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BIST-Based Low Power Test Vector Generator and Minimizing Bulkiness of VLSI Architecture*

J. Praveen† and M. N. Shanmukha Swamy‡
J.S.S. Research Foundation, Mysuru University, Mysuru, Karnataka 570006, India
†*praveenj_vishruth@yahoo.in*
‡*mnsjce@gmail.com*

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In several pseudorandom built-in self-test (BIST) circuits, the applied test vectors will be generated by a linear feedback shift register (LFSR). This type of test pattern generator (TPG) may generate some repeated test patterns, which unnecessarily increases the test power without contributing much to the fault coverage. Based on the vast designs of TPG engine, the chip area also increases by contributing for the overall power consumption of the IC. This paper presents an approach called *low power — bit complements test vector generation* (*LP-BCTVG*) *technique* with bipartite (half fixed) and bit insertion (either 0 or 1) techniques. In order to reduce the test power, the LP-BCTVG inserts appropriate intermediate vectors in between consecutive test vectors generated by LFSR circuit. Hence, the application of final output vectors of LP-BCTVG circuit over circuit under test decreases the test power compared with LFSR-based BIST. By complementing the output bits of LP-BCTVG, we can reduce the bulkiness of TPG engine approximately by half. This further contributes to the reduced IC size. The obtained simulation results prove that this technique can reduce the overall test power consumption along with better fault coverage when compared with LFSR-based BIST and other recent methods. Here, the proposed approach has been tested on several ISCAS'85, ISCAS'89 and ITC'99 benchmark circuits.

Keywords: Built-in self-test (BIST); linear feedback shift register (LFSR); circuit under test (CUT).

1. Introduction

The overall power dissipation in an integrated circuit (IC) is contributed by static, dynamic, leakage and short circuit power dissipations. For CMOS type circuits, the static power dissipation is quite small and can be negligible. The short circuit power dissipation and leakage power dissipation together contributes around 20% of total

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‡Corresponding author.

A Standard-basis Based CDMA NOC Design

Prasad Nathu M, Dr. Praveen J
Alvas Institute of Technology, Mangaluru, Karnataka, India

***Abstract*— NOC's has come into existence to resolve the problems in the conventional bus based on-chip communication. Earlier circuit switched and packet switched methods were employed in NOC's and recently CDMA based NOC's have gained popularity because of its capability of handling communication nodes concurrently. The CDMA technique is very handy in SOCs for establishing communication among a large number of integrated components on the same chip. The CDMA spreading codes for NOC such as Walsh codes were used for implementing the encoding/decoding part of CDMA and recently a new spreading code called Standard-basis Based (SB) was used in the encoding/Decoding process. In this paper, the CDMA NOC using the Walsh codes and SB codes are implemented individually on FPGA SPARTAN III kit. The design is coded in Verilog on Xilinx ISE and simulated using Modelsim 6.3f. The CDMA NOC SB and WB Coding designs are implemented on FPGA –Atrix7 and the performancesare compared. The implementation results of the two methods are compared.The designed SB code CDMA NOC has improved 30.11% area in LUT slices, 12% reduction in total power consumption and 4% faster.**

Keywords—Network on Chip; CDMA; Spreading code; FPGA;

I. INTRODUCTION

In SOC's the increase in the number of IP cores have made the traditional bus based on chip communication replaced by Network -on-chip to reduce the complexity and provide parallelism in communication between IP cores implemented in SOCs. NOC's provide a structure for providing communication between a large number of IP cores and other components on Chip. The NOC structures are of two types circuit-switched and packet-switch networks. In circuit- switch type, routing resources are allocated by the NOC to establish a link between the sender and the receiver.TDM and FDM are the two techniques used by the circuit switched NOC to share the bandwidth. The circuit switched NOC type suffer from complexity and contention problem for a large number of interconnected components such as found in SOC's. Packet switch NOC overcomes the shortfalls of circuit switched type allowing data packets use a shared link for communication, thereby eliminating contention problems. This type suffers from a large variation in packet transfer delays when using multi-hop point to point connection. To overcome this drawback, a CDMA technique has been utilized in NOC.

Traditionally CDMA was known to be one of the popular wireless communication multiple access techniques, but now CDMA is employed in wired communication primarily to provide on-chip communication. The CDMA technology uses encoding/decoding procedure to transfer data from different users simultaneously. The data is multiplied with a spreading code at the sender side to get encoded data and such encoded data from different users are sent simultaneously over a common link. The received data is multiplied with the spreading code at the receiver end. The above principle can be made use of in NOC to provide on-chip communication however the spreading code used in NOC are different to that used in wireless communication.An important feature of spreading codes is it possesses orthogonal and balance properties. Codes being Orthogonal refers to the autocorrelation of codes should be one while the cross-correlation should be zero which aids in sending different data on different code without any interference. Balance property refers to the code having an equal number of ones and zeros. These properties make the CDMA method less prone to noise and interferences.

The CDMA NOC architecture which uses "Walsh codes" is described in [4]. An 8 bit Walsh code encoding procedure was shown in [2].For a Walsh code of X bits, X-1 simultaneous communication is possible. A CDMA NOC based on standard–basis (SB), encoding/decoding method, is proposed in [7].

In this paper, a performance evaluation of the Walsh codes and the SB codes is performed. An NOC based on Walsh codes is designed and implemented on FPGA and similarly, the SB code is implemented. A comparison of the implementation parameters such as Area and Power is done.

The paper is organized as follows Section II discusses the Background of CDMA in NOC Section 3 discusses the review of literature Section IV presents the Implementation Section V is the Results section while Section VI is the Conclusion.

II. OVERVIEW

A) CDMA NOC Structure

The CDMA NOC is a packet switched communication NOC which uses spreading CDMA codes. The architecture FOR CDMA NOC consists of

1) Network-Node
2) Transmitter module
3) Network-Arbiter module

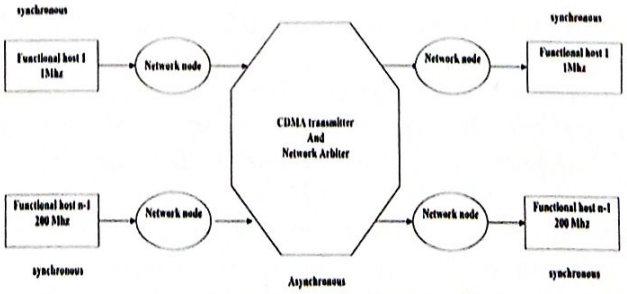

Figure1 shows the structure of CDMA NOC

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Acoustic Event Recognition for the Application of surveillance

Ms.Supriya.A.M[1], Ms.Vandanashree J S [2],Prof. AneeshJain.M.V [3]
Department of Electronics & Communication
Alva's Institute of Engineering& Technology, Mijar, Moodbidri

ABSTRACT: *From few decades many systems was designed and proposed for automatically detecting the situations on road such as accidents to safe guard quick intervention of the emergency teams. However in some situations visual data is not efficient and sufficiently reliable. So use of audio event detectors and microphones along with the existing systems improves the overall reliability and obtains efficient results in surveillance systems.*

The name Acoustic Event Recognition (AER) deals with detection, classification and recognition of unstructured or unmannered environment which may contain overlapping sound events and non-stationary noises in the background. Many sounds along with noise contribute to the context of the surrounding environment. So noises must not be degraded. As such noises are commonly useful in Automatic Speech Recognition (ASR) which are also useful for many surveillance applications.

Keywords-Acoustic event recognition, Mel-Frequency Cepstral Coefficients, Perceptual Linear Prediction, tire skidding, car crashes.

I.INTRODUCTION

Even though a variety of techniques has been developed for acoustic event recognition. The most standard approaches are often based on frame features like Mel-Frequency Cepstral Coefficients and Perceptual Linear Prediction (PLP) of ASRare used to train the Support Vector Machinefor classification process. While these methods are effective in ASR for particular source speech recognition, such systems may not perform well in the motivatingunequal conditions present in many AER tasks.

The aim of acoustic part classification is to classifytest recording into one of pre-defined classes that personifies the environment in which it was recorded driving the human ability to Categorize and recognize sounds and sounds capes. The dataset for example botanical gardens, path, workplace etc. The acoustic data will include recordings from 20 frameworks are taken to understanding the perceptual processes consists of recordings from various acoustic sections, all having distinct recording locations. Each audio file is recorded 2-6 minute long. The original audio files were then splitting into segments with a length of 10 seconds. These audio segments are provided to individual files.

The MFCC features, widely used for several audio recognition tasks like speech recognition or speaker identification, are sensitive to additive noise. When the energy of an event of interest decreases, it becomes comparable with the one of the background noise and it is more difficult to discriminate such events [1].The events are modelled using a network of hidden Markov models; their size and topology is chosen based on a study of isolated events recognition. For event detection, the system performs recognition and temporal positioning of a sequence of events. An accuracy of 24% was obtained [2]. An experiment with an acoustic surveillance system comprised of a computer and microphone situated in a typical office environment. All interesting acoustic events over duration of more than two months were recorded. A number of low-level signal features are computed from the audio signal and used to classify and identify sound events. The analysis reveals interesting activities which would be difficult to find by any other means [3]. The case where a typical situations such as screams, explosions and gunshots take place in a metro station environment. Their approach is based on a two stage recognition, each one exploiting HMMs for approximating the density function of the corresponding sound class. More precisely explosion sounds, corrupted by metro station

Miniaturized Cnc Plotter for Pcb Etching Using Arduino

Mr.Poornesh K R, Mr.Abhijeet S, Ms.Vanishree, Ms.Manjushree, Prof. Sudhakara.H M
Department of Electronics & Communication
Alva's Institute of Engineering & Technology, Mijar, Moodbidri
poorneshkr24@gmail.com

Abstract: CNC plotter machine is a 3D controlled 2D plotting machines which uses a pen to draw text or image on any given solid surface. It can be used for the purposes such as PCB Design, logo design, etc. This project is based on CNC plotter machine. With the increasing demand for the use of CNC plotters in universities and laboratories, a cheap and less complex design is an absolute need. The parts used for the plotter in our project are easily available at a very low price and spare parts are also used. The construction is very simple and robust.

