





## An investigation on mechanical properties of AA336/Al<sub>2</sub>O<sub>3</sub> composites by Duralcan process

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### Abstract

The Duralcan technique was utilized to manufacture nanocomposites of aluminium metal matrix and Al<sub>2</sub>O<sub>3</sub> nanoparticles. It is a form of stir casting in which metals and ceramics are layered one on top of the other and composites are formed by a heating and stirring process. The composite was composed of nano Al<sub>2</sub>O<sub>3</sub> at weight percentages of 1%, 1.5%, and 2.5%, respectively. The wear test was conducted through a pin on the disc, and the frictional force analysis is also performed. The effect of the Al<sub>2</sub>O<sub>3</sub> content in the matrix on the wear characteristics was investigated.

### Introduction

The most common materials used to make pistons are alloy steel, cast iron, aluminium alloys, including aluminium–silicon alloys. Aluminum alloys are known for their machinability and formability properties. Among other disadvantages, these alloys have a high thermal expansion coefficient, deprived hardness, and deprived strength indices at elevated temperatures [1], [2], [3]. Cast-iron pistons are typically used due to their slide properties, their ability to retain mechanical properties at preeminent temperatures, and their low coefficient of thermal expansion. Due to their low heat conductivity and high density, cast-iron pistons cannot be used in modern high-speed engines. A synthesis of two or more radically dissimilar materials, which are superior in particular to the original substances, can be used to overcome these properties by a composite material consisting of one or more mixtures [4], [5], [6], [7]. Composites with particle reinforcements in aluminium metal matrix (Al-MMCs) are regarded as the promising alternative to provide better wear resistance to aluminium alloys. Increased wears resistance has been reported by the addition of silicon carbide and alumina into aluminium matrix. Various other types of reinforcement have been stated as effective reinforcements to improve the tribological possessions of aluminium-based alloys such as aluminium nitride, garnets, boron carbide, titanium dioxide and cerium dioxide. Wear resistance has increased due to the reinforcement phase's high hardness and strength, increasing the reinforcement content [8], [9], [10], [11], [12], [13], [14]. Earlier, several authors studied the interaction of metal matrix composites with various friction and wear aspects sliding distance, like applied load and reinforcement percentage. Taguchi analysis and variation techniques have been employed by a variety of researchers to isolate parameters affecting wear and friction. Wear behaviour, with an add-on of 5 percent graphite and addition of up to 8 percent Al<sub>2</sub>O<sub>3</sub>, of the A7075/graphite/ Al<sub>2</sub>O<sub>3</sub> hybrid composites reported decreases in the friction coefficient. The

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## RESEARCH ARTICLE

# Experimental Investigation of Propeller Performance with Propeller Surface Corrugations

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## **ABSTRACT:**

The propeller is the primary component of flying vehicles powered by electric motors, internal combustion engines, and turboprops for producing thrust. A propeller thrust is produced in the engine by effective spinning of the propeller through air for cost-effective and environmental friendly flight. Natural flyers like birds as well as aquatic animals like humpback whales effectively use its wings and flippers with its surface features for capturing its prey and escaping from their enemies. As part of this work, corrugations are established in the leading edges or in the suction surfaces of the propeller to modify the flow field prevailing over there. Because of the flow field, the surface corrugations or leading edge corrugations energize the boundary layer in the surfaces of the propeller by counter-rotating vortices which, in turn, delays the separation of the boundary layer from the surface. The performance parameters of the propeller such as thrust, torque, propeller efficiency, power consumption etc., are measured using propeller test rig. Depending on the location of surface or leading corrugations, the variations in the performance of the propeller are investigated for further optimization on the selection of better propeller to the applications of UAVs operating at low Reynolds No.

**KEYWORDS:** Propeller, Surface corrugations, Performance parameters, Propeller test rig, Reynolds No.

## **INTRODUCTION:**

An Unmanned Aerial Vehicles capable of Vertical Take-Off and Landing (VTOL UAVs), are increasingly deployed for various applications like surveillance, autonomous parcel delivery, oil and gas spill detection and firefighting. The event of Unmanned Aerial Vehicles (UAV) for civil and military applications has increased significantly over the last decade. More industries like agricultural, educations, communications, and energy sector are getting more courageous to venture into the utilizations of UAV to carry our various missions. Because the advancement of technologies, the implementation of UAV may contribute to extend in productivity also as reducing the danger, allowing replacement of manned mission [1-3]. This is often because UAVs are cost and maintenance friendly. Hence, it's vital to possess high-performance UAV design in order that it could deliver the mission efficiently.

An unmanned aerial vehicle (UAV) is an aircraft without human pilot on board and a type of unmanned aerial vehicle. UAV may be a component of an unmanned aircraft system (UAS); which include a UAV, a ground-based controller, and a system of communications between the two. The flight of UAVs may operate with various degrees of autonomy: either under remote by human operator or by onboard computers. Compared to crewed aircraft, UAVs were originally used for missions too "dull, dirty or dangerous" for humans [4-7]. While they originated in military applications, their use is rapidly expanding to commercial, scientific, agricultural, and other applications, such as policing and surveillance, product deliveries, aerial photography, infrastructure inspections, smuggling, and drone racing. The performance of a UAV is significantly influenced by the efficiency of the propeller. Thus, it's vital to research the propeller performance to make sure that the planning led to a reliable UAV performance. The performance of a drone

# MODELLING OF LOSSLESS CONTACTLESS POWER TRANSFORMER USING IMPROVED PARTICLE SWARM OPTIMIZATION ALGORITHM

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## ABSTRACT:

The contactless power transmission is applicable recently for various real time applications like electric vehicle charging, in space travelling, and other distribution systems. The transformer winding has magnetic coupling with each phases; it analyze the primary and secondary winding for core structure of transformer. The conventional Loosely coupled transformer with mixed winding and electromagnetic shielding for contactless power transmission method used various traditional Genetic algorithm and Particle Swarm Optimization algorithms for power loss reduction. This increases the transmission time and it reduces the efficiency. In proposed methodology, the optimal model of contactless power transformer approach uses improved particle swarm optimization algorithm for reducing the power loss in grid connected PV module. The maximum power of solar panel is tracked by using MPPT algorithm and it is fed with the switching controller for reducing the overlap. Here in the IPSO, the frequency dependent scale selection algorithm selects the fitness frequency for optimizing the swarm particle positions to reduce the losses. From this, the impedance matching approach is used for eliminating the frequency scale splitting because it may cause over-coupled signal and the fixed mutual inductance also helps to transfer maximum power. This proposed approach improves the result of power transfer efficiency. Various analytical calculations, numerical simulations and experimental results are taken to address the loss diminution in contactless power transfer approach with better efficiency of power transmission than other existing approaches. Overall the proposed design model is done by MATLAB 2018a/Simulink.

**Keywords:** Contactless power transfer; Frequency dependent; improved particle swarm optimization; optimal frequency scale selection; swarm position updates; PV module; MPPT; Charging station

## 1. INTRODUCTION

The overall electrical vitality utilization is expanding exponentially to satisfy demand; it is important to introduce more power plants. However, petroleum usage holds are limited and it's only a matter of time before they will run out, unnecessary to specify their commitment in an unnatural weather change, numerous nations are presently looking at their public vitality approaches and hoping to grasp different other options. Sustainable power sources are among the vitality sources that offer another approach to dodge this fossil vitality cutoff time. They are additionally expected to assume a significant function as a clean power source later on vitality requests. Among this different sustainable power sources, PV power grid frameworks are the most utilized. One of the most significant applications is the Grid Connected PV framework on electrical vehicle application like motor driving system, charging station, etc. Here the contactless power transformation approach performed for wireless transformation in the application of electrical charging station of EVs [1]. Through the most recent decade, a few parts of ICPT have been examined, for example, attractive coupler structure strategies, remuneration geographies, control techniques, unfamiliar article identification calculations, and the radiation wellbeing issues; various optimization algorithm presented on MG [2]. The investigation incorporates the plan for the PV exhibit with its MPPT approach and its numerical model, which helps to control and manage the grid system [3]. The framework uses a DC-DC converter for battery charger to control the accusing current of a PI tuning regulators and PSO [4]. This mainly utilized the renewable energy resources for reducing the cost and demand. By increasing the number of turns on the transformer winding, the magnetic flux linkage is happened [5]. CPT is better power transformation technique to accomplish power move without mechanical contact. Since CPT can improve the adaptability of intensity gracefully, decline support cost and get high dependability, it has been applied in numerous applications, like battery charging frameworks, space [6] and submerged gadgets. At the point when the optional of series type of contactless power resonant converter is completely resounded, the auxiliary can be improved as a steady voltage source as indicated by Thevenin's approach. To improve the effectiveness further, more investigation is embraced both in





ORIGINAL ARTICLE

# Effect of lattice strain on structure, morphology, electrical conductivity and magneto-optical and catalytic properties of Ni-doped $Mn_3O_4$ nano-crystallites synthesized by microwave route



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## KEYWORDS

Photoluminescence;  
X-ray diffraction;  
Microwave combustion;  
Ni-doped  $Mn_3O_4$

**Abstract** Ni-doped  $Mn_3O_4$  nanoparticles (NPs) were synthesized by a simple one-pot microwave combustion procedure utilizing urea as a fuel. X-ray diffraction, transmission electron microscopy (TEM), diffuse reflectance spectroscopy, Photoluminescence spectra, and vibrating sample magnetometer. The particle size and the crystalline size measured from the HR-TEM mono-graphs and XRD study suggest the similarity of the data collected from these two measurements.

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Scientific paper

# Statistical Optimization of As(V) Adsorption Parameters onto Epichlorohydrin/Fe<sub>3</sub>O<sub>4</sub> Crosslinked Chitosan Derivative Nanocomposite using Box-Behnken Design

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## Abstract

In this study, Box-Behnken design (BBD) in response surface methodology (RSM) was employed to optimize As(V) removal from an aqueous solution onto synthesized crosslinked carboxymethylchitosan-epichlorohydrin/Fe<sub>3</sub>O<sub>4</sub> nanocomposite. The factors like solution pH, adsorbent dose, contact time and temperature were optimized by the method which shows high correlation coefficient ( $R^2 = 0.9406$ ), and a predictive quadratic polynomial model equation. The adequacy of the model and parameters were evaluated by analysis of variance (ANOVA) with their significant factors of Fischer's *F*-test ( $p < 0.05$ ). Seven significant parameters with interaction effects in the experiment with  $p$ -value  $< 0.0001$  was observed, having a maximum removal efficiency of As(V) is 95.1%. Optimal conditions of dosage, pH, temperature, initial ion concentration and contact time in the process were found to be 0.7 g, pH 6.5, 308K, 10 mg/L and 60 min respectively. Langmuir isotherm model fitted better than the Freundlich model having a maximum adsorption capacity of 28.99 mg/g, a high regression value of 0.9988, least chi-square value of 0.1781. The process was found to follow monolayer adsorption and pseudo-second-order kinetics. Thermodynamic parameters indicate the process is spontaneous, endothermic and physisorption in nature. Successful regeneration of the adsorbent implies its applicability to the removal of arsenic from real life wastewater.

**Keywords:** Biosorption; isotherm; kinetics; thermodynamic; optimization; response surface methodology.

## 1. Introduction

Arsenic is a pervasive element in the environment and has been known as a notorious toxic substance to man and living organisms for centuries.<sup>1</sup> Groundwater Arsenic is primarily associated with oxidative weathering and geochemical reaction of reactive carbon induce mobilization of arsenic in the sediments.<sup>2</sup> Arsenic contaminated groundwater affects over 100 million people in Bangladesh, West Bengal, China, Mexico, Chile, Myanmar, and United states.<sup>3</sup> Long term exposure to arsenic in drinking water causes skin diseases (pigmentation, dermal hyperkeratosis, skin cancer), cardiovascular, neurological, renal, respiratory and black foot diseases, as well as lung, liver, kidney and prostate cancers.<sup>4</sup> To protect public health, the

World Health Organization has set a provisional guideline limits of 10 µg/L for arsenic in drinking water which was afterward adopted by the European Union and India.<sup>5</sup> The removal of Arsenic by Co-precipitation, flotation, ion-exchange, ultra-filtration, and reverse osmosis<sup>6</sup> have been received more attention due to its high concentration efficiency.<sup>6</sup> Several adsorbents have been found suitable for arsenic removal counting activated carbon,<sup>7</sup> activated alumina,<sup>8</sup> red mud,<sup>9</sup> etc., In the last decade developments in the knowledge of biosorption exposed high adsorption capacities, low costs and regenerability of natural biosorption materials.<sup>10</sup> However, challenges encountered for biosorbents with high uptake, low cost and as well as in understanding the mechanism of reaction. Chitosan is produced from N-deacetylation of chitin, available from

**Pre-Proof File**

# Hybrid Cross-linked Bio Polymer-Epichlorohydrin/Fe<sub>3</sub>O<sub>4</sub> Nanocomposite for As(V) Adsorption: Kinetic, Isotherm, Thermodynamic, and Mechanism Study

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**ABSTRACT:** *In the present work, iron-doped particle Carboxymethylchitosan nanocomposite cross-linked with epichlorohydrin (CMC-EPC/INC) were prepared, by a chemical precipitation method, characterized and evaluated for the removal of As(v) from an aqueous solution. The adsorbent was characterized by FT-IR, XRD, and SEM. Key parameters, including adsorbent dosage, pH, temperature, initial ion concentration, and contact time were investigated and found to be 0.4g, pH 4, 308K, 10 mg/L, and 120 min, respectively. Mechanism study reveals the availability of amino groups in biopolymer, which act as active adsorption sites towards the arsenic anion. On evaluating isotherm models of Langmuir, Freundlich, Temkin, Elovich, Redlich-Peterson, and Dubbin-Radushkovich, it was found that the Langmuir isotherm model fitted better compared to other models having a maximum adsorption capacity of 28.99mg/g, a high regression coefficient value of 0.9988, least chi-square value of 0.1781 and validated by D-R isotherm also. The process was found to follow monolayer adsorption and pseudo-second-order kinetics. Thermodynamic parameters such as  $\Delta S$ ,  $\Delta H$ , and  $\Delta G$  indicated the spontaneous, endothermic, and physisorption nature of adsorption. Competing anions did not cause a significant reduction in the adsorption behavior of arsenic. Successful regeneration of the adsorbent implies its applicability to the removal of arsenic from real-life wastewater.*

**KEYWORDS:** *Arsenic; Hybrid Biopolymer nanocomposite; Epichlorohydrin; D-R Isotherm; Thermodynamic.*

## INTRODUCTION

Arsenic is a pervasive element in the environment and has been known as a notorious toxic substance to man and living organisms for centuries [1]. Groundwater Arsenic is

primarily associated with oxidative weathering and geochemical reactions. The major role in the mobilization of arsenic is played by the amount of reactive carbon in the

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# Adsorptive Removal of As(V) from Aqueous Solution onto Steel Slag Recovered Iron – Chitosan Composite: Response Surface Modeling and Kinetics

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## Abstract

In the present work iron particles was recovered by dry magnetic separation, from waste steel slag, doped with chitosan for adsorbent prepared, characterized and evaluated for the removal of As(V) from an aqueous solution. The adsorption of As(V) was optimized by using response surface methodology through Box-Behnken design model, which gave high correlation coefficient ( $R^2 = 0.9175$ ), and a predictive model of quadratic polynomial equation. Analysis of variance and Fischer's *F*-test were used to govern the parameters which interrupt the adsorption of As(V). The adsorbent was characterized by FTIR, XRD and SEM. Optimal conditions, including adsorbent dosage, pH, temperature, initial ion concentration and contact time for the removal of As(V), were found to be 0.8 g, pH 4, 308 K, 10 mg L<sup>-1</sup> and 3 h, respectively. Langmuir isotherm model fitted better compared to the Freundlich model having a maximum adsorption capacity of 11.76 mg g<sup>-1</sup>, a high regression coefficient value of 0.993 and least chi-square value of 0.1959. The process was found to follow monolayer adsorption and pseudo-second-order kinetics. Thermodynamic parameters such as  $\Delta S$ ,  $\Delta H$  and  $\Delta G$  indicated the feasibility, spontaneous and endothermic nature of adsorption. Successful regeneration of the adsorbent implies its applicability to the removal of arsenic from real life wastewater.

## Keywords

arsenic, steel slag, chitosan, thermodynamic, response surface methodology

## 1 Introduction

Arsenic is a pervasive element in the environment and has been known as a notorious toxic substance to man and living organisms for centuries [1]. Groundwater arsenic is primarily associated with oxidative weathering and geochemical reactions. Carbon plays a major role in the mobilization of arsenic in the sediments [2]. Over 100 million people in Bangladesh, West Bengal, China, Mexico, Chile, Myanmar, and United states [3] were affected by the arsenic contaminated water. Long term exposure to arsenic in drinking water causes skin diseases (pigmentation, dermal hyperkeratosis, and skin cancer), cardiovascular, neurological, liver, kidney, and prostate cancers [4]. To protect public health, the World Health Organization has set a provisional guideline limit of 10  $\mu\text{g L}^{-1}$  for arsenic [5] in drinking water. The removal of

arsenic by various methods has been widely reviewed [6]. Co-precipitation, flotation, ion-exchange, ultra-filtration, and reverse osmosis have been received more attention due to its high concentration efficiency. Several adsorbents have been found suitable for arsenic removal counting activated carbon [7], activated alumina [8], red mud [9], etc. In the last decade developments in the knowledge of biosorption exposed high adsorption capacities, low costs and regenerability of natural biosorption materials [10]. However, challenges encountered for biosorbents with high uptake, low cost and as well as in understanding the mechanism of biosorption with heavy metals. Chitin, a major component of crustacean shell and fungal biomass, on N-deacetylation produced chitosan. Chitin availed enormously from seafood



# Sustainable Concrete Ground Granulated Blast-furnace Slag Beam: Numerical Investigation Using Hybrid FRP and GFRP Techniques

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## Abstract

Cement with GGBS replacement has emerged as an effective alternative to traditional concrete, quickly attracting the attention of the concrete industry owing to its cement savings, energy savings, cost savings, environmental and social advantages. The use of slag in concrete offers many advantages, including lower energy consumption, lower greenhouse gas emissions, and lower raw material use. Nonlinear finite element analysis of a ground granulated blast furnace slag (GGBS) concrete beam utilising steel, hybrid FRP, and GFRP bars was performed in this research. The primary variables are fine aggregate kinds and reinforcing bars. According to the testing results, the optimal proportion of GGBS substitution of cement is 30%. The 70 percent cement and 30 percent GGBS ratio are maintained throughout the mix. The concrete is of M20 grade. Electric strain gauges are installed at steel and concrete structures to detect strain. A total of six beams were modelled. ANSYS finite element software is used to do nonlinear finite element analysis. Finite element analysis: the load is transmitted from the bearing plate to the beam through the bearing plate. Nonlinear material characteristics, as well as a nonlinear stress-strain curve for concrete, are included. The Newton-Raphson technique is used to determine the load increase step. It was discovered that GGBS concrete beams made of Hybrid FRP achieve the maximum strain and stress in concrete.

**Keywords:** cement, GGBS, Hybrid FRP, GFR, Nonlinear, FEA, sustainable goal

## 1. Introduction

Concrete is the most widely used building material in the world, with about six billion tonnes manufactured each year. In terms of per-capita use, it is only second to water. However, environmental sustainability is jeopardised due to harm caused by raw material exploitation and CO<sub>2</sub> emissions during cement manufacturing. This put pressure on researchers to reduce cement usage by partially replacing cement with additional materials. These materials may be naturally occurring, industrial leftovers, or byproducts that need less energy. When these materials (known as pozzalonas) are mixed with calcium hydroxide, they show cementitious characteristics. Fly ash, silica fume, metakaolin, and powdered, granulated blast furnace slag are the most frequently utilised pozzalonas (GGBS).





# Strengthening of RCC Beam with Advanced Composite Materials

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## Abstract:

Carbon fibre reinforced polymer (CFRP) is a combination of high performance that provides high strength, low weight, corrosion resistance, and fatigue resistance. This is especially true in hostile coastal areas, especially in areas where the sea is frequently changing, including salts that enter the concrete and dissolve the metal. However, the cost of pre stressing strand materials is relatively small percentage of bridge's overall cost. CFRP will reduce the maintenance cost of high bridge's service life. This paper presents construction of CFRP structures as well as the test results to determine the development length & amp; flexural strength.

## 1. INTRODUCTION

### 1.1 General

After water, concrete is the second most used source of energy in the world. Public engineering institutions, although working long hours, cannot be called neglected. These engineering structures represent the most important investments and assets. The tragic failure of public infrastructure around the world is a reminder that proper protection is essential to prevent the unexpected collapse of public institutions and the loss of money and health. Concrete structures deteriorate and collapse due to a variety of conditions, including the aging of the material, severe weather conditions, extended use, overloading, problems in conducting routine inspections, and lack of repair. Numerous nano-scale fissures may be seen inside the microstructure of concrete. These fractures develop as a result of the production or usage of the product. Nano-cracks unite to produce micro-cracks over time, causing macro-cracks to develop and structures to fail. Many investigations on damage detection using various non-destructive evaluation approaches have been spurred by growing concern about the state of existing structures, particularly following earthquakes. Sudden collapse and accidents can be averted with early diagnosis of these intrinsic problems. The service life of concrete buildings can be considerably increased by early diagnosis of faults and careful maintenance. Strengthening procedures for traditional construction are often accompanied by side effects and limitations. The extension of the cross section to the most widely used load-bearing parts reduces storage space and also indicates the need for longer removal from normal use due to the time-consuming construction process. Worse, broad reinforcement creates the complexity of the second structure. Revealed downfalls are disclosed.

### 1.2 Fiber Reinforced Concrete

Fiber Reinforced Plastic Concrete is a composite material made of cement, mortar, or concrete mixed with suitable non-abrasive fibers, which is unique and evenly distributed. Reinforced concrete comes in a variety of shapes and qualities, each with its own advantages. The different fibers do not include continuous machinery, woven fabrics, or long cords or rods. Fiber is a small piece of reinforcing material and a specific set of attributes. They come in a variety of shapes and sizes, including round and flat. A usable scale

entitled "aspect ratio" is often used to define fiber. The average length and width of a fiber is known as the aspect ratio. The ratio does usually vary from 30 to 150. Fiber-reinforced concrete (FRC) is a type of concrete that consists of fiber materials to improve structural strength.

It is made up of short divided strands that are evenly distributed and randomly directed. Metal fibers, glass fibers, synthetic fibers, and natural fibers are examples of fibers. With various concretes, fiber materials, geometries, distribution, shape, and durability, the character of reinforced concrete transformations within these various threads.

### 1.3 Objective of The Project

1. Comparison of critical load, high pressure, and flexural strength of beam specimens re-embedded with carbon fiber wrap fabric in large horizontal sizes.
2. To compare the test values of beam specimens extracted from the available test results for a variety of traditional beams.
3. To find the beam specimen with highest flexural strength and to compare its analytical values with the experimental values.

## 2. LITERATURE COLLECTION

**R. Santhakumar et. al. (2004)** they analysed the numerical investigation to create the action of retrofitted RC shear beams. The un retrofitted RC beam design selected as conventional beam and RC beams retrofitted by CFRP composites with  $\pm 45^\circ$  and  $90^\circ$  fiber orientations. The cause of retrofitting on without crack and with crack beams was calculated also. The FE model accepted by ANSYS was used in this investigation. This numerical modelling assists to track the crack formation and propagation particularly in case of retrofitted beams within the crack formations cannot be seen by the investigational study because of wrapping of CFRP composites. This numerical analysis can be used to forecast the actions of retrofitted RC beams more accurately by transmission appropriate material properties.

**H. Teh Hu et. al. (2004)** They analysed the nonlinear finite element analyses of rectangular RC beams strengthened by FRP. The impact of fiber orientation, span, and ratios of reinforcement on the final strength of the beams is evaluated. It





# Comparative Analysis of RCC Beam with Geogrid and Steel Fiber using Experimental Method and Ansys Software

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## Abstract:

Polymers are used to make geo-grid. Geo-grid in concrete serves as a new use for geo-synthetic components in structural engineering. The research' key goal is to investigate the flexural behaviour of a control concrete, biaxial geo-grid reinforced beam. Geo-grid has also been found to influence steel fibre reinforced concrete (SFRC). Since it exhibits stiffness and resilience in both machine and cross-machine directions, biaxial geo-grids are favoured. In terms of the research, concrete of grade M40 is cast, and flexure tested. It's worth noting the deflection caused by the increased load. In addition, a distinction between the two between Ansys analytical findings and experimental investigation results is made. As a direct result, the behaviour of the control beam specimen and the beam specimen with a geo-grid added to the stress and confinement reinforcement this must be investigated in order to determine the potential for geo-grid use in structural components. Finally, the findings show that geogrid-reinforced concrete are more ductile compared to the control concrete.

## 1. INTRODUCTION

Geo-grids are geo-synthetic materials consisting of polymers like polypropylene, polyethylene, or polyester that are commonly used in Civil Engineering applications to provide tensile soil stabilisation. They're designed as open grids to allow soil to pass through the apertures, and the two materials interlock to create composite behaviour. Retaining walls, steep slopes, street bases, and pillars are all built for them. Geo-grid is a component substance made from polymers such as polyester, polypropylene, and polyethylene and is known as a geo synthetic. Uniaxial geo-grids are commonly used for segmentation systems such as large slopes and retaining walls, while biaxial geo-grids are used to pull vibrations from roads. In a variety of infrastructure and heavy public works, geo-synthetics are used as an element of stabilization and reinforcement. Today, geo-grids are widely used as reinforcing materials in paving systems, especially as an asphalt layer reinforcement, a non-binding layer stabilizer, and as internal layers for overlay applications. Applying geo-grids as inter layers to reduce reflective cracking in asphalt overlays of jointed plain concrete pavements has become widely used. Geo-synthetics have long been used as reinforcement and stabilization elements in various heavy civil and infrastructure work particularly as it relates to geotechnical engineering. More recently, the use of geo-grids as reinforcement elements has expanded into pavement systems, particularly as stabilizing media in unbound layers, reinforcing elements in asphalt layers and as inter layers in overlay applications. The use of geo-grids as interlayers for asphalt coverings of composite concrete areas to reduce visible cracks has become commonplace in building roads.

## 2. LITERATURE REVIEW

**Shobana & Yalamesh** Concrete damage to geogrid concrete beams, followed by geo grid failure, may be caused by a variety of factors. Uniaxial and biaxial geogrids have the same cracking and ductile properties as steel in beams. The type of

geogrids used and the number of layers in geogrids have a significant impact on the changing behavior of the beams. Uniaxial geogrid offer better high-density flexibility compared to biaxial geogrid. Flexural strength is greater when using three layers of uniaxial geogrids on the plain cement concrete beams. Only flexural cracks are formed for all reinforced beams by geogrids.

**Rakendu & Anagha Manoharan** the tensile strength of geogrid and number of layers used plays a major role in flexural behaviour and load carrying capacity of beams. Beams reinforced with more number of layers of geogrid exhibits a good result in load carrying capacity and provide a flexural strength which is only 2.6% less than the control beams. Load carrying capacity is more when five layers of geogrid are used in plain cement concrete beams. In case of load carrying capacity an average of 4.4% increase is shown by the geogrid beams reinforced with 100G5. When stored in plain cement concrete beams, Geogrid can withstand tensile forces. The use of geo grid in beams will minimise deflection. Only flexural cracks occurred in the middle portion of the pillar, indicating that all geo grid-reinforced beams have flexural cracks.

**Chand Beebi & Visweswara Rao** Geogrids are used in pavement applications to provide stability, confinement, and reinforcement of asphalt concrete layers, as well as to minimise reflective cracking. The aim of this research is to see if using geogrid in thin concrete overlays is feasible and beneficial. Six geo-grid concrete beams and one control beam subjected to two-point bending are part of the experimental investigation. The two-point bending test on geo grid beams shows that geogrid strength and layer count are important factors in improving load-deflection behaviour and flexural strength. The results of the tests show that geogrid can be used as a substitute for steel in structural members.

**Ajit Kakade & Patil** the conventional beam with geogrid is more suitable in the concrete structure in terms of Flexural





## International Journal of Intellectual Advancements and Research in Engineering Computations

### Experimental investigation on strength properties on pervious concrete pavement

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#### ABSTRACT

Concrete production has greatly improved in recent decades. Concrete, on the other hand, has a unique purpose. Water cannot flow through ordinary concrete, but it passes through this concrete. The main motivation for making this type of concrete is to use it on the pavement and in open drains, where rainwater can pass through and continue to raise low water levels. Due to the decline in cement prices, cost savings were a major factor. In this experimental work made of slag powder was added to a mixture of asphalt, coarse aggregate, and water to form concrete. A small amount of slag powder can be used to improve strength. The use of strong concrete as a solution in the case of large water is desirable. The total strength of the finished concrete is determined by conducting a test of the ability of the material to withstand the strength of the slag powder that removes cement by various percentages of 0%, 10%, 20%, 30%, 40%, and 50%. The results obtained are discussed in the following chapters.

#### INTRODUCTION

##### Pervious Concrete

The word "pervious" is used to describe an open, almost zero-slump area made of Portland cement, compact, with little or no compound, admixtures and water. In a simple way, concrete that drains substance. It's a great opportunity. Unlike heavy concrete, it has high strength, has high porosity and allows it to move freely. Concrete equipment. For this reason, it is useful in situations where water forms, ice or other sources are available. Other sources must be exhausted. Absence or very low porosity is found in the absence or very low content of FA. A good level of integration is in between. No-finesness concrete is another name for flexible concrete, corrugated concrete or bare concrete. Cement, composite, water, and small or poor adhesives make up most of the composite. Good collections often fill the gaps between large aggregates with standard concrete.

##### Scope of the Project

- ✓ This concrete is a type of concrete with high porosity that helps groundwater to regenerate while reducing storm water flow.
- ✓ The scope of the work is to investigate Pervious concrete by using Steel slag as partial replacement of Cement.
- ✓ The results of research conducted in separate studies have been studied.

- ✓ This asphalt does not strike on wet days and does not glow at night. This enhances the comfort and well-being of the driver.

##### Objective of the Project

- ✓ To find the physical & chemical properties of various material.
- ✓ Investigate the concrete used in this study using various mixing scales.
- ✓ To find the optimum % of Pervious Concrete.
- ✓ To find the Permeability of Pervious concrete.

##### Literature collection

YongjieXue et al (2006) Steel slag obtained by hot-sprinkling method is a very suitable aggregate with porous structure for preparing stone mastic asphalt mixtures after 3 years aging. As the restoration of basalt iron ore increases the level of optimal bitumen, all the volume performance of asphalt rock mixtures containing metal slag such as aggregates will meet the appropriate specification criteria. After two years of use, test methods show outstanding results, with a coefficient of 556 abrasion and friction and surface texture depth of 0.8 mm. In summary, the efficient use of steel as a composite in the construction of the paved road will provide a modern and cost-effective solution for composite materials while also reducing the environmental hazards caused by solid debris. However, further research is needed on its recycling process and its widespread use in the future.

Hisham Qasrawi et al (2008) Metal slag is particularly beneficial for low-strength concrete in terms of compression

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## International Journal of Intellectual Advancements and Research in Engineering Computations

### Experimental study on concrete with addition of polypropylene fiber

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#### ABSTRACT

Concrete is a fundamental unit for the infrastructural development of an entire world and is a most commonly used building material for its sustainability, versatility, durability and economy. Concrete is a mixture of cement, sand and aggregate with water. To meet the requirements for new construction, the current trend in concrete technology is to increase the strength and durability of concrete. Research is very concerned with laboratory work to see how including polypropylene fibers improves material durability. Polypropylene fibres will be adding in various proportions (0.75% and 1.5% by weight of cement) the increase compressive strength, Tensile strength for M30 grade of concrete. With the inclusion of a limited number of polypropylene threads aged 7, 14, and 28 days, our project demonstrates the proven strength results of the FRC.

#### INTRODUCTION

Concrete creates small cracks in the treatment and this crack spreads rapidly under the applied pressure resulting in decreased strength of concrete. Thus the addition of fibers improves the strength of concrete and these problems can be overcome by the use of Polypropylene cables in concrete. Use of polypropylene fibers provide strength to the concrete while the matrix protects the fibers. The main role of cables in cementitious bonding is to control cracks, increase strength, durability and improve the properties of the bonding structure. FRC performance depends on the type of wires used. The insertion of polypropylene fibers reduces water penetration, increases flexural strength due to its high-strength module. In the cracking phase, as the fibers are removed, the force enters and the crack is reduced.

#### OBJECTIVE OF PRESENT STUDY

1. To determine the optimum percentage of polypropylene fiber.
2. The main objective of present investigation is to study the properties of concrete with addition of polypropylene fibres. The study was carried out on M30 grade concrete.
3. To compare the strength of concrete cube containing polypropylene fiber with 1.5% proportions of volume of the cement and normal concrete.

#### LITERATURE COLLECTION

Nivedhan et al Normal or conventional concrete uses more of the raw material like sand, gravels, fly ash etc. its usage has been increased to an enormous amount where there are likely chances of meeting with the demand of such construction materials. It may also lead to increase the cost of the materials drastically. Other building materials were built to deal with those problems. This study was conducted in an effort to improve the state of the art by building with recycled materials. Weld slag and fibers, which are readily available, were chosen to insert a concrete component. Weld slag, which is a residual product, is used in concrete in various quantities to incorporate the dreaded component into 10%, 20%, and 30% by weight.

Prabhakaran et al The use of Fiber-reinforced concrete (FRC) in many engineering applications is undeniable. Reinforced fiber concrete was previously used to build slabs, bridges, industrial buildings, footings, hydraulic structures, and various other structures. This paper provides a state-of-the-art review of experimental studies performed with a reinforced polypropylene fiber machine instead of cement with silica smoke, rice straw, and fly ash, including compression, strength and durability. The effect of different concentrations of polypropylene fibers with mineral admixtures is studied in this system, which uses M30 grade concrete. The various types of concrete have been tested on mechanical properties in various years, as well as the testing of cement, fine-grained, composite, and mineral mixing to learn more about their properties.

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# Study on Behaviour of RCC Beam with Partial Replacement of Sand by EOF Steel Slag

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## Abstract:

As the construction industry is a major consumer of natural resources, high quality natural sand has become scarce (fine aggregates). This has led us to look at other sources, including granular slag, an industrial waste product. A product from another such substance intended for use as part of nature. Sand is a type of material. Metal slag is processed in large quantities in the area, leading to several problems. When abandoned, environmental issues such as environmental degradation arise. To solve this problem, the Slag replaces the natural occurring aggregates and is used as a good compound in rapid construction. This task involves determining the various structures of locally produced materials and this is easily accessible. The utilization of steel slag in the concrete element by replacing it partially with fine aggregate (sand). The use of steel slag in concrete would be a greater advantage in enhancing the strength of concrete. Material study and the Mix proportions are calculated for M40 Grade of Concrete.

## 1. INTRODUCTION

After water, concrete is the most widely used building material in the world. Many aspects of our daily life depend on the inclination, either directly or indirectly. Concrete is a mixture made of various materials such as aggregates, cement and water. Water, cement, and so on. Concrete is different from the main building materials because it is a public engineering project designed for a particular public engineering project. Concrete is a composite material made of granular material such as coarse aggregates that are placed on a matrix and bonded together with mortar or bond that fills the gaps between the particles and binds them together. Concrete is important for the construction and maintenance of national infrastructure. About three quarters of the concrete is made up of aggregates.

The availability is expected to decline in the future, making it increasingly difficult to meet the global concrete needs. Finding alternatives to natural concrete preparations can be a daunting task. During the manufacture of iron and steel the by-product produced is known as steel slag. The conversion of iron to steel produce significant quantities of steel slag as a major by-product formed in the basic steel making processes. The large volumes of industrial by-products and secondary materials are needed for hours to produce concrete incorporating materials due to depletion of natural sand resources and strong demand for concrete. In this context fine steel slag material is used as alternative material in replacement for natural fine sand.

### 1.1 Advantages of Using Steel Slag

- ❖ These concrete mixes have good resistance towards stripping and have very high durability and flow.
- ❖ The wear resistance and flow of steel used as a course on the surface is excellent.
- ❖ The slag metal alloys retain heat well and are easy to work with.

❖ Slag can grow up to 10% when exposed to moisture due to free CaO hydration and magnesium hydrate

## 2. LITERATURE COLLECTION

**Yuksel, Isa, et.al (2006)** Several experimental findings of the use of non-ground slag blast-furnace slag (NGGBFS) as a good concrete mix were recorded by Yuksel, Isa, et al. (2006). Concrete samples are made in two stages. NGGBFS / sand standards were 0, 25, 50, 75, and 100 percent (reference). With good mixing, the first section (C1) is made up of just sand 0 to 7 mm (0 to 0.276 in.). The second phase (C2) includes sands ranging from 0 to 3 mm (0.118 in.) And sands ranging from 0 to 7 mm (0.276 in.). In both cases, the NGGBFS sands 0 to 7 mm (0 to 0.276 in.). Concrete strength and stiffness compared to control samples and vice versa. The findings show that when the NGGBFS / C1 sand rate is high, the concrete is open and has a low compression strength. The concrete strength and hardness of the C2 type, on the other hand, are higher than those of the C1 type. Under certain circumstances, it was decided that the slag of a furnace made of unused soil could be used as a good adhesive.

**Quasrawi et al. (2009)** experiments have been performed on the use of slag as a good combination. The same slag concentrations were used to apply compressive strength and 28-day strength strength ratings. The findings showed that the compressive strength improved with a change of slag ratios of 15-30% and the tensile strength improved to a 30-50% slag ratio. Strong, flexible, and compressive strength are all improved as good natural blends have been replaced with fully illuminated slag. Partial replacement of natural and slag combinations allows for long-term energy gains. The entire substitution of fine aggregates with slag aggregates should be avoided, it negatively affects the strength.

**Alizadeh et al.** investigate the effects of using slag on an electric furnace in solid concrete. Compared with natural composite concrete, experimental findings showed that slag



# Breast Calcifications and Histopathological Analysis on Tumour Detection by CNN

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**Abstract:** The most salient argument that needs to be addressed universally is Early Breast Cancer Detection (EBCD), which helps people live longer lives. The Computer-Aided Detection (CADs)/Computer-Aided Diagnosis (CADx) system is indeed a software automation tool developed to assist the health professions in Breast Cancer Detection and Diagnosis (BCDD) and minimise mortality by the use of medical histopathological image classification in much less time. This paper purposes of examining the accuracy of the Convolutional Neural Network (CNN), which can be used to perceive breast malignancies for initial breast cancer detection to determine which strategy is efficient for the early identification of breast cell malignancies formation of masses and Breast microcalcifications on the mammogram. When we have insufficient data for a new domain that is desired to be handled by a pre-trained Convolutional Neural Network of Residual Network (ResNet50) for Breast Cancer Detection and Diagnosis, to obtain the Discriminative Localization, Convolutional Neural Network with Class Activation Map (CAM) has also been used to perform breast microcalcifications detection to find a specific class in the Histopathological image. The test results indicate that this method performed almost 225.15% better at determining the exact location of disease (Discriminative Localization) through breast microcalcifications images. ResNet50 seems to have the highest level of accuracy for images of Benign Tumour (BT)/Malignant Tumour (MT) cases at 97.11%. ResNet50's average accuracy for pre-trained Convolutional Neural Network is 94.17%.

**Keywords:** Computer-Aided Detection; breast cancer detection; convolutional neural network; class activation map; computer-aided diagnosis

## 1 Introduction

Breast cancer is universally described as one of the primary causes of women's death. As a result, EBCD surges the likelihood of recovery while decreasing the rate of mortality. Breast cancer is the most often diagnosed disease worldwide [1–5]. As per World Health Organization (WHO) report, 626,700 women die as a result of cancer-related sickness, and an average of 10 million in 2000 to 19.3 million in 2020 is recorded. The estimated number of people diagnosed with cancer would rise much more in the following

## Fuzzy Based Ant Colony Optimization Scheduling in Cloud Computing

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**Abstract:** Cloud computing is an Information Technology deployment model established on virtualization. Task scheduling states the set of rules for task allocations to an exact virtual machine in the cloud computing environment. However, task scheduling challenges such as optimal task scheduling performance solutions, are addressed in cloud computing. First, the cloud computing performance due to task scheduling is improved by proposing a Dynamic Weighted Round-Robin algorithm. This recommended DWRR algorithm improves the task scheduling performance by considering resource competencies, task priorities, and length. Second, a heuristic algorithm called Hybrid Particle Swarm Parallel Ant Colony Optimization is proposed to solve the task execution delay problem in DWRR based task scheduling. In the end, a fuzzy logic system is designed for HPSPACO that expands task scheduling in the cloud environment. A fuzzy method is proposed for the inertia weight update of the PSO and pheromone trails update of the PACO. Thus, the proposed Fuzzy Hybrid Particle Swarm Parallel Ant Colony Optimization on cloud computing achieves improved task scheduling by minimizing the execution and waiting time, system throughput, and maximizing resource utilization.

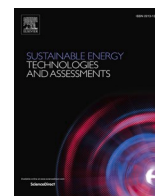
**Keywords:** Cloud Computing; scheduling; ant colony optimization; fuzzy logic

### 1 Introduction

Cloud computing is a fast-growing technology that allocates distributed modern computing systems and resources to hardware and software, allowing for more efficient resource utilization. Cloud computing discharges with minimal downtime efficiently. Cloud computing possesses dynamic provisioning, and this technique is not only applicable for the cloud service, but it can also compute the capability, storage,



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## Migrating from traditional grid to smart grid in smart cities promoted in developing country

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### ARTICLE INFO

#### Keywords:

Smart grid  
Sustainable energy  
Smart city  
Solar  
Wind  
Energy storage

### ABSTRACT

Smart Grid is a term that encompasses the economic benefits of an intelligent and advanced power grid to reach changing responsibilities related directly to sustainability and energy efficiency. Considering the shortfall of alternative fuels in developed regions, the new smart grids, in order to have access to their environmental hazard, show that the average non-renewable and renewable energy sources can be integrated to reduce environmental disasters to improve production costs significantly. In order to provide reliable, secured, and cost-effective power grid functions, infrastructures can quickly and effectively co-ordinate power-sharing between several renewable energy sources freely accessible and economically demand costs. This article reviews the conceptual model, goals, architecture, potential benefits, and power grid issues with a complete and accurate understanding of the different defenders and people involved in the worldwide region scenario. The article examined energy and transmission issues, including smart grids and grid barriers, comprehensively.

### Introduction

A Smart City is a city atmosphere that uses many IoT sensors to collect data and then utilizes insights gained to manage the assets, services, and resources effectively. It includes information about people, equipment, buildings, and assets that are processed and examined for monitoring and management of transportation systems, Electric power stations, utilities, water distribution networks, waste management, criminal activity detection [6], information systems, school education, library system, healthcare, and other community-based services.

The smart city plan combines Information and Communication Technology (ICT) and different real objects connected to the IoT network to attach the city and service with citizens [32]. The smart city's technological features help the city officials touch with the city's infrastructure and the municipality and watch its daily activities. ICT is

used to improve the feature, performance, and urban service inter-activity, reduce cost and resource use, and enhance public-government contact [20]. Smart city applications for urban flows are created and enable real-time response. Therefore, a smart city is better prepared to face the challenges than a simple "transactional" interaction with citizens [3]. However, the term itself remains ambiguous and open to numerous interpretations [15–17].

In many countries, society is migrating towards modern technology, resulting in electricity generation's need to avoid environmental risks like security, health care, business, marketing, etc. [21,25]. This makes researchers to move towards advanced technologies for developing countries to avoid risk assessments while increasing power consumption in day-to-day activities

Through the advancement and the use of emerging technologies in the nearby area, especially innovations which create smart performance,

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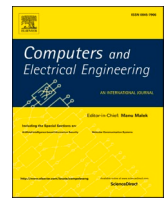
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# Detection of false data cyber-attacks for the assessment of security in smart grid using deep learning<sup>☆</sup>

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## ARTICLE INFO

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### Keywords:

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## ABSTRACT

Smart Grid uses electricity and information flows to set up a highly developed, fully automated, and distributed electricity grid system. To identify the reliability of work and availability, cyber attacks detection in the smart grids play a significant role. This paper highlights the integrity of false data cyber-attacks in the physical layers of smart grids. As the first contribution, the Proposed True Data Integrity provides an attack exposure metric through an Agent-Based Model. Next, the research focuses on the decentralization of Data Integrity Security in the system with an Agent-based approach. Finally, the productivity and efficiency of the developed modeling techniques are experimentally evaluated and compared with the existing state-of-the-art supervised deep-learning models. The obtained results of the studies have shown the improved false data detection accuracy of 98.19% through replay cyber-attacks using the Artificial Feed-forward Network. Based on the research findings, deep neural network can be used to assess cyber data in smart grids to detect malware incidents and attacks.

## 1. Introduction

Power grids are formed by the integration of electrical lines and other supporting devices to create a network. It has been used to transform a particular unit of energy for a network. In recent years, to enhance performance, management, planning, and other operative control, the smart grid uses information and communication technologies, and the new framework is called smart grids. These smart grids have to maintain a feature called Advanced Metering Infrastructure (AMI), and it is responsible for gathering and distributing data from the end-user to the service side [1]. NIST (National Institute of Science and Technology) [6] suggested that an advanced power grid comprises various fields like generating, transmitting, distributing, managing, and configuring information across the network [2]. The processes in each area incorporate devices that are meant to be primary and secondary. Electric energy and information are frequently used among smart grid domains, as depicted in Fig. 1. It shows the flow of processes made through the smart

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## An Optimized Fuzzy Based Ant Colony Algorithm for 5G-MANET

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**Abstract:** The 5G demonstrations in a business has a significant role in today's fast-moving technology. Manet in 5G, drives a wireless system intended at an enormously high data rate, lower energy, low latency, and cost. For this reason, routing protocols of MANET have the possibility of being fundamentally flexible, high performance, and energy-efficient. The 5G communication aims to afford higher data rates and significantly low Over-The-Air latency. Motivated through supplementary ACO routing processes, a security-aware, fuzzy improved ant colony routing optimization protocol is proposed in MANETs. The goal is to develop a MANET routing protocol that could provide a stable packet transmission ratio, less overhead connectivity, and low end-to-end latency in shared standard scenarios and attack states. MANET demonstrates effective results with hybrid architecture and proved to be effective than other *state-of-the-art* routing protocols of MANETs, like AODV, its routing organization implemented through Optimized Fuzzy based ACO Algorithm for 5G. Millimeter-wavelengths are required to perform a significant role in 5G. This research proposed to test the efficiency of MANET consisting of only *mmWave* User Equipment. MANET reduced packet transmission loss of UEs with *mmWave*, meaning well-transmitted SNR leads directly to a better packet delivery ratio. To verify results, simulation using the NS-3 simulator *mmWave* module is used.



**Keywords:** 5G; attacks; D2D communications; MANET; *mmWave*; security



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## Article

# Real-Time Automatic Investigation of Indian Roadway Animals by 3D Reconstruction Detection Using Deep Learning for R-3D-YOLOv3 Image Classification and Filtering

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**Abstract:** Statistical reports say that, from 2011 to 2021, more than 11,915 stray animals, such as cats, dogs, goats, cows, etc., and wild animals were wounded in road accidents. Most of the accidents occurred due to negligence and dozing of drivers. These issues can be handled brilliantly using stray and wild animals-vehicle interaction and the pedestrians' awareness. This paper briefs a detailed forum on GPU-based embedded systems and ODT real-time applications. ML trains machines to recognize images more accurately than humans. This provides a unique and real-time solution using deep-learning real 3D motion-based YOLOv3 (DL-R-3D-YOLOv3) ODT of images on mobility. Besides, it discovers methods for multiple views of flexible objects using 3D reconstruction, especially for stray and wild animals. Computer vision-based IoT devices are also besieged by this DL-R-3D-YOLOv3 model. It seeks solutions by forecasting image filters to find object properties and semantics for object recognition methods leading to closed-loop ODT.

**Keywords:** deep learning; image detection; 3D; convolutional neural networks; embedded; YOLOv3

## 1. Introduction

The computer vision domain is being conquered by deep learning (DL) techniques in general and convolutional neural networks (CNN). Computer vision (CV) endures extensive research in ODT for domestic appliances, medical imaging, industrial automation, defense, and video surveillance. CV is envisioned to have a flourishing market growth of USD 50 billion by the close of the financial year 2020 [1]. CV is executed on a high-performance cloud-based system. The application of edge devices is very similar to sensors that serve raw data equal to the cloud. CV-based Internet of Things (IoT) devices are also besieged by this DL real 3D motion-based YOLOv3 model [2]. Visual imaging is one of the vital senses of humans, as well as stray and wild animals. Our vision is a source of witness on which we have an unshakable trust. We pick up an object while passing through an environment that represents roadways of smart cities, forests, and any other locations while travelling through the vehicle, but neither probes into mere things on the way or recognizes object faces.



# Improved Linear Factor based Grasshopper Optimization Algorithm with Ensemble Learning for Covid-19 Forecasting

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## Abstract

Recently the COVID-19 is extensively increasing around the world with many challenges for researchers. Rigorous respiratory disease corona virus 2 show aggression to many parts of COVID-19 affected patients, together with brain and lungs. The changeableness of Corona virus with likely to infect Central Nervous System emphasize the necessity for technological development to identify, handle, and take care of brain damages in COVID-19 patients. An exact short-term predicting the quantity of newly infected and cured cases is vital for resource optimization to stop or reduce the growth of infection. The previous system designed a Linear Decreasing Inertia Weight based Cat Swarm Optimization with Half Binomial Distribution based Convolutional Neural Network (LDIWCSO-HBDCNN) approach for COVID-19 forecasting. However, the ensemble learning is required to improve the prediction outcome via integrating many approaches. This approach allows the production of better predictive performance compared to a single model. For solving this problem, the proposed system designed an Improved Linear Factor based Grasshopper Optimization Algorithm with Ensemble Learning (ILFGOA with EL) for covid-19 forecasting. Initially, the COVID-19 forecasting dataset is taken as an input. With the help of min-max approach, data normalization is done. Then the optimal features are selected by using Improved Linear Factor based Grasshopper Optimization Algorithm (ILFGOA) algorithm to improve the prediction accuracy. Based on the selected features, Ensemble Learning (EL) which includes Hyperparameter based Convolutional Neural Network (HCNN) is utilized to identify infected and demise cases across india for a period of time. The outcome of analysis shows that the introduced method attains better execution against previous system with regard to error rate, accuracy, precision, recall and f-measure.

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**Key Words:** COVID-19, Ensemble Learning (EL), Improved Linear Factor based Grasshopper Optimization Algorithm (ILFGOA) and Min-max Normalization.

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## Introduction

Increase in corona virus 2019 (COVID-19) has been a universal hazard so on 11<sup>th</sup> March 2020, WHO affirmed it as a worldwide virulent disease. Till 30<sup>th</sup> April 2020, total infected persons were about 3,359,055 and individuals who lost life are 238,999 due to COVID-19 across the globe. This corona-virus is widely influencing individual's life and globe's financial market (Prasad et al., 2020). Between various disease based queries, both the people and

government are worried about 1) how long will the COVID-19 disease continue; 2) when this deadly infection stop increasing; 3) how many of them are finally confirmed; 4) how many of them lost their lives. These queries are major worry for India too, a country of huge populace and financial assortment (Zhang et al., 2020); (Muhammad et al., 2020). Many of the infections are coming through the direct contacts of a person, which causes one way of spreading.

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**INSECT DETECTION IN CROP USING VGG19-CONVOLUTIONAL NEURAL NETWORK**

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**ABSTRACT**

Pest infestation is one of the major factors affecting crop yields. Because many species of insects are so similar, finding insects in crops such as rice, soybeans, and other crops is more difficult to detect on a regular basis. Currently, insect replication in the field is based on self-distribution, which is very costly and expensive. This project recommends a network-based model to address the problem of insect distribution. This product can be used by all networks to remove the full range of insect reactions. At the time of domain introduction, we adopted a regional network instead of the traditional selection system to reduce the number of windows. This is especially important to improve the accuracy of the forecast and to speed up the calculation. Experimental results show that the proposed method is highly consistent and has priority over traditional insect algorithms.

**Keywords:** Convolutional neural network(CNN), Insect detection, Region proposal network, VGG19.

**I. INTRODUCTION**

**Justification :** Quickly find information about scaffolding mounted on complex walls. It distinguishes between insect species and very similarities between classes and between classes. Effectively identifies different elements of the same insect species at different growth times.

Insects are recognized as an important factor in the world's agricultural economy, so it is very important to protect and control pests in real time through programs such as active research. Of course, there are many types of insects on the farm that require a lot of time for biologists to self-differentiate. It is a well-known fact that different types of insects have similarities, and insects often have complex characteristics due to different weather and growth times. People without biological knowledge can distinguish between insect species and insect growth, so we need to develop faster and more effective ways to address this issue. The development of advanced algorithms for machine learning has provided an excellent solution for imaging insects. Computer and machine learning methods have been very successful in detecting insects and pedestrians. Li et al. It combines a computer network (CNN) with sophisticated algorithms to understand travelers in images. However, some simple issues need to be addressed during the consolidation and separation process. Xie et al. They combined a cover-up technique for placing insect images, used interdisciplinary learning techniques (MKL) to build a detection system, and achieved 85.5% MAP (average accuracy) for 24 normal insects in the garden. The Xie dataset have a image information to identify the image type, so predicting images without applying them may not be sufficient. Lim et al. They use Alexnet and Softmax to build a bug distribution system that is optimized by streamlining a web-based system. Yalcin et al. I proposed an error correction method using four function extraction methods: Hu (Hu) time, elliptical Fourier descriptor (EFD), radial cross processing (RDF), and local binary processing (LBP), but this image is manually shown. This is definitely time. Consume. Pjd et al. We provide an automatic scoring system that distinguishes between the five hot springs by identifying the variations of the branches. Traditional machine learning algorithms have some limitations in the field of image recognition. Recently, many researchers have found that deep learning uses advanced feature extraction in images. It is implemented by learning the adaptation of artificial micro environments and does not affect the process of analysis and elimination of connective tissues. The author recommends a natural network model to understand errors and divisions. This working model of the product is divided into two stages: Initially VGG19 was adopted, a major 19-layer network that extracts high-resolution insect imaging features and an RPN that contained data from unmanned aerial vehicles trained to analyze the exact location of insects. image; In the second step, the function map is redesigned to the correct size and becomes a vector of the same size to divide the insect.



Corpus ID: 235432858

# IMPROVED CLUSTERING TECHNIQUES FOR GENES SELECTION TO IDENTIFY THE BREAST CANCER

Dr. N. Magendiran, D. Banumathy, +1 author Dr. R.

Vijayakumar •

Published 2021 • Computer Science

Microarray technology generate huge amount of microarray gene expression data for number of samples simultaneously that allows for analyzing and diagnosing breast cancer effectively. All the genes in... [Expand](#)

## SMART TECHNIQUE FOR GARBAGE DISPOSAL USING EMBEDDED SYSTEM

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### ABSTRACT

Waste management is a complicated task all over the world recently. Consequently there is need of well-organised recycling process for separating the degradable and biodegradable wastes. The biodegradable waste products comprises of organic materials like fruits, leaves, vegetables, etc., which can be decomposed by micro-organisms and living things in the soil. The decomposed materials are converted into the carbon dioxide and other simple organic molecules. The waste management also includes some inorganic matters which can be decomposed by bacteria and micro organisms lived in the soil. These type of materials have the characteristics of nitrogen and its by-products.

The microorganisms are growing in non living bodies, cause disease and produce harmful gases which create lung problems to human beings. The non-biodegradable products such as plastic, glass and batteries are don't break easily and if they are not handled properly, then it will be converted as non- biodegradable waste which cause pollutions like air pollution, water pollution, soil pollution and create harmful effects to animals.

To overcome this problem we introduce automatic garbage maintenance[1] with help of Image processing technique by capturing the image with the help of camera which will be attached at end of equipment. So, while we capture the image then the image processing will compare it with the predetermined pictures were the wastes will be directed to their respective bins.

**KEYWORDS--** Waste management, Image processing, Lab view , Arduino controller

# The Review of Vehicular Safety Enhancement Through Wireless Protocol

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**Abstract:** Nowadays, Transportation is one of the primary and major needs of almost every human being that cannot be avoided. The road congested or road traffic are due to The increases in vehicles, which in turn results in road safety and increase accidents. In current society, there are many modern cars with tremendous features in it like, Mercedes, BMW, Audi, and Tesla and so on. Those cars are highly technical and even higher in price. Many people are not economical on buying those vehicles because the middle range vehicles are not capable of much attributes like, visualizing performance, driver safety and so on.., Anyway , the action of using something that is of highly mobile and energy limitation UVs for wireless communications also introduces many new provocation. Hence, we use Vehicle to Vehicle communication and vehicle to infrastructure communication are to reduce crashes. In addition to this, for an Electric unmanned vehicle we use Wireless charging to charge the vehicle with the help of the Tesla coil. In this system we use a (Dedicated short range communication) DSRC and Zigbee. Both DSRC and Zigbee are used for the communication between the vehicles within a certain range. Dedicated short range communication (DSRC) protocol is used for the network access since it reduces the delay in transmission time. Resentencing, there are research shows that using DSRC has a performance issue in a dense area or increased network load hence Zigbee is used along with DSRC since Zigbee perform well in dense area.

**Keywords:** Embedded C, Zigbee-DSRC.

## I. INTRODUCTION

Wireless protocol for the wireless transmission of information between motor vehicles is to improve for vehicles safety. The main aim of V2V communication is to reduce accidents by letting on vehicles in transmitting basic data such as position and speed information to one another. Depending on how the technology is executed, the drivers of the vehicle may receive a warning should there be a risk of an accident is reduces or the vehicle itself may take defensive actions such as braking to slow down the speed of that vehicle. V2V communication is expected to be more efficient than current automotive original equipment manufacturer (OEM) embedded systems because V2V technology allows an 360-degree awareness of surrounding threats. V2V communication is part of the growing mode towards prevalent computing.

The main significant environmental issue in rapidly developing cities is sound pollution. The sound that from vehicles are probably the most rigid and prevalent source of sound pollution among other sources such as neighborhood. Television, music systems, public addressing systems, railway system, air traffic and electricity generating sets. Most of the vehicle noise is generated in traffic congestion which is caused by unnecessary honking of vehicle horn. In most cases, driver irresponsibility is the main reason behind the vehicle noise. Driver creates a hazardous situation by honking unnecessarily in traffic jam which adversely effect in the human body; Researchers have found vehicle noise pollution to be a major cause of several human defects like stress, unborn and effects on hearing. Over the past few years researchers adopt some system that could mitigate the vehicle noise in some extent. As computerized technology advances, there is an improvement towards Vehicle-to vehicle Communication. Though traffic safety is the main



# An Efficient Data Transmission in Cognitive Radio Networks Using Momentum Search Algorithm

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**Abstract:** Data Transmission plays an important role in the digital world. In here, We are using Cognitive Radio (CR) a concept on Wireless Sensor Networks (WSN) which is being used as an intelligent wireless Communication Technology having unique Capabilities of monitoring spectrum bands and detecting available channels to enable the usage of statically allocated spectrum. Furthermore, by dynamically adjusting its operating parameters, it can utilize available channels and to attack the upcoming spectrum crunch issue. Cognitive Radios can be used to find unused licensed spectrum and it can be utilized by secondary users without causing any interference to licensed users. Existing technologies used in cognitive radio include energy sensing, spectrum databases, and spectrum sensing using pilot channels. In small networks, transmission of small packet size can be transmitted with high efficiency without delay, whereas transmission of large data packets can cause data corruption, data packet corruption and may require retransmission over higher frequency channels. To avoid this type of interference, users need higher efficiency and wider bandwidth for efficient transmission. Here we use the technique of momentum search algorithms working on the law of conservation of momentum and the law of conservation of kinetic energy. Data transferred using this method is always unaltered. The transmitted data is split into fixed-size 64-bit packets. And the channel selection will be changed accordingly for higher channel selection efficiency for lossless data transmission. The rules of the Momentum Search algorithm allow users to transmit larger data packets with higher efficiency with the same level of interference as the primary user (PU). This proposal shows how to achieve the highest level of data transmission performance using a cognitive wireless network based on a Momentum search algorithm.

**Keywords:** Efficient Data Transmission in Cognitive Radio Networks

## I. INTRODUCTION

Radio is over a century old. The idea behind the radio is to use a recursive scope to intervene on each client. The growing number of clients severely limits repeat groups. Wireless systems have been somewhat overcrowded lately, which is exacerbating the problem. The details of the assigned frequencies show that the scarcity of the current frequencies is actually hampering the growing interest. There are no frequencies in the planned more modern wireless systems. This is a problem for anyone developing a new framework in light of the fact that it will be staged in a few years. Note that distribution of existing frameworks is also not possible. This important test is the first and most important explanation that gave rise to the intelligent radio idea. The idea of a smart radio is to take advantage of advances in transmit processing that can be used to allocate frequencies to new clients. The necessities for the new innovation were no debasement of the quality, assignment of frequencies to an enormous number of new clients, not to upset the current clients, and higher information rate. One successful way is to use a similar recurrence groups all the more effectively with specialized mastery. There are a few changes that should be finished the more current frequencies

## INTELLIGENT POWER DISTRIBUTION SYSTEM USING IOT TECHNOLOGY

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**Abstract-** *Power distribution systems should meet demands such as high reliability, efficiency, and penetration of renewable energy generators (REGs) in a smart grid. In general, power distribution systems are radial in nature. One-way power flow is the advantage of a radial system. However, the introduction of REGs causes bidirectional power flow. Furthermore, there are limits improvements reliability and efficiency in a radial system. Therefore, the upgrading of primary feeders from a radial to a loop configuration has been considered in the Korea Smart Distribution Project. An advanced power distribution system (APDS), in which primary feeders operate in a loop configuration. Enormous number of accidents occurs all over the world in substation and power grids. In such cases, the whole accident may go unnoticed and by the time it is discovered, it may have been too late to control the fire and voltage sorts. Even though in power distribution system there is no system to intimate the accident causes due to the high temperature, improper oil maintenance, high voltage and low voltage problems. Hence an automatic system is required to handle such situations. In this proposed work, we are implementing the automation in smart grid that is in loop configuration for monitoring and controlling the parameters of the transformers and relays using an android application in smart phones.*

**Keywords**—*powercontroller,advanced powerdistributionsystem,distributionautomation system, Short message service*

### I.INTRODUCTION

At this time, the traditional electrical community device is arguably old-fashioned to be capable to pursue the speedy boom of demand for electrical electricity availability we required smart monitoring and distribution system. The

Internet of Things (IoT) is a network of connected smart devices enabling to transfer data. The ‘thing’ in IoT may want to be a individual with a coronary heart display or an car with built-in sensors i.e. objects that have been assigned an IP tackle and have the capability to accumulate and switch information over a community except guide help or intervention. The embedded technological know-how in the objects helps them to have interaction with inner states or IOT based totally power meter gadget in general consists of three fundamental components i.e. Controller, Wi-Fi and Theft detection part. Whenever there is any fault or theft, the theft detection sensor senses the error and circuit response in accordance to the statistics it receives. The controller performs a most important position in the device making certain all the aspects are working fine. Therefore, IoT can enhance the overall performance and effectiveness of the smart grid in most cases in the three phases. Firstly, it will increase the reliability and durability secondly; it focuses on enablement i.e, series and analyzation of records to manipulate lively gadgets inside the clever grid. Lastly, controlling can be achieved by using examining the end result bought from the 2nd segment which helps the grid branch to make excellent decision for future upliftment.

The power meter handy until now can solely manipulate and reveal the electricity consumption of customers.



## Deep learning and Swarm Intelligence based System for Smart Agriculture Using Wireless Sensor Networks

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**ABSTRACT**—The WSN (Wireless Sensor Network) based agricultural drainage management system is a convergence technology to enhance agricultural production of crops from storm control, erosion control and water table control. In addition, implementing smart agriculture, through the convergence technology allows to determine the requirement of water resources, real-time monitoring of the field and support farmers in decision process. In addition, sensors help in collecting information on circumstances like level and flow of water in drainage area, soil moisture content and rainfall condition. We presented the survey about the WSN based smart agriculture and its techniques to future along future enhancement. The work further extends with the deep learning approach of analysing the data collected from the level and flow sensors and camera. The CNN based design can improve the performance of the system. The proposed ideation combines the swarm intelligence and CNN for better performance.

**Keywords**—WSN, Agricultural Drainage Management System, Automatic irrigation system, Wireless sensor node, Gateway node, Smart Agriculture, Water Resource Management.

### 1. INTRODUCTION

Smart agriculture uses technologies like GPS services, sensors and huge data to enhance agricultural productivity. Rather than replacing farmer expertise, Information and Communication Technology (ICT) based decision support systems, collect real-time data can additionally provide information of all events at level of granularity. This enables optimization of resources, support decision process and more efficient in operations. The proficiency now required in agriculture include weather forecasting, science-based and technological solutions.[1]. Several machine learning methods were used for the analysis of data obtained from the sensors. These ML methods enhance the way the process is done. Machine learning is the current technology which is benefiting farmers to minimize the losses in the farming by providing rich recommendations and insights about the crops Application of machine learning in agriculture allows more efficient and precise farming with less human manpower with high quality production.

#### 1.1. Architecture Of WSN In Agriculture

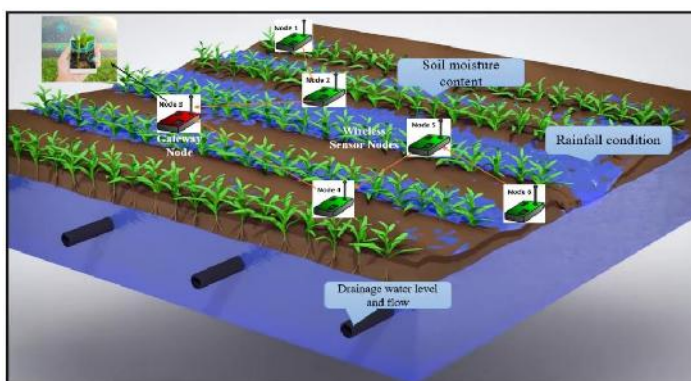


Figure 1: Basic architecture of Agricultural Drainage Management System using WSN

Kaniga.B, Dr.M.Sudha, Mr.Ravisankar Kandasamy



# A Sensor-Based Industry Automation System to Monitor Three-Phase Induction Motors

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**ABSTRACT**—An Embedded framework is a regulator customized and constrained by an ongoing working framework (RTOS) with a devoted capacity inside a bigger mechanical or electrical framework, frequently with continuous registering requirements. Implanted framework controls numerous gadgets in like manner use today. The point of the proposed technique is to plan an effective brilliant computerization framework for modern applications utilizing Bluetooth innovation. It is a limited scale industry project where white petrol transmission has been performed. Since white petrol is exceptionally delicate, it will explode, when high recurrence is applied. By, almost 60 engines have been running for ON/OFF reason. They should travel almost 500 meters for that we are utilizing low recurrence Bluetooth module to ON/OFF engine. On the off chance that crisis reason we can closure whole engines. The fundamental goal of the task is to control the 3-stage enlistment engine (ON/OFF work) in white petrol transmission industry naturally utilizing Bluetooth innovation. Bluetooth HC-12 module conceals to 1 km distance. It tends to be utilized in two strategies. First technique is giving info involving switch in transmitter side and one more strategy utilizes android applications to give input. This framework is executed by utilizing Bluetooth terminal HC-12.

**Keywords**—*Bluetooth HC-12, A Real Time Operating System, Embedded System, Android Applications.*

## I.INTRODUCTION

An set up framework is a laptop framework with a committed potential interior a bigger mechanical or electric framework, often with continuous figuring limitations.it is installed as a characteristic of a complete device frequently which includes device and mechanical parts.Embedded structures control various devices likewise use today. An implanted framework is a blend of PC equipment and programming, either fixed in capacity or programmable, that is intended for a particular capacity or for explicit capacities inside a bigger framework.

Modern machines, farming and interaction industry gadgets, vehicles, clinical gear, cameras, domestic devices, planes, candy machines and toys as well as cell phones are potential areas for an implanted framework. An implanted gadget is a machine that has programming program installed in PC equipment.

Since the installed framework is devoted to explicit errands, plan architects can upgrade it to decrease the size and cost of the item and increment the unwavering quality

and execution. A few installed frameworks are efficiently manufactured, profiting from economies of scale.

Implanted frameworks range from compact gadgets, for example, advanced watches and MP3players, to enormous, fixed establishments like traffic signals, production line regulators, and generally complex frameworks like half and half vehicles, MRI, and flying.

Installed frameworks are intended to do some errand, instead of being a universally useful PC for different undertakings. Some additionally have ongoing execution imperatives that should be met, because of reasons like security and convenience; others might have low or no exhibition necessities, permitting the framework equipment to be streamlined to decrease costs. Inserted frameworks are not consistently independent gadgets. Many inserted frameworks comprise of little parts inside a bigger gadget that fills a broader need. For instance, the Gibson Robot Guitar includes an inserted framework for tuning the strings, however the general motivation behind the Robot Guitar is, obviously, to play music. Likewise, an implanted framework in a car gives a particular capacity as a subsystem of the actual hold.

The program bearings created for embedded systems are suggested as firmware and are taken care of in read-just memory or blast memory chips. They run with restricted pc device belongings: little memory, little or non-existent console or display screen. The inserted structures essentials incorporate the parts of implanted machine equipment, installed machine sorts and various qualities. An inserted framework has three principal parts: installed equipment, implanted programming program and working capacity.

Implanted processors may be damaged into trendy classifications. Common microchips ( $\mu$ P) utilize separate coordinated circuits for memory and peripherals. Microcontrollers ( $\mu$ C) have on-chip peripherals, in this way lessening power utilization, size and cost. Rather than the PC market, various essential CPU designs are utilized since programming is specially created for an application and isn't an item introduced toward the end client. Both Von Neumann as well as levels of Harvard designs are utilized. RISC as well as non-RISC processors are found. Word lengths fluctuate from 4-bit to 64-bits and then some, albeit the most regular stay 8/16-bit. Most designs come in various variations and shapes, large numbers of which are likewise produced by a few distinct organizations.

various microcontrollers had been created for implanted frameworks use. Universally useful chip is

# **SOCIAL DISTANCING AND MONITORING SYSTEM TO DETECT, CONTROL AND TO MONITOR THE PATIENTS USING ARDUINO & IOT.**

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## **ABSTRACT:**

Due to covid-19 pandemic situation society needs to embrace and adopt new norm that includes practicing social distance to break the transmission of the disease. The smart social distance device will help to break the transmission and the human chain to prevent the transmission of the deadly diseases. The smart social application or tracker can help people to constantly monitored reminded to adhere to this practice. Direct impact that can be seen from this application will be lower or minimum number of COVID-19 cases due to high level of social distance compliance. This paper will be present an innovative solution called social distancing and monitoring device that help users or public to observe social distance advice closely. On March 11, 2020, the World Health Organization (WHO) confirmed COVID-19 a pandemic, in response to the more than 1,00,000 confirmed cases globally in more than 100 countries, and the persistent threat of spreading furthermore by number of waves. Presently, there is no medicine to cure but now there is vaccine to prevent the spread of COVID 19. Even though there is more cases among the world due to the spreading of this deadly disease caused due to not maintain social distance. Here in this paper, we supposed to give solution for the cases increases because of not maintaining social distance between the humans and non-pharmaceutical prevention that we can

easily adopt the practising of social distance. Social distancing i.e., maintaining a minimum distance of 1-1.5 meter between two individuals is one of the proactive measures advised by WHO. In this paper, we are implemented the sensors and microcontroller board with necessary techniques that helpful for preventing the deadly diseases like covid (corona virus), H1N1, Flu and many mo0re air borne diseases.

## **I.INTRODUCTION:**

In March 2020, WHO has declared pandemic due to COVID-19. To date, it has been reported more than 10 million confirmed cases worldwide with more than 500,000 deaths reported. In the presence of contagious diseases such as H1N1 and COVID-19, social distancing is an effective non-pharmaceutical approach which plays an important role in managing pandemic from getting worse. If implemented properly, social distancing can effectively reduce the transmission and severity of a disease, hence reducing the pressure on healthcare systems and allowing more time for government countermeasures. In addition, the analysis suggests that social distancing initiatives and policies in response to the COVID-19 epidemic have substantial economic benefits. Many technologies have been deemed to be able to help people or authority to follow and

# A Survey on Microstrip Antenna Array Design for 5G Communication

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**Abstract:** With the development of telecommunication, antenna are designed with miniature size with high performance. Microstrip patch antenna is playing an essential role. It is very demanded and significant thing in the 5G communication because of its several advantages over usual antennas like reduction cost, light weight, conventional to feed and antenna characteristics. It should be noted that researchers are working for the improvement of the antenna system for 5G communication for achieving high gain and bandwidth. 5G communication system provides higher frequency range with larger bandwidth. The objective of this paper is to discuss the overview study of microstrip patch antenna in 5G Communication for past few years. The measurements of antenna parameters are also discussed in this paper.

**Keywords:** Microstrip Patch Antenna array, Design parameter, 5G Communication, mm-wave, Bandwidth and Gain Enhancement.

## I. INTRODUCTION

Wireless communication having huge requirement of antennas system, antenna design becomes additional confront and required. Microstrip patch antennas have been substantially utilized in radars, satellite communications, military, aerospace communication, biomedical and for mobile communication because of its structural characteristics. Currently these antenna are generally employed in 5G communication.

PIFA antennas are used for mobile communication in olden days because it has less interaction with hand –held environment. The major drawback of PIFA antenna is that use narrow bandwidth. Microstrip antennas replace this problem and it is mostly used in mobile communication nowadays. Microstrip antenna are considered to be the most suitable design for wireless communication due to their evident advantages of light weight, low cost, planar configuration and also it has noticeable precedence of easy of conformal, suitable for arrays, superior portability and easy for fabrication. It is applied in various applications such as mobile communication, satellite communication, television, and multiple-input multiple-output (MIMO) system is specially relayed in civilian and military applications and so on. The updation is still carry on the microstrip antennas for finding new applications of it by having more innovations.

### A) Microstrip Patch Antenna:

Generally, antennas are in a metallic structure, used for transmit and receive the signal in the form of electromagnetic waves. Microstrip antennas take important role in communication system because of its several advantages and characteristics. It consists of simplest design.

A microstrip patch antenna design consists of a three layers. Two conducting materials are in the top and bottom of the antenna and the middle layer is made of dielectric substrate with a particular dielectric constant ( $\epsilon_r$ ). It covers a narrow-band microwave which is a imprinted resonant antenna. Due to its compact, it is applicable for small area such as in switch box. The basic microstrip antennas are in the shapes of rectangular and circular patches and most widely utilized in the most of the applications.



## Adaptive cluster-based heuristic approach in cognitive radio networks for 5G applications

S. Allwin Devaraj , T. Aruna, N. Muthukumaran, A. Andrew Roobert

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### Abstract

The main objective of cognitive radio network is to provide flexible spectrum management, by permitting the secondary users (SUs) to temporarily access the licensed spectrum in the absence of a primary user. In the existing backward induction approach, each SU performs spectrum sensing and consequently reports the sensing details to the centralized controller. In the proposed work, an adaptive cluster-based heuristic approach (ACBHA) with cooperative spectrum sensing (CSS) scheme has been proposed for cognitive radio medium access control networks for 5G applications. To identify the availability of unused spectrum, the proposed CSS-based ACBHA algorithm adopts a cluster-based selection scheme. Simulation results show that the proposed CSS-based ACBHA provides a better result compared with existing techniques. The performance parameters such as false alarm probability, the probability of detection, spectrum sensing time, slot length, noise density have been analyzed using MATLAB R2012a.

### Open Research

#### DATA AVAILABILITY STATEMENT

Data sharing is not applicable as no new data generated, or the article describes entirely theoretical research.



# An improved strong tracking Kalman filter algorithm for real-time vehicle tracking

K.M. Alaaudeen, T. Aruna, G. Ananthi

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<https://doi.org/10.1016/j.matpr.2022.02.507>

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## Abstract

This paper deals with the improved strong tracking Kalman filter algorithm for vehicle tracking analysis. The proposed solution has an advantage in two ways, which are used for a location to be identified with the GPS (Global positioning system) and basic GSM with message setting. The structure two modules, the Sender side and Receiver side. The performance of improved strong tracking Kalman filter algorithm is analyzed for fast lane moving and obstacle detection with history notification. This paper also analyzed the real-time measurements of the GPS vehicle tracking system using the hardware set up using Arduino MEGA with SIM 808A. The vehicle position monitoring is also tested and the performance has been analyzed with Matlab simulation.

## Introduction

Vehicle tracking is essential for today's life in object-based tracking. Example delivery via drone, children, and bus/car owner [1], [2]. The vehicle works to save money to the owner and save the duration of tracking while calling the driver. The misuse of the vehicle is reduced by introducing GPS tracking. Engine control is introduced to off/on the engine by the owner to protect the vehicle from once if theft, it is an old technique [3], [4]. The Technique can be done by SMS supported by 2G communication. But 4G communications are introduced to increase the speed and quality of the internet. The Tracking will be improved by embedding the 4G Subscriber Identity Module (SIM) on tracking devices. In another hand, we need connectivity between devices and the cloud. There is a lot of clouds that are providing space for the Internet of Things (IoT) devices [5]. This space is dynamically varied for the user instance. Provider like Microsoft Azure, Google, Amazon, etc.

The IoT devices will be of better quality to communicate the cloud in several second intervals. For this improvement in the quality of performance, we needed to research the type of SIM module in the market. The better SIM module in my research is SIM 800, SIM 808A, SIM 800L, SIM900, and SIM 7000. The SIM

## Optimal selection based K-mean clustering technique to improve the energy efficiency in cognitive radio networks for 6G applications

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First published: 27 September 2021

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### Summary

The main objective of the cognitive radio sensor network (CRSN) is to minimize the energy consumption in channel sensing and switching when sensor nodes sense and switch to a licensed channel for improving the energy efficiency for 6G applications. The drawback in CRSN is that the sensor network uses a higher amount of energy by intrabunch and interbunch of data emission energetic medium ingress assignment problem when the sensor nodes sense the channel. In this brief, a K-mean clustering technique (KMCT) is proposed for CRSN to minimize the energy used by the sensor nodes in CRSN for 6G applications. The KMCT-based joint power medium ingress technique (JPMIT) is introduced for enhancing the energy efficiency in a bunch of interdata emissions, and the KMCT-based energetic medium ingress technique (EMIT) is introduced for minimizing the energy utilization in a bunch of intradata emissions. Simulation results show that the proposed KMCT for CRSN provides a better result compared with existing techniques. The performance parameters such as medium available duration, data loss rate, quantity of data, number of authorized mediums, and probability of false alarm have been analyzed using MATLAB R2012a.

Open Research 

**DATA AVAILABILITY STATEMENT**



# A Detection of Breast Cancer by using Gaussian filtering method and Filter bank method.

(A Short Communication)

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## Abstract

Breast Cancer is the most common malignancy in women and is the second most common leading cause of cancer deaths among them. At present, there are no effective ways to prevent and cure breast cancer, because its cause is not yet fully known. Early detection is an effective way to diagnose and manage breast cancer and can give a better chance of full recovery. Several domains and concepts are used in the detection of breast cancer. The main domains used in this detection technique include different types of Filtering method. In this type Gaussian filtering method and Filter bank method was especially adapted to tumors that extend over a relatively large area.

**Keywords:** Breast Cancer, Gaussian filtering method and Filter bank method.

## I. INTRODUCTION

Cancer is the most vicious disease, the cure of which must be the prime target through scientific investigation. The early detection of cancer can be helpful in curing the disease completely. There are several techniques available in the literature for the detection of cancer. Many researchers have contributed their ideas in the detection of cancer. The literatures mainly discuss about the existing cancer detection techniques. Several domains and concepts are used in the detection of cancer. The main domains used in this detection technique include Gaussian filtering method and Filter bank method Mammogram image has been in use for very long time and much research has been carried out by early researchers. They have used different types of filtering methods are Gaussian filtering method and Filter bank method.

## II. FILTERING METHOD

### A. Gaussian Filtering Method

Dangler et al (1993) presented a method for the detection of cancer in mammograms. The proposed approach used a two stage algorithm for spot detection and shape extraction. In the first stage a weighted difference of Gaussian filter was applied for the noise invariant and size specific detection of spots. A morphological filter reproduces the shape of the spots. The results of both filters were combined with a conditional thickening operation. The topology and the number of the spots were determined with the first filter and the shape by means of the second filter.

Dubey et al (2010) stated that breast cancer is the leading cause of death among women. Currently X-ray mammography is the most widely used method for early detection of breast cancer. Many computer aided

techniques are available to assist the radiologist in taking crucial decisions. Many computers that use level set for segmentation of masses in digital mammograms was introduced. This method uses the Gaussian filter for smoothing the image and noise reduction. Level set methods offer a powerful approach for the medical image segmentation since it can handle any of the cavities, concavities, splitting or merging. However, this method requires specifying initial curves and can only provide good results if these curves are placed near symmetrically with respect to the object boundary. The results of experimental study indicated that their scheme can provide useful contour extraction for mass structure.

### B. Filter bank method

Gurcan et al (1997) described a method for detection microcalcifications in mammograms. In this method, the mammogram image was first processed by sub band decomposition filter bank. The band pass sub image was divided into overlapping square regions in which skewness and kurtosis as measure of the asymmetry and impulsiveness of the distributed were estimated. The detection method utilized those parameters. A region with high positive skewness and kurtosis was marked as region of interest. Simulation results have shown that the method was successful in detecting regions with microcalcifications detection method utilized in those two parameters.

Raul Mata et al (2000) stated that the detection of clustered of microcalcifications can aid radiologist to detect early breast cancer. Microcalcifications exhibit some important characteristics, like its small size and high luminosity. So, a CAD method can be useful to avoid overlooking them. In this paper a multiresolution analysis

# Comparative Analysis of White Blood Cell Cancer Detection Using Image Processing and IoT

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**Abstract:** *Computerized analysis of white blood cells tumor such as Leukemia and Myeloma is an essential testing biomedical investigate point. Herein, a comparative analysis of image processing algorithms to detect the cancer is made and patient's health is monitored using IOT also analyzed. The work could be useful for developing and exploring the new applications of image processing in IOT based systems.*

**Keywords:** Image Processing, White Blood Cells, IOT

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# A Major Challenges Advanced Underground Drainage Monitoring and Automatic Rescue System using Internet of Things

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**Abstract:** *In this project, An Advanced Underground Drainage Monitoring And Automatic Rescue System using Internet of Things is proposed to protect the sanitation workers form health issues. In India sewage can be cleaned from manholes and drains are a difficult and risky task for anyone, but these people/workers are forced to do these jobs just to earn for their family economy. In order to overcome this issues, a new device is proposed to monitor the human health while entering into the sewage and provide the health parameters in the real time to the officials outside or the control room. Particularly, blood pressure of sanitation workers and toxic gas level of drainage is monitored using this new proposed rescue system. The main component of this system is Arduino controller. There are three types of sensors such as Toxic gas sensor, Methane gas sensor and Ultrasonic sensor used for the proposed system. Water level indicator is used when drainage is full to find from ultrasonic sensor, SMS will be send through GSM technology. Methane Gas and Toxic gas sensor level is high, Buzzer will be ON at the same time location will be share automatically with the help of GPS. The received sensor details display on LCD at receiver with help of GSM. The performance of proposed system is compared with other existing system and shown to be more effective in terms of protect the sanitation workers from health issues.*

**Keywords:** Arduino IDE, Proteus, Gas Sensor, Ultrasonic Sensor, Buzzer, Global Positioning System

## I. INTRODUCTION

In beginning phase, An enormous number of sterilization laborers pass on each year due to whimsical and absence of offices accessible, and destructive harmful gases delivered while cleaning the sewage. Sewer vents are not intended for somebody to work in consistently, however laborers might have to enter inside the sewer vent to get done with their tasks, for example, cleaning, fix, examination and so on A superior information identified with risks in the environmental factors is fundamental for the anticipation of harming of gases. These gases must be remain focused so gigantic ascent in the ordinary degree of effluents ought to be known and restorative measures can be taken. Assuming the waste framework isn't as expected oversaw then unadulterated water gets taint with seepage water and irresistible infections might get spread

## II. EXISTING SYSTEM

The main problem for the workers include fails, or depletion, gas poisoning and fumes inside the sewer. In all problems will overcome using gas sensor, buzzer and water level indicator.



# A novel approach of Vedic multiplier using modified CSA with optimized system performance

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## ABSTRACT

Vedic mathematics is a Design of mathematics followed in ancient Indian and it is applied in various trees of mathematical calculations. a novel algorithm is designed on Vedic mathematics using bit reduction technique for binary multiplication. There is a total count of 16 vedic sutras or formulas and 13 sub-sutras to ou source the different mathematical operation. For carrying out the multiplication operation there are two sutras- urdhva tiryakbhyam and nikhilam sutra. In this two, the urdhva tiryakbhyam sutra is discussed in this paper to design a multiplier and compared the area and speed with array multiplier. Vedic multiplier is structured using modified square-root carry select adder (MSQRT-CSA). They considered the bring out with numerous adders like CSA, Carry look-ahead adder (CLA), Square root CSA (SQRT-CSA). Collated with other methods, multiplier is faster in MSQRT-CSA. Vedic multiplier is proposed and contrasted with array multiplier in Complex number multiplication is used. The remainder is derived from this sutra by lowering the remainder bit size to N-2 bit. At this moment, the no.of bits of the remainder is statically maintained as N-2 bits. The phase of the proposed algorithm is enhanced with equipoising the power and area. Even though there is a deviation in lower order bits, this method shows maximum difference in higher bit lengths. The paper is organized as follows. In section 2, exhibits the 2x2 and 4x4 Vedic multiplier architectures of proposed architecture. Section 3 explains about the complex number multiplication using Vedic multiplier. The results, comparisons are contained in section 7, while section 8 will holds the conclusion

**Keyword :** - Vedic multiplier, Carry lookahead adder, Urdhva Tiryabhyam,

## 1. Introduction

In an Ancient India it's One of the technique used for solving arithmetical problems is Vedic Mathematics in easier way. It contains 16 formulas and 13 sub-formulas. These sutras are used in solving complex computa- tions, and executing them manually. It is working on 16 sutras and 13 up-sutras. The principles and algorithms of all sutras were given in. Urdhva Tiryakbhyam Sutra is essentially used for multiplication which means "Vertical and Crosswise". The multiplier depend this sutra is known as Vedic multiplier. It is based on a novel content of array multiplication. In the model and implementation of Triyakbhyam were done and the squaring and cubing helps to compare speed with Nikhilam sutra algorithm.

In the Vedic mathematics algorithm for multiplication was discussed the implementation of Arithmetic unit was used. The arithmetic unit was structured to perform multiplication, addition and subtraction and multiply accumulation operations. A fast multiplier built with Vedic Mathematics algorithm in the MAC unit. The cube, square algorithms along with Karatsuba algorithm have been discussed , to reduce the multiplications required. In, a ROM based multiplier is suggested. From two Inputs, one is fixed here. So this method is being used in matrix



# Intelligent Sericulture System Using Wireless Sensor Network and Image Processing

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## ABSTRACT

Sericulture provides economic development for many people and improvement in the quality of life to the people in rural area and therefore it plays an important role in antipoverty programme and also India Stands fifth place in silk production .This implemented system involves the eradication of the difficulties faced by the farmers in manual intervention sericulture farm .Temperature, Humidity and Light intensity parameters plays vital role in the progression of silkworms because every stages need certain ranges. It's hard to maintain the parameters according to the environmental condition. So, we decided to do this system for make it as an easy process. This system involves the combination of Microcontroller, GSM module and Image processing for providing automated control features to the farm and the user. The automated system senses the inputs such as the temperature, light intensity, humidity through the sensors then send the information to controller. If the detected inputs exceed the threshold values then this information is conveyed to the user through the wireless network and necessary measures are taken by the microcontroller in order to avoid the fatalities that affect the farm as well as the growth of the silkworms by using auto controlled actuators like exhaust fan, heater and sprinkler. The communication between the system and the user is, achieved by the use of GSM module. Here, we use Image processing technique used to find out the colour change in the silkworms body. It indicates the non-identical stages such as black worms and swallow worms indicates the diseases worms. The objective of this model is to obtain silk, without compromising the quantity and quality of Silk.

**Keywords—Image processing, white blood cells, IOT**

## I. INTRODUCTION

Sericulture provides economic development for many people and improvement in the quality of life to the people in rural area and therefore it plays an important role in antipoverty programme and also India Stands fifth place in silk production The temperature and humidity plays a vital role in every stage of sericulture process, with this a lot of care is also needed to be taken to avoid diseases. Temperature, humidity and disinfection process should be managed to get a wonderful silk product. An ideal temperature of 23°C to 28°C and humidity in between 65% to 85% is to be maintained. The sensor network utilized in our smart sericulture system comprises of smart sensor nodes interfaced with temperature and humidity sensors to collect every stage life cycle readings inside the system. The automatic controlled actuators namely, air cooler, heater and sprayer maintain the temperature and humidity of the system. Image processing techniques is used to capture the pictures of sericulture process and to know about the status of sericulture process in the system.

# Knowledge Based Real Time Monitoring And Control System For Aquaculture Using IOT

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**Abstract-** In past years, the most important predicted problem that is water scarcity. Due to pollution of water bodies, drinking water, water for agriculture, water use to lock surface humidity, and healthy fisheries have been severely impaired. Over five million people die annually from water-borne diseases. It has also lead to contamination of marine ecosystems and a decrease in crop yields. Unavailability of easy water quality detector has been a major cause which has led to all above-mentioned problems. The objective is to monitor a quality water level and monitoring the level of water using IoT. The main motive of this paper is used to cover the parameters of water like ph level, level of water a distance of water flow, and water flow illumination level whether water is contaminated or not, all these parameters are covered to save water and to avoid wastage of water.

**Keywords-** Aquaculture, IoT, ph, Temperature

## I. INTRODUCTION

Water is a precious natural resource with fixed quantum of Availability. This number is decreasing every year which is evident as it was 1816 m<sup>3</sup> in 2001 and 1545 m<sup>3</sup> in 2011. We lack the incentive to invest in the installations and implementation of technologically advanced systems for the organized distribution of water. Water quality suggests the synthetic, physical and natural traits of water. It is a measure of the condition of water as for the necessities of biotic creature and in addition to any human need or reason. It is most frequently used by the reference to a set of standards against which compliance can be accessed. Principles are utilized to get water quality identified with wellbeing of biological community, security of human contact and drinking water. Water is an essential need for human survival but due to rapid pace of industrialization and greater emphasis on agricultural growth combined with latest advancements, agricultural fertilizers and no enforcement of laws have led to water pollution to a large extent. Our objective is to check the quality of water. It will be monitored in Real time through using IOT.

Currently, water quality real-time monitor and water bloom prediction has been one important research task in water environment protection field. Most sample equipment's, such as sampling instruments of bottle type, horizontal type and extraction type, are used to sample water quality via watercrafts, cableways, or bridges in China now. Besides ph, water temperature and some other values which will change easily should be measured on site; water sample of other measure values should all be added preservative agent on site and sent to be measured in laboratory in specifically time. The localization of workers' technical merit and equipment's will determine the work efficiency which cannot realize monitor of moving and multiple points and will lead to shortcomings of limited monitor data and low efficiency.

In addition, the toxins aroused by itself would directly threaten human's health through the food chain. In China, water bloom phenomena occurs frequently, such as Taihu Lake, Dianchi Lake, even the Hankou River which is the biggest branch of the Yangtze River has broken out. Consequently.

## II. LITERATURE SURVEY

**Automatic Measurement and Reporting System of Water Quality Based on GSM**, 2012 International Conference on Intelligent Systems Design and Engineering Application. With the rapid development of the economy, more and more serious problems of environment arise. Water pollution is one of these problems. Routinely monitored parameters of water quality are temperature, ph, turbidity, conductivity, dissolved oxygen (DO), chemical oxygen demand (COD), biochemical oxygen demand (BOD), ammonia nitrogen, nitrate, nitrite, phosphate, various metal ions and so on. The most common method to detect these parameters is to collect samples manually and then send them to laboratory for detecting and analysing. Sensor is an ideal detecting device to solve these problems. Characteristics and advantages of sensors, automatic measurement and reporting system of water quality is designed and developed. It bases on SMS (Short Messaging Service) in the GSM (Global System for Mobile Communications) network to instantaneously transfer the collected data. It also can remotely monitor the water quality



# An Efficient Data Transmission in Cognitive Radio Networks Using Momentum Search Algorithm

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**Abstract:** Data Transmission plays an important role in the digital world. In here, We are using Cognitive Radio (CR) a concept on Wireless Sensor Networks (WSN) which is being used as an intelligent wireless Communication Technology having unique Capabilities of monitoring spectrum bands and detecting available channels to enable the usage of statically allocated spectrum. Furthermore, by dynamically adjusting its operating parameters, it can utilize available channels and to attack the upcoming spectrum crunch issue. Cognitive Radios can be used to find unused licensed spectrum and it can be utilized by secondary users without causing any interference to licensed users. Existing technologies used in cognitive radio include energy sensing, spectrum databases, and spectrum sensing using pilot channels. In small networks, transmission of small packet size can be transmitted with high efficiency without delay, whereas transmission of large data packets can cause data corruption, data packet corruption and may require retransmission over higher frequency channels. To avoid this type of interference, users need higher efficiency and wider bandwidth for efficient transmission. Here we use the technique of momentum search algorithms working on the law of conservation of momentum and the law of conservation of kinetic energy. Data transferred using this method is always unaltered. The transmitted data is split into fixed-size 64-bit packets. And the channel selection will be changed accordingly for higher channel selection efficiency for lossless data transmission. The rules of the Momentum Search algorithm allow users to transmit larger data packets with higher efficiency with the same level of interference as the primary user (PU). This proposal shows how to achieve the highest level of data transmission performance using a cognitive wireless network based on a Momentum search algorithm.

**Keywords:** Efficient Data Transmission in Cognitive Radio Networks

## I. INTRODUCTION

Radio is over a century old. The idea behind the radio is to use a recursive scope to intervene on each client. The growing number of clients severely limits repeat groups. Wireless systems have been somewhat overcrowded lately, which is exacerbating the problem. The details of the assigned frequencies show that the scarcity of the current frequencies is actually hampering the growing interest. There are no frequencies in the planned more modern wireless systems. This is a problem for anyone developing a new framework in light of the fact that it will be staged in a few years. Note that distribution of existing frameworks is also not possible. This important test is the first and most important explanation that gave rise to the intelligent radio idea. The idea of a smart radio is to take advantage of advances in transmit processing that can be used to allocate frequencies to new clients. The necessities for the new innovation were no debasement of the quality, assignment of frequencies to an enormous number of new clients, not to upset the current clients, and higher information rate. One successful way is to use a similar recurrence groups all the more effectively with specialized mastery. There are a few changes that should be finished the more current frequencies

# The Review of Vehicular Safety Enhancement Through Wireless Protocol

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**Abstract:** Nowadays, Transportation is one of the primary and major needs of almost every human being that cannot be avoided. The road congested or road traffic are due to The increases in vehicles, which in turn results in road safety and increase accidents. In current society, there are many modern cars with tremendous features in it like, Mercedes, BMW, Audi, and Tesla and so on. Those cars are highly technical and even higher in price. Many people are not economical on buying those vehicles because the middle range vehicles are not capable of much attributes like, visualizing performance, driver safety and so on.., Anyway , the action of using something that is of highly mobile and energy limitation UVs for wireless communications also introduces many new provocation. Hence, we use Vehicle to Vehicle communication and vehicle to infrastructure communication are to reduce crashes. In addition to this, for an Electric unmanned vehicle we use Wireless charging to charge the vehicle with the help of the Tesla coil. In this system we use a (Dedicated short range communication) DSRC and Zigbee. Both DSRC and Zigbee are used for the communication between the vehicles within a certain range. Dedicated short range communication (DSRC) protocol is used for the network access since it reduces the delay in transmission time. Resentencing, there are research shows that using DSRC has a performance issue in a dense area or increased network load hence Zigbee is used along with DSRC since Zigbee perform well in dense area.

**Keywords:** Embedded C, Zigbee-DSRC.

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Design of an adaptive CRSN using OFDM

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## Design of an adaptive CRSN using OFDM

Ravishankar Kandasamy & G. Ravi

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### Abstract

Cognitive Radio (CR) is a novel concept that enables wireless devices to detect and adapt to their surroundings in order to enhance communication quality. The cognitive radio sensor network (CRSN) has proved to be a cost-effective solution for the spectrum constraints in wireless sensor networks (WSN). Optimizing the optimum packet size is regarded to be an essential energy constrained issue to address the practical implementation of CRSN out of all the difficulties. Small packets generate data traffic in device-to-device communication, while big packets may cause data bit corruption, requiring retransmission at a greater frequency. This will not allow access from the secondary network to the main network, since it may cause

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# ROBUST KEY REVELATION OF PUBLIC AUDITING PROTOTYPE FOR SECURE CLOUD STORAGE

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## ABSTRACT

In cloud storage the data clients can remotely store their data and use on-demand high-quality applications. Data outsourcing users are reassured from the trouble of data storage and maintenance when users put their data in huge size on the cloud, the data integrity protection is a challenging one which enabling public audit for cloud data storage security. Users can ask an external inspection of third party to check the integrity of the out sourced data. However, in such a scheme, the malicious cloud might still forge valid authenticators later than the key-revelation time period if it obtains the current secret key of Data Client. In this paper, propose a prototype named Robust Key Revelation of public auditing for secure cloud storage, in which the security of cloud storage auditing not only earlier than but also later than the key revelation can be preserved. Formalized the definition and the security model of this new kind of cloud storage auditing and design a concrete scheme. In this proposed prototype, the key revelation in one-time period doesn't affect the security of cloud storage auditing in other time periods. The accurate security proof and the experimental results demonstrate that this proposed prototype achieves desirable security and efficiency with the time intervals.

**Keywords:** Secure Cloud Storage, Robust Key Revelation, Security, Data Client, and Public Auditing.

## CHAPTER 1

### 1.1 INTRODUCTION

Cloud storage auditing is an essential part of cloud computing, whose goal is to provide powerful and on-demand out-sourcing data services for users exploiting highly virtualized infrastructures [1], [2]. Due to the low-cost and high-performance of cloud storage, a growing number of organizations and individuals are tending to outsource their data storage to professional cloud services providers (CSP), which buoys the rapid development of cloud storage and its relative techniques in recent years. However, as a new cutting-edge technology, cloud storage still faces many security challenges [3]. One of the biggest concerns is how to determine whether a cloud storage system and its provider meet the legal expectations of customers for data security [4].

The cloud environment is ensured to be secured by a set of protocols which have various mechanisms to login, access and maintains a log of records of users' information. Having the access controlling mechanism is challenging issues in vast cloud environment [5]. When a data client occupies a space in the cloud, the space is actually a virtual space allotted. That virtual space will be having limitations for other users to access data which belongs to others. Conventional access methods will have techniques to protect the device holding the memory. Whereas in a cloud, the data is much farther than the data clients control. A cloud infrastructure is a completely different domain where no single user has a control on. Not only security, a cloud has also number of other features to



# Investigations of Grid-Connected Wind Power System – Low Voltage Ride Through and Power Quality Issues

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**ABSTRACT:** This thesis presents an investigation on system architecture, control and analysis of wind turbine generators to improve grid integration performance. First of all, the main grid connection requirements have been reviewed in terms of safety operation of transmission systems as well as the wind turbine configurations. Due to these requirements, there have been conscious efforts made by wind turbine manufacturers to design grid compatible wind turbines, which are able to improve turbine operating performance and eliminate negative impacts on the utility, with features such as strong fault ride-through capability, flexible voltage regulation and good power quality performance.

## 1. INTRODUCTION

Nowadays, wind energy is a major renewable energy source to integrate into the grid. The worldwide total installed wind turbine capacity is up to 160 gigawatt at the end of 2009 when the global financial and economical crisis started. However, the crisis seemed to have no negative impact on the general development of the wind sector worldwide. Many governments sent clear signals that they wanted to accelerate wind deployment in their countries and indicated that investment in wind and other renewable technologies is an answer to the financial crisis as well as to the still ongoing energy crisis.

Along with the increasing wind power penetration into grid, the interconnection requirements for grid connected wind farms are generally formulated in order to maintain the operation performance of the connected power utilities. In the past, there is little need to consider impacts caused by wind power penetration due its low percentage of the total network capacity. However, the related impacts will be becoming very serious due to rapid increasing wind power penetration into grid without auxiliary solutions.

## OBJECTIVES

The objectives of this research project are listed below:

**Objective 1:** Fault ride-through enhancement of the DFIG based wind turbine

It is well-known that the DFIG is sensitive to network disturbances, especially severe grid faults. The crowbar technology is usually utilized to help ride through grid faults in the conventional DFIG turbine.

**Objective 2:** Design of a robust power architecture for PMSG based wind turbine

Compared to DFIG, the PMSG based wind turbine has better grid integration performance since full-scale power electronics converter is utilized. An AC-DC-AC converter, named as back-to-back converter is usually used to bridge the AC generator and the AC network.

**Objective 3:** Development of voltage quality assessment method for grids with wind power penetration

Regardless of DFIG or PMSG, wind power generation will meet a significant percentage of the worldwide electricity demand in the next decade. Large wind power injection is able to affect the connected power transmission system.

Major contributions of the thesis



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# Bi<sub>5</sub>FeTi<sub>3</sub>O nanotubes incorporated with g-C<sub>3</sub>N<sub>4</sub> nanosheets as novel Pt-free counter electrode in dye-sensitized solar cells

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## ABSTRACT

Because of their high-efficiency interfacial charge-transfer characteristics of heterojunction nanocomposites have sparked widespread interest in solar cell field. The present study reports the sol-gel electrospinning assisted Bi<sub>5</sub>FeTi<sub>3</sub>O<sub>15</sub> (BFTO)/g-C<sub>3</sub>N<sub>4</sub> (CN) heterojunction nanocomposites as counter electrodes (CEs) for dye-sensitized solar cells (DSSCs). XRD and TEM studies reveals that BFTO has orthorhombic crystal structure and nanotubes with diameter of 50–100 nm have been decorated on the CN nanosheets. The obvious red-shift in absorption and strong blue and green fluorescence has been found in the UV and PL studies. Furthermore, the BFTO/CN nanohybrid as-fabricated exhibited a synergetic effect between Bi<sub>5</sub>FeTi<sub>3</sub>O<sub>15</sub> nanotubes and a g-C<sub>3</sub>N<sub>4</sub> nanosheets, which could influence the electrocatalytic behavior against the triiodide reaction. The photovoltaic efficiency of the BFTO/CN CE is 11.2%, which is better than the typical Pt CE (7.6%) and bare BFTO CE (4.9%). As a result, the CE made of BFTO/CN nanohybrid material is a promising low-cost Pt-free counter electrode for DSSC.

## 1 Introduction

The production of electricity from fossil fuels is the main source of emissions in the atmosphere. Solar energy, a green energy source, may be considered a potential energy source. According to Michael Grätzel in 1991 [1], dye-sensitized solar cells (DSSCs) are by far the most popular green energy systems. The DSSCs have been implemented into the industry to

transform sustainable instance solar radiation into energy with good energy conversion performance, low fabrication costs, and a lesser ecological effect [2]. The active electrode is coated with a fine, mesoporous layer of a semiconductor, normally TiO<sub>2</sub>, on which a monolayer of dye molecules is adsorbed, and the counter electrode is covered with a thin catalyzer film, typically Pt electrode [3, 4]. An electrolyte including a redox pair (often I<sup>-</sup>/I<sub>3</sub><sup>-</sup>) is used to fill the

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# **AUTOMATIC DOOR OPENING SYSTEM BY SENSING THE HUMAN BODY TEMPERATURE**

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## **ABSTRACT**

*COVID-19 pandemic has a catastrophic consequence globally since its first case was detected in December 2019, with an aggressive spread. Safety critical mobile robotic system that provides a complete diagnostic test to check whether an individual is infected by Covid-19 or not. We introduce an affordable IoT-based solution aiming to increase COVID-19 indoor safety, covering several relevant aspects: contactless temperature sensing. Contactless temperature sensing subsystem relies on Arduino Uno and display in LCD. Those who have high temperature, Gate will not be Opening.*

**Keywords**—*Detection, Microcontroller, IoT.*

## **1.1 INTRODUCTION**

Since the last days of the previous year, the occurrence of novel infectious flu-alike respiratory disease COVID-19 caused by SARS-Cov-2 virus (also known as corona virus) has affected almost every aspect of people's lives globally. First, it was discovered in China, but spread quickly to other continents in just few weeks. According to, until July 11th, 2020, the total number of identified cases was 12,653,451, while taking 563,517 lives worldwide. Common symptoms of corona virus disease include fever, tiredness, sore throat, nasal congestion, loss of taste and smell. In most cases, it is transmitted directly (person to person) through respiratory droplets, but also indirectly via surfaces. Incubation period could be quite long and varies (between 14 and 27 days in extreme cases). Furthermore, even asymptomatic persons (almost 45% of cases) can spread the disease making the situation even worse. Therefore, the usage of face masks and sanitizers has shown positive results when it comes to disease spread reduction. However, the crucial problem is the lack of approved vaccine and medication. Due to these facts, many protection and safety measures were taken by governments in order to reduce the disease spread, such as obligatory indoor mask wearing, social distancing, quarantine, self-isolation, limiting citizens' movement within country borders and abroad, often together with prohibition and cancellation of huge public events and gatherings.

In this paper, cost-effective IoT-based system aiming to help organizations respect the COVID-19 safety rules and guidelines in order to reduce the disease spread is presented. We focus on most common indoor measures - people with high body temperature should stay at home, wearing mask is obligatory and distance



## **GSM HAIRBAND BASED ON WOMEN'S SAFETY**

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### **ABSTRACT**

*The project represents a detection system for the women safety using GPS and GSM modem .The system can be interconnected with flex sensors and alert the concern person. This detection and messaging system is consists of a GPS receiver, Microcontroller and GSM modem. From the satellites, GPS receiver gets the location information from in the form of latitude and longitude. Then the information is processed by the microcontroller and this processed information is send to the user using GSM modem. A GSM modem is attached to the MCU. The working function of GSM modem is to send an SMS to the predefined mobile number. In dangerous situation, when no one was there to help her, the GSM rescue her. By pressing the switch the entire system will be activated then immediately a SMS will be sent to concern person with location using GSM and GPS. With the help of GPS we can track her location. It cannot be easily find that the GPS is placed inside the hair band. So it will give the legal evidence for the crime that happened to women.*

**Keywords**—*Detection, GPS, GSM, Microcontroller*

### **I. INTRODUCTION**

In recent years, the number of incidents occurring to women has grown with ever-increasing rate and women harassment has grown day to day, it is beyond doubt that women are not safe outside particularly Maharashtra and in other State according to the national crime record bureau [NCRB] harassment at the workplace at public transport and other places among other states. Maharashtra is in third position with 2910 cases. There occur many such heinous events against women's development in a different region. In most cases, rape cases do not justice due to the lack of timely identification of guilty persons thus it accelerates the rate of rape incidents in society. To overcome the drawbacks of women's safety applications, an algorithm is to develop that works similarly like a security application. So that we will protect the women from that events.

The intelligence, identifying solutions and intellectual ability of human beings is increasing vigorously, whereas safety concerning ever-increasing updating technology (IOT).Security is the condition of being protected against danger or loss. In general, security is nothing but the safety. Security is given to people or things which are in danger. Individuals or actions that encroach upon the condition of protection are responsible for the breach of security. To identify the security of situation we have variety of techniques. The best way to prevent the women from the violent crime like robbery, sexual assault, rape and domestic violence we need to develop a technology which is very useful to the people who are in danger and it also be the evidence against the

# War Field Spying Robot Controlled by Raspberry Pi

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**Abstract:** *The major goal of this design is to deal with delicate scenarios when people are unable to navigate scripts such as darkness, entering tiny spaces, and spotting retiring losers. The robot is an ideal machine for the defense sector, as it will help to reduce mortal life loss while also preventing illegal conditioning. The robot is tone-powered, with a backup installation in case the base station's connection is lost. Wireless cameras transmit real-time videotape and audio inputs to a base station examiner, which may be viewed, and action taken as needed.*

*With a major view, to increase the amount of safety of the soldiers, if we know the activities of the enemy by maintaining a safety distance with them because, the flexibility of defense and attacking of the soldiers can be increased. It consists of a lock to position the enemy and to guide the missile, and the robotic system will also consists of a metal sensor that detects the metals such as land mines and other explosives that could cost the lives of our soldiers and the system can be controlled remotely. In creating this concept, we wanted to offer our army the ability to locate and land mains safely and attack them without damaging their lives. The project was created an army could locate explosives in the land safely, for increasing the safety of our army men and live to attack the enemies without putting our lives at risk.*

**Index Terms:** *Fire Sensor, Metal sensor, Wireless Camera, Android application, Raspberry Pi Pico , virtual network.*

## I. INTRODUCTION

Every minute, robotics will advance, while our country's troops will perish in large numbers. We have to find a solution with that way we can design robots that are useful to the warriors, we can increase the safety of their lives. Nowadays there a particular number of robots which are assisting the soldiers, and it will be the future generation of robots that can be handled by anyone [1-5]. This robotic system will be adaptable to all types of environment. Then the mobile phone may manage it up to 800meters away. We can assure this robot to detect any building because the robot can climb stairs.

This robot will be able to adapt to any environment. It can be controlled from a mobile phone up to 800 meters away. we can send it to any building because it can climb stairs. It has a metal sensor that can start the movement if it detects land mains, and we may view the camera on our laptop, computer, or television. With our controller, we can turn off and on the metal sensor, then it has a laser that locks the position where the missile can be guided [6-8].

This chassis of this system was designed as a separate setup. This robot can run inverted on the rocks, stairs, and uninhabited lands as well as forward and backward. We use a stepper motor for this, allowing us to run for a complete revolution and to stop at a specific direction and angle. Our goal is that the adjustment of the motor's position in order to raise and lower robot's speed whenever we like. A "C" form has been carved out of the wheels to assist the user in climbing steps and stones [9-11].

The chassis was designed in Solid Works and printed using 3D printing, with ABS as the material.

## II. SYSTEM DESIGN

An electromagnetic relay is a device which contains a wire coil that is allowed to wrap around an iron core (soft) (solenoid), and a yoke of iron, an iron armature that can be moved, and it also consists of a set of contact or more sets of contacts. And the robot's armature was pivotally connected to the yoke of the system and mechanically connected to one of the set of contact or more sets of moving contacts. If the relay of the system is in off condition, the spring holds the armature in place, creating the air gap which is caused in the magnetic circuit.

Anyone in the two set moving contacts in the system relay shown is in on condition, while the opposite is in off condition during this scenario. This is based on their role within the relay. Then the remaining relays can have a lot of sets of connections or a small number sets of connections. And by wiring the armature with the yoke of the relay that is used. The yoke connected to the PCB ensures circuit continuity between the armature's movable contacts and thus the circuit track of the computer circuit board (PCB).





## PERFORMANCE AND ANALYSIS OF HYBRID VEHICLE

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**Abstract:** In Electric automobiles can help reduce greenhouse gas emissions. EVs not only reduce reliance on fossil fuels, but they also reduce ozone-depleting compounds and promote large-scale renewable deployment. The study of electric vehicle attributes and characteristics, as well as charging infrastructure and charging capacity. The automotive industry has entered a new phase in the production of more fuel-efficient, low-emission vehicles and innovative technology in response to environmental concerns regarding pollution and the conservation of fuel supplies worldwide. Hybrid Electric Vehicle is among the finest innovations (HEV). The hybrid electric vehicle utilizes multiple energy sources for entire propulsion. In this project, two independent propulsions, an internal combustion engine (ICE) and an electric motor, are independently operated for combined effort derivation in total vehicle propulsion. A hybrid vehicle addresses these issues by combining the benefits of both systems and utilizing both power sources under their optimal conditions. Using cutting-edge technology, this proposed solution intends to improve fuel utilization and reduce dependence on nonrenewable resources. The implementation includes the creation of a hybrid electric vehicle (HEV) that employs both battery and petrol power for propulsion. It cuts air and noise pollution by 50 percent while

operating as an electric hybrid vehicle (non-polluting). HEVs combine the advantages of high fuel economy and minimal tailpipe emissions with conventional vehicles' power and range. By driving the fabricated two-wheeler in engine mode, electric mode and hybrid mode, the performance of the bike is tested and analyzed by comparing with the conventional vehicle.

**Keywords:** Vehicle, Converter, battery, Controller, Hub motor, .

### 1. Introduction.

Electric two-wheelers are two-wheelers that are powered by electricity. To store and convert the electrical, a battery capacity and a motor are attached. To break and alter the speed, user control is normally mounted to the handle. This Figure 1.1 shows the Overview of Electrical Scooter. A battery-operated Vehicle (Two Wheeler) refers to a vehicle designed for road use and powered solely by an electric motor whose movement energy is supplied solely by the vehicle's battery system.



# IOT BASED SMART AGRICULTURE MONITORING SYSTEM

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## ABSTRACT

Every year too increase in the human population. So it must feed in population. Agricultural growth to increase the productivity and upgradation of plantation systems. Sometimes due to whether condition and chemical reaction will affect the productivity and plantation system. The application of internet of things (IoT) technology in agricultural is major impact to increase the cropproductivity. IoT is introduced in agricultural to monitoring in crop growth and environmental conditions. Additionally, to use fuzzy logic system to read the values from sensors.

**Keywords: Monitoring system, plantation systems and Purification applications**

## 1.1 INTRODUCTION

Agricultural is most livelihood in India. Agricultural is most important things in human life. Recent days to increase the human population also increase the agricultural products. Agriculture is one of the most livelihood providers in India. Agriculture is playing an important role in human life. To increase the global population day by day proportional to growth the crop productivity. Production in agriculture is basically seasonal one. Smart agriculture which we have begun to hear more recently, causes more people to turn to this sector with its advantages. In fact, contrary to what is known, what plants need is not only soil but also vitamins and minerals that soil provides for their development. In addition, plants need carbon dioxide, water, oxygen and light to survive and grow. In smart agriculture, to grow fruits, vegetables and flowers comfortably by using a nutrient solution that contains the minerals they need instead of soil, so that instead of looking for minerals in the whole soil, plants will get nutrients easily and directly from the nutrient solution, which means production will be much more efficient and fresher. Moreover, with smart farming, you can maximize productivity in production. By using the nutrient solution containing the light, water and minerals required, you get the same yield in each harvest and your production costs are reduced thanks to the efficiency you gain. Since you do not use soil for all this production, you do not need purification applications.



**FIG: 1 SCREESHOT**



# JOURNAL OF EMERGING TECHNOLOGIES AND INNOVATIVE RESEARCH (JETIR)

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

## HYBRID ELECTRIC VEHICLE

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**ABSTRACT:** Electric vehicles are the best solution for green transportation due to their high efficiency and zero greenhouse gas emissions. In this project we used BLDC (Brushless type direct current) due to its efficiency and high power deliverable capability it is used to drive the wheel at certain speed. Brushless DC motor overcomes many problems of the brushed DC motor and has been widely applied in various fields. In this paper we combined both the functionalities of electric system and engine combustion system to drive the one vehicle. That's why we used the term 'hybrid'. A 42V, 1000W BLDC Hub Motor is selected to drive the vehicle. Charge from various power sockets and generally include removable battery that allows them to be recharged inside and plugged in or run on batteries. Lithium ion battery (46V 30AH) is used and its function may function according to expectation, being a cheaper and environmentally friendly alternative as compared with other two wheelers.

### I. INTRODUCTION

In recent years, vehicle emission is a major cause for global warming. The harmful gases produced from the vehicles create problems to our future society. Also the cost for petroleum fuels and natural gases are increasing rapidly. The requirement of vehicles which efficiently use electricity must be necessary in the coming world. The popularity of electric vehicles (EV) rises rapidly with the savings in fuel costs compared to internal combustion engine vehicles. Considering the forces that affect the running of a vehicle in real time. The major forces which affect the tractive force are gradient force, force due to acceleration, frictional force of tyres and aerodynamic drag force. A hybrid can achieve the cruising range and performance advantages of conventional vehicles with low-noise, low-exhaust emissions and energy independence benefits of electric vehicles. Accordingly, the hybrid concept, where the alternative power unit is used as a second source of energy, is gaining acceptance and is overcoming some of the problems of pure electric vehicles. In this paper we have two operating modes that are one is by electric system and another one by internal combustion engine system.

### II. MECHANICAL OVERVIEW OF PROJECT

This Hybrid Electric vehicle mainly has two operating modes that are electrical operating mode and internal combustion engine mode [1]. Lithium ion battery used in this project in the range of (48V 30 AH) is connected to the controller of electrical operating system. Battery is connected to the controller via MCB and ON/OFF switch for controlling the operation of battery. Battery is directly connected to the display which shows the present charging condition of the battery. Electronic display displays the charge of the battery in percentage (%) and speed of the motor in kilometers per hour (KMPH). When working on the electric system BLDC motor in the range (42V, 1000 Watts). Engine is also connected to the BLDC motor. When scooter is operating on IC, engine will give power to the rear wheel by consuming fuel (petrol) and a permanent magnet brushless motor cum generator is integrated to the front wheel. This motor will freely rotate with the wheel while the scooter is running on IC engine. [14]

# Automatic Rescue System for Underground Drainage Monitoring

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**Abstract**— Underground drainage monitoring system plays an important role in keeping the cities clean and healthy. Compared to other countries, India consists of highest number of sewage workers. Exposure of sewage workers to poisonous gases like hydrogen sulphide, sulphur dioxide, carbon monoxide, methane, ammonia, nitrogen oxide increases the death of the sewage workers. The main aim of this project is to design a network system which helps in monitoring poisonous gases present in sewage. Whenever the gas level crosses the threshold value, the information with different gas ppm values is displayed in the smart phone through the app. It also indicates whether it is safe for the manual scavengers to work in the environment or not. The 2021 Socio-Economic and caste census recorded more than 1,82,000 families reporting at least one member as a sanitation worker: 376 of these workers have died over five years to 2019, with 110 dying in 2019, a 61% rise over the previous year. There have been no reported convictions. The problem of manual only appears to be worsening and entrapping thousands in a supposedly illegal profession, despite recent government efforts to automate the cleaning of India's vast, invisible and dangerous underbelly.

**Index Terms:** IOT, Threshold value, Sensors, Application, LED, Sewage system.

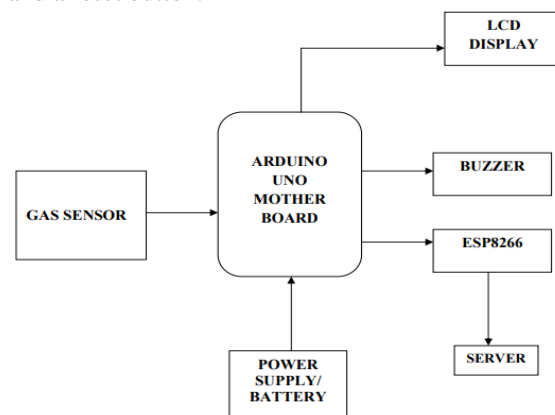
## I.INTRODUCTION

The underground drainage system monitoring plays a very important role in making the cities clean. In India, the process of monitoring and maintaining the drainage system is done manually. The drainage consists of solid and liquid waste generated by hospitals, industries, factories and from homes [1-4]. Hazardous gases are released from this waste which poisonous gases increases the chances of sewage workers affected by diseases like paratyphoid fever, hepatitis and even death. Manual monitoring &

cleaning the drainage is necessary but it leads to huge accidental deaths of human due to over gas in manholes[5-7]. The death of sewage workers has been increasing day by day. In order to protect the sewage worker from death we have come up with the solution called IOT based underground drainage monitoring system which helps in monitoring hazardous gases present in sewage & helps to alert the sewage workers whenever the gas level crosses the specified limit. It also displays the value of gas level in the smart phone through the app. It also helps to decide whether it is safe for the worker to work in the environment or not[8-10].

## II. PROPOSED SYSTEM

The drainage monitoring system that consists of a gas sensor, arduinouno, ESP8266 module, Buzzer and LCD Display. Below shows the block diagram of Drainage monitoring and Rescue system. Arduino UNO is an ATmega 328P based microcontroller. It has 14 digital pins of which 6 can be used as PWM outputs, 6 analog inputs, a USB connection, a 16 MHZ quartz crystal, a power jack, an ISCP header and a reset button.





## Data De-Duplication Process and Authentication Using ERCE with Poisson Filter in Cloud Data Storage

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**Abstract:** The cloud storage is essential environment for users to access high confidential data. Every single data is most valued by users. If we count, day by day information as well as, memory storage are increasing gradually. Cost of memory will increase when data increases with demand for storage. At present data duplication or redundant data storing in the cloud became hard for storage provider. Also, it makes security issue if repeated data from various users stored in the server. It makes data duplication, which is very efficient for intruders. Also, when same data stored in cloud, there will be a waste of storage. Our research article is focused on security of original data by generating the key from owner and identifying the repeated data, while storing in cloud platform. This process is called as data de-duplication, which is also known as intelligent based computing. Storing the data in single instance is very challenging among cloud computing researchers. In this article we propose a content level de-duplication with re-encryption using enhanced Randomized convergent encryption (ERCE) based on Poisson filter (PF). First the data is encrypted and re-encrypted using the cipher methodology. Generated key only stored and processed by authenticated user. Owner of the data give permission to access key. Then the Poisson filter is used in de-duplication process. if key is authenticated, then the authenticated user can access data from cloud server. Data is stored only once and accessing key decides who can access the data. The result is evaluated with various existing algorithm. our proposed algorithm proves less time in downloading file and less computation cost when comparing with existing system.

**Keywords:** Cloud computing; data redundancy; de-duplication; enhanced randomized convergent encryption; Poisson filter

### 1 Introduction

In order to improve and utilize the cloud storage, data de-duplication is an important topic need to be considered to remove the redundant information in the system. The de-duplication is the process of which identify the multiple copy of the same data, remove the existing data/files from the storage and maintain the original copy stored. The data de-duplication needs are listed, (i) to reduce the cloud storage to



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# RAINFALL PREDICTION USING DEEP LEARNING TECHNIQUE

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**Abstract** - Rainfall statement is extremely necessary as a result of serious and irregular downfall will have several impacts like the destruction of crops and farms, injury of the property thus higher a far better a much better a higher a stronger a more robust and improved statement model is crucial for Associate in Nursing early warning that may minimize risks to life and property and additionally managing the agricultural farms in better means This prediction mainly helps farmers and also water resources can be utilized efficiently. Rainfall statement is extremely necessary as a result of serious and irregular downfall will have several impacts like the destruction of crops and farms, injury of the property thus higher a far better a stronger a more robust and improved statement model is crucial for Associate in Nursing early warning that may minimize risks to life and property and additionally managing the agricultural farms in better means. The prediction of precipitation using machine learning techniques may use a Genetic algorithm, Random forest, Support Vector Machine, Naives Bayes algorithm, and deep learning algorithm named as a Neural network algorithm. The intention of this project is to supply non-experts with quick access to the techniques, approaches used within the sector of precipitation prediction and supply a comparative study among the assorted machine and deep learning techniques. The results provided by the MLP classifier are the most accurate and provide better results in this field.

**Key Words:** Rainfall, Genetic algorithm, Support vector, MLP classifier, Forests

## 1. INTRODUCTION

Associate knowledge base subfield of technology. The goal of the info mining method is to extract information from a knowledge set and remodel it into a visible structure for additional use. Data mining data method is that the analysis step of the "knowledge discovery in databases" process, or KDD. Data mining data methods the analysis step of the "Knowledge Discovery in Databases" process, or KDD, a field at the intersection of technology and statistics, is that the method that makes an attempt to find patterns in giant knowledge sets.

The actual data processing task is that the semi-automatic or automatic analysis of enormous quantities of information to extract antecedent unknown, fascinating patterns like teams of information records (cluster analysis), uncommon records (anomaly detection), and dependencies (association rule mining, successive pattern mining). This sometimes involves

mistreatment of information techniques like spatial indices. These patterns will then be seen as a form of an outline of the computer file and will be employed in additional analysis or, as an example, in machine learning and prophetic analytics.

## 1.1. FOUNDATION OF DATA MINING

Data Mining is that the method of movement queries to giant amounts of knowledge sources and extracting patterns and trends victimization applied mathematics and machine learning techniques. It integrates varied technologies as well as management, statistics and machine learning. Data processing has applications in various disciplines as well as medical, financial, defense and intelligence. Data processing tasks embrace classification, clustering, creating associations and anomaly detection. The method of creating by removal through information to get hidden connections and predict future trends includes a long history. Typically stated as "knowledge discovery in databases," the term "data mining" wasn't coined till the Nineteen Nineties. However its foundation contains 3 tangled scientific disciplines: statistics (the numeric study of knowledge relationships), AI (human-like intelligence displayed by code and/or machines) and machine learning (algorithms which will learn from information to form predictions). Varied data processing techniques are developed. These embrace techniques for extracting associations, neural networks, inductive logic programming, call trees, mathematical logic and rough sets.

## 1.2 ARCHITECTURE OF DATA MINING

The major components of any data mining system are data source, data warehouse server, data mining engine, pattern evaluation module, graphical user interface and knowledge base.

**RESEARCH ARTICLE**

# An enhance the data security performance using an optimal cloud network security for big data cloud framework

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**Summary**

The cloud network framework is available with several benefits relating to cost, data management, elasticity, security and resource provisioning. These capabilities of cloud computing encourage the organizations to move their resources and services to the cloud network framework. In recent days, the incredible growth in network communication technology has caused a hot topic, big data. The best major provider of cloud-network based big data and can generate a significant amount of data. Various technically challenging resources and services technique for multiservice based collect real-time data. Here arises the problem of network security as the cloud providers are subjected to several threats and security attacks. Huge measures of administration and services that are web based have been given by the cloud computing framework in order to meet the expansion in the increasing demand for the requirements and needs. This is predominantly because of the reason that the network operators possess the required ability to get access to the sensitive data. Thus, it results with the customers denying to receive the cloud services including, government and the like. In this paper, the authors focus this issue with the help of a network cryptographic approach. The network cryptographic approach thus proposed helps in storing the data effectively in the cloud servers. The proposed algorithm named security based-distributed storage (SB-DS) approach also helps in reducing the execution time as the data are being split to be sent to the cloud server. The proposed algorithm is subdivided into process such as data distribution, data converging and secure data processing. Data distribution algorithm splits the sensitive data from normal data using fuzzy techniques. Then the secured processing algorithm encrypts the sensitive data and stored in data packets. Finally convergent algorithm combines the encrypted data in the cloud storage. This technique stores distributed storage very secured from malicious threats. The experimental results of the proposed algorithm show that the proposed framework has better performance and higher accuracy. The results also prove that the proposed

B Venkatesan and S Chitra equally contributed to the study.

# Video Face Recognition based on Facial Features using Deep Learning Model

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## ABSTRACT

Personal identification is taken under consideration an awfully vital side in recognizing the identity of a selected individual. A person's identity could also be valid through the quality or biometric ways that. the applying of biometric recognition in personal authentication permits the enlargement of this technology to use in varied domains. The implementation of biometric recognition systems could also be supported physical or activity characteristics, just like the iris, voice, fingerprint, and face. Currently, the attending chase system supported biometric recognition for education sectors continues to be underutilized, so providing an honest likelihood to carry out fascinating analysis throughout this area. As verified throughout a typical area, educators tend to want the attending of their

## I. INTRODUCTION

Machine learning could also be a strategy of data analysis that automates analytical model building. it is a branch of AI supported the thought that systems can learn from data, verify patterns and make selections with stripped-down human intervention. thanks to new computing technologies, machine learning lately isn't the same as machine learning of the past. it had been born from pattern recognition and conjointly the idea that computers can learn whereas not being programmed to perform specific tasks; researchers interested by AI required to ascertain if computers might learn from data. The unvaried side of machine learning is extremely vital as a result of as models ar exposed to new data, they are able to severally adapt. They learn from previous computations to provide reliable, repeatable selections and results. It's a science that's not new – but one that has gained recent momentum.

## II. LITERATURE REVIEW

**TITLE: net based mostly STUDENT data MANAGEMENT SYSTEM, AUTHOR: MS.MYNAVATHI.R , THANGAMANI.T**

The design and implementation of a comprehensive student data system and computer program is to switch the present paper records. school workers area unit ready to directly access all aspects of a student's tutorial progress through a secure, on-line interface embedded within the college's web site. The system

students by exploitation typical ways that like by vocation out names or language off associate attending sheet. Yet, these varieties of ways that ar tested to be time overwhelming and tedious, and customarily, fraud happens. As a result, vital progress had been created to mark attending automatically by making use of biometric recognition that uses the face biometric for authentication. At the time of attending chase, student verifies the student with distinctive Face bioscience. Face recognition could also be finished the help of deep learning rule. it should be useful to avoid pretend attending and improve automatic system in real time college environments. Experimental results shows that the \$64000 time interface with student details and might implement Python framework as front and MYSQL as face

whereas AI (AI) is that the broad science of mimicking human skills, machine learning could also be a selected set of AI that trains a machine the way to find out. Watch this video to higher understand the link between AI and machine learning. you may see but these a pair of technologies work, with useful examples and one or two of funny asides. Resurging interest in machine learning is attributable to identical factors that have created processing and theorem analysis a great deal of well-liked than ever. Things like growing volumes and types of accessible data, method method that is cheaper and a great deal of powerful, and low-cost data storage. All of these things mean it's gettable to quickly and automatically manufacture models which can analyze larger, a great deal of difficult data and deliver faster, a great deal of correct results – even on a awfully big scale. And by building precise models, an organization incorporates a better chance of characteristic profitable opportunities – or avoiding unknown risks.

utilizes user authentication, displaying solely data necessary for AN individual's duties. in addition, every sub-system has authentication permitting licensed users to form or update data therein scheme. All knowledge is totally reviewed and valid on the server before actual record alteration happens. additionally, to a workers computer program, the system plans for student computer program, permitting users to access data and submit requests on-line so reducing time interval. All knowledge is hold



# Electronic Voting and Face Recognition using Blockchain Technology

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## ABSTRACT

There stay challenges to attain wide unfold adoption of such systems particularly with relation to rising their resilience against potential faults. Distributed ledger technologies is associate degree exciting technological advancement within the info technology world. Blockchain technologies provide associate degree infinite vary of applications cashing in on sharing economies. This paper aims to judge the applying of blockchain as service to implement distributed electronic vote systems. The paper elicitates the wants of building electronic vote systems and identifies the legal and technological limitations of exploitation blockchain as a service for realizing such systems. The project starts by exploitation the popular blockchain frameworks that supply blockchain as a service. We tend to then propose a unique electronic legal system supported blockchain that addresses all limitations we tend to discovered. A lot of usually this paper evaluates the potential of distributed ledger technologies through the outline of a case study, specifically the method of associate degree election and implementing a blockchain-based application that improves the safety and reduces the price of hosting a nationwide election.

## I. INTRODUCTION

The electronic balloting has emerged over time as a replacement to the paper-based balloting to scale back the redundancies and inconsistencies. Furthermore, it's significantly appropriate for the disabled folks. It's within the block-chain technology that is extremely a lot of secure. It's effective of the polling method, hashing algorithms' utility, block creation and waterproofing, knowledge accumulation, and result declaration by victimization the adjustable blockchain methodology. The thought of block creation and block waterproofing is introduced during this paper. The introduction of a block waterproofing thought helps in creating the blockchain adjustable to fulfill the necessity of the polling method. The utilization of pool blockchain is usually recommended, that ensures that the blockchain is in hand by an organization (e.g., election commission), and no unauthorized access is made of outside. The framework projected during this paper discusses the effectiveness of the polling method, hashing algorithm's utility, block creation and waterproofing, knowledge accumulation, and result declaration by victimization the adjustable blockchain methodology.

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## A LEARNER CENTRIC BLENDED E- LEARNING CONTENT RECOMMENDATION SYSTEM

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### Abstract

The growth of personal learning experiences has made it harder for students to find suitable learning resources. Individual guidelines have been used to facilitate learners' experiences in personal learning settings, and this technology will provide learners with appropriate learning content. This algorithm evaluates the multi-dimensional characteristics of the content, student ranking and the order and temporal patterns of the obtained information in a single model in order to increase the accuracy of its recommendations. There are two modules in the current solution. Late trends of obtaining resources are found and presented in two formats with the balanced association rule mining and a compact tree structure known as the sequence tree in the sequential-based suggestion module. The learner's preference tree is implemented to consider multifarious attributes of papers, ranking of learners and order of materials in the attribute-based module, after clustering learners with latent patterns by K-means algorithm. The hybrid

## Hybrid Cloud Security by Revocable KUNodes-Storage with Identity-Based Encryption

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**Abstract:** Cloud storage is a service involving cloud service providers providing storage space to customers. Cloud storage services have numerous advantages, including convenience, high computation, and capacity, thereby attracting users to outsource data in the cloud. However, users outsource data directly via cloud stage services that are unsafe when outsourcing data is sensitive for users. Therefore, cipher text-policy attribute-based encryption is a promising cryptographic solution in a cloud environment, and can be drawn up for access control by data owners (DO) to define access policy. Unfortunately, an outsourced architecture applied with attribute-based encryption introduces numerous challenges, including revocation. This issue is a threat to the data security of DO. Furthermore, highly secure and flexible cipher text-based attribute access control with role hierarchy user grouping in cloud storage is implemented by extending the KUNodes (revocation) storage identity-based encryption. Result is evaluated using Cloudsim, and our algorithm outperforms in terms of computational cost by consuming 32 MB for 150-MB files.

**Keywords:** Cloud computing; storage identification based revocation; attribute based access control; encryption; decryption

### 1 Introduction

Cloud computing is technology that serves resources on demand with well-defined network access for computation and communication. Service providers merely provide resources to users for their applications. In general, cloud storage uses applications of social networking, such as Facebook, WhatsApp, Skype, Zoom, and Twitter. Cloud storage's considerable concern is software for online application, data storage, and processing. Cloud data sharing is a volatile expanding platform with numerous problems. New technological developments, such as mobile Internet, smart cars, and smart city, enables numerous Internet devices to connect to networks. This process results in massive storage during communication over the devices that require dynamic resources for processing. Cloud computing provides enormous virtual resources when users are demanding resources. A new demand integrates the cloud with smart mobile devices or Internet of Things (IoT).



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Article

# Symmetry and Its Role in Oscillation of Solutions of Third-Order Differential Equations

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**Abstract:** Symmetry plays an essential role in determining the correct methods for the oscillatory properties of solutions to differential equations. This paper examines some new oscillation criteria for unbounded solutions of third-order neutral differential equations of the form  $(r_2(\zeta)((r_1(\zeta)(z'(\zeta))^{\beta_1})')^{\beta_2})' + \sum_{i=1}^n q_i(\zeta)x^{\beta_3}(\phi_i(\zeta)) = 0$ . New oscillation results are established by using generalized Riccati substitution, an integral average technique in the case of unbounded neutral coefficients. Examples are given to prove the significance of new theorems.

**Keywords:** neutral differential equation; oscillation; Riccati substitution; deviating arguments



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## 1. Introduction

We consider the third-order neutral differential equations with several delays:

$$(r_2(\zeta)((r_1(\zeta)(z'(\zeta))^{\beta_1})')^{\beta_2})' + \sum_{i=1}^n q_i(\zeta)x^{\beta_3}(\phi_i(\zeta)) = 0, \quad \zeta \geq \zeta_0 > 0, \quad (1)$$

where  $z(\zeta) = x(\zeta) + p(\zeta)x(\varrho(\zeta))$ ,  $\beta_i > 0$  ( $i = 1, 2, 3$ ) is a ratio of odd integers. Considering the following conditions for (1) are satisfied:

$$\begin{cases} r_i \in C([\zeta_0, \infty), (0, \infty)) \text{ and } \int_{\zeta_0}^{\infty} r_i^{-1/\beta_i}(s)ds = \infty, i = 1, 2; \\ q_i \in C([\zeta_0, \infty), [0, \infty)), \phi_i \in C([\zeta_0, \infty), \mathbb{R}) \text{ and } \lim_{\zeta \rightarrow \infty} \phi_i(\zeta) = \infty, \text{ where } i = 1, 2, \dots, n; \\ \varrho \in C([\zeta_0, \infty), \mathbb{R}) \text{ is strictly increasing, } \varrho(\zeta) < \zeta, \text{ and } \lim_{\zeta \rightarrow \infty} \varrho(\zeta) = \infty; \\ p \in C([\zeta_0, \infty), \mathbb{R}) \text{ with } p(\zeta) \geq 1, \text{ and } p(\zeta) \neq 1, \text{ eventually.} \end{cases}$$

To formulate a solution for (1), we need a function  $x : [\zeta_x, \infty) \rightarrow \mathbb{R}$  such that  $z \in C^2([\zeta_x, \infty), \mathbb{R})$ ,  $r_1(z')^{\beta_1} \in C^1([\zeta_x, \infty), \mathbb{R})$ ,  $r_2((r_1(z')^{\beta_1})')^{\beta_2} \in C^1([\zeta_x, \infty), \mathbb{R})$  and which satisfies Equation (1) on  $[\zeta_x, \infty)$ . We only consider those solutions  $x(\zeta)$  of (1) as defined on some ray  $[\zeta_x, \infty)$ ; for some  $\zeta_x \geq \zeta_0$ , which satisfies  $\sup\{|x(\zeta)| : \zeta \geq T\} > 0$  for every  $T \geq \zeta_x$ . We start with the assumption that Equation (1) does possess a proper solution. A proper solution  $x(\zeta)$  of Equation (1) is said to be oscillatory if it has arbitrarily large zeros; it is called nonoscillatory otherwise. Equation (1) is termed oscillatory if all its solutions are oscillatory.





Article

# Qualitative Behavior of Unbounded Solutions of Neutral Differential Equations of Third-Order

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**Abstract:** New oscillatory properties for the oscillation of unbounded solutions to a class of third-order neutral differential equations with several deviating arguments are established. Several oscillation results are established by using generalized Riccati transformation and an integral average technique under the case of unbounded neutral coefficients. Examples are given to prove the significance of new theorems.

**Keywords:** neutral differential equation; oscillation; asymptotic behavior; deviating arguments

## 1. Introduction

In this work, we investigate the oscillation properties of solutions to the third-order neutral differential equations with several deviating arguments

$$(r(\iota)(z''(\iota))^\alpha)' + \sum_{i=1}^n q_i(\iota)x^\alpha(\phi_i(\iota)) = 0, \quad \iota \geq \iota_0 > 0, \quad (1)$$

where  $z(\iota) = x(\iota) + p(\iota)x(\varrho(\iota))$  and  $\alpha$  is a quotient of odd positive integers.

The main results of this paper are obtained considering the following conditions:

$$\begin{cases} r \in C([t_0, \infty), (0, \infty)) \text{ and } \int_{t_0}^{\infty} r^{-1/\alpha}(s)ds = \infty; \\ q_i(\iota) \in C([t_0, \infty), [0, \infty)), \phi_i(\iota) \in C([t_0, \infty), \mathbb{R}) \text{ and } \lim_{\iota \rightarrow \infty} \phi_i(\iota) = \infty, \text{ where } i = 1, 2, \dots, n; \\ \varrho \in C([t_0, \infty), \mathbb{R}) \text{ is strictly increasing, } \varrho(\iota) < \iota, \text{ and } \lim_{\iota \rightarrow \infty} \varrho(\iota) = \infty; \\ p(\iota) \in C([t_0, \infty), \mathbb{R}) \text{ with } p(\iota) \geq 1, \text{ and } p(\iota) \neq 1, \text{ eventually.} \end{cases}$$

By a solution of (1), we mean a function  $x : [t_x, \infty) \rightarrow \mathbb{R}$  such that  $z(\iota) \in C^2([t_x, \infty), \mathbb{R})$  and  $r(\iota)(z''(\iota))^\alpha \in C^1([t_x, \infty), \mathbb{R})$ , and which satisfies Equation (1) on  $[t_x, \infty)$ . We only consider those solutions  $x(\iota)$  of (1) defined on some ray  $[t_x, \infty)$ , for some  $t_x \geq t_0$ , which satisfy  $\sup\{|x(\iota)| : \iota \geq T\} > 0$  for every  $T \geq t_x$ . We start with the assumption that Equation (1) does possess a proper solution. A proper solution of (1) is called oscillatory if it has a sequence of large zeros tending to  $\infty$ ; otherwise we call nonoscillatory.



# A Study on Employee Safety Measure in Rajsriya Automotive Industries Pvt Ltd., Unit-I At Hosur

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## ABSTRACT

A study on employee safety measures in the Rajsriya automotive industries pvt ltd. UNIT-IIt has developed by the employee safety facilities are different. Topics to be discussed in the project they are employee working environment for the Organization, safety for employee welfare, job satisfaction and development of employee for the organization. The very logic behind providing welfare schemes is to create efficient, healthy, loyal and satisfied employee force for the organization. They are providing facilities for employees to desire the highly satisfied minimum of employee will be acceptance in the satisfied categories. The research selected a sample size of 150 employees in Hosur. The employee satisfied with the selection for the percentage to calculate the chi-square analysis to using the research process. The purpose of this paper is to present the result of a survey on the safety of employee towards the various level of satisfied categories will be applied for the firm.

## INTRODUCTION TO THE STUDY

Safety is the state of being "safe", the condition of being protected from harm or other non-desirable outcomes. Safety can also refer to the control of recognized hazards in order to achieve an acceptable level of risk.

## SAFETY MEASURES REPRESENTATIVES

They are full-time workers nominated or elected and designated in writing by the employer after the employer and workers consulted one another and reached an agreement about who will be welfare and safety representatives. Further they must at least be familiar with the circumstances and conditions at that part of the workplace for which they are designated. Agreement must also be reached on the period of office and functions of the welfare and safety representative and must be settled amongst the employer and the workers.

The occupational Safety Act, 1993, requires the employer to bring about and maintain, as far as reasonably practicable, a work environment that is safe and without risk to the welfare of the workers. This means that the employer must ensure that the workplace is free of hazardous substances, such as benzene, chlorine and microorganisms, articles, equipment, processes, etc. that may cause injury, damage or disease. Where this is not possible, the employer must inform workers of these dangers, how they may be prevented, and how to work safely, and provide other protective measures for a safe workplace.

However, it is not expected of the employer to take sole responsibility for welfare and safety. The Act is based on the principle that dangers in the workplace must be addressed by communication and cooperation between the workers and the employer. The workers and the employer must share the responsibility for welfare and safety in the workplace. Both parties must pro-actively identify dangers and develop control measures to make the workplace safe.

In this way, the employer and the workers are involved in a system where welfare and safety representatives may inspect the workplace regularly and then report to a welfare and safety committee, who in turn may submit recommendations to the employer. To ensure that this system works, every worker must know his or her rights and duties as contained in the Act.

## 10 tips for work safety

**Understand the risks:** Once you know the particular hazards of your job or workplace, you can take steps to reduce your risk of work-related injury or illness.

**Reduce workplace stress:** Common causes include long hours, heavy workload, job insecurity and conflicts with co-worker's or bosses. Stress can lead to depression, sleeping difficulties and problems with concentration.



# A Study on Employees Lifestyle in Theni Guru Krishna Textile, Erode

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## ABSTRACT

The Industrial was carried out in “Theni Guru Krishna Textile, Peruthurai”. The organization mainly deals with manufacturing knitted garments. Internship in this organization helped me to understand the various management practices followed in the organization. It also helped me to understand the real time business environment. Through this training I also came to know that how the theoretical aspects taught in the class room are applied the different department in real time work environment and the functions of finance department including budget preparation, book keeping procedures, funds management, banking practices were studied. Being knitted garments manufacturing company the various operations including receiving of fabrics, production process, packing and shipping and the functions of the human resource department including safety provisions, leave facilities, bonus, provident fund and the functions of marketing department and the function of quality management department. This Industrial Summer Internship improved skills, knowledge, behavior aspects and different abilities as a whole.

## INTRODUCTION OF THE STUDY

The Industrial is carried out in “Theni Guru Krishna Textile, Peruthurai” for knowing the real world business practices. As part of MBA curriculum of the institute every student has to carry out this training. It is carried out for knowing the real world business practices and also to know how the theories taught in class rooms are applied in business. This Internship report includes the analysis of various departments in an organization and the general business practices of the business. This study also includes the analysis of various business strategies followed by the industry and SWOT analysis of the industry

## NEED OF STUDY

In a world of changing values where ideologies of rapidly under going transformation, rigid statements about the field of labor welfare need to be revised, labor welfare work is increasing with the growing knowledge and experience of techniques. The test of a welfare activity is that it removes, directly or indirectly any hindrance physical or mental of the workers and restores to him in the peace and joy of living the welfare work embraces the worker and his family. This study attempts to study about the various welfare measures undertaken in the organization and also makes an attempt to evaluate its effectiveness in improving productivity.

## OBJECTIVE OF STUDY

To study the perception of the employees regarding the safety and welfare measures provided to them.  
To analyze if the level of satisfaction is different among the various categories of employees and departments.  
To suggest provision of more safety and welfare measures to improve the performance of the employees.

## RESEARCH METHODOLOGY

Research methodology is a way of systematically solving the research problem. The research design adopted for this study is Descriptive Research. 70 respondents were in this study.

Primary data are those which are collected a fresh and for the first time and thus happen to be original in character.

The secondary data on the other hand are those which have already been collected by some one else and which have already been passed through the statistical process. In this study, the data was collected from the primary source through interview

schedule.

**Percentage Analysis**

The number of responses of each category is summarized to percentage format for the convenience to use other statistical tools namely pie chart and bar diagrams.

$$\text{Percentage} = \frac{\text{No of Respondents}}{\text{Total number of Respondents}} \times 100$$

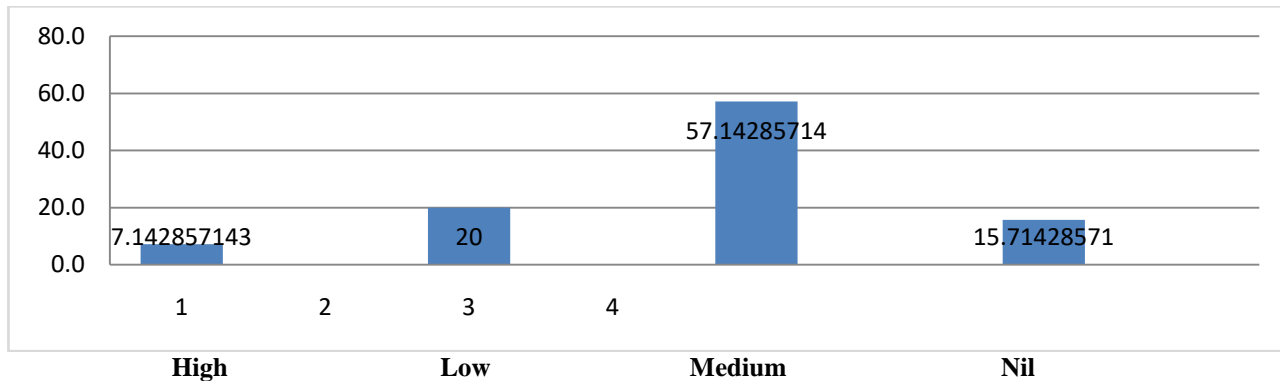
$$\text{Percentage} = \frac{70}{70} \times 100 = 100\%$$

**DATA ANALYSIS & INTERPRETATION**

**THIS TABLE & CHART SHOWS THE STRESS OF WORKERS**

In the day of day life every person has stress, pressure, tension, grief, etc. to know about this company worker stress we have collected the sample.

STRESS LEVEL			
High	Low	Medium	Nil
5	14	40	11
7.1%	20.0%	57.1%	15.7%



**INTERPRETATION**

The above chart depicts that the respondents are majority in medium level of stress 57.1% because the options are four most of the employees agreed the medium of stress in the company.

**THIS TABLE & CHART SHOWS THE HAZARDS OF WORK**

We generally know that there are risk in all fields. To know about how much the risk in this type work.

HAZARDS OF WORK			
Below25%	25 to 50%	50to75%	Above75%
6	19	38	7
8.6%	27.1%	54.3%	10.0%





# A Study on Employee Safety Measure towards Sri Varalakshmi Startch Industries With Reference To Salem

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\*\*\*\*\*

## ABSTRACT

Employee safety measure at the workplace is one of the important measure of life at work place. Organizations ensure that employees are exposed to a risk level which do not affect their physical, emotional and mental health. Also the organizations do not entertain any activity in its premises that will disturb the work life of the employees. Employees are trained appropriately about the work and about all precautionary measures that will prevent accidents at the work place. In addition to these, all the organizations have rigorous checking process that avoid intrusion of outsiders into the office premises. It is sincerely thought that the welfare notion will help the organizations to maintain harmonious industrial relations and more lasting industrial peace to tackle effectively the social problems and attain human welfare.

## INTRODUCTION

Safety is the state of being "safe", the condition of being protected from harm or other non-desirable outcomes. Safety can also refer to the control of recognized hazards in order to achieve an acceptable level of risk.

## TYPES OF WORKPLACE SAFETY

**Safety hazards:** Safety hazards are the most common type of hazard and they are present in virtually every workplace at one time or another. These hazards are unsafe conditions in a facility that can cause injury, illness, or even death. Think of hazards like spills, working from heights, unguarded machinery, wiring issues, confined spaces, forklifts, and more.

**Biological hazards:** Biological hazards affect those who work with animals, people, or infectious plant materials. People who are working at day-care centres, colleges, hospitals, nursing homes, etc. can be exposed to blood or other body fluids, fungi and mild, bacteria, viruses, and more.

**Physical hazards:** Physical factors encompass environmental factors that can cause harm to workers even when they're not directly touched. Radiation, high sunlight exposure, working in extreme temperatures, and constant loud noises are all examples of physical hazards.

**Ergonomic hazards:** These hazards can be the hardest to identify, but they can easily cause strain (and eventually injury) to the body. Workers can face ergonomic hazards if their workstations or chairs are improperly adjusted, if they're frequently lifting, if they're making repetitive and awkward movements and other situations where the body and muscles are overworked.

**Chemical hazards:** Any chemicals in the workplace can put workers at risk. Some chemicals are far more dangerous than others, but even common chemicals can cause skin irritation, illness, or respiration problems.

## SAFETY MEASURES REPRESENTATIVES

They are full-time workers nominated or elected and designated in writing by the employer after the employer and workers consulted one another and reached an agreement about who will be welfare and safety representatives. Further they must at least be familiar with the circumstances and conditions at that part of the workplace for which they are designated. Agreement must also be reached on the period of office and functions of the welfare and safety representative and must be settled amongst the employer and the workers.

The occupational Safety Act, 1993, requires the employer to bring about and maintain, as far as reasonably practicable, a work environment that is safe and without risk to the welfare of the workers. This means that the employer must ensure that the workplace is free of hazardous substances, such as benzene, chlorine and microorganisms, articles,

# “A Study on Awareness of Life Insurance Policies With Special Reference To Salem”

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## ABSTRACT

This study explores satisfaction level of customers towards Life Insurance Corporation in Salem. Due to increasing awareness among people about their uncertainty of life and increasing competition in Insurance sector, it is significant for Insurance Companies to understand the requisite of their customers. The main aim of this study is to know the consumer satisfaction towards LIC. This study is based on primary data which is collected through questionnaire among 80 policyholders in Salem and data were analyzed with multi variety statistical tools like percentage, chi-square and Correlation analyses were used to identify the factors responsible for consumer satisfaction towards LIC.

**Keywords:** LIC; Consumer Satisfaction; Consumer Awareness

## 1. INTRODUCTION

Life Insurance is a cooperative device which spreads risk of a person over a large number of people against different types of contingencies such as death of a person due to accident or sickness etc. It is an arrangement where losses of a few are extended over several who are exposed to similar risks. In today's modern and accident prone age, insurance has become an unavoidable part of the life. It has become a necessity of life along with food, clothing and shelter. It not only provides financial protection to the policyholders but also acts as better investment. Life insurance is one of the secured and assured sources of provision for old age when earnings of a person are either stopped or reduced. Further, the emergencies due to accidents, sickness etc. can be tackled with the help of life insurance policies. Insurance is/should be an integral part of man's financial planning. One should not look at it just as a tool of tax exemption, it is far more essential for enjoying tension free life. Experts in financial matters emphasize that insurance is probably the best financial instrument to invest and for provision for old age, emergencies etc

Life insurance is a must for everyone because life is very precious. With a population of over one billion, national and international life insurance companies, see India as a land of opportunities and a market for big business. Until 1999, the business of life insurance in India was the monopoly of life insurance corporation of India (lic). Privatization witnessed dynamic changes in the insurance industry and most of the private insurance companies are joint ventures with recognized foreign players across the globe. Customers are the main pillar of life insurance business. Every company tries to attract and retain existing customers to keep their profits high.

## 2. METHODOLOGY

Research methodology is a way to systematically solve the research problem. It may be understood as a science of studying how research is done scientifically. In it I study the various steps that are generally adopted by a researcher in studying the research problem along with the logic behind them. It is necessary for the researcher to know not only the research methods / techniques but also the methodology.

### 2.1 Sample size

The sample size in the study is 80.

### 2.2 Statistical tools

- Simple percentage method



# A Study on Employee Life Style of Marine Workers

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\*\*\*\*\*

## ABSTRACT

The shipping industry is one of our oldest industries and still plays an important role in our modern society. Today, over 55 000 cargo ships are active in international trade. The fleet is represented in over 150 countries, crewed with over 1.5 million sailors working around the world. The different types of cargo being transported are goods for consumers, food, raw material, cars and fuel, just to name a few. The market for shipping services can influence trade flows, the products that countries sell, and how price shocks reverberate through trade. The international shipping industry is responsible for the carriage of around 90% of world trade. Shipping is the life blood of the global economy. Without shipping, intercontinental trade, the bulk transport of raw materials, and the import/export of affordable food and manufactured goods would simply not be possible. Ships are technically sophisticated, high value assets (larger hi-tech vessels can cost over US \$200 million to build), and the operation of merchant ships generates an estimated annual income of over half a trillion US Dollars in freight rates. Ships and the maritime industry as a whole are increasingly reliant on computerized and internet-connected technology. At the same time, criminals, state actors, and terrorists are becoming more skilled and sophisticated in their ability to compromise these systems for nefarious purposes. The maritime industry uses computers and cyber-dependent technologies for navigation, communications, ship systems monitoring and control, cargo transfers, access control, passenger and cargo screening, fire detection, financial and other business transactions, and other purposes. Attacks on these systems can result in such consequences as groundings, collisions, cargo loss, environmental pollution, disruption of trade, and human injuries and fatalities.

## INTRODUCTION

Safety and welfare measures are inevitable to any organization where workers are involved. An organization's responsibility to its employees extends beyond the payment of wages for their services. The employee's safety and welfare on and off the job within the organization is a vital concern of the employer. Welfare helps to improve employee retention and creating positive image for longer time period. It helps to motivate and improve morale of the employees. Some of the facilities and services which fall within the preview of labour welfare like adequate canteen facilities, accommodation arrangements, recreational facilities, medical facilities and transportation. Providing a safe and healthy environment is a pre-requisite for any productive effort.

## NEED OF THE STUDY

Safety and Welfare is the main concern for the employees in marine industry. Its focus is on employee safety and it can provide for higher morale and productivity in the workplace. This is due to the perception that the industry truly cares about the health and well-being of its employees, thus creating a sense of pride for the industry. Increased productivity as it correlates to safety and morale is a difficult metric to measure, but forward-thinking organizations realize that it does exist and can therefore justify the costs of their safety programs as compared to the productivity benefits that they provide. In contrast to measuring productivity as it relates to safety, the indirect costs of employee injuries are much more measurable. The above mentioned points stand as motivation factors to undertake the present study. Accordingly appropriate objectives are framed and studied using primary and secondary data.

## OBJECTIVES OF THE STUDY

- [1]. To study the perception of the employees regarding the safety and welfare measures provided to them.
- [2]. To analyze if the level of satisfaction is different among the various categories of employees and departments.
- [3]. To suggest provision of more safety and welfare measures to improve the performance of the employees.



## A SOLUTION FOR ASSISTING THE BLIND USING AN ANDROID-BASED SOFTWARE PROGRAMME

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**Abstract:** The advancement of information and mobile technologies has created chances for visually impaired people to be included online. Due to the advancement of ubiquitous technology, there is an increasing need for assistive solutions to support visually impaired people in their social interactions. An Android-based mobile application for the blind that will make daily tasks easier was developed in this effort. The application was created using the Scale-Invariant Feature Transform (SIFT).

**Keywords:** visually impaired, Scale-Invariant Feature Transform, OCR.

### I INTRODUCTION

At least 2.2 billion people worldwide suffer from a near- or distance vision impairment. Nearly half of these cases, or at least 1 billion, involved vision damage that either might have been avoided or is still unaddressed.[1].<https://www.who.int/news-room/fact-sheets/detail/blindness-and-visual-impairment>

Routine chores like choosing items for personal use or spotting impediments in their path while going down the road provide several difficulties for these visually impaired and blind folks. For blind persons, it can be difficult to recognize things and movements that normally sighted people take for granted. The blind report having trouble moving around safely and independently outside, which prevents them from leading a typical work and social life [2]. Having the ability to recognize items on one's own will undoubtedly improve independent living and promote economic and social self-sufficiency in those who are blind or have severe visual impairments. Finally, the so-called activities of daily living, or ADLs, are a typical

issue for blind people.

The interest in creating technologies to aid visually impaired persons in their daily lives is growing in the modern era. It has been demonstrated that the item identification task continues to be the most challenging for blind persons. Although there are numerous programmes that can be employed for this activity, there are still clear shortcomings that call for greater advancement. There are specific gadgets for navigation and object identification among these technologies. The blind users must carry a variety of tools and equipment, each with a specific function, such as object identifiers, navigators, and mobile phones. The use of gadgets for object identification will be replaced with software that runs on the smartphones of blind users.

Different arrangements accessible at present incorporate the Low-tech marking frameworks wherein names are joined to objects, for example with material signs or instant messages in Braille [3],[4] and the High-tech frameworks that utilize 1-D and 2-D standardized tags, talking marks, or radio-recurrence recognizable proof gadgets (RFID). RFID can be utilized to look for objects at brief distances to which RFID tag was applied utilizing an acoustic sign, however, a major restriction to its utilization is that it is extremely difficult for blind clients to find the place of the scanner tag and to accurately point the standardized tag peruser at the standardized identification. Some perusing assistive frameworks, for example, pen scanners may be utilized in these and comparable circumstances. Such frameworks coordinate optical person acknowledgment (OCR) programming to offer the capability of checking and acknowledgment of text and some have incorporated voice yield [5]. Both the Low-tech





## **PREDICTION OF HEART AILMENT USING SUPPORT VECTOR MACHINE**

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**Abstract:** Heart-related illnesses, often known as cardiovascular diseases (CVDs), are the leading cause of death worldwide during the past several decades and have become the most serious illness in both India and the rest of the globe. Therefore, a trustworthy, accurate, and practical system is required to identify these disorders early enough for effective therapy. In order to automate the examination of massive and complicated data, machine learning methods and techniques have been used on a variety of medical datasets. Recently, many researchers have employed a number of machine learning techniques to aid the medical community and specialists in the detection of heart-related disorders. . In comparison to the brain, which takes precedence in the human body, the heart is the next important organ. It circulates blood throughout the body's organs and pumps blood. It takes a lot of effort to predict the emergence of cardiac illnesses in the medical industry. Data analytics is helpful for making predictions based on additional data, and it aids the medical center in making predictions about various ailments. Every month, a vast amount of patient-related data is kept. The collected information can be used to forecast the occurrence of future diseases. Artificial Neural Networks (ANN), Random Forest, and Support Vector Machines are some of the data mining and machine learning approaches used to forecast cardiac disorders (SVM). Heart disease prediction and diagnosis have become a difficult problem for doctors and hospitals, both in India and overseas. A rapid and effective detection method needs to be developed in order to decrease the enormous number of

deaths caused by cardiac illnesses. In this context, machine learning algorithms and data mining approaches are crucial. The development of software that can aid doctors in both the diagnosis and prognosis of cardiac illness is being accelerated by researchers with the aid of machine learning algorithms. The major goal of this study is to use machine learning algorithms to forecast a patient's cardiac condition.

**Keywords:** Machine Learning, Support vector machine, Random forest, Bagging with J48

### **I INTRODUCTION**

The heart is a significant organ of the human body. It siphons blood to all aspects of our life systems. On the off chance that it neglects to work accurately, the cerebrum and different organs will quit working, and in no less than a few moments, the individual will kick the bucket. Changes in way of life, business-related pressure, and terrible food propensities add to the expansion in the pace of a few heart-related sicknesses. Heart sicknesses have arisen as one of the most noticeable reasons for death from one side of the planet to the other. Cardiovascular disease is the leading global cause of death, accounting for 17.3 million deaths per year, a number that is expected to grow to more than 23.6 million by 2030. Clinical associations, from one side of the planet to the other, gather information on different wellbeing-related issues. This information can be taken advantage of by utilizing different Machine Learning procedures to acquire valuable experiences. In any case, the information gathered is extremely enormous and, ordinarily, this information can be exceptionally boisterous. These datasets, which are excessively overpowering for human



# PREDICTION OF SOFTWARE BUGS USING SUPERVISED MACHINE LEARNING TECHNIQUES

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**Abstract:** Software Bug Prediction is a critical topic in the software development and maintenance lifecycles that affects the overall success of software. This is so that software quality, reliability, efficiency, and cost can all be improved by foreseeing issues in advance. However, creating a reliable bug prediction model is a difficult endeavor, and numerous methods have been put forth in the literature. In this study, a machine learning (ML)-based prediction model for software bugs is presented. Based on past data, three supervised ML systems have been used to forecast potential software flaws. These classifiers include AdaBoost, decision trees, and Bagging. The evaluation method demonstrated that ML algorithms may be applied successfully and accurately. In order to evaluate the suggested prediction model with other strategies, a comparison measure is also used. The gathered data indicated that the ML technique performs better.

**Keywords:** Machine Learning (ML), AdaBoost, decision trees, and Bagging

## I. INTRODUCTION

The presence of programming bugs influences decisively on programming dependability, quality and support cost. Accomplishing without bug programming additionally is difficult work, even the product applied cautiously in light of the fact that most time there is covered up bugs. As well as, creating programming bug forecast model which could foresee the broken modules in the beginning stage is a genuine test in programming.

Programming bug expectation is a fundamental movement in programming improvement. This is on the grounds that anticipating the buggy modules preceding programming organization

accomplishes the client fulfillment, further develops the general programming execution. In addition, foreseeing the product bug early further develops programming variation to various conditions and builds the asset use.

Different strategies have been proposed to handle Software Bug Prediction (SBP) issue. The most realized methods are Machine Learning (ML) procedures. The ML methods are utilized broadly in SBP to anticipate the buggy modules in light of authentic issue information, fundamental measurements and different programming processing strategies.

In this paper, three regulated ML learning classifiers are utilized to assess the ML abilities in SBP. The review examined AdaBoost classifier, Decision Tree (DT) classifier and Bagging classifier. The talked about ML classifiers are applied to three distinct datasets got from [1] and [2] works.

The remainder of this paper is coordinated as follow. Segment 2 presents a conversation of the connected work in SBP. An outline of the chose ML calculations is introduced in Section 3. Area 4 depicts the datasets and the assessment procedure. Trial results are displayed in Section 5 followed by ends and future works.

## II. RELATED WORK

There are many examinations about programming bug forecast utilizing AI methods. For instance, the concentrate in [2] proposed a direct Auto-Regression (AR) way to deal with anticipate the flawed modules. The review predicts the product future shortcomings relying upon the authentic information of the product amassed deficiencies. The concentrate likewise assessed and contrasted the AR model and the Known power model (POWM) utilized Root

# Coal Mine Safety Monitoring and Alerting System using IOT Based

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## ABSTRACT

In our day to day life electric power is more important and the power generating many more types. And one of its mining So our project fully based on mine safety and alerting system with uses of IOT (Internet Of Things). Here we used a robot for analyzing the danger in undergoing mining. So we are going to use LDR sensor, GAS sensor, RF sensor, LM35 (temperature sensor) and micro camera for visualization for controller operating the robot. Now we see uses of sensor LDR (light dependent resistor) when LDR is dark place its resistances is high and, when the LDR is light places its resistances is low, GAS sensor is used for identify the carbon dioxide percentage in mining places, the mine engineers work in underground so the LM35 sensor used to measuring the temperature, RF is master controller and it will be rise the message on IOT. So we conclude that it will be useful for mine engineering safety.

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## I. INTRODUCTION

Standard coal mine noticing structures are routinely wired association systems that expect a huge part in choosing coal mine prosperity. If any kind of explosion occurs, the wired network will get damaged and it is very difficult to replace it.

It will take high time consumption to repair those networks. In order to overcome this, the coal mine safety measurement system using Internet of Things was designed and implemented. The device entails creating a Wireless Sensor Network (WSN) using an Arduino UNO controller to track the underground mine's condition.

This further develops creation wellbeing control and lessens coal mineshaft mishaps. Remote sensor networks are comprised of countless micro sensor hubs that have a little volume and minimal expense and can be conveyed anyplace, while laying link for underground checking is a complex, time consuming, and exorbitant operation.

The model is comprised of a gas sensor, a temperature sensor, also, a moistness sensor (AM2302), Heart thump sensor, Vibration sensor, Blood rate sensor, MEMS sensor, A force supply unit, LED show and a ringer.





## II. MATERIALS AND METHODS

Coal mining is the most common way of removing coal starting from the earliest stage. Steel and concrete businesses use coal as a fuel for extraction of iron from iron metal and for concrete creation. Underground mining industry goes to the class, where every single boundary, for example, methane gas, high temperature, fire mishaps, etc., must be checked consistently. Safe creation level of coal mineshaft is still low, debacles in coal mineshaft happen habitually, which lead to incredible loss of ownership and life.

The calamities occurring in coal mineshaft are because of the intricacy of mine current circumstance and the assortment of work completed in coal mineshaft, so it is extremely important to screen the workplace of coal mineshaft. To move past this issue our activities has proposed a remote sensor organization's application in coal mining wellbeing framework.

In this remote sensor organization's application framework there will, be ace regulators and slave regulators. Slave regulators will distinguish the risk and give alert through RF to dominate regulator and it will bring the caution up in all passages and furthermore raise message on IOT, which will assist with making a move at the earliest opportunity.

This checking and alarming framework is fuelled by Atmega328 microcontroller for ace regulator and 8051 miniature regulators for slave regulators. 8051 miniature regulator comprises of temperature sensor, methane and carbon dioxide sensor and RF transmitter which gathers temperature, stickiness and methane esteems underground of coal mineshaft.

## III. TEMPERATURE SENSOR THE LM35

The LM35 series integrated circuit temperature controls, the output voltage of which is linearly proportional to the temperature of Celsius. The LM35 therefore has a more flexible sensor compared to the Kelvin calibrated linear temperature sensors as there is no need for the user to subtract substantial constant voltage from their output to achieve convenient Centigrade scaling.

The LM35 does not require external calibration or trimming to provide standard precision of  $\pm 1/4^\circ \text{C}$  at room temperature and  $\pm 3/4^\circ \text{C}$  at -55 to +150  $^\circ \text{C}$ . This fire sensor circuit mishandles the temperature distinguishing property of an ordinary sign diode IN 34 to recognize heat from fire.

At the present time it recognizes heat, an uproarious alarm reproducing that of Fire separation will be made. The circuit is unnecessarily unstable and can distinguish a climb in temperature of 10 degree or

more in its locale. Ordinary sign diodes like IN 34 and OA 71 shows this property and the inside restriction of these contraptions will lessen when temperature rises. The fire sensor circuit is exorbitantly sensitive and can recognize a rising in temperature of 10 degree or more in its locale. Standard sign diodes like IN 34 and OA 71 showcases this property and within restriction of these devices will lessen when temperature rises. In the pivot uneven mode, this effect will be progressively basic. Ordinarily the diode can make around 600 mille volts at 5 degree centigrade. For each degree rise in temperature; the diode makes 2 mV yield voltage.

That is at 5 degree it is 10 mV and when the temperature rises to 50 degree, the diode will give 100 mille volts. This voltage is used to trigger the remainder of the circuit. Transistor T1 is a temperature controlled switch and its base voltage depends upon the voltage from the diode and from VR and R1. Commonly T1 conducts (as a result of the voltage set by VR) and LED sparkles. This shows run of the mill temperature.



LM35 TEMPERATURE SENSOR Outputs 10mV per Degree that can also be read directly on multimeter or read in to microcontroller. For example at 30 degree celcius it will output 300mV at linear scale. The LM35 series are precision integrated-circuit temperature sensors, whose output voltage is linearly proportional to the Celsius (Centigrade) temperature. The LM35 thus has an advantage over linear temperature sensors calibrated in  $^\circ \text{Kelvin}$ , as the user is not required to subtract a large constant voltage from its output to obtain 25 convenient Centigrade scaling.

## IV. GAS SENSORS

Gas sensors are devices that can detect the presence and concentration of various hazardous gases and vapors, such as toxic or explosive gases, volatile organic compounds (VOCs), humidity, and odors Fragile material of MQ-2 gas sensor is SnO<sub>2</sub>, which with lower conductivity in clean air. Right when the goal burnable gas exist, the sensor's conductivity is progressively higher close by the gas center rising. You should use clear electro circuit, Convert change



of conductivity to look at caution sign of gas obsession. MQ2 gas sensor has high affectability to LPG, Propane and Hydrogen, also could be used to Methane and other burnable steam, it is with negligible exertion and suitable for different application.

Sensor is delicate to flammable gas and smoke. Smoke sensor is given 5 volt to control it. Smoke sensor show smoke by the voltage that it yields. More smoke more yield. A potentiometer is given to change the affectability.

In any case, when smoke exist sensor gives a basic resistive yield reliant on union of smoke. The circuit has a hotter. Power is given to hotter by VCC and GND from power supply. The circuit has a variable resistor. The check over the pin depends upon the smoke in air in the sensor. The deterrent will be cut down if the substance is more. Besides, voltage is extended between the sensor and weight resistor. 9 GSM Module

This GSM modem has a SIM800A chip and RS232 interface while enables easy connection with the computer or laptop using the USB to Serial connector or to the microcontroller using the RS232 to TTL converter.



Once you connect the SIM800 28 modem using the USB to RS232 connector, you need to find the correct COM port from the Device Manger of the USB to Serial Adapter.

Then you can open Putty or any other terminal software and open an connection to that COM port at 9600 baud rate, which is the default baud rate of this modem. Once a serial connection is open through the computer or your microcontroller you can start sending the AT commands. When you send AT commands for example: "AT\r" you should receive back a reply from the SIM800 modem saying "OK" or other response depending on the command send.

## V. WIFI MODULE

Is a self-contained SOC with integrated TCP/IP protocol stack that can give any microcontroller access to your WiFi network.

The ESP8266 is capable of either hosting an application or offloading all WiFi networking

functions from another application processor. Each ESP8266 module comes pre-programmed with an AT command set firmware, meaning, you can simply hook this up to your Arduino device and get about as much WiFi-ability as a WiFi Shield offers (and that's just out of the box)! The ESP8266 module is an extremely cost effective board with a huge, and ever growing, community. 10 This module has a powerful enough on-board processing and storage capability that allows it to be integrated with the sensors and other application specific devices through its GPIOs with minimal development up-front and minimal loading during runtime. Its high degree of on-chip integration allows for minimal external circuitry, including the front-end module, is designed to occupy minimal PCB area.



The ESP8266 supports APSD for VoIP applications and Bluetooth co-existence interfaces, it contains a self-calibrated RF allowing it to work under all operating conditions, and requires no external RF parts.

There is an almost limitless fountain of information available for the ESP8266, all of which has been provided by amazing community support. In the Documents section below you will find many resources to aid you in using the ESP8266, even instructions on how to transform this module into an IoT (Internet of Things) solution.

## VI. DC MOTOR

A DC motor is an electrical machine that converts electrical energy into mechanical energy The working of DC motor is based on the principle that when a current carrying conductor is placed in a magnetic field, it experiences a mechanical force. The direction of the mechanical force is given by Fleming's Left-hand Rule and its magnitude is given by  $F = BIL$  Newton. The working of the AC motor (Induction motor and Synchronous Motor) is different from the DC motor.



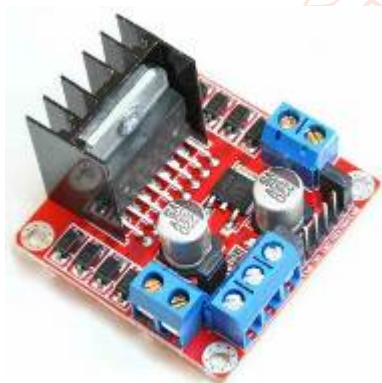
DC motor working There is no basic difference in the construction of a DC generator and a DC motor. In fact, the same DC machine can be used interchangeably as a generator or as a motor. Like generators, there are different types of DC motors which are also classified into shunt-wound, series-wound and compound-wound dc motors.

DC motors are seldom used in ordinary applications because all electric supply companies furnish alternating current. However, for special applications such as in steel mills, mines, and electric trains,

It is advantageous to convert alternating current into direct current in order to use dc motors. The reason is that the speed/torque characteristics of DC motors are much more superior to that of AC motors. Therefore, it is not surprising to note that for industrial drives, DC motors are as popular as three-phase induction motors.

## VII. DC MOTOR DRIVE

If you are planning on assembling your new robot friend, you will eventually want to learn about controlling DC motors.



One of the easiest and inexpensive way to control DC motors is to interface L298N Motor Driver with Arduino. It can control both speed and spinning direction of two DC motors And as a bonus, it can even control a bipolar stepper motor like NEMA 17. Controlling a DC Motor In order to have a complete control over DC motor, we have to control its speed and rotation direction. This can be achieved by combining these two techniques.

DC motor Drive 14 PWM – For controlling speed H-Bridge – For controlling rotation direction PWM – For controlling speed The speed of a DC motor can be controlled by varying its input voltage. A common technique for doing this is to use PWM (Pulse Width Modulation) PWM is a technique where average value of the input voltage is adjusted by sending a series of ON-OFF pulses.

## VIII. ULTRASONIC SENSOR

ultrasonic sensors measure distance by using ultrasonic waves. The sensor head emits an ultrasonic

wave and receives the wave reflected back from the target. Ultrasonic Sensors measure the distance to the target by measuring the time between the emission and reception. An optical sensor has a transmitter and receiver, whereas an ultrasonic sensor uses a single ultrasonic element for both emission and reception. In a reflective model ultrasonic sensor, a single oscillator emits and receives ultrasonic waves alternately. This enables miniaturization of the sensor head.



The distance can be calculated with the following formula: Distance  $L = 1/2 \times T \times C$  where  $L$  is the distance,  $T$  is the time between the emission and reception, and  $C$  is the sonic speed. (The value is multiplied by  $1/2$  because  $T$  is the time for go-and-return distance.) Since ultrasonic waves can reflect off a glass or liquid surface and return to the sensor head, even transparent targets can be detected. Detection is not affected by accumulation of dust or dirt. Presence detection is stable even for targets such as mesh trays or springs.

## IX. EXISTING:

In coal mine noticing structures are consistently wired association systems that accept a critical part in choosing coal mining tunnel prosperity. In the event that any sort of blast happens, the wired organization will get harmed and it is extremely challenging to supplant it. It will require some investment utilization to fix those networks [1-2]. To defeat this, the coal mineshaft security estimation framework utilizing Internet of Things was planned and carried out. The gadget involves making a Wireless Sensor Network (WSN) utilizing an Arduino UNO regulator to follow the underground mine's condition [3-5]. This further develops creation security control and decreases coal mineshaft mishaps. Remote sensor networks are comprised of countless miniature sensor hubs that have a little volume and minimal expense and can be sent anyplace, while laying link for underground observing is a mind boggling, tedious, and exorbitant operation.

## X. PROPOSED SYSTEM:

In coal mineshaft ventures is utilized to delivered electric force which is more significant and the force creating a lot more sorts. What's more, one of its mining, our task completely dependent on mine

security and alarming framework with employments of IOT (Internet of Things)? We utilized a robot for dissecting the risk in going through mining and observing the climate, issues. We will utilize LDR sensor, GAS sensor, RF sensor, LM35 (temperature sensor) and miniature camera for representation for regulator working the robot. Presently we see employments of sensor LDR (light ward resistor) when LDR is dim spot its protections is high and, when the LDR is light places its protections is low, GAS sensor is utilized for recognize the carbon dioxide rate in mining places, the mine designers work in underground so the LM35 sensor used to estimating the temperature, RF is ace regulator and it will be rise the back rub on IOT Fire, flood, mine breakdown, mine blast, risky environment and particulate matter are a portion of the perils related with underground mining. The mine current circumstance present underground is risky because of the outflows methane, nitrous oxide carbon monoxide and so on so we reason that it will be helpful for mine designing security.



## XI. CONCLUSION:

A real time monitoring system is developed to provide dearer and more point to point perspective of the underground mine. This system is displaying the parameters on the monitoring unit; it will be helpful to all miners present inside the mine to save their life before any casualty occurs. Alarm triggers when sensor values crosses the threshold level. This system also stores all the data in the computer for future inspection.

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# Intelligent Water Leakage Controller using Raspberry PI

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## ABSTRACT

In water supply network system, the major problem is water leakage. This system contains two sections, first part is leakage detection and automatically closes the solenoid valve to prevent the over leakage of water at the time it will send SMS to the corporation using GSM module which is according to sensor information. GPS location is used to detect where the leakage takes place. A prototype of suggested system was implemented and tested with various scenarios and the results are presented in this paper. Water source management is one of the key goal, so any country in the world of water requirement is increasing presently; involving automation in such systems will reduce human errors and will increase the efficiency and thus decreasing the supply demand gap.

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## I. INTRODUCTION

Water plays an important role in our everyday life. In day-today life people don't realize the scarcity of water. In water management system, the water consumption and water monitoring are efficient mainly in home or office. Therefore, efficient use and water monitoring are potential constraint for home or office water management system. For survival of things water is most essential one. Surface water will also help for our future needs. Water is synonymous to life, as living objects cannot live without it. This information is very useful for the better management for farmers to improve their lands and crops. Pipeline networks are the most economic safety, reliability and efficiency. If properly maintained, pipelines can last indefinitely without leaks. Pipeline systems are responsible for transport water, oil and gas. The financial losses and environmental damages are caused due to leakage in pipes.

## II. METHODOLOGY

Our idea is to take necessary action to restore the water leakage in underground pipelines with the help of raspberry pi. Based on GSM, the pipe monitoring system is located and then the hardware and software design of the system is analyzed, the real-time monitoring of Leakage-Detection in underground water-pipelines is improved by means of the effective design. At the same time, the modem monitoring system managements easily and flexibly for the requirement of this mode. The real-time monitoring for the traditional detection method by using this technology, the real time monitoring of underground water pipe is detected and overcome the shortcomings can be achieved. It also has the advantages like manpower is less; and it promotes the efficiency of the system and locating the leakage pipe timely. These data are sent to a flow sensor and it evaluates the problem if it is water leak or not. If the water leakage is detected, it alerts the buzzer alarm and sending a short text message (SMS) to the particular concern using a GSM module.

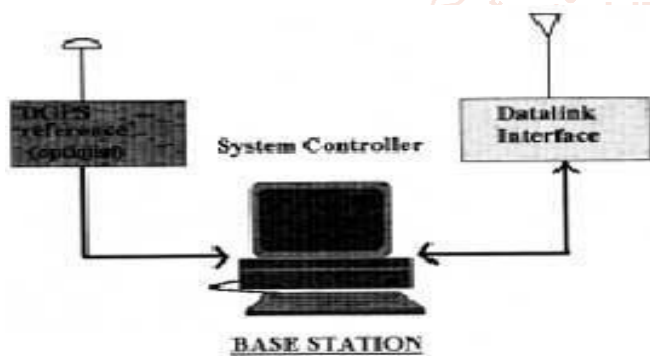




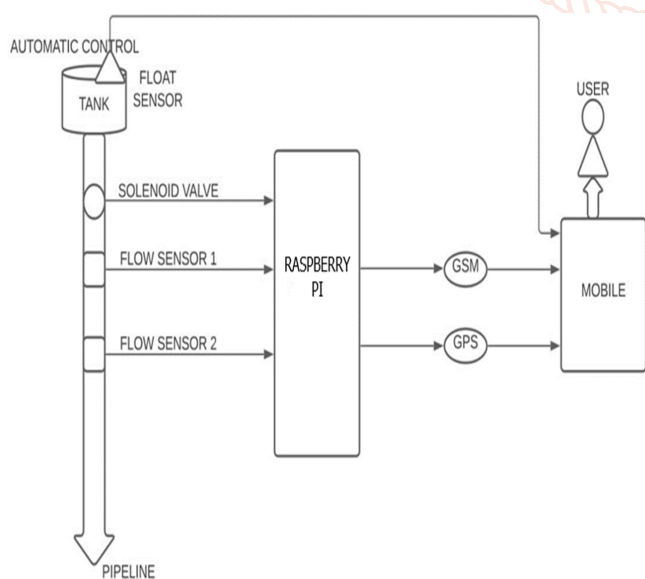
**Fig.1.GSM Modem**

**III. WORKING**

This system contains two sections, first part is leakage detection and automatically closest solenoid valve for to prevent the over leakage of water and send SMS to the corporation using GSM module according to sensor information. By using GPS location to detect where the leakage takes place. The second part is that to fill the water tank by using Raspberry pi. GPRS module enables data logging with the existing cellular network infrastructure.



**Fig.2.Base station**



**Fig.3.Block diagram**

**IV. CONCLUSION**

Smart sensor networks are a viable solution for monitoring the condition in particular the pressure

and hence leaks, of buried water pipelines. Their advantage over other commonly used leak detection methods is that they have a degree of redundancy as individual faulty nodes do not render the whole system obsolete and allow for continuous monitoring without operator intervention. This might be used to determine the location of the leak. The sensor nodes were successful deployed in field trials and they collected temperature and relative pressure data.

This water leakage detection can readily use to prevent the leakage in underground pipelines. To identify the leaks and rectify it by this system. This project aims at reducing leaks which has many benefits for the corporation as well as the consumer including greater reliability through an efficient water system and also preserving water for future use.

**V. LITERATURE SURVEY**

Monitoring the underground water pipelines is more difficult than monitoring the water pipelines located on the ground in open space. This situation will cause a permanent loss if there is a disturbance in the pipeline such as leakage. Therefore, a solution is required to detect and to determine the location of the damage when there is a leak. The detection of the leak location will use fluid mechanics and kinematics physics based on harness water flow rate data obtained using flow liquid meter sensor and Raspberry-pi as a microcontroller. The results show that the proposed method is able to work stably to determine the location of the leak which has a maximum distance of 2 metres, and it's able to determine the leak location as close as possible with flow rate about 10 liters per minute.

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# Vortex Tube Refrigeration System

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**ABSTRACT:** A vortex tube is a thermo-fluidic device, which generates both cold and hot gas from single injection of pressurised gas. Without any moving parts and chemical reaction within the tube, the interesting phenomenon of energy separation results only from fluid dynamic effects. The main part of vortex tube is a straight tube with tangentially entry, through which compressed gas is injected into the tube. There are two exit located at the different ends of tube. A controlled valve is positioned inside the tube, away from injection point, which has dimension smaller than the internal diameter of the tube and this allows the gas to escape from smaller gap between the tube and control valve. The cold exit is placed in the central part of tube near the injection valve. While the hot exit is the gap between control valve and the tube. When the compressed gas is injected tangentially into the tube hot gas will be exhausted from hot exit and cold air can be exhausted from cold exit. This phenomenon of energy separation in vortex tube is known as Ranque effect. As vortex tube does not use any harmful refrigerant, it is an Eco-Friendly component. This Eco-friendly nature and its compactness make Vortex tube to find it application in many fields like cooling the tool and work piece during machining in CNC and lathe.

**KEYWORDS:** CNC, vortex tube, controlled valve.

## I. INTRODUCTION

Refrigeration is the branch of science which deals deal with the process of removing heat and maintain the temperature of space or material below the room temperature or given temperature. In other words, it is the process of removing heat. In air refrigeration system[2], air is used as refrigerant. In olden days' air was used widely in commercial application because of its availability at free of cost. Since air does not change its change i.e. remains gaseous throughout the cycle, therefore heat carrying capacity per kg of air is small as compared to vapour absorbing system. The air cycle refrigeration, as originally designed and installed are now practically obsolete because of their low co efficient of performance and high power requirements. However, this system continues to be favoured for air refrigeration because of the low weight and volume of equipment. allowed to circulate through the cooler and then return to the compressor start another cycle. Since the air is supplied to the refrigerator at atmospheric pressure, therefore volume of air to be handled by the compressor and expander is large. [3]Another disadvantage of the open cycle system is that the moisture is regularly carried away by the air circulated through the cooled space. This lead to the formation of frost at the end of expansion process and clog the line. Thus in an open refrigeration system, a drier should be used[6].

## II. RELATED WORK

M. Yilmaz M. Kaya S. Karagoz Erdogan published a journal on A review on Design criteria for vortex tubes at Springer-Verlag on 16 October 2008 [1] explains the classification of vortex tube and some design criteria that has to be considered while designing Vortex tube. We have mentioned these design criteria in chapter-4(Important common results on design criteria of vortex tubes). This journals also explains some factors regarding selecting material for vortex tube.

Mohammad O. Hamdan, Basel Alsayyed, Emad Elnajjar published a journal on Nozzle parameters affecting vortex tube energy separation performance at springer-verlag on 27 November 2012 [2]. In this journal they increase the energy separation effect in Vortex tube by introducing number of nozzle. Later many number of tangential nozzle are placed in a device. In upcoming chapter, we have mentioned this number of nozzle as vortex Generator and we have





# Investigation of Aluminium Metal Matrix Composite by Prepared Squeeze Casting Method

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**ABSTRACT:** Squeeze casting is the combination of the casting and forging processes that can be done with help of high pressure when it is applied during melt solidification. Applying pressure on the solidification of molten metal could change melting point of alloys which enhances the solidification rate. Moreover it refines the micro and macrostructure; it is helpful to minimize the gas and shrinkage porosities of the castings. This paper stresses the importance of squeeze casting of the Aluminum Metal Matrix Composites in all aspects: squeeze pressure, casting (melt)/perform preheat/die temperature, solidification rate, reinforcement particle sizes, porosity and mechanical properties. Composite materials have led to increase the rate of development in engineering field, Metal matrix composite (MMC) are generally reinforced with other metal, ceramic organic compounds. Reinforcements significantly improved the properties such as high tensile strength, toughness, hardness, low density and good wear resistance compared to base metal. It has increasing attentiveness to fabricate composites at low cost, commonly AMMCs are used now automobile, airplane, aerospace then many supplementary fields, silicon carbide (SiC), graphite (Gr) and aluminium oxide (Al<sub>2</sub>O<sub>3</sub>) are most generally used reinforcements. Al alloy-SiC reinforcement gets increases the toughness, thickness, ductile strength then wears resistance. Al<sub>2</sub>O<sub>3</sub> reinforcement has good compressive strength and wear resistance. Gr used as the solid lubricant, between these materials, SiC and Gr particles reinforcement in hybrid composite gives low friction coefficient and high wear resistance. Al/SiC/Gr hybrid composite revealed that the presence of SiC particles has improves the strength and hardness, compensate the wearying properties of Gr. AMMC properties particle distribution has shown a very spirited role and is better by intensive shearing.

## I. INTRODUCTION

Composite materials have led to increase the rate of development in engineering field, Metal matrix composite (MMC) are generally reinforced with other metal, ceramic organic compounds. Reinforcements significantly improved the properties such as high tensile strength, toughness, hardness, low density and good wear resistance compared to base metal. It has increasing attentiveness to fabricate composites at low cost, commonly AMMCs are used now automobile, airplane, aerospace then many supplementary fields, silicon carbide (SiC), graphite (Gr) and aluminium oxide (Al<sub>2</sub>O<sub>3</sub>) are most generally used reinforcements. Al alloy-SiC reinforcement gets increases the toughness, thickness, ductile strength then wear resistance. Al<sub>2</sub>O<sub>3</sub> reinforcement has good compressive strength and wear resistance [29]. Gr used as the solid lubricant, between these materials, SiC and Gr particles reinforcement in hybrid composite gives low friction coefficient and high wear resistance. Al/SiC/Gr hybrid composite revealed that the presence of SiC particles has improves the strength and hardness, compensate the wearying properties of Gr. AMMC properties particle distribution has shown a very spirited role and is better by intensive shearing.

## II. RELATED WORK

**R Muraliraja, (2019)** “Aluminum metal matrix composites, which exhibit significantly high compressive strength, were produced through the squeeze casting process using aluminum 7075 alloy as the matrix material and 2.5 wt% alumina as reinforcement. The process parameters of squeeze casting were prudently selected based on the literature in order to obtain better mechanical properties such as compressive strength and hardness. Samples were examined using an optical microscope, energy dispersive spectroscopy, a scanning electron microscope, and X-ray diffraction analysis. The optical micrograph showed low porosity in the produced composite, which matched the porosity measured using the Archimedes principle.[1]

**T Adithiyaa, (2020)** “Rapid globalization and demand for the advanced material, hybrid materials are possessing an up marketed strategy in the field of material research. Due to the demand for lightweight and strong nature of materials,



# Mobile Operated- Automatic Drilling COBOT Machine

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**ABSTRACT:** This project is designed to build COBOT that automatically detects the obstacle on its path and guides itself whenever an obstacle comes ahead of it. This COBOT vehicle is built, using AVR Microcontroller. An ultrasonic sensor is used to detect any obstacle ahead of it. A motor driver IC and 2 DC motors are used for controlling the movement of the COBOT. A servo motor is also used in this project. The ultrasonic sensor is then mounted on the servo and by rotating the servo to different angles we will obtain the readings from the ultrasonic sensor in those angles. This will help the controller to detect the each path to navigate. A Bluetooth module is also added to the project in order to control the COBOT from your android phone when it is in manual mode.

## I. INTRODUCTION

A collaborative robot, also known as acobot, in its most basic definition is a robot which has the ability to safely work directly alongside human workers to complete a task. At Universal Robots (UR), however, we believe the accessibility of the technology through ease of deployment is similarly integral to the cobot definition. A robot that can operate directly alongside and interact with its co-workers does open up a huge number of new possibilities for task automation, but many of these possibilities could go unfulfilled if the robot system is not easy to program, affordable, and flexible enough that it can be re-deployed to different tasks at very short notice. For this reason, we strive to make UR cobots safe and collaborative, easy to program and deploy at an affordable price, to make robotic automation technology truly accessible to everyone. There are still many things that a human can do faster than a robot, due to our immense dexterity and ability to handle variations in our environment. However, for highly repetitive tasks, involving objects that are predictable in both size/shape and the orientation in which they are presented, a robot that can work for 24 hours a day without needing breaks in between is likely to result in a significant productivity gain. Often a worker's job will consist only partially of these repetitive, easy to automate tasks, so the optimal configuration can be to have the person continue doing the variable parts of the task and make use of the robot as a smart tool to speed up the repetitive parts to increase his/her overall output. This only really works if you can stand right next to the robot, passing objects back and forth. The productivity of an automated solution is also inherently easier to monitor than a manual solution, as data on the number of cycles completed by a cobot can be conveniently extracted over a network and incorporated into overall production data.

## II. LITERATURE REVIEW

**Automated Drilling Machine Based on PLC on IJISSET - International Journal of Innovative Science, Engineering & Technology, Vol. 2 Issue 3, March 2015. by Yousef M. Abueejela, A. Albagul, Ibrahim A. Mansour and Obida M. Abdallah.**

This paper aimed to design and fabricate an automated drilling machine based on PLC to produce holes (8mm depth) in the center of a cubic work pieces (3 cm x 2 cm x 3cm). The drilling machining process proposed for a cycle of drilling. The cycle process is start when the start switch is pressed; the linear motor is put in place the drilling head in home position, and rotate the rotary disk to bring the first work pieces to desired position. Meanwhile, the drilling process is running after the





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## Materials Today: Proceedings

journal homepage: [www.elsevier.com/locate/matpr](http://www.elsevier.com/locate/matpr)

# Impacts of carbon nano tubes (CNT) and boron carbide ( $B_4C$ ) particles on material properties of al 6061

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## ARTICLE INFO

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## ABSTRACT

In recent years, conventional materials are replaced with composites in particular aluminium were developed for enhanced material performance such as light weight, high strength and wear resistance etc. In this paper, aluminium hybrid metal-matrix composites (AHMC) are fabricated by stir casting technique with different compositions of carbon nano tubes (CNT) and boron carbide ( $B_4C$ ). This research work reports the tensile strength, wear behaviour, micro structural analysis of different specimens (Al 6061 with 3% CNT & 3%  $B_4C$ , Al 6061 with 5% CNT & 3%  $B_4C$ , Al 6061 with 7% CNT & 3%  $B_4C$  & Al 6061 with 9% CNT & 3%  $B_4C$ ). From these four specimens, tensile strength and the hardness of the specimen 4 is 250 MPa and 52.692 BHN respectively. By comparing the values, specimen 4 gives higher value. In addition, EDAX analysis clearly ensures the even distribution of reinforcements in different specimens. The improvements in strength are noticed when increasing the composition of CNT in Al6061 hybrid matrix composites.

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## 1. Introduction

Aluminium is the non-ferrous metal used in a variety of applications due to their plentiful desirable mechanical properties. As a result of the intensive research, a variety of aluminium composites have been developed with the goal of the improving certain material of quantities, composites are multiphase materials made up for matrix and reinforcement that were created to meet the growing demand for appealing engineering materials. Composites have superior thermal qualities and outstanding mechanical properties, such as increased fracture toughness, hardness, strength, and corrosion and wear resistance [1–3]. On the Al matrix composite, different types of reinforcements have different strengthening effects. In the Al matrix, silicon carbide ( $SiC$ ) is a well-studied reinforcement.

When compared to the native material, large percentage reinforcements, up to 15%  $SiC$ , were used to significantly increase the hardness, density, and tensile strength of the formed composite.

When compared to the native materials, the modified MMCs materials showed significant improvements in mechanical proper-

ties (e.g., lower coefficient of thermal expansion, superior wear and corrosion resistance, and improved toughness). When aluminium oxide is used as reinforcement in an Al composite, various mechanical and tribological properties such as micro hardness, wear resistance, and tensile strength improve dramatically. CNT, nano diamonds, fullerene, carbon fibre, and carbon.

Carbon are some of the most commonly used carbon-based nano materials for reinforcement applications. Ganguly et al. [4] investigated the mechanical properties of aluminium metal matrix composites (AHMC) with different weight percentage of CNT (0, 0.5, 1 and 1.5) through hardness test, tensile test, in addition with Scanning Electron Microscope (SEM) of the AHMC specimens. The results revealed that hardness and tensile strength is increases when increases the composition of CNT with AHMC. Karakoc et al. [5], produced a novel Al 6061- $B_4C$  composites utilizing powder metallurgy technique. The AHMC was reinforced with weights of 5%, 10%, 15%, and 20% of  $B_4C$ . An EDAX image shows the even distribution of  $B_4C$  with all specimens. Ravikumar and Suresh [6], the adding of support particles into the AMMCs builds to the particular wear rate, strength, stiffness and creep properties. The fundamental point of this paper to advantages of utilizing MMCs as for mechanical properties. The Al (LM24)-Gr aluminium matrix composites were created by Barekar et al. [7] using a high pressure dies

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# Ethanopharmacological Approach to Control the Replication of 2019-nCov in Host- *An Insilico* Study.

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**S.T. Kumaravel**

Paavai Engineering College

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## Research Article

**Keywords:** 2019-nCoV, Target proteins, docking, dynamics, ligand efficacy

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# ACTIVE NOISE CANCELATION IN AUTOMATIVE MUFFLER

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## ABSTRACT:

*In Day to day life our environment is getting more and more polluted and it is affected by noisier. Our people also adapted with this harsh environment so we need a new type of absorption material which is adaptive with this environment and which can be used in our vehicles to reduce the amount of noise produce by it. One of the type of abortive material is silicon carbide foam and sound absorption material. For reducing the amount of noise emitted by the exhaust of an internal combustion engine. This noise is reduced as the transmission loss (TL) when the muffler increases. Various types of components are present in the mufflers like foam, sound absorption materials, silicon carbide filter etc., which can reduce the noise. This paper explains about TL characteristics and also different methods.*

**KEYWORDS :** *Silicon carbide foam, fibrous materials, filter*

## 1.INTRODUCTION:

Over the last decade and half the amount of vehicles are increasing and due to this the amount of noise emitted by the exhaust system of vehicles and emission requirements are also getting more and more. Muffler plays an important role in reducing the exhaust and intake system noise. So there has been a great deal of research and development in the design and performance of muffler. From designer's standpoint transmission loss (TL) or insertion loss (IL) is the main characteristic performance parameter of a muffler.

**Transmission loss:** Transmission loss is the difference in sound power between the

incident wave entering and the transmitted wave exiting the muffler when the muffler termination is anechoic (no reflecting waves present in the muffler) (1). The benefit of TL is that it is a parameter of the muffler alone and the source or termination properties are not needed.

**Insertion loss:** The Insertion loss is the sound pressure level difference at a point usually outside the system, without and with the muffler present.

## 2.RESEARCH MOTIVE:

*This paper reveals the variation of transmission loss in muffler by using different*



# Investigation on laser square hole drilling of AA7475/SiC/ZrSiO<sub>4</sub> composites

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## Abstract

Compared with other machining processes, laser machining is seen as one of the time and cost effective processes in machining of metal matrix composites (MMCs). Hence, this work more focuses on analysis of laser machining parameters, namely, laser trepanning speed, laser power and standoff distance, various weight percentages of SiC and ZrSiO<sub>4</sub> are selected for investigation. Laser machining experiments were performed on SiC and ZrSiO<sub>4</sub> reinforced with Aluminium Alloy (AA7475). The performance measures, hole size at entry, surface roughness and taper angle of MMCs were evaluated. Preference Ranking Organization METHod for Enrichment of Evaluations (PROMETHEE II) was used for finding optimum process parameters. PROMETHEE II based Adaptive Network Based Fuzzy Inference System (ANFIS) was used for modelling the responses. The main contribution of this work is the analysis of the impact of reinforcement particles of the composites and laser machining parameters on the responses. The results showed that hole size at entry, surface roughness and taper angle of unreinforced alloy was less than the composite for all the processing conditions. PROMETHEE II algorithm produced a consistent result. PROMETHEE II based ANFIS model produces closer predicted value to experimental value. Scanning electron microscope is used to identify the machined defects such as recast layer, spatter and dross.

**Keywords** Aluminium · Silicon carbide · Zirconium silicate · Laser

## 1 Introduction

Metal matrix composites (MMCs) have recently developed as composite materials through addition of aluminium with silicon carbide. Compared to other metals and alloys, the major

benefits of MMCs are improved properties such as superior wear properties, better strength to wear ratio, high modulus, high-temperature resistance and better corrosion resistance [1]. These properties have enabled the use of aerospace, automotive, electronics and consumer goods. MMCs have limited applications due to low machinability [2]. Different hard reinforcement particles were added to the matrix for the improvement of properties/machinability of MMCs. Reinforcement particles including silicon nitride, boron, silicon carbide, silica sand, magnesium oxide, glass beads, titanium carbide and boron carbide were added to the matrix. B<sub>4</sub>C, SiC and Al<sub>2</sub>O<sub>3</sub> were mixed effectively to the molten aluminium. Hence, SiC was selected as one of the reinforced material. Among the various reinforcement particles, Zircon is identified as promising reinforced due to its high melting point and refractoriness and its high resistance to abrasion, impact and sudden volume changes at elevated temperatures. ZrSiO<sub>4</sub> was selected as another reinforced to the matrix. For getting the desired shape, Tool based machining and non-contact machining was used. Tool based machining of MMCs is difficult owing to the high abrasive nature of silicon carbide. High tool wear and burr formation was observed in the tool based

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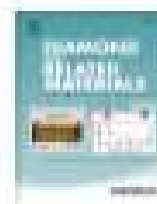
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## Progress towards a novel NO<sub>2</sub> gas sensor based on SnO<sub>2</sub>/RGO hybrid sensors by a facial hydrothermal approach

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## ARTICLE INFO

## Keywords:

SnO<sub>2</sub> reduced graphene oxide

FET junction

Hydrothermal

Chemical sensor

NO<sub>2</sub> gas

High sensitivity

## ABSTRACT

The integration of semiconducting metal oxides and carbonaceous materials has been sufficiently shown to be an efficient method to improve the sensing properties of gas sensors. The present investigation concerns the solution-based hydrothermal production of SnO<sub>2</sub> nanoparticles (NPs) decorated reduced graphene oxide hybrid sensors. The microstructure and elemental composition of the samples were analyzed through XRD, SEM, TEM, EIT and XPS analysis. The concentration of rGO in SnO<sub>2</sub> is varied from 0 to 5 wt%. In the meantime, a series of resistance-type gas sensors based on composite SnO<sub>2</sub>/rGO and pure SnO<sub>2</sub> were manufactured and tested for gas sensing analysis towards NO<sub>2</sub> and CO<sub>2</sub>. The composite sensor exhibited enhanced sensing performance towards NO<sub>2</sub> gas such as high response (89.9), fast response (12 s) and recovery time (34 s), selectiveness and repeatability. The synergistic impact of SnO<sub>2</sub> and rGO significant function is enhancing sensing behavior. Improvement mechanism that is responsible for the superior sensing properties of the nanocomposite is also discussed.

## 1. Introduction

The global gas sensor market size is evaluated at \$1 billion and is predicted to reach \$8 billion by 2020. There is a wide range of industries applying gas sensors for monitoring and diagnosis, for example, in healthcare (for early detection of noncommunicable diseases to reduce annual premature mortality rates by 25% according to World Health Organization report); agriculture (for monitoring food quality, detecting crop diseases and insect infestations); defense (for detection of explosives and chemical warfare agents); and environment (for detection of VOC pollutants accounting for 37% (540 kt/year) of total emission according to Environment and Climate Change Canada report). The use of sensors to detect gas is widely considered as a means of prevention. In the last few decades, several types of gas sensors have developed with different materials and transduction platforms. The main substances used as a gas detector include metal oxide semiconductors, intrinsic conduction polymers, conductive composite polymers, metal oxide/composite polymers, and other new materials. These materials can be used on different transduction units, otherwise known as chemiresistive surface acoustic waves (SAW), quartz crystal microbalance (QCM), optical transducer, and metal oxide semiconductor field-effect transistor (MOSFET). Based on the research that has been done, the chemiresistive

metal oxide semiconductor is a material that has the greatest potential for gas sensor technology.

Metal oxide semiconductor gas sensors have several advantages, including low production cost, high sensitivity, fast response and recovery time, simple electronic interface, ease of use, low maintenance, and the ability to detect large amounts of gas. In general, metal oxides are classified into two types: n-type and p-type [1–5]. At the same time, metal oxide semiconductors have two types: n-type (the majority of carriers are electrons) and p-type (the majority of carrier is the hole). Most of the metal oxide semiconductors are n-types due to electrons produced naturally by oxygen [6,7]. However, the p-type semiconductor has a lower working temperature when compared to the n-type [8]. Sensor-based metal oxide semiconductors are used to detect the target gases through a redox reaction between the target gases with the oxide surface [9,10]. Due to their high surface area, it is necessary to achieve high response for electrical signals. Metal oxide nanomaterials also have broad variety of possible applications fields such as power storage [11], wave absorption [12], catalysts [13] and the gas sensor [14]. Gas sensors based on metal oxides are of excellent quality. Significance for a wide variety of practical applications, such as tracking indoor air quality, identification of volatile organic compounds (VOCs) or other poisonous gases, environmental control of agricultural

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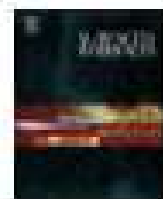
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## Effect of polypyrrole incorporated sun flower like $Mn_2P_2O_7$ with lab waste tissue paper derived activated carbon for asymmetric supercapacitor applications

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### ARTICLE INFO

#### Keyword

$Mn_2P_2O_7$

Activated carbon

Polypyrrole composite

Asymmetric supercapacitor, High stability

### ABSTRACT

In this work, we developed lab waste tissue paper derived activated carbon and bare  $Mn_2P_2O_7$ /NF and polypyrrole (PPy) incorporated  $Mn_2P_2O_7$ /NF@PPy materials by using hydrothermal and chemical polymerization methods. The phase confirmation, structural morphology, surface area information and chemical composition of prepared materials were characterized by using XRD, FTIR, SEM, BET and XPS analysis. In electrochemical results of activated carbon,  $Mn_2P_2O_7$ /NF and  $Mn_2P_2O_7$ /NF@PPy electrodes capacitive and diffusive behaviour are discussed in this article. In effect of polypyrrole incorporated  $Mn_2P_2O_7$ /NF@PPy electrode exhibits high specific capacitance of  $658 \text{ Fg}^{-1}$  at a current density of  $1 \text{ Ag}^{-1}$  compared with a bare electrode. The fabricated asymmetric device by using activated carbon as anode and  $Mn_2P_2O_7$ /NF@PPy material as cathode material and delivers a high energy density of  $27.4 \text{ Whkg}^{-1}$  compared with recent developed activated carbon and polypyrrole based devices.

### 1. Introduction

In around the world all people's lives depend on various energy sources. The fossil fuels (Coal, Petroleum and natural gas) performs most important role for every peoples life. In the fossil fuels release dangerous gases (sulphur dioxide and carbon dioxide) and pollute environment due to greenhouse effect and global warming. So, the researchers focused on next generation renewable energy sources like battery, solar cell and supercapacitor [1–5]. Recent days, worldwide battery techniques (lithium) used for many electrical devices cell phones, laptops, power banks and vehicles. Typically, the batteries have many disadvantages like high cost, harmful, low power density and short cycle life [6–8]. Hence, researchers further focused to improve the energy storage in the practical devices. Because, the supercapacitor are delivered a high power density, fast charging/discharging process, high cyclability, long term stability, high specific surface area, and high electric conductivity, resistance to electrochemical oxidation / reduction [9–11]. Whilst supercapacitor is based three categories: Electric double layer capacitor (EDLC), pseudo capacitor (Cp) and hybrid super capacitor [12,13]. Among them, EDLC electrodes are carbon based and performed at

electrostatically mechanism. The pseudo-capacitor used for various types of electrodes such as Transition metal oxide, metal hydroxide, metal sulphide, metal phosphate, and metal pyrophosphate and conducting polymers are worked as faradaically behaviour. Hybrid capacitor consist of two types of electrodes for capacitor-like and battery-like electrode performance [14–16]. Currently, researchers are working at various type electrodes (EDLC, Pseudo, and Hybrid). Recent publication of long Zhang et al reported Porous 3D graphene based supercapacitor delivered by ultra-high specific surface area  $3023 \text{ m}^2/\text{g}$  for supercapacitor application [17]. Yaoyao Xiao et al published  $MnO_2$  pseudo-capacitor delivers large areal capacity  $0.77 \text{ Fcm}^{-2}$  at  $50 \text{ mA cm}^{-2}$  work published at Yaoyao Xiao et al [20]. Anodic and cathode of potassium-ion hybrid capacitor delivers high energy density like  $191 \text{ Wh Kg}^{-1}$  and ultra-long lifespan 62.3 % after 8000 cycles reported by Xiang Liu et al [21].

In recent times, transition metal phosphate based materials are attracting more attention for various fields of catalyst, sensors, energy storage and photonics. Generally, the phosphate group divided by three categories for  $PO_4^{3-}$ ,  $P_2O_7^{4-}$  and  $P_3O_{10}^{5-}$ . Since, the phosphate group of  $Mn_2O_7$  is novel cathode electrode for SC application and M represents

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