation is used. 25% of the test data was used to validate the MLP model. The accuracy of designed network was checked by root mean square error, mean squared error and Mean Absolute Percentage Error and higher values of regression coefficient. The constructed MLP model predicted values that were highly accurate and with acceptable error. The results proved that the MLP model can be effectively implemented for predicting engine performance and hopeful prospects for waste pomegranate ethanol at commercial level.

KEYWORDS
ANN; biofuel; multilayer perception model; pomegranate ethanol; waste management; SI engine performance

Introduction

Globally, waste management is a major issue. Inappropriate waste disposal pollutes and degrades the environment. Incineration, biological treatment, recycling, and landfilling are few options (Valerio 2010). These solutions reduce waste but harm the environment. Alternatively, recycling this waste into useful items for humanity is a great waste management strategy. Biofuels like bioethanol from waste biomass may be critical to the country's economic growth as fossil fuel reserves diminish (Buratti et al. 2015,

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Design of Framework for Aggregate Key Sharing Mechanism in Cloud Environment

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Keywords: Searchable encryption, data sharing, cloud environment storage, data privacy, etc.

Abstract

The restriction to provide encryption data to various customers through open cloud storage, in particular, will ultimately reduce security constraints in the cloud scenario on unplanned data spills. The skillful organization is two-sided coding keys in key test handling some encryption arrangements. The flexibility is to provide any social concern of the selected records to a client gathering, dissimilar encryption key requests to use in each scenario for offset documents. In all cases, we have advised the need for ongoing distribution to secure customers for encryption and decryption. These customers, who stored keys securely, and appeared as a fairly large variety of catchword inputs to the cloud for remembering the true purpose of investigating data shared securely. The proposed need for secure communications, storage, and multiform existence make the philosophy clear unfounded solution. A solution to this problem has been proposed in this paper. We study all things, offering the smart idea of encryption of searchable key aggregates (KASE), multi-cloud environment schemes. We are creating the new idea through the robust KASE multi-cloud method; the info owner simply must distribute one key, to the customer for endless sharing, and show a selected key.

The single key is verified security and completion of the assessment certify that our planned arrangements are more secure and ultimately beneficial to the customer.

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Design of framework for multi-objective workflow planning for IaaS platform in cloud environment

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Abstract---Today's, we have seen in business third party companies making huge charges to customer in cloud computing platform. So, we are providing solution for how much, we are used cloud service as per timing slots we pay to company as making assets based usages on worked and service level agreement. Despite the fact that there are many existing work process accounting calculations in common widespread or heterogeneous registration conditions, they have problems to be directly connected to the cloud situations as cloud stands out from common heterogeneous situations by its management-based asset monitoring strategy and payment -Pro- Use evaluation methods. In this paper, we have introduce such type challenges and making the model workflow of planning problem that improves both brand throughput and costs as a Multiple objective Optimization Problem (MOP) of the cloud scenarios using more than one assessment plan, event sorting or even Multi-clouds in a lonely roadmap.

Keywords---Scientific work process, Workflow Scheduling, Distributed computing, Multi-Objective Optimization, Genetic Algorithm.

Introduction

Calculating has recently become popular, and it has advanced to the point where it can provide promising stages for facilitating large-scale applications. On-request computational assets, for example, systems storage and servers, can provide from a shared asset group in a Cloud computing show with minimal

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Remote Sensing Bid-Data Classification with Support Vector Machine.

21-22

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- **Author(s):** Kadam, A. J.; Jondhale, K. C.

- **Abstract:** Remote sensing is the process of getting knowledge regarding some article or observable fact not including creation mental contact with the object. The data collected by deploying this method is termed as the remote sensing data. Data collected by this method may be either linear or non-liner in nature. For classification of linear statistics, we have used linear Support Vector Machine (LSVM) and for non-linear Support Vector Machine (NSVM) using different types of kernels. Use of LSVM offers higher accuracy as compared with NSVM. In this paper, we have implemented concept of SVSA (Support Vector Selection and Adaption) for non-linear data with implementation, we have observed that this method offers higher accuracy as compared to selecting different kernel functions. We will use RACE data for training purpose, which will extent that the result of classification using this method which by passes the result of LSVM.

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Experimental study of hardness and corrosion properties of AZ91 magnesium alloy after electroless nano composite coating

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Abstract

Magnesium and its numerous alloys have excellent rigidity, low density, and electromagnetic protection properties, making them ideal for usage in numerous industrial components. Magnesium alloys have a significant disadvantage in terms of corrosion and hardness, which restricts their practical uses. One of the most recent ways for improving the corrosion and hardness of Mg alloys is electro-less nano-coating. The experimental research of corrosion and hardness of AZ91 Mg Alloy due to nano composite coating procedures of ENi-B-$TiO_2$is examined in this study. It would be useful to conduct a thorough examination, including experimental analysis, into the possibilities of increasing the deposit efficiency and characteristics of composite deposits by designing a suitable bath composition and operating circumstances. It has been discovered that as the concentration of titania particles increases, so does the surface hardness of coatings. The optimal concentration of second-phase (titania) particles and bath agitation are also examined in order to get superior surface properties following nano coating. Following this nano coating, the materials may be employed for a variety of materials engineering applications.

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FUSION OF MULTILAYER PERCEPTRON AND KALMAN FILTER FOR INDOOR OBJECT TRACKING

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Abstract: The indoor object tracking using received signal strength (RSS) or received signal strength indicator (RSSI) measurements in wireless sensor network (WSN) is of utmost important in the context of many location based services (LBS). Without the knowledge of location, the measurements obtained with WSN are of no use. The trilateration is widely used technique to get location updates of target based on RSSI measurements from WSN. However it suffers with high localization errors due to fluctuating nature of RSSI. This paper presents a range free multilayer perceptron (MLP) and kalman filtering (KF) based algorithm named, MLP+KF. The performance of MLP+KF algorithm is evaluated using simulated RSSIs and are compared against trilateration based estimation and MLP based estimation. The simulation results reveal that proposed MLP+KF algorithm show very high localization accuracy as compared to rest of the two approaches.

Keywords: Wireless Sensor Network (WSN), Multilayer Perceptron (MLP), Kalman Filter (KF), Received Signal Strength Indicator (RSSI), Target Localization.

1. Introduction

The wireless sensor network (WSN) is most appealing technology of the 21st century as it paved the way for many day to day applications such as elderly monitoring, wildlife tracking, environmental monitoring, etc (Akyildiz et al., 2002; Davidson & Piché, 2017; Gu et al., 2009).

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Application of Extended Kalman Filter for Tracking of Mobile Target

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Abstract
Knowledge of continuous location updates is very important aspect in many location based services (LBS). Therefore, localization and tracking a mobile target using RSSI measurements with wireless sensor network (WSN), is one of the widely research topic. The trilateration based localization using received signal strength indicators (RSSIs) is simple and widely used approach in the literature. However, high localization accuracy may not be obtained with the trilateration due to dynamicity (highly fluctuating nature) of RSSI measurements. Therefore, the location estimates of trilateration must be refined further with the help of some more advanced state estimation technique to guarantee high localization accuracy. In this paper a novel fusion of trilateration and extended kalman filter (EKF) to address the issue of uncertainties in measurement noise in the received signal strength indicators (RSSIs) is proposed named as Trilateration+EKF. The localization performance of the proposed Trilateration+EKF algorithm is compared with traditional trilateration technique in this paper. The simulation results demonstrate the efficacy of the proposed Trilateration+EKF algorithm with respect to trailateration technique in the context of dynamicity in RSSIs.

Index Terms— Location Based Services (LBS), Extended Kalman Filter (EKF), Received Signal Strength Indicators (RSSI's), Target Tracking, Wireless Sensor Networks (WSNs).

I. INTRODUCTION

In WSN domain there are wide variety of technological alternatives to carry out localization and tracking such as radio frequency (RF), infrared, acoustic and ultra-wideband (UWB). Moreover, RF as compared to rest of the others is widely used because of their ability to penetrate smoke, nonmetallic barriers and walls, making it a better choice for localization and tracking applications [1]–[4]. It is basically a range based estimation technique, which utilizes Received Signal Strength Indicator (RSSI) to track moving objects. The RSSI measured is basically a function of the distance between the transmitter and the receiver as described by many propagation models [5]–[8]. As many wireless transceivers have inbuilt RSSI circuitry, RSSI based techniques are simple, inexpensive and have a lower power consumption as compared to other range based techniques such as time of arrival (TOA), time difference of arrival (TDOA), and angle of arrival (AOA) [9]. However, there are many challenges in applying these models especially in indoor environment as compared to outdoor environment, due to variations in the indoor layout structure, objects, and humans. Such obstructions generally lead to reflection, refraction, diffraction, and absorption of radio signals. Moreover, many other factors also influence the RSSI, such as temperature, orientation of antenna, and height to the ground. Due to such a dynamicity of wireless medium, errors in RSSI measurements are unpredictable leading to erroneous tracking results [8], [10], [11]. Therefore more research efforts are being applied by the research community to cope up with this dynamicity in RSSI measurements since last decade.

Many research efforts have been reported in target tracking literature to deal with uncertainty in RSSI measurements. A recursive method capable of maintaining a position estimate must be used to guarantee state estimates even when no RSSI measurements are available or they are highly corrupted by noise. The choice of KF or PF based system depends primarily on the nature and amount of noise in the process and measurements as well as application requirement [12]–[14]. Depending on the application in hand, the requirement of localization accuracy may change. For example, if it is a marketing/advertisement case then roughly a 5 to10 meters should serve the

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Collateral Extension in Provocation of Security in Iot

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Abstract

It is undeniable that the Internet of Things is an emerging field of research that encourages numerous exciting solutions to numerous problems in many areas. IOT Innovation for evolving sensors and electronics applications. The goal of this research is to look at the literature on electronics applications in the context of the Internet of Things' security issues, challenges and solutions for new sensors and electronics applications. A review of electronics applications in the Internet of Things (IoT) what is the IOTinnovation directions; IOTfuture applications in the context of electronics the IOTand future Internet technologies are among the analysis themes.

Index Terms— Internet of Things (IoT); IOTInnovation; Challenges, Issues, sensors

I. INTRODUCTION

Kevin Ashton, co-founder of the Auto-ID Center at MIT, introduced the concept of the Internet of Things (IoT) in 1998. Each object has its own unique identity and can communicate with other objects. From a small wearable device to a cruise ship, the size of an IOTobject can vary remarkably. Automobiles, buildings and machines are transformed into intelligent and connected objects that can communicate with people and other devices.

IOTcan be defined in many different ways. As defined by the International Telecommunication Union (ITU), the term Internet of Things refers to "the intelligent and sensory interconnection of the world's objects". In accordance with ISO and IEC, "the Internet of Things" is "an infrastructure of interconnected objects, systems and information resources along with intelligent solutions to allow them to process information through the real and words that are digital. The IOTreception layer (sensors) where information about the physical

Environment is collected, measured and recorded. Examples include temperature, humidity, gas pressure and motion. At higher layers of the Internet of Things, this information can be read, integrated and analyzed.

Many investigators use two acronyms, IOT and NoT. (Network of Things). IOT is regarded as a NoT subset because IOT has its "things" connected to the Internet. In contrast, some kinds of NoT only use Local Area Networks (LAN) with no Internet connection. The growth of IOT is driven by business needs in the digital transformation of businesses. According to the study, 5 are expected to increase the total number of IOT connections from six billion to 27 billion by 2025 in 2015. This means a 16 percent composite annual growth rate (CAGR). As far as market growth is concerned, Berg Insight's report5 forecasts an exponential increase in the global IOT platform third party market. There are many scientific studies along with services which have been carried out regarding the styles which are current IoT security [6]. Numerous solutions have provided a number of the difficulties or attack vectors to numerous IoT devices and their guards. Numerous simulation tools, modelers, while the accessibility

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An Advanced Buried Threat Detection Using Convolutional Neural Networks and Recurrent Neural Networks

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Abstract

In this paper, we propose a method to further the research done on GPR and BEO's by capitalizing on recurrent neural networks and convolutional neural networks to analyze two-dimensional Ground Penetrating Radar B-scans in the x and y axis respectively. We will also analyze three dimensional volumes of Ground Penetrating Radar data.

Most prevalent mechanisms of detection are modelled using handcrafted features or pointed models. we make use of big real GPR data and data centric methodologies. Our algorithms are trained and evaluated using large experimental data covering a large surface area of 1200 square meters from varying lanes across U.S test sites. This data includes a wide set of Buried Explosive Objects consisting of different shapes below surface hidden depth and metallic content.

We also provide a quantitative analysis that compares the different results found using the algorithms and models used modelled on CNN's and conventional learning methods.

Keywords— Buried threat detection (BTD), convolutional neural networks (CNNs), ground penetrating radar (GPR), recurrent neural networks (RNNs).

INTRODUCTION

Detection as well as removal of landmines BEO's and IED's is a major issue affecting populous around the globe. The world is now polluted with an approximate 110 landmines buried at this moment. An equal amount in reserves waiting to be planted. According to the 'International Campaign to Ban Landmines Network', more than 4200 individuals. 42 percent are children who have been succumbing to landmines most in countries affected by war.

The task of finding these landmines has a track record of being extremely herculean killing two miners for every 500 removals. This is where GPR comes in, it is extensively researched and has sensors that emit electromagnetic waves covering big frequency bands into the ground through a wideband antenna and measuring reflections from the soil caused by targets based on their dissimilarities from the soil. Machine based learning then study this GPR data which is created bespoke for the intended application.

Conventionally, this is done in a process comprising of two steps.

First a detector tuned to detect anomalies is used to filter the stream of data and discover areas of interest that correspond to locations of anomalies.

The next step is an algorithm using a Machine Learning algorithm which assigns a confidence value denoting whether or not the aforementioned area of interest shows signs of a buried target or object. More recently, deep learning algorithms are being used, but a consistent limitation is that they used only a 2-Dimensional B scan, extracted from 3 D GPR volumes. This approach is lacking and inaccurate to detect narrow targets depending on their burial orientation. In this paper, we propose three unique and novel techniques that are based on 2-D CNN but explore the 3-D structure of the GPR data.

1) As discussed earlier, our method uses CNN and RNN deep learning mechanisms. The CNN algorithm is used to capture information in solitary B scans and the RNN part models the differential data in between scans.

2). The first layer of CNN uses 3-D kernels to exploit the three-dimensional shape of the GPR alarm by processing 2-D frames from the 3-D data parallelly.

3. We merge the results of the two-dimensional convolutional neural networks trained separately.

The first output is modelled and trained to remove information from the Down Track B-scans. the second network is trained to learn from the Cross-Track B-scans. The objective is to recognize when a B-scan profile in both directions can indicate finding a BEO.

For approaches one and two, we also train two networks that process the information along the x and y axis (DT and CT directions). Collating data from these two approaches can improve the accuracy of detection.

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International Journal of Mechanical Engineering

Modern Land Registration and Transactions using Blockchain

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Abstract—

In India, as well as many other parts of the planet, real estate management is an often unproductive and not secured process. Creating a system that not only speeds up the process of land registration but also makes it safe and efficient will be helpful. Over the last 9-11 years, blockchain technology has evolved into one of the world's most cutting-edge and secure technologies. There is enormous potential to use Blockchain technology within the land industry as it represents one of the most advanced and secure technologies on the horizon. Blockchain has evolved over the past 9-11 years. In this study, we describe a blockchain-based land management system that will improve land management transparency, efficiency, and security. Using the decentralized data storage system and its interactivity with Ethereum Virtual Machine (EVM), a smart contract can be created which can be used for real estate management using blockchain smart contracts. As part of a wise contract, estate owners and users will receive a detailed design and interaction mechanism. The transaction data will be stored on a distributed blockchain, which will be extremely secure and not vulnerable to hacking. The user can initiate, create, modify, or terminate a wise contract, thus potentially offering a more immersive, intuitive, and visually appealing contracting experience, while land agents and owners can enjoy greater profitability and sales. An important real estate management problem worldwide is solved with this practical solution.

Keywords : Blockchain, Smart Contracts, Real Estate Management, Ethereum Virtual Machine, Transparent Contracting Process

I. Introduction

Since land is a high-valued asset, it is vital to have accurate records identifying the current owner and providing proof that he is indeed the owner. With these records, you can:

a) preserve owner's rights

b) avoid sale fraud

c) resolve disputes

d) ensure ownership is successfully transferred to brand new ownership Thus, it's far important to preserve the correctness and completeness of this information, and save you unauthorized, fraudulent changes.

II. CURRENT LAND REGISTRATION PROCESS IN INDIA

Land purchases are vital in India, and you need to pay close attention to every phase of the process. Especially, you need to ensure that all the records are free of any title defects.

Getting your land registered requires the assistance of a legal professional as they examine each and every document and advise on whether to proceed further.

Procedure for land registration:

Document verification:

The first step should be to verify all documents related to the land.

a) Drafting of the deed: Regardless of how you obtained the land, you should ensure you possess the correct deed. For example, if the land is a gift, a gift deed is required. If it is a purchased one, a sale deed mentioning the contract, payment, terms, and conditions of the agreement between the seller and the purchaser is necessary.

Encumbrance certificate: This document confirms there are no loans or mortgages affecting the land.

b) Preparing stamp paper: Stamp duty is a fee for the government to be paid on property transactions and related documents like conveyance deeds, sale deeds, and sale agreements. To obtain the stamp paper, you need to buy it from authorized vendors.

c) Execution of the deed: Deeds have to be executed at the Registrar's office and both parties must be present to sign the documents. If either party, the seller or purchaser, is unavailable, a Power of Attorney can be used to execute the deeds.

Growth Prospects of Franchising Under Current Business Scenario

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Abstract

The article aims to objectively examine the history of Franchising in Europe by focusing on ties between franchisors and franchisees. We also carried out a comprehensive study, interacted with numerous prospective European franchisors and franchisees, and have been in service since 2003. Our results suggest that Europe has a very difficult negotiating franchise agreement. Franchising, which promotes strengthening of mutual links between countries at this point in the history of world economic relations, penetrates virtually every field of

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ORIGINAL RESEARCH

Improved resilience of secret sharing scheme with augmented multifarious features

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Abstract The requirement of greater flexibility and additional functionality in conventional secret sharing schemes is posed in many practical applications. To meet the flexibility requirements of applications, an extension of a secret sharing scheme with multiple features is proposed. The matrix projection property assorted with Lagrange's interpolation, matrix subtraction, asymmetric key exchange algorithm, Pythagorean triples, AND-OR circuit structure design, and Least Significant Bit technique to implement the proposed scheme. The scheme is multifarious in a way that it supports different features such as verifiability of reconstructed secret, cheater/s identification, periodical renewal of shares, the flexibility of deciding access structure, and embedding of shares for enhanced security. Further flexibility is provided to the user in the selection of one, all, or any number of required features to support the applications. The scheme is applicable for sharing secret data of various forms like text, number, monochrome and multi-chrome images. The implementation of the proposed scheme is critically analysed with the help of experimentation. It is further compared with existing techniques and the results show that the proposed scheme satisfies relatively better accuracy, improved security, lesser time complexity, and lesser storage requirements while providing multiple features for secret sharing.

Keywords Secret sharing · Multimedia security · Image processing · Information security · Cryptography

Abbreviations

SSS	Secret sharing scheme
GAS	General access structure
VSS	Verifiable secret sharing
PSS	Proactive secret sharing
LSB	Least significant bit
SSIM	Similarity Index
DSSIM	Dissimilarity Index

1 Introduction

Due to the exponential growth witnessed by digital technology, the processing of communication and preservation of information had to be digitized. The preferred modes of communication and information dissemination have become the email and internet websites respectively. Cyberspace, on one hand, offers great benefit to society but on the other hand, is very vulnerable to crimes using highly sophisticated novel technology tools. People with malicious intentions, to gain some material benefit or harm someone cause most of the security-related problems. Secret information must be kept highly confidential as

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Original Article

DEEP REVIEW ON ALOPECIA AREATA DIAGNOSIS FOR HAIR LOSS RELATED AUTOIMMUNE DISORDER PROBLEM

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ABSTRACT

Lots of women all over the globe are affected by thinning hair, & the number of females suffering from the disease is growing per year. Another important component in the development of thinning hair is genetics. One of the most important goals is to make a clinical condition. For example, in the area of medicine, categorization is critical since one of the primary goals of the doctor is to determine whether or not a patient suffers from an illness. Alopecia areata is a kind of chronic illness that causes baldness in the affected region. AA may cause baldness for a variety of causes, thus testing may be essential to confirm if it is the source of the loss of hair. Machine learning approaches have shown promise in a variety of fields, including dermatology, and may be useful in identifying alopecia areata for better prediction and diagnosis. Proper detection of an illness is also influenced by the fluctuating character of illness signs. Related work in machine learning for hair illness categorization has also been addressed. The main objective of this study to analyze several machine learning & deep learning strategies for the identification of alopecia as well as in humans, as well as to determine the accuracy of extracting features methodologies.

Keywords: Alopecia areata, Hair loss, Deep learning, Machine learning, Feature extraction approaches

INTRODUCTION

Among the many various kinds of alopecia Areata (AA), one of the most predominant is the abrupt onset of baldness in strongly defined areas, which may range from small spots to large or less usually broad involvement. Stress & incapacity may be exacerbated or masked by baldness, depending on its severity. Currently, the disorder is thought to be an inflammatory illness of the hair follicle with a hereditary component. There are around 0.1–0.2 % of the general population suffers from AA, which is an inflammatory illness of hair follicles [1]. AA is an autoimmune disorder that causes baldness without scarring. It may have a great effect on one's psychological health because of its visual effects. Follicle immunological privileged & a T-cell-mediated inflammatory reaction have been implicated in its pathophysiology, which results in the disruption of the hair development cycle. Numerous features may be seen in the form of well-defined spots, scattered or total scalp alopecia, or entire body hair alopecia. Some 40 % of people with alcoholism are at risk of having their condition return or becoming resistant to treatment [2]. AA is a harder illness that has a major effect on patients' standard of living because of its continuous relapse history. [3]. An estimated 2% of the population suffers from the disorder known as alopecia areata, which is described by the initial inception of non-

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Decentralized Application Using Blockchain for Land Registration

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Abstract :

Blockchain technology is being adopted across a broad variety of sectors, with consequences in practically every field of law. Despite the real estate industry's aversion to adopting new technological advances in the past, there are compelling reasons to employ blockchain in real estate transactions and property management.

One of the most significant advantages of blockchain technology in real estate transactions is the ability to create a more secure ledger system for positions across the capital stack. Tokenization is a more efficient way of trading and tracking interests. This will almost certainly lead to improved connection, single-platform integration, and shorter transaction times. Because hackers would have to spend a large amount of time and money to successfully tamper with the data on a blockchain, it can prevent fraud and virtually totally eliminate it.

There is currently no centralised system for government title certification, and each county and town has its own title registration system and recording offices. Parties must manually and precisely document every property transfer, mortgage, and encumbrance in these systems. Fraud and mismanagement are also possible with paper registrations. Using an immutable blockchain ledger, on the other hand, once accurate transaction data is entered into the blockchain, it may be updated in real time and continually preserved. In a blockchain land registry, any change in property ownership would be recorded in a block with a timestamp.

Introduction

Blockchain, for example, can simplify property management by expediting rental collections and payments, thanks to secure data sharing and smart contracts. By permitting specific activities, such as the release of funds when certain contractual obligations are met, blockchain technology combined with smart contracts may improve transaction efficiency. Smart contract technology can also be used to sign leases and pay rent, with payments and renewals being automated.

Furthermore, blockchain is projected to boost real estate liquidity, which has traditionally been an illiquid asset. Real estate investors would be able to quickly and efficiently sell their commercial real estate positions on the open market.The elimination of the illiquidity discount, which is believed to be as high as 30%, will undoubtedly raise prices. For investors who want to invest directly in real estate, the entry barriers are expected to be reduced as well. Due to greater fractionalization, investors might, for example, invest on a smaller scale and in a far more efficient and cost-effective manner.

Blockchain would essentially eradicate title fraud in the case of land registration and conveyances.Because blockchain ledgers are immutable and updated in real time, bad information has a much harder time disrupting the chain, and any tampering with recorded data is easily identifiable.

Use cases for blockchain in real estate

The real estate business and blockchain are likely to have a long-term and wide-ranging impact. It is possible to comprehend the unlimited potential use cases by learning about blockchain. Blockchain is a type of database that is based on a digital distributed ledger. Its most distinguishing feature is that it is immutable, which means that data recorded on the ledger cannot be erased, updated, or altered. Any third-party mediator in the real estate business could be replaced by blockchain technology. The use of blockchain to tokenize equity rights in real estate was an early application. Real Estate and Blockchain.

Blockchain technology is being utilised across a wide range of sectors, with consequences in practically every field of law.

Despite the real estate industry's aversion to adopting new technologies in the past, there are compelling reasons to employ blockchain in real estate transactions and property management. The ownership interest registries of each company up and down the capital stack of any real estate project could be replaced by a blockchain-based ledger system with tokenization of equity.

Implementation of Information Technology Service Management Using Rasa Chat-Bot and Data Visualizers

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Abstract: *ITSM is becoming an important asset for many software firms and companies today, regardless of size. The ITSM system helps the firms to manage the services provided by the firms and helps resolve any kind of issue faced. The paper presents the implementation of an ITSM system in the form of a dynamic website with some of the major modules aided by chat-bots and data visualizers. It presents the working of the modules, the steps involved in the working of each module, and the understanding of how the chat-bot and data visualization help in the betterment of the system.*

Keywords: *ITSM, ITIL4, RASA, Data Visualization, NLU.*

1. INTRODUCTION

The ITSM system can be implemented using different kinds of frameworks. The framework used for implementing the ITSM system in the context of this paper is ITIL4. ITIL4, or Information Technology Service Library, is the most widely used framework for implementing ITSM systems. The system contains Incident management, Request management, Change Management and Problem Management. The system is integrated with a chat-bot built using the open-source RASA framework and aided with data visualization techniques using a Javascript library called Chart.js.

The entire project or system is built using technologies, namely HTML, CSS, the React framework for the frontend, Django for the backend, and SQLite for the database. The basic working of the system involves creating APIs using the Django-REST framework that contains methods such as GET, POST, etc. The APIs created in Django are consumed by Axios library in React [1]. The chatbot is a separate entity from the front-end and back-end.