INTRODUCTION

CNC Machine is a generally used in the manufacturing sector that involves the use of computers to control machine tools. CNC stands for Computer Numerical Control. CNC technology produces biggest change in the world of digital electronics & Micro-controller. Project proposed here uses an idea of CNC bit plotter using ARDUINO UNO. The idea behind this project is to make a small CNC machine which can be used for etching the PCB Board. It uses three stepper motors as linear actuators on each axis X, Y & Z. While etching, the PCB synchronization of this entire three axis i.e. stepper motors, is most challenging task. At present the data to draw is given programmatically i.e. hard coded in program in binary format. A bit touches the surface & prints the pixel for logic 1 and lifts up in air for logic 0 & actuator changes its position for next commands execution.

G codes are preparatory Function. G codes are pre-defining Function Associated with the movement on machine axes. In CNC Plotter Machine only G codes are used. G codes are giving the Direction to move the pen in X, Y, Z directions. Pen can be changed by tools of drilling, laser cutting tool, milling it can be worked, if it is made in large size. The aim of over is to make a mini CNC plotter machine which is capable to draw difficult design in paper or surface of metal, To cut it with a great accuracy. We have used 3 stepper motors with lead screw in Cartesian coordinate X, Y, Z directions. Stepper motor is convert digital pulse into lead screw rotations. Stepper drivers are used to give command to the system. The main aim is to fabricate a MINI CNC plotter Machine to draw an object with using G codes. We also work on to reduced cost of the project and increase Reliability and Flexibility. In we have replace pen with mechanical tools drilling, grinding, machining etc. This will be used for soft material cutting or machining, laser cutting machine tool is also worked on this setup. We have reduced the cost, in the setup of mini CNC plotter machine.

ISSUES OF PROJECT

The PC provides X, Y, Z co-ordinates and by using the PC software read the file which is generated by the PCB design software. The basic 8051 microcontroller and drilling driver are designed by relays makes system bulky and does not provide, high amount of current in order to drive the motor exactly. System consists of three 3 stepper motors and one AC motor to control drill. Major issues in PCB designing are the complexity and instability of the system. In this project, the developed software takes the position of the drill hole. Than it calculates the previous and current co-ordinate and sends the coordinate information. The path planning algorithm optimizes the use of the motors and other mechanical paths involved in the process while reducing total time taken to cross all the drill holes.

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Research Paper

Error Detection in 2D Orbit of GPS Satellites Using GPS Navigation Data File from GNSS Receiver

Ashok Singh Raj Purohit[1], Harshith Somanna PB[1], Anushree Shettigar[1], Apoorva D[1], Dr. Dattathreya[2]

[1]Department of Electronics and Communication, [2]Senior Professor and Dean Planning, AIET, Moodbidri, Mangalore

Corresponding Author: Ashok Singh Raj Purohit

ABSTRACT

This paper is to detect the error present in 2D orbits of the GPS satellites based on GPS navigation data file generated from GNSS receiver by comparing with the SP3 file by using MATLAB. The Receiver Independent Exchange Format (RINEX) File is used to extract the parameters from GPS navigation data file. The extracted parameters are used to find XYZ coordinates of GPS satellite and are plotted in 2 dimension by using MATLAB. The XYZ data extracted from SP3 file is plotted in 2 dimension and variance is found between XYZ coordinates extracted by SP3 file and GPS navigation data file in MATLAB.

Key words- GPS, GNSS receiver, SP3 file, RINEX File, MATLAB software.

I. INTRODUCTION

A satellite navigation system with global coverage is termed as Global Navigation Satellite System (GNSS). The GNSS system is used to find out geographic location of user anywhere in the world. This GNSS system include United States Global Positioning System (GPS), Russian Federation's Global Orbiting Navigation Satellite System (GLONASS), Europe's Galileo and many more. (Fritz J et al.) The GPS is a space based radio positioning system that provides3 dimensional position, time and velocity information in any type of weather, anywhere on the Earth to users. (Ashok Singh Raj Purohit et al.)

The GPS satellite is operated by U.S. Department of Defense which consists of 32 satellites out of which 24 are visible at a time and aims at determining the user position, time and velocity accurately. The Space, Control and User segments are the different segments in GPS. (Ashok Singh Raj Purohit et al.) The Space segment consists of a constellation of satellites transmitting radio signals to users. The Control segment consists of monitor stations and control stations that maintain satellites in proper orbits and rectify the satellites clocks. The User segments consist of GPS receiver equipment, which receives the signals from GPS satellites and uses to calculate position and time. (Paolo Dabove et al.)

The Standard Product 3 (SP3) is a precise ephemeris orbits in sp3 format. SP3 is an error free data file which is obtained by Scripps Orbit and Permanent Array Center (SOPAC). SOPAC provides several GPS satellite orbit files. (Sekath Varma et al.)

II. DETERMINATION OF PATH OF SATELLITE ORBIT

The GPS satellite path is obtained from GPS navigation data file. There are some parameters which are information source for evaluation or estimation of GPS

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RINEX Analysis Method for the Detection of Multipath Error at AIET using MATLAB Software.

Govindrao M Mahendrakar[1], Harshitha S[2], Keerthi Vadeyar[3], Shashikumar Magadum[4]

Dr. Nirvikar Dashora[5], Dr. Dattathreya[6]

[1234] (Department of Electronics and Communication, Alva's Institute of Engineering and Technology, Moodbidri, Mangalore)

[5](Scientist F NARL-ISRO), [6](Senior professor and Dean Planning, AIET)

Abstract - GPS multipath signal arrives by more than one path and it is a source of positioning error which cannot be easily neutralized. The multipath environmentcan be understood by the direction and distance of the objects. MATLABtool is used to read the RINEX data extracted from the GPS receiver. This technique uses signal-to-noise ratio (SNR) time series and also helps in finding the portion of antenna affected by multipath error with their corresponding frequencies. SKYPLOT from stations with different multipath environments are plotted. The plot is in terms of elevation angles, azimuth angles and SNR data.The carrier phase multipath isdirectly related to SNR. Long-delay multipath signals are the signals where the reflected signal is delayed by greater than0.1 millisecond. Some equations of elevation and azimuth angles computed through MATLABdemonstratethat the frequency content of SNR data is directlyrelated to the multipath environment.

Keywords-GNSS receiver, GPS, RINEX FILE FORMAT version 3.03, MATLAB software, AZIMUTH and ELEVATION angles, SKYPLOT and SNR values.

I. INTRODUCTION

A satellite navigation system with global coverage is termed as global navigation satellite system(GNSS). At the end of 2016 only the United States global positioning system (GPS), Russia's GLONASS and the European Union'sGALILEO were global operational GNSSs.Under GNSS there are 5 satellitesGPS, GLONASS, GALILEO, BEIDOU and IRNSS [4].

GPS (GLOBAL POSITIONING SYSTEM):

TheGlobalPositioning System consists of 32 medium earth orbit satellites in 6 different orbit planes. GPS is operational since 1978 and it is available globally since 1994. GPS is currently considered has the world'smost utilized satellite navigation system. The GPS consists of three segments [10]. They are:

1. Space segment.
2. Control segment.
3. User segment.

The receiver position of GPS is computed based on data received from satellites.The errors may occur due to following effects:

1. Atmospheric effects
2. Multipath effects
3. Ephemeris and clock errors effect
4. Geometric dilution of precision effect.
5. Selectivity availability and relativity.

In this paper, the authors have explained about the detection of multipath error at different position [1].

Multipath describes how the signals from the GNSS satellites travel over multiple paths before they arrive at the antenna. Multipath can be described as the reflection of satellite signals. The reflection can be caused by metal, glass, water, wet leaves, wet ground etc. The satellite signals arrive at two different paths on to the receiver they are direct path and indirect path. Multipath reflections from nearby objects canarrive at short delays after the arrival of the direct path, which introduces errors inpseudoranges and carrier phase measurements [3]. The multipath errors are dependent on the surrounding environment to a large extent and these errors are different among the signals from different satellites producing errors in position, velocity, and

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Speed Control of Vehicle in Accident Zone

A Shabaz Khan[1], Chethan M N[2], Akash O[3], Ch. Rakesh Singh[4], Dr. D V Manjunatha[5]

UG Student, Department of ECE, AIET, Moodbidri, India.[1-4]

Sr. Prof. & HOD, Department of ECE, AIET, Moodbidri, India.[5]

ABSTRACT:Every year the density of vehicles are increasing rapidly, which results in more traffic related problems and leading to accidents. The causes for the accidents are over speeding, negligent driving and ignoring the road rules etc. These problems can be solved by using a system which alarms the accident zone or speed limit area, in response to these alarms the speed of the vehicle can be controlled in order to, avoid the accidents. The system can be implemented by using two methods such as RF communication and Geo-fencing. The proposed system is an attempt to control the speed of the vehicles, which is designed with software and hardware to enable the driver to get the speed of the area in which the vehicle is currently moving. The main focus of this project is to provide safety and precaution to the driver as well as to the passengers and to avoid the accidents which can save many lives.The framework makes utilization of two methods which are mentioned earlier. In RF communication method RF transmitter placed at accident zones (such as school zones, hospital areas and speed limit areas etc.) and RF receiver placed in the vehicle will communicate using electromagnetic waves. The microcontroller that is the brain of the project activates the particular action corresponding to the received signal. The prototype is implemented using geo-fencing technology to overcome from the drawbacks which are encountered in RF technology. Geo-fencing is a feature in software /program that uses the global positioning system to define the geographical area with different radius. In geo-fencing method, the software application provides an alert or notification to the controlling part of the system when the vehicle enters an established geo-fenced area. The microcontroller in the controlling part will perform the necessary action based on the notification to control the speed of the vehicle.

KEYWORDS:RF transmitter and receiver, speed limits, sign boards, accident zones, Geo-fencing.

I. INTRODUCTION

The road accidents are major cause for premature death and disability over the world from the past decades. As per the survey held by World Health Organization (WHO), around 1.3 million people are losing their lives due to road accidents every year and more than 50 million people get injured. The numeral count of road accidents are increasing due to over speeding, negligent driving, drink and drive, poor vicinity of roads etc. Among these reasons, over speeding is the major cause for the accident. The problem of over speeding becomes more dangerous in the rainy, winter and spring season. Also the roads which has full of turns are more prone to accidents.

