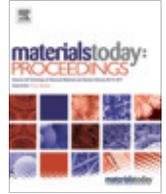




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Artificial neural network based prediction of responses on eglin steel using electrical discharge machining process

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ABSTRACT

The contribution of steel in metal industries is rapidly increasing due to its excellent properties. Eglin steel is one of the high strength steel which is used in shield, aerospace, bridges and commercial purposes. In this work, the Eglin steel is machined by Electrical Discharge Machining (EDM) process due to its high hardness. Artificial Neural Network (ANN) is used to forecast the outcome, such as Material Removal or Material Deletion Rate (MDR). Radial Basis Function (RBF) is used to develop the ANN model which is used to predict the responses. The optimum architecture is obtained through MATLAB by control the neurons and hidden layers. The errors are determined through the comparison of experimental results and ANN predicted results. The material properties and the contribution of each parameter are also discussed through analysis of variance.

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1. Prologue

The electric discharge or spark erosion machining was used to produce fine holes with good dimensional precision [1]. Processing of material, EDM, parameters and its effects were studied on alpha beta brass [2,3]. The metal deletion rate and surface quality related experiment was conducted on wire electrical discharge machining of EN 42 spring steel, tool steel [4,5]. Spark gap voltage was given the maximum effect on machining rate while electrical discharge machining of H13 steel [6]. The material deletion rate was directly proportional to the current intensity and it was providing greatest changes in material surface of duplex brass [7]. In recent days, many engineering and science oriented problems are solved by the Artificial Neural Network method. The ANN model was used to analyze the correlation of the factors and it has been decided the outcome [8–10]. ANN based optimization was applied on electrical discharge machining of alpha beta brass. The experimental results and ANN models were lies in good agreements [11]. The

relay node based routing model and algorithm was used in sensor network to estimate the investigational outcomes with considerable improvements [12]. Wireless sensor network was similar to artificial neural network used to effective communication which it consists of nodes were used to connect the source and sink [13]. ANN models with back propagation algorithms were involved to decide the responses on electric discharge machining of Inconel-718 [14,15].

2. Material properties

Eglin steel has more attractive properties like as ultra high strength, toughness, hardness and wear resistant. The chemical composition of Eglin steel was shown in Table 1. It has various important alloying elements such as iron, carbon, silicon, manganese, chromium, molybdenum, nickel, tungsten and copper. The other elements are added only a very low weight percentage, such as phosphorus, sulfur, calcium and aluminium. Silicon and nickel were added to improve toughness. Strength and hardenability was enhanced through chromium and molybdenum. The various material properties of Eglin steel were shown in Table 2.

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Wear experimentation on Tantalum carbide-based Niobium MMC

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Wear experimentation on Tantalum carbide-based Niobium MMC

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Abstract. The niobium and its alloys have been used for automobile, marine, and aerospace due to its superior properties such as a lightweight ratio, strength, corrosion resistance, thermal and electrical conductivity. The present work was used to improve the substance properties such as hardness and wear. Tantalum Carbide (TaC) reinforced niobium metal matrix composite (MMC) was produced through the stir casting route. The specific wear rate was determined through a pin on disc tribometer with respect to the input actors such as sliding velocity, load, and temperature. Taguchi optimization was applied to found the optimal parameters. The variance analysis was used to found the influential factor in the wear rate.

Keywords. Wear, Pin on disc tribometer, Niobium MMC, Tantalum carbide, Optimal parameters.

1. Introduction

Niobium was malleable, ductile and it has a body-centered cubic structure. It has better physical and chemical properties. It has the best suitable for high-temperature-resistant applications. Niobium carbide was mostly used in cutting tools. Niobium becomes a superconductor at cryogenic temperatures. It has greater toughness, strength, formability, and weldability behaviors. The effect of microstructure and its wear characteristics were studied in titanium carbide-based cermets [1]. Tribological properties and wear prediction model were conducted in nickel alloys [2-3]. Wear resistance was investigated in tungsten carbide reinforced copper MMC [4]. Wear resistance has been increased when the addition of reinforcement particles in Al-Si alloy [5]. The effect of sliding distance on wear rate was analyzed in heat-treated Al-SiC composite [6]. Effect of heat treatment and wear





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Experimental investigation of injection moulding using thermoplastic polyurethane

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ABSTRACT

In recent days, moulding of thermoplastic is difficult process. Injection moulding is one of the most imperative plastic processing technologies. The melted plastics were passed to the closed die unit through thrust of the screw or plunger. In this experimental work, Thermoplastic Polyurethane (TPU) was used as the processing material of injection moulding. The different input factors were applied to operate the injection moulding such as moulding temperature, cooling time and injection pressure. The response of each specimen of tensile strength was measured with respect to the change of input factors. Taguchi optimization, regression model and variance analysis have been conducted.

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1. Introduction

Injection molding is the suitable method for producing plastic components. The intricate shapes can be designed and manufactured through high pressure obtained from injection moulding method. The strength of the plastic components was enhanced through addition of filler materials. It was one of the environment-friendly processes and it can be reduced the waste of the materials. Thermoplastic polyurethane has high elasticity, impact strength, flexibility over a wide temperature range and high-energy radiation resistance. It was widely used in automotive, agriculture, conveyor belt, gaskets and tubes. Thermoplastic Polyurethane can be processed through injection moulding. Injection molded polyurethane characteristics were investigated. Non-homogeneous surfaces were produced due to the poor mixing of polyol and isocyanate [1]. Injection mould design and its effect on quality of the moulding components were analyzed [2]. The thermal degradation behavior and chemical properties were studied for synthesized Thermoplastic Polyurethane [3]. Thermoplastics with thermoset rubbers were produced through two component injection moulding process [4-6]. The surface roughness of the injection molded components has been decreased when

increase of mould temperature [7]. The process parameters optimization was conducted on plastic injection molding process [8,9]. Taguchi optimization was used to maintain the quality characteristics of plastic injection molding process [10,11]. The moulding components and its different moulding temperatures were investigated during injection moulding of photopolymer [12]. Influence of injection parameters on mechanical properties were analyzed in plastic injection molding [13]. The factors such as mould temperature and bonding strength were investigated in polymer using injection moulding [5]. The cooling time and its effects were studied in injection moulding process [14].

The present concept was used to describe the experimental investigation of injection moulding using thermoplastic polyurethane and its process parameters were optimized through taguchi technique.

2. Experimental details

The experimental setup for injection moulding machine was shown in Fig. 1. It consists of plunger, heating element and die units. The thermoplastic polyurethane was used as the work material with the cube size of 2 mm³. The melting point of thermoplastic polyurethane was 145.69 °C. The hopper which it has rests over the heating element and its collect the raw materials of TPU. The raw material was transferred to the heater through movable plun-

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Performance estimation and redesign of horizontal axis wind turbine (HAWT) blade

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ABSTRACT

The present global energy crisis has pushed the human race to its limit in search of alternative sources of energy. Wind turbine technology has seen continuous developments ever since the humankind has been on the lookout for harnessing the wind energy. The modern design analysis tools and the emergence of new materials have enabled the development of state-of-the-art wind turbines. The main power-producing component in the turbine is none other than the blade itself which has undergone a major design improvement in the recent past. The Present work comprises of re-design of a composite blade of an experimental Horizontal-axis Wind turbine with appropriate structural modifications to reduce its weight and hence improving its efficiency. A load generation code V BLADE was developed in C-language for calculating the design wind loads on the turbine blade. An optimized and efficient blade design with spar-rib construction was arrived satisfying the power requirements and structural design criteria through structural optimization by deploying FEA SW satisfying static and buckling design constraints. The optimization resulted in a substantial blade weight reduction of thirty-nine percent.

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1. Introduction

A quarter of the world's population does not have access to electricity and out the most are living in developing countries. The possibility of using an electrical stove for cooking makes the process much faster and using a refrigerator helps to preserve food. But for all these devices the major energy source being electricity, is being the most sought out and various alternative sources of energy are being adopted [7]. Among them, wind energy can be an economical and efficient source. In India currently produce 11.15 GW of energy in the form of wind, which has a great scope of getting increased with the new design in wind turbines and

newer engineering methods to optimize the design for a better performance of the wind turbine as a whole. The closed-loop wind tunnel was designed and simulated with their flow parameters using Computational Fluid Dynamics. More importance was given to designing of vanes at the corners and upstream turns. Error below 10% was obtained from the validation of the test specimens compared to others [1]. In a vertical axis wind turbine, solid blockage and wake have been investigated in the closed section. Two various wind tunnels are tested to identify the blockage effects. Wake proportions and large wall interactions of these developed models are low [2]. By modifying the wind blade design, the efficiency can be increased even at low and medium wind speeds by choosing the desired orientation and cross-section size of the airfoil [3]. Also, wind tunnel turbines models have been subjected to wind tunnel testing from aerodynamic level to control and aero-elasticity for specifying the application's efficiency [4]. Similarly, Blade Element Momentum (BEM) codes have been used to compare the obtained wind tunnel testing results, which was good [5]. In cold regions, the icing was the big issue which spreads on

Abbreviations: FEA, Finite Element Analysis; HAWT, Horizontal Axis Wind Turbine; GFRP, Glass Fiber Reinforced Polymer; C_L , Lift Coefficient; CFD, Computational Fluid Dynamics; BEM, Blade Element Momentum; CLT, Classical Laminate Theory.

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Autonomous Drone using Pixhawk Flight Controller with Live Stream and Mask Detection Features

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Abstract— Drones (Unmanned Aerial Vehicle) are rapidly gaining popularity as a target tracking, and monitoring facility, surveillance tool. A lot of situations, more than a number of Unmanned Aerial Vehicle must fly to an area of interest as live video is being streamed to a ground station, where one or more operators inspect the area of interest and fine-tune the Drone's location.

Keywords—Drone, Flight Controller, Multi rotor, Live stream

I. INTRODUCTION

Drone is the other name of the unmanned aerial vehicles; they are small aircraft that fly by them. Unmanned aerial vehicles (UAVs) are a type of unmanned aircraft. The unmanned aircraft system (UAS) consists of a UAV, a ground-based controller, and a communication system between the two. Drone can fly with various angle with autonomously and also with the help of human under control of remote.

II. ROTOR

A. Fixed Wing

A fixed-wing drone is one with a single rigid wing that can only fly in one direction. To resemble an aeroplane in appearance and operation. What distinguishes fixed-wing drones from other types of drones? With vertical lift rotors, they can't remain in one position for long, so they float along a fixed as long as their electricity permits. As a result, they can be significantly more effective than the other two types of drones. Wings that have been fixed in the military, unmanned aerial vehicles (UAVs) are commonly used when manned flight is deemed too dangerous or difficult. In addition, they are employed in the private sector.

B. Vertical Take off and landing

The benefits of fixed-wing UAVs are combined with the ability to hover in a new form of hybrid that can take off and land vertically. There are a number of different styles in production; some of them are only modified fixed-wing planes with vertical lift motors attached. 'Tail sitter' aircraft, for example, are another choice. which resemble conventional planes However, 'tilt rotor' planes, which can swivel their rotors or even the entire wing with propellers attached from pointing upwards for takeoff to pointing horizontally for forward flight, rest on their tails on the ground, pointing straight up for takeoff before pitching over to fly normally, and 'tilt rotor' planes, which can swivel their rotors or even the entire wing with propellers.

C. Single Rotor

Single-rotor drones are powerful and resemble helicopters in terms of construction and design. They have a single large rotor that resembles a revolving wing. A small rotor for direction and stability on the tail.

D. Multi Rotor

The most popular type of drone for getting a "eye in the sky" is the multi-rotor drone. This camera is commonly used for aerial photography, recording, and surveillance. It is used by both professionals and hobbyists due to its small size and ready-to-fly capabilities. Multi-rotor drones are also the least expensive and easiest to build. Their bodies are covered in rotors and can be further classified according to the number of them on the drone's platform. There are three rotors on a tri-copter, four on a quadcopter, six on a hexacopter, and eight on an octocopter. Quadcopters are the most popular multi-rotor drones.

III. QUADCOPTER

Before choosing a drone that meets the application's requirements and specifications, there are many factors to

DESIGN AND AERODYNAMICS ANALYSIS OF PLANE FLAPS

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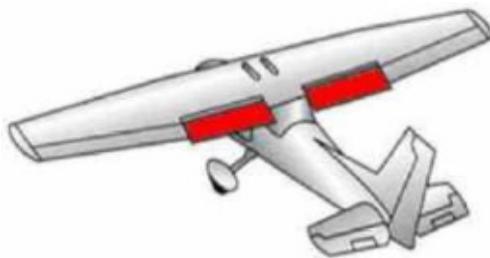
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Abstract - High lift devices (HLD) are designed to expand the flight envelope by changing the local geometry (mechanization wing), they generally camber changes depending on the phase of flight (landing, take-off). As controls, the aircraft they developed aeromechanical has effects with implications for the resistance structure of the wings, and the most important effect is the twisting of the wing. The article desires an analysis of the 2D aerodynamic profile with changes in curvature at trailing edge. This study extends an existing semiempirical approach to high-lift analysis by examining its effectiveness for use with a three-dimensional aerodynamic analysis method.

HIGH LIFT DEVICES

High lift devices used for bearing surfaces are designed to expand the flight envelope by changing the local geometry (wing mechanization) according to phases of flight of the aircraft. The methods used to increase the maximum lift coefficient $C_{L_{max}}$ rely on either modifying the profile geometry (passive systems) or boundary layer control (active systems) or the combination of both methods. High lift studies systems based solely on increasing the bearing surface (type wing folding or telescoping wing). In carrying devices high lift continuity conditions are imposed to the lifting surfaces produces by the drag increase when high lift is un-prancing and keeping balance during turning to avoid decoupling aerodynamic moments. Bank-angle modulation, also known as bank-angle steering, modifies the orientation of an entry vehicle with a non-zero lift-to-drag ratio (L/D) in order to control the direction of its lift vector. Bank angle is the angle between the lift vector and the local vertical. Controlling a vehicle's bank angle changes a vehicle's trajectory by modifying the magnitude of its vertical lift allowing it to satisfy trajectory constraints, such as downrange distance or peak heating. An entry vehicle performs attitude maneuvers to modify the bank angle via Reaction Control System (RCS) thrusters located around the vehicle.

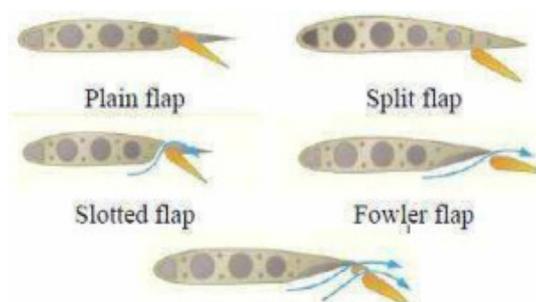
FLAPS OF CESSNA



potentially enables the use of the pressure-difference rule for prediction.

In a previous study we demonstrated the utility of a semi-empirical approach to high-lift analysis using a vortex-lattice analysis combined with empirical relationships for lift effectiveness that account for non-linear effects such as large deflection angles and viscosity.⁴ The vortex-lattice analysis is valid for conventional aircraft configurations, but it may be desirable to use a three-dimensional potential flow solution for some unconventional aircraft, such as a blended wing-body or double-bubble fuselage, or for aircraft with low aspect-ratio or highly-swept wings. In addition, a three-dimensional analysis

TYPE OF FLAPS



PAPER • OPEN ACCESS

Three-dimensional Computational Analysis of Transverse Injection in a Supersonic Combustor

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Three-dimensional Computational Analysis of Transverse Injection in a Supersonic Combustor

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Abstract. The scramjet engine plays a promising role for a successful future hypersonic flight system. The performance of scramjet system depends on many factors like mixing rate of fuel and air, proper flame stabilization mechanism and suitable injection system. The flame stabilization is provided by means of introducing a Cavity along the wall of the combustor. The cavity effects on the performance of supersonic combustion will be studied here with the help of three-dimensional combustor CFD model. The reliability of the numerical results obtained by using the computational approach depends on the proper validation of the CFD code with their corresponding experimental results. The corresponding experimental results from the literature will be identified and used here for the validation of the numerical code. The final CFD results after its validation with the experimental results will be presented in terms of x-y plots and contours for the discussion.

1. Introduction

This chapter will provide a basic introduction to scramjet technology by presenting the definition, historical timeline, possible applications, and the current status of scramjet engines.

1.1 Definition of a Scramjet Engine

A SCRAMJET engine shown in figure 1 and 2 (which stands for Supersonic Combustion RAMJET) is a major development in air breathing propulsion system where combustion occurs in supersonic mode. The supersonic combustion ramjet or scramjet engine provides high thrust and low weight for hypersonic flight vehicles. Unlike a conventional turbojet engine or ramjet engine, a scramjet engine has no complex moving parts. It consists of a diffuser at inlet, nozzle at the exit and a combustor having a fuel injector, and flame holder. The combustion chamber consists of different types of fuel injection system (transverse, parallel or angled injection scheme), flame stabilization mechanism and fuel ignition for the sustained combustion





Computational analysis of hydrocarbon combustion

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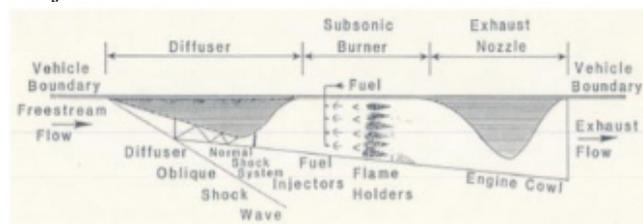
Abstract: Combustion of fuel with oxidizer provides continuous power for the vehicles to move forward. Well-designed combustor produces complete combustion, where water and carbon dioxide are the stable products. Incomplete combustion additionally produces more emission in the form of carbon monoxide and nitrogen oxides due to factors like poor mixing of the air and fuel or insufficient excess air. Therefore in order to understand the importance of various parameters which affects the combustor performance and to design the effective combustor, which delivers high combustion efficiency, it is very essential to study the combustor using CFD techniques, performed using ANSYS Fluent software. Computational or CFD methodology is used here to perform combustion simulation on the typical combustor models, where hydrocarbon like kerosene (Jet fuel) is burned with incoming air at high velocity. Computational models are created with pre-processor such as Gambit and subsequent processing and post processing with Ansys Fluent as the software. Suitable turbulent model, chemical model and physical models are enabled to analyse and plot the mass fraction of various chemical species along the length of the combustor. Fuel Additives are used to evaluate the peak temperature. The combustion efficiency of this hydrocarbon combustion is evaluated using this numerical tool.

INTRODUCTION

This chapter will provide a basic introduction to scramjet technology by presenting the definition, current status of scramjet engines. historical timeline, possible applications, and the current status of scramjet engines.

DEFINITION OF SCRAMJET ENGINE

To give the meaning of a scramjet motor, the meaning of a ramjet motor is first essential, as a scramjet motor is an immediate relative of a ramjet motor. Ramjet motors have no moving parts, rather working on pressure to ease back freestream supersonic air to subsonic velocities, in this manner expanding temperature and pressing factor, and afterward combusting the compacted air with fuel. In conclusion, a spout speeds up the exhaust to supersonic velocities, bringing about push. Figure 1 beneath shows a two dimensional schematic of a ramjet motor. Because of the deceleration of the freestream air, the pressing factor, temperature and thickness of the stream entering the burner are "impressively higher than in the freestream". At flight Mach quantities of around Mach 6, these builds make it wasteful to keep on easing back the stream to subsonic rates. Consequently, if the stream is not, at this point eased back to subsonic rates, yet rather just eased back to satisfactory supersonic rates, the ramjet is then named a 'supersonic ignition ramjet,' bringing about the abbreviation scramjet. Figure 2 beneath shows a two-dimensional schematic of a scramjet motor.



APPLICATIONS OF SCRAMJET ENGINES

There is a scope of potential applications for scramjet motors, including rocket drive, hypersonic cruiser drive, and some portion of an organized space assessments framework Figure 1.3 underneath shows the rough exhibition regarding motor explicit drive and Mach number for different sorts of drive frameworks [7]. It very well may be seen that at Mach numbers higher than roughly 6-7, the just accessible impetus frameworks are rockets and scramjets. Contrasted with rockets, scramjets have a lot higher explicit motivation levels; in this manner, it is clear why it is favourable to build up the scramjet, in the event that hence as it were. In spite of rockets, scramjets don't need that an

Motorised Agricultural Sprayer With Plougher

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ABSTRACT:

The project is intended to help the farmers as India being an Agriculture based country. It is a Sprayer cum plow mounted on a movable frame which is operated by an electric drive. The aim of developing such a concept is primarily because of preventing the three major drawbacks of the pump being used currently- First, the farmer has to carry the entire weight of the spraying pump on his shoulder; second, he has to continuously use his one hand to pump using the handle; third, the farmers don't take enough precaution while handling chemicals which results in fatal diseases because of its direct contact. All these factors have been taken care of in this project along with being cost effective, light in weight and good in strength. The handle of the sprayer will be mechanically operated through the slider crank mechanism. This will result into the reciprocating motion of the piston and hence pumping will be done in user friendly manner.

KEYWORD: DC motor, Lithium Battery, Knapsack Sprayer and Spray nozzle.

GENERAL

India is a land of agriculture which comprises of small, marginal and rich farmers. Small scale farmers are interested in manually lever operated knapsack sprayer because of its versatility, cost and design. Protection from parasites is an important factor in all the agricultural operations, and calls for continual monitoring and prompt action when needed. In many cases, different equipment, pesticides and manpower are required for this purpose which accounts for the majority of production expenses. This would ultimately affect the economy of the farmer, hence it needs serious consideration.

The smallest sprayers are hand-carried, compressed air sprayers. They contain a 1- to 5-gallon tank with an air pump in the top and a wand with a nozzle for directing the spray.

Initially water or fertilizer which has to be sprayed is loaded inside the sprayer can and the setup is placed on the field where the spraying operation to be conducted, plough is dipped into the soil up to required level. This rotation tends to rotate sprocket gear and this makes hand lever of pump to activate linearly. This activation pressurizes the fluid stored inside tank and makes it to exhaust through outlet. This pressurized fluid from outlet is transferred to the nozzles from there the fluid is sprayed on the field. The rotation also allows vehicle to displace, there by performing the plugging operation.

OBJECTIVE

- To develop manually operated sprayer which uses slider crank mechanism linked to single bicycle

- To reduce human fatigue and effort during spray and decrease time of spraying the pesticides
- Decrease the labour cost by advancing the spraying method

SYSTEM MECANISM

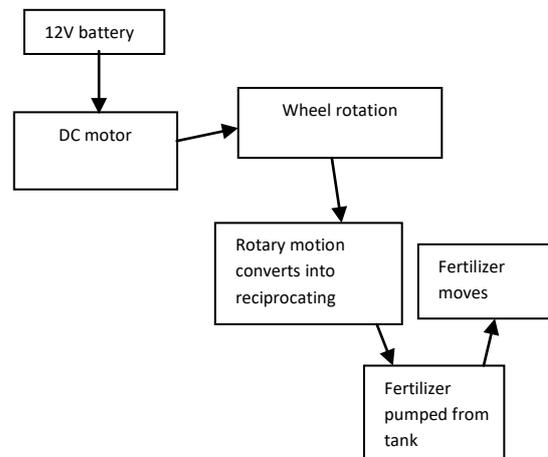


Fig.1 System block diagram

COMPONENTS USED

- Sprayer
- Nozzle
- Frame
- Disc
- Shaft
- Dc motor
- Battery

Bhuvaneshwari.M, Aslam.R, Haripraveen.V, Karthikeyan.T, Mohanraj.R (IJOSER) August – 2020

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Automatic Agriculture Spraying Using Arduino

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ABSTRACT: The responsibility of controlling and managing the plant growth from early stage to mature harvest stage involves monitoring and identification of plant diseases, controlled irrigation and controlled use of fertilizers and pesticides. The proposed work explores the technology of wireless sensors for remote real time monitoring of vital farm parameters like humidity, environmental temperature and moisture content of the soil. We also employ the technique of co2 sensor based automatic detection on farmer. Thus this paper vigorously describes the design and construction of an autonomous sensor featuring plant disease detection, growth monitoring and spraying mechanism for pesticide, fertilizer and water to apply in agriculture or plant nursery. To realize this work we provide a compact, portable and a well founded platform that can survey the farmland automatically and also can identify disease and can examine the growth of the plant and accordingly spray pesticide, fertilizer and water to the plant. This approach will help farmers make right decisions by providing real-time information about the plant and it's environment using fundamental principles of microcontroller and Sensor's technology .

KEYWORDS: CO₂ Sensor, Humidity, Spray Pesticide, Color sensor.

I. INTRODUCTION

The world's population is growing and with this growth must food must be produced. Due to the industrial and petrochemical revolutions, the agriculture industry has kept up in food production, but only by compromising the soil, the environment, health, and the food production system itself. The increased production has largely come from incremental changes in technology and economies of scale, but that trend is reaching a plateau. Conventional agriculture methods are unsustainable and a paradigm shift is needed. India plays a significant role in agriculture export to various countries, hence it's very shocking to find the efficiency is less than 30% compared to the developed countries. This is mainly due to the dependence on traditional methods and even higher dependence on the manual labor and on the monsoons which is not sufficient or reliable source of water, hence leading to limited water resources. Projects involving automation open up new ways for saving water and other resources while reducing the dependence on manual labor. Such technologies might further motivate the industries to start their own large scale farming which is still underdeveloped stating reasons such as manual labor is costly and inefficient. Similar to today's 3D printers and CNC milling machines, This automated sprayer hardware employs linear guides in the X, Y, and Z directions that allow for tooling such as seed injectors, watering nozzles, and sensors, to be precisely positioned and used on the plants and soil. The entire system is numerically controlled and thus fully automated from the sowing of seeds to harvest. The hardware is designed to be simple and scalable. To realize this work we provide a compact, portable and a well founded platform that can survey the farmland automatically and also can identify disease and can examine the growth of the plant and accordingly spray pesticide, fertilizer and water to the plant. This approach will help farmers make right decisions by providing real-time information about the plant and it's environment using fundamental principles of microcontroller and Sensor's technology .

II.LITERATURE REVIEW

The paper investigated the possible reasons for this phenomena, by continuing the review of agriculture robots, only this time focusing on practicality and feasibility. Upon extensive review and analysis, it was known that practical agriculture robots rely not only on advances in robotics, but also on the presence of a support infrastructure. This infrastructure encompasses all services and technologies needed by agriculture robots while in operation, this include a reliable wireless connection, an effective framework for Human Robot Interaction (HRI) between robots and agriculture workers, and a framework for software sharing and re-use. The paper provided a solution for these problems by helping farmer monitor

Effective Technique For Multipurpose Agriculture Cutting Machine

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Abstract:Cutting of crop is one of the important agricultural operation which demand considerable amount of labour. The availability and cost of labour during crop season are the serious problem. It is therefore, essential to adopt the mechanical methods so that the timeliness in Cutting operation could be ensured. The farmers using reapers or combines to cut their crops. But, these means especially combine, are very costly making it un-affordable most of the small farmers. So to overcome this problem we come with a solution of electric brush cutter, weeder, cultivator with different blade attachment for crop purpose. The power from li-ion battery to the throttle trigger and to shaft tube this energy goes to gear to rotate the blade with constant speed. The gear in brush cutter exceptionally valuable to all ranchers for their inter tillage activity. It makes it conceivable to do dull cultivating occupation effectively in an extremely limited capacity to focus time. The gear is additional eco-friendly.

KEYWORDS: Li-ion battery, reaper, Crops, throttle trigger

1. INTRODUCTION

Traditionally, the internal combustion engine type has been used to drive the mower requiring the human operation. It, however, may suffer from the drawback such as both time and energy consumption. Based on the modern concept, the development of modern system should consider manpower saving and avoid excessive energy consumption. Unfortunately, many systems such as traditional lawn mowers consume more power and result in greenhouse effect. This problem should be resolved by the academia and industry. In the past decade years, almost the main mechanical power source of blade of the conventional brush cutter was driven by two or four strokes internal combustion engine. Has larger instantaneous output mechanical power of engine makes that each type of engine is suit for many types of customer tools. Especially, many applications needs larger mechanical power output. The fuel of general internal combustion engine is gasoline and engine oil. As we known, the economic is increasingly development in the world, the total necessary quantity of fuel such as gasoline is certainly increased and the using days of fuel is shortened as well. More fuel is used, more air pollution is made. Warm effect become a critical problem in the world, the average temperature in earth is increasing year by year. In order to overcome these issues, an eco-friendly lawn mower needs to be designed and fabricated in order to support the green technology initiatives. In this study, a newly designed electric brush cutter was fabricated which powered through a rechargeable battery. Besides that, the grass cutting machine was fabricated at low cost by taking consideration on important aspects such as lightweight, durable, and environmental

2. OBJECTIVE

- ❖ The main objectives of electric brush cutter is to reduce the farmers effort while cutting crops.
- ❖ To design and fabrication the electric brush cutter which is light in weight.
- ❖ To strong and reliable output with high battery
- ❖ To operating principle is simple and easy to move from one place to another place.
- ❖ To reduce power consumption and also use for small farms.

3. LITERATURE REVIEW

T. Karthick ,Ashishkumar, (2005) Vicky, Fabrication of grass cutter with solar in this paper fabricated grass cutting machine with rotary blades by using solar energy. The solar energy is trapped in the photovoltaic cell to generate electricity. The cells may be grouped in the form of panels or arrays. Solar panel is placed such that to absorb high intensity from sun and it will incline at 45°. The main function of solar charger is increased current during batteries are charging and also disconnect when they are fully charged. Circuit's breakers are used to start or stop the motor. By considering ground clearance they can adjust the height of grass. In this paper author explained that solar plate which is placed above the grass cutter generates solar energy and use this energy for working controlling speed of motor as per the requirement. Solar panels, batteries, DC motor, solar charger, circuitry and g the grass cutter. Also, using driver circuit for blades these components are used for preparing grass cutter. For preventing battery from overcharging and over discharging regulator is placed into the system and it should be placed in series. They have provided LCD display. They have prepared wireless grass cutter. There are two main components such as transmitter and receiver. Transmitter continuously transmits the rays if any obstacle come in front of grass cutter then the rays are reflected back towards the receive

Ms. Lanka Priyanka, Dipin.J.K, (2008) Automatic grass cutter they have fabricated solar powered grass cutting machine with tempered blades are attached to this grass cutter. This grass cutter is manually operated as well as automatic operated. The materials commonly used GI sheet, motor, wheel, AI sheet, switch, wire, square pipe and insulating material. The components used are comparator, rechargeable battery, relay, temperature sensor, DC motor. The voltage generated by using solar panel displayed on LCD display unit. They prepared solar powered vision based robotic lawn mower which operated manually with less efforts. The predetermined program feed into the system and the robot moves as per predetermine pattern with the help of MATLAB programming as well as camera installed over the robot structure. Robots which is produced for reducing the human efforts also detects human and objects which is come in front of robot

Robotic Pesticide Sprayer

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Abstract: Our project is to design of an intelligent management system for agricultural based on internet of thinks. This project is based on microcontroller operation. This developed system involves designing a prototype which uses simple cost effective equipment's like microprocessors, various motors and terminal equipment's which is an aid to the farmers in various crop field activities. Then the amplified voltage signal is given to Microcontroller. Here the microcontroller is the spray type reprogrammable microcontroller in which we have already programmed with our objectives. It receives the signal from arduino and displays the parameters via LCD display. It is very important to improve the efficiency and productivity of agriculture by replacing labours with intelligent machines like robots using latest technologies. The project proposes a new strategy to replace humans in various agricultural operations like detection of presence of pests, spraying of pesticides, spraying of fertilizers, etc. there by providing safety to the farmers and labours.

Key Words: Battery ,Microcontroller, LCD Display, Relay, Motors, Sprayer

1. INTRODUCTION

Agriculture is one of the most important occupations in a developing country like India. The problems related to the traditional farming such as lack of knowledge of using fertilizer/pesticides, lack of man power, etc. due to which farmers are leaving the farming profession. Advancement in the field of robotics has widened and its applications extend from home automations, military operations along with agriculture related activities. Automation may prove as attraction to young farmers to continue their traditional profession with improved efficiency, precision along with the safe cultivation practices. To provide safety to the farmers and the main objective of this work is to provide precision farming. Here, Robots will be replacing laborers for the farm activities like detection of pests, spraying of pesticides/fertilizers etc. whose operations will be automated or can be controlled by the farmer. This system involves designing a prototype using equipment's like microprocessors, wireless camera, motors and terminal equipment's which will offer an aid to the farmers for automation. The rationale behind the proposed project is to bring in the improvements in safety of farmers during the crop activities like spraying chemicals, fertilizers and pesticides. The research projects finds its relevance in the field of Agricultural Engineering, Electrical Engineering, Electronics Engineering, Telecommunication Engineering, Mechatronics Engineering, Environmental Engineering, Biomedical Engineering, Mechanical Engineering etc. The identification of plant disease is an imperative part of crop monitoring systems. Computer vision and deep learning (DL) techniques have been proven to be state-of-the-art to address various agricultural problems. This research performed the complex tasks of localization and classification of the disease in plant leaves. In this regard, three DL meta-architectures including the Single Shot Multi Box Detector (SSD), Faster Region-based Convolutional Neural Network (RCNN), and Region-based Fully Convolutional Networks (RFCN) were applied by using the TensorFlow object detection framework. All the DL models were trained/tested on a controlled environment dataset to recognize the disease in plant species. Moreover, an 4 improvement in the mean average precision

of the best-obtained deep learning architecture was attempted through different state-of-the-art deep learning optimizers. The SSD model trained with an Adam optimizer exhibited the highest mean average precision (mAP) of 73.07%. The successful identification of 26 different types of defected and 12 types of healthy leaves in a single framework proved the novelty of the work. In the future, the proposed detection methodology can also be adopted for other agricultural applications. Moreover, the generated weights can be reused for future real-time detection of plant disease in a controlled/uncontrolled environment.

2. OBJECTIVE

- ❖ To used this sprayer in row crops. (Example: Cotton crop).
- ❖ To find the difference between manual sprayer to robotic sprayer.
- ❖ To give farmers more ergonomic working environment while spraying because they don't need lift or carry the poison tank.

3. LITERTATURE REVIEW

Siddhi S. Mane, Nikita N. Pawar, Sneha A. Patil, Prof. D.O. Shirsath“Automatic farmer friendly pesticide spraying robot with camera surveillance system”(2020) Compared to spraying pesticides manually when the environment is more closed, and has a high temperature, humidity and so on for operating the spray work in the greenhouse in which we use Bluetooth communication to interface controller and android. Controller can be interfaced to the Bluetooth module though UART protocol. According to commands received from android the robot motion can be controlled. The consistent output of a robotic system along with quality and repeatability are unmatched Although the productivity of the prototype is not quite efficient, the robot still meets the requirements of pesticide spraying in the greenhouse without human operators.

Reem ibrahim hasan , suhaila mohd yusuf and laith alzubaidi “Review of the state of the art of deep learning for plant diseases: a broad analysis and discussion”(2020) Deep learning (DL) represents the golden era in the machine



Automatic Fire Detection and Control Using Solar Panel

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ABSTRACT:All agricultural farms are at risk of fire and each year there are over one thousand fires in agricultural buildings, many of them housing livestock. Most fires on farms can be prevented by providing the farmers and stockpersons a timely alert and a mechanism to recognize and remedy any hazards which do occur. This project examines the fire dangers which are commonly found on farms and proposes a simple sensor based system in which risks can be reduced by timely alert and taking sensible measures. Although principally concerned with farm animal welfare, such measures are equally important to human safety. In this project basically a low cost fire detection and control system based on heat detection is proposed. It is comprised of a combination of electrical/electronic devices/equipment working together to detect the presence of fire and alert people through audio or visual medium after detection. The whole system is powered by using solar panels. These system may be activated from heat detectors which, when detects fire. Then, it automatically operates a relay which can be used to send Short Message Service (SMS) to the registered mobile numbers and switch on a motor pump to spray water using sprinkler irrigation system. Fire outbreak is a major concern at homes, offices, industries etc. It is dangerous and requires high security and control to avoid destruction of lives and property. One of the preventive measures to avoid the danger is to install an automatic fire detector at vulnerable locations, hence the Arduino based fire alarm detection and control system was proposed. It is capable of automatically detecting heat in a given environment, displaying on LCD, and switch on the motor pump automatically and also spray water to reduce the intensity of fire.

KEYWORDS: Multi Sensor, fire detection, Audio or Visual Medium, Relay, Short Message Service (SMS), Pump.

I. INTRODUCTION

Now a day's automatic fire detection and control is becoming very essential to reduce the fire in the Agriculture lands and storage areas. Automatic fire alarm system provides real time surveillance, monitoring and automatic alarm. A key aspect of fire protection is to identify a developing fire emergency in a timely manner, and to alert the building's occupants and fire emergency organizations. This is the role of fire detection and alarm systems. Generally fire detectors are designed to respond at an early stage to one more of the four major characteristics of combustion, heat, smoke, flame or gas. No single type of detector is suitable for all types of premises or fires. Heat detectors respond to the temperature rise associated with a fire and smoke detector respond to the smoke or gas generated due to fire. Although agricultural fire hazards have been present in farming scenario from a long time, we still have not developed effective way of dealing with them, and because of that the early detection of agricultural fire hazards is still quite important task. Traditional methods based on human observers are mostly used, but they have shown ineffective because of a human observer's subjectivity. Modern technologies, especially sensors technology provide tools for new techniques of agricultural fire hazard early detection. The multi-sensor system is one of the most important technologies currently being investigated by scientist all around the world for agricultural fire detection. The sensors could be deployed in nature on places where it was not possible to put sensors before, particularly because of today's development of wireless communication and miniature autonomous power supplies. In this paper proposed system has two tasks i.e. collecting data from sensors and another one is sensor network data utilization for timely alerting farmer. The goal of sensor data interpretation, particularly using data fusion techniques, is to increase the reliability and reduce the chances of false alarm. In this paper farm fire is detected by the fusion of data from two sensors. Combining sensors for collecting data and advanced algorithms for data processing and interpretation, more advanced object called the observer could be designed. Combining several sensors an observer network could be established, capable for better understanding what is going on in sensors surroundings.



Sheltering of Crop against Heavy Rain and Scheduling Automatic Irrigation

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ABSTRACT: Excessive rainfall during crop growth causes damage and loss of yield. India being an agrarian country is always impacted by heavy and unprecedented rainfall and incurs around 70% of its revenue. This paper intends to protect crop from heavy rain and avoids its spoilage. We have designed and constructed a model which completely covers the field in times of unprecedented heavy rain and protects the crop from potential damage. This system consists of an automatic roof which works by taking the signals from the rain and soil moisture sensors and covers the whole field to protect it from heavy rains. Whenever there is rainfall the rain sensor gets activated. The water level in the soil is sensed by the soil moisture sensor. Whenever there is rain, the rain sensor is ON and when the water level in the soil is beyond the normal level then soil moisture sensor is ON. If both the sensors are ON then this information is given to the controller and the GSM. Then the controller indicates the DC motor to run which opens the roof automatically to close the field using a polythene sheet. Then the roof can be opened manually using mechanical roller. Rain water is collected from the roof and stored in the field which can later be used for irrigation and other purposes. Thus water logging and crop damage is prevented and irrigation is also scheduled accordingly.

KEYWORDS: GSM, DC Motors, Rain sensor, Soil Moisture Sensor.

I. INTRODUCTION

India is an agrarian country and agriculture plays a vital role in Indian Economy. Agriculture involves not only crop raising but animal husbandry agro forestry, pisciculture etc. Any economic endeavour that utilizes directly the natural resources of soil and water for production is included in agriculture. Agriculture still forms the backbone of the Indian economy as well as human settlements and has shaped the socio cultural contours. India ranks second worldwide in farm output. Gross Value Added (GVA) by agriculture, forestry and fishing was estimated at Rs. 19.48 lakh crore (US\$ 276.37 billion) in FY20 (PE). It determines the health of the people as well as the wealth of the nation in more than one ways. The variety of agro-climatic regions enable India to produce infinite variety of agricultural products. Rainfed agricultural systems dominate much of tropical agriculture, and are extremely vulnerable to projected climate change. Nearly 80% of the global agriculture is based on rainfed farming. Rural communities across the world report that rainfall has become more erratic, shorter and heavier within seasons, and that 'unseasonal' events such as heavier rains, drier spells, unusual storms and temperature fluctuations have increased. Dependence on climate-sensitive activities, pessimistic projections for agricultural yield, falling production, poverty, food insecurity and limited capacity to adapt, exacerbate the vulnerability situation. In this project we are proposing the system which prevents the spoilage of crops due to heavy rains. This is achieved with embedded system design. The actual concept of this project is protecting the crops from heavy rainfall by covering the field automatically, save the collected rain water and irrigate the accordingly. In order to achieve this, in this system we use GSM, Rain sensor and soil moisture sensor.

II. OBJECTIVE

The main objective of this project is to prevent the damage caused by heavy and unprecedented rainfall. Excessively wet conditions cause potentially devastating losses[1]. Abnormally high amounts of rain can leach nutrients, the soil. Wet field conditions can prevent the farmer from accessing land with equipments. It also incurs greater loss. Hence this system has been designed to protect and shelter the crops from heavy

Experimental Investigation on Partial Replacement of Cement by Prosopis Juliflora in Self Compacting Concrete

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Abstract: *The experimental investigations are carried out to study the effect of Prosopis Juliflora in Self compacting concrete by partial replacement on cement. In today's world the main emphasis is on green and sustainable development. Prosopis Juliflora inflorescence is small, green-yellowish spikes without any particular fragrance or attractiveness, though relished by bees. Prosopis Juliflora is one of these species that has performed much better than many native woody species. At the moment, Prosopis Juliflora provides approximately 75% of fuel wood needs of rural people in arid and semi-arid regions of India. These species has become naturalized and spread over the greater part of north-west, central, west and south India. Under the right conditions, Prosopis Juliflora can produce a variety of valuable goods and services like construction materials, charcoal, soil conservation and rehabilitation of degraded and saline soils. But wide spread Prosopis Juliflora has become an invader species so removal of the plant is into necessity now. Mostly the plant is removed by uprooting and is burnt. In order to save the environment and to save the resources we have come up with using the Prosopis Juliflora ash as the partial replacement of cement. So using Prosopis Juliflora ash is a major step towards sustainable development. Cement will produce equal amount of greenhouse gas (co2) which increase the global warming. As the amount of cement is reduced greenhouse gases also reduced. Utilization of Juliflora ash as a partial substitution for cement is one of the promising method to increase the strength in SCC. The strength parameter like Compressive strength of Self compacting concrete in M30 grade with the partial replacement of Prosopis Juliflora ash in cement are evaluated. Materials used in this project are cement, fine aggregate, coarse aggregate, Juliflora ash and water and also admixtures whenever it is required. By doing this project we would know about the using of innovative materials in construction to increase the strength of concrete to make the construction economical. The utilization of Juliflora ash in SCC solves the problem of its disposal thus keeping the environment free from pollution.*

Keywords: Prosopis Juliflora, SCC, greenhouse gases, sustainable development

1. Introduction

Due to current boom in construction industry, cement demand has escalated which is the main constituent in concrete. Also, the cement industry is one of the primary sources which release large amounts of major consumer of natural resources like aggregate and has high power and energy demand for its operation. Concrete which is being widely used in the construction industry has unlimited opportunities for innovative applications design and construction techniques. Factors such as strength, workability and durability of the ordinary concrete are continuously being modified to make it more suitable for a specified construction purpose. It is well known that cement is a costly material and its production involves consumption of limestone which is a natural resource. CO₂ is emitted in large quantity during the production of cement which is a pollutant. Energy resources like coal and oil are decreasing as they are used in the production of cement. Researchers are searching for cheap and easily available Pozzolanic materials from the industry. This has become more realistic due to the advancement of technology. It has become essential to lower the construction cost without much compromise as far as strength and durability of the structure is concerned. The lowering of cost can be brought about in number of ways. Among all the methods available the most optimum at our disposal is the use of waste material as substitute. Hence, incorporating the usage of Juliflora ash as

replacement for cement in SCC is beneficial for the environmental point of view as well as producing low cost construction entity thus leading to a sustainable relationship. Prosopis Juliflora (Seemai Karuvelam in Tamil) grows tremendously and spreads due to its mechanism to overcome adverse conditions of like drought and salt. This is facilitated by its high 'proline' content under stress conditions, which helps the plant to thrive where other species die. With deep penetrating roots, it can draw water from deeper layers. Though the species has played a role in changing land use and the livelihood security of huge populations of the world, due to poor management practices, it has colonized many important ecosystems, creating a negative pressure on biodiversity. Prosopis Juliflora being invasive with negative impact to biodiversity and inhabitants, it has useful attributes also. Therefore Prosopis Juliflora ash is partially replaced by 10%, 15%, 20%, 25% and 30% in place of cement.

2. Material Properties

A. Properties of cement

Cement is a powdery substance made by calcining lime and clay, when mixed with water and allowed to set has good binding property and strength. In the current study ordinary Portland cement was used. Many tests were conducted on cement, some of them are specific gravity test, initial and

MONITORING AND SHAPING THE FUTURE OF PREGNANT WOMEN IN RURAL AREAS USING IoT

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ABSTRACT

Advancing solid pregnancy and safe labor is the objective of all Indian medical care frameworks. Notwithstanding critical upgrades in ongoing many years, moms and their children are still in danger during the pre-birth period, which covers pregnancy, conveyance, and the post pregnancy. Maternal medical services in rustic India has never hurled noteworthy numbers before, yet innovation is currently arriving at the distant corners of India to help young women who require pre-birth and antenatal consideration continually. The point of the undertaking is to give an IoT based maternal medical care arrangement that vows to adequately screen the strength of the pregnant women in country India. The Arduino Uno R3 is utilized which is one sort of ATmega328P based microcontroller board. The ATmega328 microcontroller is utilized, which goes about as an entryway to speak with the sensors, for example, pulse for both mother and the baby, temperature, wind current and blood glucose sensors. The microcontroller gets the information from the different sensors, sends the information esteems separated from the sensors to the organization through Wi-Fi, and consequently gives the data to the medical services group, nutritionist just as the gatekeeper to screen the medical services boundaries from any far off area. The regulator is likewise associated with LCD to caution the patient or the overseer about any strange cases. The framework is intuitive with the client.

Keywords: Wireless Device, Sensors, Vital signs, Arduino Uno R3, IoT.

I. INTRODUCTION

Internet of Things (IOT) is a network of physical objects. The Internet of Things refers to a sort of organization to associate anything with the Internet dependent on specified conventions through data detecting hardware to lead data trade and interchanges to accomplish keen acknowledgments, situating, following, observing, and organization. The IOT idea was authored by an individual from the Radio Frequency Identification (RFID) advancement confined area in 1999, and it has as of late become more pertinent to the down to earth world generally on account of the development of cell phones, installed and universal correspondence, distributed computing and information examination. An existence where billions of items can detect, convey and share data, all interconnected over open or private Internet Protocol (IP) organizations. The interconnected items have information consistently gathered, examined and used to start activity, giving an abundance of knowledge to arranging, the board and dynamic.

With the fast improvement of versatile web, IoT and wearable gadgets, the wellbeing checking has shown an insightful pattern as of late. Numerous emergency clinics have effectively utilized versatile applications for arrangement enlistment, asking electronic clinical records and assessment results. What's more, clinical wearable gadgets, (for example, 3G circulatory strain meters, Bluetooth blood glucose meter, and keen ECG gadget) have been utilized to screen pulse, glucose, ECG and other physiological signs. The observing records are shipped off the data stage for ongoing analysis or to a clinical data set for record keeping. The acquaintance of shrewd gadgets with emergency clinics can save the activity cost, upgrade the clinical experience of patients and lessen the work force of clinical staff. IoT innovation gets various applications medical services, from distant observing to shrewd sensors to clinical consideration reconciliation. It keeps the patients protected and sound. Medical services gadgets gather different information from huge set of genuine cases that builds the exactness and the size of clinical information.