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Ethereum Blockchain based Repository for Criminal Data Containment

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Abstract: *Crime in India is increasing at an alarming rate. However, the main issue is these activities are not clearly registered and are not stored effectively. Mostly in our Indian Management system Data is stored in the traditional Relational databases Systems which are prone to SQL injection attacks. . The main reason to maintain criminal records in a blockchain is that sensitive data like criminal records shouldn't be altered by anyone. There have been instances where criminal records have either been wiped or altered. It is not uncommon for corrupt officials to bribe in order to keep their criminal records clean and misuse their position. Consequently, police records can sometimes be altered or wiped out easily. A decentralized system on the blockchain platform for storing criminal records is the only way to prevent this. This ensures that no one can change or interfere with the records, and it eliminates the possibility of data being modified. The main motivation is to eliminate all the disadvantages of handling and storing criminal records in traditional database systems by incorporating the criminal data on a blockchain platform.*

Keywords: Blockchain, Information security, Ethereum, Decentralized Application Development, Web3.js

I. INTRODUCTION

A criminal record or RAP sheet is a summary of a person's criminal history. Even though criminal records differ from country to country, one thing remains the same which is that they are highly sensitive records which cannot be manipulated in any way by anyone unauthorized. When this information is stored in a traditional database, there is a possibility that it will be leaked, manipulated, or completely deleted by malicious users or threat actors. The blockchain has a role to play in this situation. Like a logbook, once data is added to the blockchain, it cannot be changed or removed. Data, once added to a blockchain, cannot be altered or deleted. In other terms blockchain is a system of recording information, which is immutable i.e., the information once stored cannot be altered or removed. One cannot hack into a blockchain as one can hack into the traditional databases using attacks such as SQL injections. As of right now, large quantities of data are stored in traditional databases, which means they are highly vulnerable to cyberattacks such as SQL injection attacks or unlawful data manipulation by corrupt officials. Along with the above issues in the traditional database, the databases can crash resulting in total loss of data. Hence incorporating the data into a blockchain is a solution to all the problems that still persist in the traditional database management systems.

II. RELATED WORK

The data integration into the blockchain and to remove the disadvantages of the traditional databases is crucial. We have briefly discussed some of the existing research articles that are connected to our work in this part. The detailed survey of the papers which we have referred is given below:

[1] proposes that it would be possible to preserve criminal records' authenticity and rigidity using a blockchain, as well as securing data from adversaries. Data is deconcentrated and decentralized using P2P networks which further helps to prevent any illegal changes in the information. Also highlighted in their article was how incorporating criminal records into a blockchain will reduce the effects, also Integrating a thorough accountability procedure will significantly reduce the likelihood of tampering with criminal records information and will eliminate the possibility of corruption in law enforcement. Keeping the data safe and making the tedious task of managing the data easy, our system provides ways for the authorities to efficiently maintain criminal records. In [2], the authors propose implementing a blockchain-based

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ITSM Using AI Chat-Bot and Data Visualizers

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Abstract: ***Information Technology Service Management is the process to plan, implement, deliver and support the IT services to cater the end-users' needs. This project aims to study the existing ITSM systems and implement an improved system aided with technologies like chat-bot and data visualization. To resolve IT issues using quality ticket system, we need a robust service management framework based on ITIL framework. The system works in three distinct steps: Reporting, Managing and Resolving an issue. The aim of an ITSM system restore the undisturbed flow of the everyday business process after resolving the ticket. The chat-bot caters to the smaller needs of the users without having a need to create a ticket in the ITSM system. Data visualization can help the management team as well as the users to visually keep the track of the tickets.***

Keywords: Information Technology Service Management, Information Technology Infrastructure Library, Chat-bot, Data Visualization, Natural Language Processing.

I. INTRODUCTION

s rapid growth of IT in current times is affecting organizations of every field like Business, Healthcare, Education, etc. In fact, the continuous utilization and improvement of IT has become an essential support to business, regardless of the sector that organization belongs to [1]. This dependency on IT has been growing, as has its complexity, forcing the organizations to have an effective management. IT services have a big impact on the competitive advantage being important to have an effective and efficient management [1]. Organizations deploy ITSM systems to accomplish that goal.

A. ITSM (IT Service Management)

ITSM is a part of Service Science that is concerned with planning, organizing, offering, and supporting IT services in order to accomplish objectives of the organization [2]. The need of ITSM emerged from the need of innovation in practices as the nature of IT organizations changed from technology-providers to service providers [3]. ITSM is a means of managing IT operations that puts an emphasis on IT services, clients, service level agreements, and how an IT function executes its daily activities via processes [3].

It is in charge of enforcing significant changes within the company, such as how IT procedures, technology assets, vendors, and employees are managed [2]. ITSM's main goal is to improve the quality of IT services while adhering to service levels agreed upon with the client. In addition to the IT service quality, IT service provider must consider some other principles such as customer relationships and value delivering through IT operations [2]. ITSM provides greater customer satisfaction, higher-quality IT services, improved IT infrastructure, stability and efficiency, a better and clear organisational structure, and lower production costs [4].

ITIL (Information Technology Infrastructure Library)

ITIL is the most popular ITSM framework, proposing a collection of best practises to aid IT firms in deploying and utilising IT services that are aligned with their businesses [5]. The latest version, ITIL4 enhances ITIL by restructuring several existing ITSM practices in terms of user experience, value streams, and digital transformation, as well as adopting new working practises like Lean, Agile, and DevOps [6].

The ITIL service value system (SVS) and the four-dimensional model are critical elements of the ITIL4 framework. The SVS depicts how the organization's numerous components and operations collaborate to promote value creation through IT-enabled services. [6]. These can be combined in a flexible way, which requires integration and coordination to keep the organization consistent. ITIL specifies four service management aspects from which each component of the SVS should be considered to ensure a holistic approach to service management [6].

II. EXISTING WORK

[1] The research paper aims to develop a reference study regarding the details of the main concepts of ITSM after reviewing a total of 47 articles selected from the top journals and conferences. The paper has adopted the SLR methodology to enlighten the ITSM domain and an overview is presented. The benefits, challenges, opportunities, and practices for ITSM implementation were extracted, critically analysed, and then discussed in this paper.

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Smart WLAN Design for Intrusion Prevention System

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Abstract

'This paper thoroughly examines the Wireless Intrusion Prevention System (WIPS). This category includes two different subtypes: distinct group algorithms or protocols and notable application system design. Observation reveals that the latter's mark of approval for those two groups is merely notional and fruitful at best. LAN and WLAN are diametrically opposed in numerous ways. This is not accidental, because it is the outcome of three weaknesses in the previous type of works in that area. The use of a credit card-prompted, all-inclusive method is recommended for substantial diction and the resulting response to any wireless protection in WIPS.

Keywords: *LAN (Local Area Network), WLAN (Wireless LAN), WIPS (Wireless Intrusion Prevention System)*

1. Introduction

Internet providers undertake punctilious efforts to provide all-out quality time to customers utilizing WLAN. On account of security reasons, it is advised that one should latch into a brand-new radio resource. Broadcasting wireless data, locating and accessing Wi-Fi connection irrespective of their authorization is a matter of concern for users of wireless enabled laptops and personal computers. Ensuring safety of 'wireless space' and shielding computer connections is a challenge to be addressed. WLAN faces many threats such as spying, denial solution assaults, monitoring to strike, intermediary (MITM) attacks, intrusion by customers, Rogue AP, flooding to strike etc. Unauthorized accessibility is studied in this research. The assaults mentioned are a breach of security to WLAN. Those hackers in the wireless network, any unauthorized access points offer unrestricted and unlimited acess to your network to access data through false measures. The users of LAN assume they are securely connected to the network. Penetration done by hackers is doesn't come under its scanner. LAN is popular because it is affordable and easy to configure. Many can create wireless based programs their own sites. Some users follow these backdoor programs allowing hackers easy access to their personal data. A modern prevention measure, meant mainly for cordless companies, exists. It is an effective WLAN intrusion detection system, but not yet widely recognized. For example, the typical 802.11 encryption strategy and WEP (Wired Equivalent Privacy) are not up to the mark. 802.1x is a well-known verification approach; WPA (Wi-Fi Protected Access) can be compromised easily [1]. To detect and mitigate these dangerously potent threats, wireless LANs must provide a security system that includes a potential intrusion prevention system (IPS) to overcome these security challenges.

1.1 Intrusion Prevention in wireless systems

The system protection incorporates three phases such as firewall, intrusion detection and intrusion avoidance.

RESEARCH ARTICLE

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Social Distancing and Face Mask Detection using Yolov4 and CNN

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ABSTRACT

Social distancing and wearing face mask is the urge of year 2022 due the possible spread of coronavirus . Social distancing is one of the possible approach with which we can continue fighting this pandemic. Motivated by this notion, the ground plan proposed a deep knowledge based framework for automating the task of covering social distancing using surveillance tape. We proposed COVID-19 Social Distancing and face mask detector system which is a one-stage detector, which consists of a machine learning module for calculating the distance among the different classes ,and a CNN model for detecting whether a person is wearing mask or not. YOLO stands for You Only Look Once, this algorithm is employed for Object Finding also as Object Tracking. After we performed recognizing with YOLOv4, we calculated the Euclidean distance between all the detected boxes and filter out or flag the people that are closest to every other indicating that they're at risk. The high the Euclidean distance score would be the better model was within the spotting of objects. The minimum distance to keep while adhering to social distancing is 6 feet , keeping this as the base for calculating distance, the model was trained and used for object detection as well as object tracking. For the mask detection a CNN model was made using Deep learning and OpenCV. The custom datasets were used to understand facemasks and were trained on those datasets for detection and tracking. Predictive Analysis on the static images as well as in the videos to detect face masks has been done. In addition, the system also used existing IP cameras(web cameras) combined with computer vision to detect people without Mask and violence of social distancing..

Keywords: Machine learning, Object detection, Yolov4, Open CV, Face mask detection, Social distance detection.

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INTRODUCTION

From the year 2020, it brought us a lot of challenges, especially in the working sectors. Many establishments were switching to a work from home-based environment [3]. The only way to prevent the spread of covid-19 that was suggested by WHO (World Health Organization) was that, people around the world should wear masks to prevent the risk of getting infected by novel coronavirus which would also help in preventing its transmission and also people should maintain social distance of at least 3m among each other to prevent the spread of virus[6]. Though government announced lockdown and started taking preventing measures then to people were just carelessly gathering together which led to result of 2nd wave in month of April 2021,and 3rd wave in Jan 2022. Talking about the current situation of

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ORIGINAL RESEARCH

Optimal design of supply chain inventory information forecasting and control system in cloud environment for biomedical instruments

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Abstract

With the rapid development of Internet technology, the network information data is exploding, and society has entered the era of cloud data. Cloud data provides a lot of data support for people's life and work, but because of its large number, multifarious types and huge value, there are some problems such as private data leakage and abuse of sensitive information. Stocking of biomedical material at one place only, can cause delay in sending important lifesaving material to needy patients. On the one hand, it is an important content of engineering scheduling theory and method; On the other hand, in medical field, a lot of materials are usually consumed to protect the life of patients. Biomedical informatics and computer vision techniques have been combined in a variety of inter-multidisciplinary disciplines during the past few decades. We are all aware that inadequate or insufficient cloud access management and controls can expose a corporation to a range of issues. The work that follows offers intelligent supply chain, an upgraded service management control telephone network architecture. If we can acquire according to the patient demands and retain the ideal inventory such that the patient requirement and interest can be safe, the overall cost will be lowered greatly. The experimental results show that R1 orders 31 times, and the total cost is 1,259,520 CNY. R2 ordered 24 times, with a total cost of 982,034 CNY; R3 orders 22 times, and the total cost is 990,146 CNY. Finally, the optimal solution of the total cost after schedule optimization is 3,231,700 CNY. It is proved that the optimal cost finally obtained by forecasting supply chain inventory information based on cloud data environment is also more practical for engineering practice.

1 | INTRODUCTION

The intelligent network information management system realizes the information sharing function. Users can set up organizations in the system, and the information of the same organization can be managed freely, realizing data sharing, avoiding the problems such as disunity of information platform, repeated data collection, incomplete database, information islands and so on [1]. Supply chain management is a major issue in many industries, as companies recognise the need of creating integrated connections with their suppliers and customers. Supply chain management is defined by the Global Supply Chain Forum (GSFC) as "the integration of critical business processes from end user to original suppliers that deliver products, services, and information that produce value for customers and other stakeholders" [2, 3]. With the advent of the cloud data era, the intelligent network information management system has new requirements. In recent years, with the occurrence of network information security incidents such as webpage tampering, skylight opening, network impersonation, and massive denial of service on websites, the awareness of network users' information security is constantly increasing. Cloud data can gather all

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Pneumonia Detection using VGG19 on Chest X-ray Images

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ABSTRACT

Pneumonia is a contagious respiratory illness that causes ulcers and is one of the major causes of death among children and the elderly worldwide. Using chest X-ray images, a Deep Convolutional Neural Network will be proposed to identify Pneumonia infection in the lungs. A Pneumonia Chest X-ray Dataset containing 12,000 images of infected and non-infected chest X-ray images will be used to train the proposed Deep CNN model. Basic image modification techniques and the Deep Convolutional Generative Adversarial Network (DCGAN) are used to create the transformed images. The proposed Deep CNN model will be created with the VGG19 network and tested on a variety of matrices, including Accuracy, Precision, F1-score, Recall, and Area Under the Curve (AUC). The main goal of this research is to develop a reliable and efficient deep learning model for identifying and classifying pneumonia. Conditional adversarial networks are studied to create an end-to-end architecture based on Convolutional Neural Networks (CNNs) to directly map realistic colors to an input grayscale image. The method, which uses Generative Adversarial Neural Networks (GANs), focuses on increasing generalization in large multi-class picture datasets by enhancing training stability. In limited domains, Generative Adversarial Networks (GANs) can generate images that are nearly photo-realistic.

Keywords: Generative Adversarial Neural Networks (GANs), Convolutional Neural Networks (CNNs), Area Under the Curve (AUC), Deep Convolutional Generative Adversarial Network (DCGAN), VGG19, ReLU, Pneumonia, MobileNetV2, ResNet152V2.

I. INTRODUCTION

Pneumonia is a contagious lung infection that produces ulcers and is one of the leading causes of death in children and the elderly around the world. The importance of early pneumonia diagnosis cannot be overstated.

Chest X-rays are the most common way to detect pneumonia. The radiologist will check for white areas in the lungs (called infiltrates) that indicate an infection, the severity of the illness, and the location of the actual infection in the lungs while interpreting the x-ray.

It's challenging to find radiological examiners in rural places to analyze a bigger quantity of chest X-rays and even if they are found, it may be an expensive task. Thanks to the current technological stack, we can solve this problem using deep learning (a subset of Machine Learning) and computer vision techniques which have been learned from large volumes of unstructured data. However, constructing and developing a deep learning model to handle a specific problem takes more effort and computer resources.

To avoid the difficulties associated with the creation of deep learning models, transfer learning approaches are presented. Transfer learning makes use of the knowledge gained by the deep learning network while solving one problem and applying this knowledge to solve a similar problem.

The common transfer learning techniques using the Convolutional Neural Network for solving image classification problems are the AlexNet, VGGNet, ResNet, and InceptionNet.

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Research

Enhancement in Surface Properties of Magnesium Alloy after Electroless Ternary Alloy Nano Composite Coating

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Abstract

AZ91 Magnesium alloys have exceptional rigidity, low density, and electromagnetic protection properties, making them ideal for usage in numerous industrial components. But Magnesium alloys specially AZ91 have a significant disadvantage in terms of corrosion and hardness, which restricts their practical uses. One of the most recent ways for improving the corrosion and hardness of Mg alloys is electro-less nano-coating. This study investigates the hardness and corrosion properties of AZ91 Magnesium Alloy as a result of ENi-B-TiO_2 Nano composite coating processes. It would be useful to conduct a thorough examination, including experimental analysis, into the possibilities of increasing the deposit efficiency and characteristics of composite deposits by designing a suitable bath composition and operating circumstances. It has been discovered that as the concentration of titania particles increases, so does the surface hardness of coatings. The optimal concentration of second-phase (titania) particles and bath agitation are also examined in order to get superior surface properties following Nano coating. Following this nano coating, the materials may be employed for a variety of materials engineering applications. The influence of coating parameters on the surface characteristics of ENi-B-TiO_2 composite coatings was investigated in this study

Keywords: Electroless Coatings, Nano Composite, Surface properties, AZ91 Alloy, Bath agitation

INTRODUCTION

Electroless nickel coatings are commonly used in a number of industries, including computer equipment, mechatronics, textile, photonic, aerospace, automotive, printing, food, plastics, and paper to preserve coatings [1, 2]. Wear resistance and greater corrosion resistance are desirable qualities of electroless coatings, as well remarkable homogeneity, superior solderability, and better mechanical characteristics [3]. For plating an alloy or a strong work part, such as metal and plastic, the electroless nano coating method, also termed as an autocatalytic chemical deposition process, is used [4, 5, 6]. While electroless coatings provide various advantages, several key limitations include a shorter chemical life cycle and a greater cost of residual material owing to chemical reinforcement [7, 8]. Maximum magnesium alloys comprise 8 to 9 percent aluminium and less than 1% zinc [9, 10]. A few research findings [11, 12] have found that addition of some few alloying materials like aluminium, zinc, and other materials to improve corrosion resistance, but they often do not meet the conditions for a wide variety of uses. As a result, employing a local engineering method is the most effective technique to progress additional structures while resisting corrosion. Due to its performance and other engineering qualities, the electroless nickel coating process is of particular

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Towards Query Efficient and Derivative Free Black Box Adversarial Machine Learning Attack

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Abstract: While deep learning has shown phenomenal success in many critical applications such as in autonomous driving and medical diagnosis, it is vulnerable to black box adversarial machine learning attacks. Objective of these attacks is to mislead a classifier in making mistakes. Hard Label attacks are those in which an adversary has access only to the top-1 prediction label and has no knowledge about model parameters or gradient loss. Secondly, for security concerns, the number of model queries that an attacker can perform for evaluation are restricted. In this paper, we propose a novel nature-inspired optimization algorithm for generating adversarial examples. Proposed algorithm is derivative-free, meta-heuristic algorithm. It searches for optimum adversarial examples in high-dimensional image space using simple arithmetic operations inspired by Brownian motion of molecules in fluids and gases. Experiments with CIFAR-10 image dataset yielded encouraging results with a query budget of less than 1000 and with a minimal distortion to original image. Its performance was determined to be comparable and exceeded in some cases compared to previous state of the art attacks.

Index Terms: Adversarial Machine Learning, Robust Deep Learning, Nature Inspired Optimization, Computer Vision, Security & Privacy.

1. Introduction

Deep learning has emerged as the preferred approach for a wide range of object detection applications, from facial recognition to autonomous driving. Complex deep neural network designs, such as Convolution Neural Networks (CNN) and its variants, have been implemented or are being explored for use in a numerous mission-critical application. However, it has been shown that Deep Neural Networks (DNNs) are not without flaws. DNNs, like conventional statistical machine learning models, are vulnerable to adversarial example attacks. Adversarial examples are created from natural images by subtly altering them. Although adversarial samples appear identical to the original image to human eye, image classifiers fail to accurately classify them. As shown in Fig. 1, leftmost image shows an unmodified image of a bird that is classified correctly by a CNN model, image in the center indicates the perturbation added to the original image. Rightmost image shows the resulting adversarial example that is misclassified by CNN as a frog.

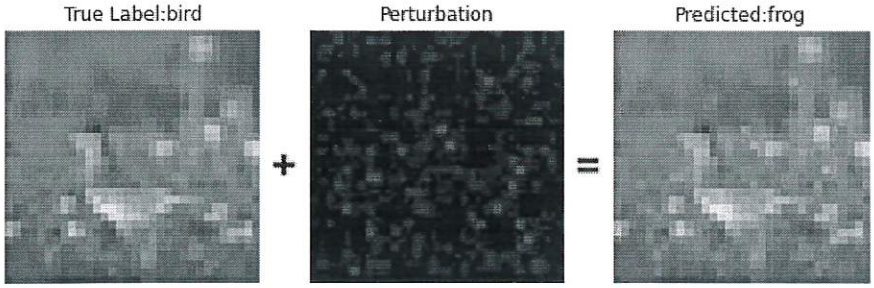

Fig.1. Adversarial Example Attack on image classifier

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Traffic Prediction in Optical Burst Switched Network using Deep Learning

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Abstract: In the recent past, Internet based applications are fueling the need of huge bandwidth. To resolve the need a paradigm shift through a new switching method Optical burst switched networks is seen as a candidate solution. Optical burst switched (OBS) networks are buffer less in nature; hence there is more probability of congestion. The congestion rapidly degrades the quality of service (QoS) requirements of the network. The traffic load gets multifold due to the congestion. Thus, it is essential to minimize congestion in OBS network to improve the performance and quality of service (QoS). This involves prediction of traffic volumes from the experience in the past. In this paper, we have used deep learning method for prediction of traffic which can help to optimize the resource allocation proactively in OBS networks. It is found that our proposed method outperforms and improves the QoS of OBS networks.

Index Terms - **Optical burst switching; convolution neural network, congestion.**

I. INTRODUCTION

Optical burst switched network is a promising paradigm which is capable of utilizing huge amount of bandwidth on a single fibre by means of switching technology. Advances in wavelength division multiplexing (WDM) have made it possible to cope with the rapid growth of Internet traffic. Optical WDM supports three switching technologies namely circuit switching, packet switching and burst switching. Course granularity switching is offered in circuit switching and needs large latency for connection setup while packet switching has buffer requirements. Unlike circuit and packet switching, OBS is promising technology. It is an intermediate solution to the other two switching paradigms and leverages the benefits of both. Burst is the switching unit in OBS networks. It is set of packet with same QoS requirement and same destination. Components in OBS networks namely optical nodes forward bursts and set of edge nodes namely ingress and egress nodes whose task is burst assembly and disassembly respectively. Bursts are aggregated at ingress node. Control and Data packets are sent on separate channels with certain offset time. Control packet reserves all the resources needed for data packet along the path. Data packet is send after the offset timer expires. Processing of control packet is done at each intermediate node electrically thus exempting processing of data packet along the paths. An OBS network uses one way reservation protocol. Data packet is sent after offset time without any acknowledgement. Hence there are chances that one or more burst contend for the same output channel. Control packet contains information about routing; arrival time and duration of burst [1].It is used by core nodes. If reservation is successful, it is forwarded to the downstream nodes and in case of failure the burst is dropped. This process occurs at every node till the burst reaches to destination. Process of burst disassembly takes place at egress node.Due to varying traffic conditions if burst assembly algorithm is designed wrongly it can cause delay and stand inappropriate for delay sensitive applications. Delay depends on four factors: packet assembling at ingress nodes, path reservation by control packet, transmission time of packets and propagation delay in network. Out of these four factors, transmission and propagation delay mainly depends on path selected and upon the availability of bandwidth in OBS networks. The main contribution of this paper is to analyse techniques for delay reduction which depends on traffic prediction. Traffic prediction is needed for tasks like resource allocation, routing and detection of anomaly in networks. This improves QoS. Traffic characteristics are influenced by aggregation policy of burst in the networks. It also affects the end to end performance. In order to ease this problem, in this paper we have proposed deep learning approach for prediction of traffic for congestion control. There is need of traffic grooming considering dynamic incoming traffic load and capacity of outgoing channel bandwidth. The main objective of using deep neural network is to minimize loss and increase throughput of OBS network. Traffic prediction is modelled as time series forecasting problem.

The paper is organized as follows: Section I provide brief information about OBS networks and its issues. Section II provides insight on related works and burst assembly algorithms. Section III describes the design and implementation of RNN. Section IV presents results and discussion followed by conclusion in section V.

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ORIGINAL RESEARCH

Vibration signal diagnosis and conditional health monitoring of motor used in biomedical applications using Internet of Things environment

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Abstract

Vibration, especially basic vibration, may cause loose contacts, open circuits, or other contact problems, which account for a large proportion of system failure causes. Due to the complexity of the chassis structure used in the biomedical motors, the vibration analysis of a single component cannot solve the vibration problems encountered in the work of the system. Therefore, it is necessary to use system simulation and experiments to monitor and enhance the health of the structure. Finite element method is used to carry out the dynamic analysis from the component to the system, and calculate the natural frequency, modal shape and harmonic response. Then, the effectiveness and accuracy of the analysis results are verified by experiments through simulation and experiments. The results show that the measures taken have effectively reduced the vibration of the chassis equipment and improved its safety for better health safety of patients. There is just a 2% variation between the natural frequencies acquired from the experiment and the simulation computation. In terms of natural frequency, the first 6-order natural frequencies all have errors of less than 10%, and the natural frequency error is comparable to that of fireproof board.

1 | INTRODUCTION

With the rapid development of the Internet of Things (IoT), its application has been involved in many fields, such as intelligent control, structural health monitoring, biomedical application. IoT applications in health and biomedicine are key areas of study. Some of the IoT applications include hospital management systems, remote patient monitoring, medical waste management, robotic nursing assistants, cancer detection via body scanning, Parkinson patient monitoring, dementia patient monitoring via GPS smart soles, depression monitoring via smartwatches, glucose monitoring, efficient drug management, and hand hygiene monitoring. In Biomedical application motors are been used for different purpose such as:

- For Mobility: Different motors with help of gear system is used in wheelchair to make the patients enjoy their freedom.
- Used in Medical pumping: In Biomedical application like computed tomography (CT) scanner, Dialysis, continuous positive airway pressure (CPAC) machines and many more uses different motors for cooling the medical operative machine, help meter fluids for proper indication, help transfer of gases inside the medical equipment's.
- Used in Robotic Operations and surgery: Now a days doctors are assist with robotic arms and devices to take part in surgical operation. These robotic arms and devices must be accurate and reliable
- Motor powered prosthetics: To eliminate the disability of any human being artificial limbs play a vital role in this 21st century. These artificial limbs are powered with motors for their operations.

From the above discussion it is clear that there is requirement of better conditional health monitoring of motor such

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International Journal of Mechanical Engineering

Novel Buried Threat Detection with Convolution Neural Networks and Recurrent Neural Networks Better Approach

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Abstract

Ground Penetrating Data is a remote geophysical sensory system that has been used intensively and researched. GPR uses radar pulses to image the subsurface and is used to find underground threats and objects. Existing model detectors use specific models or handcrafted features.