In order to reduce the count of accidents, the respective department of government has been deploying necessary steps like sign boards, speed humps etc., these steps need an individual riders attention which is not taking place effectively. So that it is necessary to design the smart system to alert the driver about the accident zone and to control the speed of the vehicle. Using the advancement of technology a new system is designed to prevent the road accidents. There are various methods available in real time to design the system. But this paper presents two methods such as RF technology and Geo-fencing to control the speed of vehicle. In RF technology the system has two sections, transmitter and receiver. The transmitter has to be installed on the road side in accident zones, which transmits the speed limit of the particular zone. The receiver is embedded in the vehicle, which receives the data and alerts the driver about the zone to control the speed of the vehicle. In Geo-fencing, different geo-fenced area can be created by using GPS tracking software application as per the requirement with different radius. The location based values like latitude and longitude of mobile devices are keeping on updated to the server. When the devices enter the geo-fenced area, the notifications are sending

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A Review on Surface Acoustic Wave Sensor

Satish Nayak, Prabhakara, Raina Benita Lobo, Varshitha C R, D V Manjunatha
Alva's Institute of Engineering and Technology, Mijar, Moodbidri-574225, Mangaluru, Karnataka, India

***Abstract*— Surface Acoustic Wave (SAW) technology can be applied to create highly sensitive biosensors due to its extreme sensitivity to surface perturbation. The velocity of an acoustic wave depends upon the mass, density and stiffness of the piezoelectric substrate. The binding of antigens with antibodies, when immobilized in the path of the traveling wave, changes the mass of the biolayer. The mass loading effect perturbs the surface boundary which changes the velocity of the wave and consequently shifts the frequency of the traveling SAW. With a pair of transmitting and receiving Inter-Digitated Transducers (IDT), high frequency SAWs can be generated through radio frequency interrogation at the free surface of piezoelectric material. In the future, bio-molecule immobilization and optimization of the sensors are necessary to develop fully functional devices.**

Keywords: **SAW sensor, Inter-digitated transducer, piezo-electric materials, MEMS.**

I. INTRODUCTION

Micro Electro Mechanical Systems (MEMS) technology is a process technology used to create timing integrated devices or systems that combine mechanical andelectrical components. MEMS technology exploits the existing microelectronics infrastructure to create complex machines on a micrometer scale. Extensive applications for these devices exist in both commercial and industrial systems. Well-known components such as integrated silicon pressure sensors, accelerometers and motion detectors have found use for several years in automotive and industrial applications.

Biosensor is an analytical device used for the detection of an analyte that combines a biological component with a physicochemical detector.

SAW sensors are a subset of acoustic wave sensor devices. Acoustic wave sensor are very versatile in that they may be used alone or as a part of a filtered sensor to measure many phenomena.

II. MOTIVATION

The early detection of cancer can significantly reduce cancer mortality and saves lives. Thus, a great deal of effort has been devoted to the exploration of new technologies to detect early signs of the disease. They can be used for risk assessment, diagnosis, and prognosis and for the prediction of treatment efficacy and toxicity and recurrence.

III. BIOSENSOR

Biosensors work with the principle of the interaction of the analytes that need to be detected with biologically derived bio-molecules, such as enzymes of certain forms, antibodies and other form of protein. These biomolecules, when attached to the sensing element, can alter the output signals of the sensors when they interact with the analyte. Proper selection of biomolecules for sensing elements can be used for the detection of specific analyte.

Importance of Biosensors

Biosensors have expanded giving rise to a vast frontier of interdisciplinary research that combines biology, analytical chemistry, physics and bio-electronics. From the first bulky biosensors built as academic curiosity, the field has shown a great deal of attractiveness thus becoming a research area that has successfully commercialized devices for multiple applications in a market that is worth many billion dollars. Different uses in medico-clinical, environmental, food-agricultural, security and forensic science, and other fields are making these devices increasingly popular. The question of defining what can be considered as a biosensor is difficult, but the most accepted concept nowadays is to be a device comprising of a biological recognition element attached or integrated into a transducer.

Application of Biosensor

Biosensors have been applied in many fields namely food industry, medical field, marine sector etc., and theyprovide better stability and sensitivity as compared with thetraditional methods.

Types of Biosensors

There are different types of biosensors based on the sensor devices and the biological materials and some of them are discussed below.

1. Electrochemical Biosensor

Electrochemical biosensor is a simple device. It measures the measurement of electronic current, ionic or by conductance changes carried by bio-electrodes.

2. Amperometric Biosensor

The biosensors are based on the electron's movement, i.e. electronic current determination as a reaction of enzyme-catalyzed redox reaction. Generally a normal contact voltage passes through the electrodes to analyze. In the enzymaticreaction which produces the substrate or product can transfer the electrons with the surface of electrodes to be reduced.

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Supermarket Self Checkout Based on LI-FI

Nagesha Gowda[1], Pooja D Patkar[2], Ranjan[3], Rashmitha K[4], Jyothi Pramal[5]
[1-4]*Students of Alva's Institute of Engineering and Technology, Mijar, Moodbidri, Karnataka, India*
[5]*Assistant Professor of Alva's Institute of Engineering and Technology, Mijar, Moodbidri, Karnataka, India*

Abstract **– Vast markets have an incredible assortment of merchandise furthermore, unique grocery stores may have distinctive dispersion of product. A large portion of the clients think that it's hard to remain in long line for charging the obtained items and they need to look through the item in the huge shopping centre. This is more time consuming. The shopping centres utilize different advances for electronic business to save the time and to increase the comfort basic viability required for charging in regular day to day existence. For each innovation utilised as a part of markets requires tag and peruser. The tag is remarkably created character which is connected on the item that distinguishes the items exceptionally. The reader is an electronic gadget that distinguishes the label which is known to it. The principle goal of proposed framework is to give innovation oriented, low cost, effectively scalable and tough framework for helping shopping face to face. Markets areconstantly bustling stores there are offering is in the feed.**

Staffs need to monitor the items they pitch to ensure what they are offering is in the feed.

Keywords **– Li-fi module, Barcode, Android app, Wi-Fi module, Automatic billing system.**

I. INTRODUCTION

General stores are dependably the bustling stores, there are number of clients obtaining items in little or mass sum in regular daily existence and the grocery store administration staff need to monitor the items they offer, to ensure what they are offering is in the stock. Consequently the markets think of the different new advancements or frameworks that outcome in the brilliant charging and stock administration of the acquired things to spare the time required for the charging and furthermore stock or stock management. The charge is created naturally when the peruser recognizes item tag and the data put away with the tag. The data can be the item name and the cost of the item. The stock administration should be possible by creating and interfacing the product with these innovations. At the point when the peruser peruses data from the label it shows the cost and amount of the item which is being acquired by client. After checkout, the obtained things are deducted from the fundamental database server which deals with the stock and amount. These new advancements are in effect exceptionally valuable in today's life by decreasing the bunches of endeavours and human work. There are numerous such advances like Barcode, QR Code, RFID, and OCR. The advancements utilized as a part of current charging framework.

II. LITERATURE SURVEY

Mohit *et. al* [1] has proposed , A super market is a place where people have to do self-service. It contains a many section than a traditional grocery store. In metro cities shopping and purchasing is becoming daily activity at big malls. During the holidays and weekend or whenever any discount is there, there will be a huge crowd at the malls. The people have to wait in long queue in order to pay the bill. It is time consuming. In order to overcome this problem a wireless integrated passive RFID based shopping system is proposed. This system consists of RFID tag for every products and trolley attached with display, microcontroller and zigbee. The LCD utilized is a 16x2 and zigbee modules make the remote system to work even at long separation due to its wide range. The concise depiction of its activity is, the point at which you pick an item and drop it into the trolley, the RFID scanner filters the item's exceptional code and its cost. Also, it gets showed on the LCD screen. So after costumer has completed with the shopping he/she needs to visit the counter and pay the charge as showed on the LCD screen fitted on the trolley. This will spare the time that was before being expended to check everything.

Janhavi *et. al* [2] has proposed Smart Trolley System for Automated Billing using RFID and ZIGBEE, In this paper every item will have the latent Radio Frequency ID label which is bearing a remarkable Electronic Product Code gives the data about the item i.e. its name and cost. At the point when the client puts the item in the Smart Trolley, the Radio Frequency ID checks the tag and the Electronic Product Code number is produced that is beforehand known by Radio Recurrence ID peruser. Radio Frequency ID peruser passes the Electronic Product Code to the microcontroller 89S52 where the controllers put away in the Base Station, which is situated at the instalment counter. A portion of the data per item that is put away in the database incorporates its standardized identification, its name, cost and weight. The weight trait of an item has been decided for an approach to two fold check the character of the item so as to identify trickiness in the framework. A heap cell has been designed as a weight sensor. The yield of the heap cell is utilized as a part of the basic leadership process at the truck. On the off chance that the weight of an item evaluated by the heap cell isn't the same as the real weight of the item, it is translated as an instance of disparity.

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Review on Various Multipliers Designs in VLSI

Mr. Mahendra H N[1], Nikhil Aarya M[2], Shivakumar G[3], Vithoba M N[4], Yadappa H[5]
[1] *Assistant Professor, ECE, Alvas Institute of Engineering and Technology, Moodbidri(India)*
[2,3,4,5] *Student, ECE, Alvas Institute of Engineering and Technology, Moodbidri(India)*

Abstract: ***Among all the math tasks that exist, a processor consume a large portion of its time and hardware assets in doing multiplication when contrasted with different activities like addition and subtraction. In this paper similar examination is done of four multipliers to be specific, Array multiplier, Modified booth multiplier, Wallace tree multiplier and modified BoothWallace tree multiplier based of different execution parameters like speed, area, power and circuit complexity. It is important to plan a fast multiplier in VLSI in order to upgrade framework execution and system performance. Low Power VLSI circuit has turned out to be imperative standard for planning the vitality proficient electronic outlines for high performance and compact gadgets. In the majority of DSP application the basic activities are the multiplication. Multiplier is the most valuable task required in many hardware computation. Productive usage of multipliers is required in numerous applications. Working of a framework relies upon the execution of multiplier along these lines multipliers to be quick and expend less zone in equipment. In this paper, near comparision of various multipliers is done.***

Keywords: Multipliers; Adder Tree; Reducing Technique; Power Consumption; Area; Delay

I. INTRODUCTION

In this paper we will contemplate Array multiplier, Wallace multiplier, Bypassing multiplier, Modified Booth multiplier, Vedic multiplier and Booth recorded Wallace tree multiplier which have been proposed by various specialists. With the more propel methods in remote correspondence and fast ULSI systems in late period, the more worry in present day ULSI plan under which fundamental imperatives are Power, Silicon area and delay. In all the rapid application to Very Large Scale Integration fields, quick speed and less area is required At the point when the investigation of the different multipliers have been performed, Array multiplier is found to have the biggest postponement and huge power utilization while Booth encoded Wallace tree multiplier has the slightest deferral however it likewise have an expansive zone. We additionally understood that, with legitimate streamlining the execution of the multipliers can be expanded essentially, independent of the sort. Worldly working strategy upgraded exhibit multiplier postponement and power dissemination is found to increment by half and 30% separately while utilizing the in part watched procedure control utilization is decreased by 10-44% with 30-36% less territory overhead. Corner recorded Wallace tree multiplier is observed to be 67% quicker than the Wallace tree multiplier, 53% speeder than the Vedic multiplier, 22% quicker than the radix 8 stage multipliers. We additionally contemplate different improvement strategies for Wallace multiplier, bypassing multiplier, modified booth multiplier and Vedic multiplier.

