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We would also like to express our gratitude and thanks to **NCETE** organizing committee and coordinators for their hard work and outstanding contributions to make it a grand success.

Our heartfelt thanks go out to all the authors who helped report their results here and participated to make this conference a memorable one.

Regards,

Dr. Shaik Mahaboob Basha

Preface

This Conference Proceedings Volume-I contains the written versions of the contributions presented during the International Research Conference.

NCETE -2021 received a substantial number of manuscripts from across the globe. All papers were reviewed thoroughly by experts of the review committee of **NCETE** -2021 and the selected papers were chosen based on the quality of research and outcomes.

We would like to thank all the participants for their contribution to the Conference and for their contribution to these Proceedings. Also, we would like to thank all the members of the proceeding team who have dedicated their constant support and time to bring these research papers into a book. The **NCETE** -2021 proceedings are a credit to a large group of people and each one of them should be proud of the outcome.

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Android Notice Board

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Abstract

The students appearing for the examinations finds it difficult to find their exam room in notice board because of the bustling created there which is not safe in the current pandemic situation. They also finds it difficult to fetch their exam room because of the tense of the examination they carry in reaching the specified exam centre in time. On a note of that to avoid all these problems, an app can be designed which enables one to find their exam room easily. In this app one needs to enter their university roll no. then the particular room allotted to them will get displayed on the screen. In addition to that, the college blueprint will also be available in the app which is useful for the students coming from other colleges such that they can know the location of the rooms in the college. The app designed is passed to all as apk file so that everyone can install the app into their own mobiles and can make use of this app to find the exam hall and trace out where the room is located.

I. Introduction

Mobile app development is the creation of software intended to run on mobile devices and optimized to take advantage of those products' unique features and hardware. It is revolutionizing our personal lives and transforming the way we do business. The creation of mobile applications has much of its roots in traditional software development

The project is about digitalizing the traditional method where the allotment of examination rooms is done by displaying them on the notice board. Many drawbacks are associated with the existing system, so in order to overcome them; an android app can be developed. One can find the allotted examination room by clicking the student button which directs you to the search university roll no. option, which when entering it gives you the allotted room details like block name, room no. and bench no. Admin is given a login to this Android App and he can enter the allotment data in to the app. Based on the allotment data which admin fills, the allotted room details can be fetched from this data when a candidate enters his roll no. Data security is also procured as one can have access to find only when the admin enables the search. Thus one can find their allotted room digitally through an android app. The android app developed is also helpful to the students coming from other colleges to

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get to the examination hall with the help of blue print option which is available in this app, which acts like a guide for them to pave the path in reaching their allotted room and getting familiar with the infrastructure. The front-end used in this android application is XML, Android and the backend used is PHP with, JSON, MySQL.

II. Existing System

In the existing system the allotment of examination rooms is done by displaying them on the notice board. It is a daunting task as one needs to rush over to the notice board carrying all the tense of examination whilst reaching in order to find their examination hall; this creates a huge bustling which is inappropriate considering the pandemic. All organizations, Offices and public sectors are finding alternative ways to avoid gathering.

III. Proposed System

To overcome the difficulties one faces with the existing system, an android app can be developed. The proposed system is "ANDROID NOTICE BOARD" which is an android application and is used to find the allotted examination hall before 2 hours of exam time. With the help of this application the students can find their allotted room with just one click through their mobile phone.

IV. Design Modules

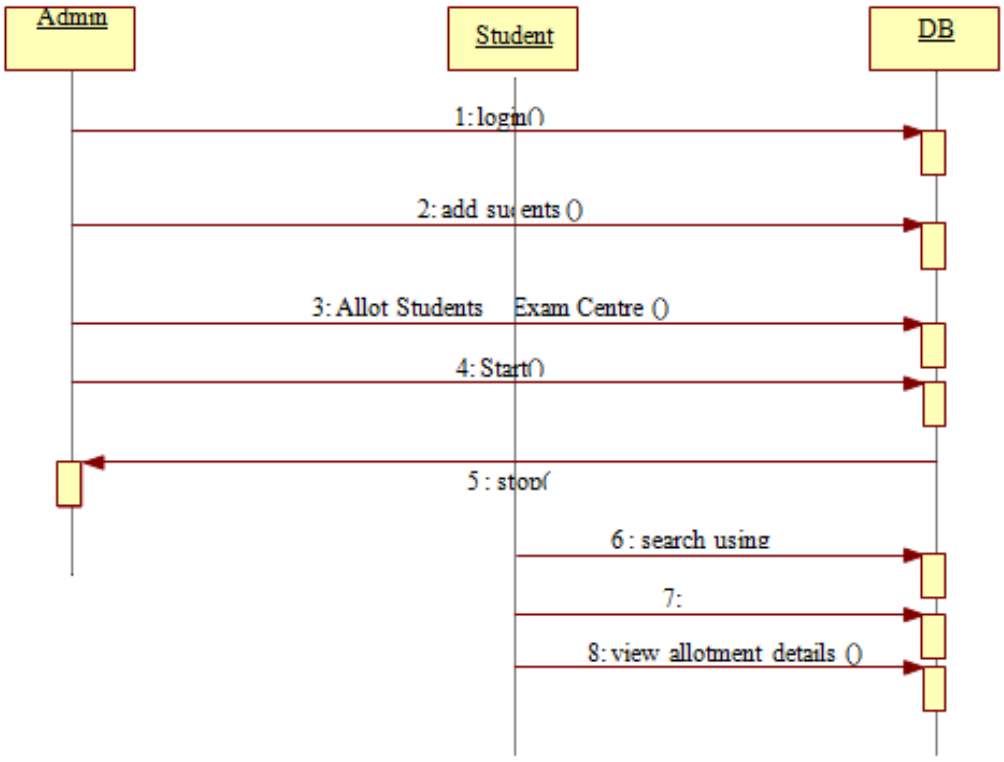

Figure 1: Sequence diagram

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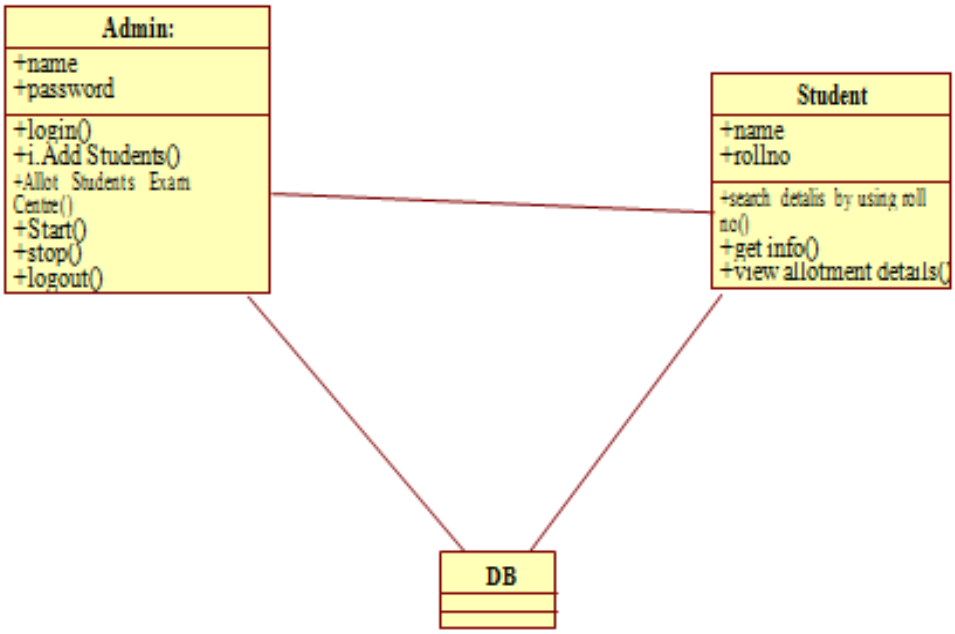

Figure 2: Class diagram

This Android Notice Board which is an android application is divided into two interfaces one is USER and another is ADMIN:

A. Blueprint: Here one can view the blue print of the college which guides one to get to their destined room. It is mainly concerned for the students coming from other colleges.

B. User Interface: User side includes student onclick button which assists students to know their Block Name and Room Number.

- **Student button:** On clicking student button, it redirects to another activity which contains Search view option. Here, students should enter their university roll number and have to click Search button, if university roll no is valid, then it will frame-up all details about their exam allotment which is allocated by ADMIN. If it is not a valid university roll no. then it displays message stating university roll no. is invalid.

C. About: Here what the project is about and its purpose and the persons who designed this application is displayed.

D. Admin Interface: Here admin is given login credentials. Admin can perform activities like adding students details and there by allotting their respective rooms only after successful login.

- **Add Students:** Here the details of students like which branch, year, semester, gender, section he/she belongs to are selected thereby entering the roll no. student name and mentor is assigned. In allocation of exam center this mentor will pop-up and assign the room to the student.

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- **Allot Students Exam Center:** Here Admin allocates exam hall details by selecting exam hall floor, exam room number later on clicking submit button the data will be allocated and if it is already allocated, it displays message stating allocation is done already! And if we try to allocate for the invalid university roll no. its displays message stating it is not found.

- **View Students Data:** Here admin can see the allocated student's data.

- **Start:** On clicking START button, admin provides access to the students to check their exam room.

- **Stop:** On clicking STOP button, admin revokes the student access , after revoking access the student interface will be not displayed.

E. Exit: It exits one from the app.

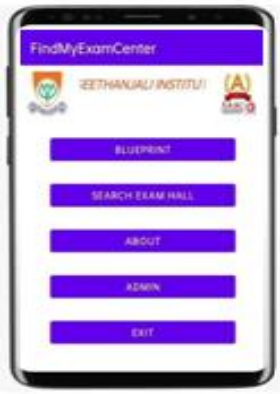

Figure 3: Main Screen

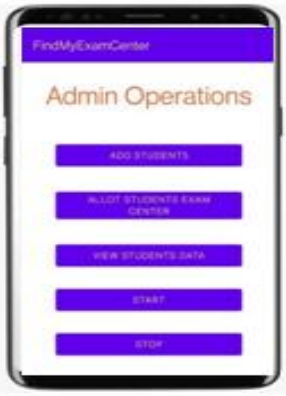

Figure 4: Admin Screen

Figure 5: Blue print

Figure 6: Student adding form

Figure 7: Allotment

Figure 8: Blue print

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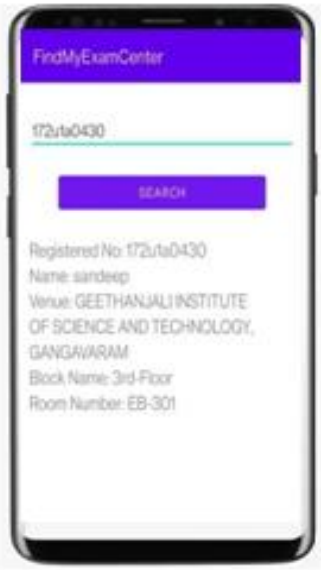

Figure 9: Valid Output

Figure 10: Invalid Output

V. Conclusion

In this project, an android app can be created that displays the respective allotted room of a candidate on entering the university roll no. of a candidate. This app also provides the blueprint of the college to make them familiar with the infrastructure whilst they search for their examination hall.

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Complete Virtual Care Taker System

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Abstract

Even if we love our elderly people (old people) and patients, we cannot always monitor them in this busy and competitive society. When a patient or an elderly person became ill, we had to provide exterior care for them with the support of family members or friends. We won't be able to take care of everything all of the time since there will be distractions. As a result, we may forget to remind them about their medicines or food in the situation. With the help of a microcontroller and a voice module, we will remind them of this in this project. The name of the tablet and when it should be taken will be spoken through the speech module, as will audio and visual communication between the caregiver and the person. So they can take it themselves if they forget, the voice will continue to transmit voice, and an IR sensor will detect whether the tablet has been removed from the location. The time and tablet will also be displayed on the LCD for ease of use. We can also transmit acknowledgement through GSM for virtual monitoring.

Key Words: GSM, virtual care taker, Voice guider, Speech module.

I. Introduction

When a person is unable to communicate, this technology assists them by playing basic and emergency voice messages based on the user's needs. These voices will be broadcast over a speaker so that a nurse or their home caregivers may respond quickly. We

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are building this project to save time and provide a user-friendly system by utilizing current technological breakthroughs. To obtain service, the user must push the appropriate button, after which the pre-recorded message will be broadcast through the speaker. The user has the option of using standard switches, a touch screen, a remote, or an Android phone. So many valuable technologies are being developed these days to make our lives more comfortable, luxurious, and secure. Many applications are being developed, particularly in the mobile industry, to provide us with additional information and fun. This project is built using a mix of two of the most cutting-edge and demanding technologies: Android and Embedded Systems. Android is an open source operating system based on Linux that is built primarily for touch screen mobile devices. Many applications have already been built on Android, and many of them are being produced for free for its users. We can also create our own bespoke applications at no cost or at a low cost, depending on our needs. We will construct an application to play some simple voices over a speaker in our room in this project. This programme transmits commands to our controlling system through Bluetooth whenever we use it. Bluetooth module, microcontroller, audio amplifier, and speaker are all part of the control system. When this blue tooth module receives an instruction from an Android app, it passes it on to the microcontroller. Depending on the command, the micro controller will play the appropriate voice. This is quite convenient and may be operated simply by touching the appropriate keys on the smartphone app. The user can also control appliances in his home with this project.

II. Motivation Towards the Work

As technology advances, more and more aspects of the patient experience are transferring to the electronic or virtual realm. These technological developments have had an impact on a number of healthcare systems. The adoption of EMR/EHR by hospitals and clinics has resulted in a significant shift in how medical records are stored electronically. As technology becomes more integrated in the healthcare process, a significant push has been made to find new methods for it to influence the patient experience.

III. Existing System

In today's medicinal services framework, patients who remain at home after surgery are checked by an overseer or a medical carer. This method may not be able to provide continuous monitoring because anything can change in a health parameter in a matter of seconds, and if a guardian or attendant is not present at the moment, more significant injury can occur. As a result of this development, a period has been formed in which the web governs the world, and it has been proposed to add to another keen health awareness framework in which the patient is checked on a regular basis. [6] At whatever point any individual can't talk then this framework assists them with playing some fundamental and crisis voice messages as indicated by client needs. These voices will be played through speaker so that medical caretaker or their overseers in home can come and help them right away. By utilizing progressions in present advancements this task is been created to save time and easy to use framework. Presently a day's such countless helpful advances are coming out to make our way of life more solace, lavish and secure. This venture is planned with blend of two most recent and most requesting advancements that are Android and Embedded System. Make an application to play some fundamental voices through speaker which is available in

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our room. At whatever point one works this application, it sends orders to our controlling framework through Bluetooth. At controlling framework side, we have Bluetooth module, miniature regulator, sound intensifier, and speaker. At whatever point this Bluetooth module gets order from android application then it moves this order to miniature regulator. Miniature regulator straight by saving prerecorded voice message in miniature regulator's memory as parallel we can play that voice message.

IV. Proposed System

In this project, we use Arduino to create a virtual caretaker in digital format. When a patient or an elderly person was sick, we had to provide exterior care for them with the support of our own or close relatives. Because there may be some distractions, it is impossible to provide constant care. As a result, we may neglect to remind them about their medications, food, and other important matters in that situation. With the help of a microcontroller and a voice module, we will keep this project on track. The name of the tablet and the time to take it will be whispered through the voice module so that they can take it themselves. If they forget, the voice will continue to emit voice, and an IR sensor will be positioned to determine if the tablet has been taken or not. For ease and convenience, the time and tablet will be displayed on the LCD.

V. Implementation

A. Hardware Requirements

- Arduino Micro Controller
- Lcd Display.
- IR Sensor
- Voice Module
- GSM
- Camera

B. Software Requirements

- Arduino
- Proteus

C. Block Diagram

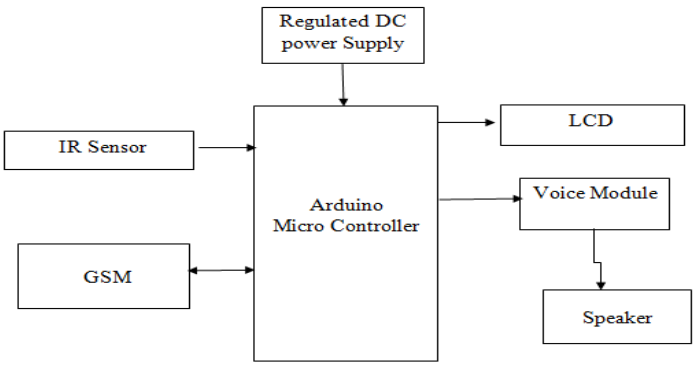

Figure1: Block diagram of proposed system

D. Component Description:

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Arduino Microcontroller

- The Arduino uno is a microcontroller board based on the ATmega328P.
- It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, 1 UART (hardware serial port), a 16 MHz crystal oscillator, a USB connection, a power jack, an ICSP header, and a reset button.
- It comes with everything you'll need to get started with the microcontroller; simply plug it into a computer with a USB cable or power it with an AC-to-DC adapter or battery.

Figure 2: Arduino uno

Lcd Display: Two lines of sixteen characters each make up an LCD screen. A 5x7 matrix makes up every character. The difference in display is determined by the facility's power supply and whether or not messages are displayed in one or two lines.As a result, the Vee pin receives a fluctuating voltage of 0-Vdd. For this reason, a trimmer potentiometer is commonly employed. Backlights are included into several display models (blue or inexperienced diodes).

Figure 3: LCD display

IR Sensor: An infrared detector is an electronic radiation device that uses infrared to detect and/or emit certain properties of its surroundings. It can both detect and measure the heat of an object. The human eye does not see infrared waves.Infrared is a wavelength range in the spectrum that is longer than visible light but shorter than microwaves. From zero.75 to 1000 metres, the infrared zone is delineated. Close to infrared is defined as wavelengths between 0.75 and 3 m, mid-infrared is defined as wavelengths between three and six m, and so much infrared is defined as wavelengths beyond six m.

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Figure 4: IR Sensor

Voice Module: This module is based on the ISD1820, which is a record/playback device for multiple messages. It has real single-chip speech recording, no-volatile storage, and an 8-to-20-second playback capability. The sample size is 3.2k, with a total recording time of 20s.This module is simple to use and may be controlled by a push button on the board or a microcontroller such as an Arduino, STM32, or Chip Kit. You can easily handle record, playback, and repeat using them.VCC is a 3.3V signal that must not be exceeded or the module will be damaged.

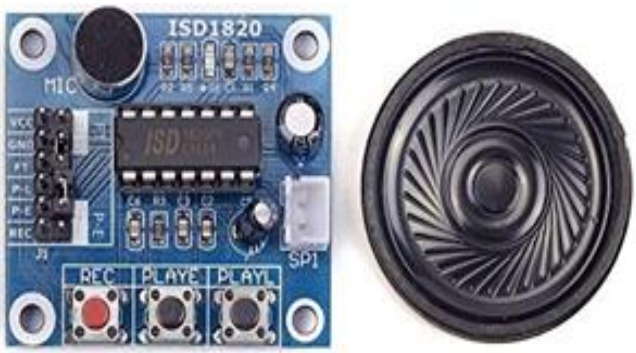

Figure 5: Voice Module

GSM Module: GSM (Global System for Mobile Communications) is a cellular network, meaning that mobile phones connect to it by looking for nearby cells. GSM networks use four different frequency bands to communicate. The 900 MHz and 1800 MHz bands are used by most GSM networks.GSM-900 uses 890–915 MHz for uplink and 935–960 MHz for downlink, with 124 RF channels separated at 200 kHz. 45 MHz is used for duplex spacing.

Figure 6: GSM Modem

Camera:

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- Two-way audio intercom with spoken message, wide-angle view, motion detection alarm, real-time monitoring, and night vision
- V380 Mobile App, Megapixel IP Wifi Camera with Stunning Picture Quality The app is available for free for the rest of your life.
- Make communication more fluid with a dual-way live video call and intercom.
- 64GB Memory Card with High Video Compression (not included) a month of recording
- For live monitoring of maid, baby, servant, etc., best suited for 20 × 20 feet room/shop/office.
- Playback of the past There's no need to remove the memory card because you may see your entire day's movement at any time using simply the mobile app.
- Low data usage on the Internet
- Using a smartphone app, you can monitor your home from your office.
- The alarm and recording functionalities of the Motion Sensor are combined.

Figure 7: Camera Module

Working of Project: User-friendly way, with a wide range of applications. This project will use a clock time to keep track of precise timings. The Various methods of messaging and drug reminders have been examined. We have now presented a system that will be extremely beneficial to older people with chronic conditions such as diabetes and cancer, as well as pregnant women. The Arduino and GSM module were used to complete this project. This system allows us to send text messages as well as broadcast messages to the people who have signed up. The Arduino may be used to improve numerous approaches for reminding people to take their medications in a more time period will be displayed on the LCD, along with a voice playback module in case they don't know what tablet to take at what time. The voice playback module will be pre-programmed to proclaim the tablet names; it will have eight channels for storing eight audio messages, but we will only use three of them for morning, afternoon, and night. A GSM module will be connected to the Microcontroller to send information about whether or not the patient has eaten the tablet. The IR sensor will determine whether or not the tablet has been taken.

Advantages

- No separate person is required to assist the individuals

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- Simple to operate; toddlers, the elderly, and physically challenged individuals can all use it
- Safe and secure

Applications

- Can be utilized by dump people to announce basic and emergency needs.
- Access control and appliance control systems are also possible.
- It is applicable for the covid positive people for better care.

VI. Results

Here we concentrate on old aged people, physically handicapped and especially for covid positive people. As the people can't remember the tablet names so we notify them to take tablets with their names and to take food in time through voice module and also display the tablet name on LCD display. If they took the tablet we can get the message through GSM module that the tablet is taken and we can monitor them through virtually with the help of camera. In this way we implement this project to support the unhealthy persons in order to avoid their problems.

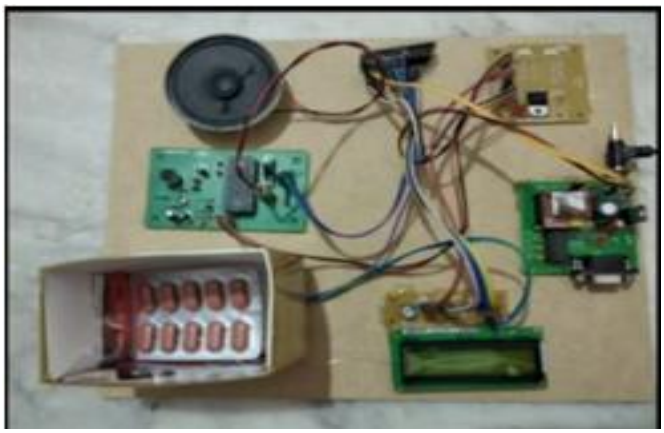

Figure 8: Figure showing virtual assistant setup

Figure 9: Figure showing LCD display indicating the time and Tablet to be taken by patient

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Figure 10: Figure showing the message received from the GSM modem indicating the tablets taken in that day

VII. Conclusion

More study will be needed as technology advances and more care is offered via speech, to find the models of care that provide the highest quality with the most access to customers. According to research, certain types of voice health can help certain older persons with specific chronic requirements, but not all. As more care is delivered through voice health services, more evidence will be available to demonstrate voice health's utility and cost-effectiveness—or lack thereof. The needs and preferences of older persons and family caregivers should influence the development and integration of home voice health solutions as payers and providers seek to improve long-term, comprehensive care for adults with complex needs in the community. We hope this work fulfills all the requirements.

VIII. Future Scope

This system can be changed in the future to display the heart rate as well as monitor the patient's status using sensors that continuously display the patient's temperature and pulse rate.

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Implementation of Arduino Atmega 2560 Based Smart Energy Meter Through Prepaid Transaction Using IOT

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Abstract

In India, energy meters are electro-mechanical and postpaid. The main drawback of this approach is that a person must walk from street to street, reading each house's energy meter and giving out the charges. According to that reading, the bill was paid. Even when bills are paid on time, issues like an over-billing amount or a provider warning are common. To overcome this problem we proposed an IoT-based prepaid power recharge unit that will integrate with ordinary household energy meters and be capable of counting down energy use and switching off the main supply once the energy usage countdown hits zero, and a data collecting system using IoT. The recharge info and energy usage from the recharge station are saved in a Data Acquisition server connected to the energy meters to control the main power supply and monitor power consumption in real-time.
Key Words: IOT, energy meter, prepaid, data acquisition.

I. Introduction

As a result of post-paid connections, the consumer has a number of concerns. Prepaid power connections are often suggested as a viable solution to this issue Consumers will need to recharge the quantity of energy they need to consume in this prepaid electricity meter circuit [1]. For this prepaid system to work, household electricity meters are to be equipped with a module that can identify the amount recharged by the consumer and tally down the

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amount recharged to zero depending on the electricity usage [2]. The main supply is automatically switched off when the meter count hits zero, and it may only be turned back on after the next recharge [3].

This concept was introduced using Arduino, a GSM board, and a node MCU [4]. We can refresh our energy balance by using an internet gateway [5]. The electricity supply link to the residence is automatically terminated if the balance is low or zero. Through the node MCU module, this device may also send energy consumption notifications from the meter to the substation at regular intervals, as well as alerting users about low balance, cutoff, and other difficulties [6].

II. Motivation

The concept of a prepaid entry system has been introduced in many countries. This notion is founded on the principle of "pay first, utilize later." From the perspective of the consumer, the concept is appealing because there is no fear of disconnection and reconnection for any reason.

The Electricity Board is unable to keep track of consumer usage of power under the current billing method (postpaid). Even if bills are paid on time, the consumer faces issues such as receiving late bills for payments that have already been paid [7], as well as inadequate electrical supply and quality [8].

III. Existig System

The local state electrical board is in charge of energy distribution and maintenance. A user's electricity usage is computed by multiplying the number of KWH consumed over the course of a month. On the metre, this reading is saved locally. This reading is taken manually by a worker from the power board who goes door to door. This information is then transmitted to the head electrical board for evaluation, after which an evaluation bill is prepared based on the monthly readings.

Figure 1: Existing System

The customers then pay their charges using their preferred payment method. This process takes a long time and requires a lot of human labour, and the cost is entirely

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dependent on the workers' readings. So, whatever reading an employee records for a customer, the consumer must pay for it, and because of the post-paid form of electricity payment, many customers use electricity inefficiently and sometimes do not pay for months .

IV. Roposed System

Prepaid energy metre using IoT is the proposed system. This proposed metre aids in the tracking of energy usage and the calculation of bills automatically using controller [9] . This information is saved on the server and also sent to the consumer via the GSM module application [10] .The data is sent to the server using the nodeMCU module [11] .Consumers can utilise the built user interface to keep track of their electricity usage [12] .

Figure 2: Proposed Frame Work

V. Implementation

A. Hardware Requirements:

- Arduino Mega controller board
- Liquid crystal display
- GSM Modem
- Node MCU
- Energy Meter
- LED
- 5v Relay
- Lamp

B. Software Requirements

- Arduino software
- Embedded c programming
- HTML
- PHP

C. Block Diagram

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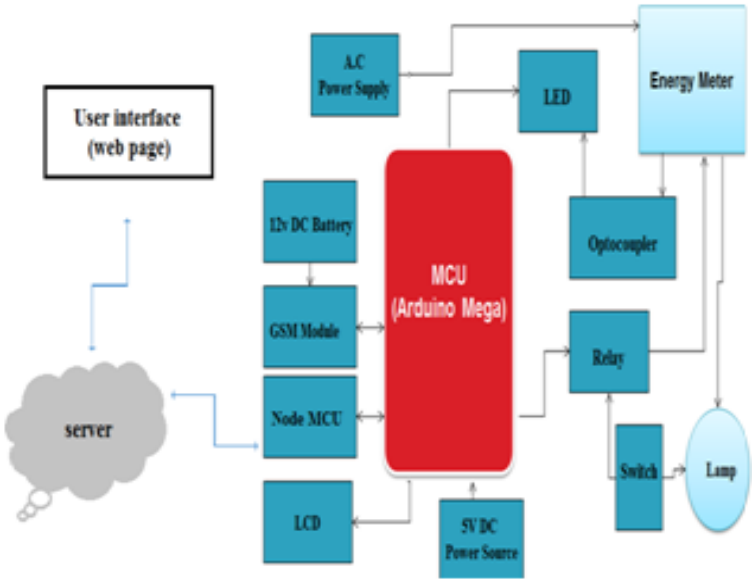

Figure 3 Block diagram of proposed system

D. Component Description

Arduino Mega: There are 54 digital input/output pins (14 of which can be used as PWM outputs), 16 analogue inputs, 4 UARTs (hardware serial ports), a 16 MHz crystal oscillator, a USB connection, a power jack, an ICSP header, and a reset button on this board. It Includes everything you'll need to get started with the microcontroller, including a USB cable to connect it to a computer and an AC-to-DC adapter or battery to power it.

Figure 4 Arduino mega board

LCD Display

- 16*2 LCD with green colour Backlight
- Works on 5V DC supply
- 2 Rows and 16 Characters Per Row
- Displays two lines of 16 characters High contrast and a wide viewing angle

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Figure 5: 16*2 LCD DISPLAY

GSM Modem: GSM stands refers to a mobile communication modem. It is mostly utilized for data transport in mobile communication around the world. A GSM modem is a sort of modem that accepts a SIM card and works by registering with a mobile provider, much like our cellphone. For transmitting and receiving SMS, GSM modems operate in full duplex mode. It is an open cellular technique that enables the 850MHz, 900MHz, 1800MHz, and 1900MHz frequency bands to communicate mobile voice and data services.

Figure 6: GSM modem

Node MCU Module

- Node MCU is an Internet of Things (IoT) focused open source Lua based firmware and development board.
- It includes software for the ESP8266 WiFi
- SoC from Espressif Systems, as well as hardware for the ESP12 board.The Arduino ID E can simply programme the NodeMCU development Board since it is straightforward to use.
- The Arduino IDE will take no more than 5-10 minutes to programmed Node MCU.
- All we need is the Arduino IDE, a USB cordand the Node MCU board.

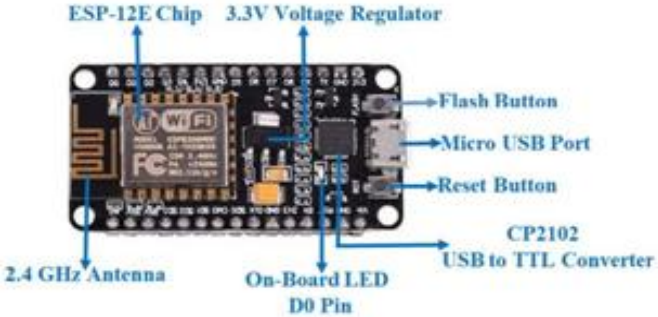

Figure 7: Node MCU

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Energy Meter: In this meter, when the load is applied, a pulse LED blinks. 1 KWH has been spent if this LED blinks 3200 times. This is known as the metre constant, and it's used to determine a metre's accuracy during production based on its class.

Figure. 8 Energy meter

Relay Module: A relay is a switch whose operation is controlled by electricity. The unit is made up of input terminals which are used for single or multiple controls, as well as a set of functioning touch terminals. On the switch, you can find any number of contacts of any sort, including generate contacts, divide contacts, and combinations of the two.

Figure 9 Relay module

E. Working Algorithm

Step 1: At first consumers must recharge the quantity of electricity they wish to consume using SMS in this method.

Step 2: The Recharged amount and the units are displayed on LCD present in the system of Consumer.

Step 3: The electricity metre have a system which will identify the amount recharged by the consumer and then based on the electricity usage it will count down from the recharged amount to zero, and send the information to a server.

Step 4: Once the reading of meter reaches zero, the connection to main supply is automatically disconnected and will be resumed after when the next recharge has done.

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Calculation of Pulses and Units: Before we begin our computations, we must first determine the energy meter's pulse frequency. The first rate is 1600 imp/kwh, whereas the second rate is 3200 imp/kwh. We're using a 3200 imp/kwh pulse rate energy metre in this example. To begin, we must compute the Pulses for 100 watts, or the number of times the Pulse LED will blink in a minute for a 100 watt load.

Pulse= (Pulse_rate*watt*time) / (1000*3600)

So, using a 3200 imp/kwh rate and a 60-second pulse bulb for a 100-watt bulb, the following can be calculated:

Pulses=3200*100*60/1000*3600
Pulses = ~5.33 pulse / minute

The single pulse Power factor is calculated now as

Power Factor= watt/ (hour*Pulse) =100/60*5.33=0.3125 watt/ one pulse Units= (Power Factor*Total pulse)/1000 No of pulses in one hour= 5.33*60=320 Therefore: Units = 0.3125*320/1000 = 0.1/ hour Let's say a 100 watt bulb is used for a day's worth of lighting then No of Units =0.1*24 = 2.4 Units and let us assume unit rate at our area is 5 rupees per unit then the amount that we have to pay for 2.4 Units is Rs: Rupees= 2.4*5 = 12 rupees

VI. Results

The figure shows an overview of the proposed project including all of the hardware Arduino mega, GSM modem, LCD display, Node MCU, relay, and variable load. When the load is first connected to the prepaid energy meter, the connected load consumes the energy. The balance drops with the load's consumption.

Figure.10 The proposed prepaid energy meter system

The user is notified by SMS when his or her balance reaches a certain level. After the power board has completed the recharge process, the user will receive the confirmation message, which will also display the current balance. The user will benefit from the

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notification messages, and the user will take the necessary measures quickly, preventing the power from being switched off and keeping energy usage to a minimum.

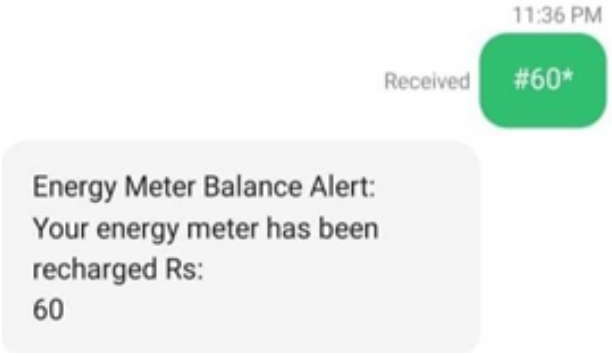

Figure.11 showing SMS received when recharged is done

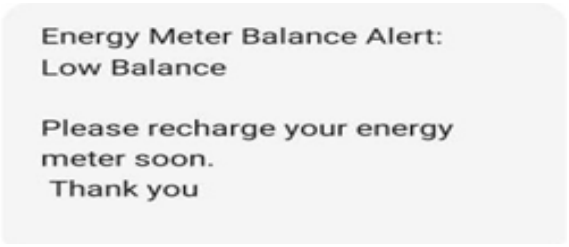

Figure.12 showing SMS alert received from prepaid meter when balance is low

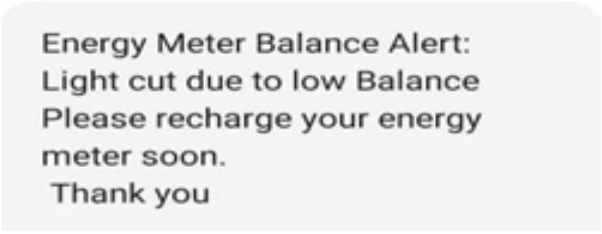

Figure.13 showing connection cut SMS alert received from prepaid energy meter.

Data is logged in real time for every 15 secs using IoT and stored in server. So user can view his power consumption and recharge information any time using web interface. There is no need to monitor power usage manually looking at meter. If Real time power consumption data of each meter is available, it can be used for power consumption analysis.

Figure.14 Logging in to Data Acquisition Page

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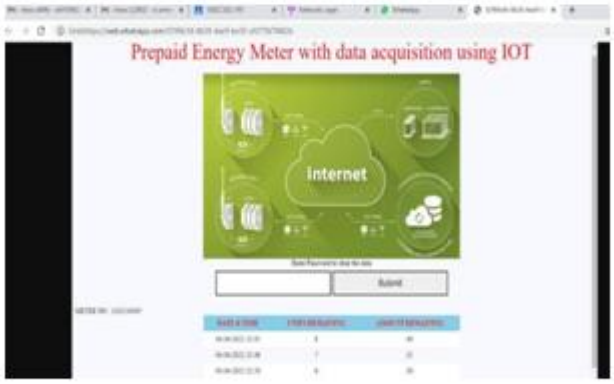

Figure.15 showing Data Acquisition Page

VII. Applications

1. We can set it up anyplace like a commercial, residential building, and municipal corporation because it is wireless and simple to set up.
2. We can also deploy a public energy supply system so that Energy waste is reduced since just the essential energy is consumed according to the schedule.
3. In Public power sources - It is extremely accurate because the entire concept of reading the units and then invoicing manually or through any other method is eliminated.

VIII. Conclusion

The proposed prepaid energy meter based on the Internet of Things, allows customers to pay for electricity before it is used. It reduces the amount of time that humans are involved in metre reading and bill calculating. Consumers maintain credit control and then utilize electricity until the credit is depleted. When the available credit is depleted, a relay cuts off the electrical supply automatically. When a user's credit falls below a certain value, GSM communication is utilized to notify them. This system, in the end, solves a lot of the issues that come with the post-payment billing system. This system also provides automation of billing.

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Designing BCD Adders Using Quantum Dot Cellular Automata

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Abstract

Due to technology advancement an alternative way is proposed to the classic CMOS technology, that is quantum-dot cellular automata (QCA), which is one of the foremost prominent solution for designing ultra-low-power and exceptionally high speed digital arithmetic circuits. QCA related implementations are mainly in decimal and binary arithmetic circuits with significant improvements. In this process a novel design strategy has described and illustrated to design an efficient 4-digit (16 bits) QCA based BCD adders. These advantages are mostly useful when two decimal integers with n digits must be summed. It assists in utilising unique logic formulations and purpose-built QCA modules to achieve much faster calculation speeds than existing count parts without losing either the occupied area or the cell count.

Keywords: BCD adders, decimal arithmetic, quantum-dot cellular automata (QCA), majority gate, QCA clock.

I. Introduction

Due to a growth in Internet's banking applications and a variety of other locations where precision is crucial, decimal circuits are gaining ground over binary arithmetic. The accessibility of multi-operand decimal adders may accelerate the development of money-related and commercial applications based on large datasets that already exist. Because it is a main part of arithmetic operations like division and multiplication, multi-operand addition

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could be considered an imperative operation. When it comes to decimal multiplication, Multi-operand decimal addition comes in handy for swiftly adding large quantities of decimal data. When many BCD operands are joined, this study presents a multi-operand decimal addition approach that uses a high-speed binary to BCD converter circuit to speed up the decimal addition process. A new n-bit binary to BCD converter circuit design is proposed. Additionally, the existing binary to BCD converter models are investigated. The suggested approach differs from multi-operand BCD addition algorithms in that no intermediate BCD corrections are performed. Instead, correction is performed at the last stage to produce valid BCD outputs. The design of the binary carry-save adder can be performed as a unified Binary/ BCD multi-operand adder since the decimal adjustments are performed independently from the binary sum calculation. As a result, the binary carry-save adder's layout need not require any advanced improvements.

Quantum-dot cellular automata (QCA) is an exciting new technique that can be used to create ultra-dense, low-power, high- performance computer circuits. As a result, the design of effective logic circuits in QCA has generated a great deal of attention in the recent years. Extraordinary efforts are focused on arithmetic circuits, with the binary addition, which is the fundamental operation of any digital system, receiving the greatest attention. In this article, a creative way for executing high-speed low-area adders in QCA is provided. The realisation of a novel 2-bit addition slice is based on hypothetical details illustrated in CLA and parallel-prefix adders. The latter permits the carry to be generated in two successive bits with only one majority gate (MG) delay. Furthermore, the intelligent high level architecture results in extremely small forms, allowing for the reduction of needless clock phases caused by long linkages.

A QCA is a nanostructure with a square consisting of 4 QCA dots charged with two free electrons capable of tunneling through the dots which are inside the cell as its fundamental cell. The two electrons will always be at opposing corners because of Columbic shock. The position of electrons within the cell (which is also known as polarizations) determine two alternative steady states that are related to binary states 1 and 0.

QCA cells do not have intrinsic data flow directions, despite the fact that nearby cells interact through electrostatic interactions and tend to change their polarizations. To provide customizable data directions, the cells in a QCA design are divided into "clock Zones", which are dynamically linked to four clock signals, each phase is changed by 90o degrees. Because each clock zone functions as a D-latch, this clock scheme is known as the zone clocking scheme, which naturally pipelines QCA systems.

II. Literature Survey

Human calculations use decimal arithmetic to get the exact results. Because decimal arithmetic endures a 100 to 1000 execution penalty with hardware, only a few programmes devote 50% t0 90% of their effort on decimal processing, according to early benchmarks. Hardware that supports decimal floating-point is essential. Present designs, on the other hand, either fail to meet modern requirements or are incompatible with decimal arithmetic's set up principles. This work proposes a current method to decimal floating-point which and it is expected to dramatically speed up a wide range of applications.

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This paper presents a modern design for the basis for high-speed decimal Multi-Operand BCD adder. Our presented approach differs from previous models in several ways. These include a new BD converter that significantly reduces the Multi-Operand Decimal Adder's latency. The suggested BD converter outperforms previous solutions, according to simulation findings by 82% in delay with only a small increase in area. Furthermore, as compared to previously reported results, the decimal Multi-Operand Adder accomplishes speeder design.

The decimal adders and techniques shown here may be particularly well suited for numerically heavy commercial applications, such as spreadsheets or financial applications, as well as industrial Computing, where huge volumes of decimal data must be processed quickly. A few software packages and programming language extensions for decimal arithmetic have been produced when a computer's hardware only supports binary arithmetic. Financial and commercial applications can benefit from multi-operand decimal adders, which are based on huge datasets. For example, BCD data is still widely used in IBM processors such as IBM DB2, centralised servers, and power. All of these components can be found in hardware registers and processing units, as well as software packages.

III. Proposed System

Since various financial, commercial, and web-based applications have steadily required more precision, decimal arithmetic had gained a lot of attention. In these circumstances, errors arising from the translation of decimal to binary data representations are not tolerated, thus, In the cores of many modern microprocessors, there are hardware decimal arithmetic units. Which are compliant with the IEEE 754-2008 standard. To reduce execution time and area occupied, valid methodologies must be used in the design of such computerized circuits, both at the logic and layout levels.

This paper briefly describes a novel strategy for designing QCA-based n-digit BCD adders that can achieve better operating speeds than existing counterparts without compromising occupied space or cell number compared to current equivalents. By integrating an innovative logic technique with the purposed-built in QCA modules, the benefits are greatly realized. The latter has been optimised by taking into account that when a carry is produced by adding the operand's least significant digits, it is the first time basic decimal addition between two n-digit integers happens., then propagated through the subsequent n-2 digit positions, and finally ingested at the last digit position, where the most significant sum digit is computed. Unlike prior work, we broadened our efforts to include the design of a 4-digit QCA-based BCD adder. Its characterisation shows that it does a 4- digit sum computation with the fewest clock phases.

IV. Design Methodology

For logic structures and linkages that can use either the coplanar cross or the bridge process, QCA cells are used. The inverters and MG logic gates are the fundamental logic gates that are organically available inside the QCA technology. Majority gate consists of three inputs. The logic function in majority gates is done by, provided that all the input cells are connected to the same clock signal clkx (with x ranging from 0 to 3), whereas the

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remaining cells of the Majority Gate are associated to the clock signal clkx+1 M (abc) = a • b + a • c + b • c.

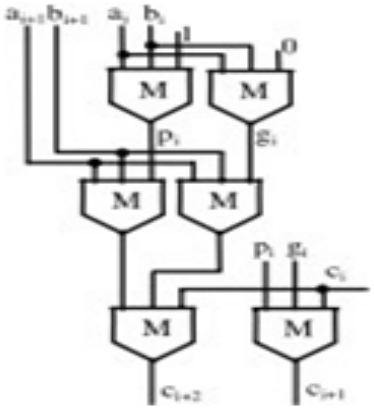

Figure-1: Basic 2-bit Module**.**

In the literature, there are several BCD adder designs for QCA. By cascading n-bit full adders, the RCA and the CLA process n-bit operands. These addition circuits have a carry-in to carry-out path consisting of one MG and a carry-in to sum bit path consisting of two MGs plus one inverter, despite the fact that they use various topologies of the generic FA. As a consequence, the worst case computational paths of the n-bit RCA and the n-bit CFA consist of (n+2) MGs and one inverter.

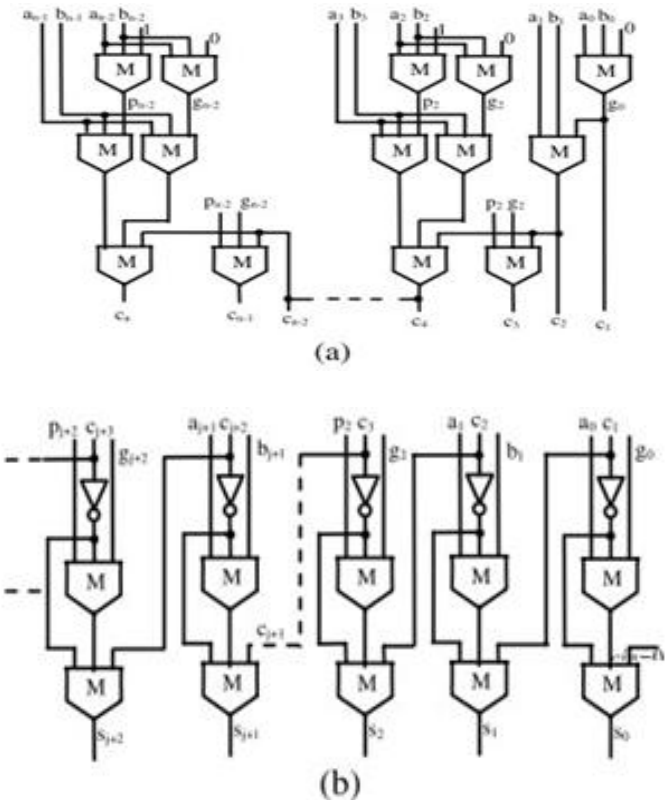

Figure-2: For n-bit adder (a) carry chain and (b) sum block.

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A 4-bit slice CLA architecture was also given, in which the propagated and generated signals, namely p = ai + bi and g = ai. bi, are computed for each bit of the operands and after that they are grouped four by four. Such a designed n-bit CLA encompasses a computational path which is composed of 7 + 4 × (log4 n) cascaded MGs and one inverter. This may be easily proven by watching the propagated signal as well as the generated signals (for which only one MG is necessary), and then computing grouped propagated and grouped generated signals using four cascaded MGs in the computational path. This architecture is also utilised to compute the carry signals, for each factor of four in the operands word-length, one level of CLA logic is required. To handle n-bit addends, log4 n levels of CLA logics are needed, with each logic contributing to the computational stream via four cascaded MGs. Finally, two cascaded MGs and one inverter are used in the sum bit computation.

The major goal is to reduce the trade-off and the delay time. A parallel-prefix adder is combined with the RCA in the hybrid adder described. The worst computational path in this architecture consists of 2log2 n+ 2 cascaded Mgs and one inverter for n-bit operands.

QCA Adder

Let's have a look at the 4-bit binary adder ADD1 to get a better understanding of the design methods described. The digits A(3:0) and B(3:0) as well as the carry Cin, are used as inputs. Cout and S(3:0) are the binary output results. The best logic structure for propagating a carry ci through a single bit position is given by (2a), which introduces only one MG between Ci and Ci+1 as shown in Figure-3.

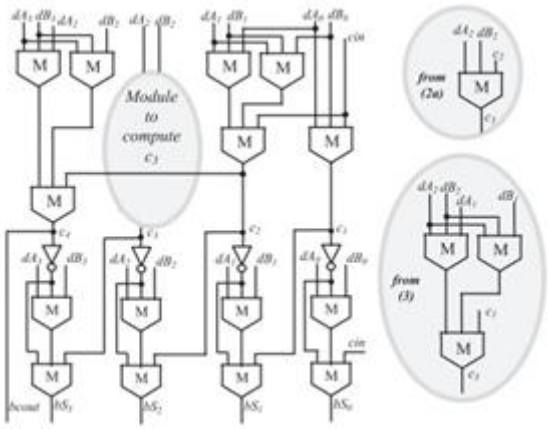

Figure-3: ADD1 module

As a result, to get the carry Ci+2, the Ci is propagated via two bit locations would necessitate the use of two cascaded majority Gates. In contrast, as shown in figure (2b), the carry Ci+2 is determined by propagating Ci through one MG using the auxiliary generated and propagated signals gi = dAi. dBi and pi = dAi. dBi. Figure-4 shows a unique technique to propagate Ci over two sequential bit locations, introducing one MG between Ci and Ci+2 while avoiding the computation of gi and pi.