To improve on them, algorithms are being evolved to predict the presence of such threats. Through this paper, we propose using vast and authentic GPR data collections and methods driven by discrimination algorithms for BTD's that capitalize on deep convolutional neural networks by combining CNNs and RNNs to investigate two-dimensional ground-penetrating data (GPR) scans in thex-axis and y-axis cartesian directions as well as 3-dimensional GPR volumes.

The data utilizes a vast collection of BEO's including various shapes, metallic substances, and underground internment profundities. We also provide a quantitative analysis that compares the different results found using the algorithms and models on CNN's and conventional learning methods.

In this paper, we compare our proposed method to further the research done on GPR and BEO's by capitalizing on recurrent neural networks and convolutional neural networks to analyze two-dimensional Ground Penetrating Radar B-scans in the x and y axis respectively. We will also analyze three dimensional volumes of Ground Penetrating Radar data.

Keywords: Deep Learning, Ground penetrating radar (GPR), Underground Threat Detection, Combinatory Neural Networks

Introduction

Landmines are instruments capable of massive destruction in slow motion. They do not know the difference between civilians and combatants and contravene international humanitarian law. In recent times, de-mining has received attention and funding worldwide, yet there is no long-term approach to this humanitarian assistance. Every month, eight hundred people are murdered and one thousand and two hundred maimed by land mines. Due to the toy-like shapes and colours, oftentimes, the victims are children. It is estimated that a mishap occurs every twenty minutes.

Machine learning algorithms have been studied for detecting BEO in sensor data for the last two decades. Several of these techniques were refined and integratedfor this particular application.

The ground-penetrating radar is a widely used sensor for detecting buried threats. Its ability to detect objects of interest is very effective for buried threat detection (BTD).

The necessary tools required for early detection of these are still not readily available in most populations globally. GPR uses electromagnetic waves in the microwave band (frequency from 1 to 1000 MHz). GPR requires two main components- a receiving antenna and a transmitter. GPR emits a pulse into the ground and records the results (using echoes, as it is a radar) from subsurface objects due to anomalies of dielectric nature (example, an object buried underground). As a result, GPRs detect non-metal objects on the basis of their dielectric contrast with the soil. The GPR system has software that translates these signals into images of objects from the subsystem.

Traditionally, underground threat detection mechanisms follow a multi-step process.

Step one is to compute the flow of data from the GPR and identify areas of possible threats that correspond to points with unique signatures. For this, we use a detector programmed to detect the earlier defined anomalies.

Following that, we use an algorithm based on machine learning (referred to as a classifier) to assign a value telling us with confidence about the unique threat detected is legitimate or a false positive.

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Designing of Application for Detection of Face Mask and Social Distancing During Covid-19 using CNN and Yolo v3

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Abstract - *The aftermath of the Covid-19 pandemic has ushered in a new normal, forcing numerous unavoidable changes in social life around the world. Wearing a face mask and maintaining social distance, especially in crowded settings, was made compulsory by the government, some disobeyed the orders, resulting in a rise in covid cases.*

Current work presents the study of machine learning algorithms for a face mask and social distance detection at crowded places during the pandemic. It suggests a system architecture that supports functions like detecting whether people are wearing masks (partially/completely) and identifying whether they are following social distancing.

Study comprises of 3 modules – face detection, mask detection, and social distance detection. YOLO (You Only Look Once) algorithm is used for Object Detection as well as Object Tracking, because of its highest accuracy and precision achieved to date amongst prevalent techniques. It detects the people and their faces in the frame for counting the objects and keeps a record of those objects in the next frame using Object Tracking.

The custom MAFA dataset is used to understand facemasks. The CNN (Convolutional neural network) Algorithm will be used to train the model on those datasets for classification and detection. Implementation of the application will be done in [illegible]on and efficiency and accuracy are calculated. A notification is sent if the separation between the two entities is below the standard specifications. Faces, both masked and unmasked, are labelled appropriately.

Key Words: **Covid-19, Object Detection, Object Tracking, Distance Estimation, MAFA, CNN, YOLO v3, Open CV**

1.INTRODUCTION

The pandemic has brought us a lot of challenges, especially in the working patterns.[1] Along with Covid-19, several other large-scale, serious respiratory diseases, such as SARS and MERS, emerged, adding to the pandemic's chaos.

In 2020, the World Health Organization recommended that people must wear masks to avoid infection by a novel coronavirus and maintain a social distance of at least 3 meters between themselves to prevent the virus's proliferation and spread.

People are more conscious about their wellbeing, and governments are placing a greater emphasis on public health. The virus's next wave has begun, but people have continued to congregate in crowded places without wearing a mask. The government has been unable to maintain control over the situation, triggering the need for artificial intelligence and computer technology to solve this problem. Distancing oneself from others and wearing masks help to slow the disease transmission. The researchers believe in developing a surveillance system that makes use of existing IP and CCTV cameras, as well as Computer Vision and Object Detection algorithms, to identify people who are violating Covid norms.[5]

Current research work comprises of 2 stages, namely designing a framework for detection of face mask and social distancing with the help of CNN and Yolo v3 and in the next part application will be developed.

This research understands various aspects of the image or videos based on frames those would be made available as inputs to the algorithms. [3] The Object Detection algorithm YOLO v3 will be used to find people in a frame.

The distance between people in the image will be calculated by the system using the Euclidean distance between the centroids of the detected boxes around the faces in the images. The six most important characteristics of masked faces are face locations, face orientation, eyes, masks, occlusion degree, and mask type. These will be considered while creating the model.

Using Deep learning and OpenCV, a CNN model will be generated for mask detection[5]. Face masks will be detected using predictive analysis on both static images and videos.

As a result, this system will automate the process of checking up on citizens, assisting the government in enforcing COVID-19 rules and regulations which will significantly reduce number of Covid cases.

1.1 YOLO v3

Yolo stands for You only look once. It detects objects using CNN. It can detect numerous objects in an image. It predicts not only the class of the object but also its location in the image. For the object detection task, Yolo version 3 employs a neural network of 53 CNN's (Darknet-53) and an additional 53 layers, totaling 106 layers.

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Speech Emotion Recognition System Using Recurrent Neural Network in Deep Learning

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Abstract: ***In today's world, machine learning and deep learning together are enabling around 80% of the human interactions through the sheer ubiquity of the solutions provided by this domain. But one of the problems with the existing world is most of the people are not able to understand the actual emotional meaning and occurrence behind a person's speech. For instance, people having problem like Catatonia, etc. are not able to express themselves clearly or some industries which are considering some marketing strategy according to the customer mood, etc. can use this method. So, to bridge this gap between the people, it is important to develop a system that can assist them and then predict their emotional speech. This paper reviews the different approaches adopted to reduce the barrier of emotional communication which are already in existence and what methodology they used while doing so. In this context, we also present an approach of using the Recurrent Neural Network which is a part of Deep learning algorithms. The whole process of automated systems which continuously learn, adapt, and improve without much instruction is really fascinating. Our primary goal is to create a robust communication system through technologies that enable machines to respond correctly and reliably to human voices and provide useful and valuable services accordingly. In this review, an extensive report is made on the various approaches available for speech emotion recognition that has been done till now. All the model's and accuracy aspects are taken into consideration and are relayed according to it.***
Keywords: Deep Learning, Recurrent Neural Networks, Emotion Recognition, Speech Recognition, SER, RNN, Catatonia.

I. INTRODUCTION

Language is one of the most important methods for communication and speech is one of its main mediums. In human to machine interface, the speech signal is transformed into analogue and digital waveform which can be understood by the machine. Speech technologies are broadly used and seen to have unlimited uses. In many of the human-machine interface applications, emotion recognition from the speech signal is considered to be the research topic for many years. For this purpose, for the identification of the emotions from the speech signal, many systems have been developed until now. In this paper, speech emotion recognition based on the previous technologies which use different models and methods for the emotion recognition is reviewed and a new approach is suggested. They are used to differentiate emotions such as anger, happiness, neutral state, etc.

The intended system is going to be proposed such that it takes the input as speech both live and audio file and detects and recognizes the emotion behind that speech. After recognizing it, the output will be represented as the emotion in which the speech was spoken. There are various types of emotions included in this system such as happy, neutral, sad, etc. We have proposed to use the Recurrent Neural Network which is a part of Deep Learning Algorithms in order to increase our accuracy as compared to others models and methods which are in existence. In RNN, one data point or the current data depends upon the previous data point to perform an overall view. The model predicts the emotions based on the speech data provided during its execution.

II. LITERATURE SURVEY

A. Problems in the Current System

Speech Emotion Recognition is one of the most booming research areas around the world which is constantly growing its importance among research scientists around the world.

For the current system, there are few publicly available labelled datasets, and the lack of languages in which they are available is a major concern. A single dataset can contain uneven amount of data of the specified category. For example, in a speech dataset there can be 1000 files for the emotion angry and only 500 for happy. In such scenarios the model would be trained uneven and the predictions may not be accurate. The present systems and models used have comparatively lower accuracy and some have the problem of Negation Handling. Negation handling is when the overall meaning of the sentence is changed just because of the negated word added in the sentence somewhere. To address this problem some modern intelligent solution is required to improve its accuracy.

RESEARCH ARTICLE

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Grading Method of Ensemble and Genetic Algorithm for Intrusion Detection System

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ABSTRACT

Intrusion Detection System is very important tool for network security. However, Intrusion Detection System suffers from the problem of handling large volume of data and produces high false positive rate. In this paper, a novel Grading method of ensemble has proposed to overcome limitation of intrusion detection system. Partial decision tree (PART), RIpple DOwn Rule (RIDOR) learner and J48 decision tree have used as base classifiers of Grading classifier. Optimzed Genetic Search algorithm have used for selection of features.These three base classifiers have graded using RandomForest decision tree as a Meta classifier. Experimental results show that the proposed Grading method of classification offers accuracies of 81.3742%, 99.9159% and 99.8023% on testing, training datasets and cross validation respectively. It is found that the proposed graded classifier outperform its base classifiers and existing hybrid intrusion detection system in term of accuracy, false positive rate and model building time.

Keywords: Grading Ensemble, RIDOR, Meta Classifier, Base Learner, AdaBoost.

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INTRODUCTION

Recently, Internet has developed an vital part of human life for communication. Although internet serves the civilization in a better way, it also owns some serious threats in the form of cybercrime. The ubiquity of internet connectivity has empowered an increase in the pace and volume of cyber-attacks. Identifying the various kinds of cyber- attacks is an obvious key technical issue. The data of individuals, financial and other important organisation is very important. During Covid-19 pandemic, most of the companies are accepting working from home through Internet. Due to huge usages of networks, cyber-attacks, network attacks and the possibility of data stealing and destruction is rapidly increasing [1]. Internal Intruders and hackers in networks modify, destruct or steal private information. A notable development has been made in the field of internet security by issuing various directives and regulations. Apart from those regulations and policies, various security measures are needed to improve the technical aspects of internet security. Various Cyber security tools such as Firewall, Antivirus software, Penetration testing have been employed to tackle the cyber-attacks. Among these tools, Intrusion Detection System (IDS) play vibrant role in the information security ground. It can recognize an attack which might be an on-going invasion or an intrusion that has already happened. In fact, intrusion detection is regularly alike to a classification problem. The central inspiration of intrusion detection is to expand the accuracy of classifiers in successfully recognizing the intrusive behaviour. Intrusion Detection technique can be classified into two broad categories; Network

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RESEARCH ARTICLE

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Contribution of Multiprotocol Label Switching Traffic Engineering in Throughput Enhancement

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ABSTRACT

Multiprotocol Label Switching traffic engineering offers competency to all types of service providers including mobile,internet. Service provider should provide highly stable and seamless connections over the globe for customers connected to network. This paper describes designing of Multiprotocol Label Switching along with traffic engineering with the help of Interior Gateway Protocol. Multiprotocol Label Switchingtraffic engineering also assures path, link and node protection functionality along with router reflector features which always ensure better efficiency and easy administration. The efficient use of available resources in internet service provider infrastructures is one of the key requirement to meet today's highly demanding business which can be possible with the help of Multiprotocol Label Switchingtraffic engineering. In this paper, one of solution has been demonstrated to mitigate subjected the requirement.

Keywords: MPLS, IGP, Traffic Engineering, OSPF, RSVP, IS-IS

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INTRODUCTION

The India being highly potential market for cellular business technology need to provide user service which is enabled with high speed & capacity. Todays, cellular network is not onlylooking for connectivity but also looking for seamless roaming capability & stable network availability across the globe. Cellular network is not limited to voice or data calls but also for providing end to end connectivity to all types for business traffic. For every business; technology is one the critical part & in that seamless & stable connectivity plays a vital role.Downtime in a cellular network has adverse effect on all part of business which in-turn affect human life. Due to this its mandate that cellular network should function precisely.

In cellular network any activity or changes in one part of network may impact the other part may in positive or negative impact but network being contiguous in nature this can be taken as an advantage provided that activity should be carried out with all critical measures so that overall network should remain stable & customer traffic should remain intact.

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RELATED WORK

MPLS techniques can be applied to any network layer protocol. However, we focus on the use of IP as the network layer protocol [3]. It is a forwarding technology employed by most modern ISPs. It operates between Layer 2 and 3-a layer that is commonly known as 'Layer 2.5'- in the OSI model. This is because it enables IP traffic to be forwarded on Layer 2 devices such as ATM (Asynchronous Transfer Mode) and frame-relay switches as well as on Layer 3 devices such as routers

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RESEARCH ARTICLE

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Crop Disease Detection System Using Deep Learning Method

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ABSTRACT

Agriculture forms a crucial part of the economy of India. More than 50 percent of India's population is reliant on on agriculture for their income. India export many crops like wheat and other cereals. It can thus be seen that wheat is a big part of the Indian agricultural system and the economy of India. Therefore, it is very important to maintain the steady production of wheat and cereals. Planning for agriculture plays a major role in agro-based economy of country development and food security. In agricultural planning, the selection of crops is a significant question. It relies on different parameters, such as the rate of production, market price and policies of the government. Many researchers have researched crop yield rate prediction, weather prediction, soil classification and crop classification using statistical methods or machine learning techniques for agricultural planning. In this paper, novel crop diseases detection system based on deformable model have proposed to handle the segmentation of crop images.

Keywords: Crop disease, pre-processing, classifier algorithm, feature extraction Convolutional neural network.

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INTRODUCTION

Predictive Analysis in order to increase productivity and crop production efficiency, agricultural systems are very efficient. Population, however, increases slowly, while the crop production resource declines day by day. Traditionally, farming includes planting the crop or harvesting it according to a predetermined timetable. With the impact of weather variation in India, majority of the agricultural crops are being severely affected in terms of their performance [1]. Attaining maximum yield rate of crop using restricted land resource is a goal of agriculture planning in an agro-based country [2]. In their study they have shown that a method name crops selection method to solve crops selection problem. Recently, modern people don't have cognizance about the cultivation of the crops in a right time and at a right place [3]. For improving prediction of crop yield under different climatic scenarios, machine learning methods are widely being used.

In this paper, the reviews on use of such machine learning technique for Indian rice cropping areas have presented [4]. If plants and crops suffer from pests, it impacts the country's agricultural production [5], in their study suggested identify the symptoms of plants at very early stage. Precision agriculture requires the collection of real-time weather data, air quality, soil, crop maturity, machinery, labor costs and current data convenience. This prognostic analytics can be used to make cleverer decisions in agricultural field. Farmers, through their experience, predict the diseases; however this is also not the correct approach. Crop diseases are triggered by bacteria, fungi, viruses etc. To control this, diseases in crop are classified based on diseased leaf types using ANN and

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RESEARCH ARTICLE

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Data Storage Security in Cloud Computing Using Aes Algorithm and Md5 Algorithm

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Abstract

The most intriguing computing paradigm shift in information technology today is cloud computing. However, security and privacy are seen as major roadblocks to widespread adoption. The authors present a list of important security concerns and encourage more research into security solutions for a secure public cloud environment. Cloud computing is a new term for a long- awaited technology. Computing as a utility is a vision. The cloud gives on-demand network access to a centralised pool of programmable computing resources that may be deployed quickly and effectively as well as little management overhead

Keywords: Cloud Computing, Security, AES Algorithm, MD5 Algorithm.

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Introduction

Since its beginnings, cloud computing has been used by billions of users all over the world as an innovation and final solution for utility and distributed computing on Web applications. Its use and impact are felt in a variety of industries, disciplines, and businesses all around the world. Nonetheless, cloud computing has encountered some challenges; the purpose of this research is to identify the factors impacting performance and provide some remedies or advice to cloud users who may encounter performance issues:

1. Information integrity and protection in the cloud domain, as opposed to the traditional approach to information storage.
2. The ability to transform data from a variety of sources into intelligence and deliver it to the appropriate individuals and systems.
3. When several users access the cloud service, load balancing and traffic control are required.
4. Large-scale data, high-performance computing, automation, response speed, rapid prototyping, and rapid time to production are all issues that must be addressed.
5. End-users of cloud services have concerns about security, privacy, and trust.
6. Using the cloud as a platform to help create a more dynamic business intelligence environment.

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Conflict of interest : None

Literature Survey

1. Paper Name : Security Challenges for the Public Cloud Author : Kui Ren, Cong Wang, and Qian Wang

   Description : The most intriguing computing paradigm shift in information technology today is cloud computing. However, security and privacy are seen as major roadblocks to widespread adoption. The authors present a number of significant security

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RASPBERRY PI AND OPENCV FOR LICENSE PLATE RECOGNITION IN REALTIME

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ABSTRACT

Vehicle number plate recognition is a tough but necessary method. This is extremely useful for automating toll booths, identifying automated signal breakers, and identifying traffic law breakers. We present a Raspberry Pi-based vehicle number plate recognition system that uses image processing to detect vehicle numbers automatically. A camera and an LCD display circuit are connected to a Raspberry Pi in this setup. The device continuously examines incoming camera footage for any traces of license plates. It analyses the camera input and extracts the number plate component from the image when it detects a number plate in front of the camera. OCR is used to process the extracted picture and retrieve the number plate number. The extracted number is then shown on an LCD display by the system. As a result, we proposed a Raspberry Pi-based vehicle number plate recognition system. It analyses the camera input and extracts the number plate component from the image when it detects a number plate in front of the camera. OCR is used to process the extracted picture and retrieve the number plate number. The extracted number is then shown on an LCD display by the system. As a result, we proposed a Raspberry Pi-based vehicle number plate recognition system.

Keywords: Vehicle Number Plate Recognition, Realtime, Raspberry Pi, Open CV, Camera.

I. INTRODUCTION

Human security has long been a serious concern. Schools, hospitals, and other public places now have video surveillance cameras to make us feel safe. According to an HIS survey, there were around 245 million security cameras installed and operational in 2014, which equates to one security camera for every 30 persons on the earth. With advances in technology, particularly in image processing and machine learning, it is feasible to teach these cameras to analyze information from the video feed, making them wiser. Face recognition, pattern analysis, emotion analysis, and much more can be done with the video input from these cameras. Surveillance firms such as Hikvision and others have already begun to include these functionalities into their products.

Figure 1: Car Number Plate

With the growing number of automobiles on the road today, keeping a manual record of the complete vehicle may be impossible. It takes time to note down the number since it requires people. Furthermore, material that is manually saved cannot be accessed after a lengthy period of time. So, in order to solve all of these issues, we created a system that would automatically recognize and save the number plate in its database. When the

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Wireless Power Charging -A new trend for Electric Vehicle Charging

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***Abstract*— — In today's world, the significance and usage of electrical energy have been increased and almost every household has equipment that mostly operates on the electrical network. Conventional internal combustion engines were also being shifted to the electrical vehicle due to their various advantages over the IC engines. Paper presents, an analysis of the wireless power control for an electrical vehicle that has been carried out using LC resonance, and its various parameters have been recorded. The object of the project is to study various aspects of a high-efficiency wireless power transfer system for charging an electric vehicle.**

***Keywords*— Wireless Power transfer, resonance power transfer, Mono resonant power transfer, Dynamic power transfer system, Cordless Charging.**

I. INTRODUCTION

Electrical vehicles are gaining more popularity and it's being recognized as an alternative for conventional IC engines due to its various advantages. Electrical vehicles use an electrical form of energy to drive the car. As we know that electrical energy is the most efficient form of energy available to date in the world hence it's very obvious to get dependent on the form of energy source. Electrical vehicles are getting increased on the road and in India government is also emphasizing the usage of electrical vehicles for public transport and private vehicle. EVs have battery banks installed inside to store the electricity and the same electricity is used to drive the electrical vehicle depending on the capacity of the battery. Electrical vehicles are equipped with on-board charging which is used for slow charging and can also use to charge the vehicle from the domestic power supply. DC fast charging is also used to charge the battery at a faster rate to reduce the charging time. Though the electrical vehicles having various advantages over the conventional IC engines it has some disadvantages and majorly it is related to the charging of the batteries and charging time. The charging time can be reduced by introducing DC fast charging. The second most hurdle in using the electrical vehicle its travel distance in the single charge. The conventional IC engines as it runs on the fossil fuel it can conveniently store in the fuel tank and it can travel more distance as compared to an electrical vehicle which has very limited running distance i.e. up to 300km per charge.

Various charging methods use the electrical cable to charge the battery of the electrical vehicle. Various DC charging plugs are used and have different charging connectors as below.

CHAdeMO – Nissan and other Japanese companies like Mitsubishi

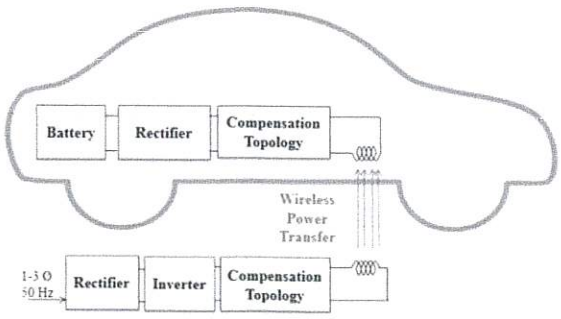
SAE Combo Charging System (CCS) – (BMW, GM, VW, and other carmakers)

Supercharger – Tesla standard connector

GB/T - BYD among other Chinese companies uses this. Mahindra and Tata electric cars also use this standard.

Various e-vehicle manufacturers using various charging connectors depending on the country and region. The same type of charging connector must be made available to sell such vehicles in the entire world. As of now, the transport vehicles that have not been yet introduced in e-vehicle may require another size of the connectors as the charging current will be at a higher rate which again leads to the addition of the connector in the charging infrastructure.

Fig -1: Figure



II. DESIGN METHOD AND TOPOLOGIES

Topologies:- There are various topologies used to transfer electrical power such as mono resonant and multi resonant which in this experiment we will be using the mono resonant circuit which has a combination of the LC Series –Series resonance.

In the LC Series-Series resonance, the Capacitor placement is also done in various combinations like series, parallel, etc. in this research we are using the series capacitor.

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EV BATTERY CHARGER USING SEPIC CONVERTER WITH PFC BASED TECHNIQUE

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ABSTRACT

Conventional PFC (Power Factor Correction) circuits in EV (Electric Vehicle) battery chargers have the efficiency limitation due to high conduction loss associated with a diode bridge rectifier (DBR) at the input. To mitigate this problem, a bridgeless (BL) single ended primary inductance converter (SEPIC) with increased power quality, is presented in this paper. The input current has a unity power factor operation over the entire charging period. Because of elimination of DBR and the current conduction through relatively fewer number of components, conduction losses are significantly decreased. This, in turn, increases the charger efficiency as compared to conventional BL SEPIC converter. The total performance of proposed charger is illustrated with the help of various operating modes, design equations, simulation based performance and experimental validation under steady state as well as over wide fluctuations in AC mains voltage. The EV battery is charged at constant current/ constant voltage control mode, which gives satisfactory results for increased efficiency and inherent PFC, thus, increasing overall performance of the charger.

Keywords: BL SEPIC converter; Constant Current/Constant Voltage control(CC/CV); Diode bridge rectifier (DBR). Electric Vehicle(EV); Power Quality(PQ).

I. INTRODUCTION

World is moving towards Electric vehicles, as conventional vehicles pollute the environment and fossil fuels are depleting. The solution leads to adopting alternate fuel vehicles such as Electric Vehicles (EV) and Hybrid Electric Vehicle (HEV). EV does not emit tailpipe pollutant like particulates, ozone, volatile organic compounds, carbon monoxide, hydrocarbons, lead and oxides of nitrogen which plays a vital role in air pollution and greenhouse gas Moreover the fossil fuel issue can be minimize.

II. LITEATURE REVIEW

Pulse Width Modulated DC-DC Power Converters, 2nd Edition PWM DC-DC power converter technology underpins many energy conversion systems including, battery chargers, active power factor correctors portable devices, renewable energy circuits and LED drivers. This second edition has following the success of Pulse-Width Modulated DC-DC Power Converters been thoroughly revised and expanded to cover the latest challenges and advances in the field. for new chapters, detailing the latest advances in power conversion, focus on dynamic and small-signal model characteristics of the buck converter in continuous conduction mode; voltage-mode control of buck converter; small-signal model and characteristics of the boost converter in the discontinuous conduction mode and electromagnetic compatibility (EMC).Provides readers with a solid understanding of the principles of operation, analysis, synthesis and semiconductor power devices and design of PWM power converters, including wide band-gap power devices (GaN and SiC).Fully revised Solutions for all end-of-chapter limitations available to instructors via the book companion website. Step-by-step derivation of closed-form design equations with illustrations. Fully revised figures based on real data. With summaries of key concepts, improved end-of-chapter, review questions, problems and answers, biographies and case studies, this is an important textbook for graduate and senior undergraduate students in electrical engineering. Its superior readability and clarity of explanations also makes it a key reference for research scientists and practicing engineers.

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Design of Robust &Efficient SMPS for Charging of Lithium Ion Battery used in Electric Vehicle

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ABSTRACT: The popularity of electric vehicles (EVs) is increasing rapidly in India & so is the demand for reliable, efficient battery chargers. The conceptual development of an SMPS based battery charger for charging of Lithium- Ion batteries used in Electric vehicles is explained here. The various protections provided in the circuit are also mentioned.