II. ARRAY MULTIPLIER

Array multiplier performs augmentation of two numbers in view of the shift and add technique. Despite the fact that it has an exceptionally customary and efficient structure, its delay turns out to be expansive for a vast word length. Min C. Stop et al. (1993) [1] displayed another design utilizing double array tree structure at each stage of computation and
which incorporate double halfway item clusters, separated from one fractional item plane of a customary multiplier. It was discovered that that the speed of the multiplier is twice that of the traditional exhibit multiplier. Despite the fact that, it has 30% bigger silicon region, as a result of its standard structure, its design can be very conservative. Shivaling S. Mahant-Shetti et al. (1999) [2], recommend a low power cluster multiplier method utilizing transient working which is a structure with higher throughput and discovered that the multiplier execution has been expanded by half and 30% as far as deferral and power dissemination when contrasted with the regular exhibit multiplier. They additionally propose that, this working multiplier into two sections and permits just a specific part to play out the capacity while incapacitating the other part, along these lines, that the exchanging movement of the multiplier is noted. The test result demonstrates that the power utilization is lessened by 10-44%, region overhead by30-36% and under 3% delay in functional unit.

Design and Simulation of Branch Line Coupler using MEMS Comsol Multiphysics

Vasanth Kumar M[1], Gowda Rachita B V[2], Prof. Pradeep Kumar K[3]

Department of Electronics & Communication Engineering

[1-2] Fifth Semester UG Students, AIET, Moodbidri, Karnataka, India.

[3]Assistant Professor, AIET, Moodbidri, Karnataka, India.

Abstract: **- A Branch Line coupler is a device which can be used as single transmitting/ receiving antenna or can be used as splitter or combiner. The branch line couplers are very small and high performance devices in communication and microwave industry. A branch line coupler has plenty of wireless applications in the design of microwave and RF devices, Viz. balance amplifiers, mixers and phase shifters, antenna/array feeding networks etc., the branch line couplers uses quarter wave length transformers. In order to realize Simple Square shaped configuration for dividing the power or combining the power in low cost fabrication. However, the reduction of size plays important role at low frequencies. Hence, the size reduction of the device is highly desirable in modern communication systems.**

I. OBJECTIVES OF THE PROJECT

The objectives which we met by this design and simulation is

- High selectivity of various materials.
- Reducing insertion loss.
- Limiting on coupling loss.
- Control over return loss.
- Reduction of impedance.
- Various operating frequency.

Tools Used

- Operating System: Windows 10 / Unix / Linux
- Application Software's: COMSOL Multiphysics 4.3, Coventor ware

II. PROPOSED SYSTEM

In modern communication systems, various characteristics such as miniaturization and low-cost fabrication are required for passive circuit design. Therefore, compact branch-line couplers are important passive components that need to be enhanced.

- The miniaturization for various reports concerning the size reduction.
- The miniaturization method has a size reduction about 51%.
- Size reduction about 71% is achieved using symmetrical T- shaped structure.

In the past years, there has been great improvement in various reports concerning the size reduction. The miniaturization is achieved by using artificial transmission lines consisting of microstriplines periodically loaded with open-circuit shunt stubs in place of transmission lines, and this method has a size reduction about 51%. Size reduction about 71% is achieved using symmetrical T-shaped structure with quasi- lumped elements.

III. STEPS IN DESIGN METHODOLOGY

Selection Physics

In the model wizard 3D window the Radio Frequency>Electromagnetic Waves, Frequency Domain (emw) is selected. The Electromagnetic Waves, Frequency Domain Interface, found under the Radio Frequency branch in the Model Wizard, solves the electric field based time-harmonic wave equation, which is strictly valid for linear media only.

Design Parameters

Table1: parameters of branch line coupler

Name	Expression	Description
thickness	60[mil]	Substrate thickness
l_s	40[mm]	Length, substrate
w_line2	5[mm]	Width, line 2
l_line2	13[mm]	Length, line 2
l_line1	(l_s-l_line2)/2	Length, line 1
w_line1	3.2[mm]	Width, line 1
w_line3	3[mm]	Width, line 3
l_line3	13.6[mm]	Length, line 3
f_min	1[GHz]	Minimum frequency in sweep
f_max	5[GHz]	Maximum frequency in sweep
lda_min	c_const/f_max	Minimum wavelength, air
h_max	0.2*lda_min	Maximum element size, air
h_s	h_max/sqrt(3.38)	Maximum element size, substrate

* 'mil' refers to the unit millinch

In the above table the parameters like substrate thickness, length of the substrate, width of the lines, length of the lines, maximum frequency and minimum frequency in sweep and in air are mentioned. These parameters are used to design the branch line coupler. The above given values are varied and the

A Review: Bit Swapping Linear Feedback Shift Register for Low Power Dissipation

Priyanka[1], Priyanka Bangari[2], Priyanka H G[3], Rupesh N[4], Praveen J[5]

[1-4]*UG student, ECE Department, Alva's Institute of Engineering and Technology, Moodbidri, Karnataka, India*

[5]*Professor and Dean Academics, ECE Department, Alva's Institute of Engineering and Technology, Moodbidri, Karnataka, India*

***Abstract*- Bit swapping linear feedback shift register (BS-LFSR) is utilized in a conventional linear feedback shift register (LFSR) to decrease its power dissipation and enhance its performance. The proposed configuration, called bit-swapping LFSR (BS-LFSR), is made out of an LFSR and exclusive OR and a 2 × 1 multiplexer to decrease switching activity or number of transitions in bit swapping technique. Hence, it reduces dynamic power dissipation. Reduce in the dynamic power dissipation will decrease the efficiency of the circuit. Hence, the decrease in the switching activity will not decrease the performance.**

***Keywords*-Bit Swapping Linear Feedback Shift Register, Built in Self-Test, Low power**

I. INTRODUCTION

The Bit Swapping Linear Feedback Shift Register (BSLFSR) is acquainted with upgrade the execution of the fundamental LFSR. The BS-LFSR configuration is principally concentrating on decreasing of power dissipation by decreasing the switching activity in a conventional LFSR without compromising its capacity and performance. Like a conventional LFSR, the BS-LFSR can likewise create pseudo-random values in the register because of the feedback component. BS-LFSR is typically utilized as a part of Built in Self-Test (BIST) as a test pattern generator (TPG) which requires producing a most sequence. BIST strategy permits an incorporated circuit (IC) to perform self-check and test without requiring any additional equipment. This will prompt a lessening in the cost for testing and maintenance of an IC by providing with the test machine. In addition, it can identify any IC disappointments in a short span interval.

The efficiency of the BS-LFSR depends not just on the parameters. There has been broad research did to expand the performance and area of very large scale integration (VLSI) plans and in this manner enhanced

LFSR outline. In any 'case, some of these works, however, give an optimized area and execution, experiences high power dissipation. Power dissipation is an essential thought in VLSI circuits as it is required to improve the battery dissipation and increment the reliability of the VLSI circuit. Subsequently, another plan concentrating on enhancing the power dissipation is especially required.

The essential task of a Bit Swapping Linear Feedback Shift Register (BS-LFSR) is the same as a traditional LFSR. The principle normal for LFSR when differ with other shift registers is that it can create a random sequence by picking an appropriate feedback function. The time of grouping is (2n-1) for a n-bit LFSR with a most extreme length of 2n-1 long states. The most maximum arrangement is persistent and once the 2n-1 distinct value have happened, it will reuse for the next sequence. A feedback capacity can be planned by including a selective XOR on the yields of the flip – flop (at least two) and boost the yield into the contribution of the flip – flop, called taps. The additional 2x1 multiplexers will be included a conventional LFSR to decrease the switching action or number of changes utilizing bit swapping method.

II. LITERATURE SURVEY

Praveen J. *et al.*, [1] have proposed the Low Power BIST Based Pattern Generation for Low Power VLSI Architecture. After the exploratory outcomes it demonstrates up to 22.25% lessening at all out power contrast with normal LFSR.

R.Vara Prasada Rao *et al.*, [2] studies that paper on Power Optimization of LFSR for Low Power BIST implemented in HDL. By the result the total power consumed in modified LFSR is 46% less than the power consumed with normal LFSR.

Steven F. Quigley *et al.*, [3] have proposed a low-transition LFSR that depends on some new perceptions about the output arrangement of a conventional LFSR. The Test comes about to 65% and 55% decrease in average and peak power, individually.

V. Selva Kumar *et al.*, [4] have investigated a new method to reduce power consumption in BIST. To present a novel test design generator (TPG) called multiple single input change (MSIC) TPG to test the modules of the chip. In this the MSIC can save the test power by 7.5%.

Bin Zhou *et al.*, [5] have reported on a low power test-per-check worked in individual test built in self test (BIST). The trial comes about in view of ISCAS'85 benchmark circuits demonstrate that the proposed low power test-per-clock BIST scheme which has increased the efficiency of power, fault coverage and test pattern.