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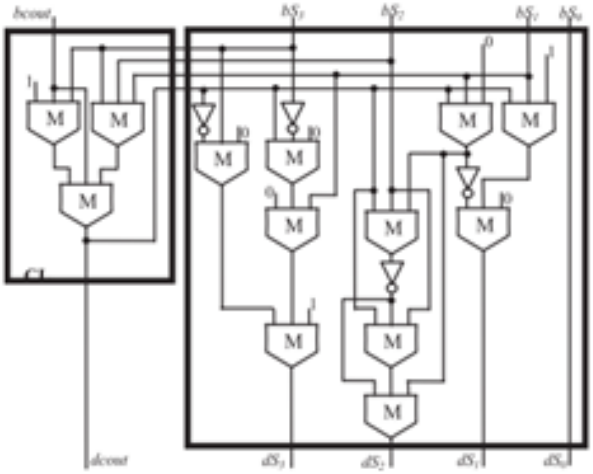

Figure-4: Cl and ADD2 Modules of BCD adder

A. Implementation

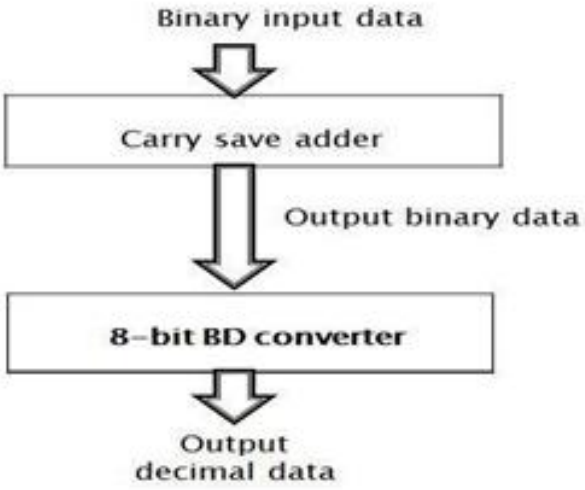

Figure-5: General Block diagram of BCD Adder

Binary n-digit input data is given to the carry save adder. He carry save adder is capable of taking three inputs and results in n-bit sum and n+1 bit carry. The output of the carry save adder is a binary data. The binary data can be converted into decimal data by using a 8-bit bcd converter.

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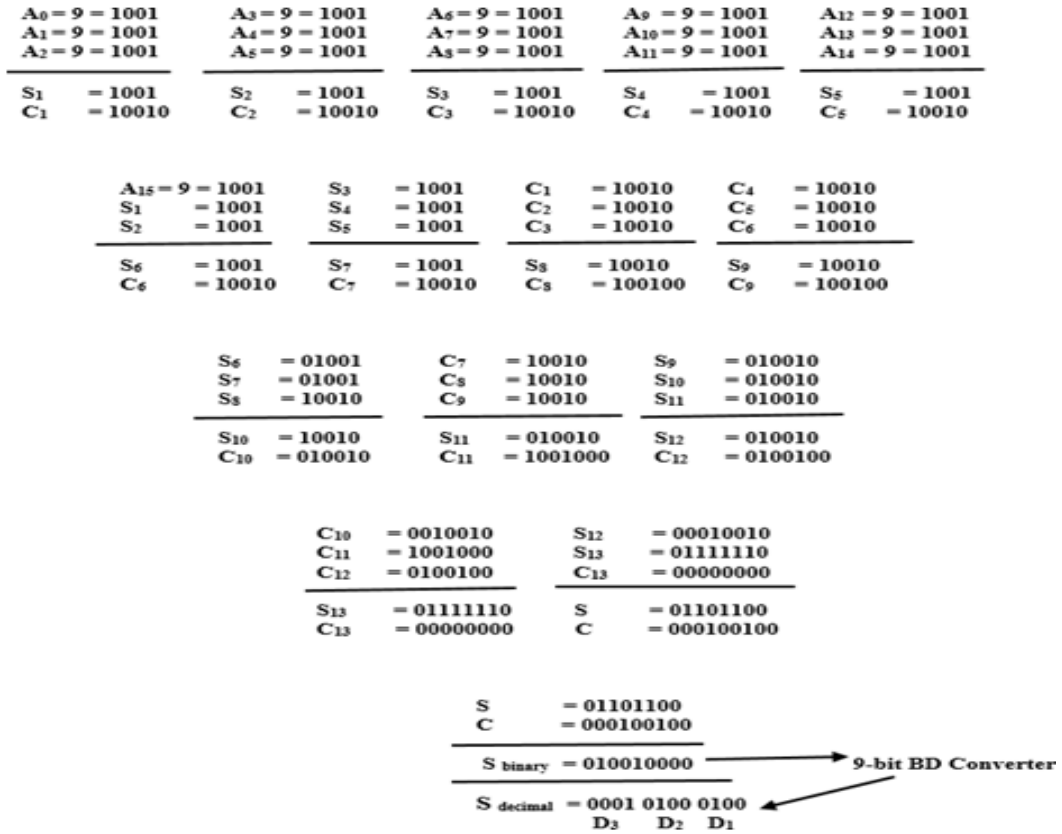

Figure-6: Sixteen Operand Decimal Addition

B. Simulation Results:

A) Waveforms:

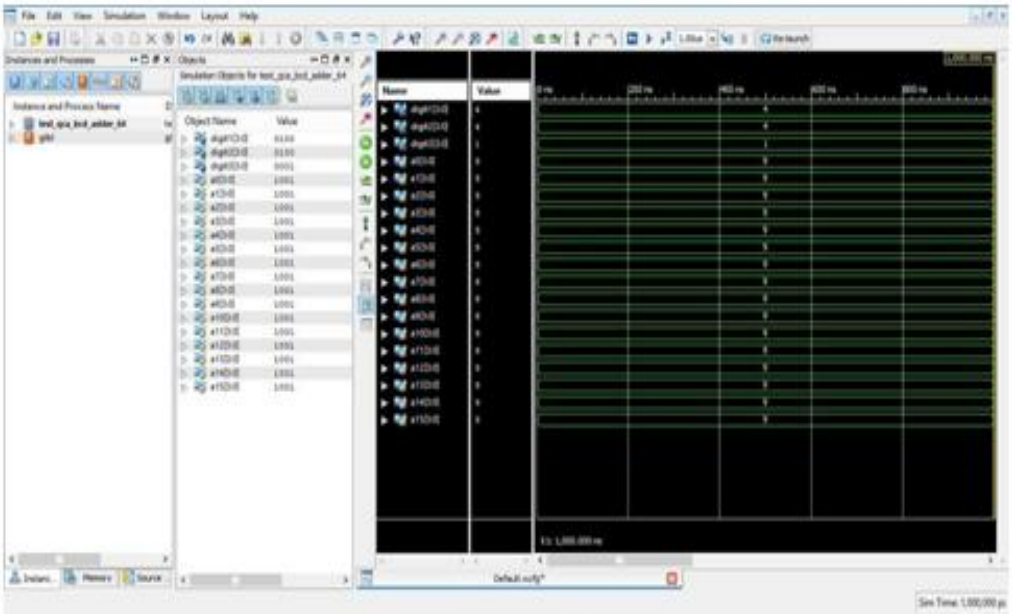

Figure 7: Simulation result of the QCA BCD adder 64bit

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B) Summary Report:

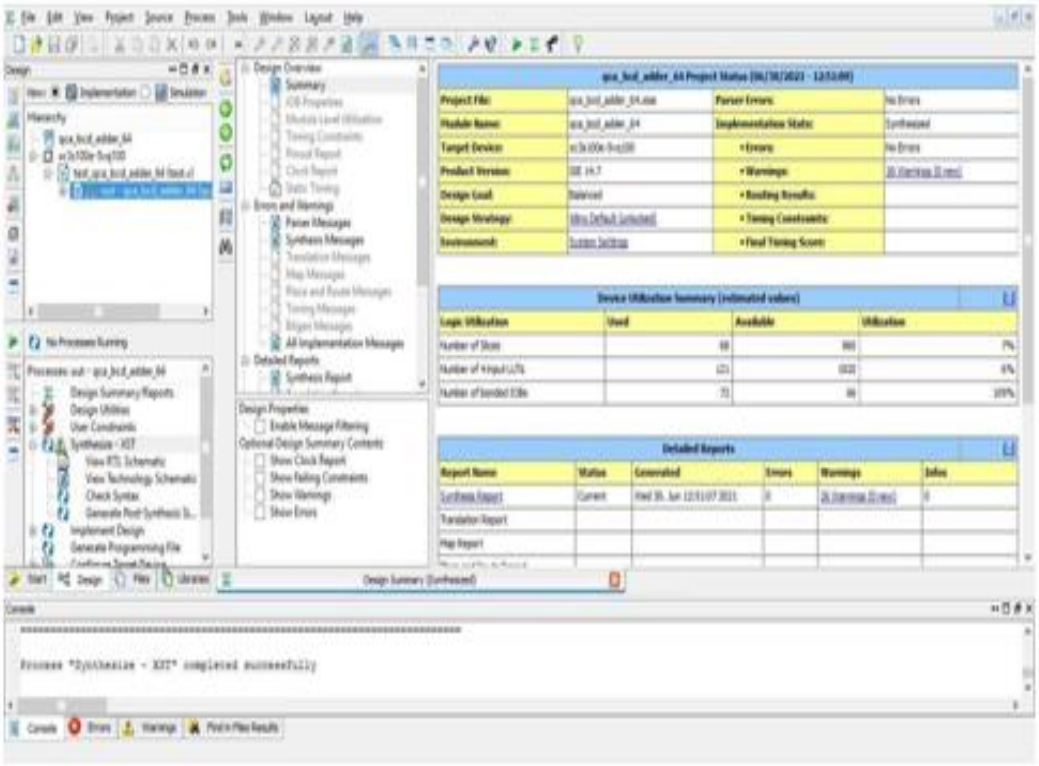

Figure 8: Summary report of the QCA BCD adder 64bit

C) Delay:

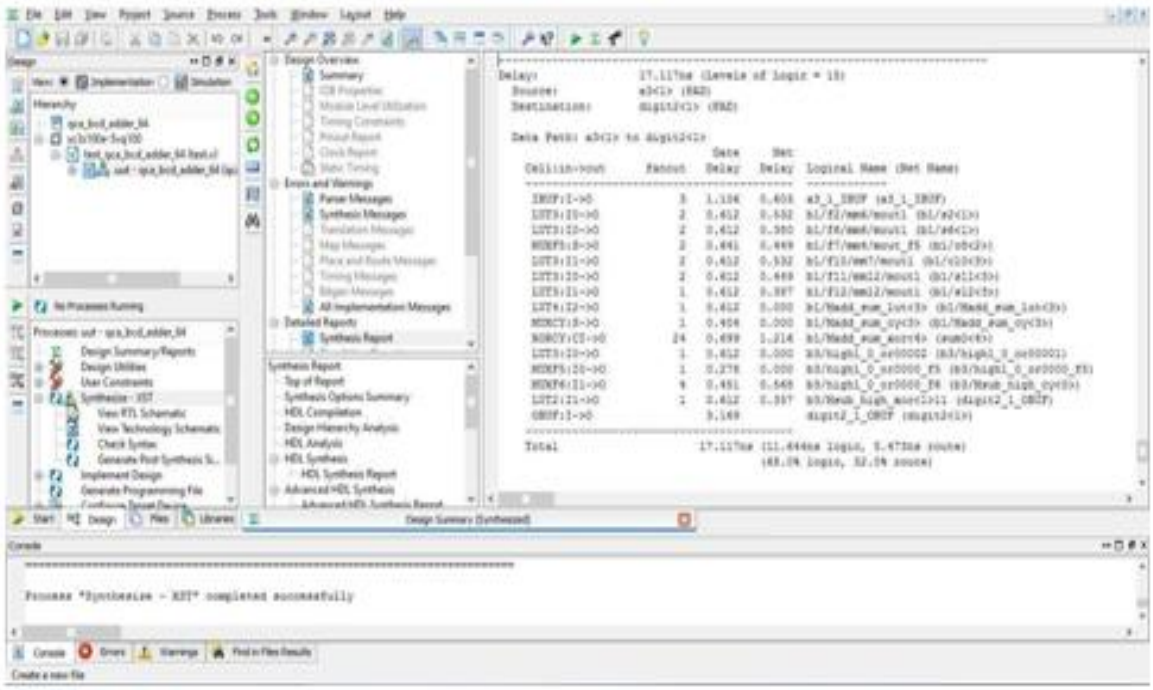

Figure 9: Delay report of the QCA BCD adder 64bit

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V. Comparison

Table-1: Area and Delay Comparison between BCD adders and QCA adders

	Area in LUT	**Delay in ns**
64-bit BCD Adder	127	19.162 ns
64-bit QCA Adder	121	17.117 ns

VI. Conclusion

A new design technique for efficient QCA-based decimal adder execution has been given and demonstrated. Unconventional logic formations and purposed constructed logic modules allow for performing known decimal additions. In actuality, the new 4-digit BCD adder has 36% reduced delay and 52% lower area occupied than its competitors. When two n-digit decimal numbers must be added, these benefits become even more obvious. The 4-digit adder operates within only 18 clock phases and occupies an area of 2.76 μm2 of space. Finally, by utilising the 2-D wave clocking approach, a more practical versions of the new adders were created without sacrificing the advantages gained over direct competition.

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Smart Nursing Robot with UV Sterilization for Covid Patients

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Abstract

There is a growing concern over the spread of the novel coronavirus among medical professionals and frontline healthcare workers and to address this issue, We have developed a nursing robot with UV Sterilization that will help to reduce physical interaction between the affected patients and frontline workers and thus maintain social distancing in times of extreme strain on the healthcare system such as during the coronavirus pandemic, robotic systems can significantly reduce by allowing frontline healthcare staff to evaluate, monitor and treat patients from a safe distance ,the danger of infectious disease transmission to frontline healthcare workers is minimized. It is our goal to quickly deploy the smart technology in the current COVID-19 pandemic to allow for screening of patient health parameters like Temperature, Plus rate, Oxygen levels of a patient. Here we also using smart camera for monitoring patient physical status and also for interacting through mic and speaker, while healthcare staff can remain at a safe distance. Patients will have less contact time with frontline healthcare providers if remote screening is enabled and, critically during the COVID-19 pandemic, an reduce the use of facemasks and other protective equipment during patient intake.

I. Introduction

The project aims to provide a contactless testing method to the doctors in hospitals to conduct initial health screenings include taking the patient's temperature, heart rate, pulse

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rate and oxygen levels. Life is becoming simpler and easier in every way as automation technology advances. Automatic systems are favoured over manual systems in today's society. Automation has made population health management feasible, scalable, and long-term. Nurses work alongside doctors in hospitals to ensure that patients receive adequate health care. In the hospital, each nurse is in charge of her own delivery tasks. In general, nurses bring several medical reports, instruments to patients using cart. The traditional cart requires some external energy to push and drag it to the patient bed and return several times during the day. This can be tiring for the nurse because she has to take care of multiple patients in the hospital. In order to assist the nurses on resolving this problem, an autonomous mobile vehicle can be developed to follow nurses while bringing with all the instruments/reports. Thereby, the work load for nurse can be reduced and she can work in other productive activities. There are numerous dangers of encountering faults in robot navigation in real-time navigation. To design a robot that able to perform in emergency case, the intelligence of the robot is can be extended where it can respond according to the emergency situation. From a technical perspective, people have started deploying robots to deal with the current difficulties brought by COVID- 19, such as, stopping this highly contagious virus from further spreading, improving efficiency within specific industries, and continuing necessary social functions.

II. Literature Survey

A few research papers related to medical robots have been reviewed and the following references show influence on the design of the smart medical assistant robot.

Marcin Zukowski et al [1] have created a humanoid medical assistant and companion robot for children's hospitals. They have focused on the robot being able to express emotions and communicate with the children by recognizing their faces and using pictures and text on the chest display to tell stories and present educational videos. The Robot autonomously navigates through hospital rooms on its own, performing simple medical tests such as monitoring body temperature and heart rate, and transmitting live video to doctors and nurses. The robot is controlled by an ODROID XU and XU4 running Ubuntu 14.04 on a specialised system with a Raspberry Pi 2 computer to animate the robot's eyes.

The implementation of a patients' temperature measurement system for the medical robotic helper was given by Marcin Zukowski et al [2]. They experimented with the MLX90614 infrared thermometer and the FLIR Lepton thermal camera and discovered that the MLX90614 infrared thermometer cannot be used as the system's sole input source, and that to obtain more accurate results, the robot would need to approach the patient's face as close as 0.3 metres. To address this, they developed a hybrid system that combines an infrared thermometer with a thermal camera to provide ambient and approximate skin temperatures, which may be used to detect the presence of humans in front of the robot.

Kaveh Bakhtiyari, Nils Beckmann and Jürgen Ziegler [3] have proposed a non-invasive contactless Heart Rate Variability (HRV) measurement with Respiratory Sinus Arrhythmia (RSA) correction. They employed Infrared and RGB cameras to measure the heart rate signal, as well as a 3D Depth sensor to collect the human breathing signal, which was then used to correct the computed HRV with RSA. They used various methods and

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instruments to conduct correlation analysis in order to discover an efficiency way for HRV calculations based on the needed precision and applicability.

Sachit Mahajan, Prof. Vidhyapathi C.M [4] has created a medical assistant robot that assists patients in transporting critical medical equipment. They have created a patient-assistance robot that follows the patient around. The robot uses a Pixy image recognition sensor for person detection and ultrasonic sensor for obstacle avoidance.

III. Existing System

Patient safety is a major public concern around the world. According to statistics, the amount of mistreatments in healthcare is on rise due to the improper identification of the patient or the drug administered to the patient. FID is thought to be the next big thing in technology. In this system, upon entering the hospital premises, the patient is assigned a temporary RFID tag which is scanned by the robot as a temporary identity and transaction for the patient. The robot identifies and avoids obstacles using the ultrasonic sensor. It instructs patients to sanitise their hands with the back-mounted automatic sanitizer dispenser. Only after using the sanitizer, the patient is able to continue the process forward. This is done to prevent unnecessary spread of contagious viruses through the touch screen display present on the robot. The robot then reads the temperature of the patient using an infrared thermometer and asks the patient to place their finger on the Oximeter MAX30105 to collect important data regarding their heart rate, pulse rate and blood oxygen saturation volume. Through the touch screen display, the patients are then enquired about their travel history and present symptoms or allergy history. These data are collected using a voice recording module and are directly sent to the doctor. The doctors have live access to the patient and their data. An integrated storage compartment and tray are present on the robot for material handling and transfer of medicines or medical reports to the doctor or the patients.

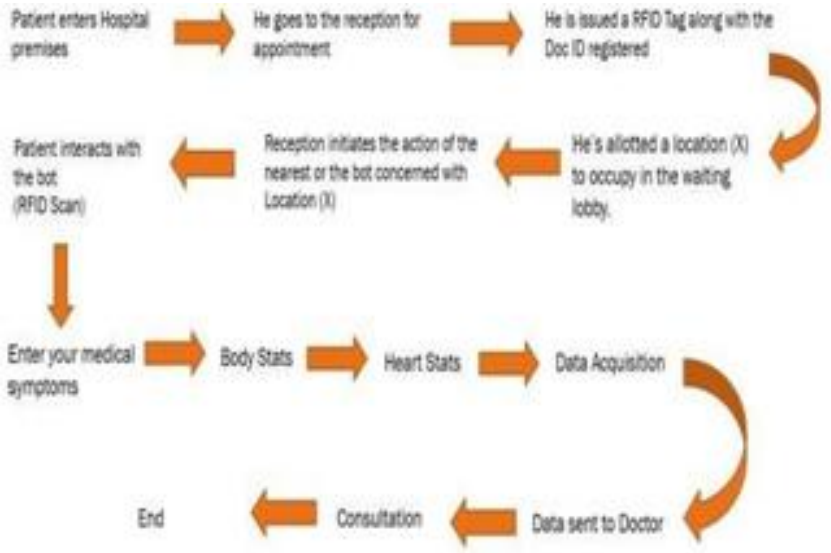

Figure 1 Describes the working protocol of the medical assistant robot**.**

Disadvantages

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- Cost of RFID readers are more expensive.
- Implementation can be difficult & time consuming.
- RFID structures may be effortlessly disrupted.
- After an item has left the supply chain, the contents of an RFID tag can be read

IV. Proposed System

Our proposed smart nursing robot is an assistive bot. Figure shows a block diagram of a smart nursing robot with UV sterilization. This nursing robot has NODE MCU (ESP8266-12E), Smart camera(V380), UV-C lamps, DC motors with driver module, IR sensor and some health parameter monitoring sensors such as Temperature sensor (LM35), Heart rate & Oxygen level sensor (MAX30100) and power supply which are interconnected as shown in figure. Initially, the system initializes the MCU, sensors and WIFI module. Later it establishes the TCP/IP connection between MCU and network through AT commands.

The LM35 temperature sensor module detects the patient's body temperature. The MAX30100 Oximeter sensor measures the heart rate and oxygen levels of the patient. We added a smart camera (V380) here to help guide the robot as well as identify patients. And also, we are using UV-C lamps for the sterilization of food items & medicines of patients. The L298N is a dual H-Bridge motor driver that allows you to regulate the speed and direction of DC motors at the same time and it acts as an interface between the motors and the control circuit. The IR sensor is used for the switching of UV lamps as and when required.

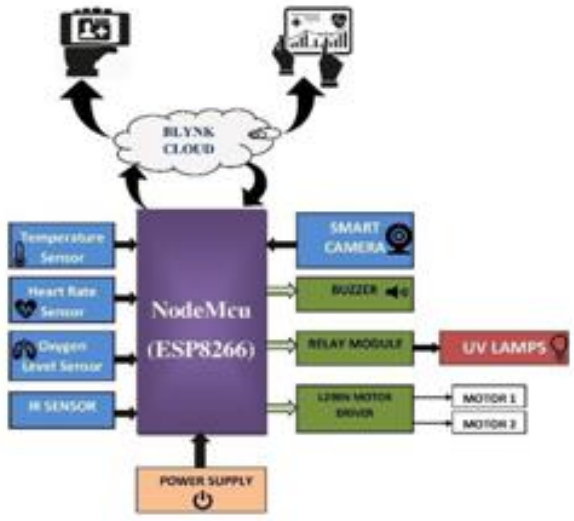

Figure :2 Block diagram of the Smart Nursing Robot with UV Sterilization

The sensor values that are being monitored by MCU. This sensors data is immediately updated to BLYNK cloud server wirelessly using TCP/IP for broadcasting the sensor values to gadgets or mobile phones. Thus, doctors can have live access to the patient and their health parameters.

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Advantages

- Sterilization capability.
- Remote controlled & live streaming capability.
- Data collection and patient monitoring
- The level of Efficiency is really high.
- It's light, portable and efficient

V. Results

In order to verify the operational effectiveness of the proposed approach, the proposed approach is simulated in the Arduino IDE Environment and the simulation results are presented as follows

Figure:3 Hardware setup of smart nursing robot with uv lamps

Figure :4 Blynk application interface with patient health parameters

VI. Conclusions

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The current and future generations often need everything to be computerized. Traditional methods only monitor the situations with the help of cameras. In hospitals to reduce manual overhead we have implemented IoT & Robotics in hospitals to monitor as well as to notify the responsible party so that appropriate measures can be taken,although this will only partially meet our expectations . With the assistance of observation is more useful to measure the quantity of medication taken by the patient and avoid mal dosage of medicines and conjointly forgetting to require the medicines at specific time duration. It that pandemic duration, autonomous robots are more useful to control the level of transmitting strength of the virus. Therefore, it is an opportunity to increase automation.

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Area and Delay Efficient Ripple Borrow Half Select Subtractor

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Abstract

In vlsi technology adders and subtractors are the building blocks for designing any digital circuits. The performance of the digital circuits are mostly depends on these building blocks, hence an high speed arithmetic circuits are needed for improving the performance of the digital circuits. In arithmetic circuits subtractors are the complex circuits and which consume high power and high delay, hence a new borrow select subtractor with different designs are implemented in this paper. The performance results of these subtractors shows that the proposed borrow select subtractor achieve better performance compared to the previous designs. In this paper, 8bit and 16bit borrow select subtractors are implemented in different technologies and found that the proposed subtractor achieves better results. The Borrow select subtractors are implemented in the Xilinx ISE design suite with the use of VERILOG HDL programming language. The area is taken in terms of LUT count and the delay is calculated in nano seconds.

Keywords: Ripple Borrow Subtractor, BLO, RBHS.

I. Introduction

A subtractor is one of the important building blocks in the construction of a binary divider. In modern systems, applications are aimed at battery operated devices so that power dissipation becomes one of the primary design restrictions.

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However, in recent years power consumption is being given equal significance. The reason for such a changing trend is attributed probably due to the fast increase in portable computing devices and wireless communication systems which demand high speed calculations and complex functionality with low power consumption. In addition to this high performance processors consume severe power which in turn raises the cost associated with packaging and cooling. From the environment point of view, the lower the power dissipation of electronic components, lower will be the heat dissipated in rooms which in turn will have a positive impact on the global environment. Also, lower electricity will be consumed.

The truth table for a single bit or half-subtractor with inputs A and B is given below along with its circuit diagram (Figure.1). In figure 2 the full subtractor is designed using two half subtractors.

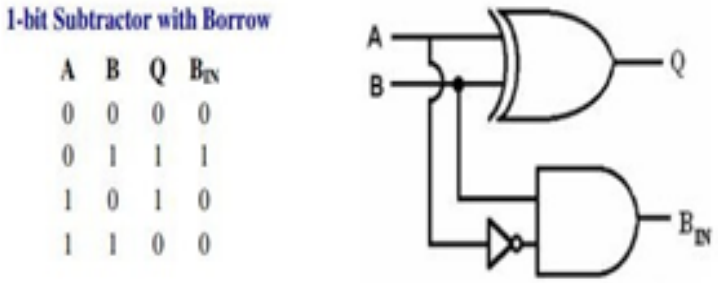

Figure 1: Truth Table and Schematics for half Subtractor Circuit

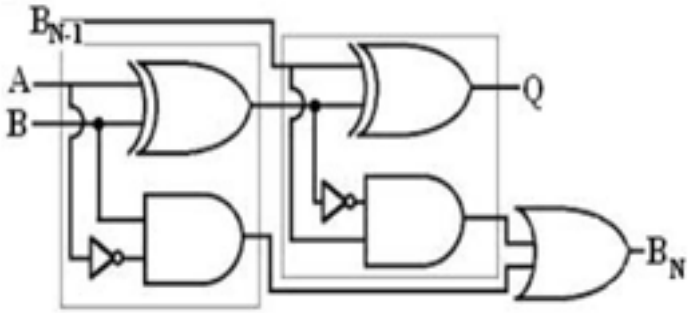

Figure 2: Truth table and schematics for full subtractor circuit

II. Literature Survey

In [6], author proposed a full adder circuit that consumes the lesser power compared to other adder. Author observes that the power has been reduced due to the elimination of the inverter in the proposed design. In [7], author presented a new 13T full adder design based on hybrid – CMOS logic design style. The proposed 13 transistor Hybrid GDI full adder circuits give superior performance in terms of power consumption, propagation delay and Power Delay Product (PDP) than all the reference full adder circuits and the proposed circuits are also free from the voltage degradation problem that existed for the most of the reference circuits. In [9], author main objective is to design that half subtractor using either of the two adaptive voltage level(AVL) techniques to reduce the sub threshold leakage current which plays a very important role in the reduction of power dissipation.

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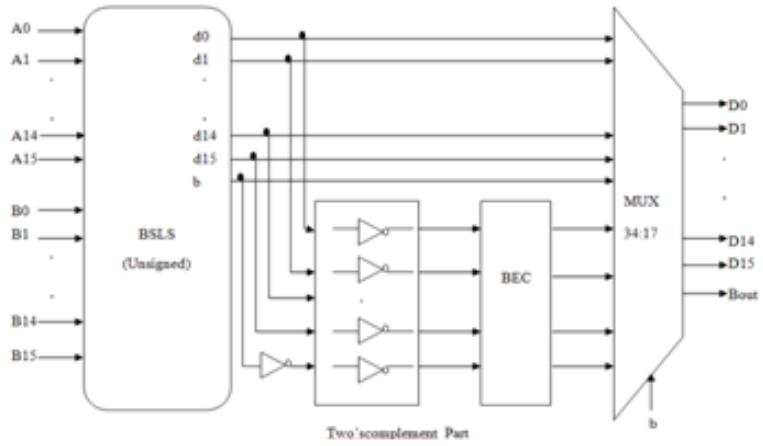
In [10], authors develop one bit half subtractor using CMOS 45nm technology with reduced no of transistor and it is efficient in speed, area, and propagation delay and power consumption. To resolve the huge consumption of power is also a challenging task. Using 45nm technology GDI based circuit can be optimized such parameters.

III. Existing Work

Adders, subtractors and multipliers are the essential building blocks of processors. Normally, subtraction is done using adder-subtractor module, which can practically result in slowing down arithmetic operation, since the same hardware has to be used for both addition and subtraction processes using additional control signals. The commonly used Ripple Borrow Subtractor (RBS) used for subtraction of unsigned numbers possesses a simple architecture. However, performance of RBS is limited by borrow propagation time incurred from Least Significant Bit (LSB) to Most Significant Bit (MSB). In other words, the delay of RBS depends on binary word length. Borrow Select Subtractor (BSLS) architecture is proposed here to overcome the limitations of existing RBS with multiple RBS circuits. This method generates partial difference and borrow using multiplexers (MUX) and the final difference and borrow is selected. As the BSLS utilizes multiple RBS circuits in it, it is proved normally area inefficient. The conventional method of subtraction for signed numbers uses two's complement method using addition.



Figue 3: Circuit Diagram of BSLS

To overcome the disadvantages in BSLS the two proposed architectures i.e, BSLS using BLO and RBHS are introduced.

IV. Proposed Work

The proposed 16-bit and 8-bit BSLS for unsigned numbers are implemented in five stages. The first stage the RBS blocks of two bits are took place and start the operation. The two inputs are passed to this first stage of the proposed design. The borrow input is generally in the off state that is it always sends zero to input block. Then the output difference is passed to the next stage of the design. This difference value is generated with respect to the previous borrow bit. The difference and borrow bits are always changes according to the inputs. The final output is selected based on the multiplexers which are having the borrow as the selection line.

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In general the second operand is taken into the two's complement form and the first operand is added to the second operand which gives the subtraction output. To convert this two's complement form the input is initially converted with respect to the not gates and after that one bit is added to the output then the two's complement is achieved. Here the borrow output is zero then the output which is obtained is in the unsigned number. Similarly when the borrow output is one then the output which is obtained is in the signed number. Hence again two's complement is done to covert the output to its original number system.

A. Modified BSLS Using BLO (BSLS-BLO)

The modified BSLS using BLO is done in the different stages in which the final output is the difference and borrow. Here the borrow in input is given to the inputs to do the subtraction process. Here the bits are propagated to the RBS according to their bit lengths and the obtained difference and borrow are send to the BLO blocks to reduce the one bit subtraction process. Hence the two outputs generated from the RBS and BLO are send to the multiplexer in which the multiplexer is going to select any one of the output through the borrow selection input. The obtained borrow signals are taken as the selection for the multiplexers. When the borrow signal is high it selects the output from the RBS and similarly when the borrow signal is low it selects the BLO block output. In such a way the output is generated effectively and faster due to the propagation of the borrow signals. Hence the output is generated in a high speed manner. Hence the modified borrow select subtractor using BLO achieves high speed due to the selection of the outputs based on the previous borrow pins.

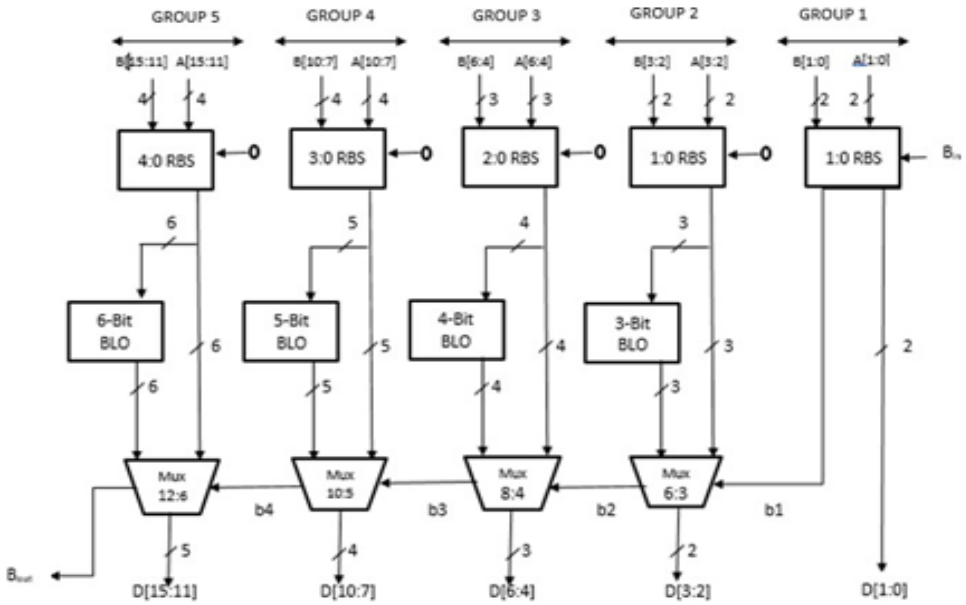

Figure 4: Modified Borrow Select Subtractor using Binary-Less-One Logic

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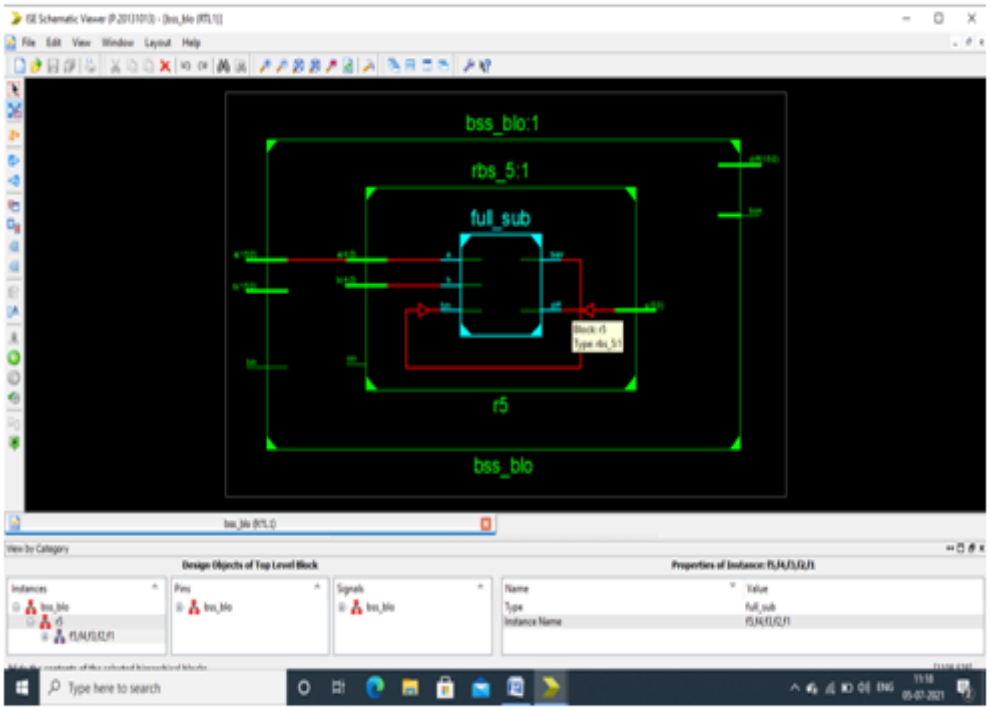

Figure 5. RTL Schematic of 16-bit Modified Borrow Select Subtractor using Binary Less One Logic

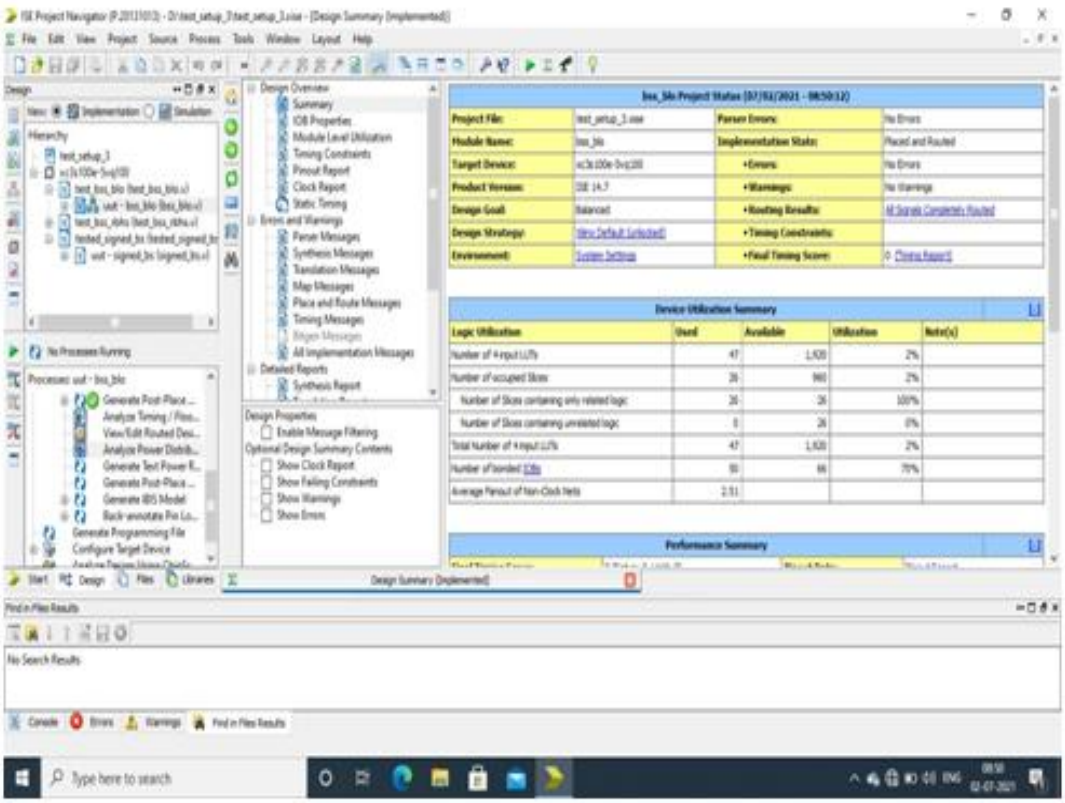

Figure 6: Device Utilization Summary of 16-bit 90nm Modified Borrow Select Subtractor using BLO Logic

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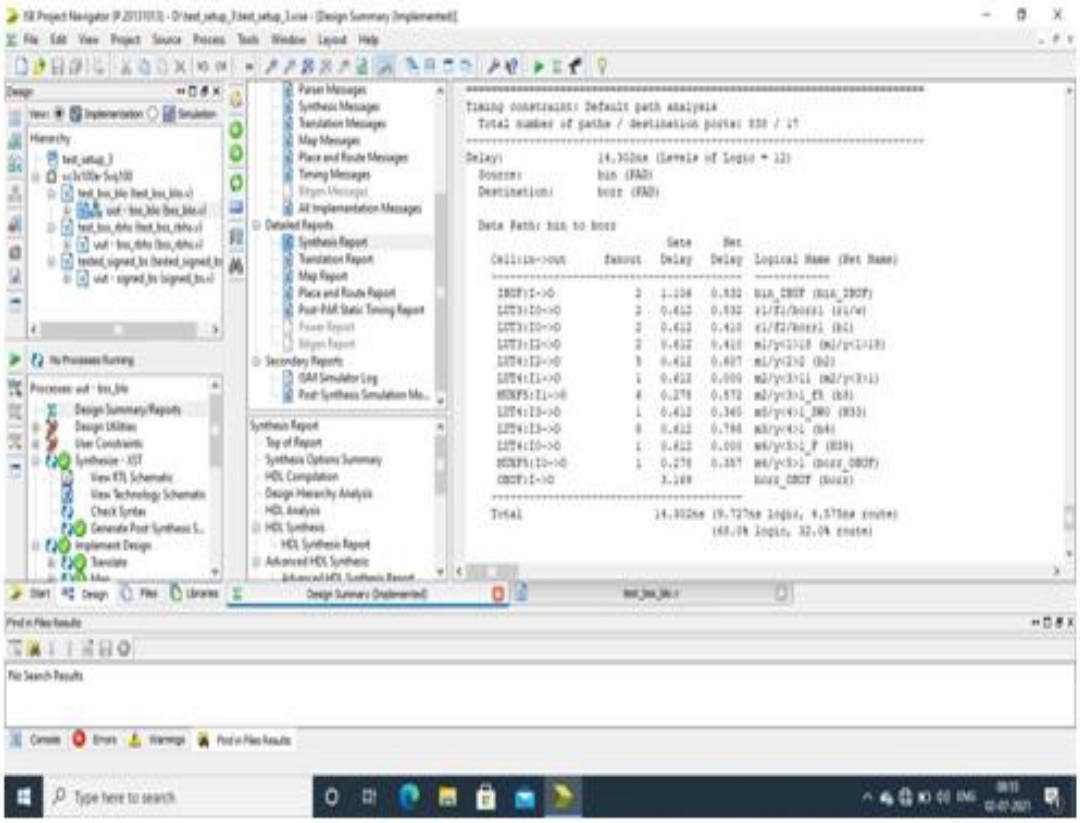

Figure 7: Delay Report of 16-bit 90nm Modified Borrow Select Subtractor using BLO Logic

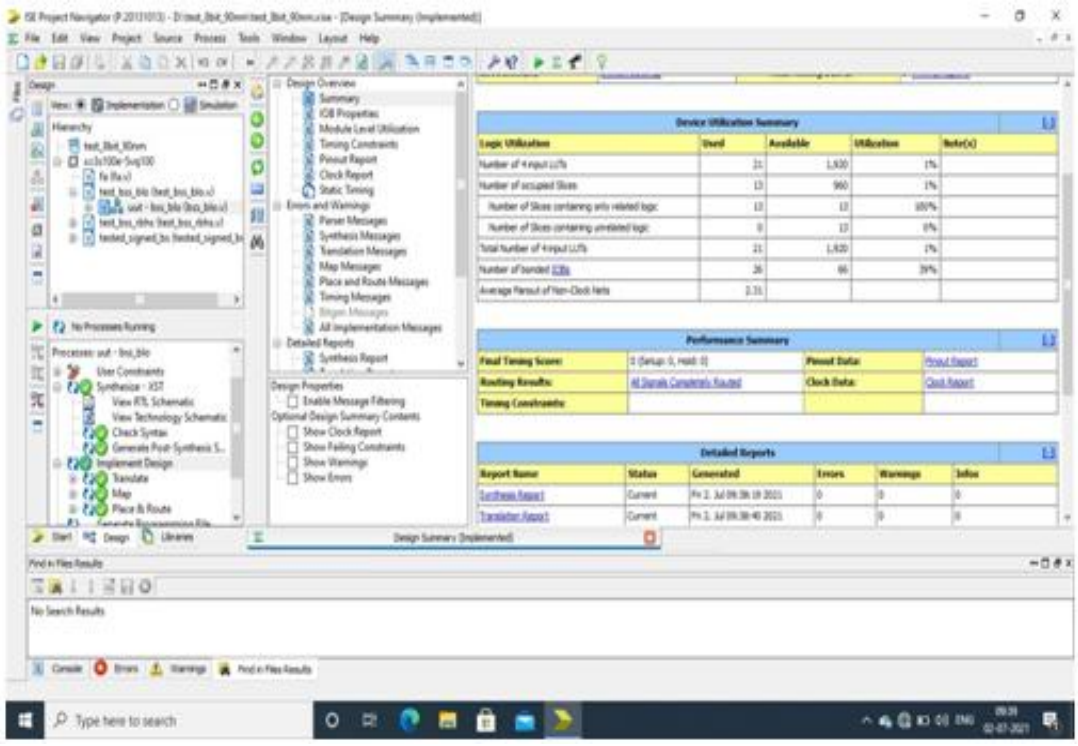

Figure 8: Device Utilization Summary of 8-bit 90nm Modified Borrow Select Subtractor using BLO Logic

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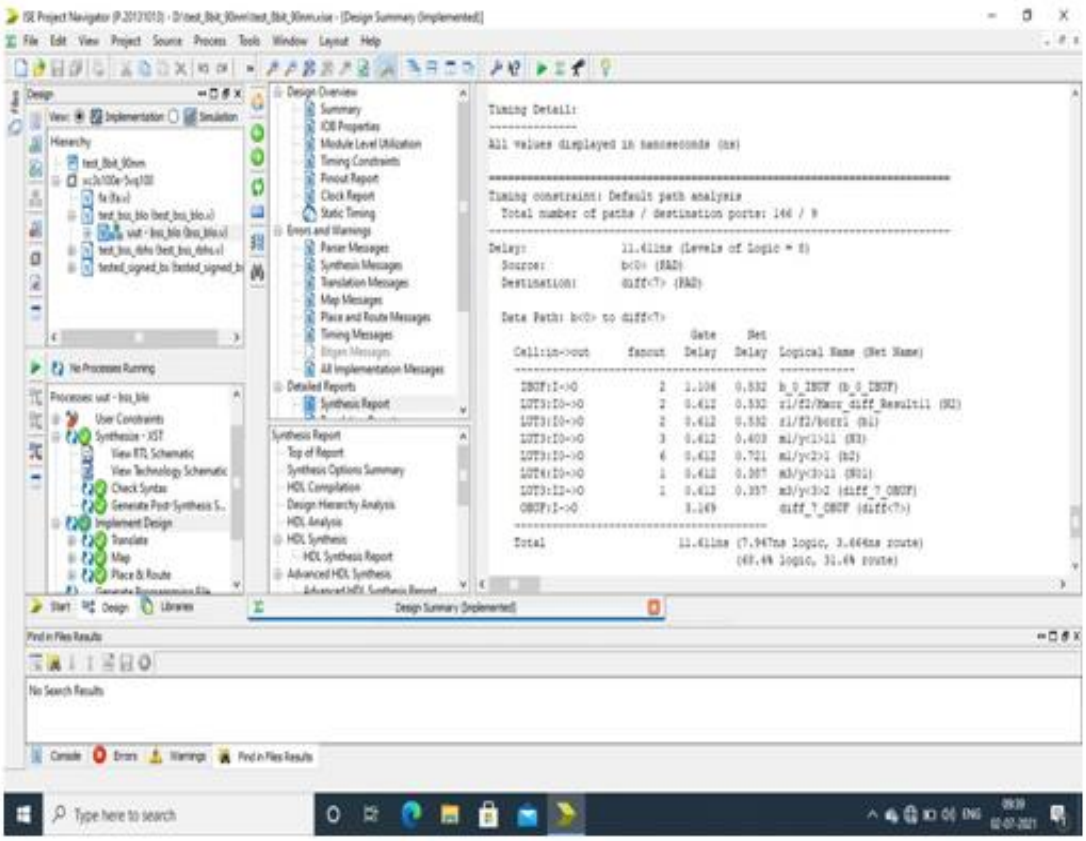

Figure 9: Delay Report of 8-bit 90nm Modified Borrow Select Subtractor using BLO Logic

B. Modofied Bsls Using Ripple Borrow Half Subtractor (BSLS-RBHS)

Here a new design is also implemented in which the BLO blocks are replaced with RBHS for generating the output. The RBHS blocks consists of half subtractors in which borrow signals are propagated to the next subtractors. The 16-bit ripple borrow half subtractor has the input from the 16-bit RBS with Borrow as the input in which it generally take the zero value. Here the borrow signal is generated with the RBS and RBHS blocks in which any one the block signal is one the borrow signal is one. for the generation of the borrow signal a or gate is used in propagating the borrow signal in which the inputs are taken from the RBS and RBHS blocks hence the borrow signals are propagated to the next block for the operation of the subtraction. Hence the final output is generated from the RBHS bocks. With the use of this RBHS blocks the output is generated effectively but there is delay is obtained for the generation of the borrow signal from the previous stage. The next stage is stays in waiting state until the previous blocks completes its operation and the generation of the borrow signal. Hence, the next is waiting for the borrow signal from the previous block due to the waiting condition power consumption is high in these architectures. The borrow-out bit Bout from both 16-bit RBS and 16-bit RBHS are given as input to the OR gate. The output of the OR gate is the borrow-out bit Bout for the current group and borrow-in for the succeeding group.