In order to charge the batteries efficiently, and to ensure their long life, we need a correct battery charging system. This charging system can support both Lithium Ion and Lead acid battery.

Several topologies such as LLC resonant converter, fly back and forward converter are possible. A Forward converter topology is adopted. It has several features like Input surge protection through MOV, current inrush protection through fuse and NTC. It works for a wide band of input voltage by use of Window comparator, soft start using TOTEM pole comparator & uses a current controlled PWM. It uses a single switch (MOSFET) and has relay drive logic at the output with protection from reverse charging of batteries. It regulates the output voltage though feedback. Simulation and experimental results reveal that the proposed SMPS based charger offers better Power quality and reliability. A prototype has been built to validate the feasibility and benefits of the system.

KEYWORDS: EV, Electric vehicle, SMPS, Lithium Ion battery, MOSFET, MOV, Current controlled PWM, Forward topology, Soft start, Reverse battery charging protection

I. INTRODUCTION

SMPS based battery charger plays important role in charging of Lithium Ion battery used in electric vehicles.

A. EV Charger:

An EV charger, also called Electric Vehicle Supply Equipment (EVSE) is an element in EV infrastructure that supplies electric energy for recharging the electric vehicles.

B. Charger Type:

B.1 Private Charger

The home private chargers are generally used with 230V/15A single phase plug which can deliver a maximum of up to about 2.5KW of power. Thus, the vehicles can be charged only up to this rate.

B.2 Public charger:

For charging outside the home premises: the electric power needs to be billed and payment needs to be collected. Further, the charges may depend on state of grid (whether it is power-surplus or is in power-deficit state).

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Design and Analysis of Half Wave Dipole Antenna for SAR Measurement

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Abstract

Antenna invention may be the boon for telecommunication field whereas the dipole antenna finds most commonly and wildly used transducer in wireless communication devices. In recent years, the rapid change in technology, antenna performance parameters get precisely improved. This paper explains stepwise design procedure of half wave dipole antenna with standard calculations so that one can be easily followed for their new inventions as well intention to design proposed antenna for Specific Absorption Rate (SAR) measurement in human head. The antenna performance parameters such as radiation pattern, VSWR, return loss been evaluated. HFSS simulation software used to design and analyze half wave dipole antenna at 1800 MHz. It proves that the proposed model is efficient version of dipole antenna at given frequency.

Keyword: Half Wave Dipole Antenna; HFSS; Specific Absorption Rate; Return Loss; VSWR; Radiation Pattern.

Introduction

Dipole antenna plays an important role in wireless communications. Half wave dipole antenna length is approximately one half of the wavelength but practically 0.45 times of the wavelength which commonly used in practical RF antenna with various applications.[1] Dipole antenna is center fed driven element which can be made by simple wire to act as a radio antenna. The dipole antenna is constructed by two quarter wavelengths conducting elements to form total wavelength λ/2 as shown in fig 1.

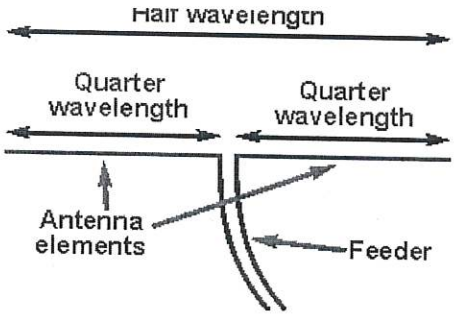

Fig.1. Half Wave dipole center feed.

Basically dipole antenna exhibits two terminals or poles through which RF current flows in association with voltage which causes radiation of electromagnetic signal from dipole antenna as shown in fig 2.

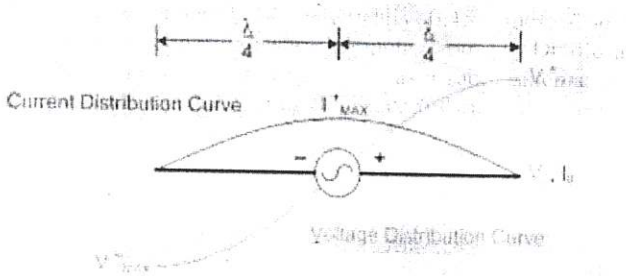

Fig. 2. Voltage and Current distribution in dipole.

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Detection of Temporomandibular Joint Disorder Using Surface Electromyography by Supervised Classification Models

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ABSTRACT

Temporomandibular joint disorder (TMD) is a complex disorder with multiple signs and symptoms. It mainly involve set of musculoskeletal disorders which may affect the neck, shoulder and masticatory system. It is estimated that around 60 to70% of population has at least one of the symptoms. This disorder is highly prevalent in general population but females are affected more with a ratio of 4:1. By using Surface electromyography (SEMG) recording technique, the data were collected and results were assessed. Performance parameters of different machine learning models were tested for Optimized features. After the analysis with various machine learning models, the results shows that the Adaboost machine learning model for the detection of TMJ disorder using SEMG of masticatory muscles gives the best results compared to all other algorithms. Result shows a classification accuracy percent of 98.5 per 10 optimized features.

Selection and peer-review under responsibility of the scientific committee of the International Conference on Nanoelectronics, Nanophotonics, Nanomaterials, Nanobioscience & Nanotechnology.

1. Introduction

Jaw disorders can be divided into several subgroups. One of them is temporomandibular joint disorders (TMJD) with noticeable signs like clicking noises, limitations in opening of jaw, Difficulty in chewing (pain in jaw muscle), locking of the joint, Ringing in the ear, headache, shoulder pain[1,3]. TMD is the second most widespread musculoskeletal disorder, after chronic low back pain resulting in work disability [7]. TMD-related pain can affect the everyday life mentally and physically of an individual which in turn affect the quality of life [14].

Non Invasive method of assessing muscle function is surface electromyography. This method has been widely used for the diagnosis of patients with general muscle disorders and diseases affecting neuromuscular performance [4, 7.]Surface electromyography (sEMG) uses surface electrodes and detects electric potentials from many muscle fibers [3,11]. It is a harmless method for evaluating muscle function that may possibly be used in the TMJ diagnosis. In this paper the data is recorded first and after that the standard characteristics will be extracted from it. Using Dentist and Neuro Physician advice [2] and thorough literature survey, very important features are chosen and finally the data from healthy and people with TMJ disorder is classified and data is gone through different machine learning algorithms with and without cross validation of five and ten folds..

2. Materials and method

The current research recruited the support of 84 subjects. There were 41 participants in the monitoring healthy group and the rest were in the study group. Many people were omitted from the research because they had a history of orthodontic treatment, lip negligence, or prior tooth restoration. Each subject has a full dental history taken and intraoral photographs from an opto pentagram (OPG) are taken to identify radiographic evaluation of TMJ parameters. The non-invasive method for acquiring EMG signals was chosen over the invasive method, which used single use and sticky type electrodes for EMG signal acquisition. Because the study concentrated on the temporal and masseter muscles, the first electrode was put on the masseter, the second on the temporal muscle as a reference electrode, and the third on the forehead as a ground electrode. The EMG recording of these muscles was done in both groups at rest position and during maximum clenching

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Electromyography Signal Analysis for the Detection of TMJ Disorder Using Classification Models and Multivariate Analysis

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Investigational Outcomes of Normal and Diabetic Human Volunteers using Microwave based Non-invasive Blood Glucometer

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Abstract **—Noninvasive estimation of blood glucose using microwave based sensor is one of the most challenging research fields in recent days. These methods are more adaptable to avoid soreness and skin estrangement that occur in traditional invasive blood glucose measurement techniques. This paper suggests the investigational outcomes of a microwave based noninvasive blood glucose meter to check performance of the microwave antenna sensor. Narrowband micro strip antenna with resonating microwave frequency of 1.3 GHz is utilized to measure Blood Glucose Level (BGL) noninvasively. Validity of sensor is assessed by performing medical tests on non diabetic and diabetic human volunteers. Mean Absolute Relative Difference (MARD) and Surveillance Error Grid (SEG) analyses were performed during experimentation to find deviation of estimated BGL from reference BGL which is measured using available invasive technique. Direct assessment of estimated data with reference data provides excellent reliability and repeatability of proposed microwave technique.**

Keywords- **glucometer, Blood Glucose Level (BGL), medical tests, Mean Absolute Relative Difference (MARD), Surveillance Error Grid (SEG)**

I. INTRODUCTION

Syndrome diabetes is related with human blood where body is unable to normalize proper measure of insulin in human blood. Therefore it is necessary to monitor BGL of human being frequently to have curative medical treatment and avoid diabetes inconveniences like ketoacidosis, cardiovascular infections, visual impairment, stroke and neurasthenia. [1]. Current scenario shows that invasive BGL measuring techniques are more popular in society. This need puncture of fingertip resulting skin damage, skin estrangement and hurt to skin.

Non invasive technique including optical spectroscopy, minimal invasive technique, infrared spectroscopy, thermal spectroscopy , impedance spectroscopy [2][9] are also exist in practice but provide disadvantage in terms of precision, standardization, dimension and other unexpected effects[2]. As a result it is important to carry out progress of non invasive BGL measurement techniques which do not cause any side effect.

Near field BGL monitoring technique using radio and microwave frequency range is mostly used for non invasive dielectric characterization of biological parameters in clinical applications [3]. Various microstrip antenna structures working in microwave frequency range are invented by researchers for dielectric characterization of blood and then to estimate BGL. Ring resonator [4], spiral shaped antenna [5], meander antenna [6], millimeter wave waveguide transmission measurement system [7] are recommended. Most of the microwave results show that complex permittivity of blood or aqueous glucose, changes in relation with variation in BGL or variation in aqueous glucose concentration over microwave frequency range[8-9]. Estimation of BGLs can be done by characterizing BGL in terms of blood complex permittivity and complex permittivity in terms of corresponding microwave frequency.

This paper suggests new microwave based noninvasive BGL measurement system using narrow band microstrip antenna structure. Performance of sensor is assessed by carrying medical trials on 25 non-diabetic and diabetic human subjects and reporting the results.

Paper presents five different sections. Section II briefly describes BGL measurement setup using microwave based noninvasive technique.

RESEARCH ARTICLE

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Detection And Diagnosis of Covid-19 Using Pnuemonia

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ABSTRACT

The corona virus 2019 (COVID-19), originated in Wuhan city, China, with its rapid spread around the globe, has become a pandemic, drastically affecting the daily lives, welfare and global economy. So, it becomes critical for quick and primary detection of the virus in the system to prevent further spread and loss of lives. The dominantly used screening technique for detection is Polymerase Chain Reaction (PCR). With rapid growth in the number of cases the scientists and scholars are looking into an substitute and also more effective ways for screening, as sometimes these PCR kits turn out to be faulty with false results. This calls for a more automated method for initial screening of patients also the aspect of expense to be considered for the same. So we propose a fully automated end to end system for first screening and detection of covid-19 as well pneumonia via X-ray scans of the individual and it will be done using Deep Learning techniques. In this project we have surveyed the various datasets available from different open source resources which are often updated by scientists and radiologists. This data set are used for Training as well as Testing of the data, with the various image modalities like X-ray scans and CT scans the CNN model is trained, for primary purpose the X-ray scans are used as image modalities and data. The Model is made of various CNN layers, Pooling is done for feature extraction, and as we have multi classifications such as Covid-19, Pneumonia and Non-findings the Softmax layer is used for obtaining the results.

Keywords: COVID, CNN, Pneumonia, detection.

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INTRODUCTION

The main objective of this work is to generate an automatic end to end model used for assisting the radiologists in screening and detection of covid-19 and pneumonia. The rapid way of identifying covid-19 and pneumonia is from radiography and radiology. This will be targeted for urban as well as rural regions as they tend to have lack of well trained radiologists and resources, so this completely automated system is the need of the time as well for future screening purposes. The detection can be done by using X-ray and CT scans as imaging modalities. The chest CT scans show high sensitivity for diagnosis and X-ray show visual indexes related to Covid- 19, the subtle abnormalities can be easily identified by the radiologists but for mass diagnosis and high accuracy within limited time this system will prove to be very useful. The Deep Learning techniques enable us to create a model with increased accuracy without the necessity of manual feature extraction and can be for great assistance to radiologists. The proposed model can be used to diagnose the

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Detection Of Breast Cancer Using Hybrid Feature Selection And Bayesian Optimization

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Abstract: Breast Cancer is the most widely recognized malignancy that happens in ladies and infrequently found in men. As per the World Health Organization (WHO), Cancer is characterized as a wild unusual development of cells in any organ or tissue of the body. Neoplasm or Malignant tumors are regular words that depict disease. The World Health Organization (WHO) review says that malignancy is the subsequent driving reason for death universally, answerable for an expected 9.6 million deaths or one of every six deaths,in 2018. Among numerous different elements, obesity and overweight are related with numerous sorts of cancer like breast, throat, colorectal and kidney. Overabundance weight was responsible for 3.4% of diseases in 2012, including110,000 various instances of breast cancer each year. The beneficial thing is malignant growth is bound to react to a powerful disease treatment when analyzed at a beginning phase, bringing about a higher chance of enduring, less expensive and more affordable treatment. Nonetheless, it is very difficult to analyze it early. Henceforth there is a need to foster a proficient early forecast model which can recognize bosom disease(breast cancer) and assists with saving life. The proposed model highlights bosom malignancy utilizing customary AI calculations alongwith cutting edge Gradient Boosting approaches.In the proposed system, Bayesian optimization technique along with feature selection techniques enhance execution by reducing parameters by practically 40% while keeping the exactness of the model high. Furthermore, hyper boundary tuning methods are executed to additionally improve the predictive model's performance. The best exactness of 96.2% is acquired with extra tree classifier algorithm by utilizing feature selection technique alongwith Bayesian optimization and hyper boundary tuning.

Keywords—*Breast cancer, Machine Learning, Prediction, Feature Selection, Hyper parameter Tuning, WHO, Gradient Boosting, Ensemble Learning, Decision Tree, Random Forest, Bayesian Optimization, SVM, Naive Bayes, Logistic Regression*

I. Introduction

According to the World Health Statistics-2020 report [1] Non communicable disease mortality rate is 41 million people all over the globe that is equivalent to 71% of deaths. Among this, 9 million deaths are due to cancer. Report says that, in high-income countries, the leading cause of premature deaths is cancer. Among all the types of cancers, breast cancer is the most common type of cancer found among women and is responsible for a large number of deaths worldwide. [2] The second most common type of cancer among women in the United States is breast cancer. [3] The study says that death and incidence rates of male breast cancer are highest among men above 80 years of age. [4] In the United States in 2017, about 2,50,000 new breast cancer cases were found, 42000 women died of breast cancer. There are high chances of survival when breast cancer is diagnosed before it has spread to the other parts of the body. Machine Learning Algorithms along with Optimization and Hyper parameter Tuning techniques can contribute significantly to identify the best features to predict breast cancer. Early detection of breast cancer can significantly reduce treatment cost, mortality rate and higher probability of survival. This paper gives a brief idea about performances of different algorithms like Logistic regression, Decision Tree Classifier, Random Forest, K nearest neighbour, Naive bayes, SVM, Linear and Quadratic Discriminant analysis and Boosting algorithms with and without feature selection techniques along with Bayesian optimization technique.

II. Literature Survey

The paper succinctly describes a comparative study of Machine Learning Classification algorithms namely Decision Trees (C4.5), K Nearest Neighbours, Naive Bayes, and Support Vector Machines on Wisconsin Breast Cancer Dataset. The simulation was carried out by the authors on the Weka Data Mining Tool and SVM resulted in the highest accuracy of 97.13%. The authors have also analyzed the time required to build the model and the effectiveness of the classifier is measured by ROC AUC Curve.[5]

The paper compares the performances of three algorithms which are Decision Trees (J48), Naïve Bayes, and Sequential Minimal Optimization (SMO) on the Wisconsin Breast Cancer (WBC) dataset. The paper focuses around the Resampling filter technique to take care of the class imbalance issue and further improving the precision of the model.[6]

Face recognition by an enhanced Local tri-directional intensity pattern technique

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Abstract: *With the growing demand for facial and emotion recognition and potential biomedical, industrial, and defence applications, image retrieval technology is being explored in unprecedented ways. In recent years, some new technologies and models have grown. However, few technologies simultaneously explore direction and intensity information. In this article, we introduced a local address-based mode for content-based image retrieval (CBIR). The proposed local feature descriptor captures the potential and unique features based on the three directions and the relative amplitude difference between the pixel and its neighbouring pixels, so that the mode is robust to illumination changes.*

The experiment was conducted on four reference data sets: MIT Vistex database, Brodatz database, AT&T face database and IRIS thermal data set. The result analysis shows that this method improves the recovery rate.

Keywords— Local binary pattern, feature extraction, texture descriptor, face recognition

I. INTRODUCTION

The development of various image acquisition technologies has led to the rapid growth of digital image libraries, and manual annotation has become tedious and expensive. This has increased the demand for effective automated techniques for retrieving images from large databases. Content-based image retrieval uses color, texture, shape, and other content-based information, rather than metadata associated with the image. The capabilities of the system depend on the type of feature extraction technique used. Recently, a large number of documents have developed around the topic of local feature descriptors, but only a few documents use both the intensity and direction information from their neighboring pixels. In layman's terms, feature extraction is used to reduce the dimensionality of an image. Texture represents the first-level spatial attributes that can be extracted from the image. The current technology is a texture feature descriptor that retrieves potential sign and intensity information from three directions. The presented results prove its effectiveness over previous model descriptors. The rest of the work is organized as follows: Section 1 contains related work, Section 2 describes two pattern descriptors, Section 3 presents the method, Section 4 presents the results, and Section 5 summarizes the work.

A. Related work

Texture-based feature extraction has been widely used in the past. Therefore, this section will explore a large amount of literature. In [1], a gray-level co-occurrence matrix based on pixel pairs is proposed. In transform domain methods such as discrete wave transform (DWT) [2], Gabor filter [3] and rotating complex wavelet filter [4], it has been proposed. A powerful technique called Local Binary Pattern (LBP) [5] has laid the foundation for several new patterns in the past two decades.

In LBP, only first-order local derivative is considered, so it is extended to the local derivative mode (LDP) [11], which includes the n-order derivative. For the real-time applications involving images from different environments, local ternary mode (LTP)

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RESEARCH ARTICLE

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Study of Data Privacy and User Data Control

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ABSTRACT

Data is information in the form of facts or statistics obtained from a variety of sources that must be analysed, processed, and used to aid decision-making, or information in an electronic form that can be stored and accessed by a computer. In a world with ever-growing amounts of data, privacy is a crucial topic to scrutinize. Privacy of data defines the practices which checks the data shared by users is only used for its valid purpose. It focuses on the proper handling of sensitive data, such as personal data but also other private data, such as some important data and intellectual property data, in order to meet the criteria while simultaneously protecting the data's secrecy and invariability. Data control is the management of information strategies for a company's data. Data control, unlike data quality, focuses on observing and reporting on how processes are performing as well as controlling faults. Inspection, validation, alerting, documentation, issue reporting, and issue tracking are all functions. In this paper we have conducted survey of software users who are using spy-ware or antitheft software's to prevent breaches.

Keywords- Confidential, Privacy, Electronic, Intellectual

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INTRODUCTION

Privacy, in simple words, is the individual's right, organizations or groups to check who can see, access, or manipulating some property, such as their bodies, ideas, data, or information. Control is obtained by an individual through physical, public, or descriptive boundaries that help prevent unwanted access, observation, or use.

Let's consider some example,

- A locked front door can act as a physical boundary that helps prevents strangers from entering a house without direct permission in the form of a key to open the door or a person inside opening the door.
- A members-only club demonstrates public boundary which only allows members to access and use club resources.
- A non-disclosure agreement defines descriptive boundary and restricts what data can be shared with others[1].

Data privacy has become more important as the number of individuals utilising the Internet has increased. Websites, software, and social media platforms commonly need to gather and keep personal data in order to provide services users.

On the other side, some programmes and platforms may go beyond users' expectations in terms of data collection and use, leaving them with less privacy than they intended. Other apps and platforms may not have sufficient controls in place to protect the data they gather, potentially resulting in a data breach that compromises user privacy. Other apps and platforms may not put enough controls in place to protect the data they collect, which could lead to a data breach that threatens user privacy.

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RESEARCH ARTICLE

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Stock Price Prediction Using Long Short Term Memory

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ABSTRACT

Stock market price prediction is difficult and complex task. Prediction in stock market is very complex and unstable Process. Stock Price are most of the time tend to follow patterns those are more or less regular in stock price curve. Machine Learning techniques use different predictive models and algorithms to predict and automate things to reduce human effort. This research paper focuses on the use of Long Short Term Memory (LSTM) to predict the future stock market company price of stock using each day closing price analysis. LSTM is very helpful in sequential data models. In this paper LSTM algorithm has been used to train and forecast the future stock prices.

Keywords: Long Short Term Memory (LSTM), Sequential data, Machine Learning, Regression, Stock Market, Price Prediction.

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INTRODUCTION

The stock market broadly refers to the group of exchanges where the buying, selling, and issuance of shares of publicly traded companies take place. While both the terms "stock market" and "stock exchange" is often used but the meaning is same, the later term generally comprises a subset of the former. Trading in the stock marketmeans buyingor sellingthe shares of listed companies on exchange. A given country or region may have one or more exchanges comprising their stock market.Technical analysis is a trading analysis domainused to evaluate stock price movements using charts and identify trading opportunities in future by studying statistical trends collected from trading activity, like price movement and volume of stock transactions. Unlike fundamental analysis, which evaluate a company value based on business results such as sales and earnings, technical analysis focuses on the study of price and volume.

The paper mainly focuses on automating the process of technical analysis of stocks. Research will be carry through using the Python programming language on a Jupyter environment.

This is software based research which includes cutting edge technologies like data science, machine learning and data driven frameworks for building the price prediction system. There are various machine learning models available for prediction of time series data. LSTM has been used becauseof its ability to back propagation with feedback and LSTM cells allowthe data to be filtered with gates.

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LITERATURE SURVEY

LSTM shows more accuracy than other sequential data machine learning models. LSTM also overcome the gradient weight loss problem in traditional recurrent neural network. Recurrent neural network (RNN) andLSTM has been used to deal with anticipated stock market [1].Stock forecasting or predictionhas been done using Deep Learning with LSTM. In survey

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On coefficient inequalities for certain subclasses of meromorphic bi-univalent functions

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Abstract. In the present paper, we investigate and define two subclasses of meromorphic bi-univalent function class Σ' which are defined on the domain $\mathbb{U}^* = \{z \in \mathbb{C} : 1 < |z| < \infty\}$. Further, by using the well-known coefficients estimates of the Carathéodory functions (i.e functions with positive real part) we obtain the estimates on the coefficients $|b_0|$, $|b_1|$ and $|b_2 + b_0^3|$ for functions in these subclasses.

Keywords: analytic function, meromorphic function, univalent function, bi-univalent function, meromorphic bi-univalent function.

1. Introduction

Let the class $\mathcal{A} = \{f : \mathbb{U} \to \mathbb{C} : f \text{ is analytic in } \mathbb{U} \text{ and } f(0) = f'(0) - 1 = 0\}$ and its subclass $\mathcal{S} = \{f : \mathbb{U} \to \mathbb{C} : f \in \mathcal{A} \text{ and also univalent in } \mathbb{U}\}$ where $\mathbb{U} = \{z \in \mathbb{C} : |z| < 1\}$ be the open unit disk and such functions $f \in \mathcal{A}$ have the form:

$$f(z) = z + \sum_{k=2}^{\infty} a_k z^k. \tag{1.1}$$

In 1972, Ozaki and Nunokawa [14] proved the following Lemma (univalence criterion). In fact, this result is appeared in the paper by Aksentév [1] (also see the paper by Aksentév and Avhadiev [2]).

Lemma 1.1. *If for* $f(z) \in \mathcal{A}$

$$\left| \frac{z^2 f'(z)}{(f(z))^2} - 1 \right| < 1 \quad (z \in \mathbb{U}),$$

*. Corresponding author

On sharp Chebyshev polynomial bounds for a general subclass of bi-univalent functions

A. B. Patil, T. G. Shaba

Abstract. In the present paper, we introduce a subclass $\mathfrak{B}_{\Sigma}^{\mathcal{H}}(\nu, \sigma, \rho)$ of the bi-univalent function class Σ, which is defined in the open unit disk $\mathcal{U}$ using the Chebyshev polynomials along with subordination. Further, we obtain sharp bounds for the initial coefficients a_2, a_3 and the Fekete-Szegö functional $a_3 - \delta a_2^2$ for the functions belong to this subclass.

M.S.C. 2010: 30C45, 30C50.
Key words: analytic function; bi-univalent function; subordination; Chebyshev polynomial; Fekete-Szegö problem.

1 Introduction

Let $\mathcal{U} = \{z \in \mathcal{C} : |z| < 1\}$ be the standard open unit disc in the complex plane. Consider the following well-known function classes:

$$\mathcal{W} = \{f : \mathcal{U} \to \mathcal{C} : f \text{ is analytic in the open unit disk } \mathcal{U}\}.$$
$$\mathcal{A} = \{f \in \mathcal{W} : f \text{ is normalized by } f(0) = f'(0) - 1 = 0\}.$$

where the class $\mathcal{A}$ consist the functions of the form:

$$f(z) = z + \sum_{n=2}^{\infty} a_n z^n \quad (z \in \mathcal{U}, a_n \in \mathcal{C}) \tag{1.1}$$

and the class $\mathcal{S}$ is defined as:

$$\mathcal{S} = \{f \in \mathcal{A} : f \text{ is univalent in } \mathcal{U}\}.$$

If the function f given by (1.1) and its inverse $L = f^{-1}$ are univalent in $\mathcal{U}$, we say that the function f is bi-univalent in $\mathcal{U}$. Let Σ define the class of all the functions that are bi-univalent in $\mathcal{U}$.

The Koebe one-quarter theorem [8] asserts that the image of $\mathcal{U}$ under each univalent function f in $\mathcal{S}$ contains a disk of radius 1/4. According to this, any function $f \in \mathcal{S}$ has an inverse map f^{-1}, defined by

$$f^{-1}(f(z)) = z \quad (z \in \mathcal{U}).$$

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RESEARCH ARTICLE

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Intelligent Agriculture System with Crop Selection Using Internet of Things

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Abstract

This paper is about the prototype implementation of Raspberry pi based intelligent agriculture system using IOT. This system tries to implement irrigation from places where the physical examination of data is difficult or not needed. The main objective of this paper is detection of diseases at the early stage. We mainly focus on machine learning algorithm like KNN. This includes a series of steps from capturing the real time image of leaf to spotting the diseases. Irrigation in the India is primarily based on the rainwater, which is also the primary source of water. The soil type is instrumental in deciding in what way crops are to be provided with water by checking water level of soil. From the data established or gets from sensors and current condition of the soil , best suited crop is selected. Parameters such as temperature, humidity, and moisture and water pump status are shown on mobile app. Values of these parameters are changed according to best condition essential for the particular crop.

Keywords: Camera, Mobile app, Moisture Sensors, Raspberry pi, Temperature Sensor, Ultrasonic Sensor.

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Introduction

In Indian subcontinent, farming is a major source of food production due to the rising demand of the human population. In agriculture,irrigation is an essential process that reflects on production of crop by supplying water to the needed crop to be taken on land. Farmers have to visit their respective land to check how much amount of water is required for their crop. This irrigation method is more time and energy intense particularly when a farmer needs to irrigate multiple agriculture fields distributed in different geographical areas. Generally farmers should be present in their fields to do irrigation process. But nowdays many farmers prefer to do other occupation along with farming. Using automation in the smart irrigation system makes farmer work much easier. Smart automated irrigation system using raspberry pi as micro controller provides a solution to farmers where the presence of farmer in the field is not compulsory. Now a day's internet is widely used. Using internet farmer know about the farming field and irrigation status. Thus provided mobile application is helpful in fulfilling this purpose. It benefits farmers to know the current status of farm fields like soil humidity,moisture and temperature over a provided mobile app and it will make the farmer at some remote places to decide whether he/she needs to watering the land/crop or not. The moisture sensor is used to check moisture level present in the soil. From sensor data one can investigate out whether the soil is dry or wet. The moisture sensor and temperature sensor are fixed with raspberry pi as microcontroller. Based on the current sensor values, the controller will activate the water pump by checking water level it will turn on if water level is low . Water is a very precious resource for farming and must be properly utilized. Agriculture is one of those areas which includes consummation of more water. It is important to know the amount of water that has been used in the irrigation process during farming. This paper describes a simple system implementation by using raspberry pi as microcontroller and Android software to automate the existing manual irrigation system.The IOT is the inter connection network of physical

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Structural, Electrical and Magnetic Properties of Substituted Pyrochlore Oxide Nanoparticles Synthesized by the Co-Precipitation Method

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Five substituted pyrochlore nanooxides such as $Nd_{1.9}Ho_{0.1}Zr_{1.8}Ce_{0.2}O_7$, $La_{1.95}Ce_{0.05}Zr_{0.29}Ce_{1.71}O_7$, $Y_{1.79}Pr_{0.21}Ru_{1.99}Pr_{0.01}O_7$, $Dy_{1.9}Yb_{0.1}Mn_{1.93}Cu_{0.07}O_7$ and $Dy_{1.99}Sr_{0.01}Sn_2O_7$ were synthesized by coprecipitation method. These precursors were monitored by thermal studies (TGA-DTA). The prepared nanosized substituted pyrochlore oxides were characterized by EDS, XRD, SEM, TEM, d. c. electrical conductivity, Thermoelectric power, Hall effect measurement, dielectric properties and magnetization measurements. XRD confirmed the formation of a single phase crystalline substituted pyrochlores with a cubic nature of nanoparticles. All substituted compounds were adopted a stable pyrochlore structure with r_A^{3+}/r_B^{4+} = 1.395 except $La_{1.95}Ce_{0.05}Zr_{0.29}Ce_{1.71}O_7$ compound, which has r_A^{3+}/r_B^{4+} = 1.175 indicate disorder pyrochlore structure (i.e. fluorite structure). The temperature dependence of d. c. electrical conductivity for all substituted pyrochlores exhibits two distinct slopes with a break. This discontinuity can be attributed to extrinsic to intrinsic semiconducting properties. The thermoelectric power and Hall effect measurements for all compounds were confirmed the p-type semiconductivity except $Y_{1.79}Pr_{0.21}Ru_{1.99}Pr_{0.01}O_7$ compound and which showed n-type semiconductivity. The dielectric constant (ε') and dielectric loss (tan δ) i. e dissipation factor decreases with an increase in frequencies and reaching constant at particular frequencies. The applied field dependence of magnetization curve at room temperature (300 K) for $Nd_{1.9}Ho_{0.1}Zr_{1.8}Ce_{0.2}O_7$, $Y_{1.79}Pr_{0.21}Ru_{1.99}Pr_{0.01}O_7$ and $Dy_{1.9}Yb_{0.1}Mn_{1.93}Cu_{0.07}O_7$, showed hysteresis loop with a small kink around the origin and which can be attributed to small but definite ferromagnetic ordering along with significant paramagnetic and superparamagnetic components. The magnetization at 2K showed a clear hysteresis loop for $Dy_{1.9}Yb_{0.1}Mn_{1.93}Cu_{0.07}O_7$ and $Dy_{1.99}Sr_{0.01}Sn_2O_7$ pyrochlores are soft (weak) ferromagnets.

Keywords: substituted pyrochlore-type oxides, ferromagnetism, electrical conductivity, magnetization, exchange interaction, coprecipitation.

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Introduction

Recently, pyrochlore-type oxides ($A_2B_2O_7$) with the cubic structure are the most important among ceramic materials because they show a high geometric frustration on both A and B sublattices [1, 2]. In this structure, large cations such as lanthanides (Ln) typically occupy the A site, which is coordinated to eight oxygen ions, where the B site fits better with smaller transition elements of the first or second row and which are coordinated to six oxygen ions in an almost octahedral environment. When the Ln cation is paired with the diamagnetic B^{4+} cation, the most favorable condition occurs for studying lanthanide magnetism. In a pyrochlore formula of $A_2^{3+}B_2^{4+}O_7^{2-}$, the choice is then limited to Sn^{4+} and marginally to Zr^{4+} or Ce^{4+}, which form pyrochlore compounds with fewer $Ln_2Ti_2O_7$ lanthanides which have

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Investigation on solid state pyrolytic decomposition of bimetallic fumarate and tartrate precursors of Co (II), Ni (II) and Zn (II) with manganese

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ABSTRACT

The complexes of Co (II), Ni (II), and Zn (II) with manganese were synthesized by co-precipitation techniques such as fumarates and tartrates. The formation of these dicarboxylate complexes characterized by elemental analysis, infrared spectroscopy, and X-ray powder diffraction studies. The thermal decomposition behaviors of these complexes were investigated using thermal analysis (TGA, DTG, and DTA) and d. c. electrical conductivity measurements under normal atmosphere. Based on conductivity measurements and isothermal studies, a probable mechanism for the decomposition was proposed. After dehydration, the anhydrous complexes decompose to yield respective carbonate intermediate in the temperature range 200 – 350 °C. Decomposition of this carbonate species to the formation of the respective spinel in the temperature ranges 350 – 500 °C. The infrared spectra and X-ray powder diffraction studies were made for the identification of intermediate products. The X-ray diffraction studies of the end product indicate that spinel such as $CoMn_2O_4$, $NiMn_2O_4$, and $ZnMn_2O_4$ formed as a final product. The electrical conductivity measurements were found to give additional information on the solid-state reaction as compared to that obtained from conventional thermal techniques (such as TGA, DTG, and DTA).

Selection and Peer-review under responsibility of the scientific committee of the Global Conference on Recent Advances in Sustainable Materials 2021.

1. Introduction

It is well known that the compounds of AB_2O_4 type, which have the spinel structure, show metal ion distribution between the lattice point of A and B sites. A large number of papers were published in this area with a variety of techniques in determining the ion distribution as neutron diffraction, X-ray diffraction, NMR and Mossbauer effect measurements, etc. From these studies, it was revealed that in the case where a metal ion can occupy both in A, B sites, in other words, energy levels of a metal ion in A, and B sites are nearly the same. The preparation conditions of a sample affect its ion distribution between the two sites.

Spinel oxides are widely used as semiconductor thermistors, powder meters, amplitude limiters, low-frequency generators, and humidity sensors and controllers, etc. [1 –3]. Mixed oxides such as manganite are technologically important due to their electrical, magnetic, and catalytic properties [4 –7]. Very recently, these spinel structures are used in lithium-ion and Zn-air batteries [8,9]. The spinel such as $CoMn_2O_4$, $NiMn_2O_4$, and $ZnMn_2O_4$, are mixed - valent oxides [10 –12]. Its electrical properties together with those of its range of solid solutions such as ($A_{1-x}B_{2+x}O_4$, $0 \leq x \leq 1$) are important of negative temperature coefficient (NTC) thermistors [13].

Chemical synthesis [10,14] of mixed spinel oxides such as $CoMn_2O_4$, $NiMn_2O_4$, and $ZnMn_2O_4$ at relatively low temperatures has attracted considerable attention in recent years, which yield material with a small particle size. They have also prepared by thermal decomposition of mixed-metal oxalate at low temperature [12,15 –18], which gives cation deficient spinels. Metal hydrazine carboxylate precursors have also used for the preparation of spinel manganites and cobaltites [11,19]. The salts commonly used for this purpose are nitrates [20,21] and oxalates [12,22 –23]. Recently nano-sized spinel oxide have been prepared by hydrothermal and

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Synthesis, structural and electrical conduction of some dual doped semiconductor oxides nanoparticles for photocatalytic degradation of Victoria blue-B and Brilliant yellow under solar light irradiation

N. J. Karale-Unde[1,2,*], A. K. Nikumbh[1], M. B. Khanvilkar[1,3], P. A. Nagawade[1], R. A. Pawar[1], D. V. Nighot[1], S. B. Misal[1], and G. S. Gugale[1]

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ABSTRACT

In this study, the nanoparticles of undoped and dual (codoped) doped semiconductor oxides such as Bi_2O_3, $Bi_{1.9}Sm_{0.038}Cu_{0.062}O_3$; Co_3O_4, $Co_{2.902}Mn_{0.049}Dy_{0.049}O_4$; V_2O_5, $V_{1.91}Ni_{0.043}Gd_{0.047}O_5$; Cu_2O, $Cu_{1.927}Mn_{0.036}Yb_{0.037}O$; CeO_2, and $Ce_{0.938}Ni_{0.028}Zn_{0.034}O_2$ were synthesized by tartarate and hydroxide coprecipitation method. The composition, structure, morphology, surface and optical properties of undoped and dual doped semiconductor oxides have been investigated by X-ray fluorescence spectroscopy (XRF), Energy dispersive X-ray spectroscopy (EDS), X-ray powder diffraction (XRD), Scanning electron micrographs (SEM), X-ray photoelectron spectroscopy (XPS), BET surface area analyzer and UV–Vis diffuse reflectance absorption spectra (UV–vis DRS). The XRD and SEM studies showcase monodispersion of undoped and dual (co-doped) doped semiconductor oxides in the average grain size range of 36–65 nm with a monoclinic structure for Bi_2O_3 and its doped oxide, cubic structure for Co_3O_4, Cu_2O, CeO_2 and their respective doped oxides and orthorhombic structure for V_2O_5 and its doped oxide. Rietveld refinements of XRD pattern and XPS results confirmed that the dual dopants exist in + 2 or + 3 states and successfully incorporated into the semiconductor oxide matrix. BET surface areas for these oxides were found in the range of 25.3–65.4 m^2g^{-1}. The band gap energy (Eg) of undoped and doped semiconductor had a direct transition to fall between 2.10 and 3.12 eV as estimated from the optical absorption data (UV–vis DRS) and found absorption band edge (λg) in the visible-light range. The d.c. electrical conductivity and thermo-electric power measurements for all compounds showed n-type semiconductor except undoped and doped Cu_2O and Co_3O_4 compounds showed p-type semiconductivity. The photo catalytic activity of

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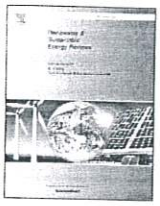

Extraction of bioethanol from waste pomegranate fruits as a potential feedstock and its blending effects on a performance of a single cylinder SI engine

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ABSTRACT

Fossil fuel depletion and strict government regulations have necessitated the finding of alternatives to conventional fuel sources. The growing population and better transport are increasing the need for energy every day. The pollution and disposal of agriculture and food waste are still serious problems to be tackled. Bioethanol has proved an alternative to S.I. engine diesel and gasoline. 10% ethanol blending is widely used by passenger cars worldwide and countries such as India have announced the implementation of a 20% ethanol blending in petrol. As a result, demand for ethanol is growing and there is inadequate bioethanol supply to meet demand. This paper portrays the extraction of ethanol from the waste pomegranate fruits and effect of its different blends on the spark ignited engine performance. Ethanol was extracted using fermentation and steam distillation processes from waste pomegranate fruit. Four blends were prepared on volumetric basis and tested for various performance and emission parameters at a constant compression ratio of 10:1 and wide-open throttle at various engine speeds. Indicated power, volumetric efficiency, and mechanical efficiency were improved by ethanol enrichment. Enrichments of ethanol decrease emissions of HC, CO and CO_2, however increase nitrogen oxide emissions. The engine performance was found optimal for WPFE15 among all fuel blend studied. This study recommends the use of waste pomegranate fruits as a source for production of second-generation ethanol if after treatments be performed to reduce NOx emissions. This study proposes the use of waste pomegranate fruits for second-generation ethanol processing, if NOx pollution after treatment is carried out.

1. Introduction

Energy crises is major issue worldwide and the energy demand is continuously rising due to rapid increase in population, improved transport and industrialisation [ ]. The standard sources of this energy are fossil fuels that include petrol, diesel, coal, natural gas, nuclear and hydropower. About seventy percent of energy production is based on fossil fuels [ ], and is projected to continue until 2035 [,]. One of the biggest challenge in 21st century is that the stock of fossil fuels is depleting very fast and it is limited and is non-renewable. Because of fossil fuel consumption, the world is marching towards the oil crises due to the demand overstepping the supply [ ]. The higher consumption of fuels leads to an increase in its price, and each passing day it moves to extinct [ ]. Even thou this pandemic has resulted a drop in the energy demand by 5%, it is expected that the demand will rise to its pre-crises level by 2023. In automotive sector, spark ignition and compression ignition will continue to be major energy sources for engine propulsion in spite of forthcoming electric vehicle technology. Hence, the demand of fossil fuels along with their substitutes will continue to be in demand. The problem can be addressed by provision of increased renewable energy substitutes, which include solar power, wind power, fuel cells and biofuels. Biofuels, due to its low emission pollutants, renewable energy and oxygenation, have become a common alternative prospective and is widely used as 10% blend in gasoline in many countries.

Thakur et al. [,] and Thangvelu et al. [ ] present an extensive review on bioethanol as an alternative fuel in SI engine. Recently, the Indian government has announced the 20% mixing of ethanol in gasoline stepwise up to year 2025. The Spice Jet, an airline operating company, successfully tested their Bombardier Q400 aircraft carrying 20

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ORIGINAL CONTRIBUTION

Complex Assembly Analysis for Geometric and Dimensional Tolerance to Obtain Selective Assembly from Partitioned Bins Using a Multi-objective Approach to Control Clearance Variation of IC Engine

S. V. Chaitanya[1] · D. Y. Dhande[1] · A. K. Jeevanantham[2]

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Abstract Complex assemblies, such as IC engines, have many parts. Component quality has an impact on assembly performance and is correlated with the tolerance of individual components. Compression ratio (CR) is greatly affected by the clearance incurred due to tolerance variation in dimensions. Variation in dimension causes a deviation in compression ratio that affects engine performance and necessitates a new assembly after testing; an engine assembly line is unable to meet production targets as a result of this. This study shows how to allocate tolerances, such as dimensional and geometrical, to individual components in order to achieve the desired CR in the assembly process. Single-cylinder IC engine case study is demonstrated by assigning a dimensional and geometrical tolerance. Analysis of clearances caused by tolerances shows that form tolerances provide an approach that is more reliable and flexible for all assemblies expected in the assembly line and confirms the desired CR with reduced rework on engines.

Keywords Clearance variation · Complex assembly · Form tolerances · Multi-objective approach · Selective assembly

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Introduction

In an IC engine, the performance of the engine is greatly influenced by the engine's compression ratio (CR). To achieve selective assembly, parts are randomly selected from bins partitioned according to dimensional variation. Assembling the IC engine, assembly precision and assembly clearance have become critical aspects of improving product quality as a result of increasing product complexity, technological innovation and functional requirements. High-precision assemblies can be made more cost-effectively by reducing the variation in assembly clearances. Component inevitable individual dimensional variations are the cause of this issue. It is more expensive to get accurate component dimensions; as a result, mass production uses interchangeable assemblies to meet clearance requirements. It speeds up production and lowers the cost of assembly. This could lead to a lack of uniformity in assembly clearances. Therefore, in the IC engine assembly process, the dimensional variation incurred due to tolerance is reflected on the variation of CR.

The quality of the chosen assembling technique has improved because of several initiatives. Mansoor [1] addressed the disparity in the number of components in the groupings that he chose to study. Piston cylinder fit is used to address the issue of component mismatching, and the method of using frequency distribution of piston and cylinder components as probability instead of selective assembly is recommended.

A simulation method for selective assembly was developed by Arai and Takeuchi [2] in which a geometrical design model with a transformation matrix and a manufacturing error model with a probability distribution function were used to assess assembly accuracy and storage variation.

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Wear behavior of environment friendly trimethylolpropane trioleate-based lubricant

Bhanudas Dattatraya Bachchhav, Pramod Shivaji Kathamore

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Abstract

Purpose

Formulation of mineral-based specialty lubricants without anti-wear (AW) and extreme-pressure (EP) additives is a challenging task. This study aims to propose an environment friendly alternative to mineral-based lubricants with superior wear preventive characteristics.

Design/methodology/approach

In this study, analysis of wear under trimethylolpropane trioleate (TMPTO)-based lube using operating parameters of four-ball tester was done. The effects of type of lube oil, temperature, load and speed on specific wear rate were investigated using Taguchi L27 orthogonal array. Based on the Taguchi experimental results and single-to-noise ratios, ranking of the four ball parameters was done

Findings

Results depict that the blend of sulfurized additives with TMPTO base oil showed a synergistic effect in terms of reduction in specific wear rate by the formation of protective film layer on the surface. The possible physical or chemical interactions between base oil and additives were studied based on the surface morphology of test balls.

Practical implications

The formulated lubricant has the potential to be used as a tapping/broaching oil.

Originality/value

To the best of the authors' knowledge, the paper is a novel study investigating the effect of different additive in TMPTO. The results could prove beneficial in making TMPTO-based lube oil a viable replacement of mineral-based oils.

Specific wear rate EDS TMPTO Taguchi method

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Tribological investigations of trimethylolpropane trioleate bio-based lubricants

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Abstract

Purpose

The screening of lube oil performance prior to field trials is the most significant for the formulation of novel lubricants. This paper aims to investigate the efficacy of trimethylolpropane trioleate oil (TMPTO) based lubricants with different additives.

Design/methodology/approach

In this endeavor, initially five lubricating blends along-with TMPTO based oil with variable additives were evaluated for their tribological performances using ASTM standards. Out of these, the top three best-performing oils were further investigated for possible physical or chemical synergies among lube oils, additives and ball surface using SEM. The molecule structures of TMPTO based lube oils were confirmed using Fourier transform infrared spectroscopy (FTIR).

Findings

The wear preventive and extreme pressure characteristics of different TMPTO based samples were evaluated and compared for compatibility and synergy of additives. Morphological analysis of SEM images was used to understand the wear behavior of the worn surfaces.

Practical implications

Further investigation of TMPTO oil on its oxidation stability at high temperature and pressure to make it technologically competitive and commercially viable metal-working lubricant is suggested.

Originality/value

This paper highlights the tribo-effects of TMPTO to be rendered as a suitable lubricant for metal-cutting operations. The surface morphology of the worn-out surface significantly demonstrates the effect of loading conditions.

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Tribological Performance of Copper-Titanium Alloy under Dry Sliding Contact

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Abstract

Frictional heating leads to sparking and excessive wear of components in engineering applications. Until now, copper-beryllium alloys have been used extensively in frictional contacts where nonsparking ability is desired. However, copper-beryllium creates an inhalation hazard when there is exposure to the dust or fumes from beryllium metal, metal oxides. Besides nonsparking ability, an environmentally friendly alternate material having equally good electrical and tribo-mechanical properties needs to be developed. In achieving the objective of this article, tribological properties of copper titanium alloy as an alternative under dry sliding contact were investigated and compared. Experiments were conducted on copper-titanium alloy having 2 % and 4.2 % titanium sliding against an EN-31 disk using a pin-on-disk apparatus. Taguchi-based design of experiments was used to find out significance of parameters and their effect on friction coefficient and wear rate. The microstructure was studied for distribution of titanium powder in alloy and its effect on grain distribution vis-à-vis tribo-properties using scanning electron microscopy analysis. It was found that the coefficient of friction decreases as titanium concentration and velocity increase. Titanium concentration has a significant effect on reducing wear. Results are indicative potential use of copper-titanium alloy instead of copper-beryllium alloy. Because copper-titanium is a more recent material, bological properties are yet to be researched. Apparently, hardly any literature is available exclusively in this type of application.

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ORIGINAL CONTRIBUTION

Analysis of Seat to Head Transmissibility of the Seated Human Body using Artificial Neural Network

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Received: 25 November 2020 / Accepted: 14 January 2022 / Published online: 14 February 2022

Abstract In the present work, the biodynamic response, i.e., seat to head transmissibility (STHT) of a seated human body subject to vibration have been extensively examined. The analysis of a human seated body subjected to vibrations is a highly complex process. This paper addresses efficient modeling for the human biodynamic response, i.e., seat to head transmissibility (STHT) based on artificial neural network response (ANN). Artificial neural network (ANN) technique is introduced in the current study to predict the STHT. The impact of gender, body weight, and anthropometric features on STHT when subjects (human body) expose to the vibrations examines through the analytical measurements. The formulated 6-DOF human body vibrational model (HBV) consists of vibration frequency, body posture, the mass of segments, and vertical vibrations. 7–20-1 ANN model with a multilayer feed-forward back propagation neural network (MLFFBPNN) is best fitted to predict the response. The analysis shows that ANN predicted results show high accuracy of simulating the seated human body's responses efficiently. From the various ANN-based models, it is observed that the value of the statistical parameter, i.e., correlation coefficient (R^2) obtain, is between the range of 0.982 to 1.00. The results of the numerical study showed that the ANN method is capable of predicting the response with less effort.

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Keywords Seat to head transmisibility · Multilayer feed-forward back propagation · Artificial neural network · Biodynamic response · 6-DOF Human seated human body

Introduction

Much of the experimental evidence has shown that prolonged exposure to vibration by a human body severely affects human health. Hinched disks and pinched nerves in the neck region due to body vibration are among the most frequent car passengers' injuries. Xian et al. [1] have projected a methodology for systematically identifying the best configuration or structure of a 4-degree-of-freedom (4 DOF) human vibration model and its parameter identification.

Phate and Choudhari [2, 3] have focused on implementing the ANN-based model in human energy analysis and biodynamic analysis, which increases human comfort, high productivity, reduced injuries, and various problems regarding the body [4]. Chi Liu et al. [5] have investigated how forces circulated over the body-seat interface. Various forces measured under the neck, middle thighs, and front thighs of 14 subjects sitting on an inflexible flat seat. Cho-Chung Liang et al. [6] observed that the formulated models are limited to one-dimensional analysis. That is why they have kept the human body in an erect sitting posture without backrest support without considering the hands' position, while feet are supported and vibrated. Bhortake [7] had surveyed whole-body vibration research and concluded that there is explicit consent in industrial safety measures and epidemiology research. These systems were further developed in software and Micro-Electro-Mechanical System (MEMS) technologies. Gohari et al. [8]

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Multi-response Optimization and Analysis of Al/B_4Cp EDM using Grey Relational Analysis

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ABSTRACT

Development of material, especially metal matrix composite (aluminum-based MMC), attracts worldwide researchers due to its enhancement in wear and abrasive resistance, lightweight and high strength, low coefficient of thermal expansion. This work investigates the electrical discharge machining (EDM) of Aluminum/Boron Carbide (Al/B_4C) MMC. The optimization will help the researchers or metal processing industries use the investigated optimized process parameters for efficient and effective machining parameters. Pulse on time (PON), pulse off time (POFF), a variation of boron carbide(CP), and input current (IP) were varied to measure material removal rate (MRR), wear rate of the tool (TWR), and the surface roughness (Ra). The Taguchi method is used for the analysis of the machining parameters. Grey relational grade (GRA) is employed for the optimization of machining responses and the input parameters. The influence of various EDM parameters is investigated by analysis of variance (ANOVA). The multi-response optimization was carried out by GRA (CP: 4% of B_4C, PON"

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ORIGINAL CONTRIBUTION

Multi-Response Optimization of Al/GrCp10 MMC Performance in WEDM Using Integrated TOPSIS-ANFIS Approach

Mangesh Phate[1] · Shraddha Toney[2] · Vikas Phate[3] · Vivek Tatwawadi[4]

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Abstract Lightweight material such as aluminum-based metal matrix composites (MMC) is extensively used in automobile, aerospace, and some other precise engineering applications. For such material, the processing is not simple due to the presence of some other material in the aluminum. To overcome this, wire electrical discharge machining (WEDM) is projected for cutting of aluminum–graphite (10%) metal matrix composite with variation in process parameters. In present work, the technique for order of preference by similarity to ideal solution (TOPSIS) and an adaptive neuro-fuzzy inference system (ANFIS) is employed to assess the WEDM of AlGrCp10 MMC. Taguchi's L_{27} orthogonal array was adopted for the experimentation. The influence of process variables, pulse on time (PON), pulse off time (POFF), the feed rate of wire (WFR), and the tension in the wire (WT), is considered for overall performance measure. The overall performance is measured in terms of the responses such as material removal rate (MRR), overcut (OVT), and surface roughness (Ra). Analysis of variance, i.e., ANOVA, is performed to find out the most influencing process parameters. TOPSIS-ANFIS predicted results are tested for the confirmation tests which show an enhancement of overall closeness coefficient increases from 0.656793 to 0.772138. The optimum setting obtained for the overall performance is pulse on time = 112 µs pulse off time = 56 µs, wire feed rate = 12 m/min, and wire tension of 1.2 kg.

Keywords Al/GrCp10 MMC · ANFIS · Multi-response optimization · TOPSIS · WEDM

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Introduction

Nowadays, most of the metal cutting industries use advanced machining processes for improving product quality and the performance of an enterprise. Along with advanced and latest precise machining processes, aluminum-based metal matrix composite is also drastically increased in space, defense, and automobile industries. Hence, the effort has been made to focus on measuring the WEDM process's performance, which will help find the ease of machining aluminum with 10% graphite (by weight) MMC. In WEDM, the material is cut with a wire that follows a definite pathway to form the intricate and complicated product. Worldwide, the research will find out the new composites and their ease of machine process parameters. The impact of various WEDM process parameters during the machining of Nitinol alloy has been performed using RSM, and multi-response optimization

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Development of artificial neural network to predict the performance of spark ignition engine fuelled with waste pomegranate ethanol blends

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Spark ignition engine performance

ABSTRACT

In this study, an artificial neural network (ANN) is developed to predict the performance of a spark-ignition engine using waste pomegranate ethanol blends. A series of experiments on a single-cylinder, four-stroke spark-ignition engine yielded the data needed for neural network training and validation. 70 percent of the experimental data was used to train the network using the feed-forward back propagation (FFBP) algorithm. The developed network model's performance was evaluated by contrasting its output with experimental results. Input parameters included engine speed, ethanol blends, and output parameters included indicated and brake power, thermal, volumetric, and mechanical efficiencies. Training and testing data had regression coefficients that were almost identical to one. The research revealed that the ANN model can be a better option for predicting engine performance with a higher level of accuracy.

1. Introduction

Many developing countries with agricultural economies face a major problem: agro-waste. There has been an increase in agro-waste as a result of environmental degradation and the limited availability of resources such as transportation and the cold chain. The disposal of agro-waste is also a major concern for municipal authorities. Ethanol production from agricultural waste could be a viable option in this scenario. Ethanol-based biofuels have become increasingly popular in recent years because of their environmental friendliness [1,2]. Humanity has been forced to look for alternatives to depleting and environmentally unfriendly petroleum fuels as a result of rapid urbanization and industrialization [3,4]. Fossil fuel combustion waste products are to blame for environmental damage [5]. Biofuels are an excellent alternative to petroleum-based fuels. Biofuels with higher oxygen content produce lesser harmful emissions. For biofuels, a mixture of 10–20% bio-oils is blended with petroleum-based fuels [6–8]. In the last few decades, ethanol production has tripled [9,10], and the demand for bioethanol is increasing at a rapid rate. This has necessitated the discovery and development of new ways to produce ethanol. Various non-edible sources are used as biomass for the production of ethanol [11–16]. To separate ethanol from feedstock, a variety of tech-

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Video Summarization Using Deep Learning for Cricket Highlights Generation

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Abstract

Recently, video surveillance technology has grown pervasive in many aspects of our lives. Automatic video monitoring produces massive amounts of data that need human examination at some point. The primary emphasis is on reducing storage usage by compressing or eliminating superfluous frames without sacrificing real information. The current effort seeks to close the growing gap between the amounts of real data and the volume. Searching through key events in large video collections is time-consuming and tedious. In this paper, smart surveillance for various applications by using video summarization has been presented. A method for generating highlights has presented which pre-processes extracted Video Frames. Convolutional Neural Networks are then used to evaluate these highlighted frames. The proposed technique extracts and calculates characteristics utilized to generate summary movies. For training deep neural networks, cricket datasets have been used. Experimental results show that the proposed solution attains improved results than other advanced summarization methodologies. Experimental results show that the proposed video summarization method consistently generates high-quality reviews for all types of videos. The proposed video summarization method is easy to use, and it can also help extract highlights of cricket games with high accuracy.

Keywords: Video surveillance; Convolutional neural networks; Feature extraction; Cricket highlight generation; Summarized video; Predefined highlights dataset.

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1. Introduction

Nowadays, viewers need help watching digital videos as the explosion of digital content on the Internet and television increases. Using the preview to understand the quality of the video is much better than watching the entire video. The video summarization system creates summaries by analyzing and shortening the video content, audio, or text from multi-modal video. Video summarization is used to generate teasers and trailers of movies and episodes of a TV serial. It is also used to present highlights of the event of sports games and music band performances [1]. These features can also be used by combining them with one another. Video summarization analysis is a process for eliminating noise in signal levels or semantic information. It is also used to create short videos or extract

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Oil chemistry/Catalysis

Prediction of spark ignition engine performance with bioethanol-gasoline mixes using a multilayer perception model

Dinesh Y. Dhande, Chandrakishore S. Choudhari, Dwarkoba P. Gaikwad, Nazaruddin Sinaga & Kiran B. Dahe

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ABSTRACT:

The current study examines the impact of bioethanol blends on spark-ignited engine performance using multilayer perception modeling. Waste pomegranate fruits (WPF) from a nearby fruit market are used to make bioethanol. After 72 hours, the fruit juice mixture yielded 1.1 ± 0.3 mLgm^{-1} ethanol. Each of four ethanol mixes was tested at different speeds to determine the engine's indicated and braking power, volumetric, thermal, and mechanical efficiency. The addition of ethanol increased volumetric efficiency by up to 25% and indicated power by up to 20%. In contrast, ethanol proportions showed thermal efficiency variations. In order to forecast performance parameters, a multilayer perception model with feed forward back propogation is used. 25% of the test data was used to validate the MLP model. The accuracy of designed network was checked by root mean square error, mean squared error and Mean Absolute Percentage Error and higher values of regression coefficient. The constructed MLP model predicted values that were highly accurate and with acceptable error. The results proved that the MLP model can be effectively implemented for predicting engine performance and hopeful prospects for waste pomegranate ethanol at commercial level.

Keywords: ANN biofuel multilayer perception model pomegranate ethanol waste management SI engine performance

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ORIGINAL CONTRIBUTION

Evaluation of Emission Characteristics and Performance of Pomegranate Ethanol Blended S. I. Engine using Artificial Neural Network and Rule Learner Classifier

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Received: 7 June 2021 / Accepted: 1 April 2022 / Published online: 3 May 2022

Abstract Waste pomegranate fruit is one of the new sources of ethanol. Using four different ethanol mixes, the emission performance of S.I. engine was measured at varied running speeds. Ethanol mixed gasoline enhances the quality of engine exhaust emissions, except for nitrogen oxides. Engine performance was found optimum using a 15% ethanol blend and a 1500 rpm speed. The emission characteristics were further examined using artificial neural network and rule learner classifiers. Experiments yielded data sets in which emission characteristics of engines were mapped in relation to engine speed and ethanol/petrol mixtures. These datasets were utilised to train artificial neural networks and rule learner classifiers to establish relationships among emission characteristics, speeds, and ethanol combinations. Both models were tested, and the rule learner classifier was found to be more accurate than the artificial neural network. Emission characteristics, speed, and ethanol combinations can all be correlated using the proposed rule learner algorithm.

Keywords Biofuel · Emission characteristics · Rule learner · Artificial neural network · Decision tree algorithm · Solid waste management

Abbreviations

AI	Artificial intelligence
ANN	Artificial neural network
BP	Brake power
BSFC	Brake specific fuel consumption
BTE	Brake thermal efficiency
bTDC	Before top dead centre
CART	Classification and Regression Trees
CO	Carbon monoxide
CO_2	Carbon dioxide
HC	Hydrocarbon
ID3	Iterative dichotomiser 3
MGYP	0.3%, Malt extract; 1%, glucose; 0.3%, yeast extract; 0.5%, peptone, 2%
NN	Neural network
NO_x	Oxides of nitrogen
PART	Partial decision tree
SVM	Support vector machines
Per_Ethanol	Percentage of ethanol
WPFE	Waste pomegranate ethanol

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Introduction

Energy crises at global level has forced the world to strive to meet the rising demand for energy owing to population growth, industrialization, and improved transportation [1, 2]. The increasing vehicular traffic and the diminishing supply of fossil fuels signifies the need of the development of an environmentally friendly substitute for petroleum fuels [3, 4]. Greenhouse gases affecting the global ecosystem is another major concern. In this scenario, renewable and environment friendly biofuels have become ray of hope for energy sector. Lower harmful emissions, renewable in nature, ability to oxygenate are few highly desirable properties because of which, worldwide, biofuel

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ORIGINAL CONTRIBUTION

Experimental Investigation of Spark Ignition Engine Performance Fuelled with various Pomegranate Ethanol-Gasoline Mixtures

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Received: 14 October 2020 / Accepted: 23 October 2021 / Published online: 5 November 2021

Abstract Agriculture fruit waste and municipal waste management in many countries, especially in large crowded cities, is a serious problem. In the fruit and vegetable market, tons of garbage are generated that is worthless. Nearly 20–30% of the fruit and vegetables produced are solid waste that causes waste disposal problems. These solid wastes can be used for the production of biofuels as an alternative to fossil fuel. Furthermore, an alternative to conventional fuel is required due to the increasing number of vehicles and the depletion of fossil fuels. Currently, 10% ethanol-gasoline blended is typically used in passenger cars. This paper explores the preparation of ethanol from pomegranate waste fruits and the effects of its different variations on the spark-ignition engine performance. The ethanol has been developed from the pomegranate waste using fermentation process. Four blends were prepared and tested at a steady 10:1 compression ratio and wide-open throttle for various speeds. Output variables were analyzed including indicated and braking power, thermal performance and volumetric efficiencies. Ethanol enrichment has enhanced the indicated power, volumetric effectiveness and mechanical performance. In all the fuel mixture tested, an engine speed of 1500 rpm and 15% ethanol blend was estimated as optimum values.

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Keywords Biofuel · Pomegranate ethanol · Alternative fuels · Solid waste management · S.I. engine performance

Introduction

Power is the most critical part of the sustainable development of any nation. Today's energy crisis is proving to be the world's most critical threat to humanity. In the transport, agricultural and energy sectors, continued growth is leading to the significant use of fossil fuels such as diesel, coal and gas. Reduced fossil fuel reserves, fluctuating oil prices, growing threats to the environment and higher conventional emissions [1] have made the use of renewable energy sources a strong contender for the future. About 20–30 percent of the fruits and vegetables produced are wasted due to inadequate cold storage facilities, refrigerated transport with population growth. Waste management is a big problem worldwide and needs to be efficiently tackled by using it as a secondary source of ethanol extraction. In addition, the tight regulation of environmental norms, the price of oil and its limited resources have rendered other energy resources used by engine producers rather than oil and its products. As a consequence, energy management and environmental security have proved to be a matter of concern for researchers [2]. It is essential to explore the use of contemporary, rich and green sources for energy production for an ecologically harmless cost-effective approach [3] in order to curb the problems. Bioethanol can be regarded as the spark-ignition engine's feasible alternative fuels because it leads to abatement in fossil fuel consumption. Alcohol are used as a fuel in automobiles since the nineteenth century. Due to renewability, a higher oxygen content and a higher octane number,

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Extraction of bioethanol from waste pomegranate fruits as a potential feedstock and its blending effects on a performance of a single cylinder SI engine

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Keywords:
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ABSTRACT

Fossil fuel depletion and strict government regulations have necessitated the finding of alternatives to conventional fuel sources. The growing population and better transport are increasing the need for energy every day. The pollution and disposal of agriculture and food waste are still serious problems to be tackled. Bioethanol has proved an alternative to S.I. engine diesel and gasoline. 10% ethanol blending is widely used by passenger cars worldwide and countries such as India have announced the implementation of a 20% ethanol blending in petrol. As a result, demand for ethanol is growing and there is inadequate bioethanol supply to meet demand. This paper portrays the extraction of ethanol from the waste pomegranate fruits and effect of its different blends on the spark ignited engine performance. Ethanol was extracted using fermentation and steam distillation processes from waste pomegranate fruit. Four blends were prepared on volumetric basis and tested for various performance and emission parameters at a constant compression ratio of 10:1 and wide-open throttle at various engine speeds. Indicated power, volumetric efficiency, and mechanical efficiency were improved by ethanol enrichment. Enrichments of ethanol decrease emissions of HC, CO and CO_2, however increase nitrogen oxide emissions. The engine performance was found optimal for WPFE15 among all fuel blend studied. This study recommends the use of waste pomegranate fruits as a source for production of second-generation ethanol if after treatments be performed to reduce NOx emissions. This study proposes the use of waste pomegranate fruits for second-generation ethanol processing, if NOx pollution after treatment is carried out.

1. Introduction

Energy crises is major issue worldwide and the energy demand is continuously rising due to rapid increase in population, improved transport and industrialisation [1]. The standard sources of this energy are fossil fuels that include petrol, diesel, coal, natural gas, nuclear and hydropower. About seventy percent of energy production is based on fossil fuels [2], and is projected to continue until 2035 [3,4]. One of the biggest challenge in 21st century is that the stock of fossil fuels is depleting very fast and it is limited and is non-renewable. Because of fossil fuel consumption, the world is marching towards the oil crises due to the demand overstepping the supply [5]. The higher consumption of fuels leads to an increase in its price, and each passing day it moves to extinct [6]. Even thou this pandemic has resulted a drop in the energy demand by 5%, it is expected that the demand will rise to its pre-crises level by 2023. In automotive sector, spark ignition and compression ignition will continue to be major energy sources for engine propulsion in spite of forthcoming electric vehicle technology. Hence, the demand of fossil fuels along with their substitutes will continue to be in demand. The problem can be addressed by provision of increased renewable energy substitutes, which include solar power, wind power, fuel cells and biofuels. Biofuels, due to its low emission pollutants, renewable energy and oxygenation, have become a common alternative prospective and is widely used as 10% blend in gasoline in many countries.

Thakur et al. [7,8] and Thangvelu et al. [9] present an extensive review on bioethanol as an alternative fuel in SI engine. Recently, the Indian government has announced the 20% mixing of ethanol in gasoline stepwise up to year 2025. The Spice Jet, an airline operating company, successfully tested their Bombardier Q400 aircraft carrying 20

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TECHNICAL PAPER

A novel tuned ant lion-grey relational dry sintered bearing for bore application

Priya Gajjal[1] · G. S. Lathkar[2]

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Abstract
Nowadays, the most utilized material has been considered the sintered bearings in many applications to control their function. However, threat tribological behavior often affects the bearing performances, which were the key challenging model of the bearing performance, such as achieving high surface roughness and less wear rate has been tended by the wide gaining range of friction coefficients. In addition, the current article focused on tuning the tribological parameters of sintered bearing with an appropriate required rate. Fe and Cu composites have been included to design the sintered bearing. A novel Ant Lion-based Grey Relational Scheme has been proposed to regulate the bearing functions. First, the rig test apparatus was used to measure the bearing properties; then, the measurement properties were trained to the proposed analysis model as an input. At last, the proposed bearing's optimized tribological parameters and validated with other conventional approaches have achieved an excellent result.

Keywords Sintered bearings · Composition · Tribological parameters · Optimization · Friction coefficient

1 Introduction

Nowadays, different metal combinations have been utilized to make sintered bearings [1]. Moreover, it has been deployed in many industrial and automobile applications for different and unique uses [2]. Analyzing the tribological behavior is the key task [3]. Hence, evaluating the tribological characteristics of the composite materials and the process of sintering is become a trending topic in recent years [4]. The sintered bearings, which are impregnated by lubricant, are a type of sliding bearings [5] that have required sufficient lubricant oil to carry the function [6]. Moreover, the oil-based sintered bearing does not need lubricant oils [7], the oil contained inside the bearings. Sintering is where the green compact porous was formed during the thermal process [8]. Several composite materials were introduced to improve the bearing process [9]. But, many of the models have resulted in a high friction rate [10]; hence, attaining the highest friction might freeze the application [11].

The flange and sleeve type's bearings are often used in a house fit application like bearing bore [12]. Bhandarkar et al. [13] have designed a comparison assessment of coated metals utilized in bearing applications. The survey verified that the carbon with chromium steel was mostly utilized for producing the anti-friction bearing fabrics. Moreover, the effect of cutting circumstance, influences, chip morphology, chip reduction, tool wear rate, and surface roughness was calculated in an efficient manner; also, the parameters of the bearings were optimized with the use of a multi-objective optimization scheme. In other scenarios, attaining a wide range of wear measures tends to attain a high friction rate; the friction value in bearing has damaged the rotating shafts. So, Rao and Ponugoti [14] have made a broad study of dry-based sliding wear characteristics. The rate of dry was analyzed by sliding wear; an optimization and prediction framework was designed with required sufficient parameters. Finally, the rate of wear was calculated in the manner of

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Optimisation using Taguchi of PEEK material in dry sliding

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Abstract

In this paper behaviour of tribological parameters of Reinforced PEEK with 20% CF, 15% PTFE, 15% Graphite filled was investigated. The property of wear was investigated by using a pin-on-disc wear test rig in dry sliding condition. Plan of experiments are conducted by using design of experiments via taguchi method. For analysis of the data A L27 Orthogonal array was selected. The parameters selected for investigations are pressure, sliding speed and time in minute on rate of wear during process of wearing was carried out using ANOVA and regression analysis for each response are established for the above composition of material, which enables the determination of optimum solution and combination of parameters. Lastly, surface morphology of wear surface of the material was investigated through SEM.

Previous

Next

Keywords

ANOVA; PEEK composite; Orthogonal array; Taguchi technique; Optimization

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ORIGINAL

Priya Gajjal · G. S. Lathkar

Fault diagnosis in an optimized rolling bearing using an intelligent approach

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Abstract Bearings are the significant component in machinery applications to run a system; hence, the damage of bearings can stop a running machine. The bearing faults often arise because of poor tribological behavior and wrong lubrication. Several fault prediction models already exist, but if the data were too large, the conventional techniques took a wide time range, gaining very low accuracy. The present research work has focused on designing an efficient bearing faults detection system and optimized tribological characters to address this issue. Moreover, the proposed mechanism is named as Hybrid ant lion and African buffalo-based Modular Neural Frame. The dataset taken for estimating the fault is Case Western Reserve University bearing center. In addition, to gain the finest result, mineral oil is added as a lubricant to reduce friction and to enhance the bearing life. Here, the fitness of Ant lion and African buffalo was upgraded in the classification layer of the modular neural frame that helps to optimize the parameters and has improved the fault prediction ratio. In addition, the proposed model is implemented in the MATLAB R2018b environment. Finally, the parameters were calculated and compared with other models in terms of accuracy, wear, friction, precision, recall, time, F-score and have gained the finest results in all scenarios.

Keywords Bearings · Fault prediction · Lubrication · Optimization · Tribology · Wear and friction

1 Introduction

In tribology, wear and friction are significant parameters in mechanical applications [1]. Hence, the machine's performance has been estimated by analyzing the tribological characteristics [2]. In the future, the emerging transportation is in the vision of electrical vehicles (EV), when all engine vehicles are changed to EV [3]. In addition, while comparing the performance, the EV became the most energy proficient system than conventional engine vehicles [4]. So, the electric motor will be a demanded application or mechanism in the future to run the electric automobile. Although to detect the fault in the bearing system, numerous approaches were invented by comparing normal frequencies with test frequencies of bearing [5]. Still, it has resulted in a low exactness rate for detecting the flaw in the bearing model [6]. The application rolling bearings were utilized in a wide range in automobiles, aerospace, etc. [7]. Hence, the function of the bearing can affect the entire machinery system. Moreover, the failures in bearings are natural, but they cause equipment process loss [8]. But, these kinds of issues are solvable when the faults are recognized in earlier stages [9]. Furthermore, the bearing is a sensitive component in the machinery system [10]. The raise flaw in bearing has tended to malfunction

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International Journal of Mechanical Engineering

Mathematical Model of Planetary Gear Train for Geared Rotary Actuator

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Abstract

Planetary Gear Trains are basically of two types viz; Simple gear trains and Compound gear Train. In this paper we have discussed about Compound type Planetary Gear Trains. Compared to simple planetary gears, compound planetary gears have the advantages of larger reduction ratio, higher torque-to-weight ratio, and more flexible configurations. In spite of these advantages, vibration remains a major concern in planetary gear applications. Vibration creates undesirable noise, reduces fatigue life of the whole system, and decreases durability and reliability. Vibration reduction, therefore, is a key to the applications of compound planetary gears. Gears in the Planetary Gear Trains are one of the most critical components in the mechanical power transmission system in which failure of one gear will affect the whole transmission system, thus it is very necessary to determine the causes of failure in an attempt to reduce them. The different modes of failure of gears as bending failure (load failure), Pitting (contact stresses), scoring and abrasive wear, in any case it is related to the loads acting on the gear.

Index Terms: Planetary Gear Trains, Compound type gear train, Durability, Reliability, Vibration, Pitting and Bending Failure, Scoring and Abrasive wear

INTRODUCTION

What is GRA

Geared Rotary Actuators are mechanically operable devices widely used in the aerospace industry so that controlled motion can be provided to secondary flight control surfaces. Their usage can be seen in a variety of applications including powered hinges for aircraft structural movements, they support aerodynamic loads in addition to the surface hinge moment, as an actuator in a linked mechanism where they supply actuation torque. Mostly GRAs are situated along with the bay door drives, and also can be used for controlling leading or trailing edge movements of the aircraft. [1,2]

Geared Mechanical Actuator is a geared mechanism that is used to convert mechanical motion (often rotary) into rotary motion at a different combination of speeds and force. They are also used when required to change the direction of motion. Unlike hydraulic or electromechanical actuators, they receive their power from an external source [3,4,5]. Further GRA is classified as simple planetary actuators and compound differential planetary actuators. Simple planetary actuators are most commonly found in commercial leading-edge slat applications and are bolted to structure driving rack and pinions to translate the slat surface. Compound differential planetary actuators are most commonly used in trailing edge flap designs. It offers higher ratios for torque multiplication while driving rack and pinions to translate the flap surfaces [6,7].

Geared Rotary Actuators are initially used for the positional control of wing-mounted flight control Surfaces of an aircraft. Their usage ranges from their application in powered hinges, when directly supporting the aerodynamic load forces in addition to the surface hinge moment, to actuators in a linked mechanism where they provide the actuation torque and the aerodynamic load reaction and is delegated to other load-bearing equipment.

These actuators are typically part of a larger system which includes a power drive, mechanical interconnects, and feedback devices to control the motion of multiple devices [8,9,10].

A mechanism is termed a planetary mechanism if it contains at least one rigid body which is required to rotate about its own axis at the same time to revolve about another axis. Points on this body will generate epicycloids or hypocycloids. Therefore tary mechanism is often called an epicyclic or cyclic mechanism.

Planetary gears are widely used in all kinds of transmission systems, such as wind turbines, aircraft engines, automobiles, and machine tools, and they are classified into two categories: simple and compound planetary gears. Simple planetary gears have one sun, one ring, one carrier, and one planet set. Compound planetary gears involve one or more of the following three types of structures: meshed-planet (there are at least two or more planets in mesh with each other in each planet train), stepped-planet (there exists a shaft connection between two planets in each planet train), and multi-stage structures. Compared to simple planetary gears,

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Design of Planetary Gear Train for Geared Rotary Actuator

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Abstract: Geared Rotary Actuators are mechanically operable devices widely used in the aerospace industry so that controlled motion can be provided to secondary flight control surfaces. Their usage can be seen in a variety of applications including powered hinges for aircraft structural movements, they support aerodynamic loads in addition to the surface hinge moment, as an actuator in a linked mechanism where they supply actuation torque. Mostly GRAs are situated along with the bay door drives, and also can be used for controlling leading or trailing edge movements of the aircraft. They receive Power Drive Unit (PDU) torque via assembly of shafts and joints. From a mechanical standpoint, the GRAs can be termed as epicyclical gear reducer or compound planetary gearbox. In this work, the governing criteria and mathematical equations used to characterize GRA are discussed. SOLIDWORKS is used for part modeling of GRA. More focus will be on the speed reduction ratio calculation, determination of strength, and overall Factor of Safety (FOS) of the torque transmission unit. Thus an attempt is made to obtain the best performance parameters to meet the desired requirements of Geared Rotary Actuator.

Keywords: *Geared Rotary Actuators, secondary flight control surfaces, powered hinge, power drive unit, SOLIDWORKS, factor of safety*

1. INTRODUCTION

An Actuator is a part of a machine that is mainly responsible for moving and controlling a mechanism or a complete system. An actuator receives input as a control signal and a source of energy. A control signal is relatively low energy and maybe electric voltage or current, pneumatic or hydraulic pressure, or can be a human-generated power. When it receives a control signal, an actuator reacts by converting the signal's energy into desired motion.
Mechanical Actuators are generally used to translate mechanical motion (often rotary) into linear motion or vice versa with the help of gearing arrangements. These actuators are typically part of a larger system which can be power drive units, mechanical interconnects, and feedback devices to control the motion of multiple devices.

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Title

Wear of Dry Sintered Iron Bearings with Molybdenum Disulphide and Zinc Stearate.

Authors

Gajjal, Priya; Lathkar, G. S.

Abstract

The wear of sintered bearing materials is studied under dry condition using a dedicated test rig. The materials tested are Fe-based alloy and additives added in it through sintering process. The performance of wear is evaluated against process parameters and manufacturing parameters. Parametric influence on tribocharacteristics has been evaluated under varying condition of running. The effect of additive concentration has been shown in case of MoS2 and Zn-stearate impregnated bearings. A comparison of specific wear rate of bearings has been reported. Finally, SEM micrographs have been taken to study the mechanism of tribo process. Addition of solid lubricants helped in reducing the friction and wear rate. SEM micrographs taken to study the mechanism of tribo process also confirm the improvement of the properties of the material.

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Experimental Investigation on Hip Implant Materials Development through Analytical and Finite Element Analysis: 3D Modelled Computed Tomography

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Abstract: Biomechanics is the interdisciplinary area comprising biomedical and mechanical domain, continuations in research of alternative and sustainable materials, which refers to the mechanical examine. This current work focuses on hip implant material development through analytical and finite element analysis. The femur bone head is 3D modeled through computed tomography (CT) images extracted data and modeled in SOLIDWORKS. The analytical analysis is performed on the femur head through Hertzian theory. The finite element analysis (FEA) (static structural analysis) is carried out in the ANSYS 19.2. The materials considered for the FEA are NbTiZrMo alloy, PEEK and CFR-PEEK for the hip implant. The analytical analysis is performed for eight different human routine activities, and the highest peak stress value is obtained for walking fast. The peak stress values obtained in FEA for CFR-PEEK material implant are lower than the maximum peak stress obtained by analytical analysis. The stress value obtained for CFR-PEEK material is somewhat higher than PEEK, but the contact pressure for PEEK material is way higher than CFR-PEEK material implant. So, it is concluded that the CFR-PEEK material is the ideal alternative as compared to other materials.

Keywords: Hertziantheory; femur head; static analysis; finite element analysis.

1. Introduction

Biomechanical research is a continuous assessment and search of a solution to biological problems through integrating the biomedical and mechanical research areas. The biomechanical researchers globally focus the hip implant development with respective the novel material deployment. This study evaluates the stress distribution on the femur bone head during different activities through an analytical method. Finite element analysis is being carried for the femur head with respective different materials, and the stress distribution and contact pressure values are evaluated and compared with the results of the analytical analysis results. An extensive literature survey is also carried out before performing the analyses. The human hip natural femur bone and the artificial implant are shown in Figure 1.

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Paper Titles

Biomaterial Properties of Femur Implant on Acetabulum Erosion: A Review

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Abstract:

The hip is one in every of the various joint at intervals the body. The correct operating of this joint is essential. For the aim once the hip is injured whole, a substitution procedure of the entire joint ought to be done to reinstate its operating, that is known as absolute hip surgical process. It is finished with the assistance of inserts of various biomaterials, as an example, polymers, metals, and pottery. The primary issues with regard to the utilization of various biomaterials are the reaction of the body's instrument to wear trash. Throughout this audit, biomaterials that are developing is talked regarding aboard the wear and tear and tear conduct and instrument. To boot, the numerous properties of the biomaterials are talked regarding aboard the expected preferences and drawbacks of their utilization. Further, the blends of various biomaterials at intervals the articulating surfaces are cleft and so the problems regarding their utilization are assessed. This paper hopes to passes away an in depth review of the trauma fringe of bearing surfaces of hip prosthetic devices. Additionally, this paper can offer AN ordered blueprint of the materials nearby their favorable circumstances and detriments and besides the conceivable outcomes of use.

Keywords: - Hip implant; Biomaterials; Wear mechanism; Bearing surfaces; Polymers

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Experimental investigation of thermoelectric generator system

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ABSTRACT

This was accomplished by mathematical models for the dependent Pi terms in the quantitative data-based modelling. This aims to use dimensionless analysis to figure out what factors influence the efficiency of a thermoelectric generator device (TEG). Simple mathematical models were developed based on actual experiments in this research work to predict the pattern of voltage, current, and power generated in TEG modules. These mathematical models are one of the most effective ways to explain experimental findings and gain a better understanding of the experimental method under study.

We often find ourselves in the situation of having to verify if data matches an equation while testing mathematical models against data. Experimental studies rely on experimental principles to explain which components are the most relevant, and they are based on observation to draw conclusions on how an experimental system performs well or not. Making the necessary observations without disrupting the experimental setup, however, can be difficult. The aim of this study is to see how the independent variables affect the dependent or response variable. An artificial neural network is used to model the mathematical formulation of the device that includes the TEG module (ANN). By intentionally making local changes in their thermoelectric generator experimental set-up, this experimental modelling and ANN simulation approach allows them to obtain a system-wide view. The development of logarithmic best fit mathematical models is used to evaluate the effects of the experiments. Different scatter graphs were plotted in this study to show the output of the dependent variable current ΠD_2 (experimental, model, and ANN) vs. the independent variable relative to the heat source Π_1.

Selection and peer-review under responsibility of the scientific committee of the 3rd International Conference on Advances in Mechanical Engineering and Nanotechnology.

1. Introduction to TEG

For many years, the basic theory and operation of thermoelectric-based systems has been developed. Thermoelectric power generation is based on Thomas Seebeck's discovery of the "Seebeck effect" in 1821 [2]. Seebeck voltage is produced when a temperature difference is formed between the hot and cold junctions of two dissimilar materials (metals or semiconductors). In reality, thermocouples, which are widely used for temperature measurement [1], are affected by this phenomenon.

In the Fig. 1, heat is shifted at a rate of Q_H from a high temperature. The heat source is held at T_H to the hot junction, and the rejected heat rate of Q_L is kept at Tc to the low temperature sink. The electric current flows in the circuit as a result of the heat supplied at the hot junction, producing electrical voltage [5].

1.1. Thermoelectric generator System:

Fig. 2, depicts the components and configuration of a traditional single-stage thermoelectric power generator. It is made up of two ceramic plates that serve as a mechanical integrator and an electrical insulator for n-type (electrons) and p-type (excess holes) semiconductor components. The charge and electron carriers are carried by the thermoelectric material. Traditional thermoelectric devices range in size from 3 mm^2 by 4 mm thick to 75 mm^2 by 5 mm thick. The length of the majority of the module does not exceed 50 mm [5] due to mechanical considerations.

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Investigation of the Exhaust Discharger System to Reduce Backpressure on the Single Cylinder C. I. Engine.

Turkish Online Journal of Qualitative Inquiry (TOJQI)
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Investigation of the Exhaust Discharger System to Reduce Backpressure on the Single Cylinder C. I. Engine.

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ABSTRACT

In the internal ignition engine, the exhaust structure assumes a fundamental job was improving burning proficiency. Energy productive gas structure improvement requires the least fuel utilization and most excessive gas energy to decrease gas emanations and successful waste energy recuperation components. To find the gas parameters accessible at various engine working conditions and to develop a gas structure for the most extreme use of available energy at the gases of the engine chamber is considered. Every gadget's structure should offer the least decrease in pressure over the setup, but it should not have confrontational impact on the operation of the diesel engine. Back-pressure directly impacts on per cycle operation of the engine. To limit the tapping work, backpressure must be low as could reasonably be expected. The backpressure is legitimately corresponding to the gas discharger structure plan. The state of the delta cone of gases discharger structure changes the backpressure. This expansion in return pressure causes more fuel consumption. Expanded pressure change finding is value addition. In the inside ignition engine, the exhaust structure assumes an indispensable job in improving the burning productivity. Decent molded gas structures increment the presentation of the engine. The work has been centered on diminishing the backpressure in the gas structure by new gases facility to expand the ignition effectiveness utilizing exploratory investigation and Computational fluid dynamic examination..

Keywords: Backpressure, Brake thermal efficiency, Computational Fluid Dynamics, Exhaust discharger system, Fuel Consumption

1. INTRODUCTION

Backpressure on the engine combustion chamber is totally subject to debilitate structure plan, its working condition, and environmental pressure. Various sound decrease procedures are utilized in suppressors, including receptive quieting, resistive hushing, absorptive quieting, and the shell is damping. The properties of engine exhaust emission gases that are important for all the specification of the fluid structure comprises of some physical characteristics; the temperature including its gases that depend on the duty of

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Optimization Technique Focused on Back-Pressure Production Occurrences of Fixed 4-Stroke Diesel Generator using ANN & DA Modeling

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Abstract

This paper focuses on the phenomena of backpressure mostly in context of a compression ignition engine. Efficient use of treatment strategies explicitly with C.I. engine needs a crucial examination of the overall exhaust system used. Searching for Diesel Particulate Filters mostly as technological advances is indeed very effective since particulates are known as a common cancer source. Backpressure primarily functioning upon this engine is perhaps the critical aspect that essentially performance of that same engine is significantly impacted as well as air pollution system requirements. The current study simulation is done to determine the correlation seen between geometrical parametric variations of its exhaust component of the system for assessment of a backpressure generation phenomenon. Backpressure was created on a static C.I. Engine by attaching a new diesel particulate filter to the exhaust system for the test case. As per methodology suggested for design of the experiments, testing of the prepared setup is done. That value of the coefficient of correlation between both the data observed and the data sets computed is calculated. The research finding shows an essential context for improving it's designed to operate efficiency of the system by optimizing the model for all types of I.C. Engines.

Keywords: Diesel engine, DPF, Backpressure generation, DA Modeling, ANN, Performance Analysis.

1. Introduction

Amongst all of the types of I. C. engines recognized today, that diesel engine is perhaps the most high energy efficient engine. Such high performance converts into better fuel efficiency and low emissions of greenhouse gases. Durability, performance, including energy conservation offer alternative diesel specifications which haven't been challenged by rival energy conversion equipment. Diesel drawbacks include vibration, low specific power generation, pollution of NOx

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Design and fatigue analysis of welded tee-joint of a thin walled tube using ANSYS workbench

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ABSTRACT - **There is no broad and complete static and fatigue analysis approach for less than 3 mm plate thicknesses in today's regulated welding regulations, nor at Saab. According to standards such as the International Institute of Welding, only static and fatigue methods for plate thicknesses less than 3 mm are available from the British Standard Institute. Furthermore, they lack the range of joint classes required for complex tube welded junctions. This paper aims to qualify and evaluate existing standardized methods for forecasting static stress and fatigue life in thin-wall welded joints., procedures provided by standard institutes of welding or practices found in literature surveys. Could a mechanism be developed to offer a conservative estimate of tube welded joints' static and fatigue life with less than 3 mm thicknesses? The structure analyzed is a welded tubular T-joint with a thickness of 1.5 & 2 mm. The T-joint has been modelled in the shell element model. Mild steel material is adopted as default, and the result is obtained at boundary condition for a load of -250 to -1500 N in the z-direction. The results show better factors from the first iteration and cyclic loading 1000 to 10000 N for maximum failure for structural steel in the second iteration.**

Keywords: T joint, ANSYS workbench, Welding, Finite Element Analysis (FEA), Fatigue failure, Static structure

INTRODUCTION

Welding is a process of joining two or more similar or dissimilar materials by applying heat with or without the effect of pressure. Welding is defined as the warming of metals to a required temperature, with or without extra substance and pushing factor [1]. A warmth source is combined with welding to create and maintain a liquid metal pool of the required size [2]. Welding contact is a manufacturing process that uses heat to combine materials, usually metals or thermoplastics. Almost any advanced item requires the connecting of multiple independent portions. Welding is frequently used when a permanent connection is needed [1]. Nowadays, welding is needed in all computational ventures that might be limited scale or aeronautical methodology. Almost certainly, Thin-walled tubes, like all aluminium pipes, are steel and treated steel pipes with a divider thickness of up to 2 mm and a diameter of 42 mm or greater [3,4]. The term 'welded joint design' refers to integrating or aligning metal selections with one another using heat and creating transition energy to soften and cement them together. The method of each joint impacts the final weld's quality and cost [5]. Choosing the best joint plan for a welding position necessitates a great deal of thought and care. According to the American Welding Society, there are five basic welding joint types commonly used in the industry, i.e. Butt joint, Tee joint, Corner joint, Lap joint, Edge joint [6, 7]. A detailed understanding of stress fields in crucial locations is required for weldments' strength and durability analysis. The stress data is then utilised to determine where fatigue cracks may emerge and how quickly they grow [8]. Welded joints are frequently crucial in defining a structure's service life. If the welding process is thoroughly understood, it is possible to extend the life of a welded part and save money. [9]. A welding junction is a point or edge that connects two or more pieces of metal or plastic. They're made by welding two or more work parts together in a specific geometry. This article looked at the microscopic and macroscopic behaviour of a few specific and regularly used joints in the industry when they were subjected to various forms of loading [10]. The purpose of this research is to investigate the fatigue strength of welded joints using a fracture mechanics technique that considers welded joint fatigue behaviour [11].

Concept of tee joint welding

When two components meet at a 90° angle, a T welding joint is formed. It's referred to as a computed T joint when the point is different. It results in the edges of a plate or segment meeting in a 'T' form at the focal point [12]. Tee joints are generated similarly to fillet welds when a cylinder or line is welded to a base plate [13]. With this type of weld, one must always check for effective penetration through the weld's root. To make a tee joint, we can utilize one of these welding styles, and they are plug weld, slot weld, bevel-groove weld, fillet weld [15]. J-groove weld [14], melt-through weld, and flare-bevel-groove weld [16]. Tee joints aren't usually made with grooves unless the base metal is thick and the welding on both sides can't support the weight the junction should

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DEVELOPMENT OF AN IOT-BASED SOLAR BANANA DRYER MONITORING AND CONTROL SYSTEM

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Abstract: *IoT Technology has proved to be very important for many applications like Manufacturing, Automotive, and Farming. In this work, an attempt has been made to automate solar dryer and monitor dryer air velocity, humidity, and temperature at optimum drying level. Testing the performance of solar dryers involves the determination of temperature, humidity, drying time, and many other parameters. The main purpose is to accomplish automation of solar dryers through IoT, this tool can be used to track and manage dryer performance remotely, making it easier for users to understand the current situation of bananas being d to achieve effective and efficient drying results. To control and monitor the solar dryer system an ESP8266 Node MCU and DHT22 Digital Temperature and Humidity Sensors are used in the dryer using a smartphone. The percentage difference for the readings of temperatures for solar collector shows that there the temperature varies from 0.19% to 1.37% that error may cause due to environmental conditions as well as calibration of instruments. The variation in the percentage of reading for humidity in solar collector range from 0.64% to 4.59% which is much greater. The values of the temperature for banana drying temperature 0.32% to 3.11% with ± 1-2°C. For the readings of Humidity in the banana drying chamber the percentage error is also a little high since the humidity is calculated from the Humidity meter. During the 14pm, the humidity shows the highest percentage with 1.41% in the reading variation between sensor and humidity meter.*

Keywords: *Internet of things, Monitoring, Node MCU, Solar Dryer, Temperature sensor, Humidity.*

1. INTRODUCTION

In the new age, IoT changing our lifestyle from how we perform our daily activity to how we behave. IoT is a colossal network with a connected device. IoT permits to get the perception of an object over networking infrastructure. These devices gather and share data about how they are used and in the environment in which they are operated. Use of IoT in solar dryer permits us to perceive and control different parameters. There is a bright future for the solar drying of different food products. The international market will be further encouraged if the quality of the dried product can be maintained with matching standard global requirements.

High precision and capacitive type Sensor performance is used based upon the ability to detect the physical state of banana inside the dryer. The sensors used in this system for the study are DHT22 Digital Temperature and Humidity Sensor Module AM2302. This sensor has a high temperature and relative humidity measuring range. The ESP8266 Node MCU CP2102 board is highly amalgamated. This chip is designed for the requirement of a new connected world. The smart monitoring and controlling of drying conditions inside the dryer chamber is done with the help of a Wi-Fi networking-based Node MCU application processor. na drying system to monitor the effectiveness of banana integration using IoT, which can be accessed in real-time through a smartphone, keeping bananas away from spoiling. Internet of things offers many advantages over the traditional method of recording data and controlling drying conditions. Some researchers are opting for a data logger to record the temperature and relative humidity at different positions. By using this technology of IoT we can obtain a very large number of different variables data. We can record and obtain different parameters values for every minute. The virtual world connects physical entities and is controlled remotely through different applications which can sense, store and visualize many variables. In the solar dryer amount of heat carried away as well as the amount of moisture removed is intimately related to the velocity of hot air, relative humidity, and temperature. The Drying process is carried out when the atmospheric conditions are good in April. The IoT assist system monitors the process of banana drying which can be accessed in real-time with the help of a smartphone. It offers a complete and

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Heat Transfer Through Porous Materials (Aluminum Foam) Empirical Optimization of a Heat Exchanger

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Abstract

Latest developments in the manufacturing technology have led to development of advance lightweight materials for thermal applications. Heat transfer(q)optimization through Aluminum Foam(AlSi7Mg)has gained significance in industrial as well as academic research. In this paper Heat transfer optimization through Aluminum Foam heat exchanger, has been presented. The experimental data was used to calculate and then optimize the Nusselt number (Nu).The models selected for optimization were log-log linear, exponential and polynomial model. The Nusselt number for the heat exchangers was calculated at u = 0.3–1.5 m/s cold fluid velocity, whereas hot fluid temperature was varied from 30-50 °C. The best performance for response variable was exhibited by heat exchanger at effectiveness ε = 30%, at u =0.3 m/s. The co-efficient of determination $R^2$was 99.80 for log-log linear model. The results of optimization can be further validated using artificial neural networks, fuzzy logic or genetic algorithms.

Nomenclature:

Keywords: *Aluminum foam, Nusselt number, optimization.*

Introduction

Saving material and energy are main objectives for optimization. The important issues that should be defined during the design process, taking in to consideration the cost of material, is the optimization of the heat transfer. The optimization process can consider minimum weight for a specified heat flow, for a set of specified conditions (such as the heat dissipation from the fin faces, minimum mass, minimum pressure drop etc). In order to intensify the heat transfer from the heat exchanger surface to fluid, it is possible to increase convection coefficient (by increasing the fluid velocity), increasing temperature difference between hot and cold fluid or increase the surface area across which convection occurs. Aluminium foam heat exchangers are used in applications where the need of increasing the heat transfer between a surface and an adjacent fluid exists. The objective of the experiment was to measure the performance of the Aluminum Foam heat exchangers and its optimization in a cross-flow arrangement. The concept was to supply the cold air at ambient temperature to flow through a square duct in which the Aluminum Foam heat exchanger is placed, occupying the entire cross-section of the duct. The experiment of the Aluminum Foam heat exchangers included measuring the coolant temperature and the pressure drop(Δp) across the heat exchangers for various coolant flow rates. At the end, empirical relationship between the dependent and independent variables was developed using the experimental data collected. The data collected was further used for optimization of response variable.

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Experimental Investigation of Modified Solar system with Copper Box Substituting absorber.

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Abstract:

An experimental investigation into the performance and reliability of a newly constructed parallel plate solar collector is the goal for this paper. Many industrial and commercial applications that require fluid temperatures lower than 1000 degrees Celsius use Parallel Plate Collectors (PPCs). Traditionally, all parallel plate collector absorbers include straight copper or aluminium sheets. It does, however, limit how much heat can be transferred from the collector to the collector's surface. Traditional collectors have been commercialised in many forms, but their purchase costs are still high. To overcome this issue, a new low-cost solar collector is built, with a simple copper box substituting the absorber and copper tube combination. Varied parallel plate collectors are tested under various operating situations, and data is collected. New and old parallel plate collectors are compared in terms of temperature output variations in this paper.

Keywords: *Parallel Plate Collector (PPC), Solar Energy, solar water heater, Copper Sheets*

I.INTRODUCTION:

sun is the most cost-effective power source available today. We refer to solar power as a renewable source of energy that is constantly replenished by sunlight. Plants use the sun's rays to produce food. Coal, oil, and natural gas were produced by the decomposition of plants millions of years ago. Because of the sun's magnetic field, a steady stream of solar energy is available all the time. Solar radiation intensity on Earth's orbit is 1367kw/m2. Assuming an equatorial orbit, we can calculate that the Earth receives 173,000 Terawatts of energy.

These systems are essential for low-temperature applications such as household hot water, central heating and drying as well as many other industrial uses. Solar water heating systems have been around for a long time because they are the most convenient method of taking advantage of direct solar radiation. Heat exchangers are used in solar water heating systems. In a solar hot water system, the collector field is one of the most critical and valuable components. Solar collectors have been at the heart of solar energy systems for the vast majority of their existence. As a result, the collector absorbs solar radiation from the sun, transforms it into thermal energy, and then transfers it to a fluid that flows through the collector. Figure 1 depicts the fundamental parts of a parallel plate. collector.

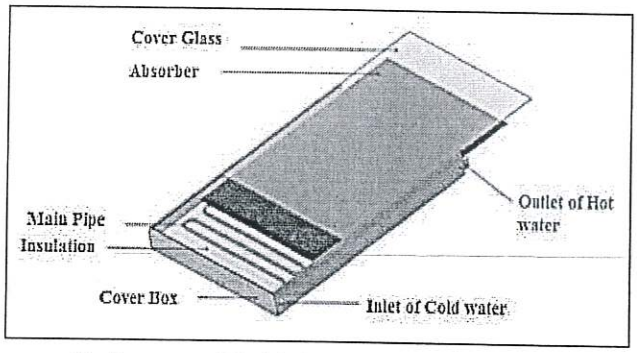

Fig.01- Principle layout of conventional parallel plate collector.

Insulation is used in the cover box shown in Fig. 1 to reduce losses [4]. The box used to conceal the opening is typically made of copper or aluminium. An absorber of dark-colored material and a cover glass are used to transfer the heat from the copper primary pipe to water. Material that quickly absorbs heat from the sun's rays and quickly transfers that heat to tubes or fins attached in

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Technology involving Absorption Refrigeration Run by Solar Energy: A Review

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Abstract

In the modern period, "energy" has joined the ranks of men, machines, and money as the fourth pillar of the industrial complex. Every business relies on energy as a need, and energy is a crucial factor in determining the industry's economy. The majority of sectors currently rely on nonrenewable conventional energy sources. Industry relies heavily on refrigeration and air conditioning as a key source of energy consumption. Unlike in developed countries where electricity is ubiquitous, certain regions of India lack electricity altogether. There is already a high cost of energy from non-renewable resources, and that cost will continue to rise over time. These sources are both harmful and depleting in nature, which causes environmental problems. A important answer to the energy and environmental problems is to use renewable energy, such as solar energy, to cool buildings. Because of the sun's enormous power, solar energy is a viable substitute for some nonrenewable energy sources, such as coal and oil. When electricity is scarce or too expensive, cooling systems might turn to solar energy as a substitute. A large number of solar-powered cooling systems have been put into use around the world for home use. Because of a lack of knowledge about solar energy in India, much of it has been wasted in the past. To dry food grains and clothes, the majority of solar energy is used. However, in recent years in India, the vast majority of individuals have gone solar. This research explores a variety of solar-powered vapour absorption cycles using various refrigerants.

Keywords Refrigeration technology review, Vapour Absorption Cycle, Renewable energy, Solar Energy.

Introduction

Heat is removed from an enclosed system or space at a lower temperature (referred to as a Heat Sink) and expelled into the environment at a higher temperature (referred to as an Exhaust) (Heat Source). Like a vapour compression refrigeration system, a vapour absorption system cools by absorbing heat from the air. System for absorbing vapour consists of four steps: compression, condensation, expansion, and evaporation. There is a condenser and an evaporator for the refrigerant. Using the condenser, the refrigerant cools the evaporator and releases the heat back into the atmosphere. The temperature of the remaining refrigerant will decrease as a result of the evaporation of the refrigerant. This results in a cooling effect. Two distinct machines, referred to as the absorber and generator, perform the suction and compression functions in the vapour

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Evaluation of Success Factors in Professional Business Incubation

Nitin Shekapure*, Sandeep Wankhade, Vipin Gawai & Swati Shekapure

Keywords: Bartlett's Test, Business Success factors, Common Factor analysis, Incubation, Principal Component Analysis, Kaiser-Meyer-Olkin (KMO) Test.

Abstract

Professional Business incubation is the name for the process by which a person or institution supports the development and growth of a startup. Incubators recognize the potential for growth and weigh the opportunity before sponsoring or channeling funding for startups. Selecting a startup requires a great deal of systematic investigation of resources before making a decision to support or fund a startup. In recent years developing countries are moving rapidly towards achieving the goals of macro-stability, inclusive and sustainable growth with the help of industries. This has contributed an impetus to establishing nurturing environments to ensure long standing successful home-grown businesses. Incubators, although a powerful tool to promote young ventures, have certain limitations as well. Clients might either develop over dependent tendencies rendering them incapable of adapting to real market forces. At the same time it has been observed that most of them work in isolation and with limited spectrum which is not allowing them to reach the potential people and resulting in lack of utilization of center, facilities and resources.At the same time due to dynamic change in technology and market demand, companies are quick to adapt and change as the fluctuating phases survive the growth trend.

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Survey Paper on Extraction of 3D image Data for Detecting Chest Diseases

Nitin Shekapure*, Sandeep Wankhade, Vipin Gawai, Swati Shekapure & Sachin Kallurkar

Keywords: Covid-19, Pneumonia, Chest X Ray,3D Image, Convolution Neural Network.

Abstract

Coronavirus sudden outburst has been of extraordinary worry to the wellbeing on the grounds that no workable solution has been found to cure it. The organic structure of COVID-19 contains a positive-situated single- abandoned RNA-type, and it is hard to treat the sickness inferable from its changing element. Clinical experts universally are going through concentrated exploration to build up a viable solution for the infection. Directly,Coronavirus is the essential driver of thousands of diseases all around the world, and significant passes are in the USA, India,Brazil, Spain, Italy, China, the UK, Iran, and so on. Numerous kinds of Covid exist, and these infections are ordinarily found in creatures. Coronavirus has been found in humans, bat, pig, feline, canine, rat, and poultry. Side effects of COVID-19 incorporate sore throat, migraine, fever, runny nose, and hack. The infection can incite the passing of individuals with debilitated immune systems. Coronavirus is communicated from individual to individual generally by physical contact.For the most part, individuals can be contaminated through breath contact, hand contact,or mucous contact with individuals transfering COVID-19.Pneumonia is a life-threatening infectious disease affecting one or both lungs in humans commonly caused by bacteria called Streptococcus pneumoniae. One in three deaths in India is caused due to pneumonia as reported by the World Health Organisation (WHO). Chest X-Rays which are used to diagnose pneumonia need expert radiotherapists for evaluation.Thus, developing an automatic system for predicting and detecting Covid-19 pneumonia which would be beneficial for treating the disease without any delay.

30.

RESEARCH ARTICLE

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Smart Technologies to Mitigate and Manage The Pandemic: Today and Tomorrow

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ABSTRACT

COVID 19 pandemic has affected the modern world in an unimaginable way. Outbreak of the coronavirus and months long total lockdown in major parts of the world has highlighted the lacunas in disaster management and unpreparedness of the world for such a type of pandemic and "unexpected" future pandemic. All the efforts put in combating this infectious virus and to deal with adverse effects of pandemic has proved that use of technology is the only and would be the only effective solution. Each and every sector including the health sector has no option other than adoption of newer technologies in innovative engineering ways. This paper tries to suggest use of various technologies including Artificial Intelligence (AI), cloud computing, big data, blockchain, 5G and smart applications, Internet of Things (IoT), drones, robotics. These and few more digital technologies have been playing a crucial role in effective management of pandemic. This focussed review and discussion is expected to create awareness and motivation to the health care sector for using all the major Industry 4.0 technologies leading to Medicine 4.0. This technological revolution in healthcare and allied sectors will help in effective management of pandemic.

Keywords: COVID 19, Coronavirus, disaster management, emerging technologies, pandemic, health care.

SAMRIDDHI : A Journal of Physical Sciences, Engineering and Technology, (2021); DOI : 10.18090/samriddhi.v13i02.4

INTRODUCTION

Today, every part of the world is fighting the spread of the corona virus, or COVID-19, which has been declared an epidemic by the World Health Organization (WHO). According to the World Health Organization, more than 4.7 million COVID-19 cases in 216 countries are said to have killed 1.2 million lives, which is not over yet. This catastrophic loss of human and economic life is a great concern to mankind.

This is not the first time the world has experienced an epidemic.The Spanish Influenza or Influenza of 1918 was one of the worst diseases caused by the H1N1 virus in human history, with a genetic predisposition to bird offspring. It is estimated that one third of the world's population is affected. The disease has claimed the lives of 50 million people, with a significant number of deaths reported in the United States. Nearly four decades later, in 1957-58, a devastating pandemic caused by a virus (H2N2) broke out. The first few cases have been reported in Singapore and Hong Kong. Over the next few months, an Asian flu spread to the United States and the United Kingdom. According to the World Health Organization, the flu is estimated to have

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Experimental Study on CNG Engine with Different Ventury Configuration

M.R. Dahake, S.E. Patil

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Highlights

- The main objective was to achieve an optimum ratio by designing a venturi type gas mixer.
- Three venturi type gas mixer were designed by varying number of holes, hole size and throat diameter.
- VCR research engine was used to test with different (three) venturi configuration for engines carburetion system.
- The performance as well as exhaust emissions were compared for all three ventury configurations.
- The most optimized venturi type gas mixer design which is requisite for CNG engine is recommended.

Abstract

Low carbon to hydrogen ratio of compressed natural gas (CNG) is counted as one of the better potential as an alternate fuel instead of conventional fuel for an internal combustion engine. CNG engines have very low particulate emission and lower brake specific fuel consumption compared to conventional fuelled IC engines. Design of carburetion system plays vital role in both conventional CNG engines as well as in dual fuel engines in consideration of better performance and emissions. The restriction barrel named venturi governs the crucial operation of the carburetor. In the presented study, main intention was to achieve an optimum ratio by suitably designing a venturi type gas mixer which mixes the CNG gas with incoming air. Fulfilling the design need, three venturi type gas mixer were designed by varying number of holes, hole size and throat diameter. A four stroke, single cylinder, VCR research engine was used to trial with different venturi configuration for engines carburetion system and their performance as well as exhaust emissions were compared. According to the experimental results, venturi 2 with 23mm throat diameter and 8 numbers of holes was resulted the most optimal venturi design. During the experimentation at full load, air–fuel equivalence ratio was found close to 1 and equivalence ratio to 0.88, which is the need of CNG engines to run smoothly. This satisfies the venturi type gas mixer design requisite for CNG engine. It is also observed that optimized number of holes improves the engine performance and emission as well.

Previous

Next

Keywords

CNG; Ventury Type Gas Mixer; Performance; Emissions

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ORIGINAL CONTRIBUTION

Asymmetric Behaviour of Elastic Waves in Anisotropic Plate having Graded Properties: A Fast Fourier Transform-based Spectral Analysis

Mannan Sayyad[1]

Received: 6 October 2021 / Accepted: 6 January 2022 / Published online: 3 February 2022

Abstract This paper discusses numerical analysis of wave propagation using spectral formulation (double series solution), which is based on fast Fourier transform (FFT) in an anisotropic plate made of functionally graded material (FGM). The plate is subjected to a tone burst excitation, and propagation of the signal is observed at various time instances. The plate is modelled with elastic moduli graded linearly along the length direction, propagation direction being along the length of plate. The wave analyses is carried out for three configurations: a) G^+, an FGM with elastic modulus varying from 1 to 10 GPa b) G^-, an FGM with elastic modulus varying from 10 to 1 GPa and c) H, a homogeneous material with average elastic modulus of 5.5 GPa. The results show that waves are dispersive in nature in case of G^+, in general. It is observed that the waves in elastic plate having graded properties exhibit asymmetric behaviour. Also, the wave travels faster in the case of increasing gradation (G^+) compared to the case of decreasing gradation. Later, these observations are discussed in the context of crack propagation in bamboo, a functionally graded material. The graded distribution of fracture toughness in bamboo is discussed from the wave mechanics point of view where a crack is idealised to an elastic wave front.

Keywords Functionally graded material · Wave mechanics · Spectral analysis · Fast fourier transform · Crack propagation · Fracture toughness

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Introduction

Functionally graded material (FGM) is a new generation material that possesses spatially varying properties within the material. It finds rapidly growing focus among researchers and widespread applications in industry, and it is interesting to evaluate the performance of FGM for getting more insights into its characterisation. FGM differs from many conventional isotropic materials because it has gradation in various material properties such as Young's modulus, density, hardness, and thermal conductivity [1]. FGM proves to be an alternative to many homogeneous or monolithic materials as it achieves multiple functions due to which it is popular in many industrial sectors such as automotive, electronics, aerospace, and nuclear [2]. A suitable application of FGM is thought of in rocket-motor casing where it can be utilised such that a refractory material is used inside the casing, whereas a strong and tough metal is used outside. It is required to have a gradual transition from the metal to the refractory material. It is advisable to use an FGM in high-temperature applications as it greatly lowers the chance of shearing in the intersection due to a gradual transition from one material to the other [3].

There are examples of FGM in nature as well. Bamboo possesses a gradation in fibre density varying smoothly across the thickness over the transverse cross section [4]. The basic difference between composites and FGMs is that the volume fraction of the inclusion is not uniform throughout the FGM. It is difficult to find the material that is truly analogous to FGM. Having said that, laminated composites are closely analogous to FGMs; however, the properties change abruptly across the lamina in the composites. Suresh and Mortensen [5] have excellently discussed the fundamentals of FGMs.

RESEARCH ARTICLE

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External Portable Cooling System for Mobile Phones

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ABSTRACT

Basically, a cooler word depicts the meaning of cool or relief from heat. Same as above a phone cooler cool down the phone or gives relief from heat which is radiated due to continuous use of phone. The working principle of the cooler is so easy to understand. Now- a-days power dissipation levels in mobile phones are continue to increase due to gaming, higher power apps and increased functionality associated with internet. With this power dissipation level, products such as mobile phones will require active cooling to ensure that the comfort and reliability perspectives. The current cooling methodologies of natural convection and radiation limit the power dissipation within a mobile phone to between 1-2 w depending on size.

In this paper, the external portable mobile phone cooling system has proposed. This system does not need any changes in designing of mobile phone. It can be used for any types of mobile phone. The proposed cooling system is portable and reliable in cooling phones. The result of this project shows up to phone heating can be controlled in any condition without any external higher power source.It has very less limitations. If the model is connected to phone to provide input power to it the fan and cool it, it will result in drainage of battery of phone. It will not so comfortable to use it for long time less than two hours.

Keywords- Phone Cooling, Battery, Motherboard, Fan, Thermal Pad, DC motor.

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INTRODUCTION

Now-a-days, mobile devices are widely being used for making calls, net browsing, gaming and social communication. For advance application and functions mobile require a processor. It consists of different chips for other assistive application and all of them dissipate power. The thermal management of phone become essential task. There are many solutions for thermal management of phone, but some solution creates issues that can affect nature and type of solution. Many researchers have discussed thermal challenges of handheld phone devices. Thermal modelling and thermal control techniques are available in market for management of power. The solution for thermal management, some hardware and software power optimization found in [2]. To increase reliability, temperature prediction and integration of design centric analysis is required [3]. Mechanical stack up and Temperature Limits are the most important challenges in phone device. Mechanical stack up is thermal engineering in designing. Z-stack up is consists of good thickness and have mechanical rigidity. Temperature limit is thermal solution provided in phone. The study on thermal limiting factors should do carefully. Certain limitations should be kept on the junction temperature. This temperature depends on

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ANALYZE THE IMPACT OF VIBRATIONS ON ANTHROPOMETRIC BASED HUMAN BIODYNAMIC MODEL

Dr. Mangesh Phate
Ms. Pooja Kamble
Prath Khedekar
Saurabh Kamble
Aniket Kamble

Abstract:

We have come in contact with so many mechanical appliances where we are continuously in contact with mechanical vibrations. Higher magnitude of vibrations is adversely affected the human body in various ways. Especially taking the people who drive or seat in the vehicles like tractors,trucks,construction vehicles etc. In vibration human body acts as an active mechanical system. Many harmful side effects of the vibration can be both physiological and neurological which in many cases lead to permanent injury or disagreeable feelings giving rise to discomfort results. To analyze the impact of vibrations on the human seated posture, a simple anthropometric based human vibratory model with four degrees of freedom human biodynamic model is presented in the presented work and 4 degrees of freedom human seated model is tested against the vibrations impact. The whole seated posture is divided into four segments such as head, neck and upper torso, lower torso and the thigh. The reposnes of the human seated postures is measured in terms of the seat to head transmissibility, apparent mass and the driving point impedance. The presented biodynamic model is simple and economical which will help to analyze the vibration impact on human seated posture.The human seated posture is considered as 4 degrees of freedom mass damper mechanical system where body parameters such as mass, stiffness and damping coefficients are calculated by using some biodynamics considerations and standards along with the human anthropometric dimensions. The experimental findings show the nature of the impact of vertical vibrations on the human seated posture.

Keywords: AM,Anthropometric,Biodynamic responses, DPMI,Human vibratory mode, STHT,Vibrations.

1. INTRODUCTION

Humans are most sensitive to body vibration under low-frequency excitation in a seated posture. It is also well known that the spine may be fractured when subjected to strong vertical acceleration. Also, the transmission of vibration to the human body may reduce comfort, or even harm health. If the vibration is very severe. for example in a vehicle on a dirt track, injuries on seated occupants and drivers may become a problem. There have been multiple research about the vibrations of the human body for sitting posture. A vibration is a periodic motion of the particles of an elastic body or medium in alternately opposite directions from the position of equilibrium when that equilibrium has been disturbed. These vibrations affect human comfort while driving and various problems depending on the subjects like human gender, human age, human posture, human anthropometric data, the magnitude of vibration (amplitude and frequency). The human body is a very sophisticated dynamic system whose mechanical properties vary from moment to moment and from one individual to another. Lumped-parameter models consider the human body as several concentrated masses interconnected by springs and dampers. This type of model is simple to analyze and easy to validate with experiments. The human body model is useful to simulate a human response in which different body parts are considered as a lumped mass system. The parameters included in the study are driving point mechanical impedance (DPMI), apparent mass (APMS), seat to head transmissibility (STHT) functions. These parameters are evaluated through a MATLAB program formed by human anthropometric data. These parameters can help to evaluate the vibrations to the human body and how much particular element is affected by the vibration.Wael Abbas et al.[1] has performed the experimentation and measure for seated subjects with feet supported and hands held in a driving position. Variations in the seated posture, backrest angle, and nature and amplitude of the vibration excitation are introduced within a prescribed range of likely conditions to illustrate their influence on the driving-point mechanical impedance of seated vehicle drivers. Within the 0.75-10 Hz frequency range and for excitation amplitudes maintained below 4m/s2, a four-degree-of-freedom linear driver model is proposed for which the parameters are estimated to satisfy both the measured driving-point mechanical impedance and the seat-to-head transmissibility characteristics defined from a synthesis of published data for subjects seated erect without backrest support.

M. J. Griffin et al.[2] has studied the nonlinearity in their biodynamic responses and quantify the response in directions other than the direction of excitation. Twelve males were exposed to random vertical vibration in the frequency range 0.25–25Hz at four vibration magnitudes (0.125, 0.25, 0.625, and 1.25ms). The subjects sat in four sitting postures having varying foot heights to produce conflicting thigh contact with the seat (feet hanging, feet supported with maximum thigh contact, feet supported with average thigh contact, and feet supported with least thigh contact). Forces were measured

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SIMULINK BASED BIODYNAMIC MODEL FOR THE HUMAN LOWER LIMB

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ABSTRACT

This research paper is about the development of lower limb exoskeleton for rehabilitation. The 4 degree of freedom (DOF) is developed for the lower limb, where one DOF for hip joint, one for knee joint, one for ankle joint and one for the foot. There are different model of lower in limb in the market which consist the 7 DOF model, two DOF for hip joint, two DOF for the ankle joint, two DOF for the ankle joint and one DOF for foot. In this model we made it's with 4DOF model which has less costly than other model. The MKC model is for 4DOF model to finding the acceleration of model and displacement of model with help of MATLAB Simulink

Keywords: Lower limb Exoskeleton, Equation of motion, RMS Value, MATLAB-Simulink.

1. INTRODUCTION

The research is based on development of lower limb exoskeletons for improving the medical assistance of human leg. The human is suffering from different type pain stress in human leg in daily life for example walking, running, driving, during activity human are goes through different types of vibration. Biodynamic of the human lower limb is the important for understanding mechanisms of vibration-induced disorders and for developing better standards for overcoming the risk of vibration exposure to human lower limb. The heavy activity of human causes different types of health effects like muscle weakness, loss the sensitivity of the skin and heavy pain in different organ. Now a common problem due to exposure of human leg while running, walking or any other activity with vibrating work surface. Which directly effect on internal parts of human leg.

The exoskeleton is used as carrying function of human weight or mass which help to reduce effort that to carry extra weight. A vibration is a periodic motion of the particles of an elastic body or medium in alternately opposite directions from the position of equilibrium when that equilibrium has been disturbed. These vibrations affect human comfort while working and various problems depending on the subjects like human gender, human age, human posture, human anthropometric data, and the magnitude of vibration

In this research, develop a four degree of freedom model of lower limb exoskeleton with help of MASS-SPRING-DAMPER system and equation of motion. The 4 degree of freedom is as follows: one for hip joint, one for knee joint one for ankle joint and the one for the foot. The human leg part more affected at the contacted area of human and the vibrating body like foot and thigh. The vibrations from feet are neglected because the variations between feet touching to the floor are not same for each person. Each body segments are considered as the spring-mass-damper with help this model, finding acceleration and displacement RMS value to finding the effect of vibration on different parts of human the transmitted acceleration is based frequency on the basis of experimentally measured vibration transmissibility values on the hip, knee, ankle and foot. The vibration power distributed in various substructures of human lower limb system exposed to vibrations.

Mohsen Safaei, Nicholas B. Bolus, Alper Erturk and Omer T. Inan The vibration at knees, at different leg

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Enhancing User Experience for Computer Aided Design packages through Artificial Intelligence

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Abstract User experience and interface design is an area which is gaining more and more attention from designers, developers and researchers over a decade. User experience with Computer Aided Design (CAD) packages is a major pain area for its designers, developers and particularly users. An attempt has been made to understand and critically review the need for it and develop a suitable solution which can help CAD developers and users by enhancing the user experience through application of Artificial Intelligence as a tool to optimize the problems and pain areas of the CAD users.

Also a model is proposed which can help to identify user experience issues particularly with CAD packages and tries to incorporate methods for evaluating parameters and measures for improving fatigue and productivity for User Experience (UX) for CAD software.

1. INTRODUCTION

Enhancement in User Experience is getting demanded by customers for all kind of products and more and more work is being carried out to ensure this. Designers and product developers are looking towards these requirements as a heart of product development process. As a need of quality enhancement, there are various efforts being taken to enhance User Experience through various areas and methods like standardized approaches like Design Thinking, Error tracking, task time evaluation, questionnaire surveys, eye tracking studies, etc which are effective in identifying the key parameters for user experience evaluation and enhancements.

The application of user experience design for software development had initiated since few decades now. There are different approaches and methodologies that have been developed and

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Evaluation of Success Factors in Professional Business Incubation

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ABSTRACT

Professional Business incubation is the name for the process by which a person or institution supports the development and growth of a startup. Incubators recognize the potential for growth and weigh the opportunity before sponsoring or channeling funding for startups. Selecting a startup requires a great deal of systematic investigation of resources before making a decision to support or fund a startup. In recent years developing countries are moving rapidly towards achieving the goals of macro-stability, inclusive and sustainable growth with the help of industries. This has contributed an impetus to establishing nurturing environments to ensure long standing successful home-grown businesses. Incubators, although a powerful tool to promote young ventures, have certain limitations as well. Clients might either develop over dependent tendencies rendering them incapable of adapting to real market forces. At the same time it has been observed that most of them work in isolation and with limited spectrum which is not allowing them to reach the potential people and resulting in lack of utilization of center, facilities and resources.At the same time due to dynamic change in technology and market demand, companies are quick to adapt and change as the fluctuating phases survive the growth trend.

Keywords: Bartlett's Test, Business Success factors, Common Factor analysis, Incubation, Principal Component Analysis, Kaiser-Meyer-Olkin (KMO) Test.

I. INTRODUCTION

This has rendered a generation of no Indian pioneers in the world of growing start-ups despite having the potential needed to become global leader in innovation with market potential and a massive talent pool in a culture of frugal innovation. Most Start-ups also fail to perceive potential demography of customers. [1]

Synergies simulated between established industries, notable experts, consultants and start-ups provide a favorable condition for Start-ups in their young budding stage. Collaboration between SMEs (small and medium sized enterprises) government, pseudo government organizations and other organizations that research and provide financial expert advice leverage the regional innovation assets that contribute the capacity to deliver, capacity to learn, adapt and grow. For even smaller businesses networking facilitates generation of referrals and opportunities.[2]

It is more than often the case where businesses due to affection for their ideas regardless of realizing that they are building a flawed product or a product with no market, don't pivot. This prompts wastage of valuable time, talent, assets, and financial resources alike.

Entrepreneurs could have great ideas and ambitions but a lack of business management and administrative skills could be the reason for the downfall of their new enterprises. With a diverse range of responsibilities on the helm such as planning, strategizing, staffing, organizing, and directing, management becomes too complicated. Additionally most Founders lack formal management education or training. Poor decisions such or decisions not made promptly result in opportunities slipping away. Bad staffing practices, inefficient organizational structure, lack of market and customer studies make businesses susceptible to failure. The shut-down of several start-ups in the Indian landscape have their roots in poor management, and not the frequently cited lack of funding. Products too early for its time or too late, amidst fierce competition in the market are provoked by bad managerial decisions.[3]

It's often observed in India that due to better performance and outpacing growth of B2B over B2C, many B2C and other small ticket-size investments, mixed portfolio start-ups with potential, lose in funding rounds. Experts and researchers concur to the fact that rampant changes in strategies to fund allocations for improved return on investments and risk diversification to speed up the overall funding trend.

In the initial stages of an emerging start-up, fundamentally in the technology sector, it is necessary to carry out a deep analysis not only of the national market, but of the global market, to see if the idea has already been proposed or is already being exploited, since once launched the product or service to the market of a country, its international expansion is practically implicit.

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Survey Paper on Extraction of 3D image Data for Detecting Chest Diseases

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ABSTRACT Coronavirus sudden outburst has been of extraordinary worry to the wellbeing on the grounds that no workable solution has been found to cure it. The organic structure of COVID-19 contains a positive-situated single- abandoned RNA-type, and it is hard to treat the sickness inferable from its changing element. Clinical experts universally are going through concentrated exploration to build up a viable solution for the infection. Directly,Coronavirus is the essential driver of thousands of diseases all around the world, and significant passes are in the USA, India,Brazil, Spain, Italy, China, the UK, Iran, and so on. Numerous kinds of Covid exist, and these infections are ordinarily found in creatures. Coronavirus has been found in humans, bat, pig, feline, canine, rat, and poultry. Side effects of COVID-19 incorporate sore throat, migraine, fever, runny nose, and hack. The infection can incite the passing of individuals with debilitated immune systems. Coronavirus is communicated from individual to individual generally by physical contact.For the most part, individuals can be contaminated through breath contact, hand contact,or mucous contact with individuals transfering COVID-19.Pneumonia is a life-threatening infectious disease affecting one or both lungs in humans commonly caused by bacteria called Streptococcus pneumoniae. One in three deaths in India is caused due to pneumonia as reported by the World Health Organisation (WHO). Chest X-Rays which are used to diagnose pneumonia need expert radiotherapists for evaluation.Thus, developing an automatic system for predicting and detecting Covid-19 pneumonia which would be beneficial for treating the disease without any delay.

Keywords: Covid-19, Pneumonia, Chest X Ray,3D Image, Convolution Neural Network.

I. INTRODUCTION

Recently , Artificial Intelligence has been generally utilised for the increasing speed of biomedical examination. AI has been utilised in numerous applications, for example, picture recognition, information grouping, Image segmentation . Individuals contaminated by COVID-19 may experience the ill effects of pneumonia on the grounds that the infection spreads to the lungs. Numerous profound learning considerations have been detected in the infection by utilising a chest X-ray image information approach. In the study It has been found that three-dimensional bifurcate digital models give a significantly more clear strategy for visually assessing the effect of COVID-19 on the lungs than straight radiographs, CT scan data or reverse transcription polymerase chain response alone. These printable computerised models are furthermore extremely powerful for imparting the effect of COVID-19 on the respiratory system to the overall population. There is rapid development in machine learning, image processing for handling innovations and the accessibility of clinical image information.It has prompted a fast development in the utilisation of deep learning models in the clinical area. This was intensified by the rapid advancement in convolutional neural network (CNN) based.

models, which were used by the medical imaging group to help practitioners in sickness analysis. Since the fabulous accomplishment of AlexNet in 2012, CNNs have been progressively utilised in clinical image examination to improve the productivity of human clinicians. In later years, three- dimensional (3D) CNNs have been utilised for the examination of clinical pictures. It has been found that the field of 3D clinical image examination utilises 3D CNNs (and its variations) in various clinical zones, for example, classification, segmentation, identification and localization.This study suggested the difficulties related with the utilisation of 3D CNNs in the clinical imaging area (and the utilisation of profound learning models by and large) and conceivable future trends in the field.

Project description

Due to the success of deep learning algorithms in analysing medical images,Convolutional Neural Networks (CNNs), Artificial Neural Networks, have gained much attention for disease classification. In addition, features learned by pre-trained CNN models on large-scale datasets are very useful in image classification tasks. In this work,we appraise the functionality of pre-trained CNN models utilised as feature-extractors followed by different classifiers for the classification of abnormal and normal chest X-Rays and CT scan images. We analytically determine the optimal 3D deep learning CNN algorithm for identifying Covid-19 Pneumonia. Statistical results obtained demonstrate that pre-trained CNN models employed along with supervised classifier algorithms can be very beneficial in analysing chest X-ray images and CT scan images, specifically to detect Covid-19 Pneumonia.This system can also redirect the images to an expert in

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Impact on industrial robot calibration due toTechno-commercial aspects in conventional Industrial robot calibration methods

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Abstract

This article analyses the techno commercial feasibility of rising demand of industrial robots in manufacturing and service industry which leads to increased product manufacturing and thus leads to potential economicgrowth. The solution to this challenge in the field of research & development work has been carried out in theindustrial robot calibration for more than thirty years. A lot of time and efforts were spent on proving therobots performance parameters. The main intention of the measures is to demonstrate how much and in whatway calibration affects their estimation results. Because there is no information on which technology is mostappropriate, two alternative tables are analyzed and compared to give an indication of how appropriate is therobot calibration techniques. Data for a techno-economic price-performance ratio has been retrieved from theliterature survey.

Keywords: Industrial robot, techno-commercial, price-performance ratio, robot calibration, innovative methods& new development.

1.Introduction

Industrial robot calibration standardization is the first focus of researcher for many years [1]. Industrial robot calibration has become one of the interesting research areas in production and service industries in the past few years. However, there is few research carried out to address the parameters like repeatability and positional accuracy, overall calibration errors reductions. This area has a greatest impact on the variables like accuracy and repeatability industrial robot performance. A brief tabulated description of measurement techniques and helps to estimate the parametric errors. To identify the desired variables in industrial robot calibration procedure a least square root technique is used to measure the errors. To address this problem, a calibration of industrial robot different measurements procedure are discuss in later stage of this paper. A robot-based calibration system thus becomes an alternative technology to manual or semi-automated measurement techniques. Since then there has not been any economical evaluation on which calibration technology is most appropriate when comparing the different methods per calibration and installation cost are considered. Standardization or Calibration of instruments is frequently needed for a newly installed device or with a specific regular time interval or some particular effective execution of progress. In other words, standardization is frequently used when a device is exposed to a sudden or unavoidable change in position, vibration or an error that occur, may put it out of its specified working factor limits. It is an activity in which a comparison is made between the products to be tested with the known reference value. In other words, it is a comparison between the dimensions of either known magnitude with reference to equipment and another instrument made alike as possible with another reference instrument. On the other hand, standard is defined as the device or instrument with pre acknowledged or designated correctness. Thesecond instrument is the unit under test or assessment instrument. Standardization and cost effective performance are needed to evaluate each technology.
The use of standardization is to develop the industrial robot positioning accuracy and

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Open Access Initiatives in Western Asia

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ABSTRACT

This paper highlights open access activities and resources from Western Asia. The development of open access journals from this region is analyzed through regional listings in the Directory of Open Access Journals (DOAJ), and information about the development and implementation of open access repositories is taken from the Directory of Open Access Repositories (OpenDOAR) platform. Additional information about OA resources and development projects was found through UNESCO's Global Open Access Portal. The study's findings show that, even with support from international groups like EIFL and OpenAIRE, the region's open access market lags behind that of more developed countries. Turkey and the United Arab Emirates (UAE) stand out among Western Asian states, and Cyprus took the important step of instituting a national public open access policy. Awareness projects and workshops will be a vital step in helping the countries of Western Asia to see the value of open access and to build a stronger OA infrastructure.

KEYWORDS: Open access development Western Asia Middle East OA repositories

Correction Statement

article has been corrected with minor changes. These changes do not impact the academic content of the article.

Disclosure Statement

No potential conflict of interest was reported by the author.

Notes

[1] "Budapest Open Access Initiative," https://www.budapestopenaccessinitiative.org (accessed May 23, 2020).

"Budapest Open Access Initiative," https://www.budapestopenaccessinitiative.org (accessed May 23, 2020).

[2] "Ten Years on from the Budapest Open Access Initiative: Setting the Default to Open," *Budapest Open Access Initiative*, https://www.budapestopenaccessinitiative.org/boai-10-recommendations (accessed May 23, 2020).