Dhanesh *et al.*, [6] examine the paper on Dual threshold bit-swapping LFSR for power reduction in BSIT. This paper proposes an original thought for joining double limit voltage

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Research paper

Ensemble EMD based Time-Frequency Analysis of Continuous Adventitious Signal Processing

B.B Shankar[1*], D. Jayadevappa[2]

[1]Jain University, Bengaluru, Karnataka, India
[2]Department of EIE, JSS ATE, Bangalore, Karnataka India
*Corresponding author E-mail: sankrubb@gmail.com

Abstract

The importance of lung sound analyses is increasing day by day very rapidly. In this paper, we present a new method for analysis of two classes of lung signals namely wheezes and crackles. The procedure used in this article is based on improved Empirical Mode Decomposition (EMD) called Ensemble Empirical Mode Decomposition (EEMD) to analyze and compare continuous and discontinuous adventitious sounds with EMD. These two proposed procedures decompose the lung signals into a set of instantaneous frequency components. Function (IMF). The continuous and discontinuous adventitious sounds are present in an asthmatic patient, produces a non-stationary and nonlinear signal pattern. The empirical mode decomposition (EMD) decomposes such characteristic signals. The instantaneous frequency and spectral analysis related to dual techniques specified above are utilized by IMF to investigate and present the outcome in the time-frequency distribution to investigate the qualities of inbuilt properties of lung sound waves. The Hilbert marginal spectrum has been used to represent total amplitude and energy contribution from every frequency value. Finally, the resultant EEMD analysis is better for wheezes that solves mode mixing issues and improvisation is seen over the EMD method.

Keywords: Adventitious, EMD, Hilbert spectral analysis, Wheezing, Crackle.

1. Introduction

The time-frequency analysis of adventitious sounds became more popular to achieve high accuracy of the diagnosed result. From Taplidou's era [12] time –frequency-based analysis of lung sounds has been designed. Thus, presented procedure utilizes a Short Time Fourier Transform which leaves the drawback of pathological and high noise robustness. The detection of robustness of different adventitious sounds well analyzed and presented [13]. Unfortunately, this could diagnose only internal noises leaving external noises unaltered. The respiratory sound wave (RSW) is multi-component, nonlinear, and non-stationary signals. This RSW consists of normal RSWS and abnormal RSW that is superimposed to RSW. There are mainly two types of abnormal RSWS are discussed in this context. The continuous adventitious sound RSW (CASRSW) as their duration is more than 85 milliseconds. The human ear can hear easily as the frequency range is between 100 Hz and 1 kHz. Thus, we can see the sharp peaks in the power spectrum. If the pitch of the wheeze is too low, then it usually referred as rhonchi (R A L E. "Adventitious Sounds") and discontinuous adventitious sound RSW (DASRSW). Normal RSW is random in nature, whereas CASRSW is quasi-periodic waveforms with a duration of more than 80–100 ms and a fundamental frequency of over 100 Hz, and DASRSW are transient and short sounds (around 20 ms), with high-frequency components (above 300 Hz) [4,5]. Adventitious sounds are usually detected more rapidly indicating abnormality of the respiratory system. The respiratory waveform of abnormality gives many variations in the wave characteristics of bronchial and vesicular sounds but only a few are widely recognized as there is a difficulty in verbal description. Coarse lung sounds, for example, indicates lower frequencies are accumulated and some of the higher frequencies are lost. The terms like cavernous, amphoric, conical and cogwheel also used but nowadays these are ignored as they are not having any clinical importance. As asthma becomes severe the wheezing is observed at the site chest. The variations in the normal respiratory sound exhibiting high pitched musical sounds which are produced in the airway is called adventitious sound. Adventitious sound can be noticed by a human acoustic system usually with inspiration and expiration stages. These adventitious sounds are continuous and discontinuous. The continuously generating adventitious sounds are called continuous adventitious sound (CAS), wheezes are the examples of CAS. The adventitious sounds that occur only for a certain period of time dis-continuously are called discontinuous adventitious sound (DAS). The crackles are the examples of DAS and crackles are of two types, fine and coarse crackles. The discontinuous adventitious sounds (DAS) are short, popping sound signals. The CAS is low or piercing sound wave created at the time of termination phase of breathing. The 'Rhonchi in the bronchi', the rhonchi is heard in bronchi. The Hilbert – Huang Transformation is the exceptionally successful nonlinear frequency verification tool for adventitious sound waves. The Fourier analysis technique is appropriate if the wave is linear and stationary. The inbuilt segments of unusual irregular sound waves must be separated and broke down precisely using time-frequency mode of examination. The non-stationary sound wave examination using wavelet transform and spectral analysis method is a suitable approach, But HHT calculation is utilized for agreeable precise outcomes. The energy level spectrogram is also plotted with the help of Hilbert spectral analysis for better examination. The review of adventitious sound regarding spectrum analysis in control after some time is accomplished by wavelet transform which gives an ideal harmony among temporal and frequency exactness. The

A Review Paper on Interactive Image Segmentation

Prof. Yuvaraj T, Nithin Krishna, Poojary Manish, Priya Naik, Varsha P

Department of Electronics and Communication Engineering, Alva's Institute of Engineering and Technology, Mijar, Mangaluru, Karnataka, India

Abstract: **- Due to advent of computer technology Image processing techniques have become increasingly important in a wide variety of application. Image segmentation is the process that partitions an image into region. One weakness in the existing interactive image segmentation algorithms is the lack of more intelligent ways to understand the intention of user inputs. Interactive Image segmentation aims to separate an object of interest from the rest of an image.**

Most of the previous work requires users to trace the whole boundary of the object. When the object has the complicated boundary, or the object is in a highly textured region, users have to put great effort into interactively collecting the selection. It achieves three goals from following three steps. First, merge over segmented region according to themaximal similarity rule using a few markingstrokes as input. Second, detect possible erroneous low contrast object boundaries by analyzing image content. Third, automatically refine those boundary regions using both local and global information.

I. INTRODUCTION

Interactive Image Segmentation has many applications in image processing, computer vision, and computer graphics.Image processing is a method to convert an image into digital form and perform some operations on it, in order to get an enhanced image or to extract some useful information from it. Our goal is to develop intuitive and intelligent image segmentation algorithms and tools that allow user to interactively guide the segmentation algorithm via a small amount of intuitive interactions until a satisfactory segmentation results that reflects both user intention and photometric features is achieved. The segmentation process is based on various features found in the image. This might be color information that is used to create histogram, or information about the pixels that indicate edges or boundaries or texture information.

For a good interactive image segmentation algorithm, there are two basic requirements: 1) given a certain user input, the algorithm should produce intuitive segmentation that reflects the user intent; 2) the algorithm must be efficient so that it can provide instant visual feedback.

Segmentation is of mainly two types

- Automatic segmentation:-It is a technique in which the background of any image is constant or fixed in nature. It refers to the process whereby segment boundaries are assigned automatically by a program.
- Interactive segmentation:-It is a technique which incorporates small amount of user interaction to define the desired content to be extracted, as received much attention in the recent years. In general, interactive image segmentation algorithm can be classified into two categories: boundary based approaches and region based approaches.

In boundary based approaches, the user is often asked to specify an initial area that is close to the desirable boundary.

In region based approaches, the user is often asked to draw two types of strokes to label some pixels as foreground or background, after which the algorithm completes the labeling of all other pixels.

II. RELATED WORK

The two categories of Interactive Image Segmentation include hard segmentation and Soft segmentation. Hard segmentation algorithm produces a binary map in which a pixel belongs to either foreground or background.

So It's segmentation algorithm extracting fractional matte for an image.

Interactive segmentation algorithm in early days uses either adobe's magic wand. The magic wand tool starts with a small user – specified region. Adobe magic wand includes boundary properties such as active contour and intelligent scissor. The magic wand tool grows through connecting neighboring pixels that for within some adjustable tolerance range of the color statistics of the specified region. The main problem with this method is that the contour is likely to be trapped in the local minimum. The intelligent scissors algorithm requires the user to place points along the desired contour of the foreground object. The problem with the intelligent scissors is that for the highly textured or un-textured regions there exist many alternatives minimal path, which requires large number of user interactions in order to obtain satisfactorily result.

The most recently used method is the Interactive Graph Cut Method which is based on improved Gabor features. This method integrates color features with reduced Gabor features and then employs graph cuts method to obtain segmentation method. Graph cut methods manage to find optimal segmentation boundaries and regions by taking image segmentation as the minimum cut problem in a weighted graph. The robustness is increased by the combination of color information in the graph cut method and an interactive learning approach.

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A VLC Enabled Indoor Navigation System for Visually Impaired People

Jyothi[1], Dr.Ponnambalam[2], Praveen Kumar.C[3]

[1] *Research Scholar, VIT Vellore, Tamil Nadu, India*

[2] *Associate Professor, VIT Vellore, Tamil Nadu, India*

[3] *Student, AIET Moodbidri, Mangalore, Karnataka, India*

***Abstract*-The WHO committee broadly estimated that about 10% of the world population is disabled. India is now been a home to the world's largest number of blind people. In an entire world there are 37 million people across the globe who are blind over 15 million are from India. In order to help blind people. Nowadays as our modern technology is developing people use a huge number of data to accomplish their work through wire or wireless network. In order to make easy transmission of data a new technology, Li-Fi has been evolved, where it transmits a data through LED lights in such a way that it is undetectable to human eyes. Li-Fi is a unique technology which is used in progression with WIFI (wireless fidelity) technology.**

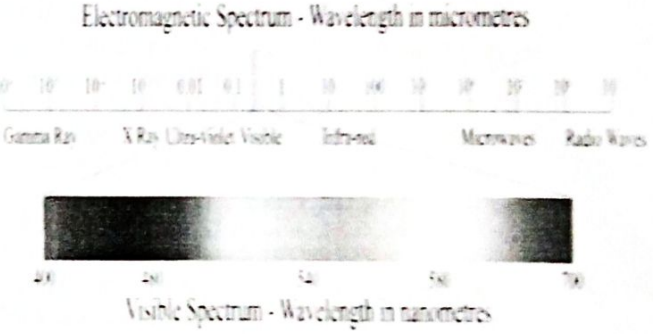
***Keywords*:--Wireless communication, Li-Fi, Led lights, Wi-fi.**

I. INTRODUCTION

Localization is one of key techniques that gain the increasing attention of researchers recent years. The location information, especially the indoor location, is important for navigation systems, heating and air conditioning systems, illumination adjustment, humidity control, robot service, and so on. Although the outdoor localization has already been well-developed using Global Positioning System (GPS), using GPS for indoor location sensing is difficult due to the poor coverage of satellites in indoor environments. To determine the indoor locations of mobile users, a number of techniques have been proposed and studied, most based on triangulation, fingerprinting, scene analysis, and proximity.