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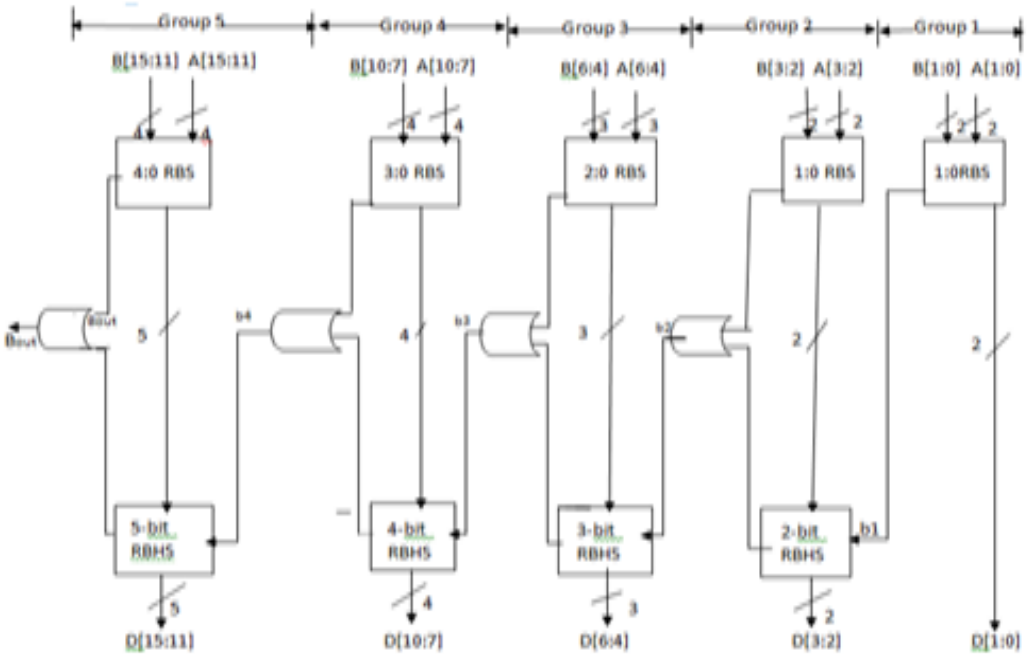

Figure 10: Modified Borrow Select Subtractor using Ripple Borrow Half Subtractor

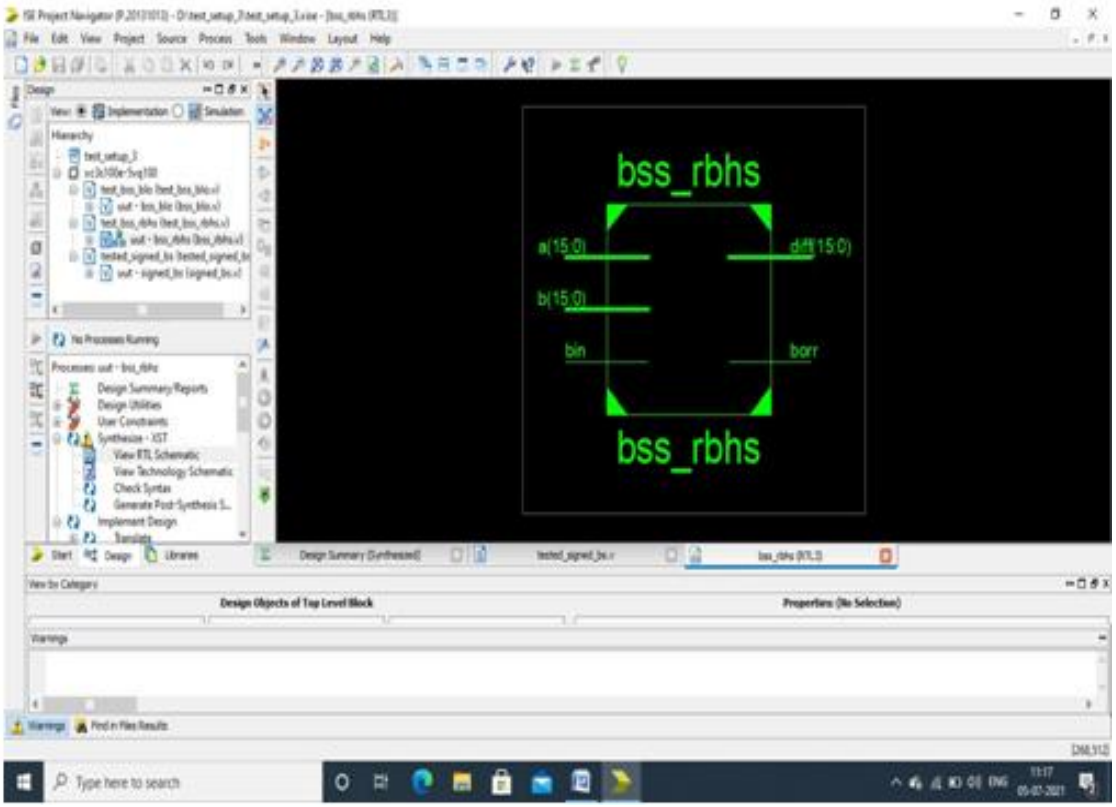

Figure 11: RTL Schematic of 16-bit Modified Borrow Select Subtractor using Ripple Borrow Half Subtractor

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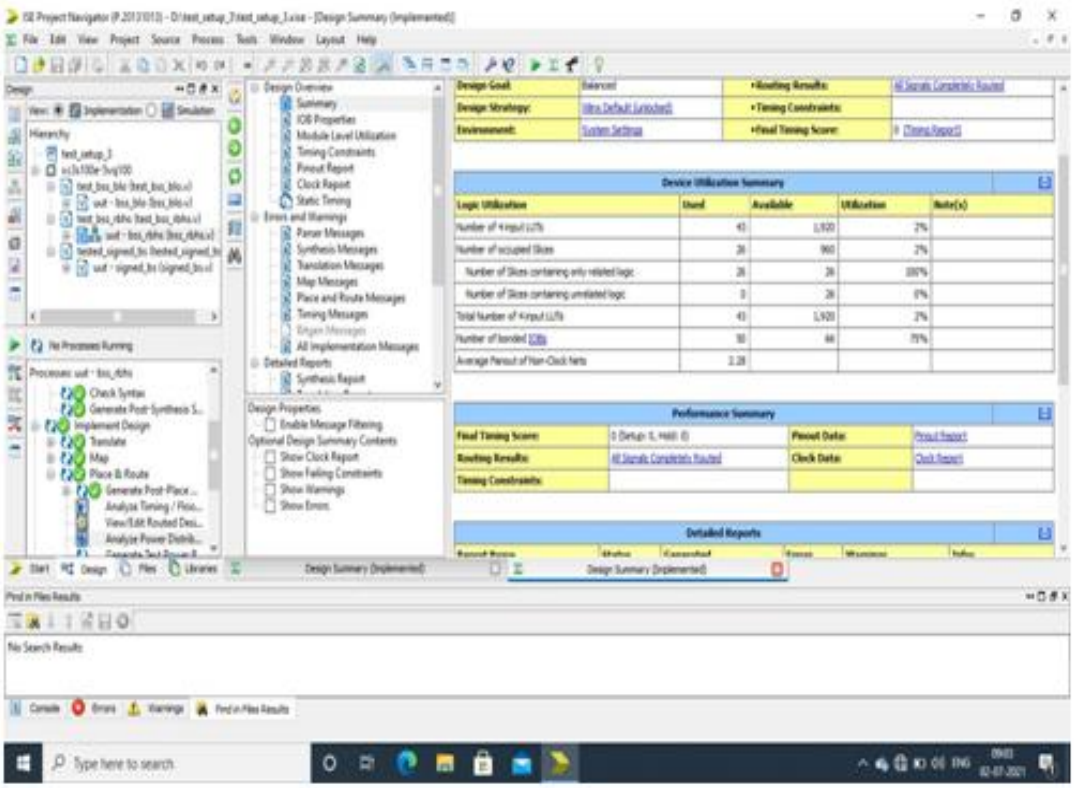

Figure 12: Device Utilization Summary of 16-bit 90nm Modified Borrow Select Subtractor using RBHS Logic

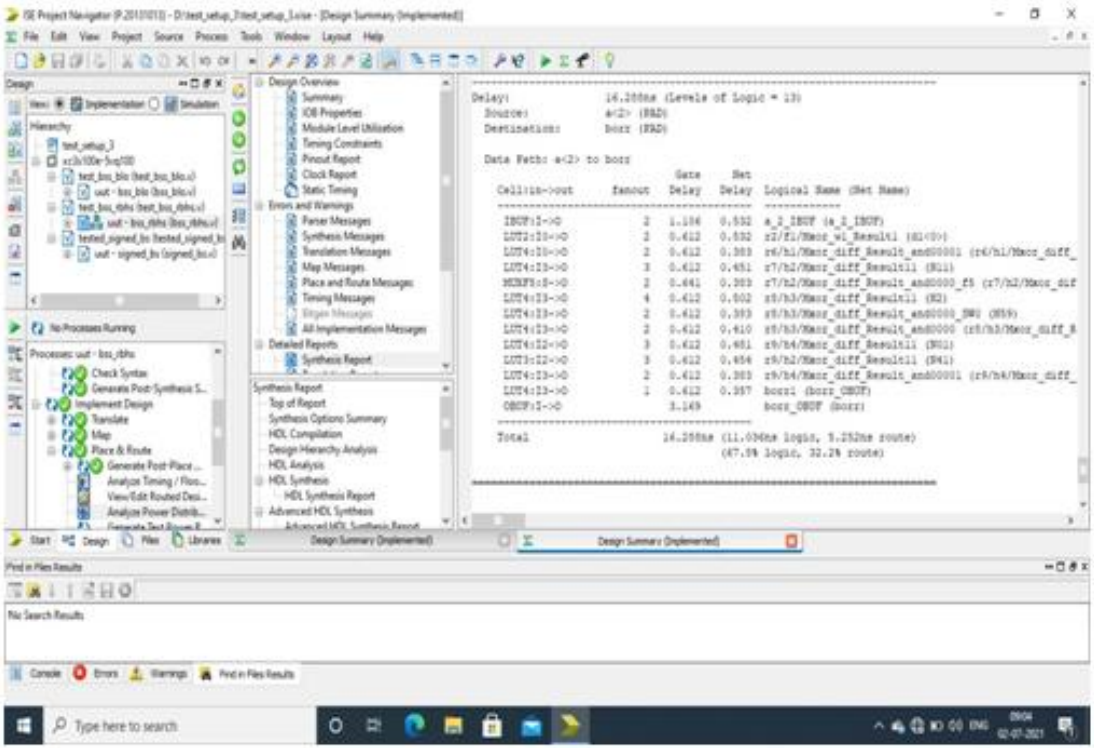

Figure 13: Delay Report of 16-bit 90nm Modified Borrow Select Subtractor using RBHS Logic

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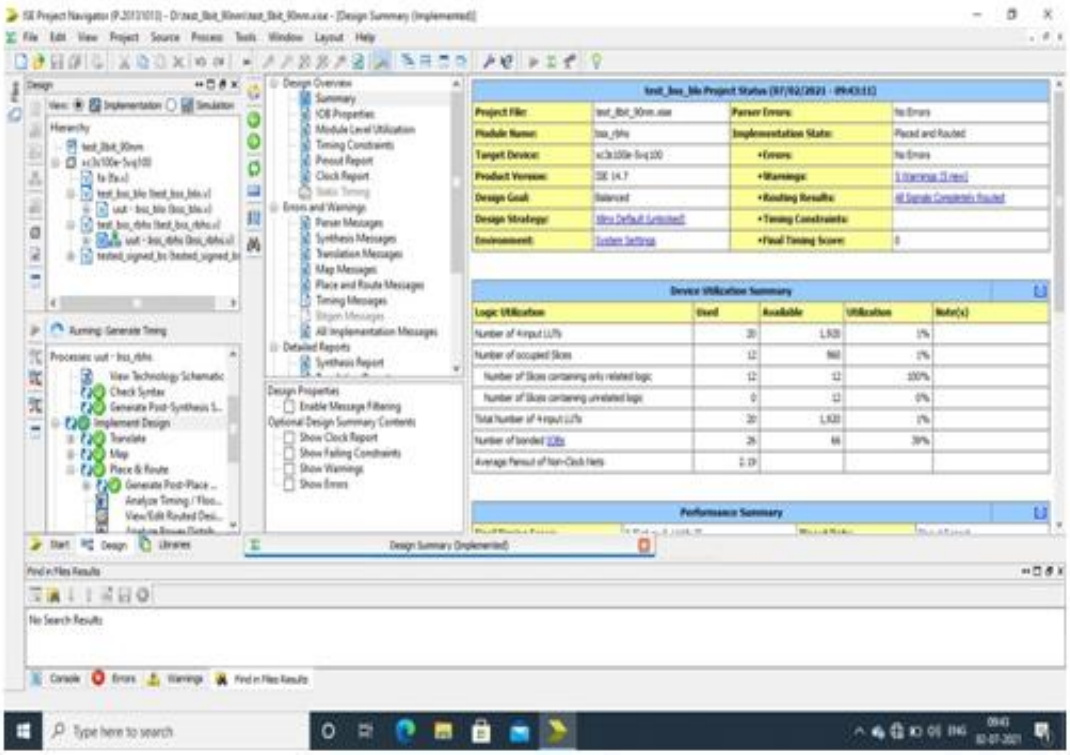

Figure 14. Device Utilization Summary of 8-bit 90nm Modified Borrow Select Subtractor using RBHS Logic

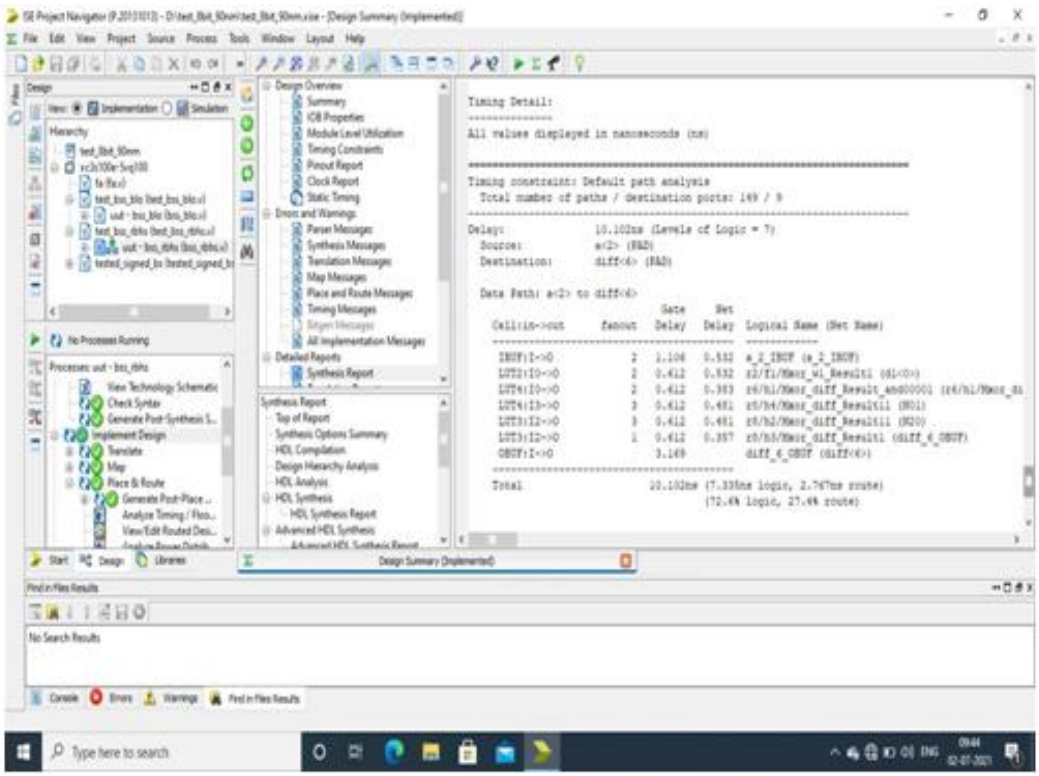

Figure 15: Delay Report of 8-bit 90nm Modified Borrow Select Subtractor using RBHS Logic

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V. Results and Discussions

Table 1: Comparison of 16-bit 90nm Subtractors

Type of Subtractor	LUT	IOBs	Occupied Slices	Delay(ns)	Quiescent Power(mW)
Conventional Subtractor	63	50	33	26.53	34
Proposed Subtractor using BLO	47	50	26	14.32	34
Proposed Subtractor using RBHS	43	50	26	16.28	34

Table 2: Comparison of 16-bit 45nm Subtractors

Type of Subtractor	LUT	IOBs	Occupied Slices	Delay(ns)	Quiescent Power(mW)
Conventional Subtractor	38	50	14	14.93	14
Proposed Subtractor using BLO	24	50	10	9.61	14
Proposed Subtractor using RBHS	28	50	17	13.76	14

Table 3: Comparison of 8-bit 90nm Subtractors

Type of Subtractor	LUT	IOBs	Occupied Slices	Delay (ns)	Quiescent Power(mW)
Conventional Subtractor	31	26	17	16.35	34
Proposed Subtractor using BLO	21	26	13	11.61	34
Proposed Subtractor using RBHS	20	26	12	10.12	34

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Table 4: Comparison of 8-bit 45nm Subtractors

Type of Subtractor	LUT	IOBs	Occupied Slices	Delay(ns)	Quiescent Power(mW)
Conventional Subtractor	18	26	9	10.93	14
Proposed Subtractor using BLO	11	26	7	7.77	14
Proposed Subtractor using RBHS	12	26	4	8.95	14

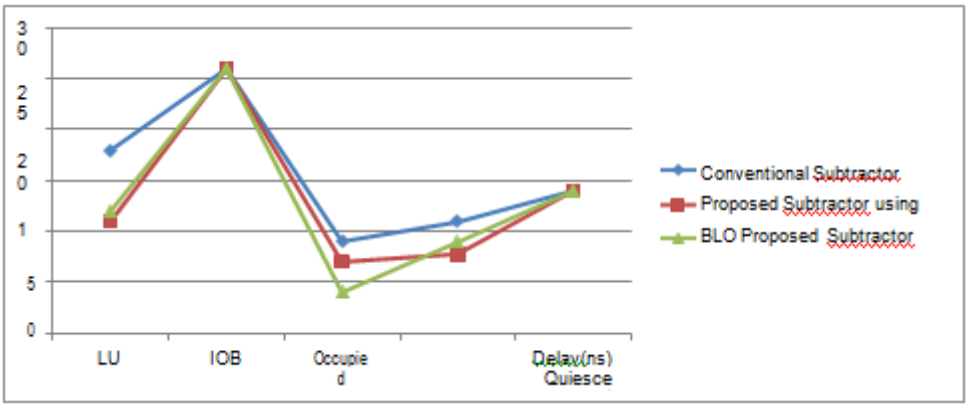

Figure 16: Graph for Comparison of 16-bit 90nm Subtractors

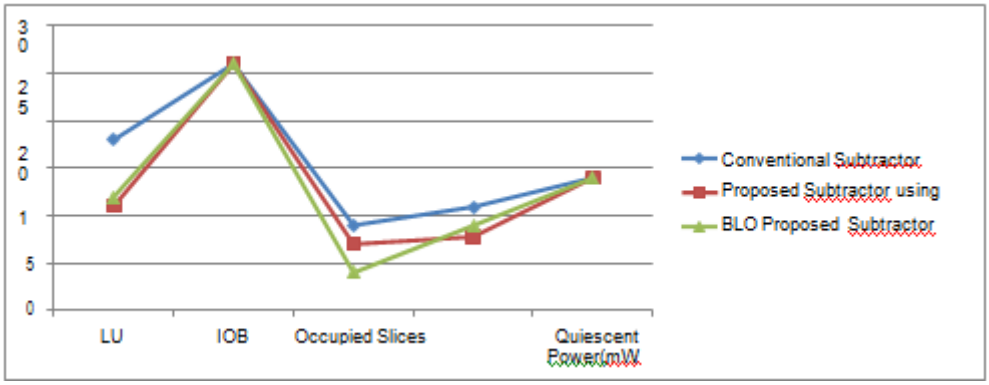

Figure 17: Graph for Comparison of 16-bit 45nm Subtractors

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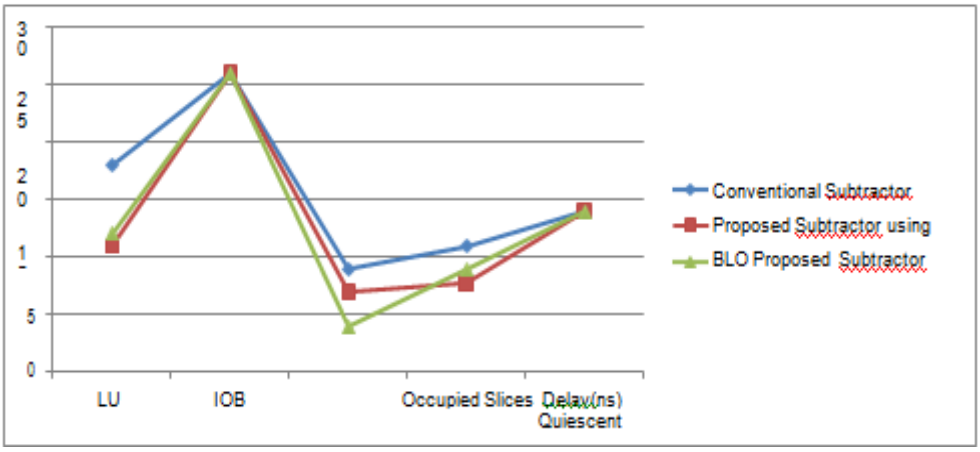

Figure 18: Graph for Comparison of 8-bit 90nm Subtractors

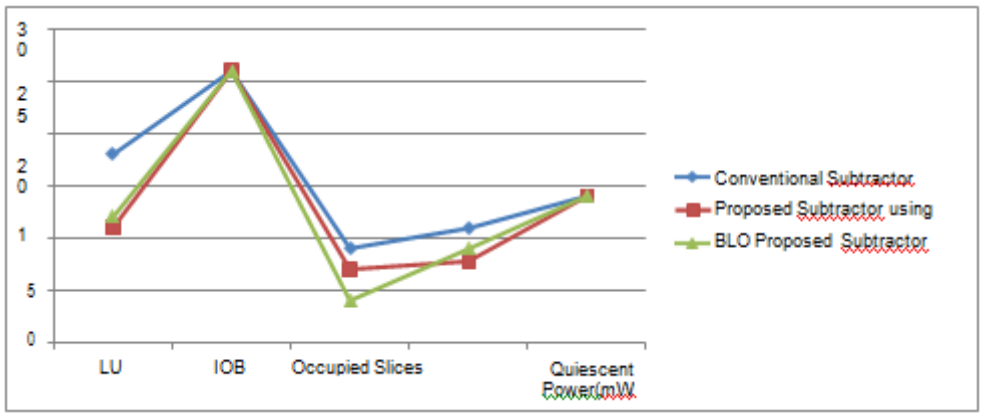

Figure 19: Graph for Comparison of 8-bit 45nm Subtractors

In this paper we are comparing the performance of the Conventional Subtractor with Subtractor designed using BLO and RBHS implemented in both 90nm and 45nm FPGAs in terms of LUTs, Occupied Slices, Delay, IOBs and Quiescent Power From the above graphs and tables, we can conclude that there is 25.4% reduction in LUTs used, 21% reduction in number of occupied slices and 46% decrease in delay in 16-bit Subtractor designed using BLO implemented in 90nm FPGA when compared with Conventional subtractor and there is 31.75% reduction in LUTs used, 21% reduction in number of occupied slices and 39% decrease in delay in 16-bit Subtractor designed using RBHS implemented in 90nm FPGA when compared with Conventional subtractor. The performance of other implementations can also be interpreted from the above tables and graphs.

VI. Conclusion

In this paper three different borrow select subtractors are designed and compared in terms of delay and area. Here the signed binary subtractor, borrow select subtractor using BLO and borrow select subtractor using RBHS are presented. These subtractors are implemented in 180nm, 90nm and 45nm technologies along with the 8 and 16bit subtractors. The proposed borrow select subtractor using BLO achieves the better results in terms of area and delay in all the technologies in which these designs are implemented. Hence the proposed design is the best suitable subtractor for the digital circuits and arithmetic circuits.

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Investigation of the Bio-Compatible Microwave/Millimeter-Wave Photo – Sensors for Identification of Malignant cells

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Abstract

The Classical Drift-Diffusion model are widely used by researchers in designing pin devices, small-signal models did not take into account the non-linear circuit effects.The previously developed Classical Drift-Diffusion (CLDD) simulator will be modified by incorporating the Quantum mechanical physical phenomenon to make the analysis more and more accurate and realistic.

Key Words:
CLDD- Classical Drift Diffusion
QMLCDD – Quantum Modified Classical Drift Diffusion

I. Introduction

The newly developed Quantum-Modified Classical Drift-Diffusion (QMCLDD) non-linear mathematical model will be used for design and characterization of pin based photo-detectors, the model has some limitations for using in high frequency domain, as far as Quantum size effects, Quantum mechanical tunneling, impurity scattering and high temperature transport properties are concerned.

II. Working Principles

The analysis and results obtained from newly developed QMCLDD simulator will be further compared with the experimental results reported under similar operating conditions at low frequency region. The validity of the model will be established. The DC and high-frequency simulation studies will be performed using QMCLDD model to observe the

1. forward characteristics,
2. frequency dependent resistance analysis
3. breakdown voltage characteristics
4. reverse recovery time
5. isolation and
6. insertion loss of flat and exotic pin based photo-detector devices for opto-electronic applications.

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Characterization of Plant Disease Prediction Using Convolutional Neural Network

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Abstract

Agriculture is one of the main factors that determine the growth of a country. In India itself, about 65% of the population lives on agriculture. Due to different seasonal conditions, plants can be infected with different kinds of diseases, which can affect the leaves of plants. First, the plant is infected, and then the whole plant, which in turn affects the quality and quantity of plant growth. Because there are many plants in the yard, it is difficult for human eyes to identify and classify the diseases of each plant in the field. Since these diseases can be transmitted, it is very important to diagnose each plant. Therefore, in this document, we introduce the automatic detection and classification of plant leaf diseases based on artificial intelligence to quickly and easily identifies, classify and perform the required tasks.This is one way to achieve our goal of increasing agricultural crop yields. In this method, we followed several steps Image acquisition, preprocessing, segmentation and classification of images.

I. Introduction

Agriculture plays a very important role in acountry's economic growth. It is the area that has the greatest impact on the country's GDP. The agricultural sector accounts for about 16% of India's GDP. There are many factors that affect quality and quantity. Cultivated plants Due to differences in climate and local conditions, these plants are susceptible to various diseases. If these diseases are not paid attention to, they can cause serious damage. In India itself, about 1,525% of the harvest is lost due to diseases, pests and weeds. We can refer to a plant disease in Georgia in the United States in 2007 that caused a loss of about 540 US dollars. Because of the large area of cultivated land and many plants, it is difficult for human eyes to correctly identify and classify. Every plant, this is very important, because even an infected plant can spread disease. In addition, most farmers do not know enough about these diseases and their real treatment methods, hiring experts can be costly, and unknowingly using pesticides is harmful to the land.

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Intelligent decision-making and speed are the two main factors that determine the success of plant leaf disease automatic detection and classification models. The proposed model will help farmers to correctly identify and classify diseases by scanning a piece of paper and alerting farmers to the disease before it spreads. The model is basically divided into four stages or stages. First, we collect data sets from various leaves of infected and healthy plants. The second step is to remove the noise in the image, and then we create a color conversion structure for the image. In the third step, we use available clustering techniques to segment the image. This step is done for foreground, d and CNN. It considers the basis of accuracy and the most suitable algorithm for training and testing.

II. Literature Survey

1. Plant disease detection and its solution using image classification

Crop production plays an important role in agriculture. At present, food losses are mainly related to contaminated crops, which are manifested in decreased productivity. The timely detection of plant diseases has not yet been investigated. The main challenge is to reduce the use of pesticides. In the agricultural sector, improve quality and quantity Our article is used to check the prognosis of early action leaf disease. We propose an improved k mean clustering algorithm to predict the infected leaf area. A color-based segmentation model is defined to segment infected areas and classify them into appropriate categories. Analysis The sample image was performed on the required time and the area of the infected area. Diseases and provide solutions to cure diseases. Display the affected part of the worksheet as a percentage. We plan to develop our project with a voice navigation system so that even people with less experience with software can operate it without any problems.

2. Plant Leaf Disease Detection and Classification Based on CNN with LVQ Algorithm

In agriculture, early detection of diseases is important to increase crop yields. Bacterial stains, late blight, Septoria leaf rot and yellow leaf disease affect the quality of tomato crops. Automatic methods of plant disease classification also help to take action after detection. This article introduces a convolutional neural network (CNN) model and training vector quantization algorithm (LVQ) for tomato leaf disease detection and classification. The data set contains 500 images of tomato leaves with four disease symptoms. They model CNN for automatic classification and feature extraction. Color information is actively used in the research of plant leaf diseases. In our model, filters are applied to three channels based on RGB components. The convolution vector of the output feature is input into the LVQ. Part of online learning. The experimental results confirmed that the proposed method effectively detects four different types of tomato leaf diseases.

3. A review on plant disease detection using image processing

India is an agricultural country, accounting for 7.68% of the world's total agricultural output. In India, the agricultural sector accounts for approximately 17% of India's gross domestic product (GDP). Effective growth and improved asset productivity are critical to boosting India’s profits and economy. For this, farmers need technical experts who manually monitor plants. However, manual monitoring does not always produce satisfactory results. In addition, experts in this area are not available in all regions and they are expensive because

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farmers have to pay. Therefore, it is necessary to develop effective intelligent planting technology to increase production and growth with less manpower. An overview of plant disease detection methods developed by various researchers in the imaging field, including research on the detection of plant diseases such as apples, grapes, peppers, pomegranates, and tomatoes.

III. Problem Statement

Agriculture is one of the most important sectors of the Indian economy. The Indian agricultural sector employs nearly 50% of the country's labor force. India is known as the world's largest producer of beans, rice, wheat, spices and herbs. Growth depends on the quality of the products produced, which depends on the growth of plants and the yield achieved. Therefore, the detection of plant diseases plays a fundamental role in the agricultural field. The growth of plants affects the ecology of farmers. In order to detect plant diseases early, it makes sense to use automatic disease detection methods. Symptoms of plant diseases appear in different parts of the plant, such as the leaves. Manually detecting plant diseases through leaf imaging is a tedious task, and computer methods must be developed to detect and classify diseases through automatic leaf imaging.

IV. Existing System

In developing countries, the area of agriculture may be larger, and farmers cannot observe every plant every day. Farmers are not aware of local diseases. Posing danger to natural resources such as water, soil, air, food chain, etc., it is expected that there will be less pesticide pollution to food

Drawbacks: Farmers cannot spend so much money to visit people who predict diseases on plants. Speed and accuracy of delayed results Due to the large fields and many plants, it is difficult for the human eye to see and classify each plant correctly.

Architecture

V. Implementation

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1. Dataset Collection

Initially, drawing images were obtained from online sources such as GitHub and Kaggle. Some image data sets consist of 20,000 images, divided into 19 different categories. , Bacterial stains, late blight, late blight, leaf blight, target stains, mosaic virus from different cultures such as apple, potato, tomato, grape, strawberry, corn

2. Image Preprocessing

At this time, the image is reduced to a smaller pixel size to speed up the calculation. There is some noise in the generated image. Use some filtering techniques (such as Median filter) to remove this noise. After that, the image is presented in RGB format, which is not suitable for most works because the RGB format cannot separate the intensity of the image. Therefore, it is converted to a different color space-HSV, which separates color from intensity. In addition, the RGB color space is louder than HSV.

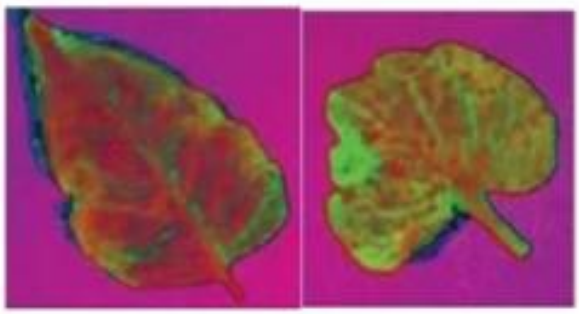

Fig 8.4 Image converted into HSV color space

3. Segmentation

At this stage, the image is segmented to separate the leaves from the background. Segmentation is done using Kmeans clustering using Sklearn library.There are two cluster centers: one for the background and one for the foreground. Kmeans clustering is an unsupervised learning technique used to divide data points into a predetermined number (k) of clusters or groups based on their similarity. After detecting two clusters, one with background and the other with leaves, the grouped image is used to change the pixel value of the leaf background to black. This removes unnecessary information from the image, thereby improving accuracy.

(a) (b)

Fig.6 Images after removal of Background

4. Selection of Classifier

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This is a classification problem, because we need to classify the types of diseases in plant leaves. Therefore, we have many machine learning and deep learning algorithms that can be applied to this data set. Complex algorithms and increased complexity to improve the accuracy of the model. We choose CNN among four classifiers, namely: Logistic Regression, KNN, SVM and CNN.

VI. Results

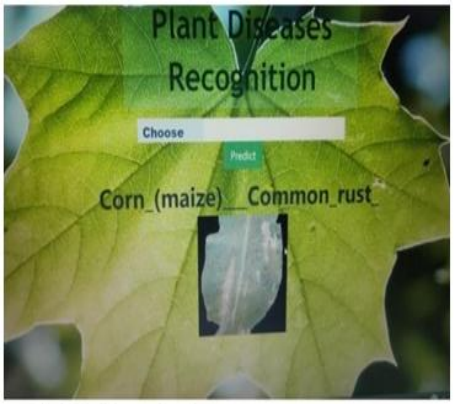

Fig 8.7 Result on user interface

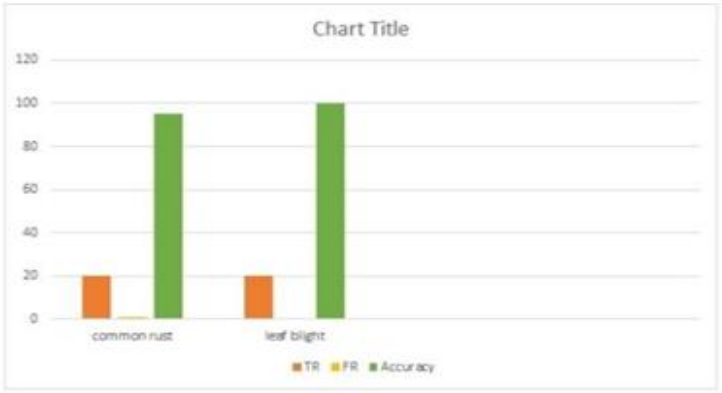

Fig 8.12 bar graph of corn accuracy

VII. Conclusion

In this article, we propose a very accurate artificial intelligence solution to detect and classify various plant leaf diseases. The solution uses convolutional neural networks for classification. The proposed model uses a data set of more than 20,000 images with a total of 41 categories. The next nm model can expand to more disease categories by using a larger data set, and it can also improve accuracy by optimizing hyper parameters. The model can also include means for treating classified diseases. You can implement it on Android and iOSn platforms to reach farmers who can actually use the suggestion system.

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IoT Based Smart Trffic Control System with Ambulance Clearance Mechanism for Smart Cities

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Abstract

This paper deals with the flow of traffic for emergency vehicle to reach its destination on time using wireless technology and high-speed microcontroller. An RFID module is useful for detecting the emergency vehicles. RFID reader present in the module reads the data from the RFID tag placed in the vehicle. By detecting the emergency vehicle, the traffic lights near to vehicle alters accordingly based on the situation. Thereby clearing the traffic for emergency vehicle. All the data captured by the RFID reader is updated in the server using IoT Wi-Fi module ESP8266. On the other hand, this paper also deals with the tracing of stolen vehicle based on the data entered in the server. All this process is controlled by ARDUINO UNO microcontroller board.

Keywords: RFID reader module, ESP8266 WiFi module, Arduino Uno

I. Introduction

Traffic now a days is the major concern in smart cities, which cannot be easily controlled by a traffic police. To clear any emergency vehicle which is stuck in the traffic, the police firstly need to identify the vehicle and then take appropriate actions to clear the traffic. This might take long time and sometimes it might be very difficult for controlling the traffic with a single person. With the use of RFID module and IoT this problem can be solved to a greater extent. By using RFID module, the traffic lights can be altered automatically and if there is any further problem to clear the traffic for an emergency vehicle the data updated in the IoT, which is being monitored by the traffic police, helps to clear the traffic.

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Finding a stolen vehicle is also a great concern to be solved. With the help of data updated in the server using IoT the path of a stolen vehicle can easily be identified which minimizes the process of investigation.

II. Literature Survey

Generally, most of the times we see emergency vehicles like ambulance, police vehicles waiting in traffic. Either a traffic police is required to clear the traffic or the emergency vehicle need to wait till the traffic light turns green. Detecting the emergency vehicles near a junction and clearing the traffic before the vehicle comes near junction is necessary to avoid this problem.

Now a days a vehicle is easily stolen. Tracing of vehicle is becoming a hectic task for police to solve. With the help of RFID tags placed in vehicles the stolen vehicle can easily be traced.

1. Innovative Congestion Control System for Ambulance using RF

This traffic system proposed by Ch. Ramaiah uses a RF transmitter and receiver to identify the presence of a vehicle. If a vehicle has a RF transmitter irrespective of its type of emergency the receiver detects the data in the same way and operation for every emergency vehicle is taken in same way.

2. A 'Green Wave' Setup:

In this 'green wave' setup the emergency vehicle generates a green wave which makes the traffic light turn to green along its way. This setup requires synchronization between the vehicle and the traffic signal which is highly impossible in heavy traffic areas.

III. Proposed Method

This system is implemented by using RFID reader for detecting the RFID tag placed in the emergency vehicle. When the emergency vehicle comes closer to traffic zone, the RFID READER in the junction senses the RFID TAG. If the codes of the RFID READER and the RFID TAG are matched, then the emergency vehicle which is arrived at the junction is detected. This information is given from the microcontroller (ARDUINO UNO) to the control room. In this way, the red light in the traffic signal changes to green light so that the emergency vehicle is allowed to reach its destination on time. In addition to this, the thefted or stolen vehicle is detected in similar manner and it is not allowed. This information is updated in the server using the IOT module (ESP8266), with which the stolen vehicle is detected.

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Block Diagram

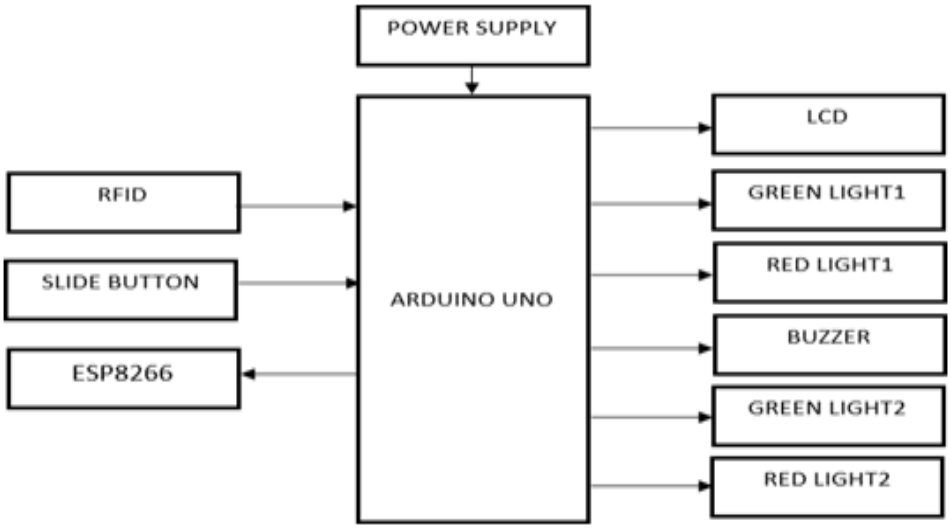

Figure 1: Block Diagram

Internet of Things (IoT): The concept of IOT was introduced by a member of the (RFID) development community in 1999. IoT has major role in this world. Internet of things is a concept from computer science which is the network of physical objects. The ordinary things get connected with the computer network so that they get intelligence. IoT makes the life of people more comfortable. This is used to interact with objects through wired or wireless connection so that we can develop new applications in the environment.

Internet of things is also defined as the internet of three things:

- People to people
- People to things
- Things to things interacting using internet.

Hardware Requirements

1. Arduino Uno Board

Arduino is a single-board microcontroller that makes the application more accessible which are interactive with its surroundings. It is a microcontroller which is based on ATmega328.

The specifications of Arduino Uno are:

- Operating Voltage: 5V
- Input Voltage (recommended): 7-12V
- Digital I/O Pins: 14 (6 provide PWM output)
- Analog Input Pins: 6
- DC Current per I/O Pin :40 mA
- Flash Memory 32 KB (ATmega328) of which 0.5 KB used by bootloader
- SRAM 2 KB (ATmega328)
- EEPROM 1 KB (ATmega328)

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- Clock Speed 16 MHz

Figure 2: Arduino Uno Board

2. ESP8266 WiFi Module

ESP8266 WiFi Module is developed by Espressif system. ESP8266 wi-fi module is a low-cost standalone wireless transceiver that can be used for end-point IoT developments. It enables internet connectivity to embedded applications. It uses TCP/UDP communication protocol to connect with server/client. For communicating with the ESP8266 wi-fi module, microcontroller uses set of AT commands. Microcontroller communicates with this module using UART having specified Baud rate (Default 115200).

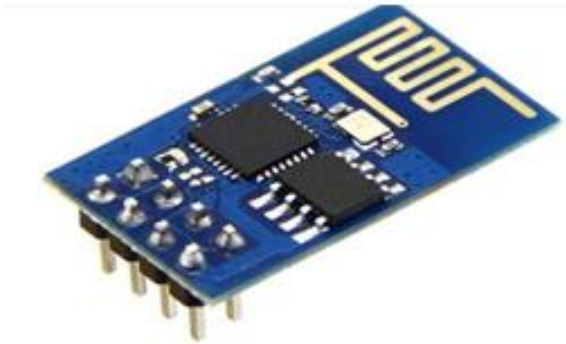

Figure 3:ESP2866 WiFi Module

3. EM-18 RFID Reader Module

EM-18 is a nine-pin device. Among nine pins, 2 pins are not connected, so we basically have to consider seven terminals. EM-18 RFID reader module operates with a voltage around +4.5V to +5.5V. It has low power operation with current consumption of 50mA and at 0ºC to +80ºC. The best operating frequency of EM-18 RFID reader is 125 KHz with a baud rate of 9600 bps. This reader can only read a maximum of 10cm, which depends on the tag. It has antenna integrated with it.

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Figure 4: EM-18 RFID Reader Module

Software Requirement

Arduino Software (IDE): The Arduino Integrated Development Environment (IDE) or Arduino Software contains a text editor for writing code, a message area, a text console, a toolbar with buttons for common functions and a series of menus. It connects to the Arduino and Genuine hardware to upload programs and communicate with them.

IV. Result

Experimental results of this process shown below says how the server is updated with the collected data from an RFID reader and the permissions are given accordingly based on the vehicle detected.

Figure 4.1: In case of no vehicle

Figure 4.2: In case of normal vehicle

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Figure 4.3: In case of any emergency vehicle

Figure 4.4: In case of any stolen vehicle

Figure 4: Data in the server and on LCD when signal is green

Figure 5.1: In case of no vehicle

Figure 5.2: In case of normal vehicle

Figure 5.3: In case of any emergency vehicle

Figure 5.4: In case of any stolen vehicle

Figure 5: Data in the server and on LCD when signal is green

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V. Conclusion and Future Scope

In this project we proposed a system which detects the vehicles near a junction and updates the data in the server. This system helps to reduce the complexity of a circuit by using RFID module instead of ZigBee module. Along with the capturing of data, proposed in this system, with the addition of cloud module the data can be stored and retrieved when needed. The usage of active RFID tags instead of passive, used in our proposed system, makes our project a real time use totally.

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Detecting the Clouds and Determining the Weather Condition, Coverage Area of Cloud Simultaneously Using CNN

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Abstract

In this Project we have to consider certain elements of the climate system to forecast the climate. One of it is the role of clouds in evaluating the climate sensitivity to change. Here, we will determine the area covered by clouds and the weather condition at specific time. Before performing this we will detect the clouded part from satellite images using pre-trained U-net Layers. Later cloud coverage area and weather condition detection will be performed using CNN techniques. Experiments showed that our proposed framework simultaneously detect and show the coverage area of clouds along with weather conditions.
Key Words: Detection, Convolutional Neural Network, U Net Architecture.

I. Introduction

Actually we get the clouds from the earth surface. And also clouds are in different shapes. Based on their height and transparency clouds are grouped into four types.

- Cirrus
- Cumulus
- Stratus
- Nimbus

Cirrus: Cirrus clouds are obtained at high heights from the range of 8000-12000 meters. These clouds are thin. And they are in White colour.

Cumulus: Cumulus clouds are similar Cotton wool. And these clouds are obtained at a height of 4000-7000 meters. Can be seen in scattered here and there. These have a flat base.

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Stratus: As the telling that, these layered clouds are covering large portion of the sky. Actually these type of clouds generally formed
either due to loss of heat or the mixing of air masses with the different temperatures.

Nimbus: Nimbus forms at middle level or near to the surface of the earth. This type of clouds black or dark grey.

By using satellite we took the cloud image or cloud part. Based upon images we get the cloud detection and weather condition detection.

II. Literature Survey

Table 1: Literature Survey

S.NO	Journal type with year	Authors	Title	Outcomes
1	International journal research of engineering and technology(IRJET),Volume: 02 Issue:09|Dec-2015	Geethu Chandran A J, Christy Jojy	Cloud identification algorithm for satellite images	Clouds in satellite images are automatically detected.
2	IEEE transactions on Neural Networks(1999)	Bin Tain,Mukhtiar A. Shaik Mahaboob R. Azimi-Sadjadi	A Neural Network Study of Cloud Classification Spectral and textural properties are used	The performance of four different sets of features, namely SVD, WP, GLCM, and spectral, was computed.
3	Proc. IEEE Int. Conf. Image process.(ICIP), Sep.2017,pp.61-65.	K.Yuan,G.Meng, D.Cheng,J.Bai,S.Xiang, and C. Pan	Using an edge-aware segmentation network and an easy-to-hard training technique, efficient cloud recognition in remote sensing	an explanation of cloud detection
4	Proc.IEEE Int. Geosci.Remote sense. Symp.,Jul.2018,pp. 7030-7033.	P.Dai, H.Zhang,L. Zhang, and H.Shen	Deep learning used to create a remote sensing spatiotemporal fusion model using landsat and modis data.	Sky description

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III. Existig System

Existing methods that detect clouds use histogram equalization techniques. They get the histogram of an image by using the command 'imhist', and then improve the intensity value over the entire image by using the command 'histeq'. As part of these steps, some pre-processing steps are also performed, such as image resizing, image rotating, image addition, etc., For determining/classifying the weather condition, methods like k- nearest neighbor and Support Vector Machine (SVM) are used.

Histogramequalization: Histogram equalization is a computer image processing technique used to improve contrast in images. It achieves this by effectively distributing the most common intensity values, i.e. measuring the image intensity range. This allows regions with low local contrast to have higher contrast. The chromaticity of an image A represents the number of pixels in each type of color component. Histogram equalization cannot be applied separately to the red, green, and blue components of an image because it causes drastic changes in the imagescolor balance. However, if the image is first converted to another color space, such as the HSL/HSV color space, then the algorithm can be applied to the luminance or value channel without causing changes in the image's hue and saturation.