ELECTRIC VEHICLE CHARGING STATION SLOT PREDICTION SYSTEM USING QUEUING MODEL

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ABSTRACT

With consistently expanding contamination levels and its effect on the climate, governments are searching for substitute energy choices for transportation administrations. Quickly exhausting worldwide oil holds and rising oil import bills of governments are likewise driving the requirement for substitute fuel hotspots for the vehicle vehicles. Transportation in general is fixing a groundbreaking change worldwide and Electric vehicle are the best answer for address both contamination and oil import bills. Electric vehicles are turning out to be an ever increasing number of basic nowadays. With the developing interest for Electric vehicles, the charging foundation is basic for supporting the E-Mobility administrations. As EVs become more business, there will be a need to make a productive opening booking framework as the charging interaction can be tedious and the requirement for additional stations will be requesting. Built up the Framework and Architecture of the Next-Generation Communication based Online EVs Charging Slot Booking at Charging Station. We assembled the stochastic lining model for EVs in the charging station. We defined the target capacity of EV's charging at charging focuses in charging stations to decide the ideal charging time, insignificant charging cost, least distance, negligible lining delay and ideal length for specific charging openings. The proposed model of the booking framework is intended to make a financially savvy and productive framework. Our Cloud based Charging Station Management stage is created to organize and deal with different charging stations. The proposed worker based continuous figure charging foundation abstains from holding up occasions and its booking the board productively keeps the EV from stopping out and about because of battery empty out.

I. INTRODUCTION

In numerous nations individuals live in thickly populated zones, explicitly in apartment complexes. With the multiplication of vehicles for private use, developers began to add underground mutual leaving territories to permit the proprietors to securely keep their vehicles when not being used. This idea is fundamentally not the same as those pieces of the globe where individuals keep an eye on live in family houses, normally a long way from large urban areas. Since numerous vehicle creators are as of now creating electric vehicles (EVs), the substitution of flow ignition motors is by all accounts conceivable in the years to come. Thus, the making of an organization of public and private charging focuses will be required, and the lattice should ingest the increment popular. On account of family houses, just a minor electrical redesign may be required, fundamentally to adjust the establishment to give the flow expected to a faster charge. Public carports are an alternate story as stopping places don't generally have an attachment previously introduced and, furthermore, it isn't clear yet how the energy cost will be charged to the proprietors. It is likewise worth referencing that power prerequisites for a speedy charge are exceptionally high, which will require running three-stage wires of a specific area to each accessible attachment.

An electric vehicle, likewise called an EV, utilizes at least one electric engines or foothold engines for drive. An electric vehicle (EV) is one that works on an electric engine, rather than an interior ignition motor that creates power by consuming a blend of fuel and gases. In this way, for example, vehicle is viewed as a potential substitution for current-age auto, to address the issue of rising contamination, a worldwide temperature alteration, draining characteristic assets, and so forth In spite of the fact that the idea of electric vehicles has been around for quite a while, it has attracted a lot of interest the previous decade in the midst of a rising carbon impression and other ecological effects of fuel-based vehicles.

In February 2019, the Union Cabinet cleared a Rs 10,000-crore program under the FAME-II plan. This plan came into power from April 1, 2019. The primary target of the plan is to empower a quicker selection of electric

SMART TRACKING SYSTEM OF SCHOOL BUSES AND ENSURING CHILD SECURITY

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ABSTRACT

Driving transports and trucks consistently for quite a long time is a very troublesome work. As a rule it has been noticed transport and transporters are seen driving in the wake of burning-through liquor. Driving such huge vehicles out and about affected by liquor is a grave danger to the driver's just as other suburbanite's life out and about. So to distinguish alcoholic driving in transports and trucks we here propose a computerized framework that identifies such episodes and furthermore maintains a strategic distance from it. Likewise it sends warning of the occurrence to individual specialists. We here utilize a liquor sensor interfaced to microcontroller alongside an IoT modem to send warnings, LCD show to show status and signal. The framework is controlled by a 12V force supply. Whenever liquor is distinguished on sensor it produces a general voltage and microcontroller is flagged. The microcontroller now checks if the liquor substance of driver is above passable levels. In the event that it is above admissible levels, the regulator shows the status in plain view, sounds a bell. It additionally stops an engine used to show as vehicle motor. Presently the regulator additionally teaches IoT modem to send a warning with Location through GPS to the individual power or proprietor of vehicle about the occasion so that further move can be made about the episode. Our proposed framework gives the ongoing area of transport. Savvy transport following innovation is beneficial for following and checking a public vehicle. It will likewise help search the transport by putting required data like source and objective. The framework will utilize IoT as the reason for the application and fundamental android application will be interfacing with the refreshed information base to give the constant information to the client, subsequently improving the user experience Internet of Things (IOT) joins the objects of this current reality to the virtual world, and engages at whatever time, wherever network for whatever has a turn ON and turn OFF switch.

Keywords: GPS, Arduino Atmega2560, IoT, RFID Reader, Gas sensor, Fire sensor.

I. INTRODUCTION

Web of Things addresses an overall idea for the capacity of organization gadgets to detect and gather information from our general surroundings and afterward share that information across the Internet where it very well may be prepared and used for different fascinating purposes. Some likewise utilize the term mechanical Internet reciprocally with IoT. This paper alludes to business utilizations of IoT innovation in the world of assembling. The Internet of Things isn't restricted to mechanical applications, in any case. This is a helpful and creative venture for scholastics. The primary inspiration of this undertaking is to stay away from alcoholic and driven in vehicles. This gives super security office to drivers. Current age vehicles mishap proportion is diminishes while contrasting with old models. This imaginative venture thought is to execute crisis framework to decrease the mishap chances. In view of this alert undertaking, we can build the wellbeing of Society Children's security has consistently been a need issue whose arrangement should continually be improved. Youngster's security is significance to their folks regardless of whether they have most great safeguards, kids, because of their absence of abilities to ensure themselves. School transport assume a fundamental part in conveying the majority of youngster's ordinary everywhere on the world.

While there are a few issues that may upset the guardians regarding the movement of school going children. This framework is particularly centered on kids' developments from home to class entrance, attempting to tackle a little piece of the young kids' security issue. On evaluating the previous work of school transport following, checking and cautioning framework, there is a likelihood to sort different systems and recognize

TRASH CLASSIFICATION AND DETECTION SYSTEM USING DEEP LEARNING

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ABSTRACT

Trash is a residual object that can't be used anymore. Usually, It is the result of certain actions, which is caused by a human doing or a natural ecosystem. There are many classifications of trash, one of them is classified as organic and non-organic waste. Organic waste is a residual object on the result of a natural process or another process that is easily decomposed by the organism. The organic waste mostly natural waste, like Lafarge and animal carcasses. On the other hand, non-organic waste was hardly decomposed by the organism. It's like metal, bottles, plastic, cover, tires and many more. Recycling is necessary for a sustainable society. because it helped minimize the amount of waste. However, the current recycling process requires recycling facilities to sort garbage manually and use a series of large filters to separate more defined objects. Therefore, trash classification attracted a lot of researchers recently is also a promising application of computer vision in the industry. Utilizing deep learning to classify trash has the potential to make processing plants more efficient. This classification proposes a Deep convolutional neural network model to solve the problem of multi-classification of trash. This will not only a positive environmental effect. also beneficial for economic effects. In this project, Camera Vision-Based Trash Classification and Detection System Using Deep Learning is introduced.

Keywords: Deep Convolutional Neural Network (DNN), Stochastic Gradient Descent (SGD), Trash Detection.

I. INTRODUCTION

Quick located the trash from the public places classify into a separate category. This action was performed on the complex image's foreground and background. that makes segregation easier and faster. A smart city is an urban area that uses state-of-the-art technologies such as the Internet of Things (IoT), Cloud computing and other information technologies to manage and assess the environment of a city in an efficient way. The smart city concept is to integrate information and communication technology. And the various physical device is connected to the network for optimizing the city's operation and services in efficiency way. However, due to the rapid development of a smart city, the city managers for facing huge challenges in how to maintain, access, urban infrastructure and environment. street cleanliness represents the spiritual outlook of the city and the humanistic atmosphere of a city. keeping the city clean is good for developing places, modern cities and the environment. Currently, many developed and major cities regard urban city and street cleanliness as the one of major task for urban civilization. if the urban street cleanliness was didn't pass the predefined level, it defected the citizen's living satisfaction. Also, it was the effects the reputation of the city name. The European Urban Cleaning Network Summit also points out that timely cleaning of streets is the right way to improve urban cleanliness. Currently, a large number of streets make the amount of garbage on the streets uncontrollable. Meanwhile, the process of finding garbage on the streets is not automated and always requires human intervention at every level. Citizens manually check the location of garbage and submit reports to city administrators, after which city administrators arrange for nearby city employees to clear the garbage. Some cities set up cameras across the street to see if there is any rubbish in the area. However, these manual solutions may not be able to understand the cleanliness of garbage on all the streets of the city in a timely manner. For this reason, researchers around the world are studying automation approaches, using cameras to capture streets without fail, and to collect street information such as street pictures, geographical location, date and time. Besides, existing object detection methods are used to locate images on the remote cloud site. Finally, diagnostic results are sent

CHILD SAFETY ANALYSIS

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ABSTRACT

Dysfunctional behavior is brought about by discouragement which may contrarily affect people or on the general public overall. It is a developing and serious issue which tends to increment with time because of the broad utilization of informal communication sites, for example, Facebook, Twitter, Instagram etc. These interpersonal interaction sites permit clients to share pictures, recordings, articulations and feelings. Wretchedness is a type of psychological sickness. Patients experiencing sorrow have state of mind issues like low disposition, high mind-set, absence of interest in things, and so on. Discouragement is positioned as the biggest supporter of worldwide inability and is likewise a significant justification self destruction. All things considered, numerous people experiencing types of wretchedness are not treated for different reasons. Past examinations have shown that downturn additionally affects language utilization and that many discouraged people utilize online media stages or the web overall to get data or talk about their issues. This paper tends to the early discovery of melancholy utilizing AI models dependent on messages on a social platform. We propose a multi-bit SVM based model to perceive the discouraged individuals. Three classifications of highlights, client microblog text, client profile and client practices, are removed from their web-based media to portray clients' circumstances. AI methods on text information and emoticons have been applied to naturally characterize a client into discouraged and non-discouraged. Thusly, our framework will peruse each word in an order and examination its significance and screen specific individual for a particular period and recognize whether the individual is in acceptable or in sorrow circumstance. On the off chance that the individual circumstance isn't acceptable, hint will be shipped off particular individual's relative mail consequently this prompts saving an individual life from surprising occasion event.

1.INTRODUCTION

Misery is very basic among various age gatherings and is an intense psychological instability that influences our psychological state, how we see things and the proper behavior on boost which is given to the sensory system. Everybody feels in some cases down or low in their lives however when this inclination endure for longer time cases, it influences general psychological capacity of the mind. The more cautious errand is legitimate detachment of the manifestations of despondency from bitterness or the blues.

The beginning of despondency first influences the temperament of the individual which perseveres for longer period when it turns into the principle side effect of misery. It influences the body through low energy, sexual brokenness, musings and sentiments. It may prompt some genuine cerebrum working handicaps, for example, alarm assaults, nervousness, dread and so forth. Misery is not quite the same as trouble/despondency. It is regularly accepted that downturn is a consequence of compound irregularity however that doesn't catch the intricacy of the sickness. Specialists propose that downturn doesn't happen due to compound lopsidedness in cerebrum however comes from an assortment of variables such including defective disposition guidelines by mind, hereditary weakness, upsetting life occasions, medicine and mental issues. It very well may be a few of these elements communicating with each other to bring discouraged state manifestations and impacts on body. Substance lopsidedness association is available yet the unevenness isn't reason for despondency by one synthetic rather, it is by various synthetic compounds which cooperate or are engaged with this cycle. With this degree of intricacy, we can understand how two individuals having comparable indications yet having physical, social conditions diverse regarding living yet comparative as far as illness.

Specialists can recognize this quality which may influence individual making him defenseless against low states of mind and how individual reacts to medicate treatment for this quality. The point of these investigates is to accomplish better customized treatment for the indications of gloom. The impact of mind assumes a critical part in the beginning of the side effects relating individual to melancholy. Nerve cell associations, nerve cell development and working of nerve cell have an influence towards the low changes in state of mind. Still the

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.



Detection of false data cyber-attacks for the assessment of security in smart grid using deep learning[☆]

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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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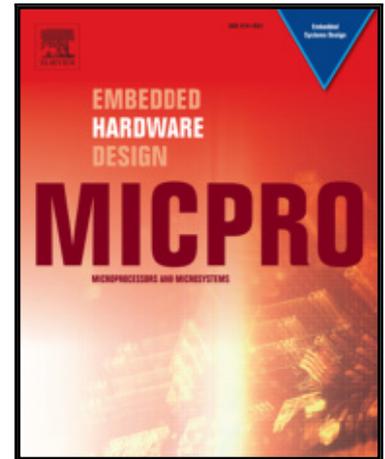
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Network Embedding Architecture using Laplace
Regularization-Non-Negative Matrix Factorization for Virtualization

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Encrypted Network Traffic Classification and Resource Allocation with Deep Learning in Software Defined Network

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Abstract

The climate has changed absolutely in every area in just a few years as digitized, making high-speed internet service a significant need in the future. Future Internet is supposed to face exponential growth in traffic, and highly complicated infrastructure, threatening to make conventional NTC approaches unreliable and even counterproductive. In recent days, AI Stimulated state-of-the-art breakthroughs with the ability to tackle extensive and multifarious challenges, and the network community is initiated by considering the NTC prototype from legacy rule-based towards a novel AI-based. Design and execution are applied to interdisciplinary become more essential. A smart home network supports various applications and smart devices within the proposed work, including e-health devices, regular computing devices, and home automation devices. Many devices accessible through the Internet by Home GateWay for Congestion (HGC) in a smart home. Throughout this paper, a Software-Defined Network Home GateWay for Congestion (SDNHGC) architecture for improved management of remote smart home networks and protection of the significant network's SDN controller. It enables effective network capacity regulation, focused on real-time traffic analysis and core network resource allocation. It cannot control the Network in dispersed smart homes. Our innovative SDNHGC expands power across the connectivity network, a smart home network enabling improved end-to-end monitoring of networks. The planned SDNHGC directly will gain centralized device identification by classifying traffic through a smart home network. Several of the current traffic classifications approach, checking deep packets, cannot have this real-time device knowledge for encrypted data to solve this issue.

Keywords Software-defined network · Traffic detection · Security · Deep learning · Data flow

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

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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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Smart X-Ray Baggage Security System using Machine Learning Algorithm

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Abstract

In our project, it is used of a neural network (NN) algorithm with transfer learning for baggage classification and detection problem solved within the context of X-ray baggage security images (as per our system). With approach requires large amounts of data to facilitate a complex web-to-web feature extraction and classification process. In the context of X-ray security screening, availability of good detection is a challenge. To overcome this difficulty, we use transfer learning paradigm such as a pre-trained CNN, primarily trained for general object classification tasks, where sufficient synthetic training data is available can be re-utilized for our application domain. Custom neural network is used to adjust the feature set from the pre-trained CNN to be used to train different images in the data using CNN. We want to explicitly show that the trained CNN feature set performs well as compared with the standard object classification tasks.

Keywords

X-Ray images, Neural Network (CNN), Color Histogram, Data Augmentation.

How To Cite This Article?

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References

[1] Arora, G., Mariani, A., & Stricker, T. P. (2015). Object classification in 3D baggage security computed tomography images using visual co-occurrence. *Pattern Recognition*, 48(5), 2489-2500. <https://doi.org/10.1016/j.patrec.2015.02.030>

[2] Ishtady, S., Tawgi, R., Boumar, H., & Alkwas, J. H. (2005). X-ray baggage screening. *Measurement and Control*, 39(1), 140-146.

[3] Jaisankar, R., Rajeev, T. W., Mariani, A. J., & Griffin, L. D. (2015, May). Tackling the X-ray cargo inspection challenge using machine learning. In *Anomaly Detection and Imaging with X Rays (ADIX)* (Vol. 9047, 9047N). International Society for Optics and Photonics. <https://doi.org/10.1117/12.2222765>

[4] Li, D., & Yu, Y. (2018). Contrast-oriented deep neural networks for airport object detection. *IEEE Transactions on Neural Networks and Learning Systems*, 29(12), 3036-3050. <https://doi.org/10.1109/TNNLS.2018.2817540>

[5] May, D., Rifa, V., Zhai, J., S., Mondrago, R., Liu, L., Jovic, L., ... & Corcoran, M. (2010). 9-Delay: The detection of foreign objects for non-destructive testing. *Journal of Nondestructive Evaluation*, 34(4), 12. <https://doi.org/10.1007/s00201-010-0205-7>

[6] May, D., Rifa, V., Zhai, J., & Prange, C. (2010). Automated X-ray object recognition using an efficient search algorithm in multiple views. In the *Proceedings of the IEEE Conference on Computer Vision and Pattern Recognition Workshops* (pp. 369-374).

[7] Mohd, S., Kadir, S. M., de Haes, J. C., Alvarado, R., Rajmohan, M., & Sathyanagar, A. (2007, October). Computer-based training increases efficiency in X-ray image interpretation by aviation security screeners. In *2007. 41 Annual IEEE International Conference on Security Technology* (pp. 301-309). IEEE. <https://doi.org/10.1109/ICST.2007.4373490>

[8] Rifa, V., & May, D. (2012). Active X-ray testing of complex objects. In *Eight Non-Destructive Testing and Condition Monitoring* 24(1), 20-25. <https://doi.org/10.179/446.2012.24.1.20>

[9] Rajeev, T. W., Jaisankar, R., & Griffin, L. D. (2017, May). A deep learning framework for the automated inspection of complex dual-energy X-ray cargo images. In *Anomaly Detection and Imaging with X Rays (ADIX)* (Vol. 10187, 10187G). International Society for Optics and Photonics. <https://doi.org/10.1117/12.2362062>

[10] Shen, Y., Ji, K., Wang, C., Li, X., & Li, X. (2018). Weakly supervised object detection via object-specific pose priors. *IEEE Transactions on Neural Networks and Learning Systems*, 29(12), 3960-3977. <https://doi.org/10.1109/TNNLS.2018.2819021>

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Intelligent IV Fluid Bottle for Healthcare Using Robotic Arm

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ABSTRACT: In this paper, we recommend an intelligent way to control the saline flow rate and monitoring of oxygen level for the quick recovery of patients. Almost in all hospitals, a nurse is responsible for monitoring the saline fluid level and the oxygen level continuously. But unfortunately, during most of the time the nurse may forgets to change the saline bottle at the correct time. It may lead to several problems to the patients such as backflow of blood, blood loss, drop oxygen level etc. The design and execution of saline and oxygen flow controlling method employs a liquid IR sensor, SpO2 sensor, temperature sensor and pressure sensor. The Arduino Mega (2560) platform has been used as controlling units for essential control along with a 3x4 matrix keypad which helps in setting the saline flow rate. The LCD display is used to indicate the saline flow rate and oxygen rate. Android phone is employed to control and monitor the saline flow rate through the mobile application; it also monitors the heart beat rate and body temperature as well as there is an option to eject the venflon using robotic arm. Also, we are using a push switches. These switches can be used in either increasing or decreasing the saline flow and also pressure. Relay also used. If any process goes down, it will indicate through an alarm. Here, using IOT technology, the status of the patient will send to the android application with the help of Wi-Fi connection. The main advantage of our project is a single nurse can monitor more than ten patients at a time.

KEYWORDS: Intravenous, robotic arm, controlling method, saline.

I. INTRODUCTION

Saline or intravenous fluid is a term refers to sterile solution of sodium chloride (nacl) or a substance which is given through vein to improve the patients' health. In medical fields the intravenous fluid is used to desiccation, hypovolemia or in nasal irrigation. The number of saline bottle is based on the condition of the patient health. Thus it is prime thing to measure the flow rate of fluid. This has been done manually by the nurses. During day or night time the few number of caretakers makes this task quite complicate. Thus it becomes mandatory to invent remote health monitoring systems which will measure the required patient data accurately and transmit a doctor or caretaker through fuzzy logic algorithm. Many systems have been developed in last few years for measurement of parameters like blood pressure, dextrose, pulse rate, body temperature and so on. This has been possible because of advancement in the field of sensors, microcontrollers and telemetry [2]. The development of such a system introduces a drastic change in medical field for monitoring the patient's parameters like heart beat rate, detection of heart attack symptoms and much more automatically with interdisciplinary nature. Even though many advanced remote monitoring devices or system are used, ensuring the safety of the patients during iv period is still a challenging issue. Intravenous fluid is a process which the liquid directly into the patient's hands. Therapies manage intravenously are often called specialty drips. The number of technology is involved to take care of health sectors and also involved in their improvement process. Still there have been many research and development of iv flow monitoring and controlling device or system for betterment of people's health care. The main objective of this is to provide reliable, convenient, effortless and cost effective system for flow and pressure monitoring. The saline is injected into blood by considering certain parameters like heart rate, blood pressure, body temperature, and pulse rate of patient. If the fluid crosses the certain limit it is required to change the iv bottle on time. Similarly, if the oxygen goes below the critical level, the nurse should check the level. An automatic monitoring system determines the flow and pressure rate. Normally when a saline is fitted to a patient, he/she is in a desiccation condition. it is major important thing when the fluid crosses the certain limit and also here to note that the saline is needed only when the patient is dehydrated. in most cases caretaker lethargically when monitored the patient, then it causes fatal consequences. if due to some other unavoidable situation, the saline bottle is completely cater of to the patient and the venflon is not at once removed from the veins then the pressure difference between the patient blood pressure and the empty fluid bottle causes an outward rush of blood into the saline. Normally this may be think of as a natural event.

PACKET OPTIMIZATION IN ADAPTIVE COGNITIVE RADIO SENSOR NETWORKS USING OFDM

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ABSTRACT:

With the rapid development of digital communication, the demand for spectral resources is increasing and the building of cognitive radios is the right solution for that. Cognitive radio networks are designed to utilize the licensed spectrum when it is not used by the primary licensed users. We are going to propose a method for effective data transmission and streaming in cognitive radio networks. By that we can achieve energy efficiency, less power consumption and much more transmitted information. In this paper, we are going to employ the OFDM method of spectrum sensing and proposed to use Cognitive Radio MAC protocol. Further our main technique is to divide the data packets into different sizes for transmission. The simulation results reveal that there is a better improvement in the detection of idle channel in the cognitive radio network and the delay is reduced with high quality transmission.

INTRODUCTION

With huge development in communication applications, the spectrum becomes more congested and the need for data rate is also highly increased. Radio spectrum is a limited resource and the service is allocated by fixed spectrum alignment[1].So, some frequencies are heavily used and some other band frequencies are weakly used.The number of devices or users using the unlicensed

spectrum is higher which results in spectrum scarcity

.To overcome the spectrum demand issue, cognitive radio networks are designed to utilize the licensed spectrum when it is not used by licensed users. CR is a promising technique to improve spectral utilization. Spectrum is allocated dynamically in the CR networks which further increases the spectrum utilization. In spectrum sensing mechanism, we are using OFDM method of spectrum sensing.

Here, the unlicensed users are going to use the spectrum of the primary users which is not in use. It senses the spectrum and finds the vacant spectrum available in the network[3,5]. Then, it chooses the best spectrum present which meets the required quality of service by the secondary user. The unlicensed users leave the spectrum as soon as the licensed user returns.

The ability to improve the spectral efficiency, enhance network efficiency and serve the telecommunication, user with high quality of user services is performed by the application of OFDM spectrum sensing[9]. The capabilities of CR allow optimization of data packets into various sizes and the resultant parameters shows that transmission frequency, waveform, interference and bandwidth performance are better.

IOT Enabled Arduino Based Voice Controlled Locomotive Neobot

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ABSTRACT: This work's aim is to make up a private assistant by utilizing Arduino as a process chip and underlying material. It showcases the substitution of screen based mostly interaction by victimization the close technologies like artificial intelligence and IoT by connecting it with the physical widget. It's composed of elements like IR sensors, Pi camera, Mic and Motor Driver. It's a voice controlled personal assistant whose movements are going to be controlled through voice directional commands. It's the capability to try to as per the content from footage then communicate the reminiscent of the shopper by utilizing the built-in speaker. It will facilitate the visually disabled to attach with the globe by giving them the access to informative sources like Wikipedia, calculator so on by victimization their voice because the command. The proposed system is better than the existing systems and it overcame the disadvantages faced in the other systems by making it a standalone personal assistant that can be associated exclusively through the client's voice. Furthermore, which perform different errands like perusing content from a picture, controlling movement through voice based indicated directions, and so forth. This system is a model for an assortment of employment.

KEYWORDS: Arduino, Pi camera, IR sensing element, Optical Character Recognition, Open CV.

I. INTRODUCTION

Today, it's become terribly rare to search out a person while not interacting with a screen, no matter whether or not it's a computer or mobile. A screen that may be a postcard-sized surface has somehow become a barrier and escapes the route in social things, gripping our gaze and taking the United States of America elsewhere. Soon, with the increasing proliferation of the net of Things {IoT}, we are going to enter the amount of screen-less cooperation or Zero wherever we are going to finish up with additional screens, everything is going to be a screen. Zero-UI may be a technology that utilizes our movements, voice, and even musings to form a system that reacts to the United States of America through our conditions. Rather than operating it through clicking, composing, and sound, purchasers can presently enter information by means of voice. Interactions are going to be the emotional differences from telephones and PCs into physical gadgets that we'll speak with. This all possible by utilizing artificial intelligence or IoT. Artificial intelligence is that the branch of technology that manages the event, design, operation, and application of robots. Our assistant is made by artificial intelligence, which controls through the preset voice directions. It gets a regular signal from the IR sensing element thus on find the constant manner for a run. It makes use of the Pi camera module for typical written or written content from the image and articulates or utters it to the shopper by utilizing an inherent speaker. It will perform Arithmetic calculations with voice commands and giving back the solution through a voice with more intuitive queries by the assistant.

II. RELATED WORKS

[1]The net of things {IoT} is that the network of physical devices, vehicles, buildings, and alternative things embedded with physics, software, sensors, actuators, and network property that modify these objects to collect and exchange information. The IoT permits objects to be perceived and controlled remotely across existing network infrastructure, making opportunities for extra direct integration of the physical world into computer-based systems, and resulting in improved potency, accuracy, and economic profit. Once IoT is increased with sensors and actuators, the technology becomes an instance of the extra general category of cyber-physical systems that additionally encompasses technologies like sensible grids, sensible homes, intelligent transportation, and sensible cities.

WIRELESS CHARGING OF MOBILE USING HUMAN BODY TEMPERATURE WITH THE HELP OF SENSOR

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ABSTRACT: Lately, remote sensor organizations (WSNs) are generally applied in various fields, like climate reconnaissance, wellbeing observing, keen home, distribution center administration, and so on. Here we will actualize in basic remote charger circuit for cell phones is introduced. The point of the examination is to actualize remote charging on cell phones dependent on internal heat level. Sensor hubs in traditional WSNs are generally fueled by energy-restricted batteries, accordingly the organization lifetime is restricted by the battery limit. To draw out the organization lifetime.

Key Words: Wireless Sensor Networks (WSNs), charger circuit, internal heat level, sensor hubs, energy-restricted batteries.

I. INTRODUCTION

Lately, remote sensor organizations (WSNs) are generally applied in various fields, like climate reconnaissance, wellbeing observing, keen home, distribution center administration, and so forth Sensor hubs in customary WSNs are normally controlled by energy-restricted batteries, along these lines the organization lifetime is restricted by the battery limit. To draw out the organization lifetime, broad investigations have been led from the viewpoint of plan of energy saving conventions and calculations in the previous years, for example, energy-saving steering conventions and geography control calculations. With the advancement of sensor hub equipment innovation, Wireless Rechargeable Sensor Networks (WRSNs) can reap energy from general climate, like sun based, wind, vibration, temperature variety, coupled attractive reverberation, and now human temperature. Among these new energy reaping approaches, utilizing human temperature procedure to charge remote sensor hubs is controllable and can charge a ton of sensor hubs all the while, thusly it has pulled in a ton of interest.

For instance, Intel built up a Wireless Identification and Sensing Platform (WISP), attempting to consolidate conventional temperature innovation with WSNs. WISPs have the capacities of standard sensor, and furthermore uphold detecting and figuring. Like any uninvolved sensor tag, WISP is fueled and perused by a norm off-the-rack RFID peruser, reaping the force it

utilizes from the peruser's radiated radio signs. Thusly, remote sensor charging is a promising and useful methodology in WRSNs. Much work has been done in WRSNs. Some work endeavors to mutually improve portable energy renewal and information gathering in a WRSN.

Some work considers mixture energy gathering remote sensor organizations, in which there are both battery-powered sensor hubs and standard battery-controlled sensor hubs. Existing examinations can be isolated into two classes dependent on whether the fuel source can uninhibitedly move in the organization: static sending and versatility booking. The plan goals of these investigations basically center around limiting fuel source organization cost (for the previous) or development cost (for the last mentioned).

In this paper, we study a situation that a portable charger moves in the organize and can stop at certain areas to charge the sensor hubs in the organization through RF. The stop areas of the charger hugely affect the exhibition of the charging interaction. In this perspective, we propose another stop area choice technique as indicated by the got power work. After the stop areas of the charger are resolved, we define two separate enhancement issues: limiting all out charging time or expanding charging effectiveness, while guaranteeing that after the charging interaction, every sensor hub's gotten energy is over a specific edge. We additionally break down the accusing effectiveness issue of no limitation condition through allowance. Trial results show that the stop area set that we pick can incredibly diminish the complete charging time and improve charging effectiveness.

II. LITERATURE REVIEW

Titles: Charger Mobility Scheduling and Modeling in Wireless Rechargeable Sensor Networks

Catchphrase: Wireless Charging; Mobile Charging; RF Charging; Charging Time; Charging Efficiency; Wireless Sensor Networks.

Theoretical:

The arising remote energy move innovation dependent on Radio Frequency (RF) is a promising

IoT Enabled T-Shirt for Monitoring Sleep Disordered Patients

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ABSTRACT: Nowadays people attracted within the wearable health monitoring devices both in industry and in research the purpose is to stipulate a totally utilitarian breathing screen with the top goal of recognizing occasions caused by apnea . This framework comprises of mechanical assembly which will distinguish the patients breathing rate, and tell a person observing the patient to a handheld screen. A caution is sound, For this reason we are creating a T-shirt for while monitoring for disorder breathing to monitoring a patient health level in real time and it'll monitored by GPRS Sever through ESP8266. Using ECG and Accelerometer sensor-based system is interfaced with Arduino Uno for monitoring sleeping disorder patient in real time. just in case of any abrupt changes in patient heart-rate or blood heat alert is shipped about the patient using IoT. this technique shows the patient blood pressure reading and display in real time. Thus Patient health monitoring system supported IoT uses internet to effectively monitor patient health and helps the user monitoring their loved ones work and saves lives.

KEYWORDS: ECG Sensor, Accelerometer Sensor, Internet of Things

I.INTRODUCTION

People attracted within the wearable health care monitoring devices both in industry and in research. The world's aging population is increasing due to the utilization of this wearable health monitoring system, whose health is continuously and frequently monitor. Our objective is to style a wearable device for disorder patient in Real time. Sleep-disordered breathing (SDB) is an increasing common, with a minimum of half people over the age of 65 experiencing disturbed sleep, with an extra 25% of youngsters experiencing SDB by adolescence. Obstructive apnea , Central apnea , Upper Airway Resistance and obesity hyperventilation are the foremost common SDB observed and are characterized by interrupted breathing with different causes.

The most common disorder. apnea cause low level oxygen in body and less sleep, which leads to sleepy in day time and tiredness in morning. Obstructive apnea may be a condition during which breathing stops involuntarily for brief periods of your time during sleep. Air flows smoothly from mouth and nose into the lungs in the least times. Lack of breathing in intervals are called apnea or apneic episodes. A continuously stopping oxygen supply in night. Central apnea may be a disorder during which your breathing repeatedly stops and starts during sleep. Central apnea is caused because of your brain doesn't response to your respiration system. This condition is different from obstructive apnea during which you can't breathe normally due to upper airway obstruction. it's less common than obstructive apnea . and a few of the symptoms are Abrupt awakenings amid shortness of breath, Shortness of breath that's relieved by sitting up, Difficulty staying asleep (insomnia), Excessive daytime sleepiness(hypersomnia), pain in the dark, Difficulty in concentrating in one thing, Headaches in morning.

Central apnea, which is more common among coronary failure patients, is caused by impaired cardiovascular and breathing control systems. thanks to an aging population also on a rise within the obesity among the overall population, the numbers of patients with SDB is predicted to rise significantly within the future. Consequently, sleep disordered research and requirements for more convenient sleep monitoring devices are predicted to expand rapidly. For this reason we are creating a sensible T-shirt based system used for individual patient monitoring system.

Untreated apnea results in long periods of disturbing sleep leading to chronic daytime fatigue. a toddler with untreated apnea may difficulty in listening. this will cause learning problems and poor in academic performance of youngsters. Some children also develop hyperactivity, causing them to be misdiagnosed attentively deficit or hyperactivity disorder. Untreated apnea can cause high vital sign, increasing the danger of stroke and warmth attack. And it's going to also cause childhood obesity.

Flying Spy Drone Car Using ESP8266

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ABSTRACT: Wi-fi is constrained by utilizing a Blynk android application rather joystick strategy. Here just should move the joystick in Blynk android application to control the vehicle in forward, in reverse, left and right bearings. So here Blynk android application is utilized as a communicating gadget and inbuilt wi-fi module put inside the vehicle is utilized as a beneficiary. Blynk android application will communicate order utilizing wi-fi to the vehicle so as that it can move inside the predefined bearing like pushing ahead, switch, turning left, turning right and stop. The robot vehicle is working with Nodemcu esp32 regulator and hence the order is given by the Blynk android application during a versatile utilizing the wi-fi network. The Nodemcu esp32 as inbuilt wi-fi module and in this way the gadgets associated with robot vehicle. Both wi-fi is associated with a confirmation token. Blynk android application will communicate order utilizing wi-fi to the vehicle so as that it can move inside the predetermined bearing like pushing ahead, invert, turning left, turning right and stop.

KEYWORDS: Wi-fi;Nodemcu esp32;Blynk android application; robotcar

I. INTRODUCTION

In the present day, technology has so improved that an Unmanned Aerial Vehicle (UAV) also called as Drone are often controlled from a distance starting from 2km to twenty km. The dependence and utilization of drones is continually ascending in various areas. this is often due to the drones capacity to supply a live-transfer, ongoing video and movie catch, alongside the capacity to fly and move merchandise [1]. Accordingly, in more than 10,000drones are going to be operational for business use inside the subsequent five years. this is often predominantly due to their benefits over business helicopters with regards to expenses and spending plan [2]. drones are furnishing clients with a bird's eye which will be actuated and utilized anyplace and whenever. In any case, as lately , the pernicious utilization of drones began to arise among criminals and cyber-criminals an equivalent . The likelihood and recurrence of those assaults are both high and their effect are often risky with annihilating impacts. during this manner, the need for criminal investigator, defensive and preventive counter-measures is exceptionally required. the varied employments of drones for vindictive objects are likewise checked on, along the conceivable recognition techniques.

Furthermore, the inventive movement enables straightforward controls through cutting edge cells to fly limited scope drones as against using distant controllers. Undoubtedly, the utilization of robots isn't limited to business and individual focuses. drones are being used by law necessity and limit control surveillance gatherings. On the off chance that there ought to emerge an occasion of calamitous occasions, search and rescue bunches use them to amass information or to drop essential supplies. In any case, drones aren't being used simply by "saints"; "agitators" are using robots to achieve their threatening objectives. Being not hard to direct , drones are regularly used to perform different attacks. however, , drones reveal security shortcomings that make them slanted to seizing. This robot is constrained by engine drive and hub mc gadgets have transmitters and beneficiaries to frame the work . parts required for this task are Arduino 4WD vehicle, NodeMcu, L298N Motor Driver and 2 Led for Light

II. LITERATURE SURVEY

The motion of robot controlling via internet is one among the straightforward means because it requires the user to access the designated webpage to guide it. This system are often utilized in defence applications for detecting landmines in war field and for bomb detections by mounting a detector sensor thereon . Further, the dimensions of device are often miniaturized based upon specific applications. The hardware components are successfully assembled and interfacing the microcontroller with robot is achieved. Controlling the motion of robot via webpage also as from android applet is successfully obtained. Hence the 2 modules of controlling the robot is successfully tested and demonstrated. Though controlling using Bluetooth limits the range of distance for communication, a sensible and straightforward means to guide a robot is achieved. Controlling the motion of robot via internet is one among the simplest means because it requires the user to access the designated webpage to guide it. This system are often utilized

Automatic Door Control with Fever Screening and Touchless Sanitizer Preventing from COVID 19

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Abstract - In the situation of this pandemic of COVID-19 (Corona Virus Disease), the main preventive measures for good health and hygiene by washing hands and sanitize their hands with alcohol sanitizers. The smart door thermal scanner with touchless sanitizer is a technique can be used when the pandemic period is on and gets over. Nowadays, in shopping malls, industries etc., The security guards check every individual person's temperature and pour sanitizers before entering into the building. When pandemic period gets over, it will be risk to check each and every individual person, especially in schools, colleges, industries etc., through this technique we can avoid such situations. The process begins with, the smart door will be at the entrance of the building. At first to sanitize their hands with touchless sanitizers, and starts to detect the presence of that person. The scanner is a laser thermometer, After scanning process is done, the temperature will be displayed on LCD, if any person is above the normal body temperature, the smart door will show display of red LED arose, the door gets locked to avoid that person from entering the building or if that person has a normal and low body temperature, green LED arose, so the door automatically opens for that person.

Key Words: COVID-19, Pandemic, Public places, Touchless sanitizer, Laser Thermometer.

1. INTRODUCTION

The concept of this project is to have automatic door control with height adjustable automatic thermometer with touchless sanitizer to prevent from COVID19. In this COVID 19, pandemic period, it is important to take preventive measures for good health and hygiene by washing hands frequently, sanitizing our hands by alcohol based sanitizers and social distancing to avoid the spreading of infectious agent in Places surrounded with many person. The smart door thermal scanner with touchless sanitizer is a technique that can be used when the pandemic period gets over. Nowadays, in shopping malls, industries etc., the security guards check every individual person's temperature and pour sanitizers before entering into the building. When pandemic period is on and gets over, it will be risk to check each and every individual person, especially in schools, colleges, industries etc., through this technique we can avoid such situations.

2. LITERATURE SURVEY

2.1 EXISTING SYSTEM

SI Kim [1] the paper title "Walk – through Screening Center for COVID-19: An accessible and Efficient Screening system in a pandemic situation" this project focuses on a safety method (Safe Assessment and Fast Evaluation Technical booth of the H Plus Yanji Hospital) system. This technique is a booth for one person to examine the negative result. The screening system should have well ventilated open space is required, this is the drawback for this technique. D. Bitar [2] through this paper "The travellers fever screening system in international airport to avoid disease spread: a literature review on the effectiveness and potential use of non- contact infrared thermometers" this project focuses on a Non-Contact Infrared Thermometer system. This technique is a fever screening center in airports for mass screening of passengers. Due to mass screening the normal temperature passengers were mistakenly identified as affected person, this is the drawback for this technique. MF Chiang [3] the paper title "Mass Screening of Suspected Febrile Patients with Remote-sensing Infrared Thermography: Alarm Temperature and Optimal Distance" this project focuses on a Digital Infrared fever checking system. This technique is a mass fever screening of patients who are entering into the hospital to identify those with fever. Due to sweat the patient fever screen were recorded as false negative, this the drawback of this technique.

2.2 PROPOSED SYSTEM

The smart door will be fixed at the entrance of the building, public places like park, school, colleges etc. The process begins by sanitize their hands with touchless sanitizers, then the PIR Sensor detects the human by their temperature and immediately the laser thermometer will start to fever screen, after the screening process the temperature will be displayed in LCD, if the person has high temperature the smart door produce with the display of red light in LED with beep sound from buzzer, then the door gets locked to avoid that person from entering the building or if that person has normal body temperature, there will be a green light in LED and the door automatically opens for that person to enter.

Traffic Density Based Automatic Road Signal Using IOT

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ABSTRACT: Traffic congestion especially at road intersections is becoming an issue for which road traffic users contend with daily. The conventional traffic light applies a fixed logic of allocating equal "GO" time to lanes of the traffic at road intersections irrespective of the density of traffic on each lane. Internet of things (IOT) is the interconnection of uniquely identifiable embedded computing device within the existing infrastructure. The proposed system (vehicle Traffic Monitoring) has a central microcontroller at every junction which receives data from tiny wireless sensor nodes placed on the road. Traffic density is calculated with the help of IR trans receivers and the information is passed to cloud server which will give prior information regarding traffic jam at junctions. Results obtained from simulation and implementation of the design indicates that the traffic control system with the PIC18F4550 microcontroller and the infrared sensors gives a better performance compared to the conventional traffic light control system.

I. INTRODUCTION

Traffic signals, traffic lights, stoplights or robots are flagging gadgets situated at street convergences, walker intersections, and different areas to control streams of traffic. The world's first traffic signal was a physically worked gaslit sign introduced in London in December 1868. It detonated not exactly a month after it was executed, harming its cop administrator. Sincere from Chicago protected the originally robotized traffic light framework in 1910. It utilized the words "STOP" and "Continue", albeit neither one of the words was enlightened.

II. RELATEDWORK

In paper [1] In Present day life we need to look with numerous issues one of which is grid lock getting more genuine for quite a while.

In paper [2] Framework will be savvy and will ascertain the time each time dependent on the thickness and work in a cyclic clockwise sign lights control. Greatest and least time cutoff will be kept up. It is to forestall over holding up of vehicle in line of different paths which would be discovered tentatively. Control of the sign will be steered through the microcontroller.

In paper [3] The task is pointed toward planning a thickness based unique traffic light framework where the circumstance of sign will change consequently on detecting the traffic thickness at any intersection.

In paper [4] Traffic Light Framework or traffic observing is a tremendous area where WSN (wireless sensor organizations) can be applied to accumulate data about the traffic load on a specific street, approaching traffic stream, traffic load at specific timeframe (top hours) and in vehicle prioritization.

In paper [5] The venture is intended to deal with the traffic light or traffic signal by assessing the thickness or number of vehicles out and about or path.

In paper [6] One of such over-extended framework is the street, a situation which has come about to increment in rush hour gridlock.

In paper [7] The undertaking is pointed toward planning a thickness based powerful traffic light framework where the circumstance of sign will change consequently on detecting the traffic thickness at any intersection.

In paper [8] The undertaking has been intended to build up a unique street signal dependent on thickness. The sync signal naturally changes to identifying traffic thickness at the crossing point.

In paper [9] Generally urban communities, traffic is turning into a great issue for everyday life. In this way, heaps of strategies are taken into worry to curb the traffic.

In paper [10] The consistent development of individuals from country to metropolitan zones looking for greener pastures has brought about metropolitan populace blast and over-extended frameworks.

Shock Preventing System in Industry

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ABSTRACT: Present industry is increasingly shifting towards automation. Two standard parts of the present modern computerizations are programmable regulators. To help the drawn-out work and to serve the humankind, today there is an overall propensity to build up a savvy activity. Because of this automation industry the human working with heavy load there will be chance of accident. Our objective of this project is to create a shock prevention system to avoid chance heavy load passing through industrial workers body. Our project is designed with wireless based wireless monitoring system to monitor the voltage passing through human body in transmitter side. It will be designed with Arduino nano and potential transformer interface with controller. In RF receiver side used to cut off the entire load while heavy load passing through human body. It will be controlled by Arduino uno in Receiver side control. Using RF transmitter and receiver we are wirelessly monitoring load and supply flow through human body.

KEYWORDS: Shock prevention, Wireless monitoring, Transmitter, Receiver, Intelligent operation.

I. INTRODUCTION

Electric stuns are a difficult issue in the mining climate. Due to incredibly wide running utilization of electrically fueled gear in the mining business, the peril to staff because of electrical 'stun and related wounds are not limited to any single region yet cover the whole range of mining action. Electrical mishaps, bringing about close to home injury, because of ill-advised or complete absence of establishing of electrically worked mining machines, structure a critical level of the by and large electrical mishap. Mainly electric accident occurs in industry the human death is increasing. For this reason we creating a shock prevention system for human or industry worker to avoid chance of heavy load passed through human body. Present industry is increasingly shifting towards automation. Two guideline segments of the present mechanical mechanizations are programmable regulators. To help the drawn-out work and to serve the humankind, today there is an overall inclination to build up an insightful activity. Because of this automation industry the human working with heavy load there will be chance of accident.

II. RELATED WORK

In paper [1] authors used sound engineering principles. IEC, IEV technologies are used to give the prevention against shock.

In paper [2] authors used Scene Modelling technology. Single-phase grounding faults in distribution networks based on personal safety protection is the major impediment in this paper.

In paper [3] authors used EMD-T, IMF technology. In this paper the signal is usually corrupted by artifacts through the recording process.

In paper [4] authors used RCD technology. Data filter is used in this paper, that is the major impediment. In paper [5] authors used statistics. It only shows the graph of the total fatality accidents occurs in the Japan.

In paper [6] Study on identifying method of electric shock current amplitude based on Independent Component Analysis. Using an ICA model will be the disadvantage to this project.

In paper [7] Study on equivalent circuit of the human body and its transient response against electric shock. The human body is composed of various fluids and tissues, all with complex electrical properties.

III. COMPONENTS REQUIRED

A. SOFTWARE REQUIREMENT:

- Arduino IDE software compiler version 8.1 is open source software and it's easily available for operating systems like MAC, windows, and Linux runs on the java platform that comes with inbuilt function and therefore the commands that play a significant role for debugging, editing, and for compiling the code within the environment. The IDE environment mainly has two basic parts: Editor and therefore the compiler where former is employed for writing the desired code and later is employed for compiling and uploading the code within the given Arduino UNO module.

Automatic Food Feeding System For Animals

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Abstract This project is designed to make an animal feeding work that incorporates imaginative system for all kinds of use; cattle raising, of farms, horse stables and many more. The feeding process will be automatized using an industrial controller which feeds and will have a track of the food to settle up periods and quantities. This food feeding automation application be applied remotely using a PIC micro controller and Wi necessary and the information can be accessed wireless sensor devices for animal tracking and want, through a VPN connected to our MQTT server. This database data will be shown in a web server (This We began) experiments with Mote hardware in ea that will monitor all the information. The 2018 deployment of the large (54 nodes) network of information should help in a continuous improvement cycle. We investigated communications b addition to that water indicator and cleaning system nodes and between a node mounted on a flyi proposed in this project. IoT is one of the technologies that was difficult to establish com are used in a huge number of applications today. One of the apart even though we could achie applications (GSM) is tracking animal and keeps the range in the lab. We learnt that rad monitoring on them. This tracking system you can help soil lost most of their emitted signal to th location and route travelled by animal, and that by placing them on inverted plastic flower p can be observed from any other remote location. We also learnt that packet tr includes the web application that provides you exact location rather than simply working or of target. This system enables us to track target if any we received packet would be fine except conditions.