The goal of this work is to allow the visually impaired persons navigate independently in the indoor environment. Conventional navigational systems in the indoor environment are expensive and its manufacturing is time consuming. The visually impaired are at considerable disadvantage as they often lack the information needed while passing obstacles and hazards. They have relatively little information about land marks, heading and self-velocity information that is essential to navigate them successfully through unfamiliar environments. In this modern world providing security to each and every human being in life gains a major consideration. Everyone has realized the need to secure themselves against hazards and unauthorized dealings. This work aims at providing the navigation for the visually impaired persons, by designing a cost – effective and more flexible navigation system. It is our belief that the recent advances in technologies could help and facilitate in day – day operations of visually impaired persons.

Visible light communication (VLC) is a modern method of wireless communication using naked light. Typical transmitters are visible light LEDs and receivers are photodiodes and sensors. Location-based services are preferred for visible light communication applications. An indoor visible data transmission system using LEDs is proposed. In this system, devices are used for illuminating rooms and also for optical wireless communication system



Visible Light Communication (VLC) using Light Emitting Diodes (LEDs) comprises Optical Wireless Communication (OWC) links using visible light spectrum, in which LEDs are used with two functions, illumination and communication, simultaneously. In VLC, communication takes place by modulating the intensity of the LED light. VLC is a category of OWC, which also includes Infrared (IR) and Ultra Violet (UV) Communications, yet VLC is particularly of interest because the same visible light used for lighting is also used for communication.

VLC is the energy saving of LED technology. Nineteen per cent of the worldwide electricity is used for lighting. Thirty billion light bulbs are in use worldwide. Assuming that all the light bulbs are exchanged with LEDs, one billion barrels of oil could be saved every year, which again translates into energy production of 250 nuclear power plants. Driven by the progress of LED technology, visible light communication is gaining attention in research and development.

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Feeder Weeder for Autonomous Farming

Chethak
dept. of Electronics and communication
Alva's Institute of Engineering and Technology, Mijar,
Moodbidre, India
chethakshetty@gmail.com

Deepika
dept. of Electronics and communication
Alva's Institute of Engineering and Technology, Mijar,
Moodbidre, India
deepikabharadhwaj01@gmail.com

Rohan D'souza
dept. of Electronics and communication
Alva's Institute of Engineering and Technology, Mijar,
Moodbidre, India
dsouza.rohan.95@gmail.com

Arun Kumar
dept. of Electronics and communication
Alva's Institute of Engineering and Technology, Mijar,
Moodbidre, India
mearun64@gmail.com

Santhosh S
dept. of Electronics and communication
Alva's Institute of Engineering and Technology, Mijar,
Moodbidre, India
Santhoshs.nayak@gmail.com

Abstract— **Agriculture is known as backbone of Indian economy. A large number of rural households depend upon agriculture as their primary source of livelihood. Recent advances in technology have made it possible to increase output as well as reduce dependence on manual labour.**

Fertilizing plants and removing weeds is very important in agriculture. Weeds are traditionally removed by manually plucking them. The solution we derived is to use grid system for sowing plants. This way it is easier to differentiate between plants and weeds. By using robot module we can fertilize only the required area around root cavity. (This avoids human error of spilling). Because of the grid system the positions of plants is known before so that any other plants can be considered as weeds and removed.

In the proposed system Feeder-Weeder, we have considered a scenario where all of the work done on farms is automated by a group of autonomous robots working together in sync with each other. In this paper, concepts such as microcontroller programming, communication, path planning, sensor interfacing are used. An agricultural field with many crops growing in it is considered. Here some of these crops need to be fed with two different fertilizers. In addition to this, there are some weeds growing in the field which need to uprooted and disposed outside the field. In order to complete these tasks two Fertilizer Robots and a Weeding Robot are deployed in the field. To make this system work more efficiently, the robots communicate between each other to share information and coordinate with each other. The concept used in this paper is adopted from Swarm robotics where different robots communicate with each other using wireless Zigbee module and get the specified task done.

Keywords— Sensors, Microcontrollers, Robots, Path planning, Communication, Zigbee, Swarm Robotics.

I. INTRODUCTION

Fertilizers are chemical components which aren't advisable to be touched in bare hands. In Agriculture when nitrogen based fertilizers are manually applied to roots, some will fall to bare land which leads to growth of weeds on those areas. Another concern with modern day agriculture is the availability of manual labour. Thus implementation of robotics and automation will drive a change in mindset and will draw more people towards agriculture.

Weeds are traditionally removed by manually plucking them. The solution we derived was to use Grid system for sowing plants. This way it is easier to differentiate between plants and weeds. By using robot module we can fertilize only the required area around root cavity. (This avoids human error of spilling). Because of the grid system the positions of plants is known before so that other plants can be considered as weeds and removed.

In the proposed system we consider an agricultural field with many crops growing in it. Some of these crops need to be fed Red-fertilizer and others need to be fed Blue-fertilizer (red and blue are just symbolic representation to differentiate). In addition to this, there are some weeds growing in the field which need to uprooted and disposed outside the field. In order to complete these tasks two Fertilizer Robots and a Weeding Robot are deployed in the field. Each of the fertilizing robots carries one particular type of fertilizer

The task of the Fertilizer robots is to traverse the field and identify crops which are required to be fertilized and fertilize the crops which require the same fertilizer as the one it is carrying. The task of the Weeding robot is to identify and remove weeds from the field. To make this system work more efficiently, the robots communicate between each other to share information and coordinate with each other.

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Automated Robot to Find Lives in Debris Using Rocker Bogie Suspension

A. Shreya[1], Charan Raj S[2], Devika H S[3], Harshitha N P[4], Prof. Santhosh Nayak[5]

[1, 2, 3, 4] 6th semester, UG Students, Dept. of E & CE, AIET Moodbidri, Mangaluru, Karnataka, India

[5] Assistant Professor, Dept. of E & CE, AIET Moodbidri, Mangaluru, Karnataka, India

Abstract-**In this modern era, technological development lead the creation of sky scraper buildings and dwellings which increase risks of losing life due to natural and manmade disasters. Many people died by trapping under debris as their presence cannot detect by the rescue team. Sometimes, it is impossible to reach in certain points of the disasters in such calamity hit zones. The situation is worst for developing country because of low quality design and construction. This paper presents a way to find lives in debris using cell phone controlled rocker-bogie suspension type rover with a scooping arm. It has a wireless thermal camera with raspberry pi which transmits live video to a nearby laptop with a range of 100 feet. The scooping arm is attached to the rear portion of the rover and a motor controls the scooping operations using Bluetooth interfaced with Arduino.**

Keywords: **Rocker-bogie rover, Thermal camera, scooping arm, Arduino, Raspberry pi.**

I. INTRODUCTION

A. Introduce of the Rocker Bogie Suspension

Since 1960's many planetary explorations have been developed. The Rocker-Bogie system is the suspension arrangement used in the Mars rovers (mechanical robot) for both the Mars Pathfinder and Mars Exploration Rover missions. It is currently NASA's favored design [1].

The term "rocker" comes from the rocking aspect of the larger links on each side of the suspension system. These rockers are connected to each other and the vehicle chassis through a differential. Relative to the chassis, when one rocker goes up, the other goes down. The chassis maintains the average pitch angle of both rockers. One end of a rocker is fitted with a drive wheel and the other end is pivoted to a bogie.

The term "bogie" refers to the links that have a drive wheel at each end. Bogies were commonly used as load wheels in the tracks of army tanks as idlers distributing the load over the terrain. Bogies were also quite commonly used on the trailers of semitrailer trucks. Both applications now prefer trailing arm suspensions [2].

The rocker bogie suspension is a mechanism that enables six wheeled vehicles to passively keep all six wheels in contact with a surface when driving on severely uneven terrain. There are two key advantages of this feature the first one is that the wheels pressure on the ground will be equilibrated which is extremely important in soft terrain. The second advantage is that while climbing over hard, uneven terrain, all six wheels will remain in contact with the surface and under load, helping to propel the vehicle over terrain. The mobile mechanism have some excellent features, such as high speed on relatively flat terrain and easily control, so many researchers try to design their exploration rovers with wheeled structure.

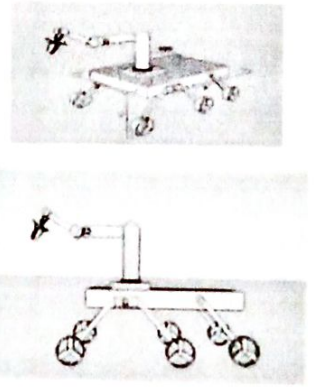

Fig 1: The principle of the six-wheel mobile mechanism.

The principle of the six-wheel mobile mechanism of rocker bogie suspension is above Fig (1). All six wheels are mounted on frame. The frame has two arms connected to the rover body. Each rocker has a wheel connected to the one end and a bogie, connected to the other end. The bogie is connected to the rocker with a free pivoting joint and at each end of the bogie, there is a drive wheel. The rockers are connected to the rover body with a differential joints so that pitch angle of the body is average of the pitch angles of the rockers. Here a rover is designed which can travel an any kind of unmanned terrain like inclined surfaces, rocky environment, lawns, debris and even on loose soil. For a rover to travel on such kinds of terrain is quite a difficult task because one has to select the right motor for the right environment and several other features necessary during the design[2].

B. Introduce of the Thermal camera

Thermal camera is used to detect human. The camera figures out the candidate region of human, erosion and dilation and size filtering are applied to the raspberry pi. By processing the video thus we can get the region human candidates and then it transmitted to Controller. The robot can be operated to bring the human bodies to safer place from the debris using scooping arm. The filtered images from raspberry pi is shown in below Fig(2).

Co-ordinate Transformation of Satellite Orbits for Ionospheric and Tropospheric Pierce Points: Visualization and Computation

Pooja S.K[1], Pooja Arekal K[2], T Hithaishi Mohan[3], Yashodha A B[4], Prof. Santhosh S[5], Junior Scientist. Himanshu Sethi[6]

[1, 2, 3, 4, 5, 6] *Dept. of Electronics and Communication*

Alva's Institute of Engineering and Technology, Moodbidri, Mangaluru, Karnataka, India

Abstract: **Ionosphere, as one of the Earth's air layers, evolving condition, both spatially and transiently. It reaches out to a tallness of around 50 to 1000 km and is the fundamental assurance of the Earth and life on Earth from the risky impact of the Sun and the universe itself. One of real restrictions to accomplish precision when utilizing single recurrence GPS (Global position framework) recipients is the issue of postponements in flag proliferation through the ionosphere. Troposphere is the most minimal locale of the earth air and it stretches out from 6-10kms from the earth surface. Troposphere contains water atoms this prompts a tropospheric delay. These deferrals can be estimated by ascertaining ionospheric and tropospheric penetrate focuses.**

Keywords: **Ionospheric and tropospheric delay, Ionospheric Pierce Points (IPP), GPS. Total Electron Content(TEC)**

I. INTRODUCTION

A disentangled model of ionosphere is anticipated as it is hard to figure the Total Electron Content(TEC) along the observable pathway. The anticipated disentangled model is expected that the ionosphere is the thin, uniform thickness shell about the ionosphere which is situated close to the mean elevation H of most extreme TEC which is roughly 350km about the earth as appeared in the Fig.1. The flag which is transmitted from the satellite to the collector will cross the ionospheric shell, in this manner the convergence between the iewable pathway and this shell is known as Ionospheric Pierce Points (IPP).

The electron thickness in the ionosphere causes to the refraction of GPS signals. Nonetheless, this structure of ionosphere varies every day, regularly, opportune and it likewise fluctuates in like manner to geographic area. Because of that, the IPP or the elevation in the ionosphere where the structure of electron thickness is most prominent does changes contingent upon those criteria expressed before. Thusly, when the altitudes or IPP of those carrier frequencies GPS carrier frequencies, L1 and L2, propaga contingent upon those criteria expressed before. Thusly, when the elevations or IPP of those transporter frequencies are different. Regularly, the refraction of L2 is constantly more prominent than L1. This is additionally because of the nearness of ionospheric even inclination. The more noteworthy the slope, the more prominent the separation amongst L1 and L2 at one specific elevation or IPP.

Ionospheric Pierce Point

Ionosphere is one of the motivation to actuate blunders to a large portion of the Global Navigation Satellite System (GNSS). Since the speed of the microwave flag is influenced by ionospheric delay contingent upon their recurrence, this is known as scattering. By at least two recurrence groups postponements can be estimated which is utilized to quantify scattering, and this estimation can be utilized to compute delay at every recurrence. The Total Electron Content (TEC) in the ionosphere along the observable pathway from the satellite to the recipient is the primary wellspring of the scattering and ionospheric shell is given as IPP.

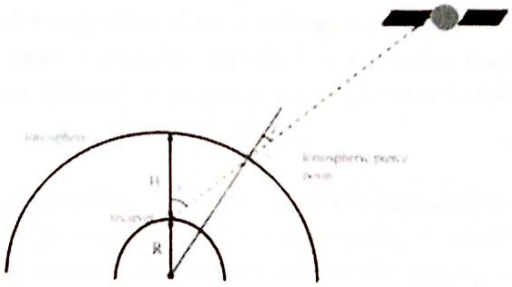

Fig 1: model of Ionospheric Pierce Point

Earth Centred and Earth Fixed (ECEF):

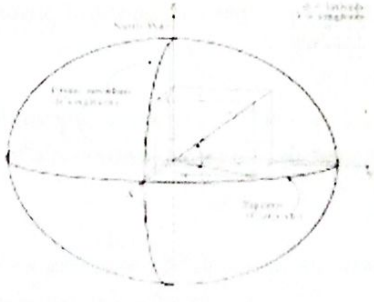

Fig 2: Model of ECEF

IOT BASED WATER UTILITY MONITORING SYSTEM

Mr.Nagaraj Dyavakkalavar, Mr.Manish Kumar Kalamat,
Ms.Ashmitha Soniya D'Souza
Prof .Pradeep Kumar K
Department of Electronics & Communication
Alva's Institute of Engineering & Technology, Mijar, Moodbidri

ABSTRACT:-Water is an important resource for all the livings on the earth, for life and its existence. To ensure the safe supply of drinking water it should be monitored in real time IoT (Internet of Things) based water utility monitoring has been proposed. The primary concept of real-time IOT based water resources information system is to provide comprehensive and accurate information. To meet the need of water requirement, its distribution and quality check, a water control valve is controlled through web interface based on water flow sensor value to ensure equal and adequate water distribution to each connection (end point).

Keywords: Water Monitoring, Water resources, Arduino Uno, sensors, Node MCU, Internet of Things.

Section 1: Introduction:-Water is an important resource for all the livings on the earth, for life and its existence. In that, some people are not getting sufficient amount of water because of unequal distribution. Using this approach everyone gets the equal amount of water.

It is also used to avoid the wastage of water during the distribution period. In the traditional method, the user will go to that place and open the valve for a particular duration, then again the user will go to the same place and close the valve, is waste of time. The proposed system is fully automated.

Here human work and time are saved. Due to a shortage of the fresh water, it is necessary to have control over water distribution. Hence, there is a need for better water distribution technology while also considering its quality. Due to increase in migration from a rural area to urban areas, the population in cities is increasing rapidly. It is a precious natural resource with fixed quantum of availability. With continuous growth in our country's population, the per capita availability of utilizable water is going down.

To ensure the safe supply of drinking water it should be monitored in real time IoT (Internet of Things) based water utility monitoring has been proposed. In this project, will implementing the design of IOT base water utility monitoring system that monitors the utility of water in real-time. This system consists of some sensors which measure the water quality parameter. The real-time monitoring of water resources information will benefit the water resources management department and the public. The primary concept of real-time IOT based water resources information system is to provide comprehensive and accurate information. The system is developed through defining some explicit water resource parameters then, Water level and flow parameter are defined for water measure & management, followed by a sensor network for water resources information monitoring is constructed based on IOT.

Section 2:-Problem Statement:-The water quality is observed only at the Municipal water tanks which are located zone wise and hence water quality is not been checked at end points where chances of water contamination is present due to rust in the pipeline, hole in the pipeline and some other reasons.

Even if water quality is checked at end points, it is time consuming, labor intensive and all end points are not going to cover. Hence, there is need of smart water distribution system with continuous water quality check

PRINCIPAL
Alva's Institute of Engg. & Technology,
Mijar, MOODBIDRI - 574 225, D.K

Optimization Bow-Tie Antenna and Its Parameters

Mr. Rohith Pawar[1], Mr. Basavaraj[2],
Prof:-Pradeep Kumar K[3]
Department of Electronics and Communication
[1,2,3]Alva's Institution of Engineering & Technology, Mijar, Moodbidri

Abstract: In this paper two proposed methods of input impedance calculation for Bow-Tie antenna are introduced. The proposed methods show input impedance calculation with high accuracy. Also, design Curves for input impedance values were developed depending on the geometry of antenna. The proposed design curves are used to design a Bow-Tie type RFID tag antenna. Recently the Bacterial foraging optimization algorithm (BFA) has attracted a lot of attention as a high-performance optimizer. This paper presents a hybrid approach involving Bacterial Swarm Optimization (BSO) and Nelder-Mead (NM) algorithm. The proposed algorithm is used to design a bow-tie antenna for 2.45 GHz Radio Frequency Identi¯cation (RFID) readers. The antenna is analyzed completely using Method of Moments (MoM), then the MoM code is coupled with the BSO-NM algorithm to optimize the antenna. The simulated antenna and the optimization algorithm programs were implemented using MATLAB version 7.4. To verify the validity of numerical simulations, the results are compared with those obtained using COMSOL Software Suite 4.3.

Keywords — Bow-tie Antenna, Underwater Communications, Wireless Fidelity, Wireless LAN.

INTRODUCTION

Antenna are a very important component of communication system. By definition, an antenna is a device used to transform an RF signal, traveling on a conductor, into an electromagnetic wave in free space. Antennas demonstrate a property known as reciprocity, which means that an antenna will maintain the same characteristics regardless if it is transmitting or receiving. Most antennas are resonant devices, which operate efficiently over relatively narrow frequency band.

An antenna must be tuned to the same frequency band of the radio system to which it is connected, otherwise the reception and the transmission will be impaired. When a signal is fed into an antenna, the antenna will emit radiation distributed in space in a certain way. A graphical representation of the relative distribution of the radiated power in space is called a radiation pattern.

A bow-tie antenna patterned on a dielectric substrate is optimized by changing the length of the arms and the flare angle to reduce the magnitude of S11, the reflection coefficient. The two geometric dimensions that are used as design variables directly control the size and shape of the antenna, and also affect the dimensions of the dielectric substrate. The gradient-free Nelder-Mead optimization method is used to improve the objective function.

The model of the bow-tie antenna consists of a rectangular dielectric substrate with two triangular faces on top representing a metal pattern, as shown in Figure 1. The flare angle and height of the arms define the antenna's shape. It is desirable to keep the size of the substrate as small as possible, so it is defined to extend a distance of 2 mm around the outline of the pattern. A lumped port excitation applied to a small rectangular face between the antenna arms mimics a 50 ohms transmission line feed.

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Transmission of Milli Watts Power in Circular Loop Antennas using MEMS

[1]Prof. PradeepKumar K, [2]Mr PranavPrakashLatti, [3]Mr. Prashantha Kumar H G, [4]Mr. Sujaya L, [5]Ms. Roopa B

[1]Asst. Professor, Dept. of E&CE, AIET, Moodbidri, D.K, Karnataka, India.

[2-5]UG Student, 8[th]Semester, Dept. of E&CE, AIET, Moodbidri, D.K, Karnataka, India.

Abstract: *Wireless power or remote transmission of electrical vitality from a power source to an electrical load without man made conduits. It is helpful in situations where interconnecting wires are badly arranged, dangerous or incomprehensible. It is completed utilizing direct acceptance took after thunderous attractive enlistment, electromagnetic radiation as microwaves or lasers and electric conduction through media. This framework now daily is exceptionally prevalent everywhere throughout the world. Radio waves are the vitality and individuals utilize them to send and get phone, TV, radio, Wi-Fi signals every day. This innovation now daily has a wide decent footing everywhere throughout the world. This innovation today has sufficiently developed to permit us another way to control our portable and devices.*

Keywords: Electrical load interconnecting wires, resonant magnetic induction, power our mobile and gadgets.