Pre-processing: Image preprocessing is a term that refers to operations on images at the lowest level of abstraction. These operations do not increase the image information content but reduce it if entropy is a measure of information. The goal of preprocessing is to improve image data that prevents unwanted distortionsor enhancescertain image features relevant to an additional processing and analysis task. There are 4 different types of image pre-processing techniques which are listed below.

- Pixel brightness transformations/Brightness corrections
- Geometric transformations
- Image filtering and segmentation
- Fourier transform and image restoration

Artificial Neural Network: An artificial neural network is an adaptive system that learns by using nodes or neurons interconnected in a layered structure similar to the human brain. A A neural network can learn from data so that it can be trained to recognize patterns, classify data, and predict future events. The neural network divides the input into layers of abstraction. It can be trained using many examples to recognize patterns of speech or images, for example, just as the human brain does. Its behavior is determined by the way its individual elements are connected and by the strength or weights of those links. These weights are automatically adjusted during training according to a specific learning rule so that the artificial neural network performs the required task correctly.

Support Vector Machinces: Support vector machines (SVM) are powerful and flexible supervised machine learning algorithms that are used in both classification and regression. But in general, they are used in classification problems. In the 1960s, SVM was first introduced but later revised in 1990. SVM has its own unique way of implementation compared to other machine learning algorithms. Recently, it has become very popular due to its ability to handle many continuous and deterministic variables.

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SVM work: An SVM model is basically a representation of different classes in a hyper-level in a multidimensional space. The super level will be generated in an iterative manner by SVM so that the error can be minimized. The goal of SVM is to classify data sets to find the maximum marginal hyper-level (MMH).

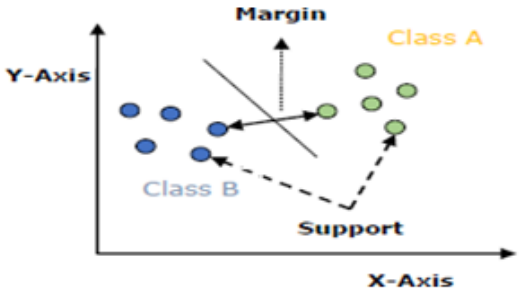

Figure 1: SVM

IV. Proposed System

The Figure shows the flow events of the proposed method. Satellite Image will be given to UNET as well as to the CNN layers. Pretrained Datastore will be given to the UNET architecture. datastore can be trained in the following manner that cloud should be in white and remaining things other than a cloud should be in black. This training can be done with the help of cloudy images and the ground truth images.

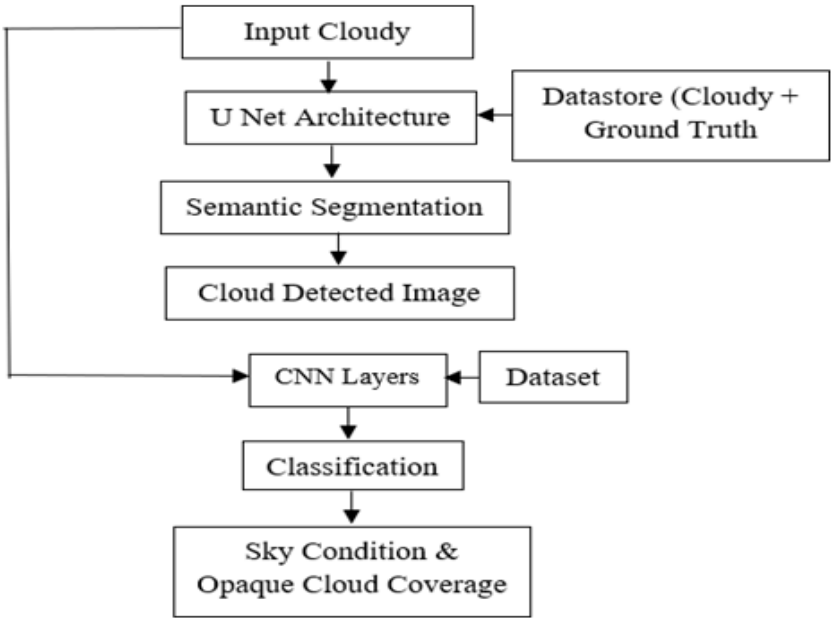

Figure 2: Flow events of Proposed Method

U Net: U-Net is a semantic segmentation architecture. It consists of two pathsi.e., contract and an expansive path. The contracting pathway follows a standard convolution network architecture and it is used to capture the context present in the image whereas an expansive path is used to precise localization using transposed convolution and this can be implemented

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by using a bounding box. U-Net, the name originally comes from the architecture, which looks almost identical to the letter U when visualized, as shown in the below figure.

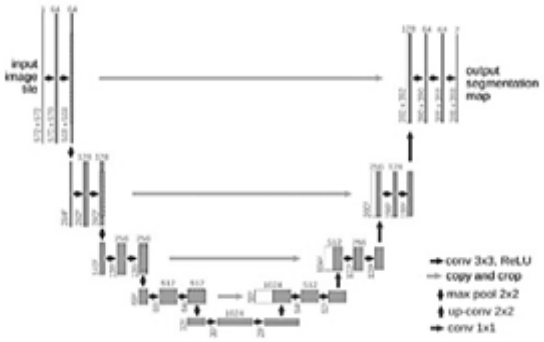

Figure 3: Visualization of U Net Architecture

The Next process of flow events is semantic segmentation and it is a process of assigning a label to every pixel and the colo r division of the image will happen in this segmentation process. And finally, the cloud will be detected.

CNN: image classification we use Convolution Neural Network. In this, we are going to build a basic building block for CNN. A CNN consist of one or multiple convolutional layers. The number of convolutional layers will depend on the amount and complexity of the data which we are going to use. CNN image classifications takes an input image, process it, and classify it under certain categories. There are four types of layers for a convolutional neural network: the convolutional layer, the pooling layer, the ReLU correction layer, and the fully connected layer.

V. Result

The Figures shows the experimental results of the proposed system. And it gives the resultant output i.e., cloud detection, weather condition at a specific time, and cloud coverage area to the given input image. Cloud detection can be done by using UNET architecture. The detected cloud will be in white remaining things will be in black as shown in the detected image. Weather classification at a specific time can be done by using a Convolutional Neural Network. And figure 5 shows the cloud coverage area layers and figure 6 shows the weather condition at a specific time. One of the merits of CNN compared to its predecessors is that it automatically detects the important features without any presence of humans and it enables CNN models to run on any device, makes them universally attractive.

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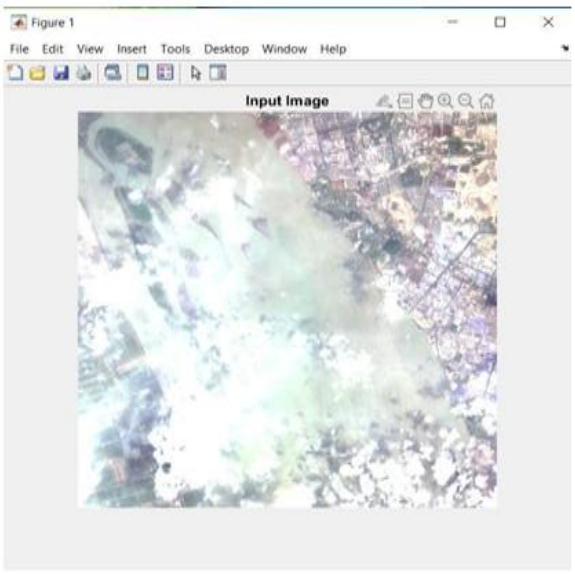

Figure 4: Input Image

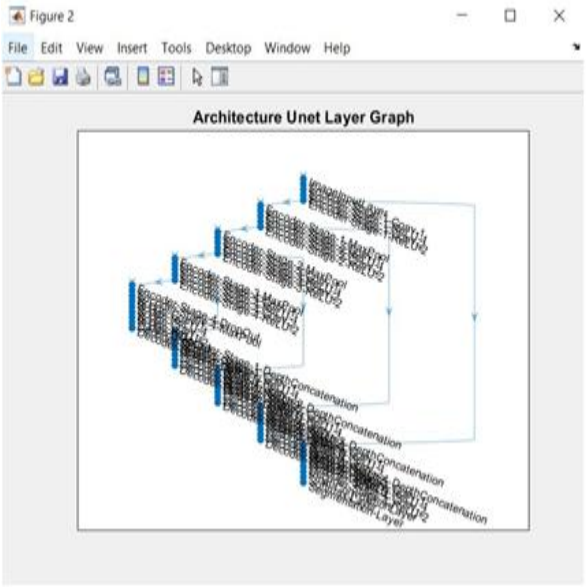

Figure 5: Architecture Unet

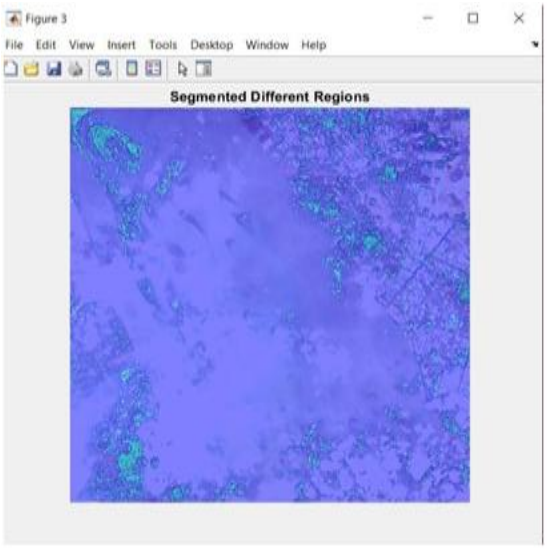

Figure 6: Segmented Different Regions

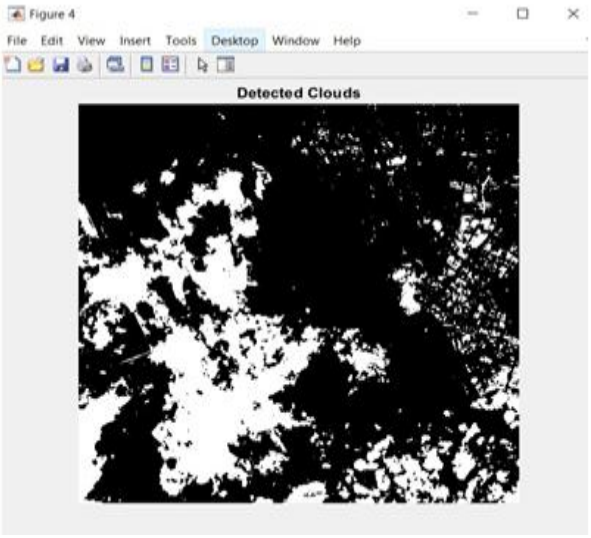

Figure 7: Detected Cloud

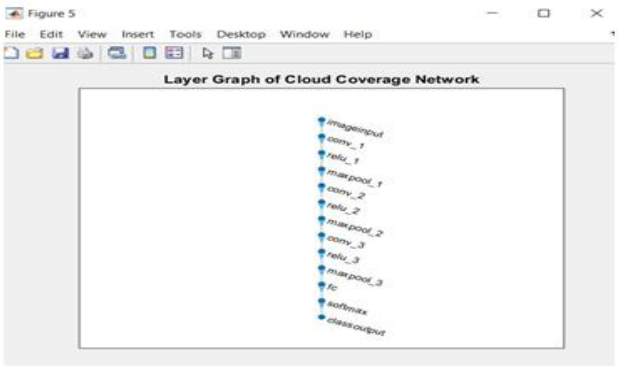

Figure 8: Layer Graph of Cloud Coverage

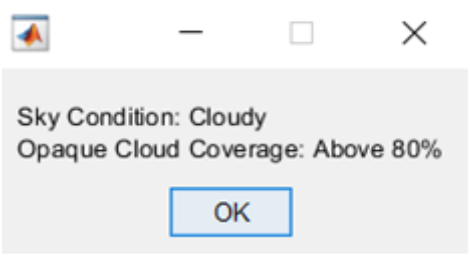

Figure 9: Weather Classification and cloud coverage area

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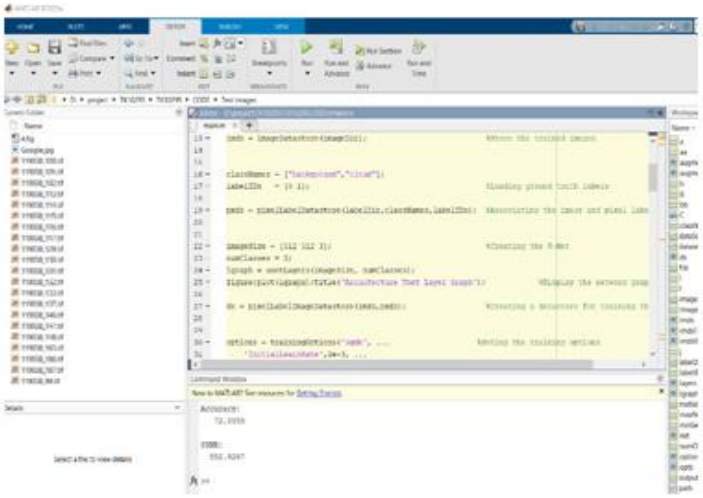

Figure 10: Resultant Accuracy

VI.Conclusion

Here, we determined the area covered by clouds and the weather conditions at specific times. Before performing this, we have detected the clouded part from satellite images using pre-trained U-net Layers. Later cloud coverage area and weather have been performed using CNN techniques. Experiments showed that our proposed framework can simultaneously detect and show the coverage area of clouds along with weather conditions and give better results when compared with existing works. This proposed work is very useful in many advanced applications like the Milita ry, Weather condition prediction, and Environmental monitoring.

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Advanced Shopping Cart Using Gsm and IoT

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Abstract

The major aim of the plan is to put in force a clever buying cart with RFID generation to enhance the buying revel in. The intention is to put in force RFID surveillance with inside the buying cart. So that, RFID playing cards are used as a method of safety while shopping items buying department stores. If the object has been located within side the buying cart, the fee of the object could be displayed, so the overall quantity could be displayed, if desired to eliminate a product from the buying cart, you could withdraw that product, and the quantity of that precise product could be deducted from the overall. At the equal time, generation is used to buy merchandise to enhance protection and buying pace in buying centers. Because the trouble we stumble upon in buying department stores is the intuition of RFID generation, this is, instinctively figuring out the products within side the buying cart, thereby destroying the client, and the client will intrude with the project of purchasing and deciding to buy the products. In this challenge, we use Arduino controller, RFID and LCD generation to put in force an RFID-primarily based totally buying cart. The whole listing of merchandise introduced to the buying cart and their price could be dispatched to the checkout internet site thru the Wi-Fi module.

Keywords: Ardunio UNO,RFID module, GSM,IOT.

I. Introduction

The dynamic increase and thrilling new traits of the Internet of Things (IOT) have paved the manner for the precise use of generation in lots of fields. Interact with gadgets and use them in every day life. Nowadays, supermarkets and big buying department stores are so common that they're not simplest to be had in cities. Anyone can visit those shops to shop for the products they need, however this isn't always very handy, particularly while consumers ought to queue for hours on busy days. RFID generation has advanced swiftly recently. We

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have visible packages in diverse industries, from scanning worker IDs with inside the workplace to publishing books in libraries. RFID stands for radio frequency identity, wherein records is digitally encoded on a label that may be RFID tags are normally captured via way of means of radio waves, and the captured records is saved in a database. RFID tags are just like traditional barcodes in use and feature due to the fact they're used for records processing. However, there are a few key differences. For barcodes, barcode readers normally ought to visually check in the code to acquire records, at the same time as RFID makes use of radio waves No line of sight is needed as a records logger. RFID has an automated monitoring feature and lets in new records to be up to date from time to time, at the same time as barcode scanning calls for guide monitoring of records and cannot replace records. The negative aspects of barcode structures encompass sturdiness problems. The aim is to create a gadget that mixes the ease of RFID tags and Wi-Fi detection with a easy and handy monitoring gadget that clients can use to buy merchandise. No want to attend in line. What the consumer has to do is to feature the product to the buying cart and allow readers look for the product to acquire records. The vehicle is geared up with an LCD contact display screen with product records.

II. Literature Survey

The creator has advanced a clever buying cart geared up with facial popularity and records retrieval capabilities. They additionally use computerized billing to keep away from queues at checkout and make sure a unbroken buying revel in via way of means of including the Internet of Things to the buying cart to offer clients with clever structures. The creator controlled to put in force a cheap, clever and absolutely purposeful gadget to make the acquisition handy and handy. They use RFID generation as it has powerful monitoring and safety features. And consistent with the supply of the product with inside the buying cart, delete, recommend, growth and decrease the fee of the product. The creator advanced a clever buying cart thru recruitment The RFID reader with inside the buying cart is hooked up to the principal server thru a Wi-Fi mode known as ZigBee, that could mechanically generate invoices while scanning merchandise, after which ahead them to the principal branch for bill processing. The drawback of this gadget is that it simplest lets in fee via way of means of meter, which hurts the person revel in. The creator created a conceptual version that makes use of merchandise and RFID tags mounted on ZigBee to transmit invoices to a principal server. The drawback right here is likewise the dearth of opportunity fee strategies for invoices, instead of conventional anti-fee strategies. After figuring out the purchaser, you must acquire the bill immediately, with a purpose to purpose the purchaser to queue up. The creator has advanced a complicated buying cart, wherein every buying cart has an RFID reader, and every product has an RFID tag. After scanning the product, the records could be displayed at the LCD display screen to offer clients with all of the records approximately the product. Customers keep away from lengthy lines, however there also are the negative aspects of being stolen and collisions. The creator efficaciously created a principal computerized accounting gadget. Each vehicle is geared up with a product identity tool (PID), which incorporates an RFID reader, LCD display, EEPROM, microcontroller, and ZigBee module for Wi-Fi transmission. The largest benefit of this gadget is that clients can stay with out coins via way of means of efficaciously enforcing the queuing avoidance method.

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III. Existing System

The modern gadget calls for plenty of guide operations at the purchaser side. It allows to song and become aware of the buying cart, that's beneficial for dealing with the business, however it's far meaningless to the consumer. This isn't always a possible time-saving solution. Shoppers with inside the store, normally while paying and paying online. This is because of the dearth of opportunity fee strategies and battle problems, due to the fact alerts may be effortlessly intercepted. The major negative aspects are purchaser dissatisfaction and simplicity of use.

IV.Proposed System

The aim is to create a gadget that mixes the ease of RFID tags and Wi-Fi identity, in addition to a easy and easyto- use monitoring gadget, in order that consumers can buy items with out queuing. All the purchaser has to do is to feature the product to the buying cart, after which ask readers to look for the product for records. The gadget lets in clients to test merchandise, and the buying cart will mechanically replace the overall fee and bill for the purchaser. The price range for triggering the alert, and the disposition of the product if it's far deemed needless and its general invoice price. The gadget is designed to ship billing records to a principal server in actual time the usage of the ESP8266 WiFi module, which tracks all buying carts and lets in clients to get admission to the integrated buy monitoring application. Due to the functionality, versatility and adaptableness of a buying cart with RFID, virtual fee makes it a cutting-edge buying gadget. Purchased via way of means of the consumer, click on the button with inside the buying cart, and the very last bill could be created.

BLOCK DIAGRAM

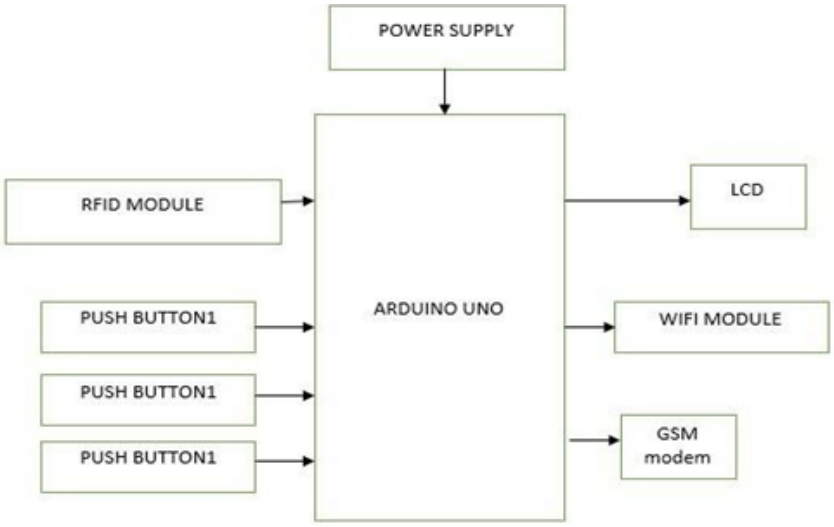

Figure1 Block diagram of the proposed Method

A. Arduino UNO: Arduino Uno is an open supply microcontroller card primarily based totally at the Microchip ATmega328P microcontroller advanced via way of means of the company. The card is geared up with virtual and analog input/output (I/O) pin groups, which may be related to diverse enlargement playing cards (shield) and different circuits.

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It has 14 virtual I/O pins (six with PWM output feature), 6 analog I/O pins, and may be programmed with Arduino IDE (Integrated Development Environment) thru USB Type B cable. It may be powered via way of means of a USB cable or an outside nine-volt battery, despite the fact that it is able to receive voltages among 7 and 20 volts. It is just like Arduino Nano and Leonardo. The hardware reference layout has been certified with inside the equal manner as Creative Commons Attribution 2.five license. It may be located at the Arduino internet site. Design and production documents also are to be had for a few hardware versions.

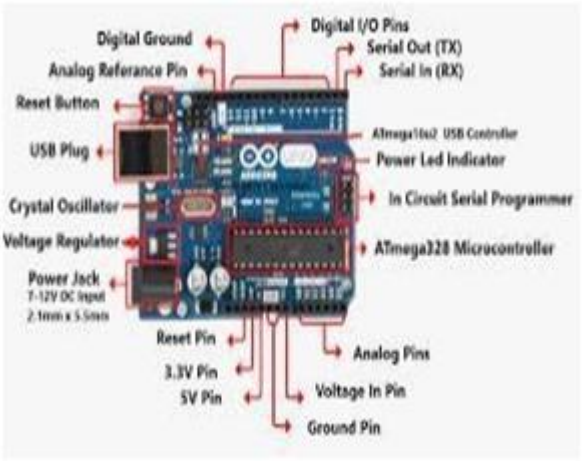
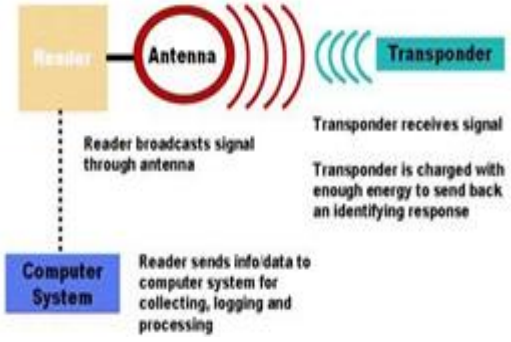


Figure 2 Hardware component Aurdino UNO

B. RFID Module: RFID is the abbreviation of radio frequency identity, which refers back to the generation wherein readers use radio waves to seize virtual records encoded on RFID tags or clever tags. RFID is just like a barcode due to the fact the tag or the records at the tag is captured via way of means of the tool that shops the records with inside the database. However, RFID has a few blessings over structures that use barcode asset monitoring software. In precise, RFID tag records may be study from outdoor the road of sight, and barcodes have to be study. Align with the optical scanner. If you need to put in force an RFID solution.



C. Wifi Module: The ESP8266 WLAN module is an independent SOC with an integrated TCP/IP protocol stack, through which each microcontroller can access your WLAN network. ESP8266 can host APP or load all Wi-Fi network functions from another APP processor. Each ESP8266 module has been pre-programmed. Use AT command Suite firmware, which means you can plug it into an Arduino device and have as many Wi-Fi

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functions as a WiFi screen (ready to use)The ESP8266 module is a lucrative circuit board with a large and steadily growing community.

D. GSM

Module: Digital cellular technologies such as GSM (Global System for Mobile Communications) are used to transmit mobile data and voice services. In 1970, Bell Labs realized this concept through a mobile radio system. As the name suggests, this is the name of the standardization organization, which was established in 1982 to create a common European standard for mobile phones. This technology accounts for more than 70% of the global mobile digital subscriber market. The technology was developed using digital technology. Today, GSM technology supports 1 billion mobile phone users in the above 210 countries/regions. This technology can provide simple to complex voice and data services. This article provides an overview of GSM technology.

GSM Modem

V. Results

The power supply is given to the cart for the activation of the cart. The cart is implemented with rfic module ,LCD,WIFI Module ,GSM Modem. when a product containing RFID tag is dropped into the cart the RFID module reads the tag attached to it and displays the status of the product that is droped into the cart on LCD. The status of each product that is present in the cart can be seen on LCD.WIFI module is used here to connect the cart with the webpage .After the shopping is done the payment is done using a RFID card which is present with the customer . The status about the payment and debited details are sent via message to the registered mobile number.

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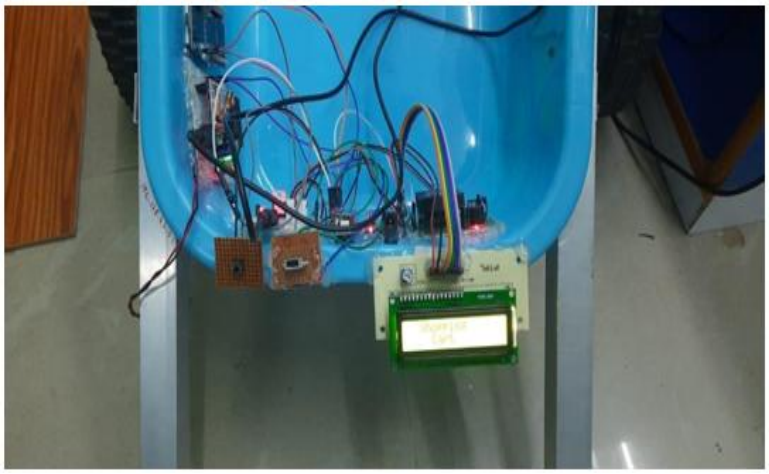

Figure (1) Activation of the cart

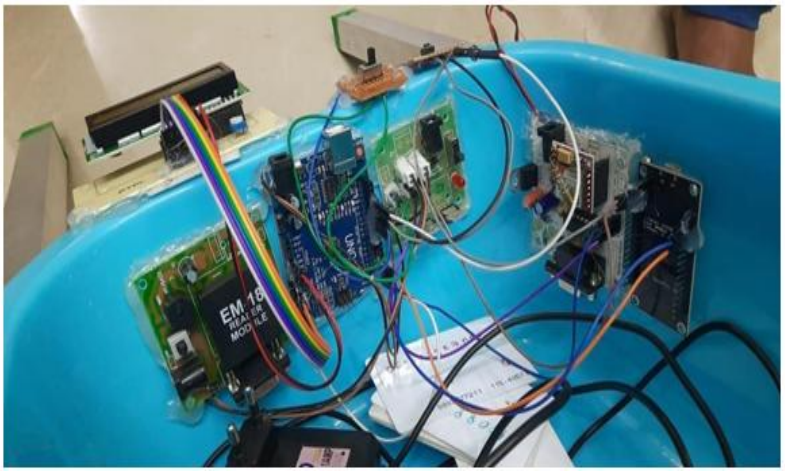

Figure (2) Hardware implementation of cart

Figure (3) the shopping cart

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Figure (4) Status of the payment sent to the registered mobile number

VI.Conclusion

A gadget primarily based totally on RFID generation has been efficaciously advanced, that could update the conventional bar code gadget. The bar code gadget has numerous negative aspects, together with strict line-ofsight necessities and the want to region oneself on a particular boundary while scanning, now no longer to say problems associated with its patience and the incapability to replace records. The simplest regarded obstacles of RFID scanning are distance and range. Information and records insurance were taken into consideration for changes. They also can function beneathneath high temperature situations and could now no longer go through bodily wear, breakage or harm beneathneath water. This makes the system reliable, bendy and adaptable. The constant door and servo motor collectively make sure that no unscanned merchandise input the buying cart earlier than fee. Provide exceptional fee strategies thru e-pockets or bank The account guarantees that each penny is paid and forestalls penny fraud. The proposed challenge is possible as it is based on current generation. After buy, please block the app the usage of theionic framework and make it to be had to all clients. The simplest drawback is if the server is going down for a few reason, it'll crash.

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Smart Driver Alert and Rescue System

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Abstract

We proposed the GPS (Global Positioning System)/GSM (Global System for Mobile Communication) for driver assistance and vehicle surveillance in this article. To monitor the accident, an accelerometer and GPS monitoring device has been created. The system is made up of two cooperating components: a GPS device and a GSM module. In the case of an accident, if the automobile driver or passengers are injured, it is possible that lives will be lost owing to a delay in medical assistance. Keeping this in mind, we propose a system in which the automobile alerts the appropriate emergency services for quick response in the event of an accident or other emergency scenario. After an accident, this wireless gadget will send a brief message to family members, the local police station, and hospitals specifying the location of the car through GPS. The driver receives emergency medical services (EMS). The threshold method is used in real-time to estimate the speed of a motorbike and the likelihood of a fall or accident. The project works well in real time, locating vehicle travel locations in the form of longitude and latitude with a margin of error of no more than 6 meters from the actual position. This system also keeps a log. The project "Black-box for Vehicles" was created to provide a time tracking system as well as vehicle characteristics. The electronic nose detects alcohol intake by the driver; if he consumes alcohol, the engine will not start.

Index Terms—GPS, GSM, MEMS, Eye blink, Alcohol detection

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I. Introduction

Road accidents are becoming more common these days as a result of the driver's negligence. Other factors that may contribute to these incidents include intoxicated driving, tiredness, and sleepiness of the drivers. To prevent road accidents to the greatest extent possible, all of the above-mentioned variables should be taken carefully. According to the report, drunk driving is a key contributor to the rise in road fatalities. According to a recent research a yearly average of 700,000 road accidents occur in India, which has surpassed China. The current yearly data published by the World Health organization (WHO) in its first Global status report on road safety many people are murdered on Indian roads owing to speed, and intoxicated driving, decreased usage of helmet, seat belts and kid restraints in cars. According to the most recent National Crime Records Bureau or NCRB study, 40 persons under the age of 25 are killed in traffic accidents throughout the world.

According to the report, drunk driving is a key contributor to the growing number of road fatalities. To send prior to collision information to the car controller system, allowing the vehicle to avoid an accident and offer automotive safety and security. A technique to monitor and detect a fatigue/drowsy or a drunken driver has been explored in the field of automotive research for many years, but individuals died in alcohol-related collisions and sleepiness, both within and outside the city, are attributable to drunken driving and drowsiness. There is no testing technique in place to prevent these fatalities in those locations, therefore the sensor provides information. According to the World Health Organization, transportation-related accidents kill over a million people worldwide each year. Nowadays, many accidents occur as a result of the driver's or person's intake of alcohol.

As a result, drunk driving is a major cause of accidents in nearly every country across the world. The project is designed to capture informative data such as vehicle speed, engine temperature, and so on in order to change the area of motor vehicle accident investigation. With the aid of GPS and GMS technologies, it may also be used for vehicle mapping and accident alert. To respond to this scenario, the black box system takes the first step toward resolving this problem, which spans national lines and affects the safety and health of people all around the world. As we all know, the current accident ratio. The accident might have occurred for a variety of reasons. In order to prepare for any insurance, Policy Claims, we must consider the practical factors of the accident. Policies have numerous clauses; in order to meet each and every requirement, adequate documentation is required. That black box will assist us in obtaining. The black box will assist you and the insurance company in settling claims. In addition, an accident tracking system will be installed. When the car is involved in an accident, an Alert Message with the vehicle's current GPS location is sent to the home contact number.

II. Literature Survey

The article[1] have derived the driver’s condition in real time environment and we propose the detection of alcohol using alcohol detector connected to Arduino such that when the level of alcohol crosses a permissible limit, the vehicle ignition system will turn off and the GPS module will capture the present location of the vehicle. In addition, the GSM module will transmit a distress message to police or family members.

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According to a recent report [2], over 70% of road accidents are caused by drunk driving, with a range of 44 percent to 67 percent in small cities. They also stated that 56 accidents and 14 to 15 deaths occur on our roadways every day as a result of people not wearing seat belts. In the currently existing technology, the alcohol sensor is mounted on the steering wheel and therefore controls the vehicle based on the presence of alcohol. However, road safety is essential in other ways, which is why we are managing the system depending on seatbelt use.

This article [3] discusses road discipline issues such as speed regulation in various locations and horn control in horn banned zones. Vehicle Speed Control in School Zone is one of the characteristics mentioned in this article, as is regulating the speed of the vehicle in various zones such as bridges, highways, cities, and suburbs. It also contains Horn Control of Vehicle in No Honking Zone-controlling horn disruptions in no-honking zones such as hospitals, public libraries, courts, and schools, as well as Alcohol Detection to identify intoxicated driving.

In this study [4], an alcohol detection system for smart city road transportation safety was created utilizing Internet of Things (IoT) technology. A microcontroller is used to establish and monitor two Blood Alcohol Content (BAC) limits. When the first threshold is achieved, the created system communicates the driver's BAC level as well as the vehicle's position coordinates to the central monitoring unit. When the second BAC level is reached, the IoT- enabled alcohol detection system turns down the vehicle's engine, sounds an alert, and illuminates the warning light indication.

III. Existing Method

In existing systems, there are RF based and Zigbee based smart agriculture systems. In these systems there is limited distance communication and no continuous monitoring, In GSM based systems, we can only get messages when any of the sensors reaches its threshold levels and no live monitoring.

IV. Proposed Method

On-board diagnostics (OBD) is an automotive term referring to a vehicles self-diagnostic and reporting capability. OBD systems give the vehicle owner or repair technician access to the status of the various vehicle sub-systems. The amount of diagnostic information available via OBD has varied widely since its introduction in the early 1980s. In this proposed approach an alcohol detector is utilized in an effort to minimize traffic accident instances based on driving under the affect’s alcohol. This project was created by integrating an alcohol sensor with a controller. The mq-3 alcohol sensor was utilized in this study to detect the presence of alcohol in human breath. Even while these approaches may identify driver tiredness, they are neither driver adaptive or interactive with an outside driving scenario. The system may come to a halt if the eye blinks continually, which might be caused by dust, insects, or eye issues. Brake control system comes to a halt in the middle of the road without preventing an accident. It may apply Brakes high altitude terrains while climbing a hill, which can cause the vehicle to fall from the up and cause severe accidents. All of these problems can be solved in this method by using sensors.

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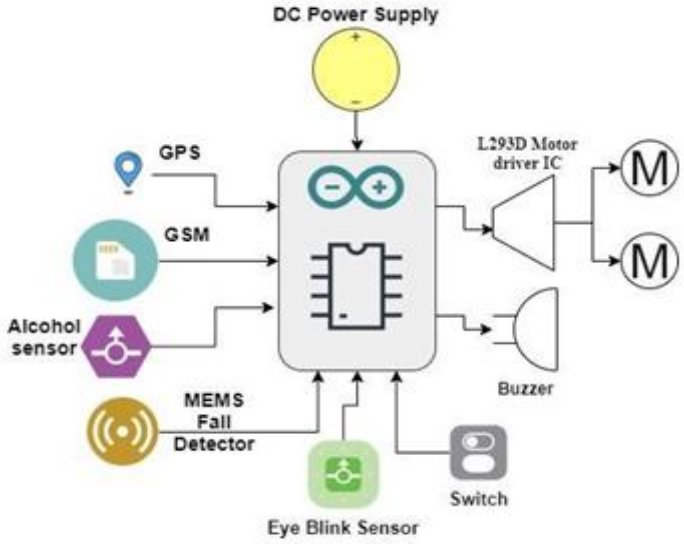

Figure 1 Block Diagram of the proposed model

Arduino Microcontroller:

1. High Performance, Low Power AVR® 8-Bit Microcontroller
2. Advanced RISC Architecture
3. 131 Powerful Instructions – Most Single Clock Cycle Execution
4. 32 x 8 General Purpose Working Registers
5. Fully Static Operation
6. Up to 20 MIPS Throughput at 20 MHz
7. On-chip 2-cycle Multiplier
8. High Endurance Non-volatile Memory Segments
9. 4/8/16/32K Bytes of In-System Self-Programmable Flash program memory
10. 256/512/512/1K Bytes EEPROM
11. 512/1K/1K/2K Bytes Internal SRAM
12. Write/Erase Cycles: 10,000 Flash/100,000 EEPROM 13)
13. Data retention: 20years at 85 c/100 years at 25 C(1)
14. Programming Lock for Software Security

Arduino is a free and open-source prototyping platform with simple hardware and software. Arduino boards can read inputs such as a light on a sensor, a finger on a button, or a Twitter tweet and convert them into outputs such as starting a motor, turning on an LED, or posting anything online. Arduino has been utilized in millions of different projects and applications because to its easy and accessible user experience. The Arduino software is simple enough for novices to use while still being versatile enough for expert users. It is compatible with Mac, Windows, and Linux. It is used by teachers and students to create low-cost scientific equipment, to demonstrate chemistry and physics principles, and to get started with programming and robotics.

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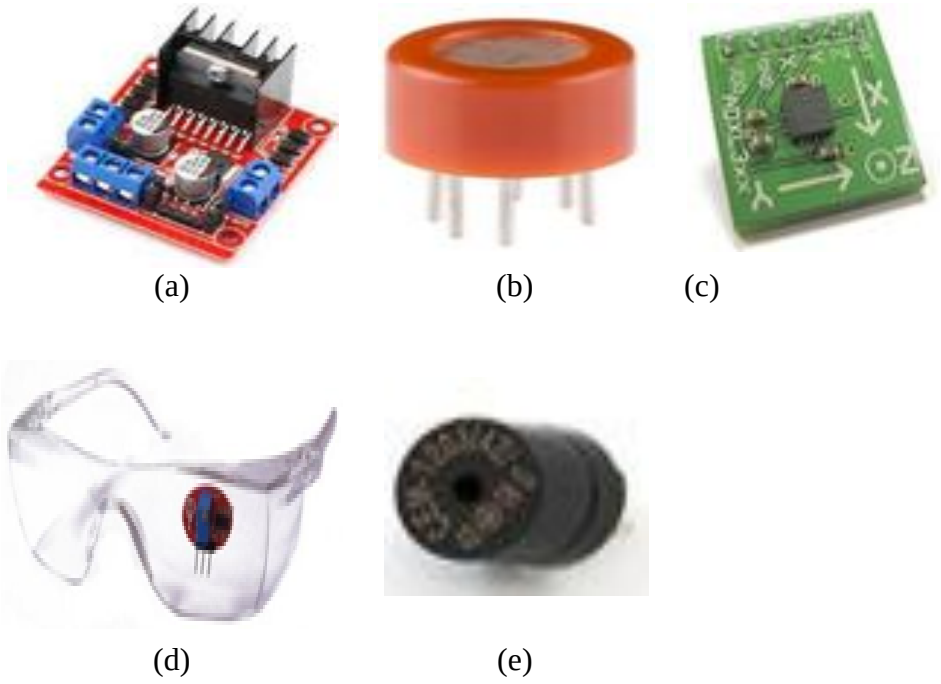

(a) (b) (c)

(d) (e)

Figure. 2 a) L298N Motor Driver, b) Alcohol Sensor, c) MEMS, d) Eye Blink Sensor and e). Buzzer

L298N Motor Driver: The L298N module (Figure. 2a) is a high voltage, high current dual full-bridge motor driver module for DC and stepper motor control. It has the ability to regulate the speed and rotation direction of two DC motors. An L298 dual-channel H-Bridge motor driver IC is used in this module.

Alcohol Sensor: This alcohol sensor (Figure. 2b), like a breathalyzer, can detect the concentration of alcohol in your breath. It has a high sensitivity as well as a quick reaction time. Based on the concentration of alcohol, the sensor produces an analog resistive output. The driving circuit is extremely basic, using only one resistor. A 0-3.3V ADC might be a simple interface.

MEMS: A MEMS (Figure. 2c) electrical phenomenon detecting g-cell and a symbol learning ASIC are combined in a single device to form the Free scale measurement system. The detector is hermetically sealed at the water level using a bulk tiny machined cap wafer. The g-cell is a mechanical structure formed by the abuse of semiconductor materials through masking and etching operations. The gadget is frequently modeled as a moveable beam that travels between two automatically attached beams. Two gaps are formed: one between the moving beam and the first stationary beam, and the other between the movable beam and the second stationary beam. The ASIC use switched electrical condenser methods to power the g-cell capacitors and retrieve acceleration information from the differential between the two capacitors. The ASIC also signal conditions and filters (through a switching capacitor) the signal, resulting in a digital output proportional to acceleration.

Eye Blink Sensor: An infrared detector (Figure. 2d) is a type of electronic radiation detector that is used to detect certain features of its surroundings by emitting and/or detecting infrared.

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It is also capable of measuring an object's heat and detective work movements. The human eye cannot see infrared radiation. Infrared sensors, including as black body radiators, W lamps, and carbide, are commonly used in systems for detecting infrared radiation. Infrared lasers and LEDs of specified IR wavelengths are used as sources in the case of active IR sensors. Following that is the transmission medium for infrared transmission, which includes vacuum, atmosphere, and optical fibers.

Third, optical components such as quartz, CaF2, Ge, and Si optical lenses, polythene physicist lenses, and Al or Au mirrors are used to converge or concentrate infrared radiation. Band-pass filters are also useful for limiting spectral response. Finally, the infrared detector rounds up the system for investigating infrared emission. Because the detector's output is often quite small, pre-amplifiers and electronic devices are used to further process the incoming signals.

GPS: The only fully operational Global Navigation Satellite System (GNSS) is the Global Positioning System (GPS) (GNSS). The GPS system employs a constellation of 24 to 32 Medium Earth Orbit satellites that broadcast accurate microwave signals that allow GPS receivers (Figure. 3) to calculate their position, speed, and altitude. The United States Department of Defense created GPS. NAVSTAR-GPS is its official name. Although NAVSTAR-GPS is not an acronym, it has inspired a few backronyms. The GPS satellite constellation is administered by the 50th Space Wing of the United States Air Force.

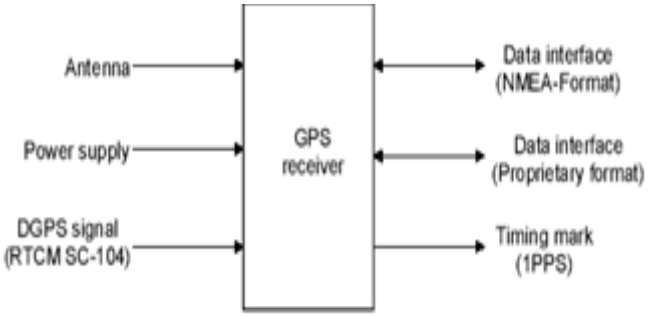

Figure 3 Block diagram of a GPS receiver with interfaces, Data interfaces

GSM: GSM (Global System for Mobile Communications) is a cellular network, which implies that mobile phones connect to it by looking for nearby cells. GSM networks use four distinct frequency bands. The majority of GSM networks run in the 900 MHz or 1800 MHz frequency bands. Because the 900 and 1800 MHz frequency bands have already been assigned, several nations in the Americas utilize the 850 MHz and 1900 MHz frequencies. AT commands are instructions used to control a modem. AT is the abbreviation of Attention. Every command line starts with "AT" or "at". That's why modem commands are called AT commands. GSM/GPRS modems and mobile phones support an AT command set specific to GSM technology. This includes SMS-related commands like AT+CMGS (Send SMS message). It's worth noting that the first "AT" is the prefix that notifies the modem that a command line has begun. It does not appear in the AT command name. For example, in ATD, D is the real AT command name, and in AT+CMGS, +CMGS is the actual AT command name. Some publications and websites, however, use them interchangeably as the name of an AT command.

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Buzzer: A piezo buzzer (Figure. 2e) is a gadget used to generate sound. It is the phenomenon of producing electricity when mechanical pressure is applied to specific materials, and the inverse is also true. When exposed to an alternating field of force, they stretch or compress in line with the frequency of the signal, resulting in the production of sound.

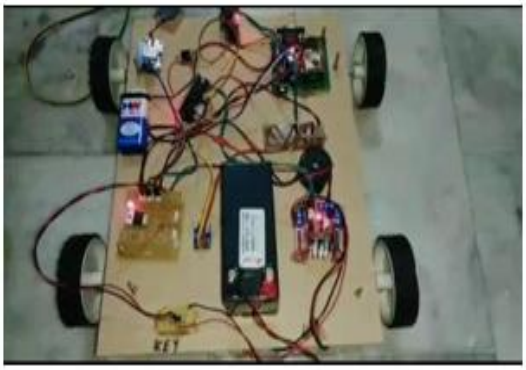
V. Results and Discussions

A unique technique of accident detection system was utilized to track the vehicle in this suggested study utilizing GSM and GPS technologies. In this system (Figure. 4), we utilized an eye blink sensor, an alcohol sensor, a mems sensor, a microcontroller, a GPS module, and a GSM module. When the car starts, the complete sensor goes into active mode and begins reading the parameters. As a result, the entire sensor will monitor the vehicle's performance. Because the control unit receives all of the data from the sensor, the core of the proposed system is a microcontroller. The microcontroller is linked to the whole peripheral sensor. All of the data will be saved in the microcontroller, which will be utilized as a black box to store the data. Ideally, the system would scan several data such as mems vehicle tilt to determine if an accident has occurred or whether the car is in a normal posture. When an accident occurs, GPS technology will be used to pinpoint the exact position of the occurrence. When an accident is detected, this system will obtain the current position coordinates from the GPS module.

The GSM module will send an alarm message to the victim's predefined contact number. Similarly, the alcohol sensor detects alcohol level and shuts off the car engine, as well as sending the position through SMS. The eye blink sensor will also identify the driver's sleepiness; if he falls asleep for 10 seconds, the car will stop and the location will be communicated to registered cell numbers, therefore preventing accidents.

VI. Conclusion

The suggested system would aid in the development of a safer mode of transportation since it aids in the avoidance of accidents and also sends notifications in the case of an accident to boost the help and rescue of the victims. In every way, the whole system is cost effective and efficient. The suggested technology will help with search and rescue operations as well as post-accident investigations. Future improvements might include autonomous driving systems, image processing methods for obstacle detection, obstacle avoidance maneuvering mechanisms, and other accident prevention mechanisms



(a)

(b)

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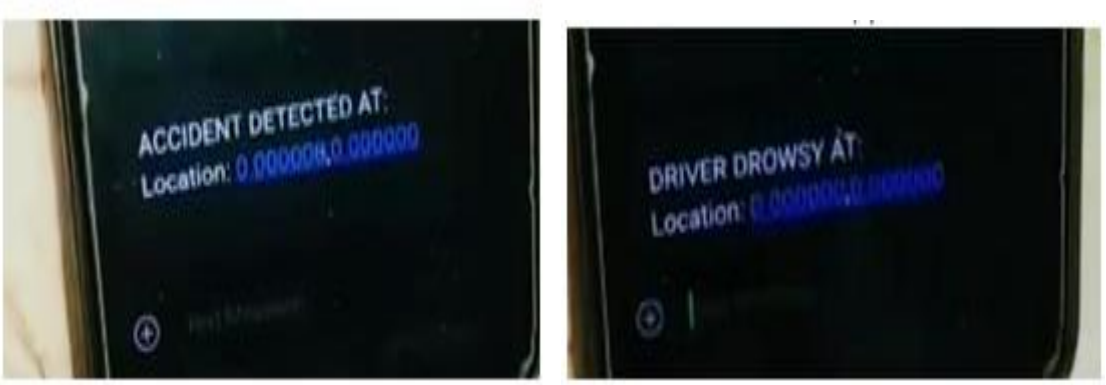

(c) (d)

Figure 4 a) Proposed Hardware Prototype, and Output message received for b) Alcohol detection, c) Accident Detection , d) Drowsiness detection

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Secure multi-objective Lion Optimization Algorithm based Energy aware Routing for Wireless Sensor Networks

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Abstract

Wireless networks consist of several low-cost nodes, mostly with narrowly limited capacities for sensing, calculation, and communication. Data aggregation is the mechanism by which sensor data is summarized and combined to minimize data transfer in the network. Since wireless sensor networks are usually used to communicate sensitive information in remote and hostile environments, sensor nodes also are susceptible to different attack types. The packet drop attack is one such attack where the compromised sensor nodes drop the whole or selective packets intentionally. Hence, wireless sensor network protocols must be designed with security in mind. This thesis introduces a secure and energy aware routing algorithm named secure multi-objective Lion Optimization Algorithm (SMOLOA) which takes the advantage of the Lion optimization algorithm LOA. The network is divided as clusters based on k-means clustering for energy efficiency & easy data aggregation. SMOLOA evaluates the fitness function on the basis of key parameters such as packet drop, residual node energy, linked nodal density, cluster-distance average, and average transmission delay. The optimal route is based on LOA's proposed multi-target function. Compared to current schemes, the results from simulation demonstrated considerable improvements in safe data aggregation and energy usage.