Keywords MQTT Server, GSM, Internet of Things, Tracking and connectors for interfacing and expansion paper we have described a new family of wireless devices. They were developed with different en tradeoffs to existing devices and the needs of

I. INTRODUCTION

The reason for this worth of effort may be on applications. and actualize all the Automatic pet nourishing system. The term programmed pet nourishing framework by Animal Tracking and Caring using RFID and IOT point not withstanding a day, particularly for those continuous advancements for innovation. Since the idea will be shared, pass new technologies are ev nonetheless the occupants need aid different RFID (Radio Frequency Identifier) has grown as enhance their generally personal satisfaction for technology for tracking things around the increment autonomy Also keep emergencies, pet should be active or passive. Active RFID tags re requirement an approach will mechanize those animals supplier for running the circuitry of bolstering from claiming their animals. Today as metal sign to the RFID reader. Passive ta claiming attempting fathers and moms and the contain battery. Rather they take power from the claiming vocation assistants. prompt animals do things tracking can be done to a longer range t unattainably for extended periods a day passive tags. The main work of RFID is to identif considerable measure of worries. This makes the important goods or person (here animals). Te search for elective approaches with handle those as RFID, IOT and sensors are been used. All for dealing with those animals. In this design, should be implanted with RFID. This helps converted from a cardboard box under an internet makes it easier in locating and tracking the an



Road Sign Recognition System Using Raspberry Pi

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ABSTRACT: Road sign recognition is one of the important tasks of intelligent transportation systems (ITS). The project aims at implementation of road sign detection and control of an autonomous vehicle using Cascade Classifier algorithm. In this proposed work, the system automatically detects the road signs, controls the vehicle and commands certain actions. The system consists of Raspberry Pi 3 processor and web camera which automatically captures the video data and converts them into number of frames which are processed by the proposed algorithm in OpenCV to detect the road sign and control the vehicle. Based on the detected sign, the vehicle is controlled by DC motors interfaced with Raspberry Pi. The experimental results for Peak Signal to Noise Ratio (PSNR) and Minimum Mean Square Error indicate the proposed system gives more accurate results with higher PSNR value compared to Hough Transformation.

KEYWORDS: ITS, Raspberry Pi, PSNR

I. INTRODUCTION

Automatic Road sign detection and recognition is an imperative errand of Advanced Driver Assistance Systems, has been of incredible enthusiasm for ongoing years for unmanned vehicles. It enhances safety by informing the drivers about the current state of traffic signs on the road and giving valuable information about precaution. Road signs are placed either at the sides of road or above as navigation guides. With continuous raise in road traffic, mishaps chances likewise raises. Road safety statistics demonstrate that about 1.24 million people die annually on road due to accidents. Thus, the research has focused in recent years on intelligent systems that can avoid the collisions and mishaps. They are developed to enhance Road safety and driving comfort. This system introduces a method of road detection using Raspberry Pi for self-driving car. When vehicles are moving on the road, it is difficult to find road sign such as lane, crosswalk, stop line, turn left, turn right etc., only using a single camera. A web camera mounted on the moving prototype vehicle captures the image and processes the image using Haar Cascade Classifier.

II. RELATED WORK

Radio Frequency Identification (RFID) system is looked upon as one of the top ten important technologies in the 20th century. According to the investigation of the AMR Research, the willingness for using RFID tags exceeds 85% based on 500 USA enterprises.[1] AGV are gaining importance and finding increased utility in both commercial and industrial purposes. AGV are computer controlled, unmanned, highly flexible and intelligent mobile vehicles (usually Battery operated) installed with intelligent guidance systems such as optical, magnetic or laser for automated functionality characterized as either towing or load carrying.[2] Cloud Computing (CC) is considered as an efficient technology to process data due to its computation power and capabilities. These capabilities are used by applications such as the Internet of Things (IoT) devices.[3] Employing proper mechanisms to prevent and stop attacks on driver-less cars is an important step to their adoption. Currently, vehicular ad hoc networking (VANET) and artificial neural networks (ANNs) are used in driver-less cars to prevent and stop attacks.[4] Several Convolutional Neural Networks (CNNs) are adapted to map raw pixels from front-facing cameras directly to steering signals and the results are reported here. This transfer learning approach proved successful.[5] Amol Jayant Kale and R.C. Mahajan have proposed a methodology for street sign acknowledgment framework which getting the traffic sign image from the moving vehicle. In this paper the framework gets separated into two phases. The primary stage is utilized as an identification part which recognizes the street sign coordinated with the database and second part is arrangement organize that is to characterize the distinguished signs which is taken from the principal arrange. Every one of the image are put away in database. In the identification arrange, the info picture taken is a YCBCR shading space distinguishes the street signs by utilizing

SMART SOLUTION FOR WOMEN SAFETY USING IOT

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ABSTRACT : *This objective of the project is to provide a women security which would be controlled from anywhere else. It is also highly economic and less expensive; hence IoT based realtime is technogy is preferred most for this mode of controlling. The GPS is used to find the women location in case of emergency. WIFI(Iot) is used to monitoring women in realtime and send the women location to his parents and police to save women. In this application we are maintaining the heart beat sensor, Accelerometer and then others like the Sensor, emergency switch, Microphone(MIC). The main objective of this project is to provide a perfect security for Women and covering all safety aspects to save a woman from danger or emergency condition.*

Key Words: IOT, GPS, Microphone & WIFI

1.INTRODUCTION

In the present era women are taking equal responsibilities in work area. They are maintaining work and home simultaneously which requires travelling and working odd shifts. Safety is a major issue which restricts women. For women to grow in their field of work or simply live their lives and feel free, safety has to be granted in all spheres. India is still trapped in the clutches of various patriarchal evils like molestations, assaults, and various crimes against Women. These crimes may be committed by strangers, acquaintances or even family members. Rapes and sexual harassment cases have been report by women in workplace, public area, at homes, etc. In India such cases have increased by 83% from 2007 to 2016. The latest National Crime Records Bureau data reflects how incidents of rapes have gone up by 12-15% while other crimes have risen by 3- 5%. At 25% the conviction rate of crimes against women in 2016 was lowest since 2007. This is due to various

reasons such as lack of evidence, withdrawing case for personal safety issues, societal norms etc.

The government has taken measures to reduce the crimes through laws and legislations to assure safety in workplace, public places. Punishment for such crimes have been made more severe New laws have been established and modifications have been made to the existing ones but as seen from the statistical data the crime rates are still high. This requires a safety provision that will be able to make women defend themselves, keep them safe and secure and not feel helpless while alone in the street's workplaces or at home. In order to serve the purpose, we have developed a prototype of 3-Way Women Safety Device named 'ProTech' which can be used in workplace, market area, and various public places. It provides features for self defence and alerting the user's emergency contacts through location information and auto-dialled call. It also has a video camera to recordervidence.

2. LITERATURESURVEY

2.1 Android and Bluetooth Low Energy Device Based Safety System - UG Student, Dept. of CSE, Satyabhama University, Chennai, India

Introduction

In this day and age, women security has turned into a noteworthy issue as they can't venture out of their home at some random time because of physical/sexual maltreatment and a dread of savagery. Indeed, even in the 21st century where the innovation is quickly developing and new contraptions were produced yet at the same time women' and young women are confronting issues. Women are skilled at assembling differing bunches for a typical reason.

The Development of a Visualization Framework Based On Embedded System for Fishing Vessels Using Arduino Board

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Abstract

Fishing is among the foremost dangerous of professions within the planet because once out on the ocean, the fishermen are subject to varied oceanographic and climate. Especially, so within the developing countries of South-East Asia, where fishing could also be an integral neighborhood of the economy, but there aren't any properly established systems for the safety of fishermen. This project aims at providing a possible solution to the numerous hardships faced by the fishermen because they're stopped from any kind of communication. During this project, a transportable device is going to be made, which uses GPS for real-time location detection and uses RF for wireless communication. The device also features a little LCD and a button that acts as a multipurpose signaling switch. Each of the fishing boats is given this portable device. Using the RF transceivers on each of the units, all the boats can form an unplanned network within themselves. Once this unplanned network is established, then the subsequent applications will become possible. 1. Prevention of fishermen from crossing into international areas: Each of the portable units is getting to be programmed with the GPS boundary coordinates for Indian Territory on the sea. With this, whenever a ship comes on the brink of or crosses over into international waters, an alarm is getting to be raised and a message is getting to be transmitted over the network about the cross over. 2. Information about weather conditions: Using the unplanned network, a weather warning is often provided to the fishermen from a coastal station / from coast guard vessels. 3. Distress management: If there's an accident or emergency on a ship, the button is often pressed on the unit, and an automatic SOS message is getting to be broadcasted on the unplanned network, thus enabling rescue operations. 4. Natural Calamity Warning: Once a network like that's in place, it can also be used for applications like Tsunami Warning using sensors that are planted on the ocean bed, and connected to a surface wireless transmitter.

Keywords: Arduino, Seismic Sensor, Wireless Receiving kit, Battery, Buzzer, Bluetooth Module, LCD, Power Supply Unit

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I. INTRODUCTION

Security and disaster alert dissemination showcase the key challenges moon-faced by the fishing business, primarily because of the shortage of reliable communication means that, and will cause serious threats to the lives of the fishermen. The fishing vessels, equipped with acceptable transceivers, are usually thought-about as MANETs (Mobile Ad-hoc Networks) stumped, and communication will happen throughout a hop-by-hop manner. The provision of a visual image framework for such a system allows authorities on the shore to urge info on vessel locations, their transmission ranges, and alternative info, in close to period, and show them. The visual image framework can aid in choosing the foremost favorable routing rule and might facilitate tracing and find the vessels. The system is supposed to modify the users to access it through an online browser and is developed to exploit the most recent internet technologies like HTML5, WebSocket, and Google Maps API V3. The system design, implementation details and so the results obtained are mentioned throughout this paper. The project aims to help the skilled worker to determine our Indian border at intervals the ocean space whereas fishing. By exploiting the eight-bit microcontroller the desired tasks are used to identify the Lankan border. This project facilitates to grasp our border limit of the navy. Then to use this project we'll avoid inessential shooting and inessential death. The fisherman will recognize their limits. The project consists of a transmission base station, Receiver setup. The receiver setup is placed within the boat receives the signal, once the boat is nearing the borderline. Once the receiver receives the signal, a message is transmitted to the coastal guard by means that a warning alarm is given to the skilled worker. By means that of this instant action, the coastal guard will stop the skilled worker from crossing the border. During this project, we tend to are exploitation the wireless technology to send the message from the boat to the workplace with the position of the boat at intervals the ocean exploitation the GPS technology. We tend to are exploitation the pc to store the information of the boat

AN ADVANCED IOT EDGE COMPUTING TECHNIQUE FOR POULTRY ENVIRONMENTAL MONITORING WITH ARDUINO UNO

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Abstract

In the system Internet of Things technology, the data is mostly transmitted to the cloud for processing, which reduces the real-time performance of the system, increases the burden of the cloud computing center. The increase in the number of intelligent devices, and the rapid growth of data also gives the network bandwidth stress. Given the above problems, this paper proposes a method of applying edge computing to the Internet of Things. The main idea is to use the characteristics of the edge nodes closer to the data source in the monitoring of the farmhouse environment system which is based on the Internet of Things technology. The processing is done on the edge nodes. After experimentation, the data can be processed in real-time, reducing the burden on the cloud computing center.

Keywords: Arduino Uno, IoT(wi-fi), Temperature sensor, Humidity sensor, LDR sensor, LCD

I. INTRODUCTION

If we can process and analyze data at the edge of the network, then this kind of computing model will be more efficient and robust because data will not be uploaded to the cloud, which adds privacy protection. we found that in the development of the Internet of Things, cloud computing is not always so efficient, we need to solve the bandwidth and delay problems, so we proposed edge computing, in which the edge is not absolutely the edge of the geographic location, but it is arbitrary computing and network resources between the cloud computing center and data source, compared with the edge of the cloud computing center, the edge computing model migrates data processing tasks to the edge of the network, reducing the pressure on cloud computing and increasing the system's real-time.

Based on the above ideas, the self-learning energy-saving system based on the Internet of Things in literature, the various types of data collected by the classroom terminal nodes are uploaded to the cloud for processing, the above problems will occur, in this paper, edge computing is applied to the environment monitoring system of farm chicken house based on Internet of Things. The temperature, humidity, and light intensity data of the house collected by the terminal node are transmitted to the STM32 gateway through the ZigBee network, and the gateway is used as an edge node to process

Fatigue surveillance and safety enhancement using IoT

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ABSTRACT: In Indian country the health level of vehicle driver is going abnormal while travelling. Because of this reason vehicle accident numbers are increasing day by day. For that we are designing a project called intelligent approach to monitor a health condition and drowsiness of a driver using IoT based system. The main objective of our project is to monitor a vehicle driver's health level, fire detection, fall detection and alcohol detection. The heart beat sensor is used to monitor the health level, in case of driver emergency the alarm is activated and vehicle automatically stopped and message in sent to nearby hospitals. Using an alcohol sensor we are testing a driver is drunken or not. Sensor detects the driver is drunken they automatically stop the vehicle and message received by traffic police server using to know the particular vehicle is drunken drive. This project describes a real-time, non-intrusive prototype for fatigue monitoring and mishaps prevention. It is a driver vigilance monitoring system which detect and alarm the user i.e driver. There are many measures for monitoring drowsiness based on monitoring the changes in vehicle, behaviour of driver and physiology of a person. They all have corresponding advantage and limitations. However for obtaining more accuracy the combination of these methods can be used. Hence here we developed a hybrid system which is a combination of behavioural based and physiological based. There are many parameters are available but in order to make simple and cheap detection system which will be suitable for everyone we take head movement and pulse rate as a parameter for this project.

KEYWORDS: Drowsiness monitoring system, driver's alcohol consumption detection, fire detection, fall detection, accelerometer, heartbeat sensor, petrol leakage sensor, Arduino Uno, IoT.

I. INTRODUCTION

Abruptly road accidents are increasing all over the world. There are many reasons for

accidents some of the major issues are lack of driver's vigilance which maybe because of drunk and drive, drowsiness or some health issues. The major problem in long driving is drowsiness. Drowsiness in drivers can be generally can be monitored by the following categories:

- Vehicle based measures
- Behavioural based measures
- Physiological based measures

[1] **Vehicle based measures:** Here sensors are placed on standard vehicle components i.e. Steering wheel and gas pedal. That sensor detects a deviation from lane position or loss of control over steering wheel movement. This method is non-intrusive. But it has limitation that it is unreliable since variation in individual and vehicle.

[2] **Behavioural based measures:** In this method alertness of a person is tracked from eye closure count, yawing count, eye blinking pattern, head pose and head movement. It is non-intrusive and easy to use. But it also has limitation that variation in background light.

[3] **Physiological based measures:** The sensor like ECG, EEG and EOG was used to measure drivers heart pulse and physiological change in order to detect drowsiness. This method has high accuracy and reliable. But it has limitation that it is intrusive, which is not realistic.

Hence in this project a real-time, non-intrusive prototype for fatigue monitoring and mishaps prevention system is designed. Generally vehicle tracking system is used for monitoring an own vehicle and a person having a vehicles like Lorry is monitored by owner by using IOT. Our project is mainly used for tracking a drunken vehicle driver to avoid the accident caused by a drunken driver. Because most the accidents is caused by drunken vehicle and rush driving. For that we are designed IOT based real time health monitoring system.



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Electronic Chair (E-Chair) Using Piezo Energy Harvesting

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ABSTRACT: Man has wished and used electricity at a growing charge for the sustenance and well-being in view that time immemorial. Due to this a lot of electricity sources had been exhausted and wasted. Proposal for the usage of waste electricity of strength with human locomotion could be very a lot applicable and crucial for noticeably populated nations like India wherein the railway station, temples etc., are overcrowded all spherical the clock. When the floors are engineered with piezo electric powered technology, the electric electricity produced through the pressure is captured through ground sensors and transformed to an electrical rate through piezo transducers, then saved and used as a strength supply and this strength supply has many packages as in agriculture, domestic software and road lighting fixtures and as electricity supply for sensors in faraway locations.

This paper is all approximately producing strength while human beings stroll at the chair. Think approximately the forces you exert that's wasted while someone walks. The concept is to transform the weight electricity to electric electricity. The Power producing ground intends to transform the kinetic electricity to the electric strength. Energy Crisis is the primary problem of global wide in those days. The motto of these studies paintings is to stand this disaster somehow. Though it won't meet the requirement of strength however as a depend of truth if we're capable of layout a strength producing ground that may produce 100W on simply 12 seating's, then for a hundred and twenty steps we can produce one thousand Watt and if we set up such a form of a hundred flooring with this device then it can produce 1mw. Which itself is a success to make it significant.

KEYWORDS: Renewable Resource, Piezoelectric Transducer, Rack and Pinion Mechanism.

I.INTRODUCTION

In order to address the growing international Department of Energy consumption and consumers, we call for to increase and put in force green, easy and renewable electricity supply. This report 's goal is to introduce an opportunity generator of power via way of means of the usage of piezoelectric substances. A chair designed with embedded piezoelectric with rack and pinion under which will generate electric power from the anxiety implemented at the chair via way of means of the strain sensation of the stress over it.

This may be implemented to public vehicle seating, bus stands and public parks. It is simple the efficiency of piezoelectric substances as a power supply. Since 1880, that is a feasible way to the phenomenon of piezoelectric impact, determined via way of the Curie brother. Piezo electric powered substances body transducer which might be successful to trade electric power and mechanical power or pressure. This transducer consequently can be used as mechanics to carry-over Ambient motion (usually vibration) into electric power which could exist saved and used to electricity different gadgets. By imposing an electricity harvesting tool we can modernize transportable structures that do not the conventional approach appearing for offering electricity, including a battery which has a determined running lifetime.

II.WORKING PRINCIPLE

The operating precept of the E-CHAIR (ELECTRONIC CHAIR) USING PIEZO ENERGY HARVESTING is as follows: When weight unit seated on the higher aspect shell of the association, the shell will dip down barely because of the load unit. The downward movement of the plate final results in the technology of electrical electricity.



Design and Fabrication of Micro Strip Patch Antenna for Cognitive Radio Applications

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Abstract

A micro strip patch antenna (MPA) is fabricated to increase the bandwidth. The communication systems want antennas with high directivity, high signal strength and gain. In this paper, spectrum underlay finite element line feeding technique (SUFELF) is proposed to design MPA's are potential for cognitive radio applications (CRA). The proposed SUFELF is designed and simulated by using HFSS-14, simulation and calculated results of SUFELF for S-band is compared. The proposed SUFELF construction can discover a lot of applications in designs for S band, efficient spectrum utilization in cognitive radio networks (CRN). To improve gain, The MPA with circular patch (CP) was fabricated through SUFELF. This design can carry out a gain of 4.21 dBi, and percentage of impedance bandwidth is 85.2% at 3.546 GHz. A SUFELF model has made-up and calculated, the results have revealed a excellent concurrence by means of the simulations. To obtain efficiency of 95.9% the Proposed Antenna (PA) is powered. We conclude this work with a discussion on the expansion to the coexistence with different patch antennas.

Keywords SUFELF · Micro strip patch antenna (MPA) · Cognitive radio networks (CRN) · Circular patch (CP) · Bandwidth · Spectrum utilization (SU)

1 Introduction

In wireless communication and networking always need better performance. The MPA experience the ill effects of thin transmission capacity over communication channel because of its single radiation typically less than 5.3% [1]. For instance, a MPA with a

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Antenna Design: Micro Strip Patch for Spectrum Utilization in Cognitive Radio Networks

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Abstract

A micro strip patch antenna with multiple parasitic patches for Cognitive Radio Network applications is presented to enhance the bandwidth. Multiple resonances are used for the design of antenna, with a view to broaden bandwidth. A modified Koch Fractal antenna is imprinted from micro strip radiating patch. A Parasitic Strip line helps to grasp micro hertz communication through antenna. A slotted patch energized by a gap feed was established before with a large angular coverage over a bandwidth of 13.1%. In this paper, it is proposed that multiple parasitic patches are potential for cognitive radio applications where circular patch (CP) covers bandwidth of 85% with radiation pattern for Spectrum Utilization (SU) and CP with meander lines feeding behaves as communication antenna operating at Wireless Local Area Network 802.11y (3.637 GHz). The transceiver in a communication network is powered by Proposed Antenna, to acquire improved energy efficiency of 95.7%. Thus, throughput and SU have been improved, a model of antenna has been fabricated and its radiation patterns, return losses were achieved which shows fine consistency with simulated results.

Keywords Micro strip patch antenna · Bandwidth · Cognitive radio networks · Spectrum utilization · Throughput · Circular patch

1 Introduction

Recent wireless communication systems require antennas with lightweight and low profile. Conventional MPA suffer from narrow bandwidth owing to the fact that its unique resonance radiation is characteristically found to be less than 5%. Among the most other common ways, adopting some slots in patch radiators can tend to capitate added controllable resonances for the purpose of bandwidth enhancement [1]. A

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Modern Agriculture with Insect Killer and Voice Alert Using IOT

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ABSTRACT: Development of commercialism utilizing innovation square measure getting to be lots of valuable in development. for a further cultivation zone, whereas not knowing or observant the various boundaries of the dirt, development square measure getting to be tough therefore the ranchers endure money connected misfortunes. This enterprise provides a short diagram of the dirt observant framework utilizing sensors. entirely completely different soil sensors areutilised to live temperature, damp and light-weight, body and pH esteem. the data from the sensors at intervals the dirt is shipped off the PIC16f877a A/D device then from A/D device it ship off the cloud through Nodemcu. eventually we have a tendency to square measure able to see the Info spared to cloud on telephone at the same time as pc. supported info we've got a tendency to note that yield is reasonable with given soil boundary consequently this forefront innovation causes the ranchers to know the precise boundaries of the dirt so making the dirt testing methodology simpler. Fly insect killer machine assists to attract flying insects towards a system that works on decoy principle. The insect killer light-weight has been fitted to kill the insects with high voltage wires on the point of tube-light .thus on differentiate sensible and dangerous insects here we've got an inclination to implemented video observation system victimization raspberry pi and camera. to boot to it device is extra to activate or deactivate the killer machine.

KEYWORDS : Arduino UNO ,NPK sensor, soli sensor, moisture sensor, blower, nodeMCU

I. INTRODUCTION

When the ball of fireplace gets cool and anxious, the planet has fashioned. the person started his civilization life before eighteen,000 years past. Accidentally he has changed into a domestic life by the invention of fireplace. It ends up in cookery and had his differing kinds of food. He began to establish the edible crops from the wild varieties. Thus, the cultivation of crop is originated. The origin of cultivation starts with kingdom eras. Later, he started exploitation tools to arrange the land and he termed the animals in cultivation. This leads the person to begin his agriculture technique in crop development. ab initio it had been through with the assistance of plough and basic tools. because the population inflated, man started thinking of advanced technologies to boost agriculture. Some mortal like Dr.M.S. Swaminathan brought revolution in our country.

There square measure differing kinds of revolution like blue revolution, white revolution and sliver revolution. These square measure eminent turning purpose in Indian agriculture system by the continual increase in population. It becomes population explosion and increasing of industry, urbanization and settlement ends up in shortage and shrinking of cultivatable lands. so population, flood, famine and starvation square measure wide unfold that don't seem to be avertable.

Agriculture is that the basic would like of each human during this world. Asian nation is associate degree agriculturally based mostly country seventieth of the Indians square measure either directly or indirectly concerned in agricultural works. Indian economy depends on the assembly of agricultural product. The growing countries like Asian nation occupied with giant population with meagerly food provide and food production. this is often because of varied factors like urbanization, settlement and industry. The individuals started moving towards cosmopolitan cities besides their native villages. This causes the poor improvement of Agricultural and farming Technologies. Failures of monsoon, inaccessibility of water, improvement of concrete jungles square measure the key factors that act as desolation of

Vehicle Monitoring System for Preventing Unauthorized Activities

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ABSTRACT: The vehicle refers to assortment of many completely different recording devices. Vehicle watching is “Event information Recorder”. Recording equipment records the relevant details a few Vehicle like vehicle load, Speed of auto, sight the vibration of the vehicle and spars area unit removing watching sight orientation or inclination of auto. The look selects ARDUINO UNO as embedded controller, CART is the common peripheral found a microcontroller wide used for GSM module, GPS module.

Vehicle watching could be a device to driving history which may be used for automotive forensics just in case of automotive accident or connected crimes. Recording equipment stores vehicle information that might be vital clues for work car-related accidents or crimes. This information is collected to police server via SMS infrastructure that gives GSM connections.

Especially, sensible phones area unit terribly helpful for this purpose. The vehicle accident could be a major public downside in several countries. This downside remains increasing thanks to rider’s poor behaviours such as speed driving, vehicle load increasing riding while not enough etc. vehicle watching has logical feature considering that additional folks' area unit die in automotive accidents than associate degree airplane crashes of investigation.

KEY WORDS: Arduino UNO, Load Cell, IR Sensor, Vibration Sensor, GPS, GSM.

INTRODUCTION

The vehicle accident could be a major public downside in several countries. This downside remains increasing thanks to rider’s poor behaviours such as speed driving, vehicle load increasing riding while not enough etc. vehicle watching has logical feature considering that additional folks' area unit die in automotive accidents than associate degree airplane crashes of investigation.

The causes of automotive accident aren’t too troublesome to research as plane crashes. However, their area unit cases that area unit terribly troublesome to resolve thanks to contradictory stories of drivers. They're notably valuable once no witness is gift at the scene of accident, and once every driver has their own version of event. Vehicle watching is digital physics' device, that vehicles speed, vehicle location, vehicle load, vibration, real time and vehicle alternative standing data. It helps to get associate degree to investigate the rationale of an accident simply and to settle several disputes associated with automotive accident like crash, and insurance settlements.

Arduino UNO

Arduino/Genuine UNO could be a microcontroller board supported the ATmega328P. it's fourteen digital input/output pins (of that vi is used as PWM outputs), vi analogy inputs, a sixteen MHz quartz, a USB association, an influence jack, associate degree CISP header and a push button. It contains everything required to support the microcontroller; merely connect it to a laptop with a USB cable or power it with associate degree AC-to-DC adapter or battery to urge started. You'll tinker together with your UNO without concern an excessive amount of concerning doing one thing wrong, worst case situation you'll replace the chip for a number of bucks.

EXISTING SYSTEM

Low level {of information|of knowledge|of information} protection - DAC will’s guarantee reliable security as a result of users can share their data, but they like. Obscure — there's no centralized access management,

Analysis Of Wearable Textile Antenna

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Abstract- A wearable antenna integrated into a military beret for an indoor/outdoor positioning system is proposed. The truncated patch antenna is designed for the Global Positioning System (GPS) band for use in outdoor situations. The antenna is fabricated using textile materials and is integrated into a military beret. The effects of the antenna deformation due to the shape of the military beret and the effects of the human head are analyzed via both simulation and measurement. The simulated and measured 10-dB return-loss bandwidths of the antenna on the head phantom fully cover the 915-MHz industrial, science, and medical band and the 1.575-GHz GPS band. We analyze by using various substrates like jean cotton and silk.

Keywords- Global Positioning System (GPS), Patch Antenna, Return-Loss, substrates.

I. INTRODUCTION

The body centric wireless communication has drawn the attention of researchers in the present era. The body worn antennas are widely used for these type of communications and have received much attention in commercial sports, entertainment and healthcare applications. Body worn antenna may be made from textiles or may be worn as a button antenna. The wearable antenna may be operating on single or dual frequencies. For body worn applications the antennas should be of small size, light weight, consumes less power, almost maintenance free, and with no installation cost. The compact size, low cost, easy fabrication makes microstrip patch antenna highly suitable and comfortable on body surface. But the reduction of the size of the antenna leads to reduced performance of the antenna such as poor efficiency, impedance and bandwidth. Hence design of a wearable antenna is quite challenging. Wearable antennas are usually placed in human torso or arm. The human body acts as a lossy medium which degrades the performance of wearable antenna. In order to design a body wearable antenna the design parameters and different dielectric properties of substrates should be clearly studied. Also the effect of body on antenna parameters needs to be understood. These parameters should be optimized according to body-worn applications. To improve the body wearable antenna performance, various techniques have been proposed by the researchers like selecting thick and high dielectric substrates materials, various radiating

microstrip patch shapes, slotting in patch to improve bandwidth, the array of antennas etc. The wearable antenna may use the combination of these techniques to give favourable performance in the vicinity of the human body.

II. LITERATURE SURVEY

Existing systems

[1] In this paper, systematic and comprehensive investigations of the bending effects of wearable rectangular patch antennas are presented. We present the resonant frequency and radiation pattern variations due to bending in two principle planes by simulating patch antennas in a full-wave model.

[2] The need of smaller flexible electronic systems increases rapidly. Among the flexible electronic devices, printed planar antennas attract a great attention. Actually, the design of flexible antennas for wireless local area network (lower and upper WLANs) and body area network communication technology applications has drawn significant interest from the research community. The proposed work emphasizes, at first, the development of magnetodielectric nanocomposite materials made of nanoparticles (CCo) and a conductive polymer matrix (PANI/PU). At second, the focus is put on the antenna design and fabrication. Finally, a comparison between the simulation study and the experimental investigation is made to evaluate the antenna performance (reflection coefficient, bandwidth, radiation patterns, and gain).

[3] Wireless body area network (WBAN) communication technology has been attracting much attention in recent years because it can be used in many fields, such as military applications and health monitoring. The significance of investigating wearable antennas is clearly reflected in the widespread use of WBAN systems, such as antenna integrated garments, bags, glasses, and smart watches. As is known, two important aspects should be considered in the wearable antenna design: comfort level and specific absorption rate (SAR). Wearable antennas are usually made of a soft material.

[4] Three-Dimensional (3-D) printing has recently gained a lot of interest in several fields including the wireless electronics industry. This new printing technique allows the

Machine Learning Algorithm In Fuel Prediction

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Abstract- The mileage for the two-wheeler claimed by the manufacturer relies on the mounted laboratory testing conditions. several factors like individual driving pattern, traffic condition, road condition, load, speed condition, gas level, and parcel of land can have an effect on the mileage of the vehicle to a bigger extent. we've projected a machine learning model to predict the mileage considering the higher than factors. within the side to facilitate and enhance the feature of bike like speed, mileage, and meter level of fuel by providing it with the detection of level and prohibit illicit activities employing device. it's enforced exploitation Vehicle Area Network (VAN) and embedded style. It suggests a processed technique in significant vehicles. within the projected system, the owner of the vehicle instantly receives a message once the fuel tank is opened by the operator or by a fuel listed and conjointly the peak of the fuel tank once gap and shutting the tank. The poised system uses Wireless based mostly communication for observation the vehicle's position. Initially, the method involves measurement stockpile followed by eliciting the knowledge and sends it to the server for more detection. Finally, the message is distributed together with the vehicle position and stockpile within the tank. This permits in distinguishing the extent of fuel at totally different times whenever the tank is opened.

Keywords- Digital meter, Fleet Management, Machine learning, Multi –feature regression.

I. INTRODUCTION

Nowadays, the world is upgrading from analog to the digital segment. Likewise, most of the vehicle are upgrading to digital. So, Fuel consumption in a vehicle mainly depends on external factors such as the road condition, traffic on the road, and weather conditions. The main objective is to predict the distance to be travelled by the two-wheeler with the available fuel. A method used to model this is a linear regression. Regression means modeling the targeted value based on the independent predictors. The predictions is happened by the comparison of previous travelled distance by the concept of machine learning.

II. LITERATURE SURVEY

Existing systems

A .Digital fuel level indicator in two-wheeler along with distance to zero indicator

The analog fuel gauge has two main units, namely the sending unit and the gauge. Here, when the fuel tank is full, resistance values decrease current value increases and when the tank is empty, resistance values increases and the current value decreases. The rear side of the analog fuel gauge has three terminals, namely B-battery, F-float, G-ground. From these terminals, voltage values are taken from the terminals-FG and resistance value is taken from the terminal-F from zero to 11 liters. So, for a particular volt value, the corresponding liters value will be shown in digital.

B .Study of digital fuel meter and fuel theft detection

In recent day's world has become digitized, if we make fuel meter in the vehicle also digital it will help to know the exact amount of fuel present in the fuel tank. In our 4 Project, we have made a digital fuel meter. Here, we are indicating the amount of fuel present in the tank digitally. That value is in numerical digits (ex: 1lit, 1.5 lit, 2lit, etc). Fuel theft is also a measure problem all over the world. In our project whenever there is fuel theft, due to the noise of the burglar alarm people are aware of the fuel thefts, and also during fuel theft a text message delivered on mobile to the owner of the bike. This is a real-time occurring process. The previous vehicle system doesn't have such functionality that there is no display gear level whatever may be the condition though the bike is running or not. Doesn't allows any new person on the bike to adjust the gear level. But in our system, we can overcome the above problem by using a digital meter that shows the gear level in a steady-state or running state of the vehicle.

C .Low Cost Intelligent Real Time Fuel Mileage Indicator for Motorbikes

This project focuses on creating a device that can help to actively display the fuel mileage of a motorbike in real-time. It involves the making of the system to provide a mileage indicator that is reliable, easy to read, and of dependable/compatible overall design. It also involves the process of utilizing the compatible speedometer/odometer apparatus of a motorbike without interfering with its

Vehicle and License Authentication Using Fingerprint

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Abstract-Fingerprints are one of many kinds of bio metrics used to identify individuals and verify their identity. The main objective of this project is to verify a private person license id, RC Book details, Insurance details are verified by without hard copy of individual person using finger print sensor and Aadhar card. RFID based system won't to verify the RC book details and insurance details and owner information. Using this technique, we will easily monitor the theft vehicle and unlicensed person. The RFID tag is placed during a vehicle. The RFID tag reader is used to urge the data from the RFID tags. For programming the RFID tags, the RFID tag writer is employed. By reading the serial number within the RFID tag vehicle identification are often easily done. Driver's license system could also be an enormous task for the government to observe. We will see many criminal activities from the traffic police while they're checking the documents. The crime is going to be done by both the side (people and police). To beat that problem by implementing another portable fingerprint sensor module that's given to the traffic police, which is integrated with IOT where the person license information is stored. If the person places his finger on the sensor then the device will tell you whether they had a license or not. This will be done by interlinking the vehicle details with the IOT.

KEYWORDS: RFID Tag, Arduino UNO board, Finger print sensor, IOT, License, Keypad.

INTRODUCTION

Regional transport office is an Indian government bureau is liable for the registration of vehicles and therefore, the issue of driver's license in India and maintaining records of drivers and vehicles. Unlicensed driving may be a matter of concern for several reasons. It is possible those drivers who haven't undergone appropriate training and testing could also be deficient in some aspects of data and skills required to drive

safely and efficiently. Also, drivers who are unauthorized may have less incentive to suits road traffic laws. Consistent with motor act, nobody shall drive the vehicle without proper documentation; a driving person should carry Registration certificate, Insurance certificate and license. Failing which the person possesses to pay a specific penalty or face the cases charged against them. Driving without license could also be a serious issue in many countries. Survey says that the accidents happened mostly by unlicensed drivers. During this paper, we proposed an approach to unravel such problems. The proposed system mainly consists of IOT, fingerprint sensor, RFID Reader and card, Arduino UNO board, Buzzer, LCD Display, alcohol sensor and power supply. A sensible reader is placed to save lots of the vehicle registration details issued by the government Then the gathered information is shipped to the government through IOT. We will get the database from the server easily. By this idea the traffic is often efficiently controlled. For detecting the License of a specific person, the Fingerprint sensor is employed and hence it makes the traffic police straightforward to seek out the person whether he/she has a License or not. Aadhar card number is additionally used to check the license by storing all the knowledge associated with the driving force within the RTO database. There's no need for the person to hold license alongside him. It minimizes burden and therefore the license verification period for both the traffic police and the person. The above details are interconnected with the IOT. Alcohol sensor will detect the alcohol level in breath and may trigger some alarm. So, it'll help the traffic police to urge the small print of the person easily. The important time routing concept is especially supported the RFID. With the assistance of this idea the traffic is efficiently controlled and at an equivalent time the crime also can be monitored making our country a digitalized one.

Voice based Hot and Cold Water Dispenser and Display the Water Quality

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Abstract - Technology is a never-ending process. To be able to design a product using the current technology that will be valuable to the lives of others is a huge contribution to the neighbourhood. Voice Based Water Dispenser Automation method using controller is the plan will be very useful for old age people and disabled people, basically one's who cannot achieve basic actions efficiently. It is the idea Corresponds to the new area of automation and technology. This presents the design and implementation of a low cost but flexible Secure voice based hot and cold-water dispenser system. The Between the cell phone and the controller board is wireless. Voice Command sends from mobile to the micro controller, to understand whether the water required by the person should be hot or cold. The Micro controller processes the information to the IR sensor to Determine where the glass is placed below the pipe or not. The method uses IR sensors to detect the presence of stream beaker and then the IR sensor sends the signal to the micro controller about the presence of the glass, accordingly the motor starts and the Water flows through the pipes from the particular jar (hot/cold).

Key Words: IR sensor, Water glass, Micro controller, Blue-tooth.

1. INTRODUCTION

Nowadays, we have remote control for our television set and previous electronic system, which Nowadays have made our lives really easy. Have you still wondered about house which would provide the resource of controlling lights, fans and other electrical appliances at home using a remote control Off-course, yes! But, are the available options cost 2 efficient. If the answer is No, we have found a solution to it. We have approach up with a new arrangement called voice-based automation using Blue-tooth. This method is super-cost effective and can give the client, the capability to control any electronic device without even spend for a remote control. This helps the user to control hot cold-water dispenser using his/her voice command to Smart phone. Time is a very valuable

thing. everyone wants to save time as much as they can unique technologies are being introduce to save our time. To save people's time we are introducing hot cold water dispenser system using Blue-tooth and display the water quality.

2. LITERATURE SURVEY

2.1 EXISTING SYSTEM

Here in this work the block diagram of the process of the classification of Automatic Water Dispenser is available. It consists of the follow major units: Sensors, Micro controllers, Display part, and Water fever. The diagram below shows the flow of in the system as well as their interoperability. When the water touches the sensor on a exacting level in the cistern than the voltage is transfer to the copper which is turn to the circuit for the further processing. while we are use the micro controller is the circuit the HIGH and LOW is feed into the micro controller which in turn uses this for Controlling of the water point. The yield of the water level is display on the LCD (Liquid Crystal Display) screen. The micro controller is programmed which is used to control the of whole system.

2.2 PROPOSED SYSTEM

In this, we present the theory on voice base warm and cold-water distributor system. The overall building block diagram of the future method is explained. Each and every block of the method is explained in detail. In this proposed block diagram consist of several sensors (Water level, IR sensor, temp sensor) is connected to ARDUNI UNO controller. The controller are accessing the sensor values as well as get command from Blue-tooth module and Processing them to dispense hot or cold water. All parameters are also shown on LCD display. A solenoid regulator will be used to manage the flow of water, which is when energized the water will run out and when de-energized the water will be stopped up. So, we will write down a regulator program which always check if any objective is located near the valve, if yes then the solenoid will be turned on and wait till the object is separate, once

Anti Theft Technology Museum Cultural Relics Based on Inter Things

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Abstract This project is designed to control exchanging data with devices and system over museum. With the event of peoples cultural web which describes the network of physical objects and museums round the world became the primary focus of museum was locked at the earliest time. No people to travel. The National museum held in Beijing, the forbidden city many unopened exhibitions, nearly 1 billion people walked in the museum an enormous lock. However the duration became how of life. This make the cultural continuation with the development of society, the foremost cultural museum even be a neighborhood of the illegal elements. It has many limitations, and thieves Museum to make sure security,, the museum will develop the lock. Later, the hightech system of various protection measures for cultural relics, the data system is sound waves. With the the security . The museum has exhibited more development in the industry, people can detect various the quantity of tourists has also increased, and frequencies of sound waves through electronic have stolen cultural relics. This proposes museum before the sound proof anti theft devices in the anti theft scheme supported the web of Things (IoT)

technology, which identifies through the passive RFID LITERATURE SURVEY reader/writers, whether the cultural relics are within the safe range. Once stolen, the cultural relic still within existing system RFID identification range, which lands up in immediately alarming, then the system starts the Active Location system using RFID and Mobile is free from traditional magnetic devices for Art Museum. detection, and thus the likes of , the proposed anti method monitoring has the immediacy and thus the failure of location are mobile technologies are safety is higher and IR sensor based energy saving system successfully in cultural different monuments during a museum. Finally, during this paper, technologies, such as RFID, WiFi, and beacon, and software development and tests are applied to allow mobile devices the interaction with. understand the required results.

Keywords Key Words: IOT, RFID, Cultural relics, mobile devices, sensors, Vibration sensor.

This paper describes a system based active and passive RFID which support the positioning of mobile devices. This paper are discussing the user interaction according to different levels of attention required for the user to the system. We have defined levels of attention are Lower level, Medium level level. This proposal results especially useful.

I. INTRODUCTION

A Museum is an establishment that care of artifacts and other objects of artistic, cultural, historical, scientific importance. Many people make this proposal has been successful for the location and available for public viewing through exhibitions which can be permanent or temporary. The working of our project is predicated IOT Technology. The working of project suggests the use of RFID technology for Tracking Museum objects using RFID based tracking System. The objective of this project is to trace or monitor individual Museum object using RFID Reader and it'll monitor this RFID Tag. The web of things that are embedded with the identification technology for museum software, and other technologies for the application in Turkey. Turkish museums hold approximately

An Autonomous System For Waste Synthesis By Using Pic

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Abstract- *By the speedy increase of population has result in the utilization of a lot of consumptives and causes improper disposal of wastes that raise the manner of spreading diseases. By our System the synthesis of wastes square measure utterly managed, transported and handled to reduce the danger of public and atmosphere. Our system designed relies upon the 3 sorts of wastes like organic waste, dry waste and bronze waste which is able to mechanically segregate themselves, thereby the waste management becomes effective. With this, we have a tendency to placed associate degree supersonic sensing element for the every garbage bin to point the extent of the bin, if it's empty or not? whereas coming to consecutive level of method the organic waste is directly decomposes and acquire a notification by the GSM module the waste is prepared to use as a fertilizers or as bio fuel like methane series gas, compared to dry waste or plastic waste by the assistance of pollution sensing element and acquire notified by GSM module.*

Keywords- GSM module, pollution sensing element, sensing element.

I. INTRODUCTION

As the production and consumption is proliferating, intensive quantity of solid materials square measure generated yet as rejected by individuals on regular basis. Garbage Mountains square measure a ordinarily seen these days. The waste drop is that the style of decay mound that dot our terrains and build our rivers, wells, lakes detestable. 68.8million tons municipal solid waste is generated annually in Republic of India. Unsorted waste, once waste is separated, inorganic waste (non-degradable) like paper, plastic, glass, metal is sold-out to waste bankers or waste traders WHO then become suppliers to the producing sectors. Then product square measure made up of this recycled plastic and metal. The organic waste (degradable) like leftover food, vegetable peel is born-again into compost or methane series gas that is usable in biogas and compost is used as a substitute of chemical fertilizers. For this reason we have a tendency to square measure making associate degree automatic waste segregationist for segregating a waste by mistreatment totally different sensors. totally different wastes square measure

detected and mechanically quarantined mistreatment conveyer belt.

II. LITERATURE SURVEY

Existing system

This system somewhat be useful keep dry and wet garbage singly in order that totally different processes- composting, recycling, burning somewhat be enforced to totally different variety of garbage. By intimating the notification of garbage crammed, the utilization of the rubbish grouping vehicle somewhat be optimized. By keeping the atmosphere clean, contribution somewhat be given to the society.

A. GSM and GPS Based Garbage and Waste Collection Bin Overflow Management System for Kitwe City Council

The Kitwe City Council in Zambia has had many challenges when it comes to garbage collection in markets and other public places. Garbage bins remain uncollected for long periods of time putting the lives of marketeers at risk in an event that there is Cholera outbreak especially during the rainy season. This happens because the Kitwe City Council does not have a system that monitors the garbage levels and notifies the Central Office. In order to avoid such a situation, this project proposes the design and implementation of a GPS and GSM Based Garbage and Waste Collection Bin Overflow Management System using GPS and GSM technology in providing real time information on the status of the garbage bins, i.e. when they are full so that appropriate action can be carried out. The system notifies the person (Truck Driver) in charge of garbage collection by sending a short message (sms) and telling them where the full bin is exactly located. Again after sometime the system notifies the Central Office that the message has been sent to the Driver. This development will ultimately save a lot of time especially when the council does not have to go and check the level of garbage in the bin. Besides, it will timely prevent the overflow of garbage due to the fact that garbage will be collected on time. That is, the council will collect garbage only when it is time to do so rather than routine where even half-full bins are collected.

AN INTELLIGENT AND SECURITY TRACTION SYSTEM FOR MONITORING SCHOOL BUS

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Abstract - Attendance and academic success are directly related in educational institutions. The continual absence of students in lecture, practical and tutorial is one of the most problems of decadence within the performance of educational. The authorized person must prohibit truancy for solving the matter. In existing system, the attendance is recorded by calling of the students' name, signing on paper, using revolving credit then on. These methods are easy to fake and to supply proxy for the absence student. For solving inconvenience, fingerprint-based attendance system with notification to guardian is proposed. The attendance is recorded using fingerprint module and stored it to the database via SD card. This technique can calculate the share of attendance record monthly and store the attendance record in database for one year or more. During this system, attendance is recorded twice for at some point then it'll also send alert message using GSM module. If the attendance of students don't have eight times for one week. By sending the alert message to the respective individuals hebdomadally, necessary actions are often done early. It can also reduce the worth of SMS charge and even have more attention for guardians. The most components of this technique are Fingerprint module, Microcontroller, GSM module and SD card with SD card module.

INTRODUCTION

The serious issue looked by organizations is tedious manual Bus participation. Our venture will take care of these issues by utilizing biometric innovation. For remote information transmission and systems administration between sensor hubs, the task utilizes Wi-Fi modules. The undertaking is planned right now on the model premise with only couple of profiles yet we can add significantly more when required. Biometrics is computerized strategies for perceiving an individual

dependent on a physiological or conduct trademark. Among the highlights estimated are face, fingerprints, hand math, penmanship, iris, retinal, vein, and voice. Biometric information is independent and unmistakable from individual data. Biometric layouts can't be figured out to reproduce individual data and they can't be taken and used to get to individual data. Utilizing an exceptional, actual trait of your body, like your finger impression or iris, to easily recognize and confirm that you are who you guarantee to be, is the awesome simplest arrangement in the market today. That is the straightforward truth and force of Biometrics Technology today. Despite the fact that biometric innovation has been around for a long time, current advances in this arising innovation, combined with huge decreases in cost, presently make biometrics promptly accessible and reasonable to buyers, entrepreneur, bigger organizations and public area offices the same. A unique finger impression scanner framework has two essential positions - it needs to get a picture of your finger, and it needs to decide if the example of edges and valleys in this picture coordinates the example of edges and valleys in pre-checked pictures. Just explicit attributes, which are one of a kind to each finger impression, are sifted and saved as a scrambled biometric key or numerical portrayal. No picture of a unique mark is at any point saved, just a progression of numbers (a twofold code), which is utilized for check. The calculation can't be reconverted to a picture and nobody can copy your fingerprints.

LITERATURE REVIEW

TITLE: Implementation of Fingerprint based Student Attendance System with Notification by GSM Module

AUTHOR: Zin NweSoe, Department of Electronic Engineering Technological University Thanlyin, Myanmar.

Remote Access to Improve ATM Security by Using IOT

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ABSTRACT: Our project proposes a secured ATM (Automated Teller Machine) system using a card scanning system along with link system for improved security. Usual ATM systems do not contain the link feature form one withdrawal. If an attacker manages to get hold of ATM card and the pin number, he may easily use it to withdraw money fraudulent. So, our proposed system supports the ATM card scanning system along with a link system. This user may scan his card and login to the system. But after user is through with this authentication ,he may view details but it asked to enter link as soon as he clicks money withdrawal option. At this stage the system generates and sends a link to the registered mobile number to that particular user. The password is generated ad sent to the user mobile phone. He now needs to enter the link in the system in order to withdraw money .Thus, our system provides a totally secure way to perform ATM transactions with two level securitystructure.

KEYWORDS: Money fraudulent; Manets; authentication; security structure; link feature

I. INTRODUCTION

An embedded system is some combination of computer hardware and software, either fixed in capability or programmable, that is designed for a specific function or for specific functions within a larger system. Industrial machines, agricultural and process industry devices, automobiles, medical equipment, cameras, household appliances, airplanes ,vending machines and to as well as mobile devices are all possible locations for an embedded system .Embedded systems are computing systems ,but can range from having no user interface (UI) for example, on devices in which the embedded system is designed to perform a single task to complex graphical user interfaces (GUI), such as in mobile devices. User interfaces can include buttons, LEDs, touchscreen sensing and more. Some systems use remote user interfaces as well. Embedded systems can be microprocessor or microcontroller based. In either case, there is an integrated circuit (IC) at the heart of the product that is generally designed to carry out computation for real-time operations. Microprocessors are visually indistinguishable from microcontrollers, but whereas the microprocessor only implements a central processing unit (CPU) and thus requires the addition of other components such as memory chips, microcontrollers are designed as self- contained systems. Embedded systems can be microprocessor or microcontroller based. In either case, there is an integrated circuit (IC) at the heart of the product that is generally designed to carry out computation for real-time operations. Microprocessors are visually indistinguishable from microcontrollers, but whereas the microprocessor only implements a central processing unit (CPU) and thus requires the addition of other components such as memory chips, microcontrollers are designed as self-contained systems.

II. RELATED WORK

In[2]Therearemanythingsthat are,,wellknow"aboutpasswords;suchasthatusercan'tremember strong password and that the passwords they can remember are easy to guess a password authentication system should encourage strong and less predictable passwords while maintaining memorability and security. This password authentication system allows user choice while influencing users towards stronger passwords.In [3] Graphical password systems are a type of knowledge-based authentication that attempts to leverage the human memory for visual information. A complete review of graphical passwords is available elsewhere. Of interest herein are cued-recall click-based graphical passwords (also known as loci metric). In such systems, users identify and target previously selected locations within one or more images. The images act as memory cues to aid recall. Example systems include Pass Points and Cued Click-Points (CCP).In [4] Classical PIN entry mechanism is broadly used for authenticating a user. It is a popular scheme because it properly balances the usability and safety aspects of a organism .However, if this scheme is to be used ina

Smart Helmet for Accident Prevention and Safe Driving Using Wireless Sensor Network

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ABSTRACT

The main cause of death in 2 wheeler drivers is drunken driving and over speeding. The objective of this project is to design the project for provide high safety in automobiles and safety for the driver. This is done with the help of embedded and wireless technology. This is enforced by using advanced features like alcohol detection, accident identification and track the location. A system which checks the two conditions before turn on the engine of the bike. The relay does not on the engine because the two conditions are not satisfied. To track a vehicle in case of accident using vibration sensor detects the abnormal Angle of vehicle and emergency key also pressed by vehicle driver to locate vehicle and emergency message send to ambulance or parents' mobile number through GSM along with location with the help of GPS module and also emergency alarm is activated. The microcontroller continuously records all the parameters for detection of accident. The alcohol sensor is placed near to the mouth of the driver in the helmet to recognize the presence of alcohol. This project is expected to improve safety for bikers and reduce accidents.

Keywords:

Alcohol sensor, Vibration sensor, Temperature sensor, Anglesensor, GSM, Microcontroller Arduino

INTRODUCTION

To reduce developed countries, road traffic accidents were the most significant cause of injuries, ranking 11th among the primary causes of lost years of healthy life. In highway system widening of the road is not a solution to avoid traffic in such cities. The issues with state drunk driving authority systems can be solved in many ways. The most effective will follow several concepts: They will invest authority and authority in human being and organizations at all levels, local to national, because drunken driving control requires action at all levels. They will operate in the public eye, using the media to report on issues and solutions, because the ultimate resolution on priorities and resources to control drunk driving must have public support. They will not promise instant compound based on a single action but rather will take stable steps towards long-term instrument. And they will establish mechanisms for recognize and solving issues rather than attempting to apply one-size fits-all methods. Hence Road Safety becomes the major problem of concern. Therefore, it suits necessary to implement such a technique which is not easy to bypass the basic order of wearing a helmet and to keep away from drunken driving. Here we draw a system which checks the 2 conditions before turning ON the engine of the bike. Our system involved a liquid sensor and a helmet-sensing switch. A switch is used to notice whether the biker is wearing a helmet. Liquid sensor is used to detect the biker is drunk, the product is fed to the MCU. Both the switch and the liquid sensor are fitted in the helmet. If any of the 2 conditions are contravened, the engine will not turn ON. Liquid sensor MQ-3 is

IoT Based Smart Water Monitoring & Distribution System For An Apartments

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ABSTRACT

As we know water is so precious for human being as well as for the complete nature without which it will not be possible to survive. Even though lot many efforts have been taken by government through various schemes and it is becoming difficult day by day to save water for future and make efficient utilization of it. In this proposed work, an IoT design for water monitoring and control approach which supports internet-based data collection on real time bases.

This proposed system shall implement in highly populated residential buildings like hotels, lodge, hostels, dormitory, apartments, shopping malls etc. And also, this system can provide a complete survey and the usage of water by every individual room. This system addresses that the flow rate measuring and scheming the supply of water in order to limit the water wastage and approach the water conservation and also this system can measure the quality and quantity of water distributed to every household by using ph and flow rate sensors. The system has been designed in such a way that it will monitor the available water level continuously. System has been implemented by using embedded system and communication will takes.

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INTRODUCTION

The internet of things (IoT) forms an important part of intelligent monitoring which connects people and devices using wireless sensor technology. It is a fast growing research area in the military, energy management, healthcare and many more.

The concept of IoT was proposed by Kevin Ashton to demonstrate a set of interconnected devices. IoT makes it possible to transfer information between different electronic devices embedded with new technology. The energy management is possible using energy harvesting mechanisms, which is a method of collecting energy from natural sources such as light, vibration, pressure etc. The combination of technologies such as Wireless sensor network (WSN), Radio frequency identification (RFID), Energy harvesting (EH) and Artificial Intelligence (AI) helps IoT to flourish widely. Water distribution system (WDS) is a very important research area that affects the economic growth of our country. WDS mainly have two issues first is the water loss due to leakage and the second is that it is prone to contamination. It is affecting the health and safety of the people. According to the report of world health organization (WHO) in 2017, around 2.1 billion people around the world lack safe drinking water. So there is a need to ensure the water quality and wastage by using IoT to reduce such issue.

There are different traditional methods to collect water datasets to measure its quality, but managing and monitoring the data from WDS in real time is challenging as the data is heterogeneous, data collection is time consuming, energy required for processing, coverage and connectivity of the nodes in the network. By using IoT and combining technologies such as WSN, AI and EH can be used to ensure the water quality in real time and alerts the users to take remedial measures.

LITERATURE REVIEW:

While over 15 million American households rely upon private well sources for water [3], the remaining 110 million households are connected to public water supplies. Likewise, most commercial and industrial applications use public water supplies. Public and municipal water utilities must carefully monitor the water they provide for public safety, billing, and resource management. Over the last few decades, water utility companies have begun installing automated meter reading (AMR) systems to further simplify the process of meter reading, decrease manual labor, and reduce transcription errors within collected data [4]. These systems allow more frequent reporting of measured demand at the individual customers, while simultaneously reducing the manual effort of physically looking at each meter to record the volume measured. In 2018, the American Water Works

GENERATING ELECTRICITY BY FOOTPATH POWER GENERATOR FLOOR TILES

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ABSTRACT

Walking is the most common movement in human life. When a person walks, he distributes energy to the road surface in the form of impact, vibrations, sound etc, due to the transfer his weight on the road exterior, through foot falls on the ground during a every steps. This energy Can be tapped and transformed in the practical form such as in electrical form. In order to develop a procedure to connect footstep energy, we are developing a footstep electricity generating device. This device, if embedded in the footpath can varying foot impact energy into electrical energy. The working principle, when a pedestrian step on the upper plate of the device, the plate will dip down to some extent due to the weight of the pedestrian. The descendant movement of the plate results in sturdiness of the piezoelectric materials fitted in the device to produce electrical energy the device was worked by persons walking over to it. However, if there is determined movement of pedestrians over the device, a large amount power will be a formed in this research a prototype of the power producing tiles is developed and studied under varying loading environments to inspect the feasibility of the technology.

1.INTRODUCTION

Energy is nothing but the capability to do the work. In today life, Electricity is most commonly used energy resource. Now-a-days energy claim is increasing and which is life-line for persons. Due to this amount of energy resources are generated and wasted. Electricity can be generated from properties like water, wind etc. to produce the electricity from these sources development of large plants is needed having high maintenance cost. Some other

energy resources are also inflated and cause pollution. Electricity has become significant resources for human being hence, it is desirable that wasted energy must have to exploit, walking is the most common movement done by human being although walking energy is wasted in the form of shuddering to the surface. Piezoelectric effect is the consequence in which mechanical vibrations. Pressure or stress applied to piezoelectric material is transformed into electrical form. This project gives idea about how energy is used on

Security Enhancement and Eminent Verification Measures of Global Distinctive E-Passport

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ABSTRACT

Electronic Passport is one of the results of the electronic revolution in The World; since the passport is the document of the person in terms of identity and nationality and is the property of the country. One of the most important Challenges is to protect this document from forgery. The common forgery for the Passport is replacing its holder photo. The proposed system concentrates on the Security part of the e-passport. It consists of two parts; the first part is hiding of the security code by using steganography and storing the same code in the issuing Country of the e-passport. The other part will be operated at the control point of the destination country to make sure of the e-passport validity by checking the Hidden code using NFC and verify it with the one. If the two values are equal, then the system will compute a key using Diffie-Hellman Key Exchange. This Key will be used to read the secret information. The project designed is an Authentication system where the Passport holder is authorized through Technology. Electronic passports include contactless chip which stores personal Data of the passport holder, information about the passport and the issuing Institution. In its simplest form an electronic passport contains just a collection of Read-only files, more advanced variants can include sophisticated cryptographic Mechanisms protecting security of the document and / or privacy of the passport Holder.

KEYWORDS: ASP- Application Service Provider, BAC- Basic Access Control, IACCO -International Civil Aviation Organization , LCD- Liquid Crystal Display, PKI- Public Key Information, PLC -Programmable Logic Controller, RFID -Radio Frequency Identification, UID -Unique Identification Number, VAL -Ventilator Associated Pneumonia, VAW -Visa Waiver Program

INTRODUCTION

The project designed is AN authentication system wherever the passport holder is permissible through RFID technology. The passport holder would have AN RFID tag that contains all the passport details like name, number, position etc. This tag must be swiped ridiculous and hence the data subsequently read is given to a microcontroller of 8051 family. This data is matched with the one hold on among the microcontroller, if the data matches microcontroller displays associate degree confirmation message otherwise displays a denial message on an alphanumeric display screen. The status of a specific person also can be obtained through a standing button within the system. Passport verification and checking may be a very time consuming process. This proposed system simplifies the method by giving the authorized person an RFID tag containing all the passport details like name, passport number and nationality etc. Once, the person places the cardboard ahead of the RFID card reader, it reads the info and verifies it thereupon data present within the system and if it matches then it displays the small print of the passport holder. Here we use microcontroller from 8051 family. For display a 16X2 LCD is used.

The status can also be retrieved from this technique by pressing the status button interfaced to a microcontroller. An electronic passport (ePassport) is associate ID document

that possesses connected biographical or biometric data of its bearer. It is embedded in Radio Frequency Identification chip (RFID Tag) which is accomplished of cryptographic functionality. The successful implementation of biometric techniques in documents such as E-Passports aims to the strength of border. Security by decreasing the chance of copy or pretend passport and making while not hesitation of identity of the documents' holder. The e-Passport additionally offers substantial advantages to the rightful holder by providing a lot of refined means that of confirming that the passport belongs thereto person which it's authentic, without jeopardizing privacy. The states are currently issuing e Passports, which corresponds to more than 50% of all passports being issued worldwide. This represents a good sweetening in national and international security because it improves the integrity of passports by the necessity to match the data contained within the chip.

LITERATURE REVIEW:

Thus, the data stored in this card is referred as the passport details of the person. The system architecture of the research work .In these details of the person would be fed into the microcontroller and a unique number is allocated to the person that number is printed Of RFID tag. The RFID reader reads the details of the RFID passport and sends the data to Controller with the help of RF reader. Here, the controllers

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A Novel Smart Energy Theft System for IoT Based Smart Home

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ABSTRACT: In the modern smart home, smart meters and Internet of Things have been massively deployed to replace traditional analogue meters. It digitalizes the data collection and the meter readings. The data can be wirelessly transmitted that significantly reduces manual works. However, the community of smart home network is vulnerable to energy theft. Such attacks cannot be effectively detected since the existing techniques require certain devices to be installed to work. This imposes a challenge for energy theft detection systems to be implemented despite the lack of energy monitoring devices. This paper develops an energy detection system called Smart Energy Theft System (SETS) based on machine learning and statistical models. There are 3 stages of decision-making modules, the first stage is the prediction model which uses multi-model forecasting System. This system integrates various machine learning models into a single forecast system for predicting the power consumption. The second stage is the primary decision making model that uses Simple Moving Average (SMA) for filtering abnormally. The third stage is the secondary decision-making model that makes the final stage of the decision on energy theft. The simulation results demonstrate that the proposed system can successfully detect 99.96% accuracy.

KEYWORDS: Smart Meters, Internet OfThings, Smart Energy Theft System (SETS), Simple Moving Average (SMA)

I. INTRODUCTION

In the modern smart grid, massive deployment of advanced metering infrastructures (AMI) facilitates the efficient and reliable information exchange[1]. The AMI can be divided into different sectors depending on the location which is crucial to end consumer. AMI includes smart meters and Internet of Things (IoT) monitoring devices that were able to collect data in large volumes and fast speed. This paper is developed for the energy detection system called Smart Energy Theft System (SETS) based on statistical models and machine learning[2]. There are three stages of decision-making modules, the first stage is the prediction model which uses multi-model forecasting system. This system integrates various machine learning modules into a single forecast system for predicting the power consumption. The second stage is the primary decision-making module that uses simple moving average (SMA) for filtering abnormally[3]. The third stage is the secondary decision-making module which makes the final stage of the decision on theft. Internet of Things is expected to produce high degree of human to machine communication along with machine-to-machine communication. This project proposes the security system using IOT, which prevents theft in home, bank etc.

II. RELATED WORK

This paper provides an overview of current sensor technologies and describes the paradigm of multi sensor fusion and integration as well as fusion techniques at different fusion levels[2]. In this paper, an innovative Smart Energy Theft system (SETS) is proposed for energy theft detection a multi model forecasting system based on the integration of machine Re-current Neural Network (RNN) Long Short Term Memory (LSTM) and Gated Re current Unit (GRU) was developed as part of SETS. Additionally a statistical model called Simple Moving Average (SMA) was also further developed into SETS[6]. There are three stages of decision-making modules, the first stage is the prediction model which uses multi-model forecasting system[7]. This system integrates various machine learning modules into a single forecast system for predicting the power consumption[8]. The second stage is the primary decision-making module that uses simple moving average (SMA) for filtering abnormally. The third stage is the secondary decision-making module which makes the final stage of the decision on theft. Internet of Things is expected to produce high degree of human to



Automated Intelligent Solar Tracking Control System for Different Weather Conditions

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ABSTRACT

The project considers an automated intelligent solar tracking control system which is mainly designed to increase the energy production from the solar energy. Since solar energy is the main source of solar energy the best way of collecting solar energy in efficient manner is our project. The proposed system of this project is detection of cloudiness allows the system to adapt under various weather conditions so that the angle of the solar panel will be changing in real time manner. This proposed system consists of two additional small solar modules the first one is installed horizontally and the second one is installed in vertical position. When cloudiness increase the output current of a solar horizontal module will exceed the current of the module which is oriented to the sun by that time the solar panel goes to the horizontal position. For monitoring the various parameters and energy characteristics of solar battery we are using wireless data transmission based on LoRa TTL module. Hence the result of the system in energy production in cloudy weather using this method exceeds than the dual axis solar tracker.

Keywords: Solar Tracking Control System, Solar Energy, cloudiness

1. Introduction

In the present scenario the variations in the climatic changes have reached the critical level. The reasons for change in climate are due to natural issues as well as man-made issues like global warming and green house gases are affecting the climatic conditions around the world. There is increase in demand for reliable electrical energy derived from renewable energy sources. Renewable energy plays vital role in energy crisis of country. The government also advises to decrease the usage of conventional energy sources and encouraging people to use renewable energy sources like wind, biomass, hydro and solar. Solar energy is a very large, abundant, inexhaustible source of energy because we can find anywhere in the world. The solar power received by the earth in a day is approximately 1.56×10^{23} KJ. The system will collect the abundant amount of solar energy through the photovoltaic cells which will absorb the solar rays present in the atmosphere. For this reason we are tracking sun light in all direction using our dual axis solar tracking system to improve the efficiency solar panel and we generate more power from solar energy.

2. Theoretical Background

- This system demonstrates the concept of dual-axis solar tracking system using Arduino and Lora technology. The main objective of this project is to check whether static and fixed solar panel is better than solar tracker, or not.

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Smart Water Leak Controller in Metro Water Supply Lines by Arduino

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ABSTRACT: In the water supply network system, the major problem is water leakage. Undesirable water leakage due to leaky pipelines and underground pipelines always be in effect in drinking water supply networks. 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 cistern tank by using an android application. GPRS module enables data logging with the existing cellular network infrastructure. A prototype model of the proposed system was executed, applied, and tested with various scenarios and the results are presented in this paper. Water resource management is one among the key goals so any country within the world as water requirement is increasing steeply; involving automation in such systems will reduce human errors and can increase efficiency and thus decreasing the availability demand gap.

I. INTRODUCTION

Water plays a key role in our day-to-day life. In day-to-day life, people don't realize the scarcity of water. In the water management system, water consumption and water monitoring are efficient mainly in the home or office. Therefore, efficient use and monitoring are potential restraints for home or office water management systems. For the survival of things, water is the most essential one. Surface water will also help for our future needs. Water is synonymous to life, as living things cannot live without it. This information is very useful for better management for farmers to improve their lands and crops. Pipeline networks are the most economic safety, reliability and efficient. If properly maintained, pipelines can last forever 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.

Pipeline networks are the most economic safety, reliability and efficiency. If properly maintained, pipelines can last forever 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. This to detect and prevent the water leakage for the consumption of water in future use. Buried pipelines are currently monitored at the ends, which can be spaced several kilometers apart. The operators provide better network of understanding for higher spatial resolution.

The goal of the system is to design and monitor the location of water leakage sensed by the sensors. The major leakage problem takes place in underground pipelines which are not able to detect. Our idea is to take the necessary action to restore the water leakage in underground pipelines. 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 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 a 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.

A. Proximity Sensor

A proximity sensor is used to detect nearby objects without any wire contact. The target sensed by a proximity sensor might be suitable for a plastic target.

IOT Based Hybrid Energy Smart Street Light Control System

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ABSTRACT: IoT based hybrid energy smart street light control system is a concept of saving energy conserved by street lamps. street lights are essential for the safety of drivers and pedestrians. smart street lights are one of the key frameworks of smart cities. Basically, street lights consume high energy and the cost of maintenance is high. This system enables to control, observe the system malfunctioning, and error identification in the hardware through the android application. This smart light system has automatic charging through the hybrid energy called a combination of solar, wind, and RF signals present in the atmosphere is converted into electrical energy.

KEYWORDS: IoT, Wind energy, Solar energy, Street Light and Mobile radiation.

I. INTRODUCTION

This paper reveals the perfect operating system for the public street lights which is more important to avoid accidents by driving and crimes. The energy consumption for street lighting is calculated to be 30% of the total electricity consumption in any country. Street light maintaining systems are mostly manual if any damage to lights it takes some time to repair it. During that time, it leads to some avoidable accidents and crimes. Street lights are maintained every month even though there is a chance of failure of the lamp and it not noticeable to the maintaining team. Lamps are failing due to sudden high-power supply in mains and other defects by the control circuits. Electricity is an important energy source for human life. Electricity is divided into renewable and non-renewable resources. In this project, we proposed hybrid energy called a combination of solar, wind, and RF signal emerged from the mobile. It reduced the cost of electricity and this energy should be stored in rechargeable batteries. With this mobile radiation observing circuit the most of the radiation present in the atmosphere converted into electrical energy. The electrical energy harvested by this circuit can be used for the street light. Due to this hybrid energy, there is no need for external power sources to operate or run the circuit. It allowed controlling, malfunctioning, and problem identification in the hardware system. This comprehensive system consists of a control unit, a managing unit, and a power storage unit. with help of IoT ("INTERNET OF THINGS"), this network becomes more compatibles.

II. LITERATURE SURVEY

Existing systems

[1] Cloud based street lighting system is a system that can control the street lights according to the specific area, can consumes less energy, realize wireless communication, can perform observing and control the street light over the website.

[2] This Paper proposed a street light that will automatically turn on at night but with different light intensity depending on the speed of the vehicles. The Light Dependent Resistor (LDR) will act as sensor that can adjust the light intensity for day and night. If LDR detect less than 80% of sunlight it will turn on the light. There are two Infrared (IR) sensors which is used to detect the speed of moving vehicles or object. When the object across the first Sensor, it will start counting the time taken to reach at Sensor 2. The sensor will stop to counting the time taken when the vehicle or object reaches Sensor 2. The gap between two sensors is six cm in this project.

[3] Nowadays the amount of electrical energy consumed by street lights plays a major energy demand. To overcome this problem, a proper power saving method and lighting control to be executed. This paper work is to have two controls such as one is to automatically switch off lights during no vehicle moments in the roads and automatically on when vehicles in motion and there are two modes to give less intensity light for pedestrian and to switch on high-intensity mode during vehicle motion at sides on the roads and streets. In this project the LED lights are used, the

Speed Control Management System for Vehicle Using Zigbee

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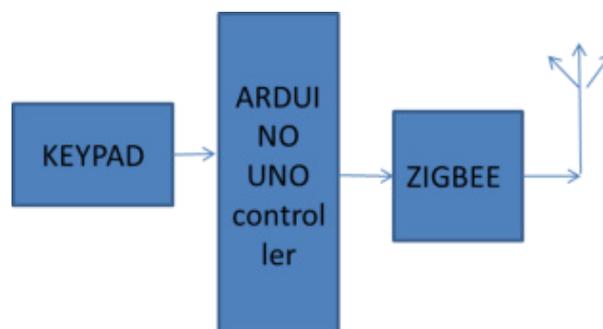
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ABSTRACT: Now a day's traffic rules are frequently violated by the drivers and over speeding occur due to bad driving behavior. But sometimes it may not be possible to view the signboards placed by the Highway Department to alert the drivers in such kind of places and there is a chance for accident. The main objective of the Project is to design and develop a new system that can effectively detect speed violations on the road and supports the driver to obey traffic rules while driving by maintaining the speed of vehicle according to the speed limit prescribed by particular zone. It will use zigbee technology. The proposed system gives an alert with the help of buzzer and LCD. working model mentioned zigbee signal transmission 10-30 metres standby when vehicle coming to particular zone receiver side received it's signal give alert to driver via display. In this system, if over speeding vehicles don't get controlled manually, then system turns ON and will get controlled automatically.

KEYWORDS: Zigbee, Automatic speed control, Over speeding vehicles, GSM modem, Speed Sensor.

I. INTRODUCTION

The need to enhance road safety, traffic efficiency and to reduce environmental impact of road transport are serious change for both academics and industry. Researchers are greatly interested to develop vehicular communication and networking technology in two realistic ways vehicle to vehicle (V2V) in ad hoc mode and vehicle to infrastructure (V2I) with fixed nodes along the road. The potency to exchange information wireless via V2X is a foundation stone for building powerful Intelligent Transport Systems (ITS). In Europe, USA and Japan are great efforts made from automakers and governments to reach single standards through the several and common projects such as CAR 2 CAR Communication Consortium, Vehicle Safety Communication Consortium, EUCAR SGA etc. Result from common effort is an international standard, IEEE802.11p also known as Wireless Access for Vehicular Environments (WAVE). This standard will be used as the groundwork for Dedicated Short Range Communications (DSRC).



Autonomous Fire Extinguishing Robot

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ABSTRACT: In the recent years the number of fire accidents are rapidly increasing which includes industrial accidents, wildfires etc., The occupation of fire Service is a risky one and the value of human life is very much important. This robot helps to make the fire operation easier where a fire serviceman cannot handle the critical situations. There are many autonomous firefighting robots designed but the implementation number is very less especially in India. The basic firefighting robot process is to detect and extinguish the fire automatically. The system consists of an ultrasonic sensor, flame sensor, driver circuit interfaced with Arduino uno microcontroller. It extinguishes the fire by pumping water from the tank. We can also use this fire extinguishing robot in hazardous and more populated areas to extinguish small flames before it spreads to other places. The main function of this autonomous robot is to locate and extinguish the fire as soon as possible. The components used in this robot are interfaced with the Arduino UNO microcontroller by using the software Arduino compiler. By considering the risky occupation of fire fighters and their lives and a recent increase in large the number of fire accidents happening daily this robot will definitely help the firefighters and to the society.

KEYWORDS: Monitoring; Extinguishing; Rescuing; Human Detector; IoT

I. INTRODUCTION

In the evolution of the technology, the robots are noticeable one. The robots are classified into many types like preprogrammed robots, humanoid robots etc., Among that autonomous robots are one type of a robot which is designed to perform a specific task without the help or intervention of humans. Now a days there is a increasing number of fire accidents happening daily in industries, hospitals, forests etc., In that situations the human fire fighters and the people or animals who stuck in the fire are at the stage of losing their life. During fire accidents there are some places where fire fighters cannot go and extinguish the fire and there is a possibility of injured peoples completely surrounded by the fire. Many losing their life at that critical situations. So, extinguishing the fire, monitoring the environment and rescuing the injured people is necessary and should be needed for every fire accident. This is our aim of project. Our autonomous fire extinguishing robot is aimed to design with the above three features. The industries had a high range of having fire accidents so, we develop our firefighting robot primarily for industries. In our project we use an Arduino uno microcontroller, flame sensor, ultrasonic sensor, driver circuit, DC motor, PIR sensor, voice playback board and servo motor for operation. The basic firefighting, robot process is to detect and extinguish the fire automatically. The flame sensor senses the fire and the ultrasonic sensor is used for obstacle detection or free path navigation. Here we use a pyroelectric motion sensor and voice playback board as a human detector. Once the fire is detected, the Pyroelectric Infrared sensor and voice playback board gets activated automatically, PIR sensor used to detect the motion and the voice playback board records the sound. It happens simultaneously when the robot extinguishes the fire. The information of motion and sound with direction are being recorded by the robot during the fire accident will sent to the monitoring system of the industry. It can be done by using IOT (Internet of Things). The all components are interfaced with the Arduino UNO microcontroller. This method of handling is very useful for extinguishing the fire and for rescuing the people. This makes the robot more efficient.

II. RELATED WORK

In paper [1] Here the user controllable fire fighter robot consists of wireless camera, a water tank with gun used for extinguishing fire. RF remote control used to control the operation through RF signals to the receiver circuit.

In paper [2] Robot operations are controlled by the android app. Fire detection done by using two sensors namely smoke sensor and temperature sensor. Fuzzy logic control algorithm is used in unknown environment.

In paper [3] This Arduino fire fighter robot extinguish the fire by remote handling. A gas sensor can be used to detect the fire and the Bluetooth Technology used for the communication purpose.

In paper [4] Gas and temperature sensor used for fire detection. The robot is completely guided by the fireman by using android mobile phone. The camera was fitted on the robot to analyze the current situation by fireman.

In paper [5] The controls placed on the RF transmitter. The robotic system is controlled by RF wireless communication. The 8051 microcontroller used for the operation.

IOT Controlled Wildlife Observation Robot

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ABSTRACT: The main objective of this working concept is to observe and monitor the wild life for the secured preventing measures of the residencies. In this working model a robot is used for the monitoring purposes. The monitoring robot is been provided with the RF transmitter so that the information grasped from the forest location can be transmitted through it. After receiving the information from the transmitter through the camera it can be monitored by the users at the station. The robot consists GSM module so that the communication is applicable flexibly without any deviation. The robot can be operated by the relay drivers interfaced in to it. Through the GSM module the robots locomotion can be controlled and in case of any emergency the exact location of it can be examined further or periodically as per the user's convenience. The LCD display is used to describe the status of the working model and in case of the emergencies and critical situations the message can be send to the station through the GSM module.

KEYWORDS: GSM module , 8051 Microcontroller Wireless camera, Relay drivers , Robot, RF transmitter and receiver, 16*2 LCD, PC or Television.

I. INTRODUCTION

Wildlife observers need to get a close footage of wild animals by getting into their habitats. Well it is not always safe to get close to all wild animals. So for this purpose we put forward this wildlife observation robot with night vision capability. This robot can be operated wirelessly by users using just their android or Joystick. The robot also has a wireless camera that sends footage of wild animals by operating this robotic vehicle from a safe distance. This system consist of an Arduino (ATME ATMEGA 328) unit used for processing user sent commands. These commands are received by the system through a GSM module. The Arduino then process this data and passes on signals to driver motors. The driver motor now in turn operate the motors by providing desired signal outputs to drive the vehicle movement motors. Also when the Arduino receives the camera directional change signal through GSM module, it then forwards this signal to camera motor in order to achieve desired camera angle. Thus this wildlife observation robot is allows for safe wildlife observation using an android or Joystick device control.

The advent of this technology has brought a revolutionary change among wildlife observers. Today in the global market, smart phones also have brought a revolution in changing people's lifestyle and providing various applications .Android operating system is an open source which has made a huge impact providing many applications for robotics to help people and other wildlife observers. The important technology used in our project for serial communication with the robot is the Bluetooth technology. Bluetooth is used to share data between two devices considering the range between two devices. Bluetooth module (HC-06) will be connected to the robot and the commands to the robot will be given through the android application [1]. The wildlife observation robot consists of arduino mega board as a controller board. It has L293D motor driver IC's along with a HC-06 Bluetooth module. Two DC motors are also used for the motion of the robot. A night vision camera is used at the top of the robot and it can be rotated 360 degrees via android application through a motor [2].

Licence Plate Detection System Using Image Processing With Vehicle Count

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ABSTRACT: Traffic law violation has been recognized as a major cause for road accidents in most parts of the world with majority occurring in developing countries. Even with the presence of rules and regulations stipulated against this, violators are still on the increase. This is due to the fact that the rules are not properly enforced by appropriate authorities in those parts of the world. Therefore, a system needs to be designed to assist law enforcement agencies to impose these rules to improve road safety and reduce road accidents. This work uses a Vehicle Plate Number Recognition system which is a real-time embedded system to automatically recognize license plate numbers. We planned to implement this with SOC . With the advent of powerful and low cost Single Board Computers (Sock), developing fully automated systems is becoming a trivial task. We can sense objects and capture images by using embedded systems to process and perform action accordingly. License Plate (LP) recognition systems use optical character recognition techniques to detect number plate on vehicles. These systems are important to control traffic, speed, theft, toll payment and parking lot access for vehicles.

KEYWORDS: Image Processing.

I. INTRODUCTION

Automation is the most frequently spelled term in the field of electronics. Due to automation, revolution has occurred in the existing technologies. This paper makes use of an onboard computer, which is commonly termed as raspberry pi2 processor. It acts as heart of the project. This onboard computer can efficiently communicate with the output and input modules which are being used. The raspberry pi is a credit-card sized single board computer which was firstly developed in uk by the raspberry pi foundation. Basically, the operating system for the detection of vehicle number plate using raspberry pi is the caspian jc. For the recognition purpose, raspberry pi model3 is used. Raspberry pi is a soc (system on chip) device has inbuilt 1.2 ghz bcm 2837 arm cortex processor. The arm cortex processor is 64 bits. Raspberry pi has 1gb ram. The overall average power is ranging from 1.5 to 6.7 watt. Raspberry pi has 40 digital input output pins in which 27 pins are gpio (general purpose input output). It has operating system which is installed in external sd card for booting and long term storage. Here in this system raspberry pi is the heart of the project. In many industries unknown vehicles are not allowed. There security is very important for them our system is going help to recognize number1963 unknown vehicle on gate. The same system can be used in such areas where security is the most important. The recognition of vehicle number plate is working in four steps. The first one is image acquisition, second is license plate extraction, third one is license plate segmentation, and last one is character recognition. Ocr is the process which converts image into text.

II. RELATED WORK

In License Plate Recognition System we apply different techniques on image to detect and extract license plate. This process is divided in two parts. In image processing techniques, Hear-like features are used to recognize objects from image. If our proposed system is selected to detect only license plates then the Hear-like features are used for this purpose and no further processing is done. This technique is old and laborious and more over needs a large database to store the collected samples nearly about 10000 images of the plates and characters.[1] This research intertwines two terms - license plate and privacy. Each state has a defined appearance of the license plate and it represents an official document, together with the vehicle documents. License plate is unique and there are no two of the same. Because of this uniqueness, the vehicle owners can be clearly identified. Registration number belongs to a single owner in a certain time period. This is the reason why a license plate represents private information.[2]Considering actual conditions, there is much interference in original car images such as the size of the image, lighting, and imaging quality, which influence the recognition performance seriously. In order to locate the license plate quickly and accurately, preprocessing of original images needs to be carried out. Here, the original images are captured at a high resolution (1250×750), which ensures that both the small license plate

Industrial Intelligence System for Pollution Control Using IOT

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ABSTRACT - The growth in an industrial and infrastructural frameworks leads to the environmental affairs like pollution. Pollution is becoming serious issue so there is need to build such a flourishing system which overcomes the problems and monitor as well as control the parameters. Industrial Automation is the control of electronic devices in our industrial whether we are there or aware. This system is designed to be low cost, low energy and expandable allowing a variety of devices to be controlled. It is a voice based industrial automation system which will be very useful for old aged people and disabled people, basically for one's who cannot perform basic activity efficiently. The main aim of this project is to make life easier and control industrial appliances by android voice command using Wi-Fi as communication protocol between raspberry-pi and Android device. It includes controlling industrial appliances remotely through phone, laptop etc. The main objective is to design a smart industrial automation which can be controlled and monitored by the Bluetooth via the Internet of Things(IoT). This will help the industrial owners to provide a simple, fast and reliable way to automate and manage their industrial.

KEYWORDS: Bluetooth, Pollution Control, sensor, etc...

I. INTRODUCTION

In today's day to day life automation can play a major role. The main attraction of any automated system is reducing human labour, efforts, time and errors due to human negligence. This project is based on Internet of Things (IoT). Internet of Things is a network of devices such as electrical appliances for connectivity which enables these devices to connect and exchange data. This project represents a flexible way to monitor and control the parameters. This project includes an android application where a user will provide voice commands for controlling devices such as "Turn light on" which will be connected to raspberry pi and according to it the required process will work Bluetooth is required for connectivity. This automation can be used majorly not only in industrial but offices and hospitals where user can register and authenticate himself/herself in android device and after successful login can give the input commands and operate the devices. It also provides security from third party users. It allows controlling number of industrial appliances simultaneously. Thus it act as an smart industrial automation system.

II. PROPOSED METHOD

This block explains about the proposed block of smart Pollution Control automation .we are using arduino UNO board to interface sensors and power supply in our circuit. The system to be developed is the wireless sensor network for monitoring and controlling the industrial pollution parameters. The system provide the users with mobile control of various devices by using Bluetooth low energy along with Raspberry pi. The main objective of this project is to control electrical industrial appliances by android voice commands using Wi-fi as communication protocol between Bluetooth and android device. For this purpose software is created. Through this software the electrical industrial appliances can be switched on and off. The software and the raspberry pi are connected by using the Bluetooth technology.

A. BIO SENSOR

A Biosensor is Associate in nursing analytical device. The detector that integrates the biological parts with the Physiochemical device to provide Associate in Nursing sign is proportional to at least one analyte which is fetched into

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High performance ethanol and acetone gas sensing behavior of FeCo₂O₄/graphene hybrid sensors prepared by facile hydrothermal route

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ARTICLE INFO

Keywords:

FeCo₂O₄/graphene
 High surface area
 Chemical sensors
 Fiber optic
 Clad
 High sensitivity

ABSTRACT

Historically, production of high-performance gas sensing materials has promised to satisfy the worldwide research interests with the increasingly enhanced gas sensor devices. In this paper we are adopting a facile hydrothermal strategy to prepare the ternary FeCo₂O₄/graphene hybrid nanocomposites. The spinal phase of FeCo₂O₄ with spherical shaped morphology was obtained through XRD, SEM and TEM images which confirms. In addition, an average particle size within the range of 30–40 nm was observed for the individual spherical shaped morphology. The Raman and XPS studies also explore the vibration modes and chemical composition of the FeCo₂O₄/graphene composites. The BET surface area and BJH pore size of FeCo₂O₄/graphene composites is estimated to be 93.2 m²/g and 19.45 nm, respectively. Such high surface area will provide the active path to gas molecules which will increase the efficiency of gas sensing. Measurement of ethanol and acetone gas sensing using clad altered fiber optic sensors and sensitivities for ethanol and acetone gases are 22 and 43 counts/ppm, respectively. Also discussed is the proposed gas sensing mechanism.

1. Introduction

Gas sensors are important components of sophisticated area systems, focusing on their wide range of applications such as in the therapeutic field, indoor and outdoor discussions on quality measurement structures, popular research, the automotive industry, and the military [1–3]. Chemical sensors based on fiber optics are currently becoming extremely clever because they are quick, tiny and low cost operation. Gas detection and monitoring can be done in inaccessible and unpredictable environments [1–3]. The propagation of transmitted light in optical fiber was extremely sensitive to optical properties (refractive index, absorption, etc.) of a cladding technique, and the fiber optic gas sensor [4–8] used extensively. In this, a small part of an inert cladding is removed and replaces it with a gas sensing material which changes its optical properties by interacting with the gas. Due to their superior gas sensitivity, metal oxide-based gas sensors have been commonly used in recent years for the detection of various toxic gases. These sensors illustrate an excellent response to oxidizing and reducing gases during surface reactions. Metal oxides are a basic route of useful materials for chemical and bio identification among their diverse applications. Following the disclosure of the identifying properties of these materials, a substantial grouping of metal oxides and their doped varieties has been widely investigated for highly sensitive

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Original research article

Design and fabrication of clad removed fiber optic based NiCo₂O₄ sensor for detection of ethanol and acetone gases

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ARTICLE INFO

Keywords:

NiCo₂O₄
 Spinel-type oxides
 Chemical sensors
 Fiber optic
 Acetone gas
 High sensitivity

ABSTRACT

The large-scale synthesis of ultra-small NiCo₂O₄ nanoparticles (20 nm) was developed using a facile hydrothermal technique without post-annealing process. A powder X-ray diffraction (XRD) and Transmission electron micrograph analysis were used to obtain the cubic structure and well crystalline spherical uniform NiCo₂O₄ nanoparticles. The N₂ adsorption-desorption study shows that the NiCo₂O₄ nanoparticles BET surface area is estimated at 88.5 m²/g, and the distribution of the pore size is about 20 nm. The gas sensing characteristics of the modified fiber optic gas sensor NiCo₂O₄ are exposed to varying concentrations of ethanol and acetone gases (0–500 ppm). Results indicate that the NiCo₂O₄ sensor displayed exceptional sensing response to acetone gas, such as high sensitivity ($72 \times 10^{-3} \text{ k/P}$), rapid response (20 s) and recovery time (26 s). More detailed discussion is also given on the theoretical sensing mechanism for the proposed sensor.

1. Introduction

Recently, all around the globe on detecting and monitoring toxic and dangerous gases is mostly concentrated, because of the increasing release of hazardous gases, fluids and chemicals from industrial effluents, agricultural chemicals and fertilizers. Gas sensors are in great demand for various household and industrial applications. Gas sensors, which play an important role in natural observation, air quality monitoring, and the detection of explosives and poisonous gasses, have attracted increasingly interested research around the world as an ever-growing awareness of natural pollution and word-related security concerns [1,2]. By counting gas chromatography, Fourier-transform infrared spectroscopy, chemiluminescence locators, mass spectrometry, and other instruments, different techniques can be used to detect gases. Gas sensors based on solid state semi-conductor materials have impressive focal points over other gas detection strategies [3]. Chemical sensors based on fiber optics are gaining a lot of shrewdness right now, as they are the quick, compact and low fetched operation. Gas discovery and observation can well be achieved in conditions that are blocked off and unstable [4–6]. The generation of transmitted light in optical fiber is extremely sensitive to optical properties (refractive index, retention etc.) of a cladding and clad-removed method is commonly used within the fiber optic gas sensor [7–11]. Metal-oxide semi-conductor gas sensors have put particular emphasis on air quality identification, flammable-gas analysis, natural observation, health care, safety, defense, etc. [12]. Since the detection aspect focuses on the surface response of these materials, their sensing efficiency is unambiguously subordinate to the morphology and structure of the materials, specifically grain measurement and surface area. Many of the metal oxides based on semiconductors, such as SnO₂ [13], Sm₂O₃ [14], Bi₂O₃ [15], ZnO [16] and WO₃ [17], have recently been

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Fabrication of hexagonal shaped CuCo_2S_4 nanodiscs/graphene composites as advanced electrodes for asymmetric supercapacitors and dye sensitized solar cells (DSSCs)

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ABSTRACT

In this report, CuCo_2S_4 /graphene (abbreviated as CCS–G) hybrid electrodes were fabricated via facile and one step hydrothermal route. The fabricated electrodes were characterized by XRD, Raman, TEM, BET and XPS to investigate the structural, morphological and elemental composition properties. N_2 adsorption–desorption studies showed that CCS–G indicates the maximum specific area of $112 \text{ m}^2 \text{ g}^{-1}$ related to CCS ($77 \text{ m}^2 \text{ g}^{-1}$). The CuCo_2S_4 /graphene electrode deliver a high specific capacitance 1625 F g^{-1} at relative current density of 2 A g^{-1} and high cyclic retention of 97% after 5000 cycles experiment. Interestingly, asymmetric device CCS–G//AC was fabricated and it shows high energy density of 27 Wh Kg^{-1} with relative power density of 5100 W Kg^{-1} . The sandwich type dye sensitized solar cell (DSSC) was fabricated and tested the J–V and IPCE analysis. The finding reveals that CuCo_2S_4 /graphene electrode shows high PCE (11.85%) and long term stability. The superior PCE of the composite is due to the heterostructure, mesoporous nature and high surface area with enhanced light harvesting capacity. Due to the high photovoltaic and electrocatalytic activity of CuCo_2S_4 /graphene heterostructure can be useful for energy conversion and storage device applications.

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THREE PORT SWITCHING CONVERTER FOR HYBRID SOFT APPLICATIONS

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Abstract: A comprehensive mathematical modeling and control design for an isolated multi-port DC/DC converter for photovoltaic (PV) generation systems is discussed in this paper. The adopted converter is a modified flyback converter consisting of three ports, namely, a photovoltaic (PV) module input port, a bi-directional battery port, and an isolated output port. The output port is receiving its demanded power without any interruption, while the power extracted from the PV module is maximized adopting a maximum power point tracking (MPPT) controller. Moreover, to improve the overall efficiency of the system, synchronous rectification switches are used on the secondary side of the isolation transformer. Set of simulations using MATLAB/Simulink are done to show the effectiveness of the proposed converter under different operating conditions.

Keywords: Congestion management, Deregulated Electricity market, Transmission Congestion Distribution Factor.

1.INTRODUCTION

TRADITIONAL DC-DC CONVERTER

Renewable sources such as solar photovoltaic (PV) and wind are increasingly being used because of the environmental concern and advances in the technology and rapidly decreasing manufacturing cost. However, the intermittent nature of the renewable sources and the unpredictability of the load demand produce a challenge for the wide promotion of these clean energy sources. Therefore, power electronic converters with energy storage systems are usually used to convert the output power from the PV panels to match the load demand, to improve the dynamic and steady-state characteristics of the green generation systems, to provide MPPT control, and to integrate the energy storage system to deal with the challenge of the intermittent nature of the renewable energy and the unpredictability of the load demand.

Traditionally, the renewable energy source is connected to the load through a traditional DC-DC converter and then the energy storage system is connected to either the input port or the output port of the traditional DC-DC converter through a bidirectional DCDC converter for charging and discharging as shown in Fig. 1.1 (a) and Fig. 1.1 (b). The main disadvantage of these traditional solutions is the low efficiency due to the utilization of the additional converter for the energy storage system. Also, the multi-stage architecture may result in increased size, low power density, and relatively high cost.

A multi-input converter is a solution to satisfy the requirements of some applications that require the integration of several different types of input energy sources such as fuel cells, wind turbines, and solar PV [9]. This type of converter can be used to provide the demanded power of the load with a single stage technique; however, no energy storage system is included in these multi-input converters, and hence the system may not be able to meet the required load demand when the output power is greater than the input power. For fuel cell operation, this may happen when there is a sudden increase in load and the chemical reaction of the fuel cell is not fast enough to follow the increase in load. Similarly for solar PV application, there may be fast PV output fluctuation during passing cloud causing the PV output to be less than the load demand or when there is no sun irradiation at night. Wind power output also fluctuates with the wind speed variation.



LUO CONVERTER DESIGN IN ELECTRIC VEHICLE FOR POWER QUALITY IMPROVEMENT

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Abstract: For maintenance of the grid and reliable to be prepared for the exponential growth of electrical vehicles in the future. The optimal allocation infrastructures, lack of regulations and market rules and network codes devolvement have low visibility on distribution grid. It consist of communicational and computational barriers. A small capacity bidirectional half bridge DC/DC converter is designed to function the harmonics DC to compensate the active power filter (DCAPF) suppress the harmonic current getting into the battery packs in the single stage structure. Finally, both simulation and experimental results are carried out to validate the low order harmonic current compensation effect. The simulation model developed in a MATLAB Simulink tools and verified with corresponding factors. Based on that hardware Prototype is designed.

Keywords: Battery charger, constant current (CC), constant voltage (CV), state of charge (SOC),

I. BACKGROUND OF THE WORK

The crucial link between electric vehicles (EV) with a depleted battery that provides the infrastructure element to electrical source that will recharge those batteries is the Electric Vehicle standards related to current and emerging for EVSE technologies. The assessment codes review the standards related to current and emerging for EVSE technologies. The network of EV charging stations recommendations of infrastructure required to support the accelerating deployment of EVs to expanded their challenges. The network establishment of requirements and needs is the primary barriers which is easy accessible of PEV recharging network communication is the significant barriers are expansion of EVSE infrastructure.

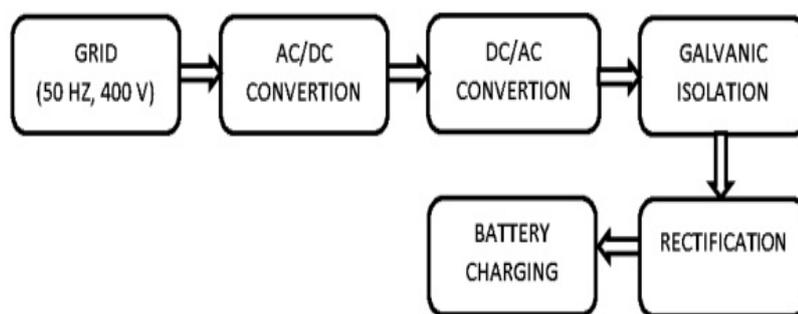


Figure 1.1. DC Charging Method from the Grid

PEV and infrastructure environment focused and consistent public awareness campaigns supporting the continued adoption of PEVs and a public officials and private enterprise want to better understand of PEV and EVSE infrastructure are needed. The manufacture of PEV have near terms expectations for advanced battery technology that will provide a travel range equal to significant advancements are made in PEV technologies for advanced battery technology. The evaluation of performance of electric vehicle charging system is the efficient of key parameters. The shorter charging time for EVs has promising future especially those bidirectional fast chargers among many charging circuit topologies of the concept “vehicle-to-grid (V2G)”.

In commercial EV fast chargers, the downstream DC/DC converter is usually designed to be an isolated converter where a high frequency transformer is necessary for isolation the traditional fast an AC/DC converter and a downstream DC/DC

OPTIMAL WIRELESS POWER TRANSFER FOR ELECTRICAL VEHICLE BATTERY CHARGING

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ABSTRACT:

WPT technique requires no physical contact between vehicle and charging device, therefore overcomes the inconvenience and hazards caused by traditional conductive method. The initial objective is replacing conductive charging method by the novel WPT technology, while maintaining a comparable power level and efficiency. The systematic analysis and the critical assessment of the AC side soft-switching inverters in electric vehicle (EV) applications. Although numerous soft-switching inverter techniques were claimed to improve the inverter performance, compared with the conventional hard-switching inverter, there is the lack of comprehensive investigations of analyzing and evaluating the performance of soft-switching inverters. Starting with an efficiency comparison of a variety of the soft-switching inverter using analytical calculation, operation and control on the loss reduction. Inverters realizing the zero-voltage-transition (ZVT) or (ZCT) operation are identified to achieve high efficiency operation. The simulation is done by using MATLABR2013a/SIMULINK software. The proposed hardware setup developed based on the PIC16F877a microcontroller.

Keywords: Wireless Power Transfer, Zero Voltage Transition , Zero Current Transition.

1.INTRODUCTION:

With rising emphasis placed on environmental protection and resource conservation today, transportation and electricity generation still contribute over 60% to the global primary energy demands, the majority from fossil sources. Extensive application of electric vehicles (EVs) and renewable energy generation is an inevitable trend. This is increasingly happening in many countries especially for public transportation. Such a transition essentially shifts sources of emission from geographically distributed individual vehicles to a few centralized power plants, simplifying pollution control to some extent. However, the status quo is still far from perfection. Firstly, the electricity used by EVs is still mainly generated from fossil sources in many countries. As a result, pollution might be merely migrated elsewhere without much reduction, violating the main purpose of introducing EVs. Secondly, current battery technology is still incapable of

Self-Regulating Control of Dynamic Response of the Grid Tied Wind Power Generator

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Abstract: This paper focused is on dynamic response of wind power generation, nowadays wind generation is taken into account as alternate to traditional fuel power plants. It's attracting more attention, as quite half this turbine capacity has been installed within the past the decades. A Maximum point Tracking (MPPT) control technique is presented for extracting the utmost power from the turbine. The high passive filter to extract the present harmonics with low stop frequency is in a position to compensate an unbalance load, but the dynamic response are going to be slow, for this reason, the Multi-Variable Filter (MVF) is in a position to compensate highly unbalance load without affecting the dynamic response of the system. The inverter allows full control of dc bus voltage regulation, and it acts as power transfer from the turbine to the grid and to the load. The MVF filter is employed to estimate a fundamental voltage source which provides excellent performance when the voltage source is distorted. This will be done through simulation and hardware under various values of the wind speed of the turbine .

Key wards: MVF, CWVO, DWIG, PMSG

IINTRODUCTION

The early Wind turbine was only based on squirrel cage induction generators (SCIG), connected directly to grid, therefore, rotor speed remains almost constant. In modern wind turbine technologies for maximum power extraction the gearbox, turbine designers are based on variable speed governor systems. Power electronic converters facility the variable speed governor systems.

Most of the variable speed wind turbine systems are based on Doubly- Fed Induction Generator (DFIG) or permanent Magnet Synchronous Generator (PMSG). The PMSG based wind turbine has a higher power density and efficiency; while suffering from the high cost of generator and partial-rated converter price are lower. Due to the environmental concerns and social/political restrictions, there is a growing demand for the offshore Wind turbine installation, where better wind condition is also an advantage.

The possible induction machine power generation schemes are identified. The scheme consists of an induction machine directly connected to a voltage-source PWM inverter that supplies the dc bus. In this scheme reactive power is supplied from the dc bus to the induction machine. Therefore, the inverter has to be designed for the rated power, and for decrease due to high ripple currents a filter capacitor (C_f) is necessary. To reduce the system cost, the scheme is proposed.

In this scheme, the induction generator is directly connected to the full-bridge diode rectifier to supply the dc bus. The excitation to the machine is supplied by means of a PWM-VSI connected across the machine terminals via filter inductors (L_f). A dc-bus electrical condenser acts as a voltage supply to the electrical converter. In this case, the inverter supplies the required reactive power to the machine and also charging current to the dc-bus capacitor so that it can be maintained at a predetermined voltage. The rating of the inverter in this scheme is considerably less than the inverter rating.

To further reduce the size of the inverter, a dual-winding-set induction generator scheme is also proposed. In this scheme, the main winding set is designed to carry rated active power and directly connected to the diode bridge rectifier. The excitation winding is designed for higher voltage than the main winding to reduce the inverter current rating which depends upon the turns ratio of the two winding sets. Through the direct connection between the excitation winding and the capacitors, the generator receives the necessary reactive power: in this way the apparent power of the main winding inverter should decrease by 40%.

This paper deal the Multi-Variable Filter (MVF) is able to compensate highly unbalance load without affecting the dynamic response of the system.

Electrical Car using Solar Energy

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Abstract: In our ecosystem mostly Gasoline engine cars are used by the public which have high cost of refueling that cause emission of greenhouse gases. In this way to reduce the automotive emission which causes the Greenhouse gases, an alternative technology is needed. The most convenient way is to use renewable energy sources. In this scenario we provide an alternative fuel for vehicles by using renewable energy resources. Among the various resources available, we design a solar power controlled motor device for automotive application.

In this project, the Electric Car is the way to alter the energy source. Sunlight is the main source of energy to obtain light energy which is converted into electricity. Amount of energy obtained from the source may vary from time-to-time. The vehicle chosen for the experiment is Marathi Omni. The solar panels are placed on the top of the car. Energy obtained from the solar panel is given to the charge controller. Charge controller can prevent overcharging and also the over discharging of the battery. Output of the charge controller is given to the Valve Regulated Sealed Lead-Acid Battery. Then the Valve Regulated Sealed Lead-Acid Battery is given to the Motor through Driver circuit which controls speed of the Motor.

Battery charging time through charge controller is four to five hours and the Electric Car travels for the distance of about 150Km with the speed of 30 to 40 Km/hr. Thus the proposed system of automotive vehicle helps to achieve zero pollution, zero noise effect and fuel consumption.

Keywords: Congestion management, Deregulated Electricity market, Transmission Congestion Distribution Factor.

I. INTRODUCTION

A. Electric Car

An Electric Car Is An Automobile That Is Propelled By One Or More Electric Motors, Using Electrical Energy Stored In Rechargeable Batteries. Electric Motors Give Electric Cars Instant Torque, Creating Strong And Smooth Acceleration. They Are Also Around Three Times As Efficient As Cars With An Internal Combustion Engine.

Electric Cars Are Significantly Quieter Than Conventional Internal Combustion Engine Automobiles. They Do Not Emit Harmful Pollutants, Giving A Large Reduction Of Local Air Pollution, And, Can Give A Significant Reduction In Total Greenhouse Gas And Other Emissions. They Also Provide For Independence From Foreign Oil, Which In Several Countries Is Cause For Concern About Vulnerability To Oil Price Volatility And Supply Disruption.

Electric Vehicles (Evs) Like The Nissan Leaf, Chevy Volt, And Tesla Model S Are Becoming More And More Popular Because Of Their High MPG Ratings, Their Convenient Ability To Be Plugged-In And Recharged, And The Frustrating And Unpredictably Wild Increases In The Price Of A Gallon Of Gasoline. The Cost Of Filling Up Your Tank Is Decreased To Charging Your Vehicle's Batteries With Electrical Energy, And The Savings Are Even More Dramatic When That Energy Comes From Your Own Solar Power System.

The First Practical Electric Cars Were Produced In The 1880. Electric Cars Were Popular In The Late 19th Century And Early 20th Century, Until Advances In Internal Combustion Engines, Electric Starters In Particular, And Mass Production Of Cheaper Gasoline Vehicles Led To A Decline In The Use Of Electric Drive Vehicles. The Energy Crises Of The 1970 And 1980 Brought A Short-Lived Interest In Electric Cars Although Those Cars Did Not Reach The Mass Marketing Stage, As Became The Case In The 21st Century.

A Solar Car Is A Solar Vehicle Used For Land Transport. Solar Cars Only Run On Solar Power From The Sun. Solar Thermal Energy Which Converts Solar Energy To Heat, PV Cells Directly Convert Sunlight Into Electricity.

To Keep The Car Running Smoothly, The Driver Must Monitor Multiple Gauges To Spot Possible Problems. Cars Without Gauges Almost Always Feature Wireless Telemetry, Which Allows The Driver's Team To Monitor The Car's Energy Consumption, Solar Energy Capture And Other Parameters And Thereby Freeing The Driver To Concentrate On Driving.

Solar Cars Combine Technology Used In Aerospace, Bicycle, Alternative Energy And Automotive Industries. The Design Of A Solar Vehicle Is Severely Limited By The Amount Of Energy Input Into The Car. Most Solar Cars Have Been Built For The Purpose Of Solar Car Races. Some Solar Cars Are Designed Also For Public Use List Of Prototype Solar-Powered Cars

IMPLEMENTATION OF FAST RESPONSE CONTROLLER FOR BRIDGELESS BUCK CONVERTER WITH IMPROVED POWER FACTOR

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ABSTRACT

Active power factor correction (PFC) converters are widely applied in power electronic equipment to meet the rigorous international input current harmonics standard like IEC 61000-3-2 limits. Commonly, the boost converter is the most popular option as the PFC front-end because of its simple topology, excellent current-shaping performance, easy control and low cost.

Keywords: Congestion management, Deregulated Electricity market, Transmission Congestion Distribution Factor.

1 INTRODUCTION

Since the industrial times, we have relied on fossil fuel, gas fired power stations and power plants to generate electricity. However, these kinds of power generation options are no longer sustainable due to the negative impact they have on our planet. Therefore, new and renewable ways of generating electricity have been developed such as solar and wind generation. These new options of generating electricity have significantly less negative impact on our planet. They do however impact our power grid in a negative way.

Two things are absolutely critical when generating electricity: the generated energy must be equal to the energy that we consume and the power grids voltage and frequency must be constant. The previous ways of generating electricity have contributed with a sort of inertia to the power grid. This inertia has created a window of time for the power generation side to adapt to the changes in power consumption, making the power grid more

DUAL INPUT THREE STAGE NPC INVERTER FED PV –GRID SYSTEM FOR UNBALANCED AC MICRO GRID

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Abstract: This paper shows a unique single-phase buck-boost 3-stage neutral-point-clamped (NPC) inverter with unbiased dc resources coupled for the grid-tied photovoltaic (PV) application that could effectively resolve the unbalanced operational situations usually appearing among impartial PV resources. The proposed manipulate scheme can concurrently assure the Most Power Point (MPP) operation of each PV assets and preserve the output waveform high-quality. As compared to the conventional two-level PV inverter, the proposed NPC inverter ought To lessen the PV array voltage requirement and the voltage score of dc-link capacitors; additionally it indicates blessings in operational efficiency. MATLAB simulations and experimental effects are supplied to have a look at the overall performance of the proposed 3-level NPC inverter.

Keywords : NPC inverter, Photovoltaic(PV), Artificial Neural Network, Solar panel , PIC Microcontroller.

1 Introduction.

Currently, photovoltaic (PV) energy generations are broadly carried out in the distribution community's PV power era device can be labeled into two predominant classes of grid interfaced and off-grid systems, and the grid system depends the PV applications in terms of the era ability. To this point, maximum of the applied PV converters is -stage inverter, whose main shortcomings are excessive operation voltage and occasional operational efficiency. The case study is made up with the solar efficiency depends on the PV module penetration under various circumstances. The literature survey will clearly state the VI characteristics on the PV penetration [1].

The current predictive method based on the P&O control technique will illustrates the load usage and nominal operating conditions by the flow of current, based on that the inversion takes place [8]. A voltage source control method for the LLMF method with DSTATCOM control technique will eliminates the harmonics elimination under various circumstances [16]. For the effort of creating a compact layout, this paper proposes a unique single-level buck-boost 3-stage NPC inverter because the interfacing circuit to tie separated PV arrays to grid. Similarly, the proposed control approach can personally tune the MPP for every PV array and boost the PV voltages to a higher dc-link voltage. The higher/lower dc-link voltages also are balanced with the aid of adjusting the switching states of NPC inverter that could assure the grid-facet present day quality. In comparison to the dual NPC inverter, the proposed inverter saves two diodes and exhibits decrease voltage score of dc-hyperlink capacitors as well as lower voltage rating of the front-stop switches. Moreover, the proposed inverter exhibits higher efficiency under excessive voltage boosting ratio situation. Theoretical evaluation has been accomplished to evaluate the proposed inverter with two-stage NPC inverter in phrases of operational efficiency. Finally, MATLAB simulations and experimental prototype established the performance of the proposed 3-stage inverter.



AN ADAPTIVE FUZZY LOGIC BASED CLOSED LOOP CONTROL TECHNIQUE FOR DFIG LINKED HYBRID SYSTEMS

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Abstract

Renewable Energy Resources plays a full of life role in standing against heating and scale back the utilization of standard energy sources. Hybrid systems shaped by combining the renewable energy sources are economical comparatively. The intent of this paper is to furnish bearable power for frontier and far places with hybrid-system of design. The meant system embodying DFIG and PV. In PV systems, management mechanism is important for rising the performance. This paper proposes a technique of progressive electrical phenomenon approach primarily based MPPT AFLC Controller for grid connected PV system that consists of electrical converter. AFLC Controller provides quick response and higher Doctor of Theology compared to Fuzzy and PI controllers. In scheme, MPPT can amplify star output power price. The DFIG has controllers Grid-Side management (GSC) and Rotor-Side management (RSC). The rated rotor speed and DC-link voltage are regulated by RSC and GSC through PI, symbolic logic Controller and AFLC strategies. By victimization simulation studies performed by management methods, THD analysis is carried out.

Key words: DFIG, Grid-Side management (GSC) and Rotor-Side management (RSC), AFLC.

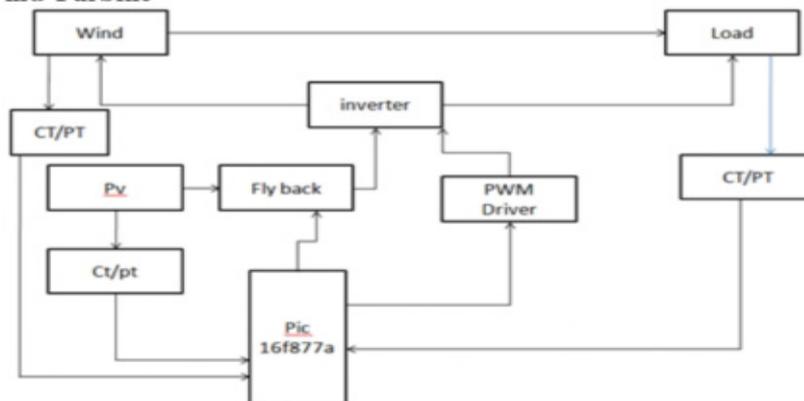
I INTRODUCTION

Renewable Energy Resources plays a vigorous role in standing against heating and cut back the utilization of typical energy sources. Hybrid systems fashioned by combining the renewable energy sources are economical comparatively[4]. The intent of this paper is to furnish supportable power for frontier and faraway places with hybrid-system of design. The supposed system embodying DFIG and star PV based mostly wind turbine. In solar systems, management mechanism is crucial for up the performance[1]. This paper proposes a way of progressive conductance approach based mostly MPPT AF logic Controller for grid connected PV system that consists of a llll converter and a 3 section electrical converter[6],[7]. Reconciling mathematical logic Controller provides quick response and higher Doctor of Theology compared to Fuzzy and PI controllers. In scheme, MPPT can enlarge star output power worth. The DFIG has 2 controllers Grid-Side management (GSC) and Rotor-Side Control (RSC)[14],[15].

In this paper, associate AFLC is employed to realize quick response with modification in wind speed. Simulation results show that the projected AFLC controller provides quick response in comparison with PI and fuzzy logic controller. From results it's discovered that there have been grid current and grid voltages are improved once AFLC is employed

Figure 1 Block diagram

II Wind Turbine





Wireless Design for Power Theft Identification Using GSM

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ABSTRACT: Aiming at the disadvantage of current anti-theft technology, a based wireless power theft monitoring system is proposed in this project. This project describes PIC16f877a Microcontroller based design and implementation of energy meter using IoT concept. The Buyer needs to pay for the usage of electricity on schedule, in case that he couldn't pay, the electricity transmission can be turned off autonomously from the distant server. The user can monitor the energy consumption in units from a web page by providing device IP address. Theft detection unit connected to energy meter will notify company side when meter tampering occurs in energy meter and it will send theft detect information through PLC modem and theft detected will be displayed on the terminal window of the company side. Wi-Fi unit performs the IoT operation by sending energy meter data to web page which can be accessed through IP address. The Hardware interface circuit consists of PIC16f877a Microcontroller, LCD display, theft detection unit and ESP8266 Wi-Fi module. Wi-Fi unit performs the IoT operation by sending energy meter data to web page which can be accessed through IP address. In our project determines the greatest opportunity for energy savings by continuously monitoring and controlling power theft from the electric meter by taking readings from it. This system prevents the illegal usage of electricity, which can be solved automatically without any human control. The implementation of this system will save large amount of electricity

I. INTRODUCTION

Electrical metering instrument technology has come a long way from what it was more than 100 years ago. From the original bulky meters with heavy magnets and coils there have been many innovations that have resulted in size and weight reduction in addition to improvement in features and specifications. So it is new concept in world of Electricity measurement. This concept is not only beneficial for electricity measurement but also has the capability to prevent misuse of electricity. Now a day, the energy consumption and distribution has become a big subject for discussion because of huge difference in energy consumption and energy production. At present most of the houses in INDIA has the traditional mechanical watt hour meter and the billing system is not automated. So a new system was discussed known as smart energy electronic meter which uses cloud in it. The present project Smart Energy Meter addresses the problems faced by both the consumers and the distribution companies. The paper mainly deals with smart energy meter, which utilizes the features of embedded systems i.e. combination of hardware and software in order to implement desired functionality. The paper discusses comparison of Arduino and other controllers, and the application of GSM and Wi-Fi modems to introduce 'Smart' concept. With the use of GSM modem the consumer as well as service provider will get the used energy reading with the respective amount, Consumers will even get notification in the form text through GSM when they are about to reach their threshold value, that they have set. Also with the help of Wi-Fi modem the consumer can monitor his consumed reading and can set the threshold value through webpage. Now-a-days the demand for electricity is increasing at a constant rate throughout the population and is being utilized for various purposes wiz, agriculture, industries, household purposes, hospitals etc. So, it is becoming more and more complicated to handle the electricity maintenance and requirements. There for there is an immediate requisite to save as much electricity as possible. As the demand from the newer generations of population for electricity is increasing so in accordance with it the technology improvement is needed. The proposed system provides a technical twist to the normal energy meters using the IoT technology. Also there are other issues that we have to address such as power theft and meter tampering which in turn generate economic loss to the nation. Monitoring, Optimized power usage and reduction of power wastage are the major objectives that lie ahead for a better system.

DESIGN OF UNMANNED VEHICLE FOR SMART HEALTH CARE MONITORING SYSTEM

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Abstract: Medical robotics is a new interdisciplinary research field, multidisciplinary collection as a whole, including medicine and robotics. With an improvement in technology and miniaturization of sensors, there have been attempts to utilize the new technology in various areas to improve the quality of human life. One main area of research that has seen an adoption of the technology is the healthcare sector. The people in need of healthcare services find it very expensive this is particularly true in developing countries.

As a result, this project is an attempt to solve a healthcare problem currently society is facing. The main objective of the project was to design a remote healthcare system. It's comprised of three main parts. The first part being, detection of patient's vitals using sensors, second for sending data to cloud storage and the last part was providing the detected data for remote viewing. Remote viewing of the data enables a doctor or guardian to monitor a patient's health progress away from hospital premises. In the proposed system robot setup is implemented to identify the temperature, Pressure and Heartbeat values of concern person. The Internet of Things (IoT) concepts have been widely used to interconnect the available medical resources and offer smart, reliable, and effective healthcare service to the patients. Health monitoring for active and assisted living is one of the paradigms that can use the IoT advantages to improve the patient's lifestyle. In this project, I have presented an IoT architecture customized for healthcare applications. The aim of the project was to come up with a Remote Health Monitoring System that can be made with locally available sensors with a view to making it affordable if it were to be mass produced.

Hence the proposed architecture collects the sensor data through Arduino microcontroller and relays it to the cloud where it is processed and analyzed for remote viewing.

Keywords: Battery charger, constant current (CC), constant voltage (CV), state of charge (SOC).

INTRODUCTION

Education system plays a major role in describing the innovative ideas to the students. In recent years, the definition of robot is generally used to mean an unmanned system or automation, as often seen in industrial applications. Generally, a robot is used to be shaped like humans, and referred to as machines and electric systems were capable of performing similar actions as humans. With the technological advancements in robotics field, efforts are being taken in researching, designing and development of robots for different practical purposes.

Robots designed to assist human in their work and reduced human efforts. Nowadays, robots are designed to mimic human behaviour and perform tasks similar to human. Many research companies are developing robotic arm for performing basic functions like human arm. Among different functions, writing skills is one of function. The proposed robotic arm can be used by physically challenged person for writing operation

The main aim of developing the proposed system is to facilitate the physically challenged persons to write what they speak and also this design can be used in many other applications such as data accounting in industries can be done through wireless communication from one place to another. This reduces time and efforts of the workers.

BLOCK DIAGRAM

The design of unmanned vehicle for smart health care monitoring system consist of temperature sensor, pressure sensor, heartbeat sensor, relay driver and LCD display.



RESEARCH ARTICLE

WILEY

Photovoltaic module integrated modified three-port interleaved flyback converter fed six-level shunt active power filters

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Summary

In this paper, a photovoltaic (PV) array tied modified three-port interleaved flyback converter (MTPIFC) is proposed to power shunt active power filter (SHAPF). The MTPIFC is intended to feed a SHAPF from a PV power source to overcome the power quality issues associated with the interconnection of nonlinear loads with the low-power distribution network. The three-phase six-level cascaded multi-level inverter operated as a SHAPF reduces the current harmonics and the number of active and passive components compared to widely used MLI. This study also presents a DQ current control method with a modified phase-locked loop to generate the required reference signal for the PV-SHAPF. Extensive recreation and test contemplates are done to confirm the capacity of the suggested PV-SHAPF.

KEYWORDS

current harmonics, modified three-port interleaved flyback converter (MTPIFC), phase-locked loop, power quality, PV based shunt active power filter (PV-SHAPF), three-phase six-level inverter

1 | INTRODUCTION

The term power quality (PQ) is applied to a variety of phenomena that occur more frequently in the power distribution network such as voltage and current distortions. The power electronic equipment utilized in the industrial, commercial, and residential applications are the main sources of PQ issues. The nonlinear loads connected with the power distribution network degrade the quality of the power delivered by the power distribution network. The PQ phenomena such as voltage sag, voltage swell, voltage harmonics, interruption, and current harmonics are the major source of power quality issues. Among these, the current harmonics presented in the power distribution network creates a considerable effect on the performance and life span of the electrical apparatus. To deliver clean power and to mitigate the PQ issues aroused by the interconnection of power electronics components, several devices have been developed and presented by the researchers.¹⁻⁵

List of Symbols and Abbreviations: DC, Direct Current; FLC, Fuzzy Logic Controller; Hz, Hertz; L, Inductance; MLI, Multi Level Inverter; MTPIFC, Modified Three-Port Interleaved Flyback Converter; PV, Photovoltaic; SHAPF, Shunt Active Power Filter; THD, Total Harmonic Distortion; TPSL, Three-Phase Six-Level; V, Volts; V_{dc} , DC link voltage; V_{pv1} , PV array 1 voltage; V_{pv2} , PV array 2 voltage; V_{pri1} , Primary 1 voltage; V_{pri2} , Primary 2 voltage; V_{L1} , Voltage across the inductor 1; V_{L2} , Voltage across the inductor 2.



SEGMENTED ENERGY STORAGE MANAGEMENT

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ABSTRACT

The segmented energy storage management (SES) is the current and typical solution of smoothing renewable power generation fluctuations. An SES based hybrid power systems require a suitable control strategy that can effectively utilize the maximum power output and battery state of charge (SOC). Proposed system presents the efficiency of a wind/photovoltaic (PV) hybrid power system simulation analysis undertaken to improve the smoothing performance of wind/ PV/BESS hybrid power generation and the effectiveness of battery SOC control. A smoothing control method for reducing wind/PV hybrid output power fluctuations and regulating battery SOC under the typical conditions is proposed. A real-time SES based power allocation method also is proposed.

Keywords: Hybrid power, segmented energy storage & state of charge

1. INTRODUCTION

The battery energy storage system can provide flexible energy management solutions that can improve the power quality of renewable-energy hybrid power generation systems. Several control strategies and configurations for hybrid energy storage systems, such as a battery energy storage system, superconducting magnetic energy system (SMES), a flywheel energy system (FES), an energy capacitor system (ECS), and a fuel cell/electrolyzer hybrid system have been proposed to smooth wind power fluctuation or enhance power quality. In the present study, under the assumptions that the capacities of the WP and PV hybrid generation system (WPPVGS) and BESS had already been determined and that we do not have ability to adjust the WPPVGS output power, a large-scale BESS was used to smooth the WPPVGS output power fluctuation.

1.1 OBJECTIVE

The objective of this project is to perform the maximum utilization of hybrid renewable energy to load.

The Fuzzy logic control system was implemented to simplify the operation of converter.

1.2 SCOPE

The Project proposes for alternative source of sensitive loads and also which helps to reduce the cost of non-renewable generation.

2. LITERATURE REVIEW

Chad Abbey et al experimented A Knowledge-Based Approach for Control of Two-Level Energy Storage for Wind Energy Systems [1]. A knowledge-based management algorithm is developed in order to

NOVEL HYBRID MULTILEVEL SINGLE PHASE INVERTER

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Abstract: Multilevel inverters have created a new wave of interest in industry and research. While the classical topologies have proved to be a viable alternative in a wide range of high-power medium-voltage applications, there has been an active interest in the evolution of newer topologies. Reduction in overall part count as compared to the classical topologies has been an important objective in the recently introduced topologies. In this paper, some of the recently proposed multilevel inverter topologies with reduced power switch count are reviewed and analyzed. The paper will serve as an introduction and an update to these topologies, both in terms of the qualitative and quantitative parameters. Also, it takes into account the challenges which arise when an attempt is made to reduce the device count.

1.INTRODUCTION

Multilevel inverters (MLIs) are finding increased attention in industries as a choice of electronic power conversion for medium voltage and high-power applications. Multilevel inverter improves the output waveform and reduces its respective harmonic content, the size of the filter used and the level of electromagnetic interference (EMI) generated by switching operation. Multilevel inverters offer many benefits for higher power applications. In particular, these include ability to synthesis voltage waveforms with lower harmonic content than two level converters and operation at higher DC voltages using series connected semiconductor switches. The desired output from an inverter is a sinusoidal waveform which is a continuous function of time. However, use of power switches to implement a static inverter results in output waveform composed of discrete values. In other words, the waveform has fast transitions (dv/dt) rather than smooth ones. In order to imitate a sinusoidal waveform, two (or three) level inverters use pulse-width modulation (PWM) operation with high switching frequency, so that the fundamental component of the output is sinusoidal. This also eliminates the lower order harmonics. Apart from the issue of high switching losses due to high switching frequency, another issue that limits the feasibility of conventional two-level inverters for high-power high or medium-voltage applications is unavailability of high voltage/high power semiconductor switching devices.

Multilevel inverters are an attractive alternative to improve the output by synthesizing a staircase waveform imitating a sinusoidal waveform. Such a waveform not only has a low distortion, but it also reduces the dv/dt stress. Multilevel inverter topologies have the advantages of overcoming voltage limit capability of semiconductor switches, high voltage capability and better harmonic profile. Various multilevel inverter (MLI) structures are reported but the cascaded MLI (CMLI) appears to be superior to other inverter topologies in

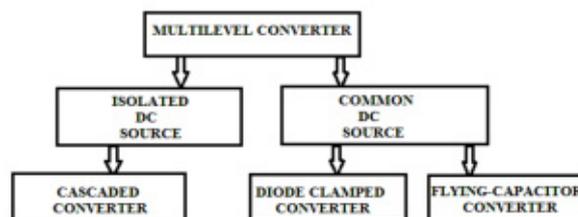


Fig2.1 Different Topology of Multilevel Inverter

application at high power rating due to its modular nature of modulation, control and protection requirements of each full bridge inverter (FBI). CMLI synthesizes a medium voltage output based on a series connection of power cells that use standard low-voltage component configurations. This characteristic allows one to achieve high-quality output voltages and input currents and also outstanding availability due to their intrinsic component redundancy.

Most of the modulation methods developed for MLI is based on multiple-carrier arrangements with pulse width modulation (PWM). The carriers can be arranged with vertical shifts (phase disposition, phase opposition disposition, and alternative phase opposition disposition (APOD) PWM), or with horizontal displacements (phase-shifted carrier ((PSC) PWM). Space-vector modulation (SVM) is also extended for the MLI operation, offers good harmonic performance[1].

A Grid Tied Hybrid System Based on a Closed Loop Solid State Transformer

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Abstract: *Power demand is increasing day by day as the world's population grows. The incorporation of renewable energy sources into the power grid is growing at a faster pace to meet this rising power demand. Wind and solar energy is a most rapidly hybrid emerging technique for utilizing renewable energy source. The step up transformer is essential for integrating the WEC System into the main power grid. In this project we have to use SST instead of step up transformer. Solid state transformer is one of the most promising renewable energy integration technology. The step up transformer is replaced in a Wind energy conversion system . By a solid state transformer based on advanced power electronics, with the advantage of improve the power quality. The SST topology functional schematic discussed here is divided into three functional stages. The first stages consist of a rectifier, which is a low voltage AC to DC converter that regulates the DC bus. The second stage include dual active bridge DC to DC converter, which uses a high frequency transformer to regulate the secondary DC bus.The third stage is to DC to AC inverter that controls the final AC voltage. The solid state transformer will interfaced in the boost converter. The converter operates in buck boost mode which allows wide variation in PV array voltage. The boosted voltage is fed into the inverter circuit for AC output. Finally, the output is routed to the loads. The feedback from the load in the form of voltage and current was fed into the controller and compared to reference signal. After the comparison, it will generate a PWM signal for the gate driver circuit. The gate driver will be in charge of both the DC to DC converter and the inverter for the rated output.*

Keywords: wind energy conversion system with solar panel, solid state transformer, SG3525 PWM generator, microcontroller.

I. INTRODUCTION

The world's population is growing, and power demand is increasing every day. The incorporation of renewable energy sources into the power grid is growing at a faster pace to meet this rising power demand. These renewable energy resources are limitless and they would not pollute the environment, i.e. they are almost emission free.They can be set up anywhere where there are sufficient resources.



Solar Photovoltaic Interfaced Quasi Impedance Source Network Based Static Compensator for Voltage and Frequency Control in the Wind Energy System

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Abstract

In this paper, the purpose of improving the power quality of the standalone wind conversion system (WECS) is to utilize a quasi-impedance (qZ) static compensator (STATCOM) integrated solar photovoltaic (SPV) source network. The standalone WECS has utilized the flywheel energy storage system (FESS) and the self-excited induction generator (SEIG). The SPV power generation network integrates with the STATCOM DC-Link to compensate for the voltage and frequency fluctuations over a longer time. The SEIG terminal voltage and STATCOM DC-link voltage are regulated using an enhanced second-order generalized integrator (ESOGI) with a fuzzy logic controller (FLC). The coordination logic is proposed in order to handle the various scenarios and make the device energy efficient. The unit is built for optimal usage of the electrical energy generated from renewable sources by utilizing physical energy storage systems such as flywheel and battery. In both batteries and flywheels, excess power from the SPV and wind turbines is collected. To verify the performance of the SPV supported STATCOM, the simulation and experimental studies are performed under specific load conditions. This paper describes an optimal way to produce and utilize green power with better energy efficiency. With various current conditions, the typical level of harmonic distortion of the source current is about 1.4% lower than that specified by IEEE Std. 519–2014 for the tolerable 5% level.

Keywords Solar photovoltaic · Renewable energy · Circuit implementation · Inverters · Fuzzy logic controller · Total harmonic distortion

1 Introduction

The availability of conventional energy resources declines rapidly as a result of the growth of manufacturing industries, commercial and domestic customers. Since electricity demand is increasing, there is no supply of fossil fuels such as coal, diesel and natural gas. Restricted supply of fossil fuels and emissions has moved the emphasis to green energy production. As the power generation costs from this emission-free source are comparatively low, wind energy is

the optimal alternative. Small wind turbines have emerged as a realistic choice in stand-alone plants to satisfy the need for electricity. A generator is suitable for such wind turbines needs to be highly reliable, moderate and cost-effective control and excitation systems with low maintenance. The benefits of the gearless operation, high power density, high performance and low maintenance requirements include the direct-drive permanent magnet synchronous generators. But they are much more expensive and rugged than SEIG. Therefore, the significant benefit of supplying the small-scale standalone loads to remote, off-grid locations until now has come from SEIG based WECS. The SEIG requires a self-excitation condenser, whose acceptable range depends on the load requirement and the SEIG's angular speed. The induction generators are however particularly suitable for the autonomous wind turbine [1–3]. The induction generators have a general benefit over regular synchronous generators. The advantages include a brushless durable design, lower costs, less maintenance, simple operation, automatic failure

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IOT BASED TRANSMISSION LINE MULTIPLE FAULT DETECTION AND INDICATION TO EB

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ABSTRACT:

The Electric Power System is divided into many different sections. One of which is the transmission system, where power is transmitted from generating stations and substations via transmission lines into consumers. A smart GSM based fault detection and location system was used to adequately and accurately indicate and locate the fault had occurred. This will ensure a shorter response time for technical crew to rectify these faults and thus help save transformers from damage and disasters. The system automatically detects faults, analyses and classifies these faults and then, calculates the fault distance from the control room using an impedance-based algorithm method. Finally, the fault information is transmitted to the control room. In conclusion, the time required to locate a fault is drastically reduced, as the system automatically and accurately provides accurate fault location information. By using this project, we can detect the faults of three phase transmission lines one can monitor the Temperature, Voltage, Current by means of GSM modem by sending message.

Keywords: Global System for Mobile Communication.

1. INTRODUCTION:

Power system is classified into power generation, transmission and distribution. Transmission network is considered to be one of the vital parts of power system, as it connects the supply and the demand. The loss in transmission and distribution network is considered to be very high, compared to other parts of power system. Currently, the electric power infrastructure is highly vulnerable against many forms of natural and malicious physical events, which can adversely affect the overall performance and stability of the grid. The faults in the transmission network obstruct the supply of power to the consumer. Usually when a fault occurs in the

Design of A Small Wind Turbine for Electric Power Generation (1-5kW)

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Abstract - This dissertation is the documentation of the design and development of a sustainable wind energy conversion system to be employed as a stand-alone electrical energy generator for isolated communities and dwellings. As our global population increases at an exponential rate and our consumerism grows with it, a sustainable source of energy needs to be developed to meet our power requirements. Because of the fast depletion of fossil fuels, there is a current global need for clean and renewable energy sources. Among all the renewable resources wind power is one of the most efficient and environmentally friendly. At present, India is fifth in wind power generation across the world. It is speculated that at most of the places in India wind turbines are not viable due to low wind speed. Hence a wind turbine, which produces energy even at very low wind speed is required. This paper is concerned with the design, implementation and monitoring of such wind turbines for domestic applications. The proposed system is composed of 3 blades using NACA-63215 profile, which is made up of fiber glass materials. A permanent magnet synchronous generator is used for power generation of 250 W. The generated power is rectified and used to charge a lead acid battery of 24 V, 40 Ah. The battery power is then inverted by a pulse width modulation inverter before utilized by the load. The charge controller prevents the battery from overcharging and/or deep discharging. This type of small/micro-wind turbine operates even at low wind speed.

Index Terms - Turbine, Wind Energy Conversion System (WECS), steel tower.

INTRODUCTION

The renewable energies such as Biomass, Geothermal, Hydro, Wind, Solar and Ocean Energy can be converted into more useful energy like electricity.

They deliver power with minimal impact on the environment. These sources are typically more green/cleaner than conventional energies like oil or coal. Among all the renewable energy sources, wind and solar have recently experienced a rapid growth around the world. Ultimately the aim of this project is to make use of a natural resource to supply mankind's energy requirements in a sustainable manner. If a wind turbine can be designed and constructed so that it can produce more power over its lifetime than it takes to be produced and maintained over its useful life, then it is a sustainable answer to our global energy requirements. It is obvious now that we are facing an oncoming global energy shortage. Fossil fuel prices are rising in conjunction with the decrease in their stockpiles and it is vital that alternative methods of energy production be investigated and introduced on a global scale to maintain our standard of life. Wind energy has the potential to meet our requirements and several nations have already begun effectively producing and harvesting this form of green energy.

PROPOSED SYSTEM

This document proposes a design for a small-scale wind turbine that could be used to recharge households, will help residents reduce the health risks associated with rising temperatures, such as heat exhaustion or heat stroke. When designing the turbine, we assumed that it would generate approximately 0.5 W of electrical power. Our estimated output was determined from the capabilities of Motors RF-370CA DC generator, . We also assumed that the turbine will be mounted above the laminar boundary layer during operation, allowing it to take advantage of the maximum windspeed in a particular location. Since



Performance Analysis of Intelligent Control Technique Coupled Magnetic Technique for Power Transfer with Microgrid

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ABSTRACT: Wireless Power Transfer is an innovative technology in which power is transferred without physical contact. As technical knowledge is proceeding, the most of wired technology is also converting into wireless technology through different techniques. Electric Vehicles and plug-in hybrids may be fresh and feasible but it is not enough if it is forgetting to plug in the power source the night before. Electric Vehicles will automatically charge when it will park in the special parking space where the transmitter circuit has already been developed, when an electric vehicle parks on that place, charging will start automatically. A preceding review of a few methods for wireless charging discovered that Inductively Coupled Power Transfer System (ICPT) is an advantageous method for wireless charging of EVs(Electric Vehicles). This paper presents a IPT(Inductively Coupled Power Transfer) system which is appropriate for Vehicle to Grid (V2G) systems. For EV charging A WPT is a stable dynamic and effective system. Wireless power techniques fall into two categories, non-radiative and radiative. This research follows the non-radiative field using magnetic inductive coupling between coils of wire. After the usage of charging the DC Power is inverted and then the excess power is given to the Grid automatically. In this project mutual inductance technique is used between two coils. This paper will also enhance the feasibility, reliability and efficiency of the system.

I.INTRODUCTION

Vehicle-to-Grid innovation offers the best alternative resource for generating the electricity during the peak hours and electricity interrogation. V2G innovation empowers two-way power stream between the network and the powerful, high-limit impetus battery in an electric vehicle. That is, V2G empowers a harmony between power requests and flexibly, which is getting troublesome because of the presentation of discontinuous wellsprings of sustainable power source. The creators have appeared through framework recreations that bi-directional WPT is conceivable with a framework that meets the rising SAE (Journal of Transportation Safety) standard. In view of the outcome, the creators have additionally exhibited a bi-directional remote charging framework for V2G applications. In this work a current SAE good uni-directional framework was adjusted to empower bi-directional WPT with least effect on framework cost, while keeping up full similarity with the necessities of SAE standard. Consequences of framework execution over the full scope of working conditions are accounted for.

II.LITERATURE REVIEW

A. S. Mohamed and O. Mohammed 2018[1]Wireless charging technology presents an ideal fit for autonomous electric vehicles for realizing a fully automated system (vehicle and charger). This paper presents a planning optimization analysis for a pilot project of in-route wireless charging infrastructure serving fixed-route on-demand shared automated electric shuttles (SAESs) at Greenville, South Carolina, USA. A single-objective non-linear mixed integer system planning optimization problem is formulated. A comprehensive cost model representing the overall inductively charged SAESs system is developed, considering road construction, power electronics and materials, traction battery, and installation costs. The optimization problem is solved to determine the best combination of the system key design parameters (number and allocations of wireless chargers, charging power level, track length and on-board battery capacity) that show the most cost-effective solution and allow the SAESs to achieve charge-sustaining operation.

Optimized PSO Technique Based PID Controller for Load Frequency Control of Single Area Power System

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Abstract : In this article Particle swarm optimization (PSO) technique is recommended to single area multi-sources power generating system to overcome the Load frequency control (LFC) crisis. In this research work Proportional - Integral - Derivative (PID) controller is employed as a subsidiary regulator for the power generating system. The proposed power network includes thermal, hydro, gas, and nuclear, photovoltaic (PV) systems with an energy storage device. During unpredictable load change conditions, the system frequency deviates from the standard values, to maintain the quality of the power system the LFC scheme is applied. PSO technique based regulator is developed and demonstrated for the above proposed multi-source power system. The supremacy of the proposed technique is validated by comparing the performance with conventional tuned PID controller performance. The supremacy of the suggested controller performance is demonstrated by analyzing time domain specification parameters. The distinction specifically shows that the PSO – PID controller is best in terms of fast settling of frequency oscillation, limited peak overshoot values, and undershoots.

Keywords: Particle - Swarm - Optimization, Proportional - integral - derivative controller, Load frequency control, Settling time, Frequency deviation.

I. INTRODUCTION

The electrical demand of the modern world is upsurge every day. Balancing demand and power generation is not an easy task. To balance the load demand of power generating system size should be increased, while the size of the system increases automatically the quality issues are raised. Power system operated at particular standard values to maintain the quality during unexpected load varying condition supply deviated from the standard values, to control the frequency oscillation LFC schema is implanted [1,2]. Research peoples are deal with this problem by applying many numbers of optimization techniques and controllers.

Teaching learning-based optimization (TLBO) based PID controller implemented for multi-area power system automatic generation control (AGC) [3], Author [4] implemented Polar fuzzy controller (PFC) for LFC of interconnected nuclear power generating system, a PV thermal interconnected power system examined by Shuffled frog-leaping algorithm (SFLA)tuned PID in [5]. Thermal, gas, and hydro

Performance Estimation of Frequency Regulation for a Micro-Grid Power System Using PSO-PID Controller

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ABSTRACT

This paper proposes the particle swarm optimization (PSO) technique-based proportional integral derivative (PID) controller suggested for frequency regulation of a micro grid (MG) system. MG system integrates with thermal power generating units, renewable energy sources (RES) like photovoltaic (PV), wind energy generators (WTG), and Energy storage systems (ESS) such as fuel cell (FC) and battery energy storage system (BESS). Identifying the supremacy of proposed technique-based controller and supremacy is examined with three objective functions (integral absolute error [IAE], integral time absolute error [ITAE], and integral squared error [ISE]). The results of the system are compared with conventional PID controller results. From the comparison, it is clearly evident that PSO-PID controller gives better performance over conventional methods in terms of various time domain specific parameters such as settling time, peak overshoot, and undershoot. In both methods, ITAE objective function used controller produce more effective response in MG under sudden load demand situation.

KEYWORDS

Frequency Deviation, Fuel Cell, Load Frequency Control, Particle Swarm Optimization Technique, Power System, Proportional Integral Derivative Controller, Settling Time, Wind Energy System

INTRODUCTION

In present word electrical power requirement is increasing day by day, to compensate the demand we requires more power generating units. In conventional power generating unit's area operates with help of non-renewable sources such as coal, diesel, and nuclear etc. Those sources are polluting environment in various aspects, in order to reduce the pollution and also prevent the shortage of

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Simulation Studies of Heat Transfer Enhancement in a Double Pipe Heat Exchanger Fitted with Plain Tape Insert

A. P. Sivasubramaniam, K. Mayilsamy, P. Murugesan

Abstract

Heat exchangers are important devices that are commonly used in various industries such as processes, petroleum refining, chemicals, oil industries, power plants, and paper, etc. The demand for high efficiency heat exchangers has been driven by energy and material saving requirements as well as environmental challenges in the industry. In order to improve the heat exchanger performance, an increase in the heat transfer in heat exchangers is required. In addition, heat transfer improvement makes it possible to greatly reduce the size of the heat exchanger. For a compact heat exchanger, a high heat transfer rate with minimum space requirement is required. The counter flow heat exchanger increases the heat transfer feature of the plain tube with plain tape insert in the inner tube. To predict the Nusselt number, Reynolds number & Thermal enhancement factor based on the numerical calculation with help of ANSYS software.

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Experimental Investigations on Heat Transfer Enhancement in Double Pipe Heat Exchanger Using PT-SCA and PTT-SCA Twisted Insert Profile



A. P. Sivasubramaniam, K. Mayilsamy, and P. Murugesan

1 Introduction

All processing industries that require heat energy use heat exchanging devices. Over the years it was found that there is lot of scope for energy saving and size reduction to make them compact through research works. As these heat exchanging devices involve convective transfer, enlarging the heat transferring surface has become one of the main criteria. This can be noticed from the continuous rise in literature available world-wide on heat transfer enhancing devices, a growing number of patents and also hundreds of companies are marketing thermal products ranging from enhanced tubes to complete set of thermal systems with integrated improved technology. The considerations for the saving of energy, materials, and space in the design along with cost incentives have led to producing heat exchanger equipment with more efficiency.

2 Literature Review

Dittus and Boelter [1] experimented using nano-fluids in heat exchanger and found that it improves the heat transfer rate and also reduces fuel consumption and weight. To further enhance the heat transfer process in the tube a twisted ribbon inclusion

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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



Experimental investigation of control parameters for machining of copper alloys using electrochemical micromachining

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ABSTRACT

This work presents the machinability study of copper alloys using Electro-chemical Micro-Machining (EMM) for conicity and material removal rate (MRR). Applied voltage (AV), duty cycle (DC) and electrolyte concentration (EC) is chosen as the control parameters. Experiments trails were investigated based on L_9 Orthogonal Array (OA). The mathematical equation for conicity and MRR are developed using MINITAB software. Analysis of Variance (ANOVA) is performed for finding the most significant factor. Based on ANOVA, contribution for parameters A, B, and C on MRR are found to be 60.88%, 14.40%, and 13.30% respectively. The significant factor on MRR is AV which is found to be 60.88%. For conicity, contributions of factors A, B, and C were found to be 65.54%, 18.63%, and 03.37% respectively. The significant factor on conicity is AV which is found to be 65.54%.

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1. Introduction

EMM process is the concept of metal dissolution and the machining structure is determined by the electrode dimensions. Advances in manufacturing technology have led to the ongoing demand of micro-scale dimensions such as micro-groove, micro holes, micro-slits, etc. It is one of the methods by which conductive and hard materials achieve the formation of micro-scale features. It stands out with its crack-free, stress-free and good surface finish advantages [1,2]. There is a broad classification of electrolytes into non-passive and passive. Like sodium nitrate, passive electrolytes contain oxidizing anions and form an oxide film [3]. Sodium nitrate (NaNO_3) electrolyte drilling of 0.5 mm on inconel 718 micro hole will improve the surface finish at the optimum 8 V parameter, 30 g/lit concentration, 1 $\mu\text{m}/\text{min}$ feed and 66 percent duty ratio [4]. EMM on SS with acidified NaNO_3 to solubilize products increased the production rate and greatly conquered it. It showed a dissolution rate of 15–17.5 ms at a high pulse time and a higher EC of 20–25 g/lit [5]. A analysis of dissolution behavior shows that increased NaNO_3 pH value results in higher and more homogeneous removal of Ti Alloy content. A steady shielding layer on

the surface of the workpiece is formed when the NaNO_3 electrolyte is used [6]. Effect of reinforcement % for aluminium composites are studied using EMM. The results revealed that, % of reinforcement significantly contribute for higher MRR [7]. The outcome of parameters in EMM for SS304 material with distinct tool tip shapes was investigated and optimization techniques were also carried out using grey relational analysis (GRA) to find the optimal parameters.

The result shows that the maximum result is given by the conical shape with a round electrode, 9 V AV, 0.35 mol/lit EC and 15 ms pulse-on-time [8].

It is clear from the above literature that micro-hole machinability studies on alloys and composites using EMM are sparse. Therefore, an attempt was made in this paper to machine the copper using Taguchi approach with distinct parameters such as AV, DC and EC based on L_9 orthogonal array (OA). In order to find out the effect of various parameters on conicity and MRR, the mathematical model and ANOVA were created.

2. Experimentation

The EMM experimental setup is schematically depicted in Fig. 1. Due to the strong determination of the current density and erosion rate by the immersed depth of the tool and the inter-electrode gap, they must be precisely controlled.

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Design and Analysis of Automatic Fire Exting using Robot

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ABSTRACT: Detecting fire and extinguishing is a hazardous job for a fire extinguisher, it often risks the life of that person. This project aims in giving a technical solution to the mentioned problem. A robot is a mechanical design that is capable of carrying out a complex series of actions automatically, especially one programmable by a computer. the flame sensor detects the fire and gives the further signal to the extinguisher units to trigger the pump and spray the water. The whole system is programmed using an arduino UNO board (ATmega328P microcontroller) which forms the brain of the system.

It is a arrangement of different elements in order to regulate, direct, sense and command itself to achieve a particular and desired result. "Automatic Fire Fighting Robot" project has a electric thermostat technology for controlling the fire 24hrs. This project is cost effective with a explore application which will show the best result. It can be use very much in Industrial, commercial and as well as domestic purposes.

The robot works with sensor for searching the fire and when fire is detected then automatically spray the water over it.

There are two dc motors used for motions. There are three sensors used Temperature for detecting the increase in fire, Smoke(gas) for detection of smoke and IR for detection of obstacle. Dc water pump is used to pump water for extinguishing the fire.

I. INTRODUCTION:

Robot is a machine that looks like a human being and performs various complex tasks. there are many types of robots such as fixed base robot, mobile robot, underwater robot, humanoid robot, space robot and medicine robot etc. In this paper a "FIRE EXTINGUISHING ROBOT" is proposed. This robot is equipped with a single flame sensor used to sense environmental fire and feed the signals to the microcontroller in order to

trigger the pump which sprinkles water in order to extinguish the fire

This robot implements the concepts of environmental firesensing, proportional motor control. The motor driver is used for the bidirectional control of the motors equipped in the robot.

The programming of the robot is done using the arduino C which is derived from C and C++ languages. This paper is presented as follows. Proposed methodology in section II which constitutes of block diagram and components and their explanation. Hardware and software details are included in section III. In Section IV, results and conclusions are included. Arduino/Genuino Uno is a microcontroller board based on the ATmega328P. It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz quartz crystal, a USB connection, a power jack, an ICSP header and a reset button. It contains everything needed to support the microcontroller.

This sensor is able to detect a flameby sensing light wavelength between 760 – 1100 nanometers. The test distance depends on the flame size and sensitivity settings. The detection angle is 60 degrees, so the flame does not have to be right in front of the sensor.

There are two sensor outputs

- i. Digital – sending either zero for nothing detected or one for a positive detection
- ii. Analog – sending values in a range representing the flame probability/size/distance; must be connected to a PWM capable input

Motor drivers are used to describe the direction of movement of the robot. It is used to give high voltage and high current as an output to run the motors which are used in the project for the movement of the robot. Below shown is the circuit of the H Bridge which is used for the motor driving in the IC L293D and also provides the bidirectional motor control. In this project we use simple DC



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Optimization of friction welding parameters on aluminium 7068 alloy

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ABSTRACT

In present scenario, the role of welding techniques was played an essential to any industrial applications. The demands of most economical and high productive weld have been increased. It was satisfied by Friction Welding (FW) technique. It was used to join ferrous and nonferrous metals. In the present work, to discuss about friction welding of aluminium 7068 alloy. The tensile strength was measured with respect to the input factors such as rotational speed, friction and forging pressure. The parametric effect and best possible solutions were done by Response Surface Methodology (RSM). The intercept of factors and its effects have been discussed through three dimensional surface plot analysis and variance test.

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1. Introduction

The Friction welding was used in tubes and shafts. It was mostly used in oil industries, marine and automobile applications. The welding strength was developed in piston rod, truck rollers, valves, drive line and gears. It has more advantages like as high weld speed, no need of filler metals high heat generation and good weld strength. The welding strength was depends on related to frictional heat produced between the work pieces. During welding, coalescence was formed due to the sliding motion between the two rubbing surface.

The friction welding experiment was conducted on two dissimilar materials such as aluminium and steel and its factors were optimized by taguchi technique [1]. The friction welding technique was applied in different type of steels such as austenitic, ferrite and duplex [2]. The axial pressures and its effects on mechanical behaviours were investigated in AISI steels [3]. The friction welding characterization and properties of AISI 1040 have been discussed [4]. The friction of welding aluminium with steel and its characteristics was discussed [5]. The weld interface, plastic deformation and axial force have been studied [6]. The mechanical behavior and temperature circulation was investigated during welding of aluminium sheet [7]. The response surface plots were used to investigate the weld factors of aluminium plates [8]. The maximum ultimate strength was achieved through RSM using dissimilar

aluminum alloys [9–10]. The friction welding and RSM optimization were conducted on Al 6082 alloy. Through friction and forging force, the maximum tensile strength was attained [11]. Mechanical behaviours and its effects on friction weld strength of Al 6063 and stainless steel [12]. The age-hardening and non hardening of AA6082 sheets were joined by friction welding. The microstructure and welded joints behaviours have been reported [13]. The high strength aluminium alloy was welded and its applications were discussed [14]. Non homogeneous microstructure was attained in friction stir weld of 7075 aluminium alloy [15].

The present work describes the friction welding of aluminium 7068 alloy and its factors were optimized through response surface methodology. The 3D surface plots were used to investigate the factors.

2. Experimentation

The heat was generated between the two rubbing surface. The welding was completed by heat and external pressure. The welding joint was finished by thermo mechanical treatment which was applied at two contact area. For this experimental work, FWT-120 model welding machine was used. The specimen was prepared with 20 mm diameter and 80 mm long. Before welding, the two end of the work piece has involved into facing operation. The other process factors were kept at constant such as forging time (4sec), braking time (0.3sec), upset time (0.3sec) and feed (70–75%). The size of the test specimen was 80 × 40 × 3mm.

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Engine Performance and Emission Analysis of DI Diesel Engine Fuelled with Blends of Neem Bio Diesel

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ABSTRACT: Continuous use of petroleum based fuels is now widely recognized as unsustainable because of the depleting supplies and the contribution of these fuels to the accumulation of carbon dioxide and carbon monoxide in the environment. Renewable, carbon neutral, transport fuel is necessary for environmental and economic sustainability. Here we will compare the sole fuel with the blends of biodiesel extracted by two stage trans-esterification process from neem oil to study the performance characteristics and emission of diesel engine. In this study, neem oil is used to extract the bio-diesel. The extracted bio diesel is blended with sole fuel and the blended as various ratio of B25% B50% has been selected. The reason for selecting various blends gives various readings that the engine performance and other operational parameters can be calculated. Metal based nano additives impact on the performance and emission aspects of diesel engine. Iron oxide nano particle has been selected for additive of biodiesel. The investigation was carried out in the single cylinder water cooled diesel engine with the sole fuel blended with neem oil and the engine performance and emissions, and will be analysed. The CO, NOx emission are found to decrease for all the biodiesel blend with decrease in smoke emission when compared to that of diesel fuel.

KEYWORDS: Biodiesel Blends, Nanoparticles, Trans-esterification process, Engine performances.

I. INTRODUCTION

Rapid urbanization, increase in population and extreme living standards induce requirement for alternative energy sources. Shortage in fossil fuel resources and global warming strives the search to develop a renewable, efficiently and more environmentally friendly fuel source [1]. Biodiesel is derived from renewable resources such as vegetable oils and animal fats [2-

3]. The environmental benefits of vegetable oils, as well as the fact that they are made from renewable resources, have made them more appealing. Vegetable oils are a sustainable, possibly infinite source of energy with a similar energetic content to diesel fuel. Biodiesel is conceived to contribute even less to global warming than fossil fuels because the carbon in the oil or fat comes mainly from carbon dioxide in the air. When diesel engines run on biodiesel instead of petroleum-based diesel fuel, they emit less carbon monoxide, unburned hydrocarbons, particulate matter, and air toxics. Vijayakumar Chandrasekaran [4] studied the performance of mahua oil with its blends in a single cylinder diesel engine with diesel at different loads at constant rated speed. From the investigation it is found that 20MEOM is the better fuel blend in comparison with other blends. The obtained result indicates that the brake thermal efficiency was 2.19% improved compared than 20MEOM blend without additive at rated loading condition. The present analysis reveals that the bio-fuel from mahua oil with nano additives is quite suitable as an alternate fuel for diesel engine. Yadav and Singh [5] investigated engine efficiency with preheated jatropha, karanja, and neem oil. They indicated that using these vegetable oils reduced engine power as compared to mineral diesel, which they attribute to the higher viscosity of vegetable oil. Preheated oils have a slightly lower thermal performance (at 800C), but it is equivalent to mineral diesel. Haldar [60] investigated the engine efficiency and emission parameters of three vegetable oils, putranjiva, karanj, and jatropha, after removing impurities with phosphoric acid (degumming). They mixed 10 %, 20 %, 30 %, and 40 % vegetable oils with mineral diesel and tested engine output in a Ricardo variable compression engine, reporting that degumme performed well. The viscosity and cetane

Measurement and Multi-response Optimization of Turning Parameters for Magnesium Alloy Using Hybrid Combination of Taguchi- GRA- PCA Technique

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ABSTRACT:

The requirement for magnesium alloys has been rising constantly over the years because of the thrust towards weight reduction in various fields that demand fuel- efficient automobile, low-priced electronics, hand-held compact devices and biodegradable medical implants. Hence machinability studies of magnesium alloys contribute significantly to use them in appropriate applications. The present work is aimed to investigate the cutting force (F_z), material removal rate (MRR), tool flank wear (V_B) and surface roughness (R_a) in turning of magnesium alloy with physical vapour deposition (PVD) coated carbide insert in dry conditions. The tests were carried out on the basis of the orthogonal array of Taguchi's L_{27} . To identify the optimal parameters setting, a combination of principal component analysis (PCA) and grey relational analysis (GRA) has been conducted. From the analysis of variance, it was revealed that depth of cut is the significant contributing parameter on this multiple performance characteristics process.

Keywords: Cutting force, Magnesium, Optimization, Turning, GRA, PCA.

1. INTRODUCTION:

Magnesium's utilization is rising extensively in a variety of industrialized applications because of the advantage of low density. The aforesaid characteristic makes it appropriate to use wherever the intent is weight reduction. Due to its favourable properties, magnesium finds applications in different fields like medicine, sports, electronics, automobile, household equipment, aerospace etc., [1-2]. Nowadays weight reduction has become a main objective in automobile sector to reduce fuel consumption and decrease green house gas emissions [3-4].



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Experimental investigation of MRR and ROC in aluminium metal matrix composites

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ABSTRACT

Nowadays, microparts are finding applications in many products for increased functionalities. The application of Aluminium Metal matrix Composites (AMCs) expands to various fields such as automobile, aerospace, bio-medical and manufacturing industries. This article introduces the machinability study of aluminium 6061 metal matrix composites (MMCs) reinforced with Ground Granulated Blast Furnace Slag (GGBS) using electrochemical micro-machining (EMM). % of reinforcement, machining voltage (V), concentration of electrolyte (gm/lit) and duty cycle (%) were chosen as parameters and sodium nitrate (NaNO₃) used as an electrolyte for the machining process. Experiments were conducted based on the varying one parameter at a time and effect of process parameters on material removal rate (MRR) and radial overcut (ROC) were studied. The circumference of the machined micro-hole in the AMCs using scanning electron microscope (SEM) image is analysed.

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1. Introduction

Current engineering applications require stronger, lighter weight and low-cost materials. In the field of engineering applications, AMCs are known for providing such tailored property materials needed. In many applications, AMCs are a fast substituted of standard metal alloys as their uses are expanded mainly from the automotive, aerospace, bio-medical and manufacturing industries [1]. In the development of MMCs, aluminium remains the most widely used metallic alloy as a material matrix and the reasons for this have also been revealed. Similarly, literature offers the intrinsic value of using whiskers or discontinuous ceramic particles over ongoing ceramic fibers for the production of AMCs. On the other side, an insufficient supply of ceramic reinforcing products, a developing country in specific, has remained a severe drawback relevant to the case of discontinuously reinforced AMCs [2]. Research attempts put these problems in a position to solve in order to select the appropriate range of materials for reinforcement. Often, this is because the strengthening materials play a

main role in determining an MMC's efficiency. GGBS is used as an Al6061 reinforcing material with a composition of 6%, 9% and 12%. Electrochemical machining (ECM) techniques play a major role in micro-component manufacturing due to their benefits such as greater MRR, no tool wear, excellent surface finish and better accuracy control. This technique is used to remove the unwanted material by electrochemical process and it is limited to electrically conductive materials. The EMM setup is shown in the Fig. 1. EMM is used irrespective of tough-to-cut materials, tool wear and difficult materials etc and is one among the non-traditional non-contact machining process [3–5]. In EMM, the material is forcibly removed through the anodic dissolution of the electrolytic process and very small machining gap should be maintained. Investigation of process parameters in micro-ECM based on the machining of MMC (Al/B₄C). They used Taguchi integrated fuzzy logic to determine the optimum solution at 10 V voltage, 25 Hz frequency, 1.4A current, 0.45 gm / lit concentration of electrolyte solution for greater MRR [6]. Machined a micro-hole by using EMM on stir-cast hybrid AMCs. Experimental results revealed that, increased voltage, current, and pulse-on time increases the output response of MRR, micro spark affected zone [7]. LM6 Al / B₄Cp composites machining based on Taguchi L₂₇ orthogonal array and

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Mathematical modeling and investigation on aluminium bronze MMC using ECM process

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ABSTRACT

The electrochemical based energy processes are used to remove material for intricate contours or cavities. The main features of the electrochemical processes are no mechanical and thermal stresses are produced during operations. The Electro-Chemical Machining (ECM) was used to produce the machining parts with high quality of surface finish. This chapter was used to discuss the machinability behaviours of aluminium bronze through ECM which was produced from stir casting method. The Surface Roughness (SR) was measured with the help of input factors such as voltage, electrolyte flow rate and its pressure. To achieve optimal surface roughness, the effective optimization tool like as taguchi technique was applied. Analysis of variance was applied to determine the most involvement factor on SR based on the highest F value and percentage of role of factors. The electrical voltage has provided the considerable effect on surface roughness.

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1. Introduction

The electro chemical machining was used to machine hard materials such as titanium, inconel, cobalt and carbides. It was used to manufacture the complex shapes such as profiles, contours and turbine blades with better surface finish. It was also extensively used in deburring process. Absolute zero tool wear and no heat generation were the special features of ECM process. It was suitable for mass production. High material removal can be achieved with no thermal stresses were affect the machined surface. It comes under reverse electro plating process. Single operation was enough to make the materials with good quality surface. The surface roughness of the material depends on the composition of alloying elements and ECM process factors. The reinforcement, machining characteristics and processing of Al-MMC were discussed [1]. The surface roughness was measured

in SiC reinforced aluminium composite [2–4]. The machining parameters levels and its effects were studied in Al/SiC-MMC [5–6]. The full factorial design of experiments was conducted on electrochemical machining of stainless steel [7]. The optimization and electrolyte characteristics were studied during ECM of turbine blades [8]. The ECM of titanium and taguchi-grey relational analysis was discussed [9–10]. The ECM drilled holes and radial over cut were investigated [11]. The ECM applications and its features were compared with EDM process [12]. Electrochemical discharge machining was conducted on fiberglass reinforced plastics [13]. Micro electrochemical machining of inconel factors were optimized through taguchi method [14]. The electrolyte flow rate was the powerful factor and it was found through ECM of titanium [15]. The machinability surface was compared before and after process of ECM on Al-MMC [16].

The present investigation deals with machinability behaviors of aluminium bronze MMC using ECM process. After machining of aluminium bronze MMC, the surface roughness was measured. The process factors were studied through taguchi and variance analysis.

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Enhancement of material removal rate in EDM process using silicon carbide based strenx 900 steel

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ABSTRACT

Material removal rate (MRR) plays an important role in metal industries. Its mainly depends on hardness, strength and toughness of the material. Light hardness materials are easily machined by conventional machining processes. High hardness materials are easily machined by unconventional machining processes. Electrical discharge machining (EDM) process is one of the effective methods to machine very hard materials. To achieve high material removal rate in very hard material is difficult and it takes more time. The silicon carbide-based strenx 900 steel is used as work material for this experimental investigation. The material removal rate has enhanced by modification of electrical circuit, powder mixed dielectric fluid and install oxygen arrangement. These additional facilities are used to improve the machinability characteristics and tool life of the EDM process.

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1. Introduction

The strenx 900 is a high-strength structural steel and wear resistant steel which is used to many applications like as building construction, bridge works and railways. It consists of various alloying elements such as silicon, titanium, chromium, vanadium and manganese. These alloying elements are used to improve the material properties of the strenx steel. In recent years electrical discharge machining process is used in many fields such as aerospace, automobile, tool and dies [1]. In EDM process, material is removed through electrical discharge produced in between tool and work piece [2]. To enhance the material removal rate, silicon particles and graphite powders are mixed in to the dielectric fluid [3,4]. The discharge energy and pulse duration mainly depends on variation of electric resistance [5]. The material rate has been increased by the charged powder particles [6]. The various effects on material removal rate has been studied in EDM using Water and Powder-Mixed Dielectric Fluid [7]. Material removal rate was analyzed in EDM process using EN-31 steel [8]. Material removal rate is analyzed with different tool materials in heat treated steel [9]. The dual phase brass material is machined by EDM process and the effect of material removal rate was discussed [10] (Table 1).

In present investigations clearly discuss about an enhancement of material removal rate through additional supply of oxygen, modification of electric circuit and powder mixed dielectric fluid in EDM process using silicon carbide based strenx 900 steel.

2. Experimental methodology

The strenx 900E steel with silicon carbide is fabricated through stir casting method. The silicon carbide particles are used as a reinforcement material (6 wt% of SiC). The above 6 wt% of reinforcement SiC provides non uniform material structure [11]. The material properties are evaluated before and after addition of silicon carbide particles. After that, the material is machined by EDM process. The performance of material removal rate is measured by before and after modification of EDM process. The enhancement of material removal rate is measured in the modification of EDM circuit and provides oxygen supply. FD7125 Model, Berlin Machine Corporation made EDM was used.

3. Result and discussion

3.1. Enhancement of material removal rate

EDM is used for machining advanced materials and widely used in various industries [13]. The strenx 900E was considered as a

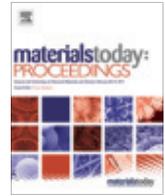
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Parametric optimization of chrome composite through ultrasonic machining using taguchi approach

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ABSTRACT

The combination of nickel and chromium has provides better substance properties. In addition to that, the Silicon Carbide (SiC) particulates (weight percentage of 1.50) were mixed to the base alloys to enhance the further substance properties. The tensile strength and density of the composite was increased. The chemical composition was validated through Energy Dispersive Spectroscopy (EDS) test. The chrome composite was drilled by ultrasonic vibrations. The voltage, slurry concentration and abrasive grit size was chosen for control factors. The Material Removal Rate (MRR) was determined through the combinations of control factors. Taguchi approach was used to optimize the ultrasonic machining factors. The factors effects have been discussed through variance test and Pareto chart.

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1. Overview

The chrome alloy has high strength, density, corrosion and oxidation resistance. It has widely used in automobiles, aerospace and temperature measurement devices. The effective MRR was obtained during rotary ultrasonic machining of nickel alloy [1]. Taguchi based orthogonal array was used to optimize the USM factors for machining of tungsten carbide based cobalt MMC [2]. The diameter 1 mm ultrasonic drilling holes were produced on ceramic coated nickel alloy [3]. The ultrasonic machining and pretty wear experimentation was conducted on duplex brass [4]. The metal removal mechanism and working principles of USM were studied [5]. The metal removal has been decreased when increase the depth of cut on ultrasonic machining of alumina and quartz [6]. The process factors, applications, machined surface morphology and metal removal of different materials were discussed [7]. The ultrasonic technology was applied on aluminum foam and its economic aspect of machining was also discussed [8,9]. The ultrasonic turning experiments were conducted on silicon carbide based Al-MMC its results were compared with conventional method [10,11]. The cutting force, velocity and vibrations were analyzed

on ultrasonic turning of SiC – Al MMC [12]. The optimal parameter of USM was found through nontraditional genetic algorithms [13]. The touchy approach and variance test was used to found interaction of parameters on Al-MMC [14]. The Taguchi optimization was carried out on drilling of magnesium and SiC based carbon nanotubes [15]. Taguchi parametric optimization of electrochemical micromachining for MMC was investigated through Signal to Noise ratio [16–18].

The present concept was used to explain the Taguchi parametric optimization and Ultrasonic machining of chrome composite. In this work, the various chapters such as material synthesis through hot chamber pressure die casting, material composition through EDS report, Taguchi optimization of ultrasonic drilling input factors and parametric effects were discussed.

2. Material fabrication method

The hot chamber based pressure die casting was used to fabricate the chrome composite. It has heating section and mold section. The raw materials of nickel and chromium alloys were kept in furnace at 1400 °C. The manual stirrer has been applied to the molten metal. The preheated silicon carbide particulates were added to the molten metal and applied stirrer. The molten metal was transferred to the mold cavity through injection unit. The

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Hardness performance analysis of chromel composite using end and lateral quenching method

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ABSTRACT

The achievement of materials hardness was difficult in heat treatment through quenching methods. At the same time, the quenching medium was not covered the entire surface of the work piece. In present topic was discussed about the development of water quenching method for chromel composite. For these experimental investigations, the different levels of control factors were considered such as water velocity, the rotational speed of the work piece, and Standoff Distance (SOD). The response such as hardness was evaluated according to the variation of control or input factors. The effects of quenching factors were reported through the Taguchi technique and variance analysis. The maximum hardness of 545BHN was achieved through the developed quenching apparatus. The water velocity (74.22%) was the influential factor on hardness. It was validated through variance analysis.

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1. Introduction

The applications of hardened materials have been increased gradually in all fields especially construction and manufacturing sectors. The effect of quenching and improved substance properties were analyzed [1]. The particulates of composites were strengthened through the quenching method [2]. The cooling rate and its effects have been discussed in aluminium composite [3]. The material structure depended on its temperature which was provided during the casting process [4]. The stir casted material was quenched by the developed model [5]. The Taguchi optimization was performed based on L_9 orthogonal array and its effect of factor has been confirmed through variance test [6–25]. The sintered aluminium composites were kept under solution treatment with different temperature and its microstructure was studied [26]. Al 6063 was treated under age-hardened and its effects of silicon carbide particles have been discussed [27]. The Jominy end quench method was executed on aluminum alloys and its Vickers hardness was determined [28]. In Jominy end quench process, the

cooling rate was directly proportional to the distance from the quenching end [29]. Micro structural and characteristics of Al-Zn-Mg-Cu alloy were investigated under different aging circumstances [30]. The rapid cooling and its effects have been analyzed in aluminium and silicon alloys [31].

The present investigation deals with the modified water quenching apparatus for the heat treatment of the material. For experimental purposes, chromel composite was considered and its hardness was measured after the end and lateral quenching process.

2. Experimental method

The experimental arrangement with the developed model was shown in Fig. 1. The chromel composite was converted to the required shape and a size of 25 mm diameter and 100 mm length. The heat-treated work piece was held rigidly on the chuck and it was rotated. The water quenching was applied at the end and lateral surface of the work piece. Therefore, uniform cooling was provided on all surfaces of the work piece. The control valves were used to regulate the flow of water. After the quenching process, the water was returned to the collecting tank. Hence, it was one

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Investigation on Electrochemical Micromachining (EMM) of AA-MMC Using Acidified Sodium Nitrate Electrolyte



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Abstract Machining of aluminum alloy (AA) -based composites is essential for the manufacturing sector due to its high strength, stability, and less weight. Accordingly, the outcome of metal matrix composites (MMC) needs to be understood for further processing in other application. Hence, in this paper an attempt made to study the process parameter of electrochemical micromachining (EMM) such as machining voltage (Mv), electrolyte concentration (Ec), duty cycle (Dc) on material removal rate (MRR), and overcut (OC) using acidified and non-acidified electrolyte. The AA-MMC (AA 6063, reinforced with 12% Sic and 5% Gr) is fabricated using stir casting method by weight fraction and considered as work material. Along with that the experiments are conducted in two electrolytes for enhancement of EMM performance, which are NaNO_3 (aqueous non-acidified sodium nitrate) and $\text{NaNO}_3 + 10 \text{ ml of H}_2\text{SO}_4$ (aqueous acidified sodium nitrate). Therefore, 3.41 times better MRR is obtained in the aqueous acidified sodium nitrate electrolyte when compared to the aqueous non-acidified sodium nitrate electrolyte at the machining condition of 90% Dc, 30 g/l Ec and 15 V Mv. Additionally, scanning electron microscope (SEM) images are taken for the understanding of micro-hole surfaces and its intermolecular structure.

Keywords Electrochemical · Acidified · AA6063 · MMC · Electrolyte · H_2SO_4

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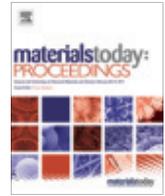
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Analysis of process parameters of electrochemical micromachining by using response surface methodology

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ABSTRACT

This research paper presents the machinability of ground-granulated blast furnace slag (GGBS) which is reinforced with aluminum 6061 metal matrix composites using electrochemical micromachining (EMM). EMM process is the most prominently utilized machining process in various fields of micro fabrications in aerospace technology, automobile and other industrial applications. In this research a central composite design was adopted while designing the experiments. Temperature of the electrode, voltage, electrolyte concentration and percentage composition of reinforcement (6%, 9% and 12% GGBS) are chosen as the input machining parameters. Radial overcut (ROC) and material removal rate (MRR) are considered as response parameters. Additionally, multi criterion decision making namely grey relational analysis (GRA) is utilized to find out the optimal input parameters. From GRA, the optimal parameters are 40°C, 12 V, 25 g/l and 9% of GGBS composition.

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1. Introduction

Nowadays the aluminum metal matrix composite (AMC) are gaining more requirement in automobiles, aerospace, and defense industries. The AMC is the rapid replacement of conventional materials because of cheap cost, stronger in strength and lighter in weight [1]. The aluminum is the foremost utilized alloy as a material matrix in MMCs [2]. The most of the researchers are concentrated on turning, facing and drilling experiments in MMCs, the machining of MMCs through advanced machining process is limited in particular micro fabrication. EMM is one among the advanced machining process utilized for difficult to cut materials like MMC. EMM plays a considerable role in the production of micro components because of their good surface finish, no tool wear, better precision control and higher MRR [3–6]. A research on μ -ECM method which is used for making a hole in MMC. They determined the optimum combination of 0.45 g/l concentration of electrolyte, 1.4A current, 25 Hz frequency, 10 V voltage for improving MRR via Taguchi technique [7]. The impact of process parameters like feed rate, electrolyte concentration, % of reinforcement,

and voltage on ROC was investigated and reported the significance of parameters [8]. Investigated on the impact of reinforcement in AMCs through EMM process. In addition, MCDM technique is utilized to find out the optimal parameters [9]. The study of effect of different process parameters in EMM for SS304 material and optimization technique is carried out for optimal parameters by using grey relation analysis (GRA) [10].

The investigation of heated tool in EMM process by considering temperature as one among the input parameters. Thus the result revealed that, performance of EMM process improved significantly [11].

From the above studies, only a few researchers are studied machining of AMCs through EMM. In this study, the aluminum 6061 is reinforced with GGBS and it is fabricated by stir casting process. The composite of 6%, 9% and 12% is made in the three different % of GGBS with Al6061 by its weight. The composite is about to machining with different input process parameters like temperature, electrolyte concentration, % of composition and voltage based on R30 trial by response surface methodology (RSM).

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Enhancement of Energy Efficiency Using Environmentally Benign Refrigerant Blends in Vapour Compression Refrigeration System



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Abstract This study involves theoretical investigations made on a simple vapour compression system working with R152a/R1270/R600 refrigerant mixture. The properties of the mixtures along with that of R22 were obtained from REFPROP 7.0 software for the operating temperature ranging from 0 to 60 °C. CYCLE_D software has also been used for finding the proposed refrigerant mixture's performance. Test results from theoretical study presented that the coefficient of performance of the HFCs and HC refrigerant mixtures being 2.1% higher than that of R22. Compressor power of the mixtures was 1.8% less than that of R22 at 7 °C evaporator temperature and 53 °C condenser temperature. Mixture of the refrigerants showed higher mass flow rate than that of R22, and also its deviation was 36% from R22. Compressor shell outlet temperature of the refrigerant mixtures was 9.6% lower than R22 at 7 °C evaporator temperature and 53 °C condenser temperature. In this study, the selected ternary refrigerant mixture was found to provide better energy efficiency, and hence, it can be used as a suitable replacement for HCFC 22 in residential air conditioners.

Keywords Refrigerant · Environment · Ozone depletion · Condenser · Evaporator · R22

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

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SASTRA Deemed University: Shanmugha Arts Science Technology and Research Academy

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Investigation on laser square hole drilling of AA7475/SiC/ZrSiO₄ 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 ZrSiO₄ are selected for investigation. Laser machining experiments were performed on SiC and ZrSiO₄ 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. B₄C, SiC and Al₂O₃ 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. ZrSiO₄ 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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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 (Al₂O₃) are most generally used reinforcements. Al alloy-SiC reinforcement gets increases the toughness, thickness, ductile strength then wears resistance. Al₂O₃ 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 wearing 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 (Al₂O₃) are most generally used reinforcements. Al alloy-SiC reinforcement gets increases the toughness, thickness, ductile strength then wear resistance. Al₂O₃ 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 wearing 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,

CORIOLIS ACCELERATION BASED HEAD GESTURE CONTROL SYSTEM FOR A SMART WHEELCHAIR

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Abstract - Smart wheelchair is a robotic system having the ability to navigate based on the Head gesture recognition technique. This smart system is controlled by various sensors and artificial intelligence techniques. The wheelchair can move forward, backward, left and right according to the directions from the ADXL 335 sensor which is controlled by the Arduino UNO. Tracking and monitoring the patients condition is made easier by making use of GPS and heartbeat sensors.

Key Words: Arduino, Smart wheelchair, ADXL 335, artificial intelligence, gps, heart beat sensor.

1. INTRODUCTION

The emerging technologies and developments have a great influence in our day to day life. In our project we are trying to make use of these advancement for human requirements. The main objective of our project is to develop a Smart wheelchair which can be easily accessible by the paralytic patients. These people's become more isolated and has to depend on other's for their needs. Their social freedom is reduced. Robotics plays an important role in this developing world. A Smart wheelchair is a guidance system for them. In this system a head motion module is introduced to control the directions of the wheelchair. Effective tracking and monitoring also done which is totally controlled by the microcontroller. The components used are Arduino UNO, ADXL 335, Motor driver, HCSR-04, GPS and GSM modules, Heartbeat sensor, DC motors.

2. METHODOLOGY

Arduino is an open source platform and we can do so many projects with the use of it. In this system, we use it as a central processing unit of the robotic system. The ADXL 335 senses the movement of our head which is fitted in the cap of the patient. Arduino receives the input signals which is trapped by the accelerometer sensor and it is analysed by the microcontroller to take the decisions. Based on these signals the wheelchair movement is controlled. The HCSR-04 is employed to detect the obstacles to avoid unnecessary damage and collisions of wheelchair. While in an emergency situation the smart wheelchair is equipped with a global

positioning system through which we can locate the coordinates of the patient and provide immediate assistance.

3. WORKING

Arduino UNO has 6 analog input pins (A0-A5) and 14 digital I/O pins of which 6 provide PWM output. The operating voltage is 5V and having a flash memory of 32 kb. We use it as a central processing unit of our intelligent robotic system. All the requirements are already pre-programmed in the microcontroller using the software Arduino IDE. The ADXL 335 ie, the accelerometer sensor is connected to the analog port of the UNO. We use it to transmit the signals. The signals are given as input from the accelerometer sensor to the microcontroller which inturns controls the wheelchair movement. If patient tilt his head in right or left direction, the chair will move in right or left direction. In the same way if the person tilts his head up or down, the chair will move in forward and backward directions.

The movement of the wheelchair is made possible using the dc motors. The dc motors are connected with the motor driver (L293D) which enables the driving of two dc motors at a time. The inputs are recieved from the Arduino UNO and thus the motor driver take the motion possible.

OPERATING STAGES

The working of the smart wheelchair comprising of two stages.

1. Wheelchair locomotion
2. Tracking and monitoring

1. WHEELCHAIR LOCOMOTION

In this operating stage the accelerator sensor takes the overall control of this smart wheelchair. According to the tilt movement of our head the directions are received and analysed by the microcontroller to take the control. Thus the following data's will be sent to the Arduino UNO.

Human and Machine Interface for Controlling Smart Wheelchair

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Abstract - The purpose of this project is to serve these people by automating the process of moving in direction using Different methods. First kind of interface is push button switches in which displays arrow keys so that the user can move in direction of his/her choice. Similarly, wheelchair can be controlled using Hand Gesture, as well as android phone and joystick. Smart Wheelchair is mechanically controlled devices designed to have self-mobility with the help of the user command.

Key Words: Arduino, Android, Bluetooth, Push Button, Joystick, Hand Gesture

1. INTRODUCTION

Smart Wheelchair is automatically controlled devices designed to own self mobility with the assistance of the user command. This reduces the user's human effort and force to drive the wheels for chair moreover it conjointly provides a chance for visually or physically impaired persons to maneuver from one place to a different. These devices area unit helpful particularly in transportation from one place to a different. The machines may also be employed in maturity homes wherever the maturity persons have problem in their movements. The devices function a boon for people who have lost their mobility.

2. LITERATURE SURVEY

K. Shiva Prasad¹, Prince Kumar², E.V.N.Paradesi, Smart chair is automatically controlled devices designed to possess self-mobility with the assistance of the user command. This reduces the user's human effort and force to drive the wheels for chair. The chair is additionally given obstacle detection system that reduces the possibility of collision whereas on the journey. sensible chair has gained heaps of interests within the recent times. These devices are helpful particularly in transportation from one place to a different. The machines can even be utilized in adulthood homes wherever the adulthood persons have problem in their movements. The devices function a boon for those that have lost their quality. differing types of sensible chair are developed within the past however the new generations of wheelchairs are being developed and used that options the utilization of computer science and therefore leaves a bit to tinker close to the user UN agency uses the wheelchair. The project additionally aims to create the same chair which might have a kind of intelligence and therefore helps the user on his/her movement.

Jesse Leaman, and Hung M. La, Senior Member, IEEE, A smart chair (SW) may be a power chair (PW) to that

computers, sensors, and helpful technology square measure connected. within the past decade, there has been very little effort to supply a scientific review of sou'-west analysis. This paper aims to supply a whole progressive summary of sou'-west analysis trends. we tend to expect that the knowledge gathered during this study can enhance awareness of the standing of latest PW moreover as sou'-west technology and increase the practical quality of individuals WHO use PWs. we tend to consistently gift the international sou'-west try, beginning with Associate in Nursinging introduction to power wheelchairs and therefore the communities they serve. Then we tend to discuss well the sou'-west and associated technological innovations with a stress on the foremost researched areas, generating the foremost interest for future analysis and development. we tend to conclude with our vision for the long run of sou'-west analysis and the way to best serve individuals with every type of disabilities.

3. METHODOLOGY

Arduino is Associate in Nursinging open supply platform and that we will do several comes with the utilization of it. In this, Arduino receives the input from the user and analyze it whether or not the input matches the command aren't. to manage via Bluetooth command is given to the Arduino by Associate in Nursinging humanoid app(Blue Term), Push button is that the another methodology moving four ways in which of direction, Hand gesture(accelerometer) is another methodology for moving completely different directions, still as joystick is employed for moving directions

4. WORKING

Arduino UNO has fourteen digital I/O pins of that six provides PWM outputs and six analogue pins. it's non-volatile storage of 8KB and SRAM of 1KB. we have a tendency to use it for a wheelchair management. It controls the system of wheelchair and also the Arduino is controlled by the user's completely different commands. The Bluetooth module is connected with the Arduino UNO. we have a tendency to use it to transmit and receive the signals from the user. The RX pin of the Bluetooth is connected with the American state pin of the Arduino and also the American state pin of the Bluetooth is connected with the RX pin of the Arduino. The RX pin of Arduino receives the data from the user and also the American state pin of Arduino transmits the data from Arduino to the user. The input voltage pin of the Bluetooth is connected to the 5V pin of the Arduino UNO. and also, the GND pin of the Bluetooth is connected with the GND pin of the Arduino. And in similar method button switch, joystick, measuring system square measure connected to the Arduino

ARDUINO-ANDROID ROBOT FOR AGED PEOPLE

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Abstract - Arduino-Android Robot is a voice controlled robot has the ability to understand the voice and give response to the command given to the robot. The robot is controlled by an android application via Bluetooth signal. In this application we can save our commands and it will respond to our commands. The robot can able to move forward, backward, left and right according to the commands given to the motor driver L293D (H-Bridge) from Arduino UNO. When we put it in line following mode it will works as a line follower by our command.

Key Words: Arduino, Android, Bluetooth, Robot, Voice control.

1.INTRODUCTION

Robotics plays an important role in this developing world. This is also a robot, which can lift things from place to place within the house and also outside the house. It is much more suitable for people who aged above 50. Those people cannot easily lift the vessels, cooker and utensils used for cooking purpose from kitchen to dining hall. They can use it to lift and transport those things from kitchen to dining hall and grocery shop to house. we can control it by manually and also by line following method. The components used are arduino module, IR sensor, motor drivers, motors, Bluetooth module.

2.METHODOLOGY

Arduino is an open source platform and we can do many projects with the use of it. In this, we use it as a brain of the robot. Arduino receives the input from the user and analyze it whether the input matches the command are not. The voice command is given to the robot by an android app using speech recognition extension in MIT app inverter. Speech recognition (voice recognition) is a technique which converts our voice into text. Humans are mostly made their communication through their voice. So only, we used voice recognition in this robot. It will make us easy to control the robot. The line following technique will work with the help of IR sensor.

3.WORKING

Arduino UNO has 14 digital I/O pins of which 6 provides PWM outputs and 6 analog pins. It has flash memory of 8KB and SRAM of 1KB. We used it as a robotic brain. It controls the overall system of robot and the arduino is controlled by the user's voice command. The Bluetooth module is connected with the arduino UNO. We use it to transmit and receive the signals from the user. The RX pin of the Bluetooth is connected with the TX pin of the arduino and the TX pin of the Bluetooth is connected with the RX pin of the arduino. The RX pin of arduino receives the information from the user and the TX pin of arduino transmits the information from arduino to the user. The input voltage pin of the Bluetooth is connected to the 5V pin of the arduino UNO. And the GND pin of the Bluetooth is connected with the GND pin of the arduino.

The motors of the robot is connected with the motor driver L293D (H-Bridge). The arduino provide the input signals to the motor drivers. There are four motors used for the movement of the robot. The tyres are attached with the motors for the movement.

MODES OF CONTROL

The robot is controlled by an android application. There are two modes of control

1. Manual Mode
2. Line Follower Mode

We can control the robot by the above modes.

MANUAL MODE

In manual mode, we can control the robot using voice commands. There are five commands. There are five signals behind this five commands. The commands and signals are as follow.

COMMANDS	SIGNALS
Front	F
Back	B

UNMANNED FEVER DETECTING TEMPERATURE SENSING AND DATA RECEIVING

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Abstract - The main problem faced by everyone in this world is security for our life on earth, due to this covid19 pandemic we have to make sure that everyone is not affected by corona virus while entering in to the office premises. Therefore we have to ensure the safety of all the workers while entering into the office by checking their body temperature if the person is affected by corona or not, providing sanitizers to keep them clean, detecting the face masks to avoid direct contact and also allows only the staffs in to the office by verifying their Id cards. All these process were done with the help of IOT system in four stages namely Fever Detection, PLX-DAQ, Hand Sanitizing, Mask Detection and Tag based Entry. These five systems help to keep the workers safe and secured from the covid19 pandemic. This project is very helpful in controlling the corona cases. Our system helps to protect the persons from getting affected from covid19, novel corona virus. As the corona virus spreads each and every day from our neighbors till our colleagues. This season became a corona season and thus made lots of lives to get away from the earth, also this not only created an imbalance in the population also it created an impact in an economical imbalance in the society. This created a drastically imbalance in the economy and the cost of living has been increased due to this lots of life became a huge question mark of how to lead the life now. Therefore we came up with the solution of proving the safety of each person in the workplace and ensure them to continue working by following all the safety protocols. The safety protocols were meant to the four stage of safety that is the project we made. The fever detection system is the primary check which ensures the person is not affected from corona virus, and the PLX-DAQ can get the fever detection value in excel sheet, and the hand sanitizer is the secondary check to ensure there is no virus in their hands, and the mask detector is the tertiary check to ensure the person who enters the work place with the mask and the final check is only permitted persons are allowed to enter. These solutions provided by us help each and every person to lead a happy life without the fear of corona virus.

Key Words: Detector, Bluetooth, Hand Sanitizer, Mask Detector, Tag Entry, COVID19

1. INTRODUCTION

The whole world is now in a dangerous situation, there is no security for life due to covid19. Therefore ensuring the

safety is a primary thing for everyone who comes out for their survival in their life in this covid19 situation. The need of a solution is on high demand to get rid of this disaster, as there were many self solutions to overcome this situation like wearing masks, using sanitizers frequently, etc helps us to keep us safe in this situation but, we can't ensure the safety of lives here as we can't confirm that all of them are following the safety measures or not. As people come out of their homes to work as the economy got drafted away in these days. Therefore, we are in need of an unmanned monitoring system to solve this problem. As no man needed to monitor the person's the IOT system provides a better way to monitor each and every person. The function of normal body is disturbed by the action of such virus which breaks into cells within their host and exploits them to replicate itself.

2. METHODOLOGY

Now a day's temperature sensing is mostly using in all the places but using on man power so we can use automatic detecting.

3. WORKING

We have proposed our solution to overcome this covid19 situation using the IOT system which will ensure the safety of people. We ensured the safety of each and every person who came out of their homes for their survival on the basis of four stages they are,

- Fever Detection
- PLX-DAQ
- Hand Sanitizing
- Mask Detection
- Tag based Entry

These five stages of entry help to the people to have a smooth life outside the premises, without any danger from the dangerous corona virus. The stage by stage safety is

GESTURE CONTROLLED ROBOT HAND USING GYROSCOPIC SENSOR

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Abstract - Gesture controlled robot hand is a wireless robot hand that works based on the gesture given by the operator to pick and place an object from one place to another by using the gesture of our hand. The gesture of the hand is read by using gyroscopic sensor. With the help of Bluetooth module, Arduino UNO and servomotor the hand is being operated to pick and place the object.

Key Words: Gesture, Gyroscopic Sensor, Bluetooth module, Arduino UNO.

1. INTRODUCTION

Robotics makes work easier for men to do the job easily and also helps in developing the world. Gesture controlled robot hand uses hand gesture recognition to develop human and computer interaction so that the person need not required to depend on the traditional method to work at every field and need not want to depend on others to do the job. The five finger hand combined with its wrist and forearm has fourteen degree of freedom to do the job. With the help of the robotic hand it not only makes the job easier but also helps to produce objects with greater accuracy. It also helps in carrying the object comfortably like using our own hands.

2. METHODOLOGY

Nowadays many projects using automations use Arduino board since it's an open source platform. Here we use Arduino board for receiving the signals from sensor and sends it to the servomotor and controls it as per the gesture given by the sensor. Here the Arduino board is given with a set of commands on how the motor needs to be controlled for the given gesture. If the gesture shown to the sensor matches the command it controls the motor according to the command given to the respective gesture. This will be helpful for workers using a joystick for lifting and moving things instead they can use their gesture to control the movement easily.

3. BLOCK DIAGRAM

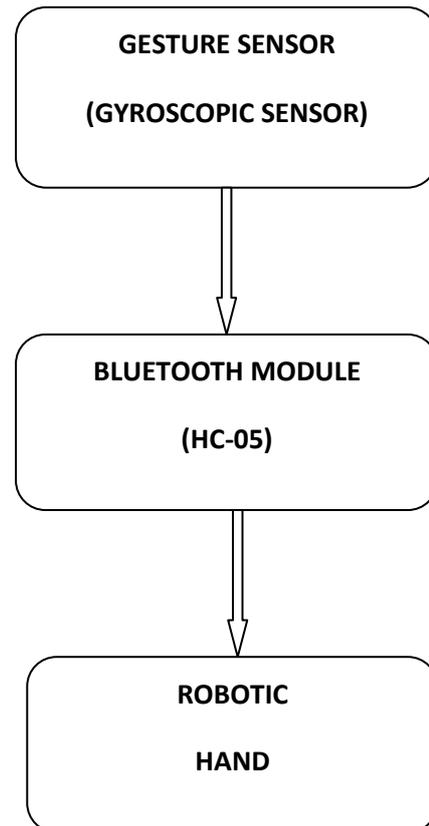


Fig-1 Block diagram

The block diagram shows as follows,

- The command is being sent by the user to the hand through the sensor.
- The command is received by the Bluetooth module (HC-05) which is connected to the Arduino module.
- The Arduino module acts according to the command received and controls the robotic hand.

4. WORKING

In this project we have used gyroscopic sensor to sense the movement of the hand. It can be attached to the hand or we can use the Smartphone having inbuilt gyroscopic sensor. On the other hand the robotic hand consists of five fingers each of them connected to the individual servomotor. Five fingers

MULTI CONTROLLED IOT BASED QUAD-ROBOT

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Abstract - Multicontrolled IOT based quad robot system is a four leg walking robot system which can used to identify the pressure,temperature and unwanted gas in mining.Especially used for army based activity like spy and location sharing the robot can able to move forward, backward,left and right according to comments given to the servo motor from aurdino ESP 32 when we put in the following mode it will works as a line follower by our command

Key Words: Bluetooth, Remote control, Wifi, IOT..

1.INTRODUCTION

Robotics place an important role in this devloping world. These is a four leg walking robot, used to messure pressure,temperature gas in the mining.Why it is used mining means,there are lot unwanted gas present in the mining and its cause to occur accident.Sometimes death also so we made it to find aurdiono ESP 32,servo motor,sensor are the main equipments used in our project

2. METHODOLOGY

Aurdino is an open source platform and we can do many project with the use of it .We use it as brain of the robot.Aurdino ESP 32 is programmed for our project like the iot based quad robot need means ESP 32 is specially programmed for it.When the power supply given to the ESP 32,it will send signals are command to the servo motor based on the input used given through mobile or remote control.Output is taken by the mobile or servo motor which are specially made to receiver output from the quad robot.

3. WORKING

The working of quad robot system is simple .By sing components we made our kit.The ESP 32is programmed and connected to components which are used,battery is the power source.

Thing speak website is the website which is used to help iot based project for the freshers.

The output of the robot is show or appers in the think speak website.But the draw backs are only pc or laptop is used to get output and server is not relaiable for all the time.

3.1THINK SPEAK

- *For iot operation
- *Store data on cloud
- *Access from any ware

*To way communication

3.2 WHY ESP32

- * In built
 - *Wifi
 - *Bluetooth
 - * Hall effect sensor
 - *Touch sensor
- *520kb SRAM
 - *More digital pins
 - *Ultra low power working

MODES OF CONTROL

The robot is controlled by Four method.

1. Bluetooth
2. Wifi
3. Iot
4. Remote control

LINE FOLLOWING MODE

In line following mode the robot will acts as a line follower.By using ir sensor the robot walk above on the line to destination to get information .But we don't know any possibility about it bt we made it as a proto type.

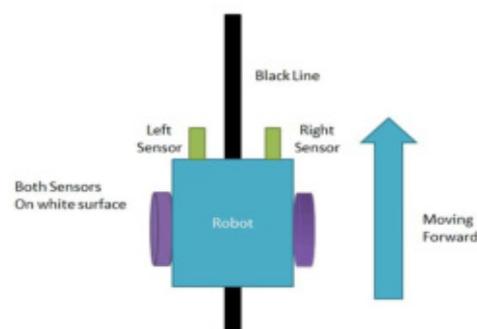


Fig-1.Line follower of quad robot

SENSOR BASED AUTOMATIC AND BLUETOOTH CONTROLLED FORKLIFT

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Abstract -The mechanical field is improving day by day Lots of innovative ideas are entering into the field .This report is indeed to endow with a comprehensive study of the technical and theoretical aspects of "FORKLIFT" all the topics covered in this report are essential for the complete understanding and survey of title of "FORKLIFT". In the project we have modified the product called "FORKLIFT MACHINE". THE report engrosses different chapter and each is design in the organized style .covering basic introduction, specification, application, and it is uses in the various industries

Key Words: forklift, Bluetooth, line follower,

1. INTRODUCTION

IN the general the forklift can be defined as a tool capable of lifting hundreds of kilograms. A forklift is a vehicle similar to a small truck that has two metal forks on the front used to lift cargo. THE forklift operates drives the forklift forward until the forks push under the cargo, and lift the cargo several feet in the air by operating the forks. The forks also known as blades or tines are usually made out of steel and can lift up to a few tons. FORKLIFTS are either powered by gasoline, propane, or electricity. Electric forklifts relay on batteries to operate. Gasoline or propane forklift are sometimes stronger or faster than electric forklifts. But they are more difficult to maintain and fuel can be costly. FORKLIFT have revolutionized warehouse work. They made it possible it for one person to move thousand of pounds at once. the mechanical structure of its prototype module is constructed with square metals pipe , this structure looks like rectangle box and the vertical moving mechanism that contains metal fork is assembled over the structure at front side the entire vehicle is designed to drive through four wheels . And four motors are used to drive all the four wheels directly. All these four motors are driven through a single "H" bridge dc motor drive package. All the four wheels are directly coupled to the motor shafts independently .the dc motors are having reduction gear mechanism internally, here by speed is reduced and torque is increased

2. METHODOLOGY:

FORKLIFT are generally used for moving object or heavy goods, and good supplies from one place to another place quickly and with less effort. The forklift are small but compact machine designed to work in tight and narrow areas. In this we have used sensors based forklifts .and it as line following methodology. Now we can control the forklift by using our phones .the line following technique will work

with the help of IR sensor. In this we can control the forklift by using Bluetooth method easily in our cellphones. Nowadays humans are using Bluetooth for essential purpose.it will make the forklift to control easily.

3. WORKING:

FORKLIFT trucks are vehicles designed to move and stack, or heavy or bulky goods. They are mainly used in warehouses, stockyards and other storage areas. forklift trucks are highly mobile with a very small turning circle which allows them to move easily in confined spaces .on front of the trucks two forks operated by b hydraulics .the driver must fit these forks into the pallets on which goods are stored . the operated then uses the hydraulic forks to lift the pallets takes it to where stes it down. Some goods ,such as bricks , and moved by forklift lift without the need for pallets they are stacked in bales with forks. The operates must work carefully as these good not protected by pallets. Some truck are fitted with small computer display panels that direct the operates where to place goods in the warehouse.

Operates may also to keep records and follow instruction written on a worksheet on a worksheet. They are also resoponsibler for the basics maintenance of the truck. yhis includes greasing or oiling parts and changing or recharging the battery. Forklift truck operates may hane to work in noisy and dusty environment. Working outdoors in all weathers conditions may also be necessary.

All lift trucks operates must be trained prior to operating a lift truck. Training is provided by the cocern manufacturer and consists of both formal instruction and practical traning .traning is both vechile and workplace into serverice .the traning is one time requirment unless the operates is involved in a lift truck accident or observed operating the truck in unsafefemanner.

3. MODES OF CONTROL:

THE forklift is controlled by an a sensorand Bluetooth in (mobile applications).there are two modes .

1.bluetoothmode

2.line follower mode.

Automatic Floor Cleaning and Disinfectant Sprayer Vehicle

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Abstract - We all know that, we are recovering from Covid-19 pandemic situation.. So there is no possible of manual cleaning and sanitizing of surrounding areas. So we have a new idea of an project for cleaning and sanitizing of floors. The purpose of this project is to clean floors in hospitals, houses, malls and hotspot areas where group of peoples will organized. The aim of this project is to design and develop automatic process for cleaning the floor having untidy surfaces and also this process uses the sprayer to kill the germs and micro organisms. Here we use the control systems (arduino) to control the spraying and movement of vehicle. This working model will have a great scope in future technologies. It consists of arduino UNO as a microprocessor. Hence the maintenance is very less and effective. The cost of this project is very less. The major advantages are cost effective, no person need of operating and it is portable. This vehicle will have zero pollution because it is an e-vehicle. This vehicle uses the electric energy from the battery. The vehicle is designed as fully automatic or can be switched as bluetooth controlled vehicle. Hence it works on narrow places that are difficult to clean.

Key Words: Arduino, Bluetooth controller, Battery, micro-controller, vehicle.

1. INTRODUCTION

Generally the disinfectants refers to liquid or chemical the are able to kill or destroy microorganisms on any surfaces. Disinfectant necessarily kill all microorganisms. It is also effective to sterilization, The word 'sterilization' means an chemical process that destroy all types of micro-organisms, regular household cleaning and disinfection products will effectively eliminate the micro-organisms from household surfaces. For cleaning and disinfecting households with suspected or confirmed COVID19, disinfectants are used.

Here the sprayer vehicle is used to disinfectant the floor and other dirty surfaces into a sterile one. The spraying liquid consist of 0.05% (NaClO) sodium hypochlorite and products based on ethanol (at least 70%), should be used as disinfectants. The above ratio of disinfectant liquid is effective on micro-organisms. Here the vehicle is fully automated and no man power is needed to operate this vehicle. These chemical disinfectants are effective but have no harmful to human skins and animal.

2. METHODOLOGY

Arduino is an open source platform and we can do many projects with the use of it. In this, we use it as a brain of the vehicle. Arduino receives the input from the user and analyze it whether the input matches the command are not. The Bluetooth or automatic program is given to the vehicle by an programming. Arduino is a technique which converts our program are mostly made their communication through their signal. So only, we buetooth in this vehicle. It will make us easy to control the vehicle.

3. WORKING

Arduino UNO has 14 digital I/O pins of which 6 provides PWM outputs and 6 analog pins. It has flash memory of 8KB and SRAM of 1KB. We used it as a vehicleic brain. It controls the overall system of vehicle and the arduino is controlled by the user's voice command.

We use it to transmit and receive the signals from the user. The RX pin of the Bluetooth is connected with the TX pin of the arduino and the TX pin of the Bluetooth is connected with the RX pin of the arduino. The RX pin of arduino receives the information from the user and the TX pin of arduino transmits the information from arduino to the user.

The input voltage pin of the Bluetooth is connected to the 5V pin of the arduino UNO. And the GND pin of the Bluetooth is connected with the GND pin of the arduino.

The motors of the vehicle is connected with the motor driver L293D (H-Bridge). The arduino provide the input signals to the motor drivers. There are four motors used for the movement of the vehicle. The wheels are attached with the motors for the movement.

MODES OF CONTROL

The vehicle is controlled by an android application. There are two modes of control :

1. Automatic Mode
2. Bluetooth controlled Mode

We can control the vehicle by the above modes.

AUTOMATIC RAILWAY GATE CONTROL AND ANIMAL DETECTION SYSTEM

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Abstract – The automation of railway crossing gates are used to avoid the accident near to it. At present, railway crossing gates are operated only in manually. Involvement of humans and manpower will be reduced. Traffic jam will be totally avoided by this method, the arrival and departure will be calculated by the device. Then any disturbance through the railway track will be intimate. The gates are lifting and shutting by the motor by the intimation of sensors. The detection is occur, the total process is done by under the control of arduino.

Key Words: Arduino, IR sensor, relay, WIFI module, UV sensor, Piezo buzzer.

INTRODUCTION

Railways are one of the most common used modes of transport in India. Error free railway in India is very rare in the human negligence and miscommunication which causes many accidents and delay in train. The railway gates are opened and closed are required human effort and there is so many mistakes and accidents occurred. To avoid these situations, we may use system work of arduino and sensors. Some of the main challenge for railway department is to avoid accidents near to the railway gate. Now a days, the gate operations are manpower by the signal intimation. Sometimes it to be gone wrong, to avoid this category, we use arduino and sensor programming control gates instead of human work. There is many times of security given then the normal human method.

IMPLEMENTATION

There is implement of arduino microcontroller, IR {tx,rx}, node MCU, relay driver, motor, 16*2 lcd display, UV sensor, WIFI module, motor, piezo buzzer and finally power supply. The IR sensors are connected to the transistors respectively.

WORKING

The transformer is fixed to receive the power supply and send it to the distributor which distributes power to other devices. Arduino is operate the other devices which are sensors, motor and buzzer by the programming code of arduino. When the train crossing first IR sensor, the LCD shows the train is near

and gate is closing. Then the train passes away, the second IR sensor senses and now the LCD shows the train is exit and the gate is opening. These all process are intimate by the signals or lights. In-case of any animals are in the truck it should be detect by the UV sensor fixed on the exact manner. It detects any obstacles the buzzer will be blow.

The opening and closing of gates can seen by any places with the internet. The working process of motor railway gate should be recorded and filed. The WIFI module is used to transmit the result of gates by some arduino programming.

SENSORS

The sensors are used to senses the train and obstacles like animals in the track.

1. Infrared sensor [IR]
2. Ultraviolet sensor [UV]

They can control by the arduino microcontroller.

IR SENSOR

Infrared radiation (IR) is electromagnetic radiation with a wavelength 0.7 and 300 micrometers , which equates to a frequency range between approximately 1 and 430 THZ.

Its wavelength is longer and the frequency lower than that of visible light, but the wavelength is shorter and the frequency higher than that of terahertz radiation microwaves .Bright sunlight provides an about 1 kilowatt per square meter at sea level. This IR sensors are used to identify the objects which may disturb or crossing, it can intimate through respective manner. There is need of two sensors which one is used to opening and another one is used to closing the gates. These two sensors are fixed in the two sides of the gates respectively to the opening and closing of the gates.

AMCOPTER

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Abstract – This project is aimed at developing a prototype of drone to hand to the ambulance in saving human life. The issues of traffic are very paramount in any accident; therefore, we intend to develop a system that would be able to fly to the emergency spot earlier for medical emergency response, supply delivers and take into account multiple real time health parameters of patient such as temperature heart rate and heartbeat. The values of this essential parameter are then transmitted to the ambulance. The ZIGBEE technology is used to transmit the real time data from the emergency spot to the ambulance. When is en-route to the destination this helps to the doctor to evaluate the situation better. For the ambulance drone a new type of frame was developed that is a compact tool box containing essential supplies for advanced life support. In shoot with the ambulance drone we want dramatically increase the accident survival rate.

Key Words: Drone 1, Medi-kit 2, GPS Tracking 3, Instructing Camera 4, Auto piloting 5 etc

1.INTRODUCTION

In today world, there is a lot of traffic on roads which leads to congestion in the whole city. So, in the time of emergency crisis situation an ambulance which travels via road may not able to reach destination in time and the patient might loss his or her life. That would take the objective of "saving human life" on step closer. A drone or a Hexa-copter take aerial route and is not driven by human. using a greater number of motors and propellers in produce motor thrust. Hexa-copter which consists of six motors and propellers attached to it optimal design and provide the necessary thrust.

1.1 Introduction of Drone

A drone or a Hexa-copter takes aerial route and isn't driven by human. Employing a bigger variety of motors and propellers can turn out a lot of thrust. The hexacopter that consists of 4 BLDC motors and propellers connected thereto makes it the optimum style and provides the mandatory thrust. Four 2200mAh batteries offer power offer to the drone. The drone includes of a med-box that is capable of reaching emergency things quicker than the automobile and may live patient real time health parameters. the assorted detectors during this paradigm includes of heartbeat sensor, temperature detector, and graphical record detector. Associate in nursing graphical record detector with disposable electrodes is connected on to the chest to observe each heartbeat. The electrodes convert heartbeat to

electrical signal and therefore graphical record Sensors ready to measure continuous heart beat and offers knowledge of rate.

1.2 UAV and the Grid

Traffic in its 'peak hours' on a mean doesn't exceed 30-40 km/h ninety two of the days. In existing systems, a drone carries solely the electronic device to the emergency spot. Thus, it takes under consideration solely one parameter. This paper aims at developing a system that might be able to fly to the emergency spot previous car and take under consideration multiple real time health parameters of the patient like temperature, rate and heartbeat.

1.3 Autopiloting

UAV autopilot system allows an unmanned aerial vehicle, such as a drone, to perform entire missions autonomously without the need for manual remote control. These missions may include cargo delivery, mapping, surveillance and many other applications. Operators use ground control stations to set the parameters of the mission and the UAV autopilot directs the drone or other unmanned craft to complete the task.

2. METHODOLOGY

The prototype proposed in this paper is in a drone ambulance which is equipped with a med-box, Electro Cardio Gram sensor and heart beat sensor which reaches the emergency spot earlier than the ambulance and not only measures the real time health parameters but the also transmit them to the ambulance. The doctor presents in the ambulance can analyses the real time health parameters, such as the condition of heart provided by the Electro Cardio Gram sensor data. This enables them to prepare for the pre medication to the people.

2.1 Med- kit Releasing Mechanism

The mechanism is hooked up to the drone and carries medical aids safely whereas decreasing the quantity of take-off and landing by deploying the kits from air to land (using parachute method).The drone are going to be equipped with the mechanism that's ready to carry the medical aid kits (30 things with soap. weight of 500grams).The main plan of the navigation management of a capability to an automatic craft platform, which can permit a completely autonoments level flight from an ingenious purpose to a destination, passing by a given variety of waypoints. The UAV initial gets its current

SEWAGE MONITORING AND CONTROLLING USING IOT

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Abstract - At present time, disasters are basic in sewage because of the unpredictability of its regular habitat. Such regular debacles bring tremendous loss of ownership and life. To overcome these issues a safety helmet is proposed having a control framework worked inside the cap. The safety helmet for sewage workers is a venture attempted to expand the rate of security among excavators. The thought is acquired subsequent to realizing that the expanding number of lethal mishaps in sewage throughout the years. Controller is utilized for controlling every one of the operations. Our framework comprises a wellbeing safety system and control room which is connected through IOT beneficiary. Wellbeing our system sense the different encompassing conditions around worker and report it to the control room so that prompt measures can be taken to guarantee the security of the workers. Here we monitor the co₂, methane, hydrogen sulphide using at mega 328p with help of IOT module to communicate the above parameter wirelessly and also here we add automatic buffering system which help to dilute the harm full gas at instantly.

Key Words: IOT 1, Co₂ 2, Methane 3, Controller 4, WSN 5 etc.

1. INTRODUCTION

Drainage is the system or process by which water, sewage or other liquids are drained from a place. In order to maintain the proper function of drainage, it should be monitored regularly. It is also difficult to monitor all the area of drainage because of physical limitation of human being. The irregular monitoring results in clogging the drainage that forms the silt which triggers flooding in the neighborhood. Sensor node consists of controller, memory, transceiver and battery to supply the power to the sensor node. Size of the sensor node depends on its application. In military application is microscopic small, its cost depends upon its processing speed, memory and battery. The node collects information from the surrounding areas and this sensed data is exchanged with a base station.

1.1 Proposed System

In an urban area, drainage has an important role in avoiding the danger of floods. Many researchers have investigated the drainage system which is related to drainage design as found in the study, while research about management of drainage has not been much discussed. In these studies, emphasize was on control simulation of the sewerage system for monitoring sensors and instrumentation drainage conditions. While research related to the implementation of a wireless sensor

network in the management of the drainage system has not been done. The proposed work focuses on to design wireless sensor network based underground drainage monitoring system.

2. WORKING PRINCIPLE

A reliable method of measurement for gas quantity is found in a gas sensor based on taguchi principle. This gas sensor is essentially heated element inside a porous semi conductive tube. The tube has a large surface and is able to freely absorb gas modules on the semiconductor surface. Electron transfer occurs between the gas molecules and the already absorbed oxygen molecules. This causes a relatively large increase in conductivity for a small change in gas concentration. This change occurs quite quickly.

Standard work condition

Parameter name	Technical condition	Remarks
Circuit voltage	5V±0.1	AC OR DC
Heating voltage	5V±0.1	ACOR DC
Load resistance	can adjust	
Heater resistance	33 Ω ± 5%	Room Tem
Heating consumption	less than 800mw	

Environment condition

Parameter name	Technical condition	Remarks
Using Tem	-20°C -50°C	
Storage Tem	-20°C -70°C	
Related humidity	less than 95%Rh	
Oxygen concentration	21%(standard condition)Oxygen concentration can affect sensitivity	minimum value is over 2%

Sensitivity characteristic

Parameter name	Technical parameter	Remarks
Sensing Resistance	3K Ω -30K Ω (1000ppm iso-butane)	Detecting concentration scope: 200ppm-5000ppm LPG and propane 300ppm-5000ppm butane
Concentration Slope rate	≤0.6	5000ppm-20000ppm methane 300ppm-5000ppm H ₂ 100ppm-2000ppm Alcohol
Temp: 20°C ± 2°C Vc: 5V±0.1 Humidity: 65%±5% Vh: 5V±0.1		
Over 24 hour		

Table -1: Specification table

The main reason to use WSN for continuous monitoring of environment where human cannot reach to records the readings. WSN systems have a higher level of efficiency than wire line network system in terms of cost, flexibility and reliability. This paper will discuss the design of drainage systems to monitor conditions by using wireless sensor network. Some node sensors are deployed in the drainage manhole and will transmit the data about the condition of drainage to the cloud (base station) and municipal mobile. The parameters will be monitored through water levels in drainage, humidity and temperature of drainage manhole. It



Research article

Brain Computer Interface for the disabled people based on EEG signal for Human Interaction

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Abstract: Epilepsy is an incessant neurological disorder. The Epilepsy seizures are generated due to the aggravation in transient signals in Cerebrum. These seizures can be detected by analyzing the Electroencephalogram (EEG) Signals. The Akima Spline Interpolation based Ensemble Empirical Mode Kalman Filter Decomposition (ASI-EEMKFD) model proposed in the paper focuses on detecting seizures automatically through a stable algorithm written in Python by using PyEEG package. The signal detection process is done in three phases. First, the EEG signals are acquired through data sets. Then the signal is decomposed using Akima Spline interpolation for finding the intrinsic mode function. Further the signal is decomposed by implementing the steps involved in the Ensemble Empirical Mode Decomposition (EEMD). During the decomposition Kalman filter is used in order to remove the white Gaussian noise. Finally, the decomposed signals are applied to the Long Term Short Term Memory (LTST) deep learning classifier which classifies the ictal, pre-ictal and healthy signal. Our proposed method produces the result higher compared with the existing EEMD Methods with the accuracy rate of 98.2%, sensitivity of 94.96% and specificity of 93.72%

Keywords: Electroencephalogram, Kalman Filter, Akima Spline Interpolation, Ensemble Empirical Mode Decomposition, Long Term Short Term memory

1. Introduction

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⁻¹ and 3 h, respectively. Langmuir isotherm model fitted better compared to the Freundlich model having a maximum adsorption capacity of 11.76 mg g⁻¹, 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 ΔS , ΔH and ΔG 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



A Study on Financial Performance Analysis of Alamelu Steel Industries at Salem

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ABSTRACT

The financial health of a company is determined by not only the values shown on the financial performance but also the relationship among these values. Financial performance and ratio analysis these relationships are known as financial ratios. Good steel industries financial management includes monitoring the critical financial ratios and comparing them to other companies in the industry. We look at ratios that are commonly used to measure the performance of the company, regardless of its industrial segment. Where necessary these ratios are adapted to the unique characteristics found in the steel industry. As suggested earlier, various users approach financial performance analysis with many different objectives. Creditors are interested in whether a company will be able to repay its debts on time. Both creditors and stockholders are concerned with how the company is financed, whether through Debt, equity, or earnings.

Stockholders and potential investors analyse past earnings performance and dividend policy for clues to the future value of their investments. In addition to using internally generated data to analysed operations, company managers find much information prepared for external purposes useful for examining past operations and planning future policies. The study covers a period of 5 years from 2015 -2020. The secondary data were extracted from the published annual reports of the study units for a period of five years. The data have been analysed with the help of different accounting and statistical techniques such as ratio analysis. This financial analysis involves studying various relationships between different items reported in a set of financial performance. This research evaluates to a firms financial performance in order to point out the strengths and weaknesses of the firm, and the areas that need improvement. The researcher has suggested suitable measures to improve the efficiency of the financial analysis of the Sri Alamelu Steel Limited at Salem.

INTRODUCTION

Financial analysis involves using financial data to assess a company's performance and make recommendations about how it can improve going forward. Financial Analysts primarily carry out their work in Excel, using a spread sheet to analyse historical data and make projections of how they think the company will perform in the future. This guide will cover the most common types of financial analysis performed by professionals. Learn more in CFI's Financial Analysis Fundamentals Course.

Financial performance analysis is the process of identifying the financial strengths and weaknesses of the firm by properly establishing the relationship between the items of balance sheet and profit and loss account. It also helps in short-term and long term forecasting and growth can be identified with the help of financial performance analysis.

The dictionary meaning of „analysis“ is to resolve or separate a thing in to its element or components parts for tracing their relation to the things as whole and to each other. The analysis of financial performance is a process of evaluating the relationship between the component parts of financial performance to obtain a better understanding of the firm's position and performance. This analysis can be undertaken by management of the firm or by parties outside the namely, owners, creditors, investors.

Meaning

Financial performances provide an overview of a business or person's financial condition in both short and long term

A Study on employees Retention Strategies in RRR Home Fashions at Karur

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ABSTRACT

The research titled on “A Study on employee retention strategies with special reference to “RRR Home Fashions, Karur”. Employee retention is the systematic effort to retain the current employees by providing best policies and to recognize various expectations of the employees. The challenge is not only to attract the talented employees and to retain them. The objective of the study is to analyses the organizational factors influencing the employee retention and to find individual factors leading employees to leave the organization and to examine the necessary conditions to retain the employees.

The study has done through descriptive research method and the collection of primary data has done through single cluster sampling method under probability sampling method. The research design followed in this study is descriptive research. Questionnaire is used to collect primary data and conceptual review is used for secondary data collection through books, websites. The data isto be analyses with percentage analysis, chi square & one sample run test and interpretation will be followed. From the study, the findings shows that the respondents are not satisfied with compensation benefits & working environment, the employees feel that their work load is high. The company can implement better working environment to the employees; they can provide proper job rotation to motivatethem.

INTRODUCTION

Employee retention involves taking measures to encourage employees to remain in the organization for the maximum period of the time. It is a process in which the employees are encouraged to remain with the organization for the maximum period of time or until the completion of the project. Employee retention is beneficial for the organization as well as the employees. Effective employee retention is a systematic effort by employers to create and foster an environment that encourages current employees to remain employed, by having policies and practices in place that address their diverse needs. Retention of key employees is critical to the long term health and success of any organization. It is a known fact that retaining the best employees ensures customer satisfaction, increased product sales, satisfied colleagues and reporting staff, effective succession planning, and deeply embedded organizational issues such as training time and investment, lost knowledge, insures employees, and a costly candidate search are involved. Hence, failing to retain key employees is a costly proposition for an organization. Various estimates suggest that losing a middle manager in most organizations costs up to five times his salary. Corporate is facing lot of problems in employee retention these days. Hiring knowledgeable people for the job is essential for an employer, but retention is even more important than hiring.

Employee retention is a new era of modern technology and competitive business environment. Organizations are continually changing. This changing environment is not only effecting the organization but also the employees working in it. In order to maximize organizational efficiency and for optimal utilization of the resources management plays a vital role in this regard. They are responsible that how employees are treated in the organization. Employee’s retention is a vital issue and challenge to the entire organization now days. There are numbers of factors which promote the employees to stay or leave the organization. It may be external factors, internal factors and the combined effect of both. Human resources practices counts a lot in this regard.

Importance Of The Study

Employee’s retention refers to the techniques employed by the management to help the employees stay with the organization for a longer period of time. Employee retention strategies go a long way in motivating the employees so that they stick to the organization for the maximum time and contribute effectively. Sincere efforts must be taken to ensure growth and learning for the employees in their current assignments and for them to enjoy their work. ensure growth and learning for the employees in their current assignments and for them to enjoy their work.



A Study on Impact of Training on Workers In Pupa Chemical Industries, Karur

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ABSTRACT

Employees are major assets of any organization. The active role they play towards a company's success cannot be underestimated. As a result, equipping these unique assets through effective training becomes imperative in order to maximize the job performance. Also position them to take on the challenges of the today's competitive business climate. Although extensive research has been conducted in the area of Human Research Management, the same cannot be said on employee training especially as it concerns developing countries. The primary data are collected from the respondents by using a well structured questionnaire through the survey method. The secondary data are collected from the company profile, magazine, journal, publication and websites. This research provides a reasonable suggestion and conclusion as the company

INTRODUCTION

Training of personnel consists in providing them with the necessary facilities and opportunities to acquire knowledge develop skill and cultivate attitude and behavior for the efficient and effective discharge of their duties and responsibilities. Administrative skills can be grouped into technical skills, human skills and conceptual skills. Training should enable people to perform their present effectively and at the same time prepare them to shoulder higher responsibilities in future. The ultimate objective of training for personal is the improvement in the effectiveness of achievement of organizational objective.

Each and every position in an organisation calls for a certain amount of expertise in terms of knowledge, skill and attitudes. The person occupying the position may not have all the elements. Of expertise required for effectively performing new technology or procedure or law. The need for training arises in account of the requirement of filling the gap between the skill and competences required for the performance of a job and the expertise actually possessed by the job holder. This gap can be filled either by institutional training or on-the-job training.

The common method is to amount a course on the basis of the experimental wisdom. Hence, a training course conducted kin a training institution is generally looked upon as some kind of an isolated event. This is one of the reasons why it has not been possible to derive the maximum benefit from a training course. Institutional training is regarded as a break from the monotony of the job. No wonder "sabbatical" was one of the objectives of some of the course.

It is time that training is looked upon as a system. A system may be defined as a group of inter-related and inter-development parts or processes operating in a sequence, according to a predetermined plan in order to achieve a goal or series of goals

STATEMENT OF THE PROBLEM

The study concluded that training and development have important impact on employee performance and productivity. Therefore, it was recommended the effective training programs and carefully set development plans should be provided to all employees to enable them to enhance their skills and upgrade their knowledge.

OBJECTIVES OF THE STUDY

- The broad objective of the study of training policies in PUPA is to study the impact of training on the overall skill development of workers. The specific objectives of the study are:
- To assess the effectiveness of training in overall developing the skills of workforce.

A Study on Employee Retention to Wards MGP Agroand Medicare Products Pvt Ltd At, Salem

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ABSTRACT

A Good Relationship is necessary for the smooth running of any business. The term 'Industrial Relations' means the relationship between employers and employees, A good communication between an employer and its employees is imperative for building a positive work place culture. In order to improve the work performance, an employee must receive feedback, both positive and critical. Gratitude and Appreciation is very important. Discipline that benefits the company and the employees, Employers will treat their employees with respect and vice versa if they all want to succeed and achieve goals. Spending a time with the employees, listening to employees is important.

The negative effects of employer –employee relation, an employer who fails to understand issues concerning his employees might not achieve long-term success in his SM Hi-Tech rice mill. Some business fears in giving their employees to much buying in power. The negative effects show up in three ways in particular. Size of the sampling is collecting from 120 employees moreover it's suggested that the positive level by chi square analysis. It's find out good relationship between employees and employers well accumulate to improve them.

INTRODUCTION OF THE STUDY

Employee retention involves taking measures to encourage employees to remain in the organisation for the maximum period of the time. It is a process in which the employees are encouraged to remain with the organisation for the maximum period of time or until the completion of the project. Employee retention is beneficial for the organisation as well as the employees. Effective employee retention is a systematic effort by employers to create and foster an environment that encourages current employees to remain employed, by having policies and practices in place that address their diverse needs.

Retention of key employees is critical to the long term health and success of any organisation. It is a known fact that retaining the best employees ensures customer satisfaction, increased product sales, satisfied colleagues and reporting staff, effective succession planning, and deeply embedded organisational issues such as training time and investment, lost knowledge, insures employees, and a costly candidate search are involved. Hence, failing to retain key employees is a costly proposition for an organisation. Various estimates suggest that losing a middle manager in most organisations costs up to five times his salary. Corporate is facing lot of problems in employee retention these days. Hiring knowledgeable people for the job is essential for an employer, but retention is even more important than hiring.

Employee's retention is a vital issue and challenges to all the organisations now days. There are numbers of factors which promote the employees to stay or leave the organisation. It may be external factors, internal factors and the combined effect of both. Human resources practice counts a lot in this regard. It is the need of the hour that HR managers should identify the needs of the employees and then devises the retention strategies. One strategy does not fit to all as different individual have different priorities. HR professionals face the vital challenges to retain talented employees.

A Study on employees Retention Strategies in RRR Home Fashions at Karur

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ABSTRACT

The research titled on “A Study on employee retention strategies with special reference to “RRR Home Fashions, Karur”. Employee retention is the systematic effort to retain the current employees by providing best policies and to recognize various expectations of the employees. The challenge is not only to attract the talented employees and to retain them. The objective of the study is to analyses the organizational factors influencing the employee retention and to find individual factors leading employees to leave the organization and to examine the necessary conditions to retain the employees.

The study has done through descriptive research method and the collection of primary data has done through single cluster sampling method under probability sampling method. The research design followed in this study is descriptive research. Questionnaire is used to collect primary data and conceptual review is used for secondary data collection through books, websites. The data isto be analyses with percentage analysis, chi square & one sample run test and interpretation will be followed. From the study, the findings shows that the respondents are not satisfied with compensation benefits & working environment, the employees feel that their work load is high. The company can implement better working environment to the employees; they can provide proper job rotation to motivatethem.

INTRODUCTION

Employee retention involves taking measures to encourage employees to remain in the organization for the maximum period of the time. It is a process in which the employees are encouraged to remain with the organization for the maximum period of time or until the completion of the project. Employee retention is beneficial for the organization as well as the employees. Effective employee retention is a systematic effort by employers to create and foster an environment that encourages current employees to remain employed, by having policies and practices in place that address their diverse needs. Retention of key employees is critical to the long term health and success of any organization. It is a known fact that retaining the best employees ensures customer satisfaction, increased product sales, satisfied colleagues and reporting staff, effective succession planning, and deeply embedded organizational issues such as training time and investment, lost knowledge, insures employees, and a costly candidate search are involved. Hence, failing to retain key employees is a costly proposition for an organization. Various estimates suggest that losing a middle manager in most organizations costs up to five times his salary. Corporate is facing lot of problems in employee retention these days. Hiring knowledgeable people for the job is essential for an employer, but retention is even more important than hiring.

Employee retention is a new era of modern technology and competitive business environment. Organizations are continually changing. This changing environment is not only effecting the organization but also the employees working in it. In order to maximize organizational efficiency and for optimal utilization of the resources management plays a vital role in this regard. They are responsible that how employees are treated in the organization. Employee’s retention is a vital issue and challenge to the entire organization now days. There are numbers of factors which promote the employees to stay or leave the organization. It may be external factors, internal factors and the combined effect of both. Human resources practices counts a lot in this regard.

Importance Of The Study

Employee’s retention refers to the techniques employed by the management to help the employees stay with the organization for a longer period of time. Employee retention strategies go a long way in motivating the employees so that they stick to the organization for the maximum time and contribute effectively. Sincere efforts must be taken to ensure growth and learning for the employees in their current assignments and for them to enjoy their work.



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Enactment Assessment of Content Based Image Retrieval for Brain Images

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Abstract

Content based image retrieval (CBIR) innovation gives huge image assortments the executives, yet in addition helps clinical consideration, biomedical exploration, and training. Computerized images are developing in Magnetic Resonance Imaging (MRI), Computerized Tomography which are utilized for detecting and arranging treatment plans. Subsequently, visual data the board is trying as the information amount accessible is immense. As of now, accessible clinical database usage is constrained image retrieval issues. Archived computerized clinical images recuperation is continually testing and explored further as images are vital in quiet finding, treatment, clinical reference, and clinical preparing. In this paper, a image coordinating plan utilizing Gabor filter for feature extraction is introduced. The effectiveness of various calculations for grouping the features to recover clinical images was examined.

Keywords: Content based Image Retrieval (CBIR), SVM_SMO, Gabor filter, Classification via Regression

I. INTRODUCTION

The Content-based image retrieval (CBIR) is a profoundly confused PC pictorial research region. Accessibility of consistently expanding visual and sight and sound information and web improvement features the requirement for the making of topical access frameworks contribution more than straightforward content based questions/demands dependent on coordinating careful database fields. Numerous projects/devices were created to plan/execute visual or sound substance inquiries and help peruse mixed media storehouses. In any case, no advancement was accomplished in regards to enormous fluctuated databases with various records having shifted qualities. Answers to questions with respect to speed, semantic descriptors or target image translations despite everything stay unanswered.

Database images separate features after programmed pre-preparing; creating feature points in content based image retrieval (CBIR) frameworks. Feature points are put away in include databases and images arranged. The question clinical image is additionally comparatively pre-prepared for features taking out. In view of such comparability, explicit database images are recovered. Image retrieval assumes a major job in dealing with visual data in clinical applications. [1]. Image retrieval framework relies upon a multifaceted element points

through utilization of separated image data, figuring likeness quantifies and right database image distinguishing proof with least separation measurements as respects the question image.

Insignificant features are utilized for Image Retrieval [2, 3], as all models join insignificant features to characterize a separation metric evaluating similitudes among image models. A deficiency of this approach is insignificant image features not continually catching a image also human recognition. To state, semantic image content is extreme for include extraction with insignificant image includes alone, this being known as the semantic hole issue [4]. Clinical Image Retrieval frameworks are not quite the same as standard image retrieval frameworks from multiple points of view. For one, the retrieval happens as to obsessive situations that are nearby wherein retrieval dependent on worldwide marks would be silly when utilized for clinical databases. Changing over images from spatial to frequency domain is as of now utilized image retrieval system accessible [5, 6].

Image retrieval assumes a fundamental job in dealing with much visual data in clinical applications [1]. Image retrieval framework execution relies upon the multifaceted component vector shaped through utilization of data extricated from images, registering of the comparability measures and exact database image distinguishing proof with most reduced separation measurements as respects inquiry images. Changes strategies are utilized in image preparing the same number of coefficients are overlooked to decrease feature vector size.

Images, particularly advanced images, are delivered in huge sums in the clinical arena for analysis and treatment.. Cardiology at present creates the second most elevated maker of advanced images uniquely recordings of heart Atrial fibrillation. Images have numerous utilizations in human services and medical science exploration, yet in spite of boundless practice, minor is thought about how clients look for and additionally oversee them. Dual examinations uncover that image use is typically associated with the client's "job," like doctors, teacher, and analyst. It is critical to comprehend client desires and furthermore give frameworks to address those issues since image assortments/search interfaces multiply on the web and shut systems.

Documented computerized clinical images retrieval is being investigated further as images are critical in clinical conclusion. In this paper, a image coordinating plan utilizing Gabor filter for pertinent component extraction is introduced. The effectiveness of various calculations for grouping the

features to recover clinical images is examined. This research is composed as follows: Segment two audits a portion of the connected works accessible in the writing. Segment three depicts incorporates extraction and the classifier method, Segment four clarifies the analysis and outcomes got. Segment five finishes up the research paper.

II. RELATED WORKS

Song X, Liu F [7] 2D Gabor image filters have certain ideal joint determination properties in the spatial space and in the spatial frequency. Gabor filter can depict the image surface features from various rules and directions, along these lines the progressions of image factual attributes brought about by steganography implanting can be caught all the more viably.

G Quellec et al [8] proposed a content based retrieval strategy for finding in clinical fields. In this, images are recorded in a conventionally, short of separating space explicit features: a mark is incorporated with every image from wavelet change. In these marks describe wavelet coefficient circulation in every decay subband. A separation quantity thinks about 2 image marks and recovers maximum comparable images from the database when a doctor presents a question image. Recover pertinent medical images from a clinical database, marks and separation degree ought to be identified with clinical image understanding. In this manner the framework requires a lot of opportunity to alter it to any paleopathology with image methodology being presented. The strategy projected utilizing a practice decay plan to adjust the wavelet premise with elating plan structure. Loads are presented between subbands. All the constraints are adjusted by an enhancement strategy, utilizing database clinical image reviewing to characterize execution measures.

T Baranidharan, et al [9] tended to clinical images retrieval issue from a different variant database. A calculation dependent on vitality data was projected for picking up Hilbert Transform-linear operator for clinical images grouping dependent on imaging sentience and body parts. Neural systems were utilized for image grouping. This research paper changed image spatial data to choose grouping result and projected a unique clinical image arrangement technique two dimensional Neural Networks utilizing Fuzzy Logic for information pre-preparing. The proposed Neural Network calculation is an adjusted Elman organizes comprising of a shrouded layer with Tanh initiation work. Outcomes display that arrangement precision improves when contrasted with standard MLP Neural Network.

Ramamurthy [10] introduced a clinical images retrieval come nearer from huge clinical databases, needful pre-preparing, include feature extraction, characterization, retrieval also ordering steps to build up an effective framework. In this effort, image division was done for pre -handling, while fundamental form feature was extricated utilizing shrewd edge discovery calculation for include extraction, while for arrangement, K-implies grouping calculation was utilized. For image retrieval, Euclidian separation technique esteems were determined among inquiry and database images. This effort

expects toward give a clinical image retrieval framework aimed at clinical analysis.

In content based image retrieval, an essential for successful retrieval is extricating many distinctive features which portray significant image content qualities.

Jing G Han and Shru [11] introduced a boundary fine-tuning strategy utilizing reenacted tempering to powerfully modify significant boundary esteems utilized in modified image preparing calculations to improve retrieval execution for great goal Computerized Tomography lung images in PC supported analysis. Eminent improvement utilizing F β measure between five components, this strategy increases retrieval execution in numerous applications in clinical image data processing's.

K Rajkumar [12] introduced a twin stage clinical image retrieval system for comparable image retrieval from different features. A image subset was picked over a wavelet sifting procedure and the image deteriorated into six levels utilizing wavelet changes with removed forces. Euclidean separation coordinated comparative question and database images with measurements presence decreased over PCA usage. At long last, determined eigen vectors and likeness estimates applied guaranteed productive clinical image retrieval bringing about improved retrieval precision because of decreased inquiry space proficiency. Trials with 200 clinical images demonstrated the proposed strategy's exactness in regards to accuracy and review rate.

III. METHODOLOG

III.1. Gabor Filter

Gabor filter is a direct filter utilized in heap of image handling application for edge identification, feature extraction and so on. The attributes of specific cells in the visual cortex of certain warm blooded creatures can be approximated by these filters. These filters had been seemed to have perfect confinement things in both spatial and reappearance space and subsequently are suitable for surface partition issues. The Gabor filters are uncommon modules of band pass filters, Gabor filter can be seen as a sinusoidal sign of specific recurrence and direction, balanced by a Gaussian wave

Complex

$$g(x, y; \lambda, \theta, \psi, \sigma, \gamma) = \exp\left(-\frac{x^2 + \gamma^2 y^2}{2\sigma^2}\right) \exp\left(i\left(2\pi\frac{x'}{\lambda} + \psi\right)\right)$$

Real

$$g(x, y; \lambda, \theta, \psi, \sigma, \gamma) = \exp\left(-\frac{x^2 + \gamma^2 y^2}{2\sigma^2}\right) \cos\left(2\pi\frac{x'}{\lambda} + \psi\right)$$

Imaginary

$$g(x, y; \lambda, \theta, \psi, \sigma, \gamma) = \exp\left(-\frac{x^2 + \gamma^2 y^2}{2\sigma^2}\right) \sin\left(2\pi\frac{x'}{\lambda} + \psi\right)$$

where

$$x' = x \cos \theta + y \sin \theta$$

and

$$y' = -x \sin \theta + y \cos \theta$$

Figure 1: Pseudo code for Gabor Filter

III.II. Classifiers

III.II.I. SMO_SVM

SVM is a direct mechanism building a hyperplane such as choice surface [13]. SVM calculation execution depends on inward item part among a Support vector x_i and information vector w .

SVM utilizes planning toward the bigger space to figure cross items with factors in unique space relieving calculation burden. In bigger space, cross items are characterized utilizing a portion work $K(x,y)$ which is chosen to outfit the difficult area. Cross items with a vector in space if consistent is utilized characterize hyper planes [14]. Hyperplane characterizing vectors are straight blends with boundaries α_i of feature vectors which happen in information based. Afterward hyperplane determination, feature plane focuses x are characterized by:

$$\alpha_i K(x_i, x) = \text{constant}$$

In the event that $K(x,y)$ turns out to be little after y becomes additional from x , closeness degree is given by the aggregate proportions of closeness of test direct x toward comparing information base point x_i

The above technique estimates familiarity of each check feature information focuses starting from informational collections anticipating segregation. As focuses set planned can be very tangled, complex segregation occurs between sets which are not curved in unique space.

Sequential Minimal Optimization (SMO)[15] is to solve the SVM problem that is higher proficient than typical QP solvers. SMO utilizes investigative to divide the problems toward more modest issues that can be explained orderly. Regardless of whether it functions admirably relies to a great extent upon the hypothesis behind the investigative. Normally, it's acceleration preparing by a considerable amount.

$$f(x) = w^T x + b$$

$$f(x) = \sum_{i=1}^m \alpha_i y^{(i)} \langle x^{(i)}, x \rangle + b$$

The SMO algorithm takes two α boundaries, α_i and α_j , and improves them. To do this, we emphasize over all α_i , $i = 1, \dots, m$. On the off chance that α_i doesn't satisfy the Karush-Kuhn-Tucker conditions to inside some mathematical resilience, we select α_j at arbitrary from the leftover $m - 1$ α 's and streamline α_i and α_j .

$$\alpha_j := \alpha_j - \frac{y^{(j)}(E_i - E_j)}{\eta}$$

$$\alpha_i := \alpha_i + y^{(i)} y^{(j)} (\alpha_j^{(\text{old})} - \alpha_j)$$

Choose the threshold b :

$$b := \begin{cases} b_1 & \text{if } 0 < \alpha_i < C \\ b_2 & \text{if } 0 < \alpha_j < C \\ (b_1 + b_2)/2 & \text{otherwise} \end{cases}$$

After optimizing α_i and α_j , we can also compute w that is given:

$$w = \sum_{i=1}^m y_i \alpha_i x_i$$

III.II.II. Bagging with J48

Leo Breiman [16] imported bagging with bootstrap and combination approaches to advance uneven classification approaches accurateness. In bagging, X bootstrap data groups, with x random particular samples, produced, with restoration from Y , decision tree is built using X sampling. The projected new sampling class is obtained by more vote. New instances are check alongside X decision trees and outcomes are noted. Though, modest particular decision tree understanding is lost, bagging advances classification rule accurateness.

J48 is marginally changed C4.5 in WEKA. The C4.5 calculation creates an arrangement choice tree for a particular informational index through recursive information parceling. Choice tree is developed utilizing DFS-Depth first search methodology. The calculation reflects all trials that divided an informational index and chooses a trial that prompts top data gain. For each distinct characteristic, single trial with results the same number of as unmistakable property estimations is thought of. Paired tests including each unmistakable estimations of the trait are considered for each constant characteristic. To accumulate every single twofold test entropy gain proficiently preparing informational index of the hub being considered is arranged for consistent characteristic qualities with entropy increases of double cut dependent on each unmistakable qualities being determined in one arranged information filter, this procedure being rehashed for each ceaseless properties [17].

The J48 classifier followed a straightforward procedure. To arrange additional thing, a choice tree reliant on the quality estimates of the available making info should initially be made. At the point when it understandings a many of things (preparing set) it recognizes the separating characteristic of different occasions obviously. Among this present element's qualities, If a value remains unambiguous, For information opportunities within its classification have a comparative incentive for the target variable, at which time this branch is terminated the estimate of the obtained target being relegated to this branch.

III.II.III. Multilayer perceptron (MLP)

One of the popular supervise network is Multilayer perceptron (MLP) containing of an input, hidden and output layers, Within a layer associations are shaped by interfacing each node from a layer to subsequent layer's neurons[18]. In the course of preparing, every association's scalar weight is balanced. Feature vector x is contribution at input network layer through output describing to a discriminator between its group and different classes. Preparing models, in preparing, are taken care of and the anticipated yields registered. The yield and target

yield are thought about and estimated fault is procreate back over network and weights balanced [19, 20].

III.IV Classification via Regression with MP5

Linear regression is a method to show the linking among two features (a). Condition (b). Incline equation. The condition $Y = a + bX$, where Y is the needy variable, X is the autonomous variable, b is the inclination of the line and one is the interception in Y .

$$a = \frac{(\sum y)(\sum x^2) - (\sum x)(\sum xy)}{n(\sum x^2) - (\sum x)^2}$$

$$b = \frac{n(\sum xy) - (\sum x)(\sum y)}{n(\sum x^2) - (\sum x)^2}$$

The early stage for result linear regression is to choose whether the two factors are related.

M5 tree calculation allocates straight relapse capacities at the terminal hubs and fits a multivariate direct relapse model to every subspace by grouping or partitioning the entire information space into a few sub spaces. The M5 tree strategy manages constant class issues rather than discrete classes and can deal with undertakings with extremely high dimensionality. It uncovers piecewise data of each straight model built to surmised nonlinear connections of the informational index.

The data about the parting rules for the M5 model tree is picked up based on figures of mistake at every hub. The blunder is broke down by the standard deviation of the class esteems that show up at a hub. The trait that boosts the normal mistake decrease coming about because of the testing of each property at that hub is picked for parting at the hub[21]. The standard deviation decrease (SDR) is determined by:

$$SDR = sd(K) - \sum \frac{|K_i|}{|K|} sd(K_i)$$

III.IV Daggging Hoeffding Tree

This meta classifier makes various disjoint, separated overlap out of the information and feeds each piece of information to a copy of the provided base classifier. Predictions are made by means of averaging, since all the produced base classifiers are placed into the Vote meta classifier. Helpful for base classifiers that are quadratic or inferior in time performance, with respect to number of occurrences in the training data[22].

The Hoeffding tree is a progressive decision tree for enormous information flows, which accepts that the transmission of information does not change in the long run. It gradually develops a decision tree dependent on hypothetical insurance of the Hoeffding boundary (or the added substance related to Chernoff). A node is extended when there is sufficient measurable evidence that an ideal separation feature exists, a choice depending on the bound Hoeffding free diffusion. The

model taught by the Hoeffding tree is asymptotically almost inseparable from that built by a non-incremental learner [23,24]

IV. RESULTS AND DISCUSSION

An analysis was done in WEKA to deal with various information images, yielding co-productive of Gabor filter. Different Magnetic Resonance Imaging (MRI) images and clangorous clinical images from the data set were utilized for assessment. Test data set clinical images are found in Figure 2. The analysis utilized 4 clinical image groups with various clatter degrees. 65 Magnetic Resonance Imaging images were the data sources and classified by MLP, SVM, SMO, DAGGING, Bagging with J48, Naïve Bayes, Classification via Regression. About 70% data was given as preparation set with the others being a trial set.

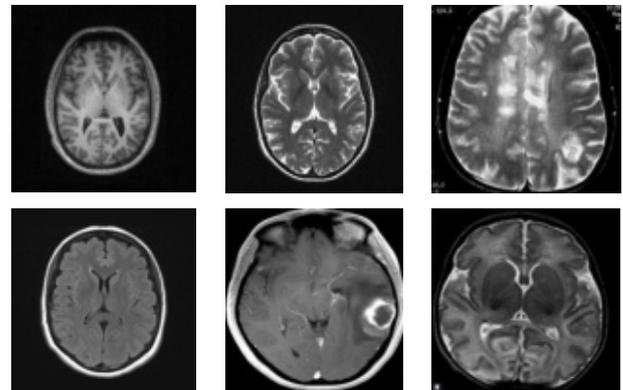


Figure 2: Sample Images Used in the Medical Retrieval System

The result accomplished by different classification algorithms are shown in Table. 1, Figure 3 and Figure 4 shows Kappa Statistics.

Table 1: Classification Accuracy achieved by Different Techniques

Classifier Used	Classification Accuracy %	Kappa Statistics
SMO_SVM	87.6923	0.7543
Multilayer Perceptron	89.23	0.7845
Daggging with Hoeffding Tree	89.2308	0.7849
Bagging with J48	89.2308	0.7845
Classification via Regression	90.7692	0.8155

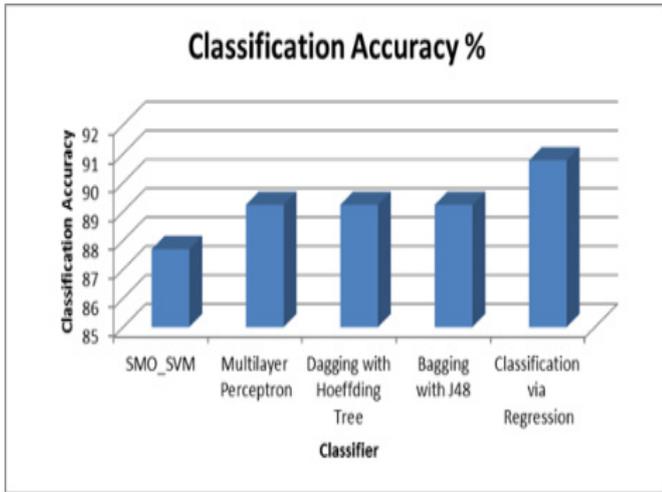


Figure 3: Classification Accuracy

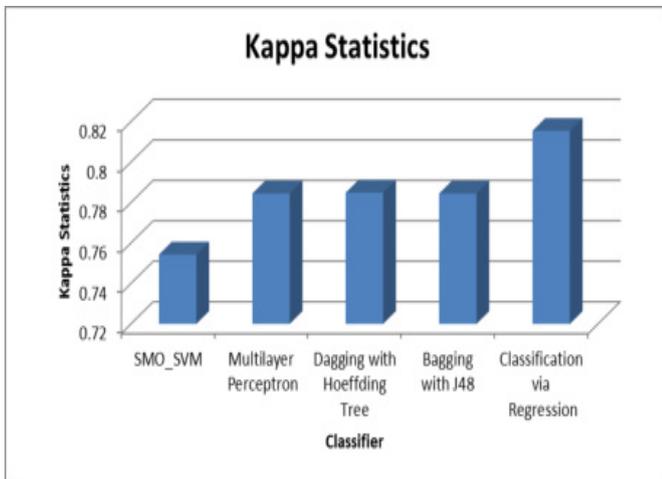


Figure 4: Kappa Statistics

It is apparent from the charts that the Classification via Regression accomplish preferable characterization precision over packing with SVM-SMO, Dagging, Naïve Bayes, and Bagging through J48. Additional examinations are essential to assess delicate registering methods in exertion to progress the classification accurateness.

V. CONCLUSION

Medical Image classification is a significant advance in image retrieval as it spares period whereas looking for clinical images in a colossal size of data repository. Image Classification is distinguishing proof of the clinical images various areas by which framework retrieval effectiveness is enhanced. The present research paper examines classification precision for various classifiers. It obtain features using Gabor Filter and extracted features were prepared and classified with MLP, SVM-SMO,DAGGING, Bagging with J48 ,Naïve Bayes, Classification via Regression. Outcomes indicate that the Classification via Regression accomplish excel classification

accurateness compare than MLP,SVM-SMO,DAGGING, Bagging with J48 ,Naïve Bayes.

REFERENCES

- [1] N. S. Chang, and K. S. Fu, "Query by pictorial example," IEEE Trans. on Software Engineering, Vol.6, No.6, pp. 519-524, Nov.1980.
- [2] S. K. Chang, C. W. Yan, D. C. Dimitroff, and T. Arndt, "An intelligent image database system,"IEEE Trans. on Software Engineering, Vol.14, No.5, pp. 681-688, May 1988.
- [3] J. Dowe, "Content-based retrieval in multimedia imaging," In Proc. SPIE Storage and Retrieval for Image and Video Database, 1993.
- [4] C. Faloutsos et al, "Efficient and effective querying by image content," Journal of intelligent information systems, Vol.3, pp.231-262, 1994.
- [5] P. Kelly, T. Cannon, and D. Hush. Query by image example: The CANDID approach. In Storage and Retrieval for Image and Video Databases III, pages 238–248. SPIE Vol. 2420, 1995.
- [6] H. B. Kekre, Dharendra Mishra, "Digital Image Search & Retrieval using FFT Sectors of Color Images" published in International Journal of Computer Science and Engineering (IJCSSE) Vol. 02, No.02, 2010, pp.368-372.
- [7] Song X, Liu F, Yang C, Luo X, Zhang Y. Steganalysis of Adaptive JPEG Steganography using a 2D Gabor Filters, Proceeding of 3rd ACM Workshop on Information Hiding and Multimedia Security, USA, 2015, pp.15-23.
- [8] Quelled, G., Lamard, M., Cazuguel, G., Cochener, B., & Roux, C. (2010). Wavelet optimization for content-based image retrieval in medical databases. Medical image analysis, 14(2), 227-241.
- [9] Baranidharan, T., & Ghosh, D. K. (2012). A Two Dimensional Image Classification Neural Network for Medical Images. European Journal of Scientific Research, 74(2), 286-291.
- [10] Ramamurthy, B., & Chandran, K. R. (2011). Cbmir: Shape-Based Image Retrieval Using Canny Edge Detection And K-Means Clustering Algorithms For Medical Images. International Journal of Engineering Science and Technology (IJEST) Mar.
- [11] Han, J. G., & Shyu, C. R. (2010). Improving Retrieval Performance in Medical Image Databases Using Simulated Annealing. In AMIA Annual Symposium Proceedings (Vol. 2010, p. 276). American Medical Informatics Association.
- [12] K. Rajakumar, "An Integrated Approach for Medical Image Retrieval Using PCA and Energy Efficient Wavelet Transform", European Journal of

Scientific Research ISSN 1450-216X Vol.51 No.3
(2011), pp.340-348.

- [13] Vandewalle, J. (1999). Least squares support vector machine classifiers. *Neural processing letters*, 9(3), 293-300.
- [14] Cortes, C., & Vapnik, V. (1995). Support-vector networks. *Machine learning*, 20(3), 273-297
- [15] Platt, John. (1998). Sequential Minimal Optimization: A Fast Algorithm for Training Support Vector Machines. *Advances in Kernel Methods-Support Vector Learning*. 208.
- [16] Leo Breiman, (1996). Bagging predictors. *Machine learning*, 24(2), 123-140.
- [17] Loh, W. Y. (2009). Improving the precision of classification trees. *The Annals of Applied Statistics*, 3(4), 1710-1737.
- [18] Sasi Kumar. M and Y.S. Kumaraswamy, "Medical Image Retrieval System using an Improved MLP Neural Network",*European Journal of Scientific Research*, Vol.66, No.4, pp. 532-540, 2011.
- [19] Leisch, F., Jain, L. C., & Hornik, K. (1998). Cross-validation with active pattern selection for neural-network classifiers. *Neural Networks, IEEE Transactions on*, 9(1), 35-41.
- [20] Widrow, B., & Lehr, M. A. (1990). 30 years of adaptive neural networks: Perceptron, madaline, and backpropagation. *Proceedings of the IEEE*, 78(9), 1415-1442.
- [21] Sihag, P., Mohsenzadeh Karimi, S. & Angelaki, A. Random forest, M5P and regression analysis to estimate the field unsaturated hydraulic conductivity. *Appl Water Sci* **9**, 129 (2019). <https://doi.org/10.1007/s13201-019-1007-8>
- [22] Kotsianti S.B., Kanellopoulos D. (2007) Combining Bagging, Boosting and Dagging for Classification Problems. In: Apolloni B., Howlett R.J., Jain L. (eds) *Knowledge-Based Intelligent Information and Engineering Systems. KES 2007. Lecture Notes in Computer Science*, vol 4693. Springer, Berlin, Heidelberg. https://doi.org/10.1007/978-3-540-74827-4_62
- [23] P. Domingos and G. Hulten. Mining High-Speed Data Streams. In *KDD*, pages 71-80, Boston, MA, 2000. ACM Press.
- [24] G. Hulten, L. Spencer, and P. Domingos. Mining time-changing data streams. In *KDD*, pages 97–106, San Francisco, CA, 2001. ACM Press.

THE CASE OF “MISSING PARENT(S)”: CHILDREN’S LITERATURE IN INDIAN WRITING IN ENGLISH

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Abstract

This paper explores the transition from the theme of the “lost child” to that of “lost parent(s)” in children’s literature in India. In the case of the “lost child,” the child is lost but the parents/family are together, and for the lost child it is s/he who is alone and has lost his or her parents. Therefore, in traditional narratives, if a child is lost, a child is lost to his or her parents, and so are the parents lost to the child. But in a strange reversal of this pattern in contemporary Indian children’s literature, it is now common that the child is present but the parent or parents are missing. In this leap, the writers of children’s literature have deviated from the established structure of “home-away-home” in which the child is lost to a condition when either or both parents are missing. Children’s literature is traditionally embedded within the paradoxical nature of the adult/child binary and it is common for writers of children’s literature to discard the adult and centralize the child. However, despite the peripheral treatment of parents in children’s literature, this paper argues that the absolute necessity of parental care still remains for the child “inside” and “outside” the text. The need for parents still remains the same in contemporary times, yet children’s texts also show how a child is affected when either or both parents are absent. Contemporary Indian children’s literature addresses this issue of “missing parents” by introducing “alternate parenting” into the narrative.

Keywords: missing parents, ‘lost child,’ ‘home-away-home,’ thanatophobia, alternate parenting

Introduction

What is a Child?

An experiment.

A fresh attempt to produce the just man made perfect that is, to make humanity divine. George Bernard Shaw, “Treatise on Parents and Children”(1914, 45)

If the “lost child” is a common trope in children’s literature both in the East and the West, then the theme of the orphaned child or child who is alone is also not uncommon. To list some of the more prominent examples, Brothers Grimm’s “Hansel and Gretel”(1812) and Hans Christian Andersen’s “The Princess and the Pea” (1835) revolve around orphaned children; Charles Kingsley’s *The Water Babies: A Fairy Tale for a Land Baby*(1863) deals with a boy

Tom who sweeps chimneys; John Richard Jefferies’ *Bevis, The Story of a Boy*(1882) presents boys spending summer without adult supervision; Mark Twain’s *Huckleberry Finn*(1884) presents a journey away from home; Robert Louis Stevenson’s *Kidnapped* (1886) portrays seventeen-year-old David Balfour, whose parents die; *The Story of Pinocchio*(translated into English in 1892) is a tale of a puppet boy’s traumatic adventures and social transformation; Lucy Maud Montgomery’s *Anne of Green Gable* (1908) presents an orphan, Anne Shirley; J. M. Barrie’s *Peter Pan and Wendy*(1911) shows Peter Pan as the leader of lost boys; Frances Hodgson Burnett’s *The Secret Garden*(1911) projects an orphaned Mary Lennox and Eleanor Hodgman;

A new type of exterior and frontier in Topological spaces

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Abstract. In this paper, we introduce gp^* -exterior and gp^* -frontier and some of its basic properties.

1. Introduction and Preliminaries

Levine introduced generalized closed sets in topology as a generalization of closed sets. This concept was found to be useful and many results in general topology were improved. Many researchers like Arya et al, Balachandran et al, Bhattarcharya et al, Arockiarani et al, Gnanambal Malghan, Nagaveni and Palaniappan et al have worked on generalized closed sets. Later in 1998 H.Maki, T.Noiri gave a new type of generalized closed sets in topological space called gp -closed sets. In this paper, the notion of gp^* -exterior, gp^* -frontier in topological spaces using the notions of gp^* -closed sets and obtain some related results. Throughout the paper, X and Y denote the topological spaces (X, τ) and (Y, σ) respectively and on which no separation axioms are assumed unless otherwise explicitly stated.

2. Preliminaries

Definition 2.1 [4] Let A subset A of a topological space (X, τ) , is called a pre-open set if $A \subseteq \text{Int}(cl(A))$.

Definition 2.2 [1] Let A subset A of a topological space (X, τ) , is called a generalized closed set (briefly g -closed) if $cl(A) \subseteq U$ whenever $A \subseteq U$ and U is open in X .

Definition 2.3 [5] Let A subset A of a topological space (X, τ) , is called a generalized pre-closed set (briefly gp -closed) if $pcl(A) \subseteq U$ whenever $A \subseteq U$ and U is open in X .

Definition 2.4 [3] Let A subset A of a topological space (X, τ) , is called a generalized pre-closed set (briefly pg -closed) if $pcl(A) \subseteq U$ whenever $A \subseteq U$ and U is pre-open in X .



Oscillatory behavior of solutions of certain third-order neutral differential equation with continuously distributed delay

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Abstract. This paper concerns the oscillatory behavior of the solutions of the third-order neutral differential equation with continuously distributed delay. We prove many new sufficient conditions which ensure that every solution to be either oscillatory or converges to zero asymptotically. Examples dwelling upon the importance of our theorems are also included.

1. Introduction

This paper is we discuss oscillatory behavior of third-order neutral differential equations with continuously distributed delay

$$\left[r_1(t) \left(r_2(t) \left(x(t) + \int_a^b p(t, \mu) x(\tau(t, \mu)) d\mu \right) \right)' \right]' + \int_c^d q(t, \mu) f(x(\sigma(t, \mu))) d\mu = 0. \quad (E)$$

Throughout this work, we will assume that:

- A₁. $r_1(t), r_2(t) \in C^1([t_0, +\infty))$, $r_1(t), r_2(t) > 0$, $r_1'(t) \geq 0$, $a < b$, $c < d$,
 $\int_{t_0}^{\infty} \frac{1}{r_1(t)} dt = \infty$ and $\int_{t_0}^{\infty} \frac{1}{r_2(t)} dt = \infty$. (1.1)
- A₂. $p(t, \mu) \in C([t_0, +\infty) \times [a, b], [0, +\infty))$, $0 \leq \int_a^b p(t, \mu) d\xi \leq P < 1$, $q(t, \mu) \in C([t_0, +\infty) \times [c, d], [0, +\infty))$ and $q(t, \mu)$ is not identically zero on $[t_*, +\infty) \times [c, d]$, $t_* \geq t$; $f \in C(\mathbb{R}, \mathbb{R})$ satisfies $uf(u) > 0$ for $u \neq 0$ and there exists a constant $\delta > 0$ such that $\frac{f(u)}{u} \geq \delta$.
- A₃. $\tau(t, \mu) \in C([t_0, +\infty) \times [a, b], [0, +\infty))$, $\tau(t, \mu) \leq t$, $\tau(t, \mu)$ is nondecreasing in μ ,
 $\liminf_{t \rightarrow +\infty} \tau(t, \mu) = \infty$ for $\mu \in [a, b]$ and $\sigma(t, \mu) \in C([t_0, +\infty) \times [c, d], [0, +\infty))$, $\sigma(t, \mu) \leq t$,
 $\sigma(t, \mu)$ is nondecreasing in μ , $\liminf_{t \rightarrow +\infty} \sigma(t, \mu) = \infty$ for $\mu \in [c, d]$.

We set

$$y(t) := x(t) + \int_a^b p(t, \mu) x(\tau(t, \mu)) d\mu.$$



Nonexistence of Kneser solution for third order nonlinear neutral delay differential equations

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Abstract. The achieved sufficient conditions for nonexistence of so-called Kneser solutions are based on the new comparison principles, which help us decrease the problem of the wavering between the third and first-order equations. Examples are given to prove the significance of new theorems.

1. Introduction

The purpose of this work, we are concerned with third order nonlinear neutral delay differential equations of the form

$$\left(c_2(\ell)((c_1(\ell)z'(\ell))')^\gamma\right)' + q(\ell)y^\beta(m(\ell)) = 0, \quad (1)$$

where $z(\ell) = y(\ell) + p(\ell)y(k(\ell))$. Further, assume the hypotheses are tacitly supposed to hold:

(A₁) γ, β is a quotient of odd positive integers, $c_1, c_2 \in C(I, \mathbb{R}^+)$ take $I = [0, \infty)$ $p(\ell), q(\ell) > 0, 0 \leq p(\ell) \leq p_0 < \infty$ and q does not vanish identically;

(A₂) $m, k \in C^1(I, \mathbb{R}^+), m(\ell) < \ell, k'(\ell) \geq k_0 > 0$ and $\lim_{\ell \rightarrow \infty} k(\ell) = \lim_{\ell \rightarrow \infty} m(\ell) = \infty$.

Moreover,

$$C_1[\ell_0, \ell] = \infty, \quad M_2[\ell_0, \ell] = \infty \text{ as } \ell \rightarrow \infty, \quad (2)$$

where

$$M_1[\ell_0, \ell] = \int_{\ell_0}^{\ell} c_2^{-1/\gamma}(s)ds, \quad M_2[\ell_0, \ell] = \int_{\ell_0}^{\ell} c_1^{-1}(s)ds.$$

Article

Philos-Type Oscillation Results for Third-Order Differential Equation with Mixed Neutral Terms

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Abstract: The motivation for this paper is to create new Philos-type oscillation criteria that are established for third-order mixed neutral differential equations with distributed deviating arguments. The key idea of our approach is to use the triple of the Riccati transformation techniques and the integral averaging technique. The established criteria improve, simplify and complement results that have been published recently in the literature. An example is also given to demonstrate the applicability of the obtained conditions.

Keywords: oscillation; third-order; mixed neutral differential equation; distributed deviating arguments



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1. introduction

It is prudent to say that neutral differential equations have drawn obvious regard because of their wide uses and applications in science and technology, including physical sciences, gas and fluid mechanics, signal processing, robotics and traffic systems, engineering, population dynamics, medicine and the like. Of late, the theory of oscillation of differential equations of the third order has become an important topic, and therefore the oscillatory properties of this type of equation have already been obtained [1–6]. In particular, it is a necessary and invaluable issue, either theoretically or practically, to probe into neutral differential equations with distributed deviating arguments. Hence, a scientific study of the qualitative properties of solutions of these equations is proposed for applications, see for example the book [7,8] and the papers [9–15].

Tongxing Li et al. [16,17], Yunsong Qi et al. [18], Chenghui Zhang et al. [19], Zhenlai Han et al. [20], Ethiraj Thandapani et al. [21,22], Jianga et al. [23], considered nonlinear second/third-order mixed neutral differential equations.

Cuimei et al. [2] established an important extension of the Kamenev oscillation criterion for a third-order equation with a middle term. Ganesan et al. [3] studied the oscillatory properties of a third-order equation with a neutral type. Kumar et al. [6] extended the oscillation results of a third-order equation with distributed deviating arguments.

Based on these background details, this paper is concerned with the oscillation of third-order mixed neutral differential equations with distributed arguments:

$$(r(\mu)u''(\mu))' + \int_a^b q(\mu, \sigma)y(\mu - \sigma) d\sigma + \int_a^b p(\mu, \sigma)y(\mu + \sigma) d\sigma = 0, \quad (1)$$

where $u(\mu) = y(\mu) + p_1(\mu)y(\mu - \eta_1) + p_2(\mu)y(\mu + \eta_2)$, $\mu \geq \mu_0 > 0$ and $a < b$. Throughout this work, we formulate the following assumptions:



Design and fabrication of clad modified fiber optic gas sensor based CeO₂/MWCNTs hybrid sensors by facile hydrothermal technique

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ABSTRACT

In this report, a novel CeO₂/MWCNTs nanocomposite was synthesized using a simple hydrothermal method and examined structural, morphological and elemental composition using powder X-ray diffraction, transmission of electron microscopy, dispersive energy spectra, and N₂ adsorption-desorption analysis. The XRD and TEM findings indicate that both pure nanocomposite and CeO₂/MWCNTs exhibit cubic structure and CeO₂ nanoparticles (30–60 nm in diameter) are distributed uniformly on the surface of MWCNTs. The gas sensing properties of the as synthesized composites were tested using fiber optic clad modified method at room temperature with ethanol and ammonia gases. The results showed that nanocomposite CeO₂/MWCNTs demonstrated high sensitivity (75×10^{-3} k/Pa), rapid response (26 s) and recovery time (35 s). The newly prepared sensor CeO₂/MWCNTs opens up exciting perspectives for nanosized sensor devices to develop. The possible mechanism for gas sensing has also been discussed in detail.

1. Introduction

Fast and accurate detection of trace amounts of hazardous gases is important in many aspects of human society, such as environmental monitoring and detection of toxic gases in industrial processes, public health, and national security. Chemical sensors based on fiber optics are currently becoming extremely clever because they are quick, tiny and low cost operation. Gas detection and monitoring can be done in inaccessible and unpredictable environments [1–3]. The propagation of transmitted light in optical fiber was extremely sensitive to optical properties (refractive index, absorption, etc.) of a cladding technique, and the fiber optic gas sensor [4–8] used extensively. In this, a small part of an inert cladding is removed and replaces it with a gas sensing material which changes its optical properties by interacting with the gas. Due to their superior gas sensitivity [9–12], metal oxide-based gas sensors have been commonly used in recent years for the detection of various toxic gasses. These sensors illustrate an excellent response to oxidizing and reducing gasses during surface reactions [13]. Recently, many metal oxides such as SnO₂ [14], WO₃ [15], ZnO [16] and Sm₂O₃ [17] have been extensively studied as sensing material to detection of different gases. Of these, CeO₂ is a widely applied rare-earth oxide material in many fields such as catalysts, optics, and gas sensors because of its unique properties, arising peculiarly from its 4f shells. Cerium being the most abundant nontoxic element in the Earth's crust,

CeO₂ is one of the most used catalysts for the reduction of toxic gases, like CO, NO_x, hydrocarbons, etc., emit from automobile exhausts. High oxygen storage capacity, huge oxygen vacancies, and low redox potential between Ce³⁺ and Ce⁴⁺ have made this oxide an advantageous sensing material toward reducing gases. During the past decade, CeO₂ has gradually become a promising metal oxide for gas sensing applications and has gained an upsurge in interest in the field of gas sensors owing to its properties like large number of oxygen vacancies and high oxygen storage capacity. CeO₂ has already proved its ability in detecting various toxic gases like, formaldehyde, ethanol, carbon monoxide, and ammonia [18–22]. Ceria was also used for detecting acetone gases and NO in an oxygen atmosphere, and the results showed that CeO₂ sensor is more acetone-sensitive than NO [23]. The ZnO and SnO₂ doped CeO₂ sensor demonstrated superior efficiency in sensing gas against CO, butanone and ethanol gases [24–26]. However, the CeO₂ sensors have poor electron conductivity and low surface area which decreased the sensing properties of different gases. CNTs are used in gas sensing applications because of their inherent high electrical conductivity and chemical stability to solve those problems. CNTs are simpler to get well-aligned arrays compared to graphene, which is considerable for as-prepare gas sensor reproducibility. Furthermore, the CNT-based gas sensing output operates at low working temperatures as opposed to metal oxide nanoparticles, resulting in excellent sensitivity and selectivity. Due to their synergistic effect, excellent sensing

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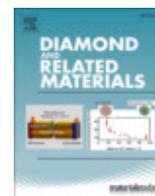
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journal homepage: www.elsevier.com/locate/diamondDevelopment of high sensitivity LPG and NO₂ gas sensor based ZnGa₂O₄/graphene nanoplates hybrid structure - A novel approachV. Munusami^a, K. Arutselvan^b, S. Vadivel^{c,*}^a Department of Mechanical Engineering, Narasu's Sarathy Institute of Technology, Poosaripatty, Salem 636305, Tamilnadu, India^b Department of Electrical and Electronics Engineering, Narasu's Sarathy Institute of Technology, Poosaripatty, Salem 636305, Tamilnadu, India^c Department of Physics, Paavai Engineering College (Autonomous), Namakkal 637 018, Tamilnadu, India

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ABSTRACT

The report is on high performance LPG gas sensor based ZnGa₂O₄/Graphene (ZGO/GR) structure by using facile hydrothermal approach. The heterostructure was characterized by X-ray diffraction (XRD), Field emission scanning electron microscope (FESEM), Transmission electron microscope (TEM), Raman and Brunauer-Emmett-Teller (BET) analysis. XRD results exposed that ZGO/GR is cubic phase with spinel structure. The fibers and platelets morphologies obtained were ZnGa₂O₄ and ZGO/GR sample, confirmed through FESEM and TEM analysis. Mesoporous with high porous nature and huge surface area (108 m²/g) of ZGO/GR hybrid samples was confirmed by N₂ adsorption-desorption analysis. The resistive sensor was fabricated and the prepared sensors were evaluated towards LPG and NO₂ gases with various concentrations at room temperature. The results deliver that the hybrid sensors have excellent sensing performance such as high sensitivity (52%), fast response (32 s) and recovery time (41 s) as well as high stability towards LPG gas. The obtained hybrid sensor is not only high sensitivity, it also high selectivity to LPG gas then other gas species (NH₃, ethanol, ammonia, CO and acetone). The improved mechanism is also proposed in detail.

1. Introduction

Fast innovative and industrial improvements continuously result within the emanation of unsafe gases, poisons, and biomolecules. Subsequently, detecting of such undesirable chemical or biochemical forms has gotten to be significant research in later years [1–3]. In modern time, amazing contemplations have been paid by the analysts to fabricate low cost sensors for recognizing destructive and perilous chemicals or gases for natural observing [4–8]. Recently, gas sensors have been fabricated and functioned in natural monitoring, human security, medical applications, and industrial automobiles applications [9–12]. Among those distinctive target gases detecting, liquid petroleum gas (LPG), broadly utilized as fuel for industrial and residential purposes has frequently demonstrated to be perilous, since of blasts caused by leaks. It is, hence, vital to create great sensors for the detection of LPG. Nitrogen dioxide (NO₂) is another important toxic compound with a sharp odor that's destructive to the environment as a major cause of acid rain and photochemical brown haze. NO₂ is primarily delivered by control plants, combustion motors and automobiles. It can moreover be harmful and initiate wellbeing issues to human [13–15]. Subsequently, it is

exceedingly desirable to create a reliable sensor that can successfully identify NO₂ indeed with amazingly low concentration. Semiconductor gas sensors have incredible potential for commercial application in natural monitoring and healthcare due to the properties low cost, low control utilization, long lifetime, and the capacity to operate in cruel situations. Diverse types of metal oxide based sensors composed of In₂O₃ [16], SnO₂ [17], ZnO [18] and Ga₂O₃ [19] have been used widely to detect toxic and pollutant gases, such as NO_x, H₂S, Cl₂, CO, SO₂, and O₃.

Currently, AB₂O₄ spinel materials received much attention in the field of gas sensing [20,21]. Especially, zinc gallate (ZnGa₂O₄) is a wide optical band gap materials (approximately 4.4 eV), which has a spinel crystal structure, with Zn²⁺ ions in the tetrahedral sites and Ga³⁺ ions in the octahedral sites. It has remarkable properties and shows good potential in the field of gas sensing [22,23]. Moreover, it has been widely used in different filed of applications such as photocatalyst [24], aerospace [25], phosphorous materials [26] and power devices [27]. Both ZnO and Ga₂O₃ have been used as gas sensors for decades because of their high sensitivity. On the other hand, there are very few reports on the ZnO–Ga₂O₃ system. Moreover, ZnGa₂O₄ sensor showed an excellent response and recovery performance, which was attributed to their

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Dye-sensitized solar cells (DSSCs) as a potential photovoltaic technology based on La_2MoO_6 /bio-carbon hybrid composite photoanodes with ~12.5% efficiency

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ARTICLE INFO

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ABSTRACT

In this work, series of bio-carbon (BC) activated La_2MoO_6 nanoparticles were prepared by a traditional hydrothermal method. The La_2MoO_6 nanoparticles are composited with bio-graphene to serve as a low-cost electrode to improve photovoltaic performance for dye-sensitized solar cells (DSSCs). The structural, morphological, optical and textural properties of the electrode samples were analyzed by using XRD, SEM, TEM, Raman, UV, PL and BET analysis. The La_2MoO_6 /BC composite sample exhibits higher specific surface area ($102.6 \text{ m}^2\text{g}^{-1}$) and larger total pore diameter (40.5 nm), compared with pure La_2MoO_6 ($78.9 \text{ m}^2\text{g}^{-1}$ and 28.3 nm, correspondingly). The higher specific surface area provides more catalytic sites; thus, the DSSC assembled with a La_2MoO_6 /BC composite electrode deliver power conversion efficiency (PCE) of 12.5%. This could be due to the narrowing of the band gap which prevents the recombination process of electron-hole pair. Moreover, the EIS analysis illustrates that La_2MoO_6 /BC composite show high electron transfer efficiency and long life time than bare La_2MoO_6 electrode sample. This work provides new insights into the utilization of La_2MoO_6 /BC based photoanode materials for high performance DSSC based applications.

1. Introduction

DSSCs are developing photovoltaic solar energy conversion devices based on the sensitization of a wide band-gap nanoporous semiconductor, typically TiO_2 , utilizing atomic photosensitive dyes [1]. The achieved improvements of their exhibitions since the pioneering work of Oregan and Gratzel [2] have made of them a promising alternative technology to conventional silicon solar cells [3,4]. They have the potential of reducing the consumption of photovoltaic power generation by their low-cost materials and produce moderately high efficiency [5]. Numerous critical efforts have been made to improve the stability of DSSCs. Generally, respectable metal platinum (Pt) is employed as a counter terminal (CE) fabric owing to its superior electrocatalytic behavior and high electron transfer capacity toward I_3^- species [6–14]. However, it is one of the foremost costly components in DSSCs [15,16]. Moreover, Pt can be eroded by traditional I^-/I_3^- redox couple electrolyte to create PtI_4 , which influences the lifecycle of DSSCs. DSSC research begins with TiO_2 by Gratzel's group, and now TiO_2 becomes the

preferred semiconductor material due to its peculiar promising properties and later considered as the model DSSC system. The use of TiO_2 with high internal surface area to support the adsorption of monolayer of sensitizers on the TiO_2 is one of the major breakthroughs in enhancing the DSSC performance. Though, TiO_2 gives the maximum solar conversion efficiency, other metal oxide semiconductors (MOS), which include ZnO , SnO_2 , Fe_2O_3 , ZrO_2 , Nb_2O_5 , CeO_2 , and Al_2O_3 . However, their poor electrical conductivity is disadvantageous for rapid electron transport and thus greatly hinders the widespread application in DSSC. Therefore, the design and synthesis of electrode materials with excellent electrical conductivity, high reaction activity, and stability in DSSC remain as urgent requirements.

Diverse sorts of Pt-free catalytic materials for the CE in DSSCs have been detailed, such as carbon materials (enacted carbon, multiwall carbon nanotubes (MWCNTs), graphite, nanotubes, graphene and C_{60}) [17–21], conducting and doped polymers (polypyrrole (PPy), polyaniline (Dish), polythiophene (PTh), polyphenylene (PPP), and poly-(3,4-ethylene dioxythiophene)(PEDOT)) [22–24], and transition metal

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High performance ethanol and acetone gas sensing behavior of FeCo₂O₄/graphene hybrid sensors prepared by facile hydrothermal route

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High surface area
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ABSTRACT

Historically, production of high-performance gas sensing materials has promised to satisfy the worldwide research interests with the increasingly enhanced gas sensor devices. In this paper we are adopting a facile hydrothermal strategy to prepare the ternary FeCo₂O₄/graphene hybrid nanocomposites. The spinal phase of FeCo₂O₄ with spherical shaped morphology was obtained through XRD, SEM and TEM images which confirms. In addition, an average particle size within the range of 30–40 nm was observed for the individual spherical shaped morphology. The Raman and XPS studies also explore the vibration modes and chemical composition of the FeCo₂O₄/graphene composites. The BET surface area and BJH pore size of FeCo₂O₄/graphene composites is estimated to be 93.2 m²/g and 19.45 nm, respectively. Such high surface area will provide the active path to gas molecules which will increase the efficiency of gas sensing. Measurement of ethanol and acetone gas sensing using clad altered fiber optic sensors and sensitivities for ethanol and acetone gases are 22 and 43 counts/ppm, respectively. Also discussed is the proposed gas sensing mechanism.

1. Introduction

Gas sensors are important components of sophisticated area systems, focusing on their wide range of applications such as in the therapeutic field, indoor and outdoor discussions on quality measurement structures, popular research, the automotive industry, and the military [1–3]. Chemical sensors based on fiber optics are currently becoming extremely clever because they are quick, tiny and low cost operation. Gas detection and monitoring can be done in inaccessible and unpredictable environments [1–3]. The propagation of transmitted light in optical fiber was extremely sensitive to optical properties (refractive index, absorption, etc.) of a cladding technique, and the fiber optic gas sensor [4–8] used extensively. In this, a small part of an inert cladding is removed and replaces it with a gas sensing material which changes its optical properties by interacting with the gas. Due to their superior gas sensitivity, metal oxide-based gas sensors have been commonly used in recent years for the detection of various toxic gases. These sensors illustrate an excellent response to oxidizing and reducing gases during surface reactions. Metal oxides are a basic route of useful materials for chemical and bio identification among their diverse applications. Following the disclosure of the identifying properties of these materials, a substantial grouping of metal oxides and their doped varieties has been widely investigated for highly sensitive

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Original research article

Design and fabrication of clad removed fiber optic based NiCo₂O₄ sensor for detection of ethanol and acetone gases

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 High sensitivity

ABSTRACT

The large-scale synthesis of ultra-small NiCo₂O₄ nanoparticles (20 nm) was developed using a facile hydrothermal technique without post-annealing process. A powder X-ray diffraction (XRD) and Transmission electron micrograph analysis were used to obtain the cubic structure and well crystalline spherical uniform NiCo₂O₄ nanoparticles. The N₂ adsorption-desorption study shows that the NiCo₂O₄ nanoparticles BET surface area is estimated at 88.5 m²/g, and the distribution of the pore size is about 20 nm. The gas sensing characteristics of the modified fiber optic gas sensor NiCo₂O₄ are exposed to varying concentrations of ethanol and acetone gases (0–500 ppm). Results indicate that the NiCo₂O₄ sensor displayed exceptional sensing response to acetone gas, such as high sensitivity ($72 \times 10^{-3}k/P$), rapid response (20 s) and recovery time (26 s). More detailed discussion is also given on the theoretical sensing mechanism for the proposed sensor.

1. Introduction

Recently, all around the globe on detecting and monitoring toxic and dangerous gases is mostly concentrated, because of the increasing release of hazardous gases, fluids and chemicals from industrial effluents, agricultural chemicals and fertilizers. Gas sensors are in great demand for various household and industrial applications. Gas sensors, which play an important role in natural observation, air quality monitoring, and the detection of explosives and poisonous gasses, have attracted increasingly interested research around the world as an ever-growing awareness of natural pollution and word-related security concerns [1,2]. By counting gas chromatography, Fourier-transform infrared spectroscopy, chemiluminescence locators, mass spectrometry, and other instruments, different techniques can be used to detect gases. Gas sensors based on solid state semi-conductor materials have impressive focal points over other gas detection strategies [3]. Chemical sensors based on fiber optics are gaining a lot of shrewdness right now, as they are the quick, compact and low fetched operation. Gas discovery and observation can well be achieved in conditions that are blocked off and unstable [4–6]. The generation of transmitted light in optical fiber is extremely sensitive to optical properties (refractive index, retention etc.) of a cladding and clad-removed method is commonly used within the fiber optic gas sensor [7–11]. Metal-oxide semiconductor gas sensors have put particular emphasis on air quality identification, flammable-gas analysis, natural observation, health care, safety, defense, etc. [12]. Since the detection aspect focuses on the surface response of these materials, their sensing efficiency is unambiguously subordinate to the morphology and structure of the materials, specifically grain measurement and surface area. Many of the metal oxides based on semiconductors, such as SnO₂ [13], Sm₂O₃ [14], Bi₂O₃ [15], ZnO [16] and WO₃ [17], have recently been

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Fabrication of hexagonal shaped CuCo_2S_4 nanodiscs/graphene composites as advanced electrodes for asymmetric supercapacitors and dye sensitized solar cells (DSSCs)

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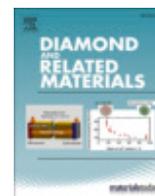
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ABSTRACT

In this report, CuCo_2S_4 /graphene (abbreviated as CCS-G) hybrid electrodes were fabricated via facile and one step hydrothermal route. The fabricated electrodes were characterized by XRD, Raman, TEM, BET and XPS to investigate the structural, morphological and elemental composition properties. N_2 adsorption-desorption studies showed that CCS-G indicates the maximum specific area of $112 \text{ m}^2 \text{ g}^{-1}$ related to CCS ($77 \text{ m}^2 \text{ g}^{-1}$). The CuCo_2S_4 /graphene electrode deliver a high specific capacitance 1625 F g^{-1} at relative current density of 2 A g^{-1} and high cyclic retention of 97% after 5000 cycles experiment. Interestingly, asymmetric device CCS-G//AC was fabricated and it shows high energy density of 27 Wh Kg^{-1} with relative power density of 5100 W Kg^{-1} . The sandwich type dye sensitized solar cell (DSSC) was fabricated and tested the J-V and IPCE analysis. The finding reveals that CuCo_2S_4 /graphene electrode shows high PCE (11.85%) and long term stability. The superior PCE of the composite is due to the heterostructure, mesoporous nature and high surface area with enhanced light harvesting capacity. Due to the high photovoltaic and electrocatalytic activity of CuCo_2S_4 /graphene heterostructure can be useful for energy conversion and storage device applications.

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Progress towards a novel NO₂ gas sensor based on SnO₂/RGO hybrid sensors by a facial hydrothermal approach

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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 SnO₂ nanoparticles (NPs) decorated reduced graphene oxide hybrids sensors. The microstructure and elemental composition of the samples were analyzed through XRD, SEM, TEM, BET and XPS analysis. The concentration of rGO in SnO₂ is varied from 0 to 5 wt%. In the meantime, a series of resistant-type gas sensors based on composite SnO₂/rGO and pure SnO₂ were manufactured and tested for gas sensing analysis towards NO₂ and CO₂. The composite sensor exhibited enhanced sensing performance towards NO₂ gas such as high response (88.9), fast response (12 s) and recovery time (34 s), selectiveness and repeatability. The synergistic impact of SnO₂ and rGO significant function in 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 \$5 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); defence (for detection of explosives and chemical warfare agents); and environment (for detection of VOC pollutants accounting for 37% (693 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 composites 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: nontransition and transition [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], catalysis [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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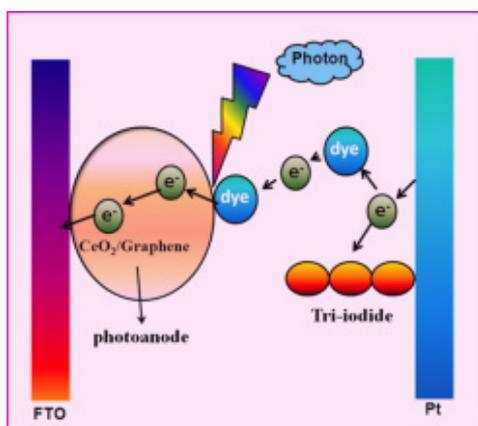
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Short communication

A simple and one step low cost microwave induced low cost grapheme modified CeO₂ photo electrodes for high-efficiency dye-sensitized solar cellsR. Gayathri^{a,*}, G. Raja^a, P. Rajeswaran^b^a Department of Chemistry, Paavai Engineering College, Namakkal 637018, Tamilnadu, India^b Department of Chemistry, Vivekanandha College of Arts and Sciences for Women, Tiruchengode 637205, Tamilnadu, India

GRAPHICAL ABSTRACT



ARTICLE INFO

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ABSTRACT

The photovoltaic properties of CeO₂ nanoparticles were improved when composited with graphene making this material as a potential candidate for high performance dye sensitized solar cells (DSSCs) device applications. Pure CeO₂ with various composite of CeO₂ and graphene photoanodes were successfully fabricated via microwave irradiation method. The fabricated photoanodes were characterized with various techniques XRD, SEM, Raman, XPS, UV-DRS, PL and BET analysis. Cubic structure with uniform individual spherical shaped particles (30–35 nm) was consistently wrapped on the graphene nanosheets. Mesoporous nature with high surface area (83.5 m²/g) and pore size (29.3 nm) was gotten by the optimized (3:1) CeO₂ incorporated graphene composite photoanode. A considerable red shift in optical band gap energy and the significant reduce in the recombination of electron-hole pair process was identified through UV and PL analysis. FTO substrate has been used to making the photoanode (CeO₂/graphene) and counter electrode (platinum), which are finally constructed by sandwich type dye sensitized solar cell device. The J-V plot reveals that CeO₂/graphene hybrid photoanode deliver a high power conversion efficiency of 7.95%, which is comparatively higher than bare CeO₂ photoanode (4.48%). The improved PCE by graphene doping is also discussed in detail.

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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⁻¹ and 3 h, respectively. Langmuir isotherm model fitted better compared to the Freundlich model having a maximum adsorption capacity of 11.76 mg g⁻¹, 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 ΔS , ΔH and ΔG 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

A facile synthesis of DBSA doped poly (aniline-co-3-bromoaniline) nanostructured copolymer: Its electro active properties

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Abstract

A new copolymer, aniline-co-m-bromoaniline has been synthesized using DBSA with different molar ratio of monomers by chemical oxidative in-situ polymerization method. These polymers possess unique electrical and magnetic properties leading to wide range of industrial applications such as sensors, rechargeable batteries, electromagnetic shielding and solar cells etc. The synthesized polymer composites were subjected to various characterization techniques such as UV-visible spectroscopy, FT-IR spectroscopy, X-ray diffraction, Scanning electron microscopy. The copolymer samples were found to be soluble in common organic solvents like DMSO, NMP, THF and DMF. The UV-visible spectra show two major peaks at 342 nm attributing the $\pi - \pi^*$ transition and 600 nm indicating the $n - \pi^*$ transition. FT-IR spectra confirmed the formation of the benzenoid ring and quinoid ring of the copolymer system.

X-ray diffraction pattern confirms the amorphous nature of the polymer. SEM image reveals a large number smooth surfaced and agglomerated granular structure. Thermal analysis shows that the copolymer composite is highly decomposition temperature, thermal stability than that of its homopolymer possessing higher thermal stability. The electrical conductivity study indicates that the increase in 3-bromoaniline monomer feed ratio causes decreased in conductivity.

Keywords: Aniline, 3-bromoaniline, in-situ polymerization, surfactant, conductivity.

Introduction

Syntheses of nanosized conducting polymers have gained more interest because of their captivating properties. Among the various electro active polymer, polyanilines (PANI) have grabbed a great attention due to ease of synthesis, high conductivity, environmental stability and low cost. PANI is found to have electrifying applications in light emitting devices (LEDs), schottky diodes, solar cells, light weight batteries, sensors and electro chromic devices^{5,28}. Conversely the applications of PANI are limited due to its

poor solubility in common organic solvents and processability. The poor solubility produces some complexity in the film formation, which is the main requirement for device fabrication²⁶.

Therefore, copolymerization reaction of aniline with different monomers was found to improve the processability. Several research works were done to improve the solubility of PANI, substitution in alkyl chain, derivatives of PANI and copolymers have been synthesized¹⁹. The lateral substituent present in the polymer chain reduces the stiffness of the polymer chain and improves the solubility characteristics.

Also, it decreases the overlap of p-electron, nitrogen lone pairs and leads to decreases in the conductivity²⁴. Substituted PANI can be prepared by chemical or electrochemical polymerization of aniline with ring substituted derivatives²⁰. Also doping of PANI with suitable dopant like protonic acid, sulfonic acid is another way to improve the processability^{3,17,18}. Recently, nanostructured conducting polymer was synthesized by template assisted method and self assembly processes to obtain ordered nanoscaled dimensions.

Several studies has been reported to prepare PANI dispersion; polymerization of aniline in micelle^{3,13}, emulsion^{15,16} and reversed microemulsion⁷ as a polymerization medium. Halogen substituted aniline copolymers such as fluorine², chlorine¹, iodine³² and bromine¹⁰ groups in polymer chain have been examined well. It has been reported that the presence of electronegative group such as fluorine and chlorine decreases the electrical conductivity¹².

The halogen substituted aniline copolymers depict significant electrical conductivity and superior solubility⁹. The electrical properties of the copolymer also depend on the electron withdrawing and electron donating group present in the polymer chain because of the variation in electron charge density in the polymer matrix, forces, bonding nature and therefore a research attempt was made to synthesize a novel polyaniline copolymer in nanoscaled features with improved electrical conductivity for industrial applications^{6,11}.

Roy et al²² reported on the chemical synthesis of homopolymer and a copolymer based on o-bromoaniline and