Section 1: Introduction

The idea of remote power exchange has been presented since the nineteenth century. Full circuits were utilized to improve the transmission run. It is realized that electromagnetic vitality likewise connected with the proliferation of the electromagnetic waves. We can utilize hypothetically all electromagnetic waves for a remote power transmission (WPT). The distinction between the WPT and correspondence frameworks is just proficiency. Despite the fact that we transmit the vitality in the correspondence framework, the transmitted vitality is diffused to all bearings. The got control is sufficient for transmission of data, the effectiveness from the transmitter to beneficiary is calm low.

Run of the mill WPT is a point-to-point control transmission. For the WPT, we would do well to think energy to beneficiary. It was demonstrated that the power transmission effectiveness can approach near 100%. We would more be able to think the transmitted microwave energy to the recipient opening zones with decrease technique for the transmitting radio wire control dissemination. Renowned power decreases of the transmitting receiving wire are Gaussian decrease, Taylor dissemination, and Chebyshev appropriation. It compares to expand the power transmission proficiency. Concerning the power transmission proficiency of the WPT, there are some great optical methodologies in Russia Future appropriate and biggest utilization of the WPT through microwave is a Space Solar Power Satellite (SPS).

The primary sunlight based gatherer can be either photovoltaic cells or sun powered warm turbine. The second DC-to-microwave converter of the SPS can be either microwave tube framework or additionally semiconductor framework. It might be their mix. The third fragment is a massive reception apparatus cluster (circle receiving wires). An adequacy decrease on the transmitting reception apparatus is embraced so as to expand the bar accumulation proficiency and to diminish side flap level in all SPS plan. A run of the mill sufficiency decrease is called 10 dB Gaussian in which the power thickness in the focal point of the transmitting radio wire is ten times bigger than that on the edge of the transmitting reception apparatus.

Human Detection Using Quadcopter

Sevanthika H V[1], Sheethal M Nayak[2], Sachin K V[3], Subramani M[4], Mrs. Tanya Mendez[5]
[1,2,3,4] Department of Electronics and Communication, Alva's Institute of Engineering and Technology, Moodbidri,
[5] Asst Prof, Dept. of ECE, AIET,
[1]sachinkv358@gmail.com. [5] mendez.tanya@gmail.com.

Abstract- Quadcopters are the unmanned air vehicles and these are playing an important role in different areas like surveillance, military operations, fire sensing and some important areas having many complexities. The quadcopter plays a major role in present world, which can be controlled from remote. This system capture images or videos from the camera installed in it and send them to base station. Detection of moving objects is the first step of detection process. This project mainly helpful for detecting human beings. The main aim is for security purpose to determine the moving objects such as human beings since quadcopter can be moved freely in the air. Human detection in a smart surveillance system aims at making distinctions among moving objects in a video surveillance.

Keywords- **Quadcopter, camera, video, human detection, smart surveillance.**

I. INTRODUCTION

The quadcopter or quadrotor is one among the different types of Unmanned Aerial Vehicle (UAV) which is the next form of helicopter having more dynamic stability like helicopter. The similarities between the quadcopter and helicopter is the vertical takeoff and landing. The control of quadcopter is easier than the helicopter model of vehicles but it is entirely different where as the lift force is produced by the four motors. Quadcopters can be used in rescue, surveillance, traffic monitoring, weather monitoring and in some important areas. The quadcopter has the ability to take off vertically, landing and hovering it to the required location. It consists of four rotors which are attached at the end of the frame structure. The main aim pf this project is for security purpose to determine the moving objects such as human beings. In some places where human cannot be reached like plane crash and forest areas, quadcopter can be used to detect human.

II. DESCRIPTION

Quadcopter, also known as quadrotor, is a helicopter model with four rotors. The rotors are directed upwards and they are placed in a cross(X) configuration with equal distance from the center of mass of the quadcopter. The quadcopter is controlled by adjusting the angular velocities of the rotors which are spun by electric motors. Quadcopter is a usual design for small unmanned aerial vehicles (UAV) because of the simple structure. The quadcopter has the ability to take off vertically, landing and hovering it to the required location. It consists of four rotors which are attached at the end of the frame structure. A pair of rotors in one arm facing each other rotates in clockwise direction while adjacent pair of the rotor in anticlockwise direction. In the proposed system the input video is converted into multiple frames in order to ease the process. The key frames are selected and converted into grayscale images where pre-processing is done in order to detect all the boundaries in the image. To detect human beings in an image, objects need to undergo some of the operation such as background subtraction, contour detection. Then the human beings are classified using texture based method.

A Protecting System Design for Coal Miners

Mr. Sagar Yaranal , Mr. Girisha V, Mr. Mallikajigouda Patil , Mr. Prashanta Pateela
Ms. Shreedevi Subramanya
Department of Electronics & Communication
Alva's Institute of Engineering & Technology, Mijar, Moodbidri.

ABSTRACT: The persons who are working in Coal mining has to face various environmental parameters in the mining They have the dangerous from Temperature, Humidity and Oxygen So we need to provide a strong Security for the people This paper presents implementation of safety helmet for coal mine workers Here we design a smart helmet, which enable the helmet as a mobile sensor node of ZigBee wireless sensor networks, gathering parameters the temperature, humidity and illumination level of underground environment and will alert the central management unit in case of abnormal condition. We also design a voice transmission system, based on the same low-rate ZigBee networks. So with environmental monitoring, the miners can communicate with control centers or with other miners through wireless speech communication.

Keyword: Helmet, Zigbee, Sensors, LCD Display, Battery, Arduino UNO3,MQ-2, Reguleted Power supply

Section 1: INTRODUCTION: Demand of coal as energy resources is always important and significant. But thousands of people have lost their lives in mining accidents, all over the world. In their article Jing change, Qinggui Cao & Yonjge Yang listed 100 of major mining accident which had taken place from 2001-2010 The main reason is these accidents occur due to the presence of methane and carbon monoxide gas in theses mines. These gas are colorless, odorless and is undetectable by human sensors the key.

To controlling such accidents is the prediction of outburst by implementing sensors and microcontrollers and to generate an alarm system before critical atmospheric level it is on the safety helmet of the coal mine Workers. A smart safety helmet having sensor array to sense Data and a wireless modem to transmit it .ZigBee based wireless sensor networks are recently investigated due to their remote environment monitoring capabilities. Such a network can easily collect sensor data and transmit them by radio. Combining these two advantages we design a smart new helmet, which enable the helmet as a mobile node of ZigBee wireless sensor networks, gathering parameters from underground timely and quickly. Moreover miners can also exchange information from control center through wireless speech communication so potential safety problems can be avoid by early-warning intelligence.

Section 2: METHODOLOGY: Consists of smart helmet wireless stations and Cable network .Control unit can send speech instructions to miners .Miners can also receive calling from others working at different coal phase smoothly through smart helmet this project is intended for underground coal mining. Here we are making use of the sensors to find the environmental parameters like temperature, humidity, carbon monoxide. These sensors will sense the environmental parameters and sends to the arduino uno 3 microcontroller. This microcontroller will converts the analog into the digital signal and sends the information to the Zigbee. Zigbee consisting of the in-built coder and it will send the data information to the controller unit.

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DESIGN OF ELECTRIC SENSOR USING MEMS USED FOR PURIFYING ANY LIQUID CONTENTS

Sneha G.N[1], Pooja M[2], Prof. Shreedevi Subrayamanya[3]
[1&2]UG Student Dept. of ECE, AIET Moodbidri
[3]Asst Professor Dept. of ECE, AIET Moodbidri

ABSTRACT
Electric sensor examines the change in electric or magnetic signals based on a environmental input. A sensor is a device that measures a particular characteristic of an object or system. Some sensors are purely mechanical, but most sensors are electronic, returning a voltage signal that can be converted into a useful engineering unit. Sensors take advantage of the mechanical or electrical response of its component to relate the response to a relevant quantity. Engineers use sensors in test and monitoring applications, but home owners interact with sensors every day. Automobiles are filled with sensors, from the engine to the airbag. We are interested in the development of mems technologies, where the emphasis is on minimizing cost, and the ratio of performanceof minimizing cost rather than maximizing performance. As the materials serve as the basis for this exploratory progress, a conceptually selected effort to reduce the cost of diagnostic systems by developing electric sensor.

Keywords: RADAR, AIRBAG, SENSORS, WATER PURIFIER

1. INTRODUCTION

In the broadest definition, a sensor is a device, module, or subsystem whose purpose is to detect events or changes in its environment and send the information to other electronics, frequently a computer processor. A sensor is always used with other electronics, whether as simple as a light or as complex as a computer.

Sensors are used in everyday objects such as touch-sensitive elevator buttons (tactile sensor) and lamps which dim or brighten by touching the base, besides innumerable applications of which most people are never aware. With advances in micromachinery and easy-to-use microcontroller platforms, the uses of sensors have expanded beyond the traditional fields of temperature, pressure or flow measurement, for example into MARG sensors. Moreover, analog sensors such as potentiometers and force-sensing resistors are still widely used. Applications include manufacturing and machinery, airplanes and aerospace, cars, medicine, robotics and many other aspects of our day-to-day life.
A sensor's sensitivity indicates how much the sensor's output changes when the input quantity being measured changes. For instance, if the mercury in a thermometer moves 1 cm when the temperature changes by 1 °C, the sensitivity is 1 cm/°C (it is basically the slope Dy/Dx assuming a linear characteristic). Some sensors can also affect what they measure; for instance, a room temperature thermometer inserted into a hot cup of liquid cools the liquid while the liquid heats the thermometer. Sensors are usually designed to have a small effect on what is measured; making the sensor smaller often improves this and may introduce other advantages. Technological progress allows more and more sensors to be manufactured on a microscopic scale as microsensors using MEMS technology. In most cases, a microsensor reaches a significantly higher speed and sensitivity compared with macroscopic approaches.

1.1 Electric Sensor

This is a model from electric impedance tomography, a method of imaging the interior permittivity distribution of a body by measuring current and voltage at the surface.

This model demonstrates how the shape and placement of figures with different material properties inside a closed box can be determined with this non-invasive technique. Applying a potential difference on the boundaries of the box gives rise to a surface charge density that varies depending on the permittivity distribution inside the box.

The technique can be used in, amongst other applications, medical diagnosis. Different organs have different properties so that you can "see" the organs and their movement from the permittivity "image" that they create.

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Alva's Institute of Engg. & Technology
Mijar, MOODBIDRI - 574 225, D.K.