Keywords: WSN, Data aggregation, Energy aware routing algorithm, Lion optimization algorithm, Packet drop attack, Energy consumption.

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I. Introduction

Wireless sensor networks (WSN), including medical monitoring, environmental monitoring, military monitoring and many others such as the Internet of Thing (IoT), have been implemented in many respects. [1]. The most important topic for WSNs has been energy conservation. However, energy is scarce and difficult to substitute for sensor nodes. Furthermore, nodes near the base station (also called the sink) are more energy consuming compared with other nodes as the nodes transmit the data gathered from sensors away from sink [2]. Thus, collected data from other sensors cannot be moved to the sink when these sensors close to the sink fail. The whole network would then be disconnected, although most nodes still have a great deal of capacity. The main task for WSNs is therefore to increase network life by reducing the energy consumption of sensor nodes.

A network of sensors includes a significant number both within and close to the device of highly-distributed low-cost multi-sensor nodes. These small nodes are made up of sensing, data processing and component communications. There should be no absolute location for those small nodes, which means not only that the sensor network protocols and their algorithms must have the capacity to organize themselves in inaccessible places. They must also be placed at random. However the energy supply and the bandwidth of nodes are limited, the low power consumption requirements are one of the most critical restrictions of sensor nodes.

These limitations along with the specific use of a number of nodes presented many obstacles to the creation and management of networks. These problems require energy sensitivity at all network stack levels. In all types of sensing applications, there are common physical and connecting layer problems, and the focus of research is therefore on system knowledge, such as the dynamic voltage scale, hardware for radio communications, low-duty problems for cycles, system service and energy intense MAC protocols [3]. The main objective of the network layer is to find ways to build energiesparend routes and relay sensor nodes efficiently to a plinth to increase the durability of the network.

A network of sensors enables the ability to observe and respond to events in a given environment to be sensed, processed and communication. Tens to thousands of nodes is normally composed of WSN. This collects and communicates information collaboratively to a central site [4]. Figure 1 represent the Basic architecture of sensor network.

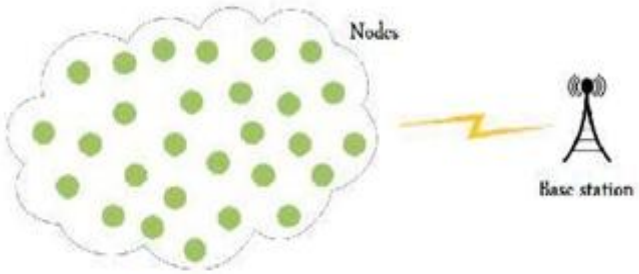

Figure 1. Wireless sensor network

Compared with traditional networking technologies such as cost reduction, reliability, scalability, versatility, accuracy and ease- of-use, WSN technology provides numerous

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benefits. Sensors are being used for thousands of different applications as a result of the rapid technological advances. The areas of military, climate, health care and protection are some of their possible applications [5]." Many factors affect the nature of this network, such as: manufacturing failures, the operating environment, the topology of the sensor network, hardware's, media transmission and power consumption. These are the guidelines for protocols and algorithms designed to produce an efficient network of sensors [6-7-8].

Packet dropping attack: The transmission of data for both sensitive and non-sensitive applications can be damaged by a packet drop attack. Malicious nodes are like regular nodes in dropping attacks and dropping packets selectively [9]. The drop nodes which be randomly selected. It is very difficult and sometimes impossible to identify such attacks. A packet drop attack is a form of denial of service that attracts and selectively drops packets without being transferred. Take the scenario in Figure 1, for example. Node 1 is the source node, while Node 7 is the source node [10]. Nodes 2 to 6 are in the center. Node 5 is like the node of malice. If the source wants to send data packets, the first RREQ packets will be sent to the next nodes. The RREQ is also provided to malicious nodes which are part of the network. The source node transmits data packets after receiving the RREP from the destination. Since node 5 also forms part of the routing route, it sends and sends some data packets. The malicious nodes sound like a good node to make this form of attack is very tough to detect. The dropping of packets has a great negative effect on traditional protocol efficiency metrics. Figure 2 shows the packet drop attack.

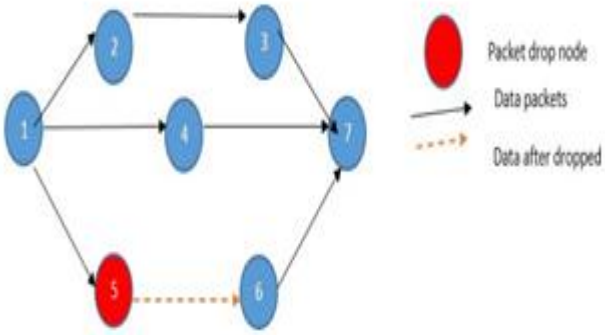

Figure 2: Packet drop attack

II. Literature review

Kashif Saghar and David Kendali [11] have been able to use structured modeling to resolve the issue of block hole attacks and avoid attacks by developing the RAEED (Robust formally analyzed protocol for deployment of wireless sensor networks).

An analysis technique of a suggested Black Hole Attack is given and Black Hole Attack nodes are identified in the course the AODV routing Protocol is improved [12].
The authors of [13] have proposed a confidence model and the confidence between network nodes. The trustee is either unbelieved or trusted by a node, depending on faith. Since thruster disbelief prevents and removes black hole attackers from the road.

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Manisha Rathee et al.,[14] proposes QEBSR in addition to energy balance and ACO adapt to estimate the routing route for WSNs based on the security requirements and QoS requirements. In considering the packet generation rate and the packet drop rate, the method has been based on an efficient confidence measurement mechanism. However, QEBSR is performing better than existing methods such as EENC and DEBR in terms of reduced delays, prolonged lifetime and data transfer through nodes.

SDARP for energy balance and security balancing ad hoc sensor networks was proposed by K. Vinoth Kumar etal. [15]. Data gathering technology based on fuzzy was also used to collect data using a clustering model. The algorithm of data encryption and decryption reduces energy use and improves safety. The proposed method SDARP shows improved performance in increasing energy consumption, high data collection speed, less jitter, less delay and high network life in comparison with previous methods such as STEAR and FEEMCHSRP.

III. Existing System

QoS aware and energy balancing secure routing (QEBSR) algorithm using ant colony optimization (ACO) [16]: This QEBSR lists the major contributions as follows.

1. Simultaneous attention was paid to critical WSN concerns (balancing energy use, quotas and safety requirements)
2. For data generation and data communication to the sink node an event-based scenario is assumed and a source node selection framework is given for this.
3. Improved heuristics for the calculation of sensor node delay and trust, resulting in improved network efficiency, are proposed in this section.

A number of bio-inspired metaheuristic techniques, including Genetic algorithms (GA), ACO, PSO, bee optimization and Cuckoo Search (CS), to name a few, have been developed. Although these two methods can be used in WSN routing, ACO is better suited to and adaptable for the WSN routing problem.

Routing in WSNs is a discreet optimization problem and the previous continuous optimization techniques have, with the exception of ACO and GA, been mostly proposed. These methods must also be discretized if they are to be used for routing.

IV. Proposed Framework

In this paper, we introduces a secure and energy aware routing algorithm named secure multi-objective Lion Optimization Algorithm (SMOLOA) which takes the advantage of the Lion optimization algorithm LOA. The network is divided as clusters based on k-means clustering for energy efficiency & easy data aggregation. Based on important parameters such as packet drop, elected residual energy node, connected node density, average cluster distance, mean time and traffic rate, SMOLOA evaluates fitness function. Based on the proposed multi-objective feature of LOA, the optimal routing is defined.

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Proposed algorithm overview: The network is divided into clusters based on k-means of energy efficiency clustering and simple data aggregation during the proposed work. SMOLOA assesses the fitness function on average cluster distances and average transmission & traffic speeds based upon important parameters including packet drop value, residual energy in the node chosen, associated node densities. Based on the proposed multi-objective feature of LOA, the optimal routing is defined.

K-means algorithm: K-means-algorithm mainly depends on Euclid distances, and the selection of the cluster head depends on the residual node capacity. Therefore, from all nodes about the node id, location and residual energy, the central node collects and stores data. The clustering algorithm starts after it's obtained from all nodes (k-mean).

Algorithm

- Take "k" number of centroids at random locations at first for the number of clusters of 'k.'
- Calculate the distance from each Euclidean node to all centers and allocate the center closest to them. The first clusters are created with this "k"

Suppose there are n nodes are given such that each one of them belongs to $\boldsymbol{R_d}$. The problem with the discovery of the minimal variance classification of k nodes is that the k centroids can be found as $\{\boldsymbol{m_j}\}$ in $\boldsymbol{R_d}$ such that,

$$\left(\left(\frac{1}{n}\right) x \sum \left(midd^2\left(X_i, m_j\right)\right), \quad for i = 1 to n \right. \quad \text{Eq (8)}$$

Where $\boldsymbol{d}(\boldsymbol{X_i}, \boldsymbol{m_j})$ denotes the Euclidean distance between $\boldsymbol{X_i}$ and m_j.

1. Recalculate the centroid positions in each cluster and verify the location changes from the previous.
2. If the location of a centroid changes then go to STEP 2 otherwise the clusters will be completed and the operation of the cluster will end.

As each node takes part in clustering decisions, the clustering method is distributed. Each node here receives information required to cluster all other nodes. The algorithm clusters all nodes and selects the cluster head based on this information.

Finding secure optimal routing path using multi-objective LOA: The selection of the optimal routing path with multi-target LOA is discussed in this section. The SMOLOA algorithm proposed determines the suitable forwarder nodes based on the multi-target parameters. With the proposed multi-target fitness, the fitness of each node is determined. For fitness assessment a number of goals are considered, including packet drop value, elected node residual energy, connection node density, mean cluster distance, average transmission & traffic delay.

Multi-objective Fitness function: This article provides the role of optimizing fitness based on various goals: average dropping time and transport rate, residual node energy and connected node density. The fitness function is per node the highest value to pick the node as the best node. The following is briefly clarified for all these parameters:

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- **Packet drop value (PDV):** This metric is the number of packets dropped during transmission of data by the sensor node. If the node is to be selected as the perfect forwarder, the packet drop value should be minimum.
- **Residual energy of elected Node (RE):** Present energy node left. Residual energy is one of the main considerations. Furthermore, the residual power of a node is its transmission.
- **Node density (ND):** The number of nodes in a cluster is the node density. The ND is also growing with the number of cluster members. In addition, node density would be more the overhead network interaction.
- **Average cluster distance (ACD):** The distance from other nodes in their cluster is measured first, then the sum of the distances is calculated. Take S as a group of cluster nodes such as S {S1, S2 ...SN }. Let I and j be two nodes of S, . (i, j) ∈ S, and distance can be calculated as:

$$Dist = \sqrt{(i_x - j_x)^2 + (i_y - j_y)^2} \quad \text{Eq (9)}$$

Then the mean cluster distance value will be for node I

$$ACD = \frac{1}{N}\sum_{l=1}^{N} Dist\,(i, S_l) \quad \text{Eq (10)}$$

Average delay in transmission (ADT): The time required to pass all packet bits to the wire is the time required to move them. The length of the packet and rate of the bit are determined. This means the packet size-to-link transmission rate ratio. ADT should be minimum for timely data transmission.

$$\boldsymbol{ADT} = \frac{\text{Packetsize}}{linktransmittingrate} \quad \text{Eq (11)}$$

Traffic rate (TR): The last objective parameter is traffic density for the derivation of the fitness function. For improved communication, the amount of traffic has the minimum value. The following is the volume of traffic

$$\boldsymbol{TR} = \sum_{l=1}^{N} \frac{F_{(i)}(t)}{max\,|F_{(i)}(t)|} \quad \text{Eq (12)}$$

$\boldsymbol{i}$=**1** $\boldsymbol{max}$ $|\boldsymbol{F}(\boldsymbol{i})(\boldsymbol{t})|$

Where, the term $\boldsymbol{F}(\boldsymbol{i})(\boldsymbol{t})$ indicates the flow rate of the ith node and **max** $\boldsymbol{F}(\boldsymbol{i})(\boldsymbol{t})$ indicates the maximum flow rate. The fitness function is determined by combining all these factors:

$$\boldsymbol{fitness}(\boldsymbol{f}) = \frac{\text{PDV} * \text{RE}}{ND * ACD * ATD * TR} \quad \text{Eq (13)}$$

Construction of the proposed SMOLOA algorithm: The SMOLOA algorithm proposed determines the perfect path. The current LOA algorithm uses three lions to solve the optimisation problem. He's a lion, a lion, a nomad lion. Selecting optimal sensor nodes from the different sensor nodes is the issue of optimization. Three lions used in the proposed

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SMOLOA reflect the sensor nodes. The process of optimization ensures that nomadic nodes are eliminated from the routing zone. Figure 3 represent the block diagram of proposed system.

SMO LOA

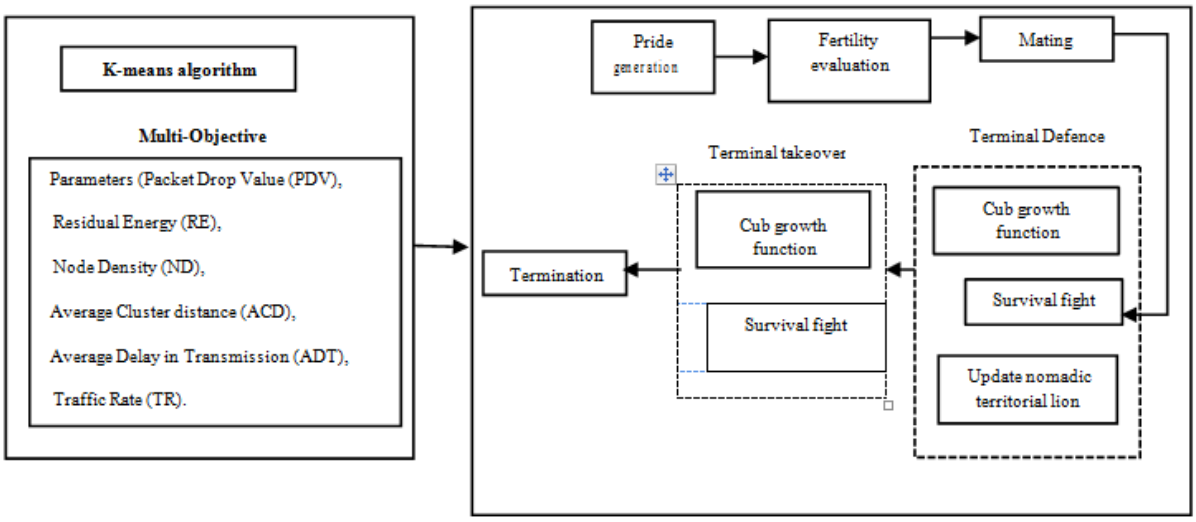

Figure 3: Block diagram of Proposed SMOLOA

The SMOLOA algorithm proposed ensures the following conditions,

- The male lion is fit to optimize the issue more effectively.
- The SMOLOA proposal provides a multi-objective fitness function for the ideal sensor node from existing sensor nodes.
- There is a trajectory between the sensor nodes and the ideal cluster.

Different steps are explained in the proposed SMOLOA algorithm,

Step 1: Pride generation: The first phase in the SMOLOA algorithm is the production of pride. The cluster nodes are the pride of the cluster's head node. The term $\boldsymbol{Y^U}$indicates the male lion, the term $\boldsymbol{Y^V}$ indicates the female lion, and the term $\boldsymbol{Y^{W1}}$indicates the nomadic lions in the WSN. $\boldsymbol{Y^{W1}}$And $\boldsymbol{Y^{W2}}$are the two nomadic lions, in which $\boldsymbol{Y^{W1}}$is initialized in pride generation and $\boldsymbol{Y^{W2}}$ is initialized in territorial defense. The various elements of the male lion$\boldsymbol{Y^U}$, female lion $\boldsymbol{Y^V}$, and nomadic lion $\boldsymbol{Y^W}$ are expressed as follows,

$$\boldsymbol{Y^U(p) = \{Y^U(1), Y^U(2) \ldots\ldots\ldots\ldots\ldots\ldots Y^U(p)\};\quad p = 1, 2, 3, \ldots\ldots P}$$
$$\boldsymbol{Y^V(p) = \{Y^V(1), Y^V(2) \ldots\ldots\ldots\ldots\ldots\ldots Y^V(p)\};\quad p = 1, 2, 3, \ldots\ldots P}$$
$$\boldsymbol{Y^W(p) = \{Y^W(1), Y^W(2) \ldots\ldots\ldots\ldots\ldots\ldots Y^W(p)\};\quad p = 1, 2, 3, \ldots\ldots P}$$

Where, the population size is indicated by P.

Step 2: Multi-objective test proposed Fitness Every node fitness via Equation 6 is established with the proposed SMOLOA algorithm. For node selection between sensor nodes, a threshold

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is established. The optimisation method calculates the fitness of each lion as a problem of maximisation.

Step 3: Fertility evaluation The next step is the assessment of fertility in the proposed SMOLOA algorithm. It is now settled on the fertility between the male lion and the female lion. The proposed SMOLOA algorithm prevents the convergence of the local Optima algorithm. The evaluation of lion fertility depends on the wellbeing of each lion. In the assessment of fertility: the modified lion of the girl, health of comparison, ratings, sterility rate, number of females updating and number of females are considered. The algorithm selects a fthres reference fitness for the assessment process. If the fitness of the lion knots is greater than the fitness of the comparison, it changes the laggardness rate. Failure to do this would re-establish the health of the male lion and the laggard rates. The female lion's fertility assessment is given as,

$$Y_q^V = \begin{Bmatrix} Y_p^V; & if q = p \\ Y_q^V; & otherwise \end{Bmatrix}$$

$$\boldsymbol{YV} = \boldsymbol{min}_{\boldsymbol{p}}[\boldsymbol{Y}^{\boldsymbol{max}}_{\boldsymbol{q}}, \ \boldsymbol{max}_{\boldsymbol{P}}(\boldsymbol{Y}^{\boldsymbol{min}}, \nabla \boldsymbol{p})] \quad \text{Eq (14)}$$

Where, the terms Y_q^V , and Y_q^V indicates the $\boldsymbol{qth}$ and the $\boldsymbol{pth}$ vector elements of the female lion $\boldsymbol{YV}$. The term $\boldsymbol{p}$ indicates the random integer between the values 0 to P. The term ∇p indicates the female lion update function. The formulation of the lion update function ∇p is defined in the following equation.

$$\nabla p = \left[Y_p^V(t) + (0.1a_2 - 0.05)(Y_p^U(t) - a_1 Y_p^V(t))\right] \quad \text{Eq (15)}$$

Where, $\boldsymbol{a1}$ and $\boldsymbol{a2}$ ranges between 0 and 1.

Step 4: Mating of the nodes The next move is to combine the algorithm proposed. The method involves crossover and transmutation operators to effectively generate the lion's cubes. The pairing is performed accordingly,

$\boldsymbol{Y}(\boldsymbol{cub})(\boldsymbol{r}) = \boldsymbol{Lr} \nabla \boldsymbol{YU} + \boldsymbol{L1r} \nabla \boldsymbol{YV}$ Eq (16)

- is a result of Hadamard and the word "Lr" means mask length crossover (F). The set value ranges between one and four values. The mating of the male lion and the female lion efficiently produces four cub lions $\boldsymbol{Y^K(r)}$.

Step 5: Cub growth formation The cub growth formation depends on the mutation of the both the male cub $\boldsymbol{Y^{U-cub}}$ and the female cub $\boldsymbol{Y^{V-cub}}$. The mutation rate for cubic growth is below 0.2. The mutated cube of man and female replaces the male cub and female cub if their health value is higher.

Step 6: Territorial defence For the proposed SMOLOA algorithm the territorial defense relies on the Nomad coalition, survival, pride updates and updates to the nomad. The Nomad coalition between the two nomad lions $\boldsymbol{Y^{W1}}$and the $\boldsymbol{Y^{W2}}$ results in one of the winning nomad lion $\boldsymbol{Y^{WIN-W}}$

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- The survival fight between the lions depends on the winning nomad lion Y^{WIN-W}.
- The following equations indicate the conditions for the nomad Lion to win the survival fight:

$$fitness(Y^{WIN-W}) > fitness(Y^{U})$$
$$fitness(Y^{WIN-W}) > fitness(Y^{U-cub})$$

$$fitness(Y^{WIN-W}) > fitness(Y^{V-cub})$$

The pride update is done when the male lion Y^{U} is defeated by the winning nomad lion Y^{WIN-W}.

Step 7: Territorial takeover When wellbeing is met, territory is taken by the substitution of old lions with cubic lions. The male lion shall be replaced by the following criteria:

$$Y^{U} = \begin{Bmatrix} Y^{U-cub}; & if\ (fitness(Y^{U}) < fitness(Y^{U-cub})) \\ Y^{U}; & else \end{Bmatrix} \quad \text{Eq (17)}$$

The substitution of the female lion is performed on the basis of:

$$Y^{V} = \begin{Bmatrix} Y^{V-cub}; & if\ (fitness(Y^{V}) < fitness(Y^{V-cub})) \\ Y^{V}; & else \end{Bmatrix} \quad \text{Eq (18)}$$

Step 8: Termination This is the last phase in the method of optimisation. When the termination condition is not met, the algorithm is repeated from step3. The algorithm terminates until the $Tmax$ iteration is reached as far as possible.

V. Results and Discussion

Experimental setup

The scenario below is used to assess the approach proposed and compare with the methods already in place. The sensor nodes are randomly deployed and the sensor nodes are spread across the network area within an area of 1000x1000m. The location of the node is still. The size of the network varies between 50 and 250. The sensor nodes have an initial energy of 100joules. CBR communication is allowed and the sensor nodes will send the packet at the constant bit rate speed. The size of the database is 1024bytes. The network has been simulated for 100ms.

Table1: Simulation Parameter table

PARAMETER	**VALUE**
Application traffic	CBR
Transmission rate	1024 bytes/ 0.5ms
Radio range	250m

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Packet length	1024 bytes
Routing Protocol	AODV
Simulation time	100s
Number of nodes	50, 100, 150, 200, 250
Area	1000 x1000
Transmission Protocol	UDP
Initial Energy	100j

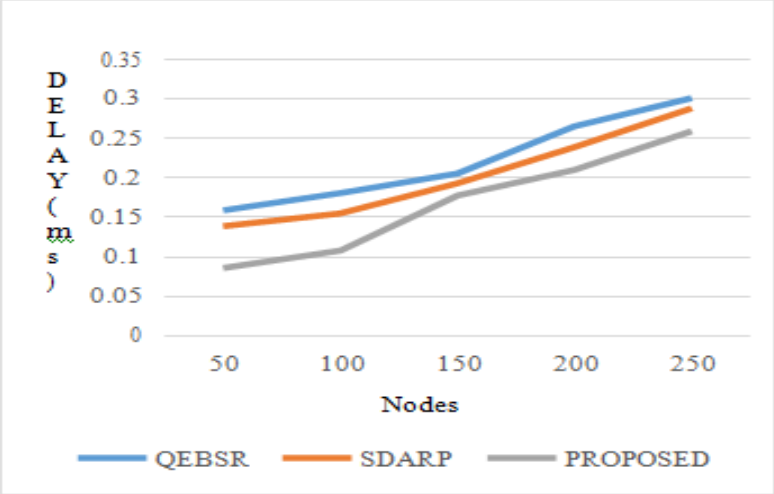

Figure 4: End to end delay

The above results figure 4 display the experimental results of the implementation of the methods in 50 to 250 different Network Sizes, both current and proposed. Time and time a data packet takes to the destination shall be determined by the delay between the end to end. Improper selection of the forwarder node and a high hop count affect the data packet delay at the end. In the proposed way, the transmission of data is achieved using the proposed multipurpose fitness function, energy-efficient transmission nodes. Therefore, there is relatively less delay in the proposed process than in the previous ones.

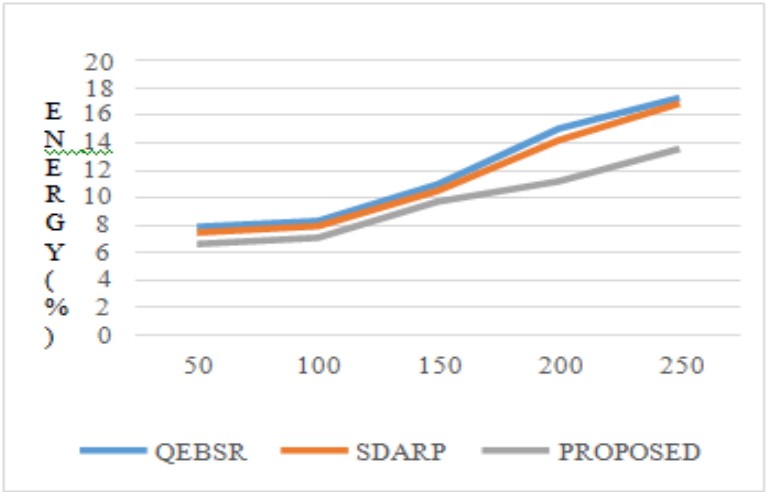

Figure 5: Energy consumption

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Energy is the sensor network's critical parameter. The initial energy is provided for each node of the network. The first energy was 100joules in our simulation. For network operations, the sensor nodes consume resources. In order to last longer, energy consumption should be optimized. The choice of the energy-efficient routing route through the proposed fitness calculation multi- objective algorithm optimizes the energy use of the sensor node and improves network life. Therefore, energy conservation was not taken into account by the current approaches in a way that the energy consumption was comparatively superior. The proposed method's average energy consumption rate was 13j for 250 node networks with a maximum of 17j in previous methods. Figure 5 represent the graphical view of energy consumption.

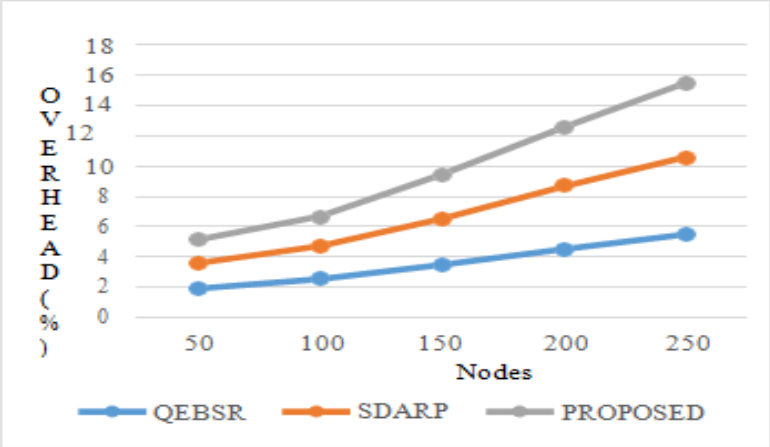

Figure 6: Overhead

The overhead parameter is associated with the overhead often occurring in the network by the method/ algorithm implemented. The algorithm/method needs resources for completing the given task related to the sum of additional control packages. The route loss because of the wrong selection of the forwarder node calls for transmission completion. To save the undesirable energy consumption, this should be avoided. The multi-objective fitness estimate algorithm was checked in the approach proposed, selecting energy-efficient paths. The successful network clustering also enhances the aggregation of data. In the proposed system, therefore, the overhead was regulated when the current methods failed. Figure 6 shows the graphical representation of overhead.

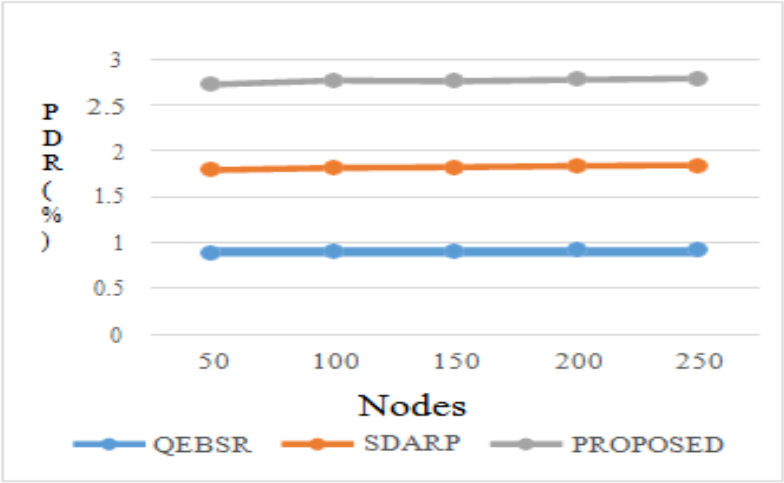

Figure 7: Packet delivery ratio

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A Packet Diffusion Ration, PDR, determines the ratio of the total number of packets sent to the destination node from the source node to the number of packets sent. The failure of the route and congestion are the major factors affecting the PDR rate. The successful data aggregation by cluster heads and energy-efficient path selection by means of the multi-target fitness feature ensure that data packets are transmitted smoothly to their own destination through energy-efficient pathways. Therefore, in the system suggested, the PDR of the current methods was as low as 91% while the PDR was as high as 95%. Figure 7 shows the graphical view of packet delivery ratio.

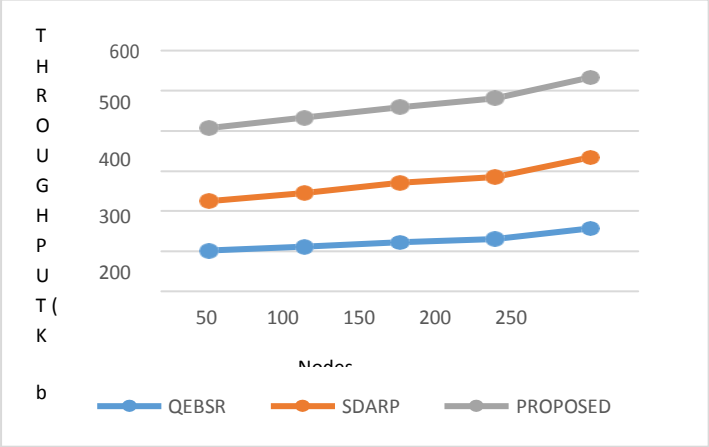

Figure 8: Throughput

The Throughput refers to the amount of data that can be transmitted in a certain time from one sensor to the other. The efficient rate of transmission of the network is described throughput. In the network performance, the presence of congestion in the routing path. The effective path selection strategy of the MOA and the data aggregation of the proposed algorithm maintains high fitness efficiency. The highest throughput rate achieved in our execution was 198 kbps, compared to 156 kbps for existing methods. Figure 8 represents the graphical view of throughput.

VI. Conclusion

This work implemented a WSN routing mechanism which is safe & energy conscious. In this thesis, proposes a Lion optimizing algorithm based on the SMOLOA algorithm. The work proposed used the multi-target fitness function to pick the best sensor nodes for the routing. The SMOLOA proposal takes various factors into consideration: packet drop value, elected residual energy, related node density, average cluster distance, average fitness transmission and traffic delays. The proposed model is simulated by a difference in population size and WSN nodes. The comparative study of the current models, including QEBSR and SDARP, is carried out. Even for dense sensor networks, the proposed algorithm has increased standardized grid energy.

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Identifying Liver Cancer Using Image Processing Techniques

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Abstract

Image processing is a processing method with the assist of mathematical operations. It makes use of any of the shape of sign processing. Here the enter is an photograph or video and the output is additionally an photo or a set of image. This approach is additionally used in clinical purposes for a number detection and treatment. In this paper, it has been used to discover most cancers cellphone of the liver. Here OTSU's approach is used for bettering the CT photograph and watershed technique is used to section the most cancers telephone from the image.

I. Introduction

Digital evaluation of clinical photos is an interesting lookup region that requires a synergy between technical, engineering, and clinical disciplines. Medical imaging no longer solely presents beneficial data for analysis however additionally serves to help in planning and monitoring the remedy of disease. The noninvasive liver imaging approach is very beneficial in diagnosing and treating sufferers with regarded or suspected persistent liver illnesses nowadays. Other imaging modalities like Computed Tomography (CT), Magnetic Resonance Imaging (MRI), Positron Emission Tomography (PET), Ultra Sound (US) and Single Photon Emission Computed Tomography (SPECT) have been expansively applied for physiologic grasp and diagnostic functions in cardiology. The software of scientific picture processing lets in visualization and quantitative evaluation of clinical images. The use of trendy user- interface and evaluation equipment allows researchers to share lookup information from/to far flung sites, and deal with clinical disorders.

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The system of Medical imaging develops the computational techniques and algorithms in examining biomedical data, and to collaborate with researchers and colleagues at different lookup facilities to follow statistics evaluation and visualization in biomedical lookup problems. It additionally helps in creating hardware and software program to analyze biomedical facts to guide the discovery and development of biomedical know-how amongst the collaborators. In many fields of bio-medical lookup things to do and scientific practices, the essential function is performed through the Medical imaging process.

The CT and MRI scans assist radiologists to become aware of and quantify tumors, biologists to find out about cells and generate 3D co focal microscopy facts sets, neuroscientists to become aware of regional metabolic Genius exercise and virologists to create 3D reconstructions of viruses from micrographs. These distinct photographs from one of a kind modalities are analyzed by using researchers with the assist of contemporary visualization equipment and computerized quantification. In traditional method, human intervention is required to notice the tumors or abnormalities in liver. This is time eating system and it is now not appropriate for massive population. Hence, there is a want for automated detection and segmentation of tumors in liver

Characteristics of a medical imaging procedure: This part describes how and why scientific pictures are commonly used. Consideration of these characterizations have to be made when defining working procedures, transmission and compression procedures. Our predominant purpose for thinking about this records apart from making sure a greater entire perception of the utility is the opportunity of the use of some of the information regarding picture use to enhance transmission, storage and archiving. This is on the other hand now not a straight ahead task; though many structures have pretty superior services for dealing with statistics regarding how an picture was once obtained with perchance a herbal language rationalization of why the process was once performed, none keep explicitly the semantics of the approaches in a way which would possibly be of use for duties like guiding archival and compression systems. It will be beneficial to endure such chances in thinking for future use and when thinking about database designs and compression schemes.

Other authors additionally reflect on consideration on such facts to be useful, for instance, reflect on consideration on the following listing of essential facets characterizing a clinical imaging system following the manufacturing of an stock of 30 imaging processes overlaying a wide variety of modalities:

1. The scientific aim of a technique is to gain a analysis or attention of a therapeutic act.
2. To achieve data from received sequence it is fundamental to make relationships between sequence explicit. For occasion it is one-of-a-kind to recognize the attitude between two DSA images, and to recognize why the snap shots have been obtained with such an angle.
3. Image processing is used to extract statistics applicable to the technique aim from the big quantity of information produced. It is consequently crucial to represent how and why processing is performed.
4. In nearly all instances of digital methods picture processing is performed. Most frequently easy (windowing, zooming, and measurements) processing strategies are used. Only in nuclear medication are complicated processing methods performed.

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However, there is no relationship between the algorithmic complexity of a processing approach and the want for storing parameters used in the course of processing.

5. By some distance the most frequent clinical motive to save pics is to evaluate sequential approaches to consider the evolution of pathology

II. Literature Survey

Survey based on automatic liver tumor segmentation: Abdel-Massieh et al. (2010) designed a totally automated tumor segmentation technique for liver buildings besides guide consumer interaction. Every liver picture slice is subjected to distinction enhancement and a white photograph with little pepper noise is delivered to get the tumors as darkish gray spots. The picture is transformed into binary image, by way of utility of Gaussian smoothing; in which tumors are like black spots with a white history the use of iso-data threshold value. Their experimental effects confirmed higher effect when utilized on stomach datasets.

Foruzan A.H. et al. (2009) propounded a approach for segmentation of liver in CT statistics for liver preliminary border estimation; they started with an photo simplification and thereby searched rib bones and related them collectively to discover ROI of liver. To phase the pictures a approach known as break up thres holding was once used by means of them. Different colours have been assigned to objects current in ROI, the cut up threshold step and the objects that have been located in 75% of proper section of the abdomen. After this a coloured photograph was once received in which liver had a particular colour from the place liver boundary used to be extracted.

Zhang et al. 2010) approached computerized liver segmentation blanketed common liver structure mannequin localization in CT by way of 3D generalized Hough Transform, subspace initialization of Statistical Shape Model thru depth and gradient profile and then by way of deforming the required mannequin to liver contour via most appropriate floor detection technique based totally on sketch theory.

Laszlo R. et al. (2009) applied a technique which robotically segments the liver, through the use of region-growing facilitated through pre- and post- processing functions, then right here to cast off over and beneath segmentation anatomical and multi-phase records are considered.

Masoumi et al. (2012) filtered the aspects of liver place in MRI pix the usage of watershed algorithm and synthetic neural network, which lead to computerized liver segmentation. But all these strategies resulted solely in liver boundary and did now not realize liver tumor.

Lezoray et al. (2009) propounded an unsupervised clustering technique. In this technique, the determinations of wide variety of training have been executed by using making the watershed to function on distance characteristic on facilities of class. In this method, to quantify the excellent of the segmentation with the aid of electricity function, pair-wise coloration projections are regarded to absolutely the automate the segmentation and it have a seem to be for dominant colorations of 2-D histogram for inspecting purpose. But the histogram technique is too tough to become aware of peaks and valleys in the image.

Escobar et al. (2012) first colorized the pixels representing tumor and wholesome tissues and then used threshold technique for segmentation to notice tumor to overcome the trouble as

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confronted in histogram. But these techniques are both carried out on CT or MRI pictures or the photos are first coloured and then segmentation is applied. Since morphological adjustments continually precede metabolic modifications and are detected thru imaging modalities like CT or MRI, PET is anticipated in enabling an early evaluation of response to treatment. 18F-FDG PET has been stated to supply until now response for tumor detection than CT [58].

Lartizien et al. (2012) and Changyang et al. (2011),stated that Positron emission tomography (PET) with 18FFluorodeoxyglucose (18F- FDG) used to be the most normally counseled approach for clinical imaging as severa tumors which have been detected very precisely and accelerated the selection for remedy consideration and assessing sufferers having most cancers at unique stages. It is based totally on the tumor precise excessive intracellular accumulation of the glucose analog fluorodeoxyglucose (18F-FDG). It is used to file the tumor's physiological facts and its metabolic activities. PET/CT offers practical and anatomical imaging inside a single scanner in a single scanning session.Baardwijk A. et al. (2007) furnished the benefit of PET mixed CT pictures for the segmentation purpose. PotesilV. et al. (2007) segmented PET/CT pics the use of preliminary warm spot detection and segmentation in PET for tumor shape look and used form mannequin to classify voxels in CT. Xia

Y. et al. [91] (2008) proposed an expectation maximization algorithm the usage of prompted annealing to routinely section Genius PET/CT images. But lengthy execution instances have been the foremost disadvantage of this method. Yu et al. (2009a) proposed the co-registered multimodality sample evaluation segmentation machine (COMPASS) to extract texture elements from PET/CT and then used decision-tree primarily based K-nearest- neighbor classifier to label every voxel as both "normal" or "abnormal" and the performance was once compared with threshold methods: SUV price and signal/background ratio.

III. Proposed Method

The extraordinary boom of cells in the liver motives liver most cancers which is additionally acknowledged as hepatic cancer, where, Hepatocellular Carcinoma (HCC) is the most frequent kind of liver most cancers which makes up 75% of cases. The detection of this tumour is tough and normally discovered at superior stage which reasons life-threatening issues. Hence it is a long way crucial to find out the tumour at an early stage. So the precept intention of this undertaking is to discover liver most cancers at beforehand stage the usage of photo processing technique. Here the malignant liver tumours are detected from Computed Tomography (CT) images. The photograph undergoes enhancement the use of anisotropic diffusion filters and segmented by using morphological operations which is easy and handy to work. This operation makes use of mixture of two processes, dilation and erosion. The scope of this propounded approach is to spotlight the tumour vicinity existing in the Computed Tomography.

In this paper, we present a new and accurate method for liver tumor segmentation from computed tomography(CT) scans. Initially, the liver CT imageispre-processed, i.e., noise removal and contrast of the image is enhanced. We then employ a support vector machine (SVM) classifier, which is trained using the user fed image sets, to classify the liver image. Sequentially, morphological operations and feature extractions are performed over the

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segmented binaryimaget ofur therre fine the rough segmentation result of SVM classification. The experiment results prove that the accuracy and efficiency of the proposed algorithm to be higher than conventional methods. The block diagram of propposed liver tumor segmentation and detection algorithm is shown in Figure 3.1. The method employs a pre- processing step, Feature extraction and classification using Support vector machines.

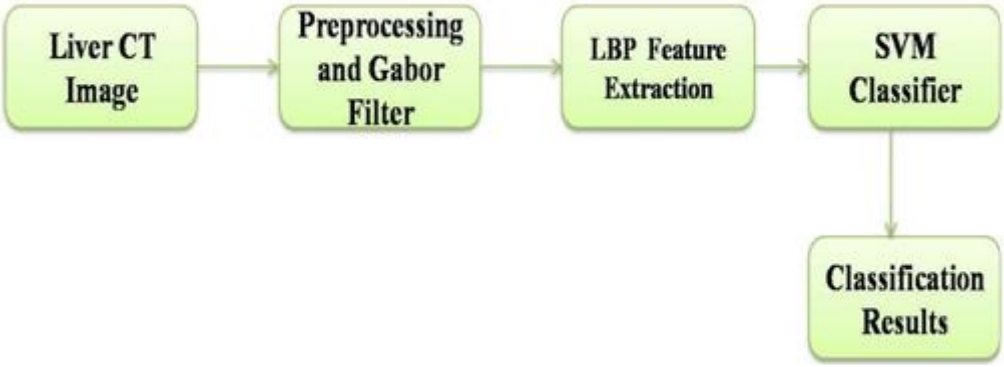


Figure 3.1 Block diagram of proposed liver tumor detection technique

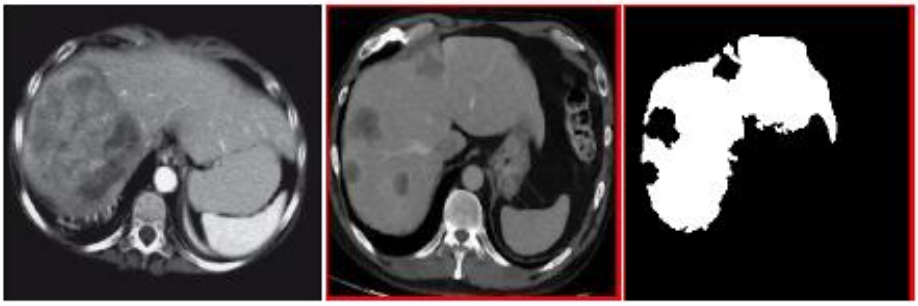
IV. Results and Discussions

To analyze the performance of the proposed algorithm to detect the liver tumor, the images obtained using the proposed liver tumor segmentation technique is compared with their corresponding ground truth images. The performance of the proposed techniqueisanalyzed with the following parameters:

- Sensitivity[Se=TP/(TP+FN)]
- Specificity[Sp=TN/(TN+FP)]
- Accuracy[Acc=(TP+TN)/(TP+FN+TN+FP)]

All the above parameters help in defining the performance of our proposed technique. Se and Sp define the ratio of well-classified tumor and non-tumor pixels, respectively. Lastly, Acc is the ratio of total well-detected and classified liver tumor pixels.

The Local Binary Pattern features, GLCM features, and grey level based features are extracted for a set of liver images. Then, the neural network(NN) classifier is trained with these features in the training mode. In the classification mode, the NN classifier segments the tumor regions into benign and malignant as shown in Figure4.1.



(a) (b) (c)

Figure 4.1 (a) Fused Image (b) Median filtered Image (c) Thres holded Image

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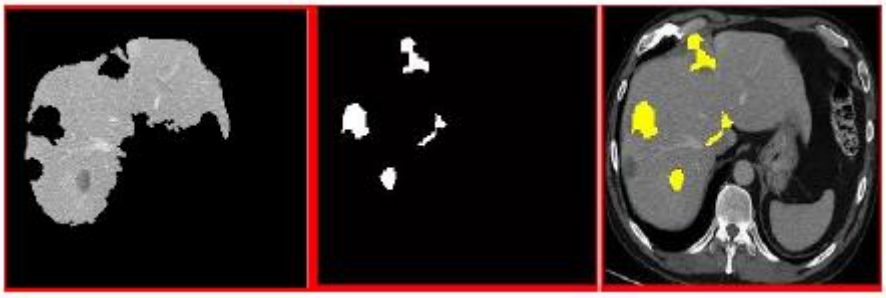


(d) (e) (f)

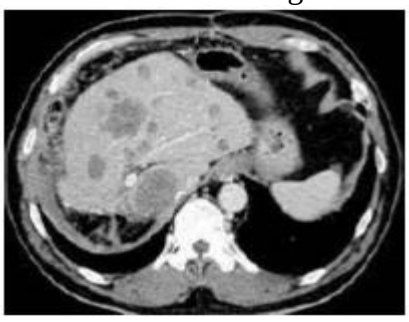
Figure4.2 (d)Gabortrans formed Image (e)Detected tumorregions (f)Result of tumor segmentation

Table 4.1 illustrates the performance evaluation of the proposed tumor detection algorithm in terms of the performance evaluation parameters. The average accuracy achieved is 98.2% form alignant tumor region in accordance with ground truth images.

Table4.1Performance evaluation of proposed algorithm

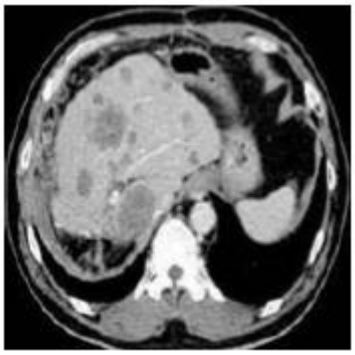
Methodology	**Year**	**Accuracy (%)**
Proposed work	2016	98.2
Antere*tal*.[7]	2013	93.0
Kumar*etal*.[42]	2011	93.3
Rajagopal&Subbaiah(66)	2014	95.23

Liver MRI Image

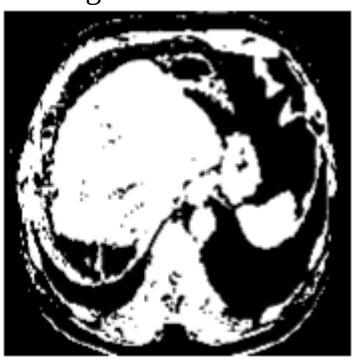


Hybrid Segmentation Threshold Image

Objects in Cluster 1



Segmented Tumor



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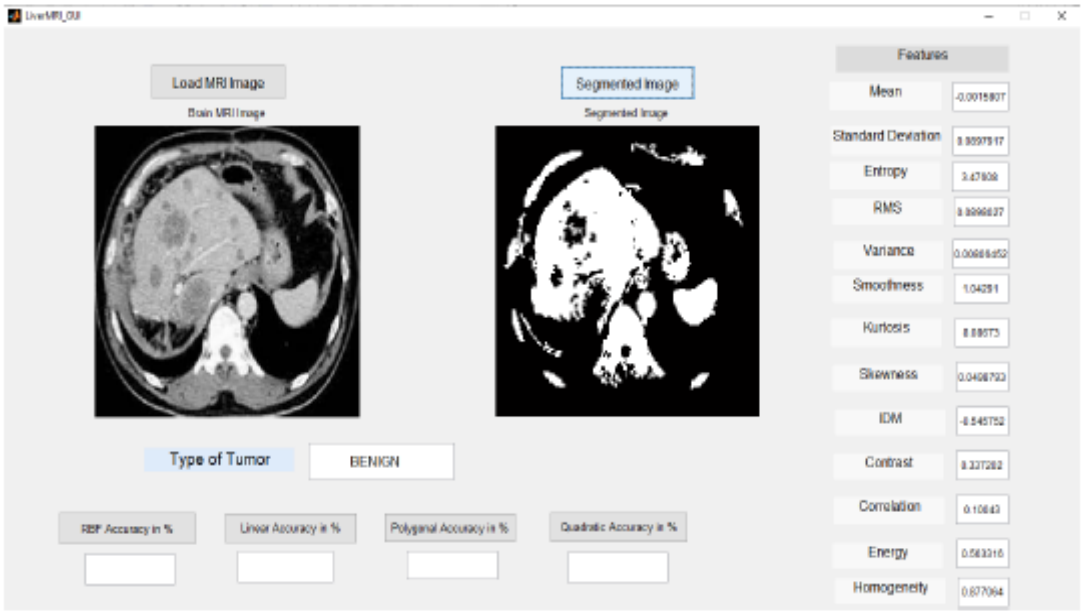

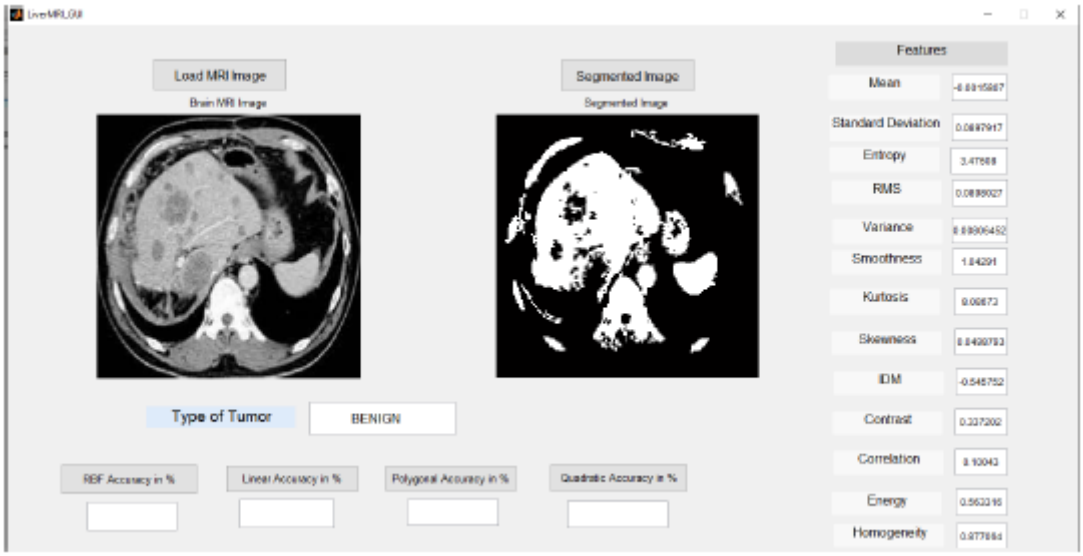

V. Conclusion

Different MRI Images where acquired from the internet, basic OTSU preprocessing technique was used, for segmentation Marker-Controlled Watershed Segmentation was used and it was observed that for a few images' segmentation was done correctly, so our future works includes creating a GUI and enabling a single click feature extraction using wavelet transform, with the accuracy.

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Smart Card Based Fuel Supply System

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Abstract

When connected to a smart card interface, a smart card is an integrated circuit card that becomes part of a circuit or system. Smart cards are gaining popularity for use in security and personal identification applications. Smart cards have one or more embedded microcontrollers that handle access to and storage of sensitive data that is really stored in memory devices on the smart card. A smart chip embedded in a smart card allows for secure electronic transactions as well as identification. The integrated chip, which is incorporated in the smart card, is responsible for processing particular transactions. The smart card communicates via a serial interface and is powered by an external source such as a smart card reader. Many fuel stations now use a manual cash method to fill any car with gasoline. Every user in this system receives a smart petro card, which allows them to access petrol at petrol stations. We must first recharge this card before we may use it. When we wish to fill the tank, we must insert the Petro card into the card reader, which is serially interfaced to the microcontroller. The microcontroller receives the data from the smartcard reader and prompts you for the number of liters you desire, which is shown on the LCD panel. Then we must pick the needed number of liters of gasoline using buttons that serve as input to the microcontroller. Following the reading of this value, the microcontroller will verify the available balance in the smart card; if it is adequate, the petrol filling procedure will begin.

Index Terms—Microcontroller, Smart Card, Fuel Supply, LCD

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I. Introduction

ALMOST all fuel pumps now feature a controlling device that performs functions such as managing the electrical pump, driving the display, measuring the flow, and turning off the electrical pump as needed. However, a person is still required to collect the money. This project attempts to create a mechanism that eliminates human involvement so that no personnel are required to fill the gas tank. Every driver in this system has a smart card. Our project has a variety of features. It can provide a variety of benefits to the user. Some of the most notable aspects of our concept include: - Automatic: With automatic transmission, petrol may be poured into the tank without the need for a human interface. Manual: This mode of operation allows the user to utilize a prepaid card. To make use of a smart prepaid card. To connect the pump and the bike module, an RF transmitter and receiver are needed. It will first detect the presence of gasoline. The level of gasoline is indicated on the LCD. We would like not to be interrupted by anyone for an extended period of time when driving on a highway, but we cannot escape one interruption. That is a petrol filling station. We can save time by making it automated, similar to how our phones work. In this system, we may create a prepaid system. This will include a prepaid card, RF modems, a microcontroller, software, and a computer.

This method will minimize personnel while also saving time. When certain cars arrive at a gas station, parameters such as vehicle type, number, color, and driver's license number are immediately updated in the system. C will be used to write the program. Now, the user will just enter the amount from the keypad while sitting in the automobile, and the vehicle will be filled with gasoline. The rapid growth in the number of cars in India has resulted in traffic congestion and delays in nearly all Indian cities. The distribution of fuel to such a large number of cars at fuel stations has generated numerous problems in India. The vehicle driver must pay for fuel with cash and may be required to pay more than the amount of fuel delivered owing to a scarcity of small change available from the station operator.

The goal of the SMART CARD-based automated fuel pump is to decrease human labor while developing an auto-guided mechanism and implementing the task sequentially using SMART CARD technology. These systems are very dependable and time-saving gadgets. This project's components include a microcontroller, SMART CARD tags, a power source, an LCD display, a motor driver, and a SMART CARD reader. Petroleum products are among nature's most valuable and scarce creations. The appropriate usage and distribution of these items is critical to their survival. A fuel station is a facility that sells fuel and lubricants using fuel dispensers, also known as browsers, which are used to pump gasoline, diesel, kerosene, and other fuels into cars and compute the financial cost of the product so delivered. Enterprises involved in urban and suburban public transportation, as well as other modes of transportation, are major fuel users. Control over gasoline supply is required to avoid or at least reduce fuel abuse. The emergence of radio frequency technology has altered traditional data collecting methods. SMART CARD tags provide non-contact, reading speed, no wear, extended life, user friendliness, and a security function as compared to standard bar codes, magnetic cards, and IC cards. The use of the SMART CARD for vehicle identification, toll collection, and traffic control has already been widely tested. This study suggests the use of SMART CARD technology to regulate gasoline delivery in densely populated nations.

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II. Literature Survey

In this article [1], RFID technology is utilized to regulate the flow of water to individuals; if the RFID card is put near the RFID reader, an LCD shows information about the card holder. According to the details, the DC Motor will pump the water and a notification about the amount of water consumed will be delivered to the card holder.

Project [2] aims to create a system that automatically recognizes incoming cars and records the toll gate name, date, and time. If the car belongs to the authorized individual, the toll gate automatically opens and a fixed sum is taken from its account. This reduces traffic congestion at toll plazas and contributes to decreased fuel usage. This technology can be utilized in toll collecting systems when speed and efficiency are of the utmost importance. When a car passes through a toll gate on any route, the RFID reader indicates that it has passed through the clearing.

The basic and advanced microprocessor Raspberry-Pi with RFID smart card technology enable complete security and automation in gasoline delivery [3]. It has an interface with a high-speed gasoline dispenser that is easy for the user to use. The password and IRIS detection will be supplied to the user in our system for a safe transaction. The client must wave the smart card at the reader, which displays account details on the LCD given by the fuel station, which will assist the fuel business in creating authentication for the user as well as the distribution of the gasoline, which is not possible until it is validated by the database.
This article [4] proposes a Smart Anti-Theft Vehicle System based on the Internet of Things (IoT) enabling real-time monitoring of any equipped vehicle from anywhere. Global Positioning System (GPS), Global System for Mobile Communication (GSM)/General Packet Radio Service (GPRS), and Microcontrollers are utilized in the development of this system to allow customers to monitor their cars in a simple manner. This technology allows users to remotely monitor and operate (emergency stop by blocking the fuel line) cars using a mobile application

III. Proposed Method

Human errors have a negative impact on the final product's quality. Logic Control that is Hardwired. Contractors and Relays, together with a timer and counter, were utilized to achieve the necessary amount of automation. Bulky and complicated wiring necessitates a significant amount of rework to incorporate changes in control logic. Work can only begin when it is completely specified, resulting in a lengthier project timeline. Expensive, requires a third-party license, is bulky to transport, and requires an expert. Since the development of the technology, the aforementioned procedures have been employed for automation. Because each of them has certain disadvantages, we are replacing them with new technologies.

There are several disadvantages to the current system, which will all be addressed in this current implementation. The SMART CARD card was utilized in the previous approach, but because the smart card tag has no memory, it cannot retain any balance amount that will be used as a prototype. In this case, we use a smart card reader instead of a smart card reader so that we may store the amount in it and there will be no data clearance in the smart card because it includes a tiny chip for storing purposes.

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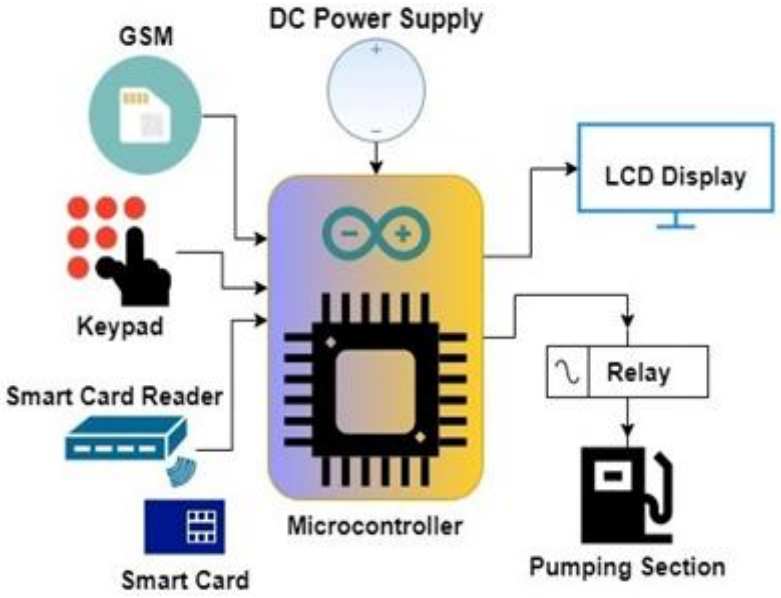

A. Arduino Microcontroller

1. AVR® 8-Bit Microcontroller with High Performance and Low Power
2. RISC Architecture (Advanced RISC Architecture)
3. 131 Intuitive Instructions - The Highest Single Clock Cycle Execution
4. General Purpose Working Registers, 32 x 8
5. Operation in a completely static state
6. At 20 MHz, up to 20 MIPS throughput is possible.
7. Multiplier with two cycles on-chipHigh Endurance Non-volatile Memory Segments
8. In-System Self-Programmable Flash programme memory of 4/8/16/32K bytes
9. EEPROM (256/512/512/1K bytes)
10. Internal SRAM: 512/1K/1K/2K Bytes
11. Cycles of write/erase: 10,000 Flash/100,000 EEPROM
12. Data retention: 20 years at 85 degrees Celsius/100 years at 25 degrees Celsius (1)
13. Software Security Programming Lock

Arduino is a free and open-source prototyping platform with simple hardware and software. Arduino boards can read inputs such as a light on a sensor, a finger on a button, or a Twitter tweet and convert them into outputs such as starting a motor, turning on an LED, or posting anything online. Arduino has been utilized in millions of different projects and applications because to its easy and accessible user experience. The Arduino software is simple enough for novices to use while still being versatile enough for expert users. It is compatible with Mac, Windows, and Linux. It is used by teachers and students to create low-cost scientific equipment, to demonstrate chemistry and physics principles, and to get started with programming and robotics.

B. LCD (Liquid Crystal Display): A model depicted here is most commonly used in follow due to its inexpensive cost and attractive potentialities. It supports the Hitachi HD44780(figure. 2a) microprocessor and can display messages in two lines of sixteen characters each. It displays all alphabets, Greek letters, punctuation marks,

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mathematical symbols, and so on. It is also possible to display symbols that the user informs it off. Automatic shifting message on show (shift left and right), appearance of the pointer, backlight, and so forth are regarded of as useful features.

The LCD screen is made up of two lines of sixteen characters each. Every character is made up of a 5x7 matrix. The distinction in display is determined by the facility supply voltage and whether or not messages are shown in one or two lines. As a result, variable voltage 0-Vdd is supplied to pin Vee. Trimmer potentiometers are commonly used for this purpose. Some display models include a built-in backlight (blue or inexperienced diodes). When utilized during the operation, a resistance for current restriction should be applied (like with any autoimmune disease diode).

C. Relay: Nowadays, a relay (figure. 2b) might be a useful gadget. They are used in many circuits, and many individuals are confused about how to operate a relay. As we all know, a relay is a device that is used to provide connection between two or more locations or devices based on the signal applied. In other words, relays provide isolation between the controller and therefore the device, as we all know, gadgets may operate on both AC and DC power. However, they receive signals from a microcontroller that operates on direct current, necessitating the use of a relay to bridge the gap. When you need to control a large amount of current or voltage with a little electrical signal, a relay comes in handy

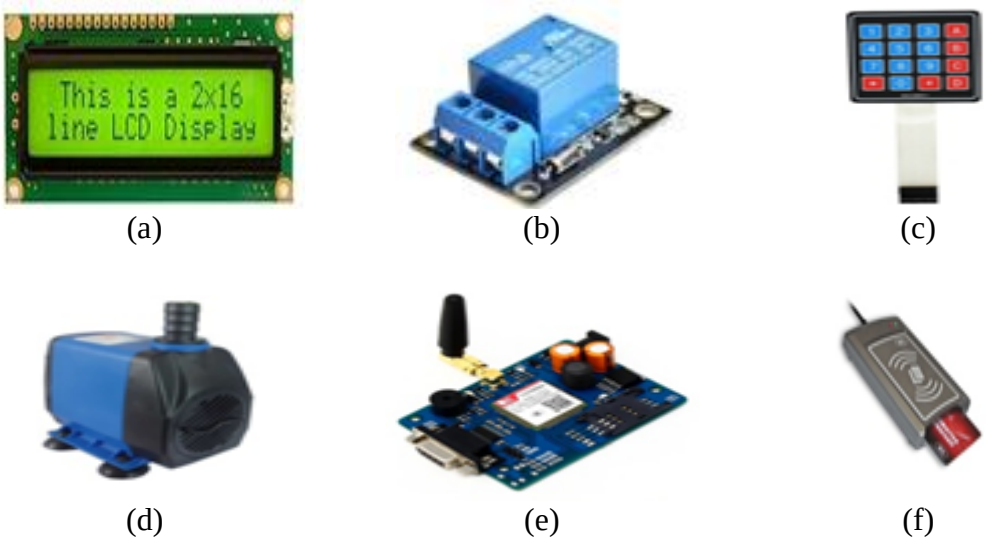

Figure. 2 a) LCD, b) Relay, c) Keypad, d) Motor pumping, e) GSM module and f) Smart Card reader

D. Pumping Motor: Submersible pumps (figure. 2d) utilized in ESP systems are multistage centrifugal pumps that operate vertically. Although their constructional and operational characteristics evolved throughout time, their essential operating concept remained constant. After being subjected to large centrifugal forces induced by the impeller's high rotating speed, the produced liquids lose their kinetic energy in the diffuser, where kinetic to pressure energy is converted. Radial and mixed flow pumps use this as their primary operating mechanism. A mechanical coupling at the pump's base connects the pump shaft to the gas separator or protector. Fluids are raised by the pump stages after

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entering the pump through an intake screen. Other components include radial bearings (bushings) placed along the shaft to provide radial support to the pump shaft while it rotates at high rotational speeds. An optional thrust bearing absorbs some of the axial forces generated by the pump, while the protector's thrust bearing absorbs the majority of those forces.

E. Keypad: A keypad (figure. 2c) is a block of buttons that generally bear numerals and other symbols but not a complete set of alphabetical letters. If it is primarily made up of numbers, it is often known as a numeric keypad. Keypads are present on many alphanumeric keyboards as well as other devices that need mostly numeric input, such as calculators, combination locks, and telephones. A distinct grid of number and function keys designed for efficient data entering, sometimes included as part of a regular computer keyboard. To facilitate efficient numerical data entering, a computer keyboard often includes a tiny numeric keypad with a calculator-style layout of buttons replicating the numeric and arithmetic keys on the main keyboard. Because most individuals are right-handed, the number pad (often shortened to numpad) is generally located on the right side of the keyboard.

F. GSM: GSM (Global System for Mobile Communications) (figure. 2e) is a cellular network, which implies that mobile phones connect to it by looking for nearby cells. GSM networks use four distinct frequency bands. The majority of GSM networks run in the 900 MHz or 1800 MHz frequency bands. Several countries in the Americas use the 850 MHz and 1900 MHz frequencies because the 900 and 1800 MHz frequency bands have already been assigned. AT commands are commands that operate a modem.

Attention is abbreviated as AT. Every command line begins with the letters "AT" or "at". Because of this, modem commands are referred to as AT commands. GSM/GPRS modems and mobile phones support an AT command set specific to GSM technology. This includes SMS-related commands like AT+CMGS (Send SMS message). It's worth noting that the first "AT" is the prefix that notifies the modem that a command line has begun. It does not appear in the AT command name. For example, D is the actual AT command name in ATD, and +CMGS is the true AT command name in AT+CMGS. Some publications and websites, however, use them interchangeably as the name of an AT command.

G. **Smart Card Reader:** A Smart Card Reader (figure. 2f) and Writer Module with an RS232 interface. It may be linked directly to computers through the RS232 connection and to microcontrollers via the on-board serial TTL output. Smart cards are classified into two types: contact and contactless. Both have a microprocessor and memory integrated in them. The smart card varies from the proximity card in that the proximity card's microchip has only one purpose: to give the reader with the card's identifying number. The smart card processor has an integrated operating system and can handle a variety of applications such as a cash card, a pre-paid membership card, or an access control card. The way in which the card's microprocessor connects with the outside world distinguishes the two sorts of smart cards.

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A contact smart card contains eight contact points that must physically touch the contacts on the reader in order for information to be sent between them. Because contact cards must be carefully placed into readers in the right orientation, the speed and ease of such a transaction are insufficient for most access control applications. Contact smart cards are primarily used for physical access control in parking applications where payment data is kept in card memory and transaction speed is not as critical.

IV. Results and Discussions

System for dispensing. The project is being carried out as a SMART CARD-based petrol bunk. SMART CARD card is used by users: Petro Card includes SMART CARD tags, as well as user verification codes These cards may be refilled at the recharge stations. When a user swipes the card through the SMART CARD reader, the amount input by the user is detected and gasoline is delivered to the vehicle. As a result, the money will be withdrawn automatically from the user card, and the LCD display will reflect the amount as well as the user's data. The microcontroller maintains the details of numerous cards and compares them to the data provided by the SMART CARD reader. When both of these details match, it sends control signals to the relay, causing the motor to pump petrol. The suggested system specifies three straightforward applications for SMART CARD smart cards.

When the client arrives at the gas station, he will first swipe the card. If the card is valid, the SMART CARD card reader will accept it. The pin number will then be requested. If the customer's inputted pin number is correct, it will ask for the amount of petrol to be dispensed. The system functions in this manner. If the client uses an illegal card, the reader will show the incorrect card message since the card is unauthorized. As a result, the system is secure. This solution does not necessitate the use of a high-performance microcontroller, such as an Arduino. Some use low-cost microcontrollers, which indirectly decreases the whole system cost. The remaining money will be transferred to registered cellphone phone.

V. Conclusion

The SMART CARD system is a versatile piece of technology. This system is utilized in a variety of applications including real-time applications. In our application, the SMART CARD system delivers the correct quantity of gasoline, reducing fuel waste. It also decreases the number of employees. If the consumer tries to swipe the illegal card, the SMART CARD system rejects it. As a result, the system is extremely secure. To get the greatest performance , the SMART CARD readers and Tags must be of high quality. This technology may be improved to apply a similar method for milk processing companies while supplying milk and its products to the market. In everyday life, we can see that water distribution in the heat is also one of India's challenges.

As a result, it is feasible to maintain control over water delivery in a certain region. Using the same approach, we suggested, rationing items such as vegetable oil, kerosene, and its sub products may be securely delivered to customers. It is also feasible to maintain track of the dispersed items in the market, which is crucial for industries.

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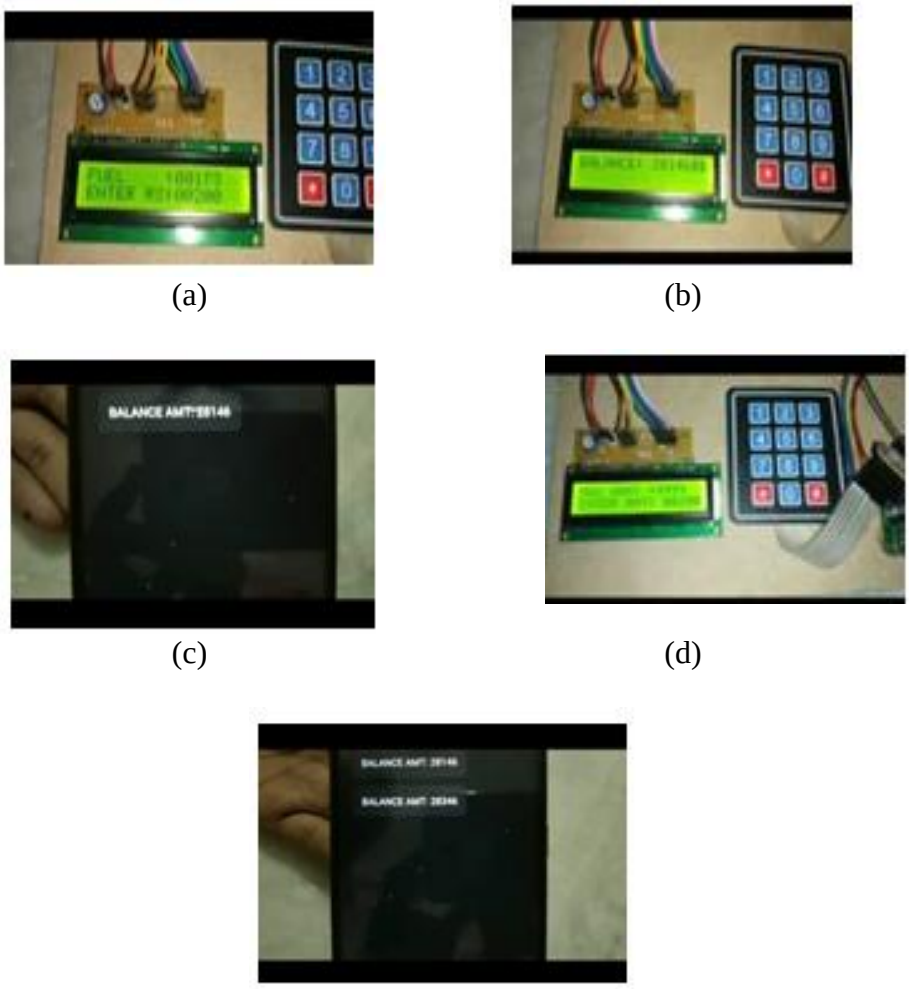

(a) (b)

(c) (d)

(e)

Figure 3 a) – e) Proposed Hardware Prototype, and Output message received for fuel pumping

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Smart Driver Alert System Using RFID Sign Boards

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Abstract

In modern days numerous accidents are occurring mainly on highways and we do not have adequate prior information indications regarding road state or gas bunks. The goal of this project is to provide cars with advance information in the form of voice regarding road condition such as speed breakers, road bends, and control stations, hospitals, petrol bunks, toll gates, and so on. Speed bumps, crosswalks, reverse curves, blind corners, one-way streets, steep ascents, work-in-progress, railway lines, and silence zones are just a few of the anomalies that may be found on the road. These anomalies are sometimes accompanied by road signs. Mandatory road signs enforce the law, whereas cautionary road signs are placed in high-risk locations to prevent accidents. However, the car driver frequently misses them. It's naturally tough to keep an eye out for traffic signs while you're supposed to be driving. The annoyance is exacerbated by the signage' poor placement and low visibility. As a result, providing the driver with a customized notification within the automobile is a superior means of notifying him. We are now working on an RFID-based system that will notify vehicle drivers of road anomalies at the optimal distance before they encounter them. The goal is to give an alternative to traffic signs, which are typically dispersed, unobtrusive, and emerge too late for corrective action to be taken. In addition, the gadget will help in the prevention of accidents and traffic congestion, as well as the enforcement of traffic law and order.

Key Words: RFID Reader, RFID Tags, Arduino Microcontroller, LCD Display, Voice Module, Speaker, Power Supply

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I. Introduction

The problems of vehicle commuting in congested metropolitans in developing nations are many – having to wait hours together in traffic jams, taking tortuous detours owing to on road construction, trying to identify speed breakers, negotiating blind curves, one-ways and so on. Forked roads, railway crossings, sharp reverse curves, and steep ascents and descents are just a few of the road peculiarities that one could experience on a typical trip. Such road anomalies are sometimes accompanied with road signage. Most car drivers, on the other hand, frequently fail to see traffic signs. It's naturally tough to keep an eye out for traffic signs while you're supposed to be driving. The inconvenience is exacerbated by the signage' poor placement and visibility. The issues go much deeper than our daily annoyances. Every year, about 130,000 people are killed in traffic accidents in India alone. (From the National Crime Records Bureau.) With the increasing expansion of road transportation across the world, there is a growing demand for innovative concepts and sophisticated technologies that improve driving safety and convenience. An RFID-based in-vehicle Alert System for Road Oddities has been detailed in the early idea. Radio frequency identification (RFID) is a technology that uses radio waves to identify and track objects. Most RFID tags have at least two components. One kind is an integrated circuit that can store and process data, modulate and demodulate a radio frequency (RF) signal, and perform other specialized activities. The second component is an antenna for receiving and sending signals. Identification and tracking do not require a direct line of sight. Allows for highly precise vehicle detection. RFID allows for the detection of many cars at the same time. There is no performance reduction during inclement weather. Tags generate radio signals that can be intercepted by devices such as routers and coordinators.

II. Literature Survey

For the visually impaired in educational environment, the use of the bar code and the RFID with reader-writer attached to a PDA was studied by Tatsumi et al. [1] as a promising step toward building an information ensured area, especially to get information from a bar code or from RFID tags attached to equipment or surroundings. The demand for health monitoring in e-healthcare service is continuously rising and its application is becoming practical using wireless sensor network technology. Regular patients and handicapped individuals can be watched at smart settings delivering e-healthcare services by deploying tiny wireless sensor network devices in a ubiquitous networking environment with some specialized health monitoring system.

Another assistive system is an Android app called On The Bus [5], which uses voice notifications to assist people with special needs in mobility and can be used by all passengers. This program is mostly dependent on the GPS system, although it can also make use of the smartphone's compass and 3G network. It includes two modes: one for persons with regular needs and one for people with exceptional needs. Voice instructions allow blind individuals to engage with the application. The program will then display a selection of available routes to the location, from which the user may select the most appropriate one.

A detailed assessment [6] of all suggested bus ticketing and bus information techniques has been given. The research results in a better solution in terms of cost, convenience, user happiness, and future deployment.

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The selection of working modules and their effective performance has been explored, as has the relevance of technology for the welfare of the general public and the visually handicapped.

III. Proposed System

In the current method, notice boards were put on the roadside, and the driver was required to observe them. If they missed the sign board signal, they were unable to control the car promptly, which resulted in several accidents. Because this might result in deaths at times, all of the concerns have been addressed in the present systems. The goal was to replace road signs with RFID tags and utilize in-vehicle RFID Reader-enabled modules to recognize them and present the driver with concrete information.

IV. Implementation

A. Hardware Requirements:

- Arduino Microcontroller
- Lcd Display.
- Power Supply
- RFID Reader
- RFID Tags
- Voice Module
- Speaker

B. Software Requirements

- Arduino
- Proteus

C. Block Diagram

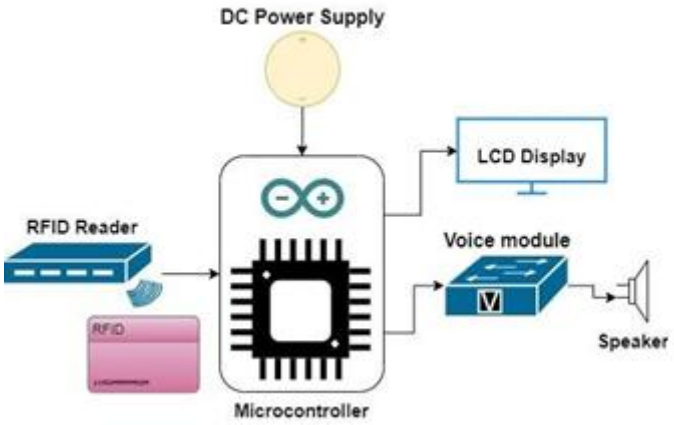

Figure. 1 Block Diagram of proposed model

In this prototype model (figure. 1), we used a passive RFID reader that is wirelessly connected to the vehicle's display console. Along with this technology, we offered speed control capabilities that can regulate the hydraulics when speed limit TAGs are crossed. In

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addition to a visual notice on the LCD, a voice alert can be included to give the vehicle driver with an auditory notification.

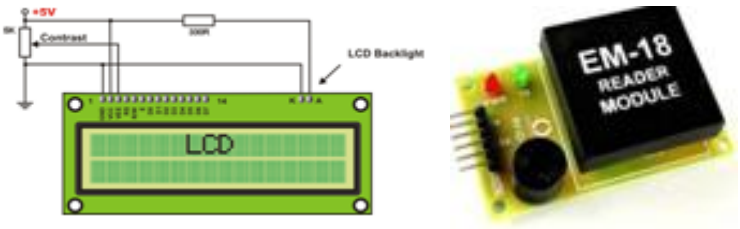
Arduino Microcontroller

1. High Performance, Low Power AVR® 8-Bit Microcontroller
2. Advanced RISC Architecture
3. 131 Powerful Instructions – Most Single Clock Cycle Execution
4. 32 x 8 General Purpose Working Registers
5. Fully Static Operation
6. Up to 20 MIPS Throughput at 20 MHz
7. On-chip 2-cycle Multiplier
8. High Endurance Non-volatile Memory Segments
9. 4/8/16/32K Bytes of In-System Self-Programmable Flash program memory
10. 256/512/512/1K Bytes EEPROM
11. 512/1K/1K/2K Bytes Internal SRAM
12. Write/Erase Cycles: 10,000 Flash/100,000 EEPROM
13. Data retention: 20 years at 85 C/100 years at 25 C(1)
14. Programming Lock for Software Security

Arduino is a free and open-source prototyping platform with simple hardware and software. Arduino boards can read inputs such as a light on a sensor, a finger on a button, or a Twitter tweet and convert them into outputs such as starting a motor, turning on an LED, or posting anything online. Arduino has been utilized in millions of different projects and applications because to its easy and accessible user experience. The Arduino software is simple enough for novices to use while still being versatile enough for expert users. It is compatible with Mac, Windows, and Linux. It is used by teachers and students to create low-cost scientific equipment, to demonstrate chemistry and physics principles, and to get started with programming and robotics.

LCD (Liquid Crystal Display)

A model depicted here is most commonly used in follow due to its inexpensive cost and attractive potentialities. It supports the Hitachi HD44780(figure. 2a) microprocessor and can display messages in two lines



(a) (b)

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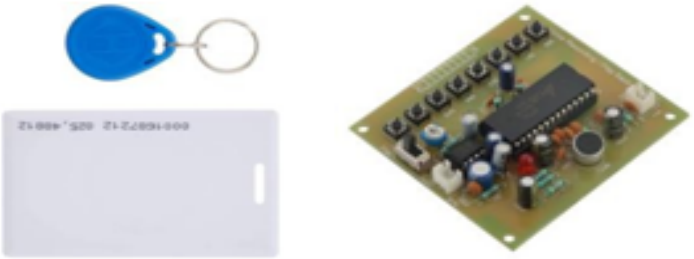

(c) (d)

Figure 2 a) LCD, b) RFID Reader, c) RFID Tag, d) APR2600

Voice module of sixteen characters each. It displays all alphabets, Greek letters, punctuation marks, mathematical symbols, and so on. It is also possible to display symbols that the user informs it off. Automatic shifting message on show (shift left and right), appearance of the pointer, backlight, and so forth are regarded of as useful features. The LCD screen is made up of two lines of sixteen characters each. Every character is made up of a 5x7 matrix.

The distinction in display is determined by the facility supply voltage and whether or not messages are shown in one or two lines. As a result, variable voltage 0-Vdd is supplied to pin Vee. Trimmer potentiometers are commonly used for this purpose. Some display models include a built-in backlight (blue or inexperienced diodes). When utilized during the operation, a resistance for current restriction should be applied (like with any autoimmune disease diode).

RFID

RFID is an abbreviation for Radio Frequency Identification. A RFID system is made up of two components. A Reader(figure. 2b) with one or more Transponders, commonly referred to as Tags. RFID systems arose from barcode labels as a way of automatically identifying and tracking items and persons.

A basic RFID system consists of three components:

- An antenna or coil
- A transceiver (with decoder)
- A transponder (RF tag) electronically programmed with unique information

TAGS (Transponders)

An RFID tag (figure. 2c) is made up of a microchip that contains identifying information and an antenna that wirelessly sends this data to a reader. At its most basic, the chip will include a serialized identification, or license plate number, that uniquely identifies that object, in the same way that many bar codes do today. RFID tags, on the other hand, have a larger data capacity than their bar code equivalents. This expands the types of data that may be encoded on the tag, such as the manufacturer, batch or lot number, weight, ownership, destination, and history (such as the temperature range to which an item has been exposed). In fact, depending on the application, RFID tags may contain an infinite number of

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various sorts of data. RFID tags can be used to identify individual goods, cases, or pallets, as well as permanent assets such as trailers, containers, totes, and so on.

APR9600(Voice Playback Module)

The APR9600(figure. 2d) device provides real single-chip speech recording, non-volatile storage, and playback for 40 to 60 seconds. Multiple message access is supported by the device in both random and sequential modes. Sample rates are user-selectable, allowing designers to tailor their designs to meet their specific quality and storage time requirements. Integrated output amplifier, microphone amplifier, and AGC circuits make system design much easier. The device is well-suited for usage in portable voice recorders, toys, and a variety of other consumer and industrial applications. APLUS integrated achieves these high levels of storage capacity by utilizing its unique analogue/multilevel storage technology, which is implemented in a sophisticated Flash non-volatile memory technique that allows each memory cell to hold 256 voltage levels. The APR9600 gadget can recreate speech signals in their natural form thanks to this technology. It does away with the necessity for encoding and compression, which frequently create distortion

Working of Project:

Road transport networks in cities are getting denser and new cars are being unveiled daily. With the rapid increase in road transport the world over comes the need for enhanced driving safety and convenience. Advanced technological concepts ensure a perpetual scope for development in this sector. We are currently developing an RFID based system that will alert vehicle drivers about road oddities at an optimum distance before encountering them. The objective is to provide an alternative to road signs, which are generally scattered, inconspicuous and appear too late for corrective action. Also, the device will aid in averting accidents and traffic jams, and in implementing traffic law and order.

The rfid tags has unique numbers so that the tags are placed to the sign boards on the road sides. The rfid reader is interfaced with the Arduino atmega328 microcontroller. This controller unit is placed in the vehicle so when vehicle is moving on the roads the rfid reader detects the rfid tag which is fixed to the sign board and sends RF signals to the microcontroller. As the tag is registered it detects the unique number and anlysis it has a prerecorded voice in the voice play back module. Then it activates the voice module from the microcontroller. The voice will be alerted to the driver when that specific tag is detected.Here we use 5 tags for speed breaker, work in progress, train track, school zone and petrol bunk. Simultaneously the board indication will be displayed on the LCD as text format display.

Advantages:

- Immediate intimation of sign boards
- Voice alert
- Automatic process no need to monitor driver

Applications:

- Used in easy navigation of the road.
- Used in controlling the speed of reckless driving

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V. Results

Cities' road networks are becoming more congested, and new automobiles are being introduced on a daily basis. With the increasing expansion of road transportation throughout the world comes the demand for improved driving safety and convenience. Advanced technical concepts ensure that there is always room for growth in this industry. We are now working on an RFID-based system that will notify vehicle drivers of road anomalies at the optimal distance before they encounter them. The goal is to give an alternative to traffic signs, which are typically dispersed, unobtrusive, and emerge too late for corrective action to be taken. In addition, the gadget will help in the prevention of accidents and traffic congestion, as well as the enforcement of traffic laws and regulations. The rfid tags have unique numbers, allowing them to be attached to roadside sign boards. The RFID reader is linked to the Arduino microcontroller atmega328. This controller unit is installed in the vehicle so that while the vehicle is driving down the road, the RFID reader identifies the RFID tag attached to the sign board and sends RF signals to the microcontroller. When the tag is registered, it detects the unique number and analyzes whether or not it has a prepared

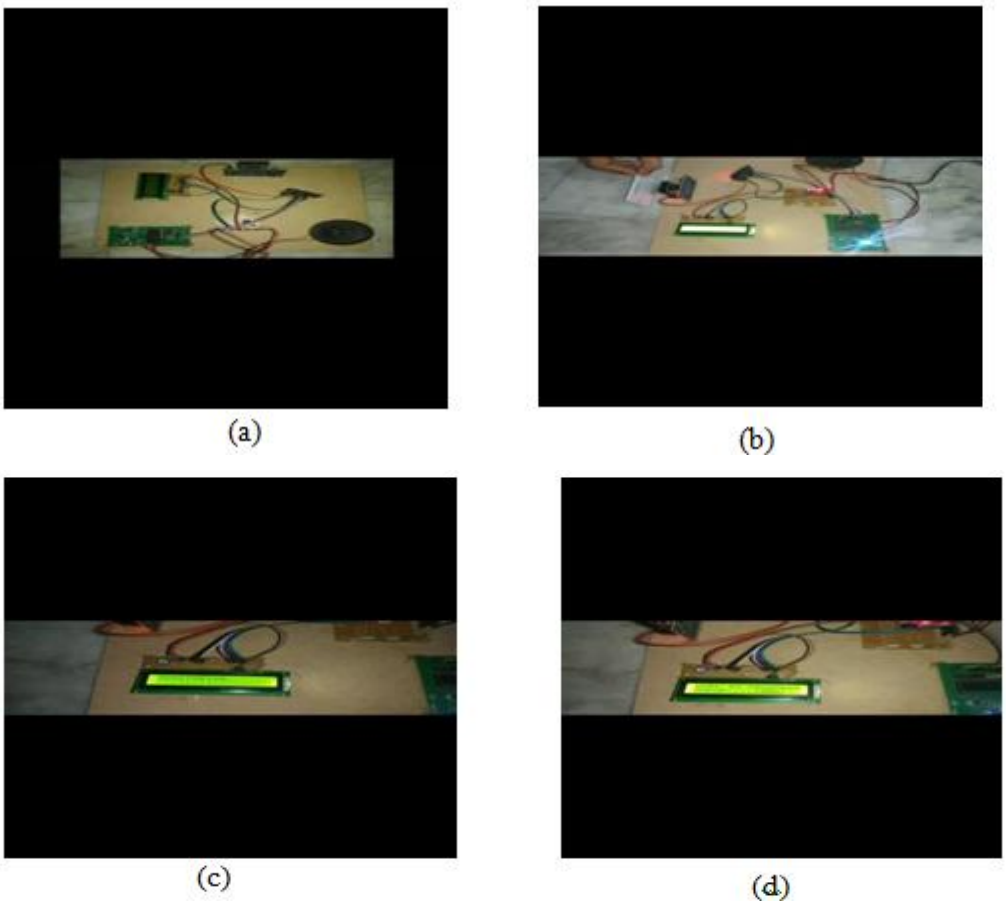

Figure 3 a) Proposed Hardware Prototype, b), c) and d)

shows the output display for detection of RFID tags the voice play back module. The microcontroller then activates the voice module. When that exact tag is recognized, the driver will be warned by the voice. We utilize five tags in this example: speed breaker, work in progress, railway track, school zone, and petrol bunk. The board indicator will be shown on the LCD in text format at the same time.

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VI. Conclusion

Many features of a digital electrical circuit may be learned by implementing the above-mentioned system. This will offer the entire understanding of designing microcontroller-based system and building embedded software. Using ZigBee modules, the signal from the microcontroller to the display and speech system may be made wireless. Furthermore, the requirement for an additional LCD may be avoided by creating a display at the bottom of the existing music and navigation system already installed in the vehicle using Visual Studio Software. Tablet PCs can also be used to replace the entire console.

VII. Future Scope

1. The signal from microcontroller to display and voice system can be made wireless by using ZigBee modules.
2. Also, the need of extra LCD can be eliminated by making the display in the bottom of existing music and navigation system already installed in vehicle using Visual Studio Software.
3. The overall console can also be replaced by Tablet

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Underground Cable Fault Detection Using IOT

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Abstract

With the growth of the power system grid, underground cables have been frequently employed. Subterranean cables are susceptible to a wide range of defects as a result of underground environments, wear and tear, and rats. Detecting the source of the problem is challenging since the complete line must be excavated in order to examine the fault at the cable line. The repairmen know exactly which portion is faulty, and only that region needs to be dug up to find the cause of the problem. As a result, it saves time and money while also allowing for speedier service of subterranean cable lines. The goal of this research is to calculate the distance in kilometers between an underground cable fault and a base station.

Key Words: Underground, Fault Detect, Money, Repairman

I. Introduction

POWER supply networks are expanding at a rapid pace, and their dependability is becoming more critical than ever. The whole network's complexity includes various components that can fail and disrupt power delivery to end users. Underground cables have been utilized for many decades for the majority of the world's low voltage and medium voltage distribution lines. Underground high voltage cables are increasingly being utilized since they are not affected by weather conditions such as severe rain, storms, snow, and pollutants. Even though cable production technology is always improving, there are still factors that might cause cables to break during testing and operation. A cable in good condition and properly placed can endure for around 30 years.

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Cables, on the other hand, can be readily damaged by faulty installation or badly executed jointing, as well as later third-party damage by civil works such as trenching or curb edging. Fault in cable is defined as any flaw or inconsistency produced by conductor breakage, insulation failure, and weakness or non-homogeneity that impacts cable performance. A cable is a bundle of electrical conductors used to transport power. An underground cable typically includes one or more conductors that are insulated and protected by a protective cover. Insulation materials that are commonly utilized include varnished cambric and impregnated paper. A fault in a cable can be any imperfection that disrupts the cable's performance route. As a result, the error must be corrected. Power transmission can take place via both overhead and subterranean lines. However, unlike subterranean cables, overhead wires are vulnerable to the impacts of rainfall, snow, thunder, lightning, and other natural disasters.

This necessitates cables with enhanced dependability, safety, durability, and serviceability. Underground cables are favored in many regions, particularly in cities. When it is simple to discover and fix problems in an above line, it is impossible to do so in an underground cable. It is difficult to identify problems in them since they are buried deep in the earth. Even when a defect is discovered, it is extremely difficult to detect the fault. This necessitates debugging the entire region in order to discover a defect between two subsection units, resulting in a waste of money and effort.

II. Literature Review

In this paper [1], Fourier analysis is used to analyze underground power cables with the goal of detecting faults and determining the average life of the cable. In this experiment, three types of cables are used: a regular cable, a shorted cable, and a cable with holes. In each example, the impedance is calculated and Fourier transformed such that the resulting impedance magnitude and phase may be evaluated in the frequency domain. To minimize interference, several windowing techniques are applied to the experimental data. The impedance data obtained from both the transmitting end voltage and the differential voltage is then subjected to Fourier analysis.

Power Technologies, Inc. (PTI) created an expert system and on-line adviser for the Electric Power Research Institute (EPRI) (EPRI). The system, FAULT, provides guidance for field crews to diagnose a cable failure, recommend applicable fault location techniques, and trouble-shoot resulting difficulties which occur during the process of locating underground cable faults on transmission and distribution cable systems. This article [2] presents the fault location methodologies discovered during the development of the expert system, as well as utility statistics from an underground cable fault location study.
This paper [3] is about a robot that we created that can locate the source of the complaint so that the engineer may dig a hole at that location and solve the problem. The basic principle of Electromagnetic Theory is used to detect the cable discontinuity. A low frequency signal is sent into the wire via a signal injector, and the generated magnetic field is utilized to detect the defect

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III. Existing System

Underground cables are prone to a wide variety of faults due to underground conditions, wear and tear, rodents etc. Also detecting fault source is difficult and entire line is to be dug in order to check entire line and fix faults. So here we propose cable fault detection over IOT that detects the exact fault detection.

IV. Proposed System

Normally, power is transmitted using subterranean wires. If that cable sustains any damage, we must inspect it from beginning to finish. If a dam breaks, we must excavate the entire palace, which costs time and money, and the entire system is inaccurate. Because the procedure requires a large number of people, all of the flaws in the current system have been addressed. The goal is to use IOT and a microcontroller board to detect the cable problem and its distance. When a fault arises in the current situation, finding the source of the fault is difficult, and the whole line must be excavated in order to inspect and repair the faults. The major goal is to detect the issue from a short distance away in order to save time. As a result, the trouble of excavating the entire line is avoided. The main concept is to read voltages from various locations utilizing subunits. As a result, it will detect the issue using the sub unit. In this implementation, we use four node units in a transmission line and create it with the help of wires. If a problem occurs, the following subunit will be unable to update its status. As a result, the fault will extend from that location to the next subunit. From anywhere in the globe, we will be able to view the status of all units on a single IOT website.

V. Implementation

A. Hardware Requirements:

- Arduino Micro Controller
- Lcd Display.
- GSM
- Cable lines
- Relay
- Power supply

B. Software Requirements

- Arduino ide
- Proteus

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C. **Block Diagram**

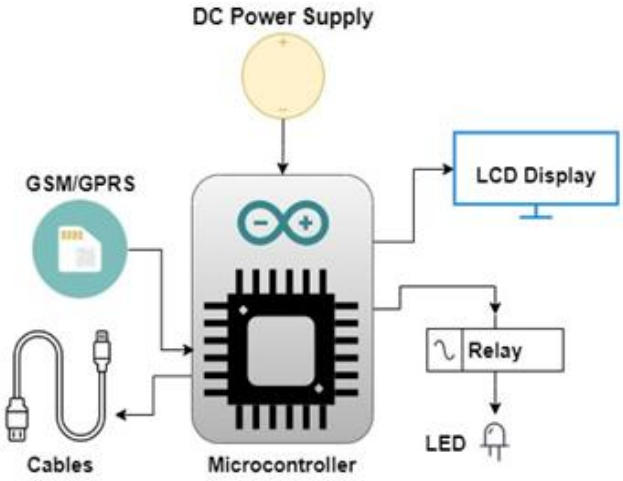

Figure.1 Block diagram of proposed system

D. Component Description:

Arduino Microcontroller:

1. AVR® 8-Bit Microcontroller with High Performance and Low Power
2. RISC Architecture (Advanced RISC Architecture)
3. 131 Intuitive Instructions - The Highest Single Clock Cycle Execution
4. General Purpose Working Registers, 32 x 8
5. Operation in a completely static state
6. At 20 MHz, up to 20 MIPS throughput is possible.
7. Multiplier with two cycles on-chip High Endurance Non-volatile Memory Segments
8. In-System Self-Programmable Flash programme memory of 4/8/16/32K bytes
9. EEPROM (256/512/512/1K bytes)
10. Internal SRAM: 512/1K/1K/2K Bytes
11. Cycles of write/erase: 10,000 Flash/100,000 EEPROM
12. Data retention: 20 years at 85 degrees Celsius/100 years at 25 degrees Celsius (1)
13. Software Security Programming Lock

Arduino is a free and open-source prototyping platform with simple hardware and software. Arduino boards can read inputs such as a light on a sensor, a finger on a button, or a Twitter tweet and convert them into outputs such as starting a motor, turning on an LED, or posting anything online. Arduino has been utilized in millions of different projects and applications because to its easy and accessible user experience. The Arduino software is simple enough for novices to use while still being versatile enough for expert users. It is compatible with Mac, Windows, and Linux. It is used by teachers and students to create low-cost scientific equipment, to demonstrate chemistry and physics principles, and to get started with programming and robotics.

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Figure 2 Aurdino

Lcd Display

Two lines of sixteen characters each make up an LCD screen. A 5x7 matrix makes up every character. The difference in display is determined by the facility's power supply and whether or not messages are displayed in one or two lines. As a result, the Vee pin receives a fluctuating voltage of 0-Vdd. For this reason, a trimmer potentiometer is commonly employed. Backlights are included into several display models (blue or inexperienced diodes).

Figure. 3 LCD display

GSM Module: -

GSM (Global System for Mobile Communications) is a cellular network, meaning that mobile phones connect to it by looking for nearby cells. GSM networks use four different frequency bands to communicate. The 900 MHz and 1800 MHz bands are used by most GSM networks.GSM-900 uses 890–915 MHz for uplink and 935–960 MHz for downlink, with 124 RF channels separated at 200 kHz. 45 MHz is used for duplex spacing.

Figure 4 GSM Modem

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RELAY

A power relay module is an electrical switch that is operated by an electromagnet. ... Held in place by a spring, the armature leaves a gap in the magnetic circuit when the relay is de-energized. While in this position, one of the two sets of contacts is closed while the other set remains open.

Figure: 5 Relay

Working of Project

A system is created that includes a microcontroller, an LCD display, a Fault Sensing Circuit Module, a Wi-Fi Module, and a suitable power supply arrangement with controlled power output. The relays, which are linked to the microcontroller, detect current in the circuit. The fault detection circuit is built using a series of resistors and switches connected to each resistance. The proposed system is simulated and tested using PROTEUS version 8.1, and the hardware

Advantages

- Less maintenance
- It has higher efficiency
- Less fault occur in underground cable This method is applicable to all types of cable ranging from 1kv to 500kv
- It can detect other types of cable fault such as Short circuit fault, cable cuts.
- Resistive fault, Sheath faults, Water trees, Partial discharges.

VI. Results

Underground high voltage cables are increasingly being utilized since they are not affected by weather conditions such as severe rain, storms, snow, and pollutants. Even though cable production technology is always improving, there are still factors that might cause cables to break during testing and operation. A cable in good condition and properly placed can endure for around 30 years.

Cables, on the other hand, can be readily destroyed by faulty installation or badly executed jointing, as well as later third-party damage by civil works such as trenching or curbing. The main power source will be applied to a step-down transformer, resulting in a drop in power. The power will be applied to the rectifier bridge in order to convert alternating current to direct current. The microcontroller checks the status and sends the data to the cloud. We utilize four node points and check the status on the LCD to see which node had problems, which is then posted on the Things Speak website.

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Figure 6 Figure showing underground fault detection setup

Figure 7 Figure showing LCD displays which node has fault and essage received from GSM Modem

Figure 8 Figure showing the IOT analysis when it detects the fault at node

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VII. Conclusion

The work automatically sends data about a defect to the cloud using an Atmega328 and an ESP8266 Wi-Fi module in a website or IOT application. Underground high voltage cables are increasingly being utilized since they are not affected by weather conditions such as severe rain, storms, snow, and pollutants. Cables, on the other hand, can be readily damaged by faulty installation or badly executed jointing, as well as later third-party damage by civil works such as trenching or curb edging. A fault in a cable can be any imperfection that disrupts the cable's performance route. As a result, the error must be corrected. Underground cables are favored in many regions, particularly in cities. We can use this method to pinpoint the location of a defect in a cable that is buried underground. As a result, this approach does not necessitate the debugging of the entire region in order to discover the issue. As a result, both expense and personnel are decreased. The advantages of a defect are that it may be repaired quickly, restoring power to the system and improving system performance. It saves operational costs and the time required to discover issues in the field. The Arduino microcontroller operates dependent on the state of the power source. The IOT module is critical because it allows it to quickly update the status of IOT and numerous substations, which can be done using a single IOT app. We will utilize voltage reading sensors and increase node points in the subsequent implantation procedure, and we will verify all of the readings from the cables to find any defects that have happened. As a result, the procedure will be more precise

VIII. Future Scope

In this project we detect the exact location of short circuit fault in the underground cable from feeder end in km by using arduino. In future, this project can be implemented to calculate the impedance by using a capacitor in an AC circuit and thus measure the open circuit fault..

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Zigbee Controlled Floor Cleaning Robot

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Abstract

Cleaning is an important element of healthy living because it is only through cleaning that we can develop our personalities by keeping them clean both externally and internally. This comes in handy for scrubbing wet flooring. Cleaning the floor is important for our health, and floor cleaning equipment decreases the amount of effort required. As a result, we can use this proposed project in our daily lives. It has a very simple design and is simple to operate; anyone can use it. This floor cleaning equipment has a sponge mop, swiping brushes, and a fan to cut cleaning time in half. This machine is also inexpensive in general. These machines are commonly employed for this purpose, but they operate on different principles and are quite expensive. Floor cleaning machines have grown in popularity in recent years as a cost-effective way to clean a vast area in a short amount of time. However, India, as a developing country, need a significant number of these machines to meet its cleaning demands.

Key Words: zigbee, floor cleaning, ROBOT, cleanliness.

I. Introduction

The research paper's main purpose is to design a robot that reduces a person's effort in scrubbing and sweeping while also finding a way to overcome the disadvantages of previous cleaning methods. Sweepers were used to sweep the floor and roads manually in the manual operation. People will take a long time to do their cleaning work, and they will also experience health issues such as back discomfort, shoulder pains, and so on. Scientists

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devised the "Vacuum Cleaner" to solve the aforementioned issues. It can also be used to clean. People that use this cleaner face issues such as lifting it and moving it around the house. It's also nearly impossible to move a vacuum cleaner up and down stairwells. Large-scale vacuum cleaners were produced. Our electricity cost would rise from hundreds to thousands of rupees based on the vacuum cleaner model we choose. To address the aforementioned issues, a cleaning robot has been devised and developed that is

II. Literature Review

In today's world, Cleanliness having a great importance. We can keep our bodily and mental health clean with the help of cleanliness, and this will make us feel better. There is no dirt, dust, stains, or foul odours in a clean environment. Health, beauty, the absence of objectionable odours, and the prevention of dirt and toxins spreading to oneself and others are the purposes of cleaning. [1] The study describes the appearance, development, and fabrication of a programmed cleaner robot. This sort of robot has additional characteristics such as to choose and place mechanism and a dirt container with an air vacuum mechanism. This form of work is simple and beneficial to the betterment of humanity's life variety.[2] Offered a thorough analysis of the technology benefits that have aided in the real world for the convenience of nearly everyone who is incredibly busy. As a result, the goal of building an automatic home appliance has emerged. The review comprises a computerized cleaner with DC motor- driven wheels, a dustbin, a cleansing brush, and a mop clean. The automatic floor cleaner is a system that uses a highly stabilized and fast functionalized electronic and mechanical control system to clean the floor. While designing the robot, we must first evaluate how domestic service robots can be utilized for cleaning, and then we must consider how the robot will fit into our home [3].

III. Existing System

The existing system includes Bluetooth technology to connect the robot to the sweeper, which has the disadvantage of covering a short distance and not being able to clean long floors. All of these flaws will be addressed in the proposed system, which includes a camera for monitoring.

IV. Proposed System

We developed the robot to make the task easier, and it is designed to clean houses, offices, apartments, cellars, and even streets. The robot is being watched by someone who is positioned far away from the cleaning area. The robot is being watched by someone who is positioned far away from the cleaning area. DC motors, servo motor brushes, scrub, LED light, battery, water pump, Arduino and Zigbee for wireless connection, as well as a mobile phone, are all included in this design. To control the robot, we are using zigbee wireless connection.

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V. Implementation

A. Hardware Requirements

- ARDUINO Microcontroller
- Zigbee
- L293d motor driver ic
- Dc motors
- Relay
- Dc fan
- Pump motor
- SERVO MOTOR

B. Software Requirements

- Arduino ide
- Proteus

C. Block Diagram

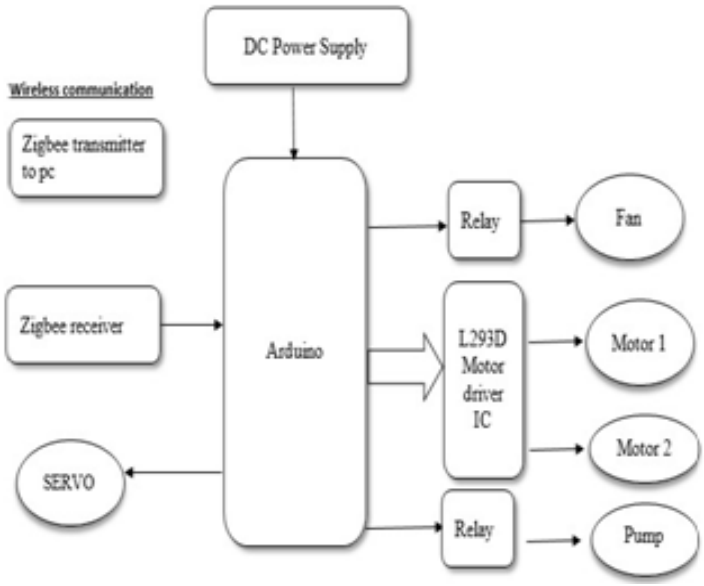

Figure 1 Block diagram of proposed system

D. Component Description:

Arduino Microcontroller:

- The Arduinouno is a microcontroller board based on the ATmega328P.
- It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, 1 UART (hardware serial port), a 16 MHz crystal oscillator, a USB connection, a power jack, an ICSP header, and a reset button. It comes with everything you'll need to get started with the microcontroller; simply plug it into a computer with a USB cable or power it with an AC- to-DC adapter or battery.

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Figure 2 Arduino uno

ZIGBEE:-

- IEEE 802.15.4 true single chip a pair of.4 giga cycles per second
- Electronic baseband equipment for the DSSS with a 2MChips/s effective rate and a 250 kbps effective rate.
- Suitable for all RFD and FFD operations
- Low supply voltage (2.1–3.6 V) with built-in transformer.
- With an external transformer, a low offer voltage (1.6–2.0 V) can be achieved.
- Programmable output power

Figure 3 Zigbee module

Motor Driver IC:-

The L298N module is a twin full-bridge motor driver module with high voltage and current for controlling DC and stepper motors. It can control the rotation direction as well as the speed of two DC motors. An L298 dual-channel H-Bridge motor driver IC is used in this module. The speed and rotation direction of the DC motors are controlled using two approaches in this module. PWM is used to control speed, and H-Bridge is used to control rotation direction.

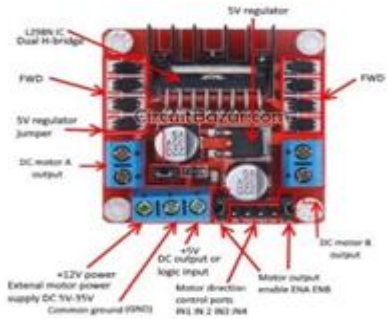

Figure 4 Motor driver

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DC Motor

A DC motor is one that runs on DC electricity. Michael Faraday's homopolar motor (which is unusual) and the ball bearing in motor (which is (so far) a novelty) are two examples of pure DC designs. Brushed and brushless DC motors are by far the most common, and both use internal and external commutation to generate an oscillating AC current from a DC source, so they aren't strictly DC machines.

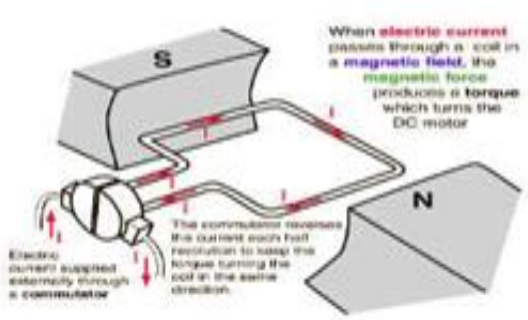

Figure 5 DC Motor internal view

Relay Module

A relay is indeed a device whose operation is controlled on electricity. The unit is made up of a set of input terminals for a single or multiple control signals, as well as a set of functioning touch terminals. Any number of contacts of any contact type, such as create contacts, split contacts, and combinations of the two, can be found on the switch.

Figure 6 Relay module

DC Fan

A DC fan, also known as a direct current fan, is powered by a transformer. The energy is subsequently converted to direct current, or one-way current, via the transformer. As a result, the amount of power used is reduced in the end.

Figure. 7 DC fan

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Pump Motor

- Operation is as simple as plugging it in and turning it on.
- It can run on any 12 volt DC power source, such as a power bank.
- Heavy-duty 1.6-meter cable with DC jack
- Pumping capacity of 240 liters per hour
- 3M Max Head (Lift Height)
- DB of noise: 40dB (most 35dB).
- IP68 is a water-resistance rating (can be submersible installed).
- More than 30000 hours of life expectancy.
- Solar panel, DC electric source, and battery for power.

Figure 8 pump motor

Servo Motor

- In most cases, the operating voltage is +5V.
- Torque: 2.5kg/cm
- Operating speed: 0.1s/60°
- Torque: 2.5kg/cm
- Speed: 0.1s/60°
- Gear Type: Plastic
- Rotation: 0°-180°

Figure 9 servo motor

Working of Project

In this work, we use Zigbee to operate the robot, with one zigbee at the transmitter and another zigbee at the receiver. By transmitting orders from a PC while maintaining the minimal distance required by the Zigbee committee for data transfer. According to the

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instructions, the robot will begin functioning in the following directions: forward, backward, left, right, and stop. The Arduino is a microcontroller board that uses the ATmega328 microcontroller. There are 14 digital input/output pins (six of which can be used as PWM outputs), six analogue inputs, a 16 MHz ceramic resonator, a USB connection, a power jack, an ICSP header, and a reset button on the board. The Zigbee module will be connected to the Arduino microcontroller via RF wireless communication. The robot is set up with a cleaning kit that is connected to the servo motor. We need to send a command to start the scrubbing while controlling the robot directions, and then we need to control as per our requirements. The pump motor will also be turned on, and a tiny amount of water will flow. A tiny fan will also be connected to dry the floor at the same time. The stats will also be sent to the PC as a reply, allowing us to check the robot's response if the robot is not visible. A wirelsess cam is also interfaced to the robot for monitoring, and we use the software v380 pro to keep an eye on the surroundings.

Advantages

- Cleaning does not necessitate the employment of a separate individual
- It is simple to use and operate

Applications

- Cleaning floors
- Grass cutting
- Wireless applications

VI. Results

Figure 10 Figure showing floor cleaning robot model

Figure 11 Figure showing water motor and dc fan used for water pumping and floor cleaning

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Figure 12 Figure showing view of the cleaned surface

VII. Conclusion

This study report explains how to clean a floor effectively with sweeping and mopping activities. It lowers labor costs, saves time, and produces effective results. This robot will be used for a variety of tasks.

VIII. Future Scope

This system can be upgraded in the future by employing GSM technology for longer distances, and we will integrate ultrasonic sensors and obstacles detection to make it automatic.

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An IOT based Agricultural Crop Monitoring and Protection System from Heavy Rains using Rain Shield

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Abstract

Horticulture is the main thing for basic need i.e., food for all nations on the planet. In this agribusiness even water plays a major role. The mechanized water system and harvest field checking framework is utilized to advance the utilization of water asset for agribusiness. The whole system comprises of sensor network for humidity, temperature, soil moisture sensors and downpour sensor are utilized in this system. Moisture and humidity sensor are set in the agribusiness field. And downpour sensor is utilized for the programmed roof. The microcontroller of the regulator unit is customized with edge up sides of the temperature and moisture levels. The regulator unit controls the water system engine consequently controlling the water stream to the field. This task is mostly centered around further developing the agricultural fields yield by furnishing an observing framework with viable and proficient use of water asset. In the event that moisture sensor distinguishes dryness in the field, the water engine will be on. If downpour sensor recognizes the downpour the programmed rooftop will open. The status of sensors checked through page i.e., thing speak site and water engine is controlled dependent on the dirt moisture sensor status.

Keywords : Horticulture, agri-business, crop protection

I. Introduction

Farming plays a major role in our country. A large number of people in India relies upon horticulture. About 58% people relies just upon agriculture. GDP approximately equal to 38% of Indian economy is by horticulture. It depends upon storm and precipitation, so it is as yet being worked on. Selection of better water system and logical strategies helps in good progress of horticulture. Nursery, polyhouse sort of improved and ensured technique assists with yielding more. Indeed, even agribusiness is embraced my numerous individuals in India, yet creation rate is less. Comparing to nations like USA, China, Germany and Italy we produce small amount of food grains, and we are bringing in food grains from those counties. In the event that we needed to procure more benefit from horticulture, we should embrace current cultivating procedures, for example, Greenhouse cultivating (polyhouse cultivating),

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aquaculture cultivating and so forth Government is likewise promising these sorts of present-day advancements to expand the yield and give assets through various plans. Focal government give endowment, credit for nursery, penny polyhouse, conceal net house plan to empower present day strategy for horticulture. The public authority is constantly putting forth attempts to foster agribusiness area. Nursery is a design with dividers and rooftop comprised of straight forward material, like glass or clear things. According to plant requirement the climatic condition is set in green house structure. There are many designs and sizes of green house including small sized sheds to big like mechanical structures.

Here by using updated technologies, we are designing an automatic greenhouse system which prevents spoilage of crops due to heavy and uneven rainfall. It has a roof which can automatically close in presence of heavy and open during the conditions specified by the user. Roof can be controlled automatically. This system can monitor different conditions like humidity, moisture suitable for a growth of plant specified by the user.

II. Literature Review

In some regions the water supply is not sufficient, in those regions there is necessity of preserving the water for agriculture. Conserving of rainwater helps in various agricultural needs. This can be achieved using rainwater harvesting and other advanced irrigation techniques helps in better use of water. The main key to overcome is to establish a various domain of concern such as land, farm, water tank etc. [1] Many advancements took place in irrigation techniques like drip irrigation etc…In the initial stage the project cost is high due to taxes to farmer is more in the form of levy.

The use of IOT to monito temperature, humidity and moisture in the soil of agricultural land. Due to weather variations, a large number of crops have been damaged. Sensor capture more precise field data and detect numerous characteristics in the soil, such as temperature, moisture and humidity content which aids in the reduction of difficulties in the agricultural field [9]. To identify an object, such as crop, as well as to facilitate communication by transmitting and receiving data RFID technology is used. The quantity of water supply to crop can be determined by moisture sensor which measures moisture content and sends data to RFID, allowing to turn on and off the water source.

III. Existing System

The existing system is a GSM based remote control system. It can automatically irrigate the field based on readings of temperature and humidity from sensor and it sets the irrigation time. Information is collected via SMS on GSM network. Here the microcontroller chip contains Bluetooth module to reduce SMS charges. This design gives information like dry running motor, water content, temperature, smoke via SMS on GSM network or by using Bluetooth.

IV. Proposed System

Here an automatic system is developed and deployed. We introduce a new wireless which is a design of embedded web server making use of WIFI module and internet of things. The automated irrigation has the sensor network built using soil moisture sensor, rain sensor and humidity sensor. If moisture sensor detects dryness in the field, the water motor will be

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ON. If rain sensor detects the rain the automatic roof will open. The status of sensors monitored through webpage i.e., things peak site and water motor is controlled by the the soil moisture sensor status.

The methodology of the proposed system can be given by below block diagram

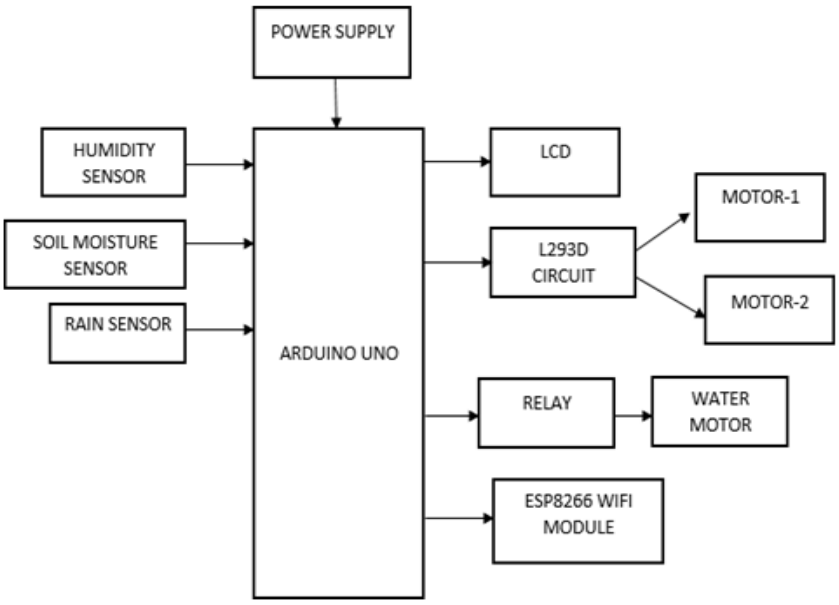

Figure 1: Blocks present in proposed system

V. Module Description

Arduino Uno:

Arduino Uno is an open-source microcontroller card based on the Microchip ATmega328P microcontroller developed by the company. The card consists of digital and analog input/output (I/O) pin groups, which can be connected to different expansion cards (shield) and other circuits. It has 14 digital I/O pins in which 6 are PWM outputs, 6 analog I/O pins, and can be programmed by using Integrated Development Environment (IDE) via USB. It accepts voltage ranging from 7 to 20V and can be powered by using USB cable or external battery of 9V. It resembles Arduino Nano and Leonardo. The hardware design has been licensed in the same way as Creative Commons Attribution 2.5 license. It can be found on the Arduino website. Design and manufacturing files are also available for some hardware versions.

Figure 2: Hardware component Arduino uno

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Wifi Module

The ESP8266 WLAN Wi-Fi module consists of Transmission control and Internet protocol stack, through which each microcontroller can access your WLAN network. By using this we can host APP or load all Wi-Fi network functions from another APP processor. Each module has been pre-programmed by using AT-command Suite firmware, which means you can plug it into an Arduino device and have as many Wi-Fi functions as a Wi- Fi screen (ready to use) The ESP8266 module is a lucrative circuit board with a large and steadily growing community.

Figure 3: ESP266 module

Soil Moisture Sensor:

It is one type of sensor used to check the volumetric substance of water inside the soil. These sensors measure the volumetric water content by even considering some other guidelines of soil like dielectric consistent, electrical opposition, in any case cooperation with neutrons, and substitution of the moisture content.

Figure 4: Soil moisture sensor

Rain Sensor

A rain sensor is a switching device which is used to detect the rainfall. In case of rain the switch will be closed and will be opened if there is no rain.

Figure 5: Rain sensor

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DHT11 Sensor

It is commonly used to measure temperature and humidity. This sensor consists 8-bit microcontroller to give temperature and humidity values as serial data. It can be interfaced to different microcontrollers.

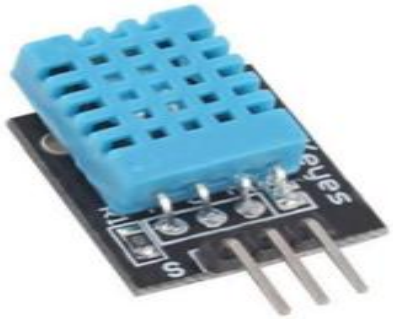

Figure 6: DHT11 sensor

VI. Results

The system was designed according to the requirements and here the results are obtained and is shown in below figure.

This system mainly focuses on small crops. Here we set the moisture condition to 100. If it is more than 100 then it will automatically turn OFF the pump or it turns ON in-case of vice-versa. The main objective of this system is to avoid loss of crop and to increase yielding even it is in-case of heavy rain. The rain sensor used here notifies presence of rain. If it rains the roof on the top will be closed to protect crop and stops the irrigation process. It also collects rain water which can be used for other purposes.

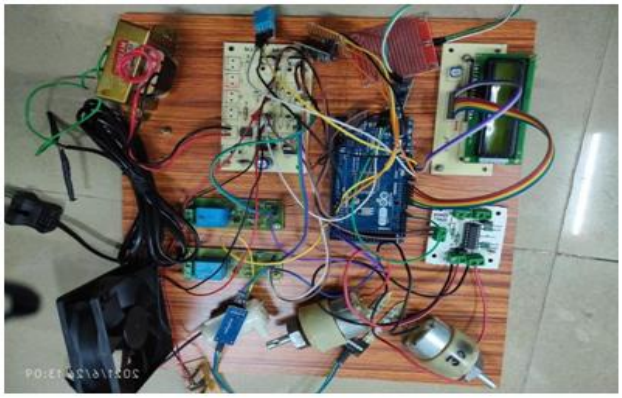

Figure 7: Hardware Setup

Moisture sensor measures the moisture content in the soil. If the moisture level is normal then we can say that there is sufficient amount of water is present in the soil, if the moisture level is below the normal value, it indicates that the soil is dry, in that case the motor pump will automatically waters the field. The humidity sensor analyses the moisture levels in air and displays it on LCD, it also measures temperature and displays on LCD. The rain sensor detects presence of rain and automatically closes the crop with roof on the top and will be open if it's not the case.

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VII. Conclusion

Here the main intention is to protect the crops and improve the productivity. Deploying the idea of roof of the greenhouse protects the crop in any climatic conditions. The IOT makes this idea simple and to deploy in a easy way which is even cost effective to farmers and reduce man-power.

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High Speed Three Operand Adder using Kogge-Stone Adder

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Abstract

A three-operand adder is implemented using the parallel prefix adders which reduces the delay of the addition. The previous adder structures are compared with the critical path of the carry propagation was considered for a new logic implementation. Here, in the parallel prefix adder structure a high-speed adder called as Kogge-stone adder is used in the addition process. Then the modified three operand adder achieves better performance compared to the previous adders. The logic is implemented in Verilog HDL language and design is implemented in Xilinx ISE design suite. The modified method performance better in terms of delay. These are the suitable adders in the applications of digital circuits.

Keywords: Kogge-Stone adder, Ripple carry adder, Parallel Prefix adder

I. Introduction

These also required for building multipliers for multiplication result. As mostly arithmetic block consumes more power. So, The devices with less switching noise and low power consumption are preferred.

In normal adder, the addition of bits depends on the sum produced by the previous bits and bred carry is propagated to other position. CAC raises corns on the speed due to the peers of carry propagation and hence this is considered as major problem. Ripple carry adder (RCA) is array of full adders. Full adders are used for the summation of more than two numbers. In RCA the bits are proliferated from less to high bits.

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In RCA the carry is propagated to the next full adders and the sum is obtained from full adder block and carry is propagated to next full adder. To reduce the delay, carry look ahead adder is used to improve the performance of the design.

A conventional CSLA uses a pair of RCA that generates sum and carry bits based on the carry-in (Cin) bits, such as Cin = 1 and Cin = 0. The Final add and Cout bits are then selected by a multiplexer once the correct Cin is known. The CSLA is not area efficient because it uses dual pair of RCA to generate sum and carry. To overcome this, CSLA is altered by replacing lower RCA block with BEC to achieve low power consumption and less area.

The operands for summation can be multiple bits, thus the output and input be more number of bits. These are represented by simply consists of a compressor tree, that certainly reduces the propagated carry and partial sum. There are different types of MTA like (Wallace, Overturned-stairs and Balanced delay) tree adder. For any summation, these are necessary components because of its the delay involved and in reserve consumption processing. These are also the other resource intensive component of summation circuits. The delay and energy efficiency of the BTA structure be contingent on the enactment of these adders used for this structure.

Among all adders, ripple carry adder has less energy and area having higher delay, whereas other adders are having quite less than these. On the other hand, energy and area are the two foremost constraints which demand the summation of multiple number of operands. The BTA employed in the system should be mostly energy efficient and area.

II. Literature Survey

The main motive of the TAC was to find the input causing and the worst path of these combination which are stored in ROM. A.N. Jayanthi et al. work on, "Comparison of performance of high-speed VLSI adders", modified adder design for all the adders and the comparison is made in terms of delay.

Mang et al. Hence, multiple parallel prefix adder structures are implemented to the performance of the design and to reduce the delay. et al. work on, "Improved Fault Tolerant Sparse KOGGE Stone ADDER", modified a method for error correction and also error detection was possible. The first work had only error correction which used Kogge Stone configuration. Several modifications are introduced in the design; the error recovery time is reduced by using a 16-bit register.

TMR-RC is effective method and simple for correction and fault detection but it upturns the tripling of the associated power dissipation and also area too. The addition register detects and correct the error in RCA.

Ladner & Fischer proposed a new parallal prefix adder which has logic level computation of log2N+1.The number of computational cells is given by (N/4*log2N). The kogge stone adder achieves lesser delay due to the carry generation and carry propagation through black and grey cells. To obtain this lesser delay long path is need for the stages and the prefix addition is also computed to reduce the delay. With the use of this adder little bit

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area is increasing but the critical path delay is gets reduced. Due to this new parallel prefix designs are implemented to reduce the area and delay of the adder architectures. Hence, multiple parallel prefix adder structures are implemented to improve the performance and reduce the delay. Then modified parallel prefix adders with different combinations came into existence and improves the performance of the addition operations.

III. Exisitng Work

The high-speed adders are achieved by using the parallel prefix adder structures which are came into existence with the carry look ahead adder and the carry propagation is reduced with the additional carry logic blocks. The carry select adder is the fastest adder but it requires large amount of area, due to the increase in size parallel prefix adders are proposed to reduce the area with slight reduction of delay. The parallel prefix adder structure has 3 steps namely,

a. Pre-processing
b. Carry generation, and
c. Post-processing.

BK adder offers asymmetrical loading on all intermediate stages, so it will increase the extend with common sense stage of 2log2N-1, where N is number of bits. BK adder will decrease RCA is retained in the modified shape and mux is used to pick out the one of the outputs from the BK adder or from RCA depending on the Cin. Then there is more delay in BK adder compared to others. And it uses less number of stages which reduces the area and power consumption.

It is observed that most of the work modified in the literature is mainly focused on to improve the design metrics of fast adders which can enhance the performance of WTA structure. On the other end, the BTA structure is regular and simple, which can be designed easily for N value, the delay of RCA-BTA can be improved by the minimisation of RCA delay, whereas the WTA performance can be increased by the use of fast adder at the final addition stage.

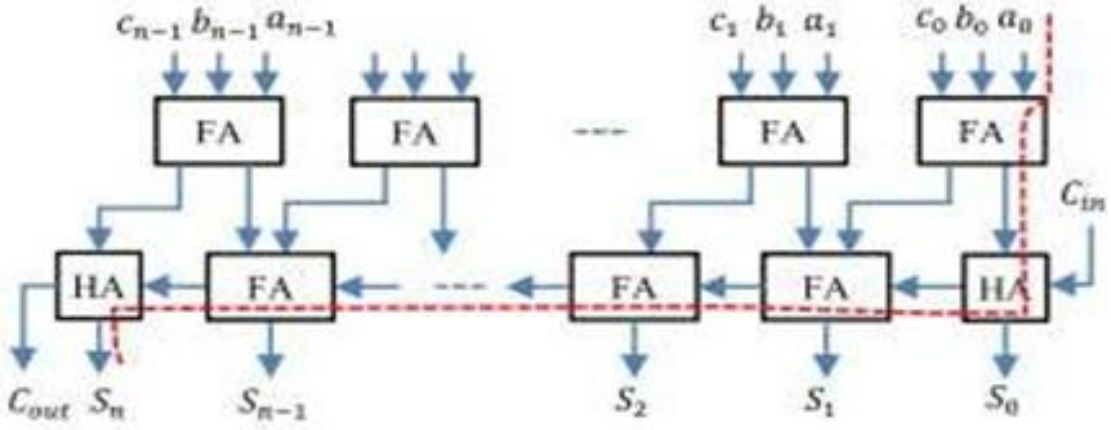

Figure 1: Three operand carry save adder (CS3A)

The three-operand summation is mostly used in LCG-based PRBG methods such as MDCLCG, CLCG, CVLCG and modular arithmetic architectures. It can be implemented by

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using one three-operand adder i.e., implemented by CSA or two-operand adders. It computes the summation of three operands in two stages. The first stage is array of full adders. Each full adder performs carry and sum bits from the inputs ai,bi,ci. Second stage is RCA that computes the sum and cout bits. The cout bits are propagated to full adders in ripple carry stage. Therefore, the delay increases.

IV. Modified Work

The modifies architecture uses new logic. The design of 16-bit adder is designed with the help of Ripple carry adders and Kogge-stone adder in which carry propagation is fast and achieves high accuracy. In the modified adder instead of using the general ripple carry adders we are generating the separate sum and carry in the ripple carry adders. The separate generation of sum and carry consumes the very less amount of time. Here the carry is not propagated to the next full adder. Hence the obtained 16-bit sum and carry are propagated to the kogge stone adder in which the general addition will perform. The KSA is considered because of its high- speed performance.

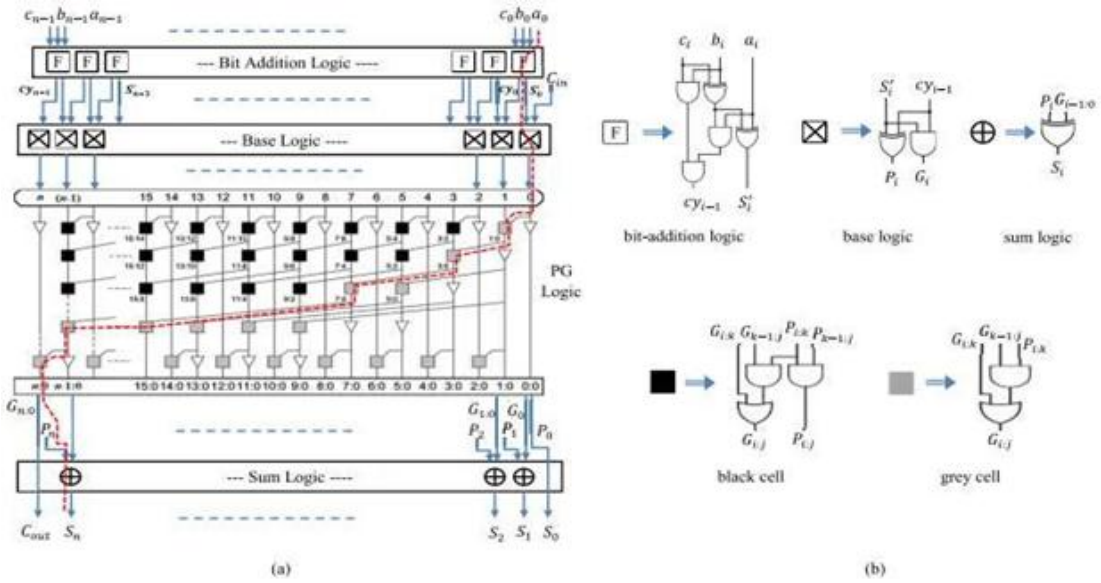

Figure 2: Modified three operand adder

a) First order VLSI architecture
b) Logic diagram of bit addition logic, base logic, sum logic, black cell and grey cell

The modified adder is compared with the different adders and this modified adder gives the better performance compared to the previous adders. This modified adder can add three operands which generals consume huge area and power consumption. In the modified adder it consumes comparatively less area and power. The modified is mainly focused on the speed of the design. The speed of the addition is done by the fast calculation and propagation of carry to the next bits. Hence this fast carry propagation is achieved by using the kogge stone adder. Hence by combining the both ripple carry adder and kogge-stone adder which achieves high speed addition.

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The modified adder of the three-operand binary adder and its internal structure is shown in fig 2. The new adder performs the addition in four stages. In first stage, bitwise addition is performed with array of full adders which computes sum and carry signals.

The number of computation stages for the modified adder is (log2 n+1), and therefore, the critical path delay of the modified adder is mainly affected by this carry propagate chain.

V. Results

A. Existing system

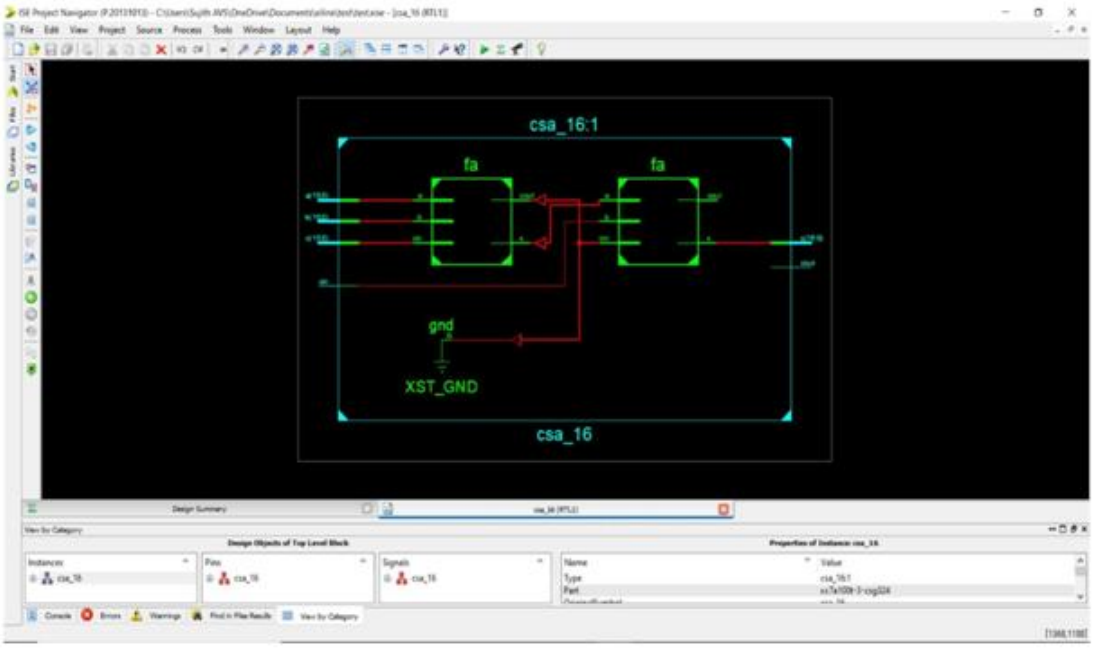
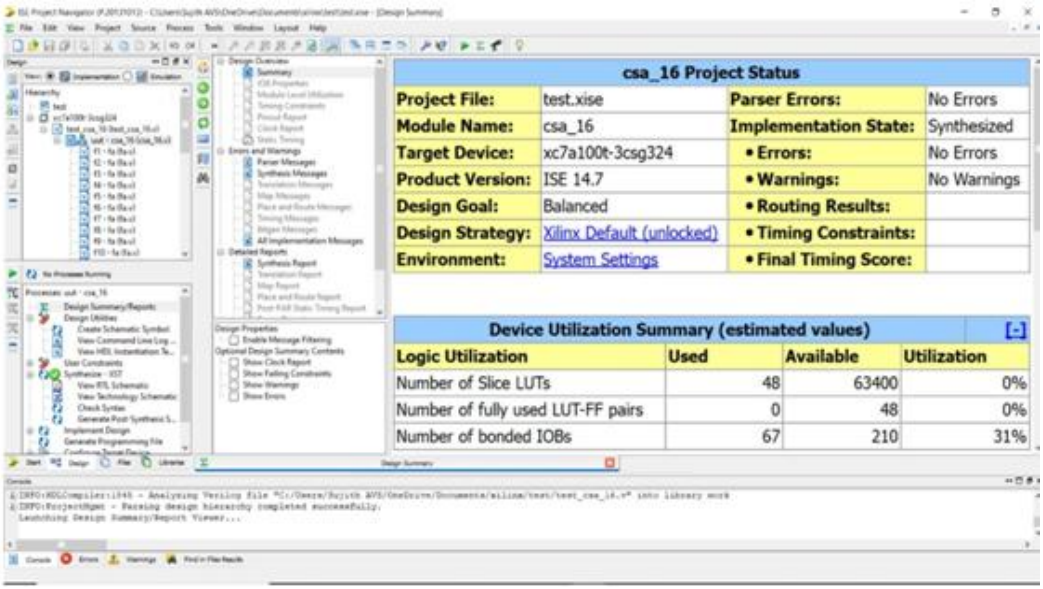


Figure 3: RTL schematic of the existing system



csa_16 Project Status

Project File:	test.xise	Parser Errors:	No Errors
Module Name:	csa_16	Implementation State:	Synthesized
Target Device:	xc7a100t-3csg324	• Errors:	No Errors
Product Version:	ISE 14.7	• Warnings:	No Warnings
Design Goal:	Balanced	• Routing Results:	
Design Strategy:	Xilinx Default (unlocked)	• Timing Constraints:	
Environment:	System Settings	• Final Timing Score:	

Device Utilization Summary (estimated values) [-]

Logic Utilization	Used	Available	Utilization
Number of Slice LUTs	48	63400	0%
Number of fully used LUT-FF pairs	0	48	0%
Number of bonded IOBs	67	210	31%

Figure 4: Device utilization summary of the existing system

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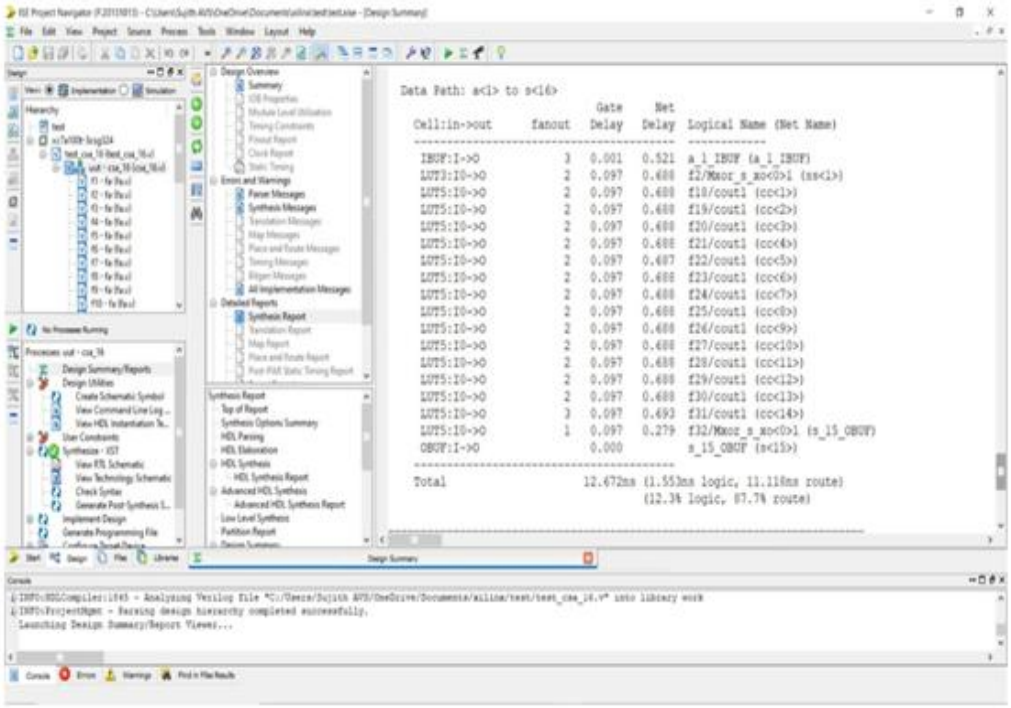

Figure 5: Delay report of the existing system

B. Proposed system

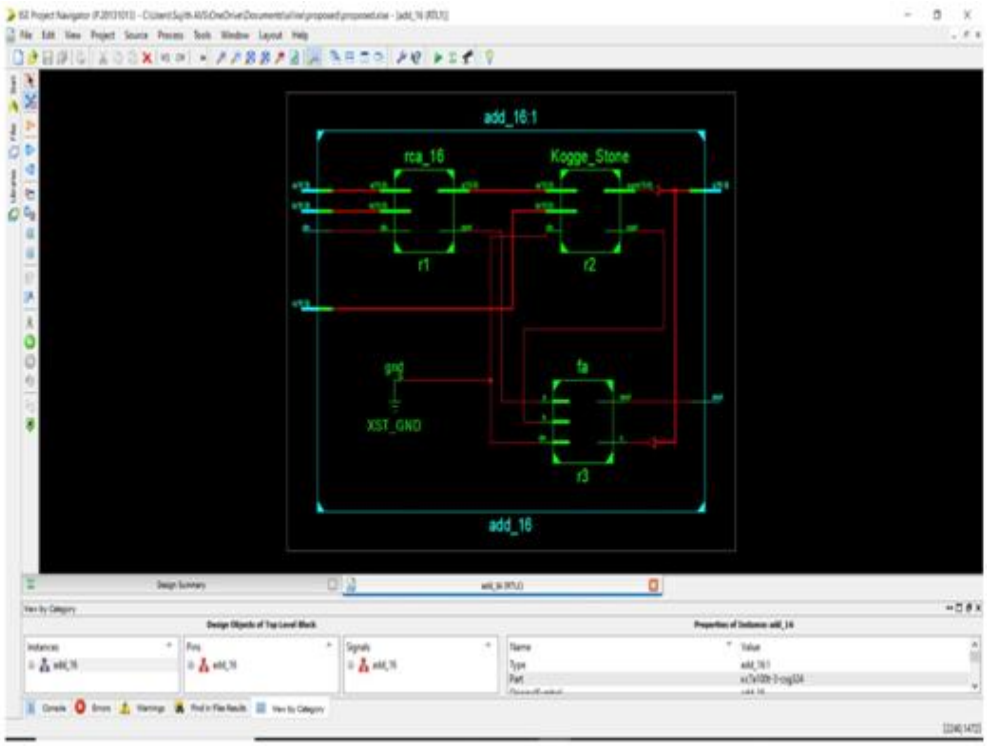

Figure 6: RTL schematic of the proposed system

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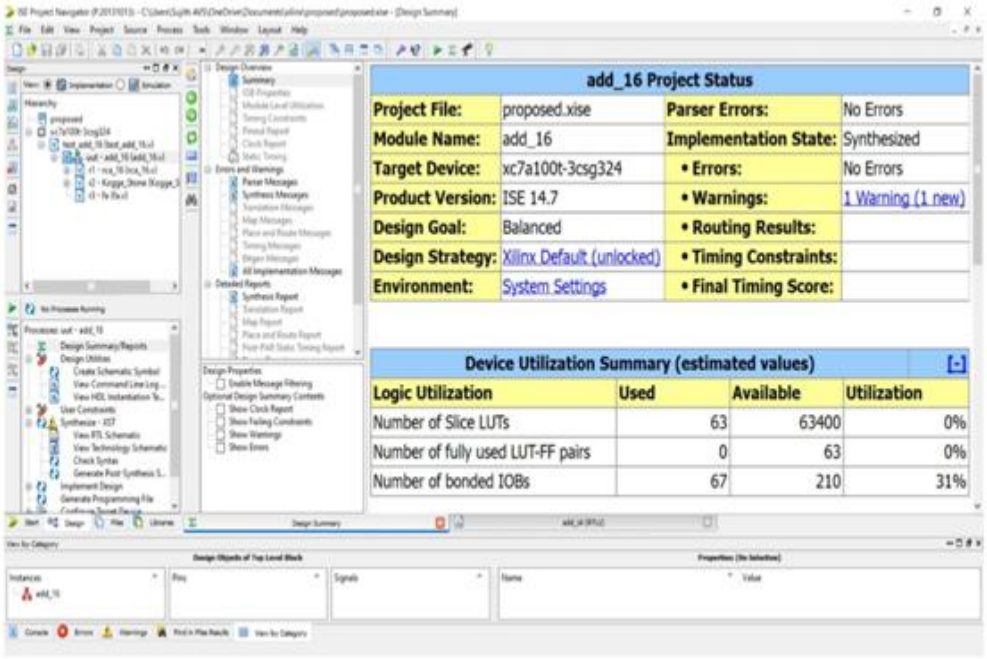
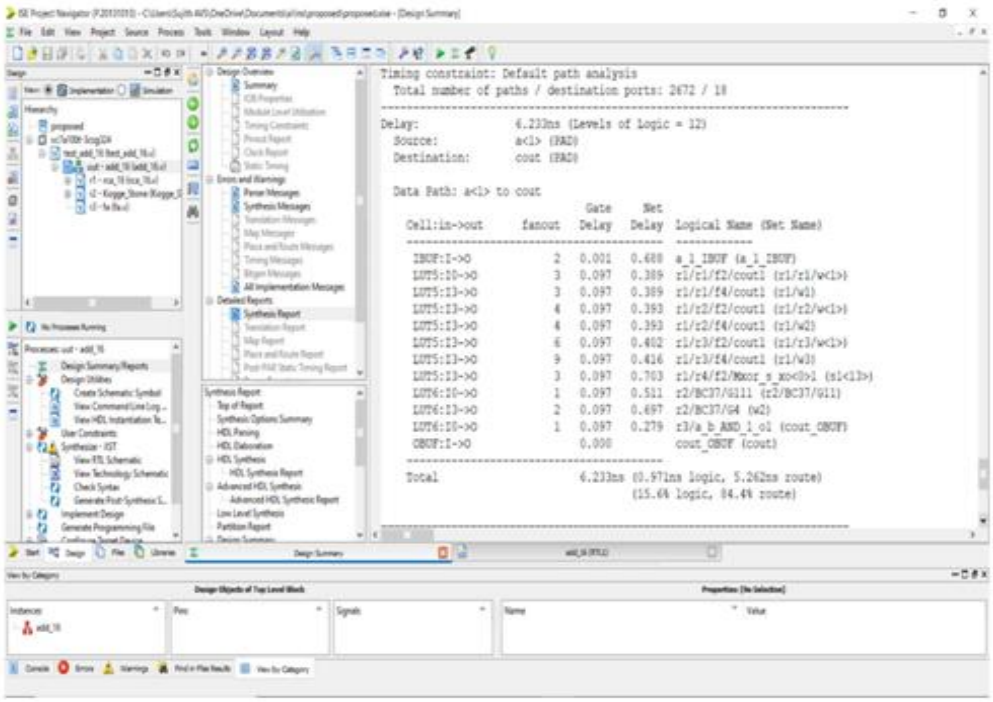


add_16 Project Status			
Project File:	proposed.xise	Parser Errors:	No Errors
Module Name:	add_16	Implementation State:	Synthesized
Target Device:	xc7a100t-3csg324	• Errors:	No Errors
Product Version:	ISE 14.7	• Warnings:	1 Warning (1 new)
Design Goal:	Balanced	• Routing Results:	
Design Strategy:	Xilinx Default (unlocked)	• Timing Constraints:	
Environment:	System Settings	• Final Timing Score:	

Device Utilization Summary (estimated values)			[-]
Logic Utilization	Used	Available	Utilization
Number of Slice LUTs	63	63400	0%
Number of fully used LUT-FF pairs	0	63	0%
Number of bonded IOBs	67	210	31%

Figure 7: Device utilization summary of the proposed system



```
Timing constraint: Default path analysis
  Total number of paths / destination ports: 2672 / 18
--------------------------------------------------------------------------------
Delay:               6.233ns (Levels of Logic = 12)
  Source:            a<1> (PAD)
  Destination:       cout (PAD)

  Data Path: a<1> to cout
                                Gate     Net
    Cell:in->out      fanout   Delay    Delay  Logical Name (Net Name)
    ----------------------------------------  -----------
     IBUF:I->O             2    0.001   0.688  a_1_IBUF (a_1_IBUF)
     LUT5:I0->O            3    0.097   0.389  r1/r1/f2/coutl (r1/r1/wc1)
     LUT5:I3->O            3    0.097   0.389  r1/r1/f4/coutl (r1/w1)
     LUT5:I3->O            4    0.097   0.393  r1/r2/f2/coutl (r1/r2/wc1)
     LUT5:I3->O            4    0.097   0.393  r1/r2/f4/coutl (r1/w2)
     LUT5:I3->O            6    0.097   0.402  r1/r3/f2/coutl (r1/r3/wc1)
     LUT5:I3->O            9    0.097   0.416  r1/r3/f4/coutl (r1/w3)
     LUT5:I3->O            3    0.097   0.703  r1/r4/f2/Mxor_s_xo<0>1 (s1<1>)
     LUT6:I0->O            1    0.097   0.511  r2/BC37/G111 (r2/BC37/G11)
     LUT6:I3->O            2    0.097   0.697  r2/BC37/G4 (w2)
     LUT6:I0->O            1    0.097   0.279  r3/a_b_AND_1_o1 (cout_OBUF)
     OBUF:I->O                  0.000          cout_OBUF (cout)
    ----------------------------------------
    Total                       6.233ns (0.971ns logic, 5.262ns route)
                                        (15.6% logic, 84.4% route)
```

Figure 8: Delay report of the proposed system

Table 1: Comparison between existing and proposed works

Method	Adder Name	Delay in ns	Area in LUT
Existing	**Carry save adder**	**12.672 ns**	**48**
Proposed	**Kogge- stone adder**	**6.233 ns**	**63**

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VI. Conclusion

The modified adder is the fastest adder due to its modified design. The addition of Ripple carry adder and Kogge-stone adder generally consumes huge area but compared to the three operand adders the modified adder achieves better results compared to the previous adders. The 16-bit adder is modified and the design is implemented in Xilinx tool using Verilog HDL programming language. The results of the modified adder achieve good performance in terms of delay.

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IOT Based Real Time Farming Using Raspberry Pi

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Abstract

The motivation behind this project is to give the farmer a total irrigation framework utilizing the Internet of Things. It could be a test to shape a productive automatic irrigation framework to scale the loss from backwater. Give various models to choose the effective measure of water for plants. The recommended plot comprises various types of sensors with low expense and low power consumption. For instance soil dampness sensor, temperature sensor. The Raspberry Pi is worked with sensors to control the kickoff of the irrigation valve. The telephone is utilized as a controller. The two sensors speak with The Raspberry Pi. The Fire sensor is utilized for fire recognition. On the off chance that the fire sensor recognizes fire, a video connection will be shipped off th e site page for live observing.

Key words: Sensors, IoT, Raspberry Pi.

I. Introduction

According to the World Bank, it was found in 2013 that 1% of GDP was attributed to agriculture. In this regard, as noted by FAO, 60% of the world's population is directly dependent on agriculture. 1.4 billion land area in the world is used to grow plants. In addition, the total population survey at the end of 2019 shows that there are 7.7 billion people living on the planet. The population growth has led to a decrease in developed areas. , We need to apply information about horticultural innovations and current developments, especially in planting areas, to get the best results. In this regard, the global Internet of Things market is also expected to reach US$1.8 trillion in 2020. , Related to the financial field. In any case, the Internet of Things is hardly used in agriculture. In the current environment, ranchers rely on outdated methods to create fields in the fields. The Internet of Things can solve the problems of creativity and security well. In addition, some creative and defenseless countries in the world are in poverty. They know very little about what is happening in the modern world and how to apply science and innovation. Suddenly, IoT innovation provides effective solutions

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to our usual goals. If we, like some sectors in agriculture, only use the Internet of Things in the areas of creation or harvesting, then the organization will become better, more convenient, and more convenient. To work properly with the Internet of Things, we need to use a less complex structure and remain financially sound. The Raspberry Pi-based layout provides the easiest way to realize the gift of the Internet of Things. According to the Internet, Raspberry Pi is a cheap, high-configuration PC that uses MasterCard for measurement. You are creating a Wi-Fi called the Internet of Things Center. However, through the Python language, Raspberry Pi provides excellent performance for the Internet of Things and distributed computing. Raspberry Pi also gained an application approach based on worker threads. There is a strategy of collaborating with Raspberry Pi in the field of horticulture, connecting various sensors required for agriculture. Further on we can discover an IoT arrangement just as live observing through a dashboard.

Internet of Things (IoT): The advanced space has seen significant changes over the most recent few years and according to industry specialists would keep on developing itself. The furthest down the line contestant to the computerized space is the Internet of Things (IoT). IoT can likewise be characterized as an exchange for programming, telecom and electronic equipment industry and vows to offer colossal freedoms for some businesses. With the coming of the Internet of Things (IoT), took care of by sensors soon to number in the trillions, working with smart frameworks in the billions, and including a great many applications, the Internet of Things will drive new purchaser and business conduct that will request progressively shrewd industry arrangements, which, thus, will drive trillions of dollars in a promising circumstance for IT industry and surprisingly more for the organizations that exploit the IoT. The quantity of Internet-associated gadgets (12.5 billion) outperformed the quantity of individuals (7 billion) in the world in 2011, and by 2020, Internet-associated gadgets are required to number between 26 billion and 50 billion universally. The Indian Government's arrangement of creating 100 shrewd urban communities in the country, for which Rs. 7,060 crores has been distributed in the current spending plan could prompt a gigantic and fast extension of IoT in the country. Likewise, the dispatch of the Digital India Program of the Government, which targets changing India into an advanced empowered society and information economy will give the necessary driving force to improve the IOT business in the country.

II. Literature Survey

The new situation of diminishing water, evaporation of streams and tanks, and a flighty climate, present a dire need for legitimate use of water. To adapt up to this utilization of temperature and dampness, sensors are put at appropriate areas for checking the yields. After research in the horticultural field, analysts tracked down that the yield of agribusiness is diminishing step by step. Nonetheless, utilization of innovation in the field of agribusiness assumes a significant part in expanding the creation just as in decreasing the labor. A portion of the examination endeavors are accomplished for advancement of ranchers that give frameworks which use advances accommodating for expanding the rural yield. The distributed computing gadgets make an entire figuring framework from sensors to apparatuses that notice information from agrarian fields and precisely feed the information into the vaults. This thought proposes a novel approach for shrewd cultivating by connecting a brilliant detecting framework and keen water system framework through remote correspondence innovation. It proposes a minimal expense and productive remote sensor

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network procedure to secure the dirt moisture, Humidity , temperature from different areas of field and according to the need of yield water engine is empowered .It proposes a thought regarding how a mechanized water system frame work was created to improve water use for agrarian purposes.

III. Existing Method

In existing systems, there are RF based and Zigbee based smart agriculture systems. In these systems there is restricted distance correspondence and no constant observing, In GSM based systems, we can possibly get messages when any of the sensors arrives at its limit levels and no live checking.

IV. Proposed Method

In this project we are using raspberry pi as microcontroller which has inbuilt wifi. Here we are using humidity sensor, soil moisture sensor and PIR sensor and these sensors are interfaced with microcontroller. Humidity sensor and soil moisture sensor are used to monitor the humidity and moisture level in the agriculture field. The Fire sensor is used for fire detection. If a fire sensor detects fire, a video link will be sent to the web page for live monitoring.

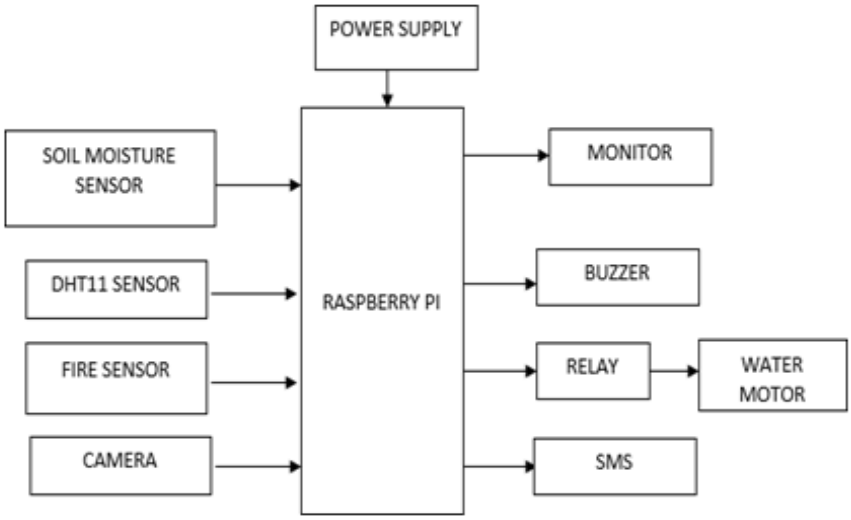

Figure 1: Block diagram of the proposed Method

A. **Raspberry Pi:** The Raspberry Pi is a small pocket length computer used to do small computing and networking operations. It is the primary detail with inside the subject of internet of things. It offers get right of entry to the internet and for this reason the relationship of automation structures with far flung region controlling gadgets turns into possible. Raspberry Pi is to be had in diverse versions. Here, version Pi 2 version B is used and it has quad-center ARM Cortex-A53 CPU of 900 MHz, and RAM of 1GB. It additionally has: forty GPIO pins, Full HDMI port, four USB ports, Ethernet port, 3.5mm audio jack, video Camera interface (CSI), the Display interface (DSI), and Micro SD card slot.

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Figure 2: Raspberry Pi 3B model

B. **Soil Moisture Sensor:** The soil moisture sensor is one form of sensor used to test the volumetric substance of water in the soil. As the immediately gravimetric factor of soil moisture desires killing, drying, simply as check weighting. These sensors degree the volumetric water content material now no longer straightforwardly with the help of a few extraordinary concepts of soil like dielectric constant, electric obstruction, anyways communiqué with neutrons, and substitution of the moisture content material.

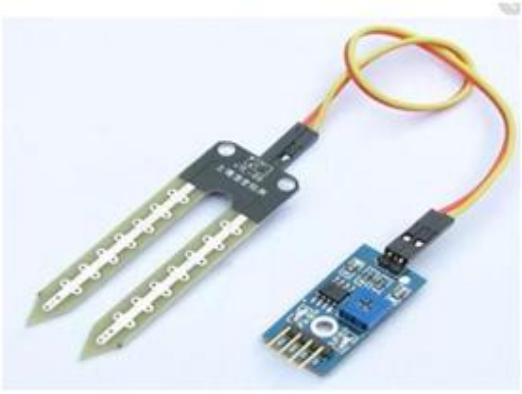

Figure 3: Soil moisture sensor

C. DHT 11 Sensor: The DHT11 is a commonly applied Temperature and humidity sensor. The sensor accompanies a devoted NTC to gauge temperature and a 8-digit microcontroller to yield the upsides of temperature and humidity as sequential information. The sensor is also processing plant aligned and ultimately easy to interface with different microcontrollers. The sensor can quantify temperature from 0°C to 50°C and humidity from 20% to 90% with an exactness of ±1°C and ±1°

Figure 4: Humidity sensor

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V. Results

The sensors are related with raspberry pi and power supply is given. The raspberry pi reads the values from Sensors and posts the data at the webpage. If the values are much less than the already set threshold values, then the relay receives ON, and the relay switches ON the motor. The motor remains in ON situation until the element this is much less than the threshold value reaches the threshold value. When the threshold value is reached, the relay automatically switches off the motor. The connections of the experiment are shown below.

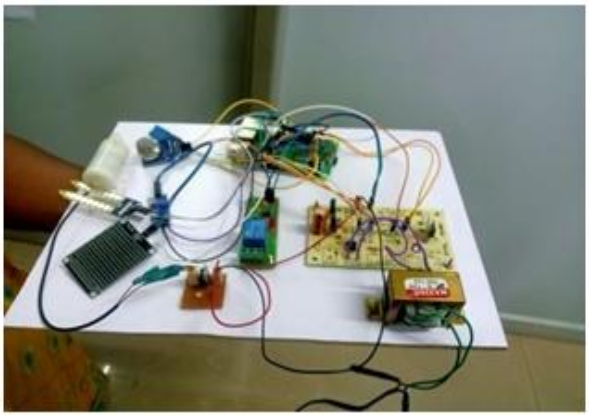

Figure 5: Experimental setup

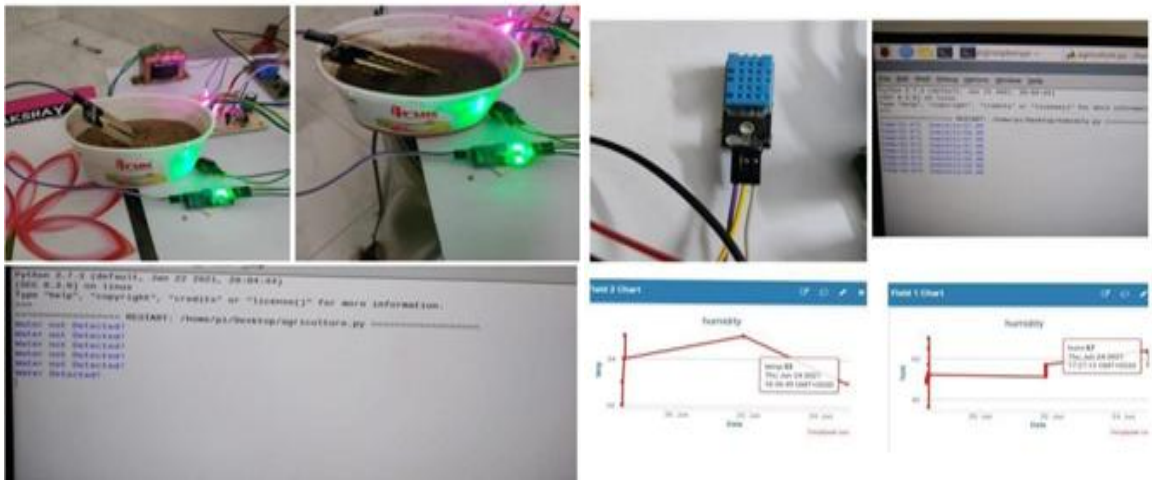

Figure 6: Moisture & humidity measurement

VI. Conclusion

A system to focus on continuous perception with proficient utilization of least expensive security systems, live observing and the project conveyed an opportunity to get familiar with the possible systems, along with their highlights and disadvantages. Through this system it tends to be resolved that there can be a critical number of progress in cultivating areas with the consumption of IOT and computerization. This proposed system can be utilized for estimating moisture of the documented soil moisture sensor, identifying overflowed water, estimating the pH of soil and following out the current temperature and humidity in the

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horticulture. In this way, the system would be a plausible clarification to the issues looked in the remainder of manual and cumbrous movement of irrigation by allowing powerful abuse of water assets.

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Designing a Lossless Multihop Energy Harvesting Links with Distributed Power Control

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Abstract

Only, we will make the point of regularity and harvest (yes) that communicates the park to park through many related posts. The future is removed before removing first. After packet package (PDP), you try to adjust online control. For this reason, we begin to obtain a representation of PDP to rip between us. Next, when the priceI kegrella, we obtain a closing system for the best tears. Time to understand the impact of rips. In, both elevators are designed for channels. Imitation shows the purpose is presented to promote a higher solution

Key Words: Automatic Repeat Request (ARQ), Packet Drop Probability(PDP), Retransmission-Index based Power control policy(RIP).

I. Introduction

Internet applications are taken from wide width and extend to the Fuion Center [3]. [3]. Often, this private entrepreneur and informed the authenticity of this condition, and found that the unsolicited conditions made by time were an important problem. With power control, the rotation method as automatically (ARQ) is the usual way to ensure a safe role. This is part of a strong communication connection. IEEE 802.15.4 or Bluetooth a laspecification [6] [7]. In the form of a network, the effect of a small random fading and prosperity of the woom energy for computers [8]. the documented ARQ Protection to communicate between Hop Links (EHN), policies that have recently been controlled to reduce Packet Drop Probability (PDP) that can cut the package used by the power process between nodes. Link [9].

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Modern care plans are many Internet connections, which are tracking systems, which should be sent to the link to jump and multi-hop formed in the jump method. If each jump passes, it is a rich carce for the next node to resend the package given to inflammation and bend. Each package , receipt The node sends approval (AK AK) or negative (with me) to show the failure of effort or final failure. The host receives the current package. Previous inflammation. Suspension mode nodes do not consume energy, but they continue to grab energy Environment before future value. Living environment. If this depends on it, the package is only accepted if each inflammation cannot provide more inflammation without your number. For a rat root connections with power transmission or energy receiver or transmit during transmission during the transmission period. This package is used, PDP as a metric to trust [8] [11]. In this system, PDP is described as the amount that is about the package.

Radio Configuration Operation Control Model: Slow slump disappeared. If it is low, the channel is always available for all efforts of ENh, distributed channels depending on the deposition of the road (I.). The results of the study showed that valid policies in two conditions were excavated. The next paragraph is short and summarizes the next paragraph contributions of this paper. The policy of the manager and the analysis of the Fort EH Link is like many reasons, like extension values [13], etc. He studied. [18], Big Sense [20], is considering the concept of system objectives, cooperation between the collection and suppressor method. [25]. Below, model the search-Hopi-hop eh no documents.

II. Existing System

In the existing system we come across a communication system which involves transmission of data via multihop links which transmits the data with periodic measurements and energy relay nodes(EHN)s included. The principle followed is decode and forward fashion .The packet transmission over each node follows ARQ protocol which is Automatic Retransmission Protocol .This protocol operates by the negative or non negative acknowledgment received from the receiver section. For example, the data is transmitted in the form of packets with a predetermined slot numbers, if one packet is sent to receiving node it sends acknowledgment (ACK) for the received packet and gets into sleep mode until next packet is received. During the sleep mode the node saves its energy and harvests some energy from the environment i.e., via renewable source sun it charges its sensor batteries. If the packet is not delivered to the node within the allotted slot it sends NACK. The loss of information or dropping of a packet may happen due to channel fading, energy reduction and noise at the receiver.

Disadvantages:

- Communication quality is poor.
- Downlink and uplink frequencies are not appropriate.
- Low efficiency.
- Poor accuracy.
- Computationally very redundant.
- Low Data rate.
- Interchannel and co-channel interferences are very high.
- Not reliable.

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- Heavy loss of information.
- Incomplete communication due to severe fading

III. Proposed System

In this project we proposed a novel approach for signal retransmission via Distributed Power Control in Multi-Hop Energy Harvesting Links by considering an EHN that takes the measurement and transmission of packets periodically to receiver node over multiple EH relays operating in the decode and- forward fashion, using the automatic repeat request (ARQ) protocol. We would be designing an online retransmission-index based power control policy (RIP) for each node to minimize the dropping of packets i.e., loss of information. To this end, we first derive an expression for the PDP in terms of the RIPs at the nodes. Next, when the energy cost for decoding a packet is negligible, we obtain closed form expressions for the optimal RIPs. We also extend the results to the case where the peak transmit power is constrained. If the energy cost of decoding is negligible then we can opt for the iterative geometric algorithm for calculation of optimal Retransmission Index policies of each node. One of the major problem in this proposed system is state of charge (SOC) of the battery. In practice, the estimation of SoC could be energy-expensive as well as inaccurate. We present a method to systematically design PDP-optimal SoC-independent policies for retransmission-based EH links, where both transmitter and receiver are Energy Harvesting Nodes. We derive approximate closed-form expressions for the PDP of ARQ-based multi-hop EH links equipped with finite sized batteries for both slow and fast fading channels. We present the accuracy of our proposed system for a variety of parameters with many simulations. Mathematically, by using some expressions we derive lower bound of the Packet drop Probability(PDP). We show that the gap between the lower bound and the PDP of our system decays exponentially fast with the battery size at each node. When the energy required for receiving and decoding a packet is negligible compared to that required for transmitting a packet, we present closed-form expressions for the optimal SoC-independent retransmission-index based policy (RIP) for transmit power control, in both slow and fast fading scenarios. Furthermore, when there is a peak transmit power constraint at the transmitter, we provide a provably convergent algorithm to determine the optimal transmit power control policy.

Finally, when the energy required for receiving and decoding a packet is non-negligible, the problem becomes a mixed-integer nonlinear program. Using tools from geometric programming (GP), we obtain near-optimal RIPs in the general case. Furthermore, due to the large state space of the problem, it is challenging to find a numerical solution using dynamic programming techniques. Hence, in the following, we reformulate the above optimization problem by finding tight bounds on the objective function.

Consider the way you hop-hop is governed by N + 1create in the image. Measured first (source) in the first TF box. Package measures require shipping to the last (destination). Final frame The package removed the area that will be completely completed. Will be removed. Face behind and face behind Provide a package between two retirement members. Efforts, each received without error, without delay. [8] - [11] Small messages and can be sent to the importance of protection to maintain an error value that you can ignore. The report removed from the package and collecting energy until the next package is received.

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On the other hand, if both recipients have the next energy, the recession of Nilareton recently.

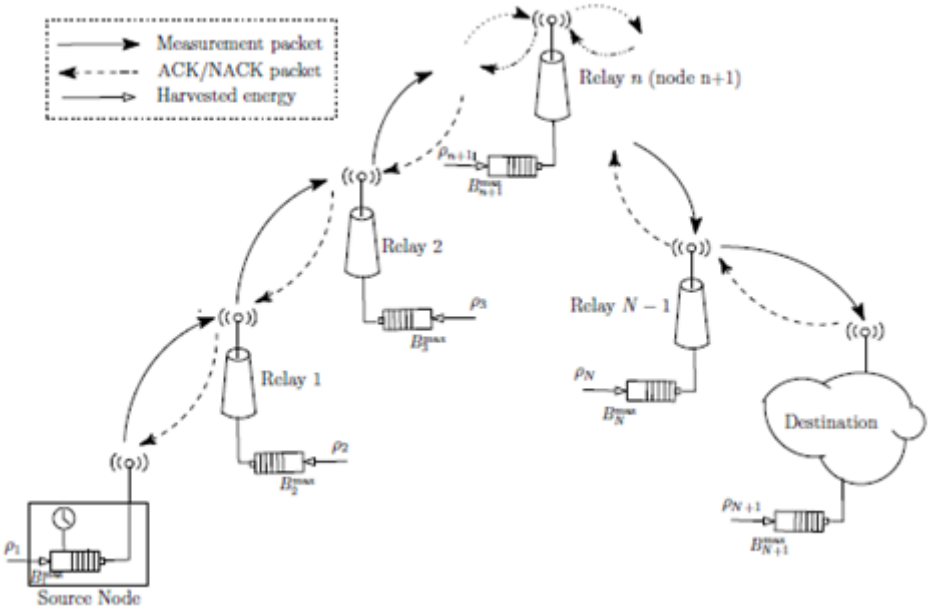

Figure 1: Basic model demonstrating the transmission and reception of packets in the form of frames.

We consider a time-slotted system, and let Tb denote the duration of a slot, which is total time required to make a request to receive the ACK/NACK from the receiver. Let us assume that there will be total no of K slots. Out of these K slots, the nth packet is nk the probability of this packet must be 1.The receiver node gets awake until the nk packet is received it it is not received it is dropped somewhere. After the reception of the nk packet the node gets in to sleep mode to harvest energy. This type of action can be designed before inflammation that requires nodes that require inflammation to maintain inflammation. When inflammation is not repaired and the node received, it is sent to the environment and plan based on plan is efficient. Multiple hop make hood through a difficult job

Energy Harvesting Model

Problems of energy abuse on the node between nodes, holes, inflammation of energy n by potential _n, and energy by loss. = 1 Figure 1 is considered. Bernouruli was pushed through a pool for the baseball source. Bernoulli is equally easy Although it is easily presented on paper, the list of Marko Marko appears in a sequel to the sequel and weather conditions in Kahns More generally, and, and, and. In addition to disseminating directly to Marketov and Markopa can involve slots. The package, the average adjusts to each package, so the property is necessary to disassemble the package taken. AK / NACK. here.

Energy consumption in each node with danger (OPP). Markurbine in each battery node guarantees the force of nodance. The ENC, and is given as follows

$$B_{s+1}^{n} = \min\left(\left(B_{s}^{n} + \mathbb{1}_{\{\mathcal{H}_{s}^{n}\}} - E_{\ell}^{n}\mathbb{1}_{\{\mathcal{E}_{t,s}^{n}\}} - R\mathbb{1}_{\{\mathcal{E}_{r,s}^{n}\}}\right)^{+}, B_{n}^{\max}\right)$$

In the above, Bmax n < 1

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$$U_s^n \triangleq \begin{cases} -1 & \text{ACK received,} \\ \ell & \ell - 1 \text{ NACKs received, } \ell \in \{1, \ldots, K_n\}. \end{cases}$$

In the local transmission the last frame index is set to 1,it increments if it is a NACK and is set to 1 if it is a ACK> Thus, the nth node makes the attempt to transmit the simultaneous packets if all the following conditions are satisfied:

1. The nth node has received the packet successfully, i.e., the local transmission index of all the previous n1 nodes is equal to 1..
2. Both the last two nodes have sufficient energy in the battery to transmit and receive the packet, respectively.

Channel Model

The criteria between two consecutive nodes is depicted as below:

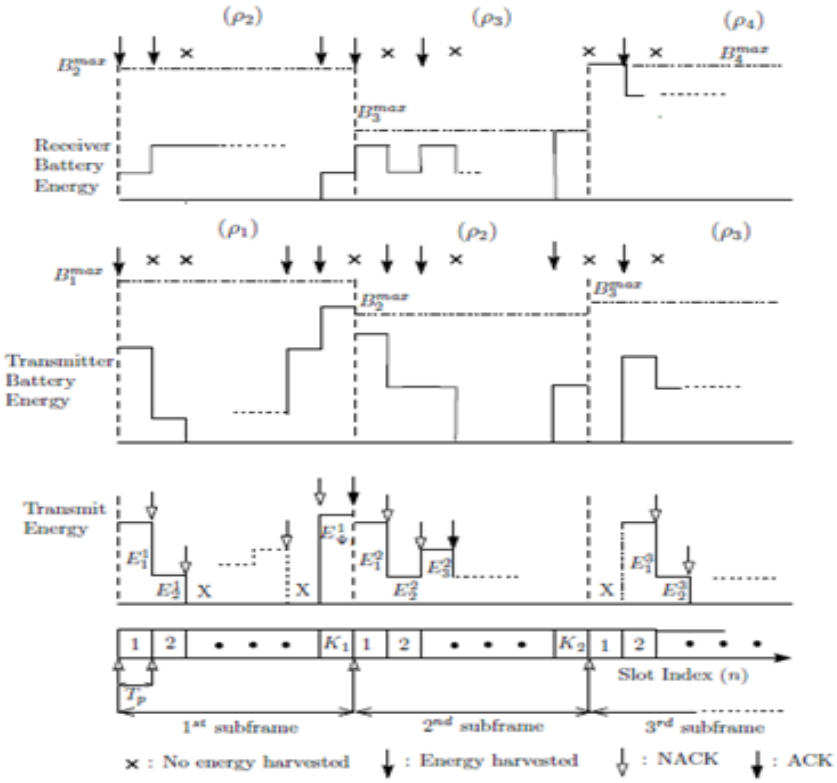

Figure 2: Evolutionary evolution and paper during work.

The first sub -.frame is the second nature called the first time to start the first period I. Fashion and change. Send edes node can not access the channel. However, it can be the channel that is celebrated using a message AQ / NACK. Changes in tape are scattered as CN (0 _2 c). Potential efforts to n a n is in outage is given as [31]–[33]

$$P_e(E_\ell^n, \gamma) = \exp\left(-\frac{E_\ell^n \gamma}{N_0}\right)$$

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Here, N0 is designing ripsfpngn n = 1 because the PDP has been reduced, treated, each advantage in more. PDP product system and the rules of power floors. The following section has found a short-full system full of PDP throughout the parameter. Deal with key materials using hurtered system reminders.

Packet Drop Probability

The packet drop probability is nothing but the information is transmitted in the communication channel in the form of packets. The packets are transmitted within a slotted sections as frames. There may be loss of information or loss of packets between transmitting node and receiving node the probability of no of packets dropped is given as the packet drop probability.

The expression for the transition conditional probabilities is as depicted below:

$$P_{\mathrm{D}} = \sum_{\boldsymbol{B}} \pi(\boldsymbol{B}) \mathbb{E}_{\boldsymbol{\gamma}} \left\{ P_D \left(K | \boldsymbol{B}, \boldsymbol{U} = \mathbf{0}, \boldsymbol{\gamma} \right) \right\}$$

Here B denotes the initial probabilities of the battery nodes, The conditional probability gives the no of packets dropped from the starting of the frame to the channel encountered. The present proposed system follows RIP Policy which is known as online retransmission index policy.

Average Conditional PDP: For the state of the port, the PDP mode was determined by the number of means and accepts efforts and the risk of energy volume. KNO to allow the use of energy organized by swelling found on the battery in the first frame on the first frame of the first frame on the first frame on the first frame. The ACP is used to provide exception over the channel state. It denotes the packet dropped at the initial battery state and initial harvesting state.

IV. Results

This project deals with the transmission of data over longer distances via multihop transmission.

The advantages of this from the existing system is we use energy harvesting links and distributed power control by using RIP policy i.e., Retransmission Index Policy. We construct this entire communication system in MATLAB environment. The transmitter, receiver and channel modules are constructed in the MATLAB environment.

The results show the simulation graphs obtained in MATLAB in the process of passing information. The results show characteristics of various attenuation characteristics with respect to the frequency components of the information signal. We use OFDM methodology for execution. This is sustainable towards the environment. The results of designing a lossless multihop network with energy harvesting links and distributed power protocol are depicted as below.

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Input: The input given to obtain the simulations in the MATLAB environment are as given below. The source matlab code file is opened To perform the simulation and various parameters are given as depicted as below:

```
source data filename: house.tif
Output file will be: house_OFDM.bmp
IFFT size: 8
Number of carriers: 2
Modulation(1=BPSK, 2=QPSK, 4=16PSK, 8=256PSK): 1
Amplitude clipping introduced by communication channel (in dB): 8
Signal-to-Noise Ratio (SNR) in dB: 20
```

Required Output

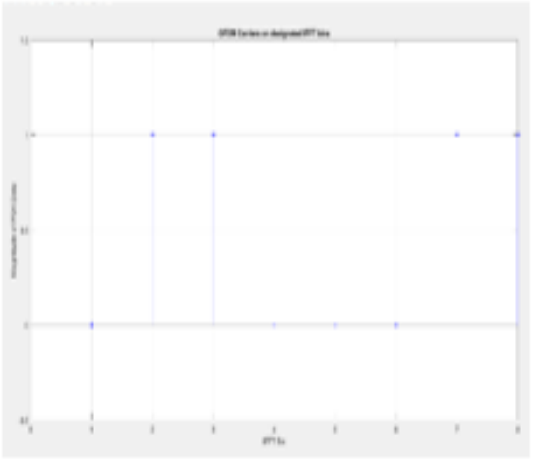

Figure1: OFDM carriers on designated IFFT bins

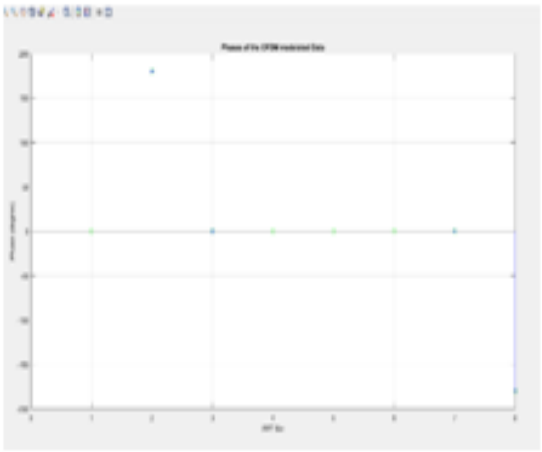

Figure2: Phases of the OFDM modulated data

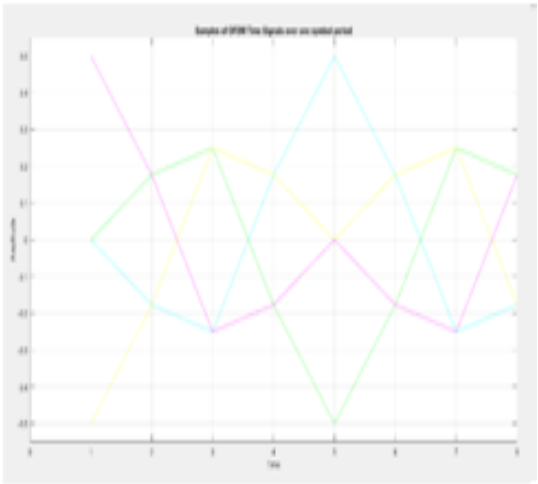

Figure 3: Samples of OFDM time signals over one period

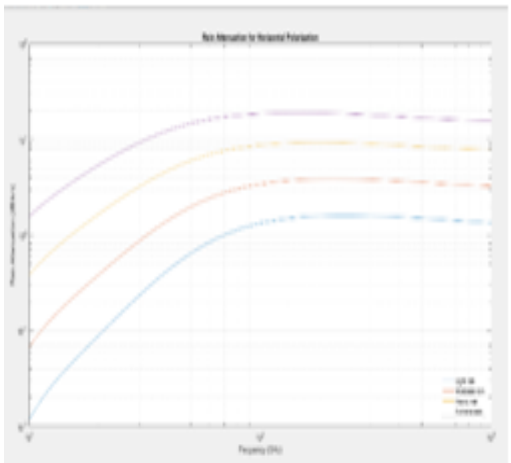

Figure4: Free Space path loss Vs Frequency

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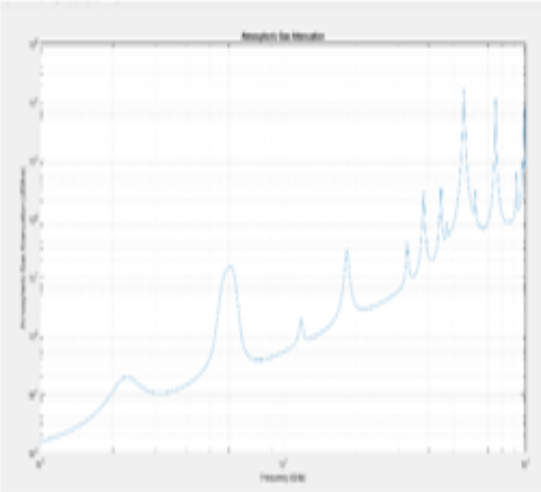

Figure5: Atmospheric gas attenuation Vs Frequency

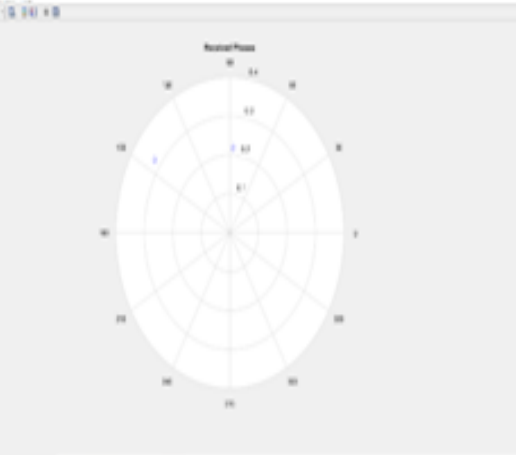

Figure 6:Received phases of the signal

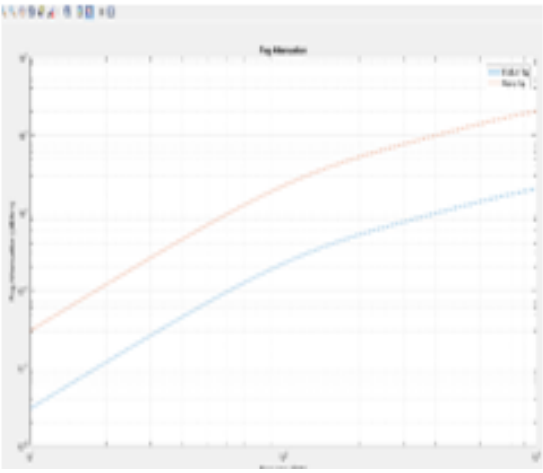

Figure 7: Fog Attenuation Vs Frequency

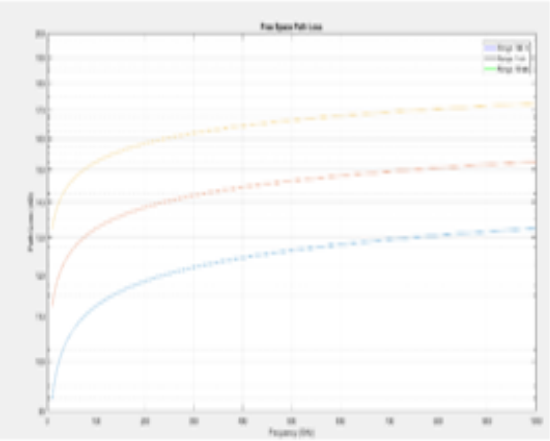

Figure 8: Free Space Path Loss Vs Frequency

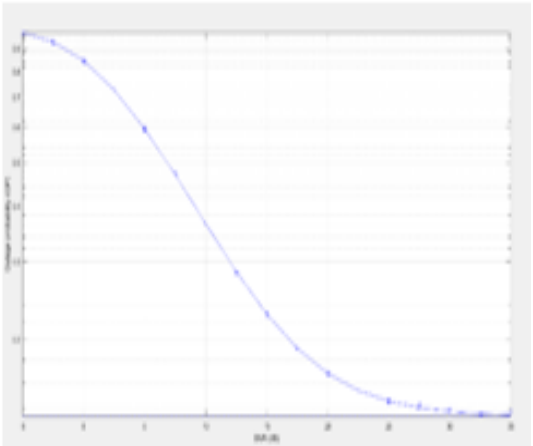

Figure 9: Probability of Signal to Noise Ratio

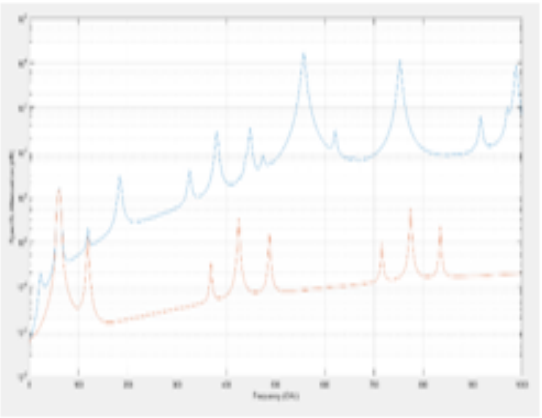

Figure 10: Specific Attenuation Vs Frequency

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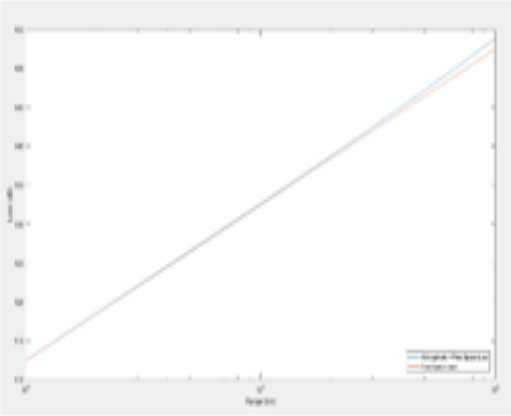

Figure 10: Loss (dB) Vs Range (Km)

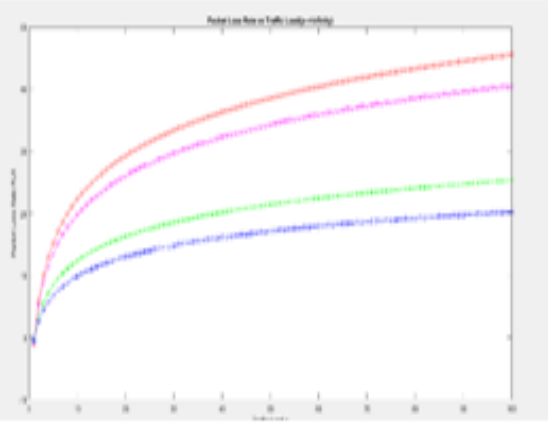

Figure 11: Packet Loss rate Vs Traffic Load

V. Conclusion

In this paper, we tend to designed PDP-optimal RIPs for ARQ-based multi-hop EH links. to the current end, we tend to1st derived closed-form expressions for the PDP of multi-hop EH links. exploitation the derived expressions, we setup a RIP optimization problem, that was solved in 2completely different scenarios. First, we tend to thought-about a state of affairs once the energy value for reception is negligible, and derived closed-form expressions for the best RIPs. Next, we use iterative geometric programming based mostly answer to the RIP optimization drawback below non-negligible energy reception cost. Through the MATLAB simulations we guarantee a better performance, high accuracy and low packet drop probability which gives us the low loss of information For further improvement of this work we may collaborate our project with time correlated channels for different service requirements.

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Fingerprint Based Exam hall Authentication System Using IOT

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Abstract

Multi biometric is an authentication innovation making use of various biometric innovation like precise finger impact, facial highlights and, vein layout. The cycle for allowing scholar to take a seat down for an exam in lots of faculties has skilled the advent of automobile of recognizable evidence, for example, ID playing cards, expenses leeway card, image playing cards, and so on this piece of labor is propelled via way of the manner that the pick for confirming a scholar for an exam has a conspicuous issue, for example, display of phony freedom card, etc. In any case, bio measurements is an innovation that apparently distinguishes an man or woman depending on his physiological or social attributes. The factor of this paintings finally is to plan a software in order to solve troubles of check misconducts, for example, pantomime and exposed the viability of biometric device making use of precise mark in directing exam leeway. The proposed device applied precise finger impact biometric approach, the device perceives someone via way of searching at his/her biometrics with every report with inside the statistics set as opposed to antique guide method. The everyday final results from the device is that the brand new device will necessarily provoke for biometric to allow scholar get entrance into the device for authentication and distinguishing evidence of actual scholar previous to going into exam.

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I. Introduction

Authentication has consistently been a significant check in a wide variety of exam. Confirmation of the credible up-and-comer is certainly now no longer a easy assignment, and moreover it is something however a ton of time and cycle. This brought about the plan of Fingerprint primarily based totally check authentication device this is supposed to by skip simply person checked via way of their finger impact sweep and rectangular non showed via way of Users. Formal exam can appropriately be characterized as the assessment of an man or woman's Performance, when faced with a development of inquiries, troubles, or assignments set him/her, to decide the degree of records that he has received, the diploma to which he can use it, or the great and viability of the abilities he/she has created. During the 19th century, formal composed examinations got preferred in faculties, schools, and different instructive foundations. Examinations were moreover steadily applied for the dedication of enlisted humans to the not unusual place assist, and the callings, and to posts in enterprise and begin. Over the ages, country administered testing has been the maximum famous procedure, but the legitimacy and believability of the extended scope of present day assessment techniques had been raised doubt on Where it has styles of structures that assist in set up the identification of someone: 1) Authentication structures 2) Identification structures In Authentication device, someone favoured to be diagnosed via way of post an identification declare to the device, via way of a magnetic stripe card, login call and clever card, etc, and the device get both rejects or accepts the submitted and declare identification for it. In an identity device, the device establishes a topic identification or fails if the challenge now no longer enrolled in device database without the challenge having to say an identification. The subject matter of this paper is channel toward the improvement of exam impersonation removal device and this precise function of identity via finger print. The verification device is depending on fingerprints, and the phrases verification, authentication, and distinguishing evidence are applied from a free perspective. Exact programmed man or woman recognizable evidence is getting more and more more extra important to the interest of our undeniably electronically interconnected statistics society. Customary programmed man or woman distinguishing evidence improvements to affirm the individual of an man or woman, which use â€•Something which you know, for example, an man or woman ID number (PIN), or something which you have, like an (ID) card, key, and so forth, are now no longer, at this factor taken into consideration reliable sufficient to fulfil the safety requirements of digital exchanges or separate among an authorised man or woman and a sham who falsely obtains the entrance gain of the authorised man or woman. Biometrics is an innovation that apparently recognizes a man or woman depending on his physiological or social qualities. It relies upon on something which you are to make man or woman distinguishing evidence and for this reason can innately separate among an authorised man or woman and a faux faker.

II. Literature Survey

The software of biometric era associated with impersonation has been utilized by Federal Bureau of Investigation (FBI) withinside the 1960s. By preceding studies on biometric techniques has received renewed interest in latest years added on via way of an growth in safety concern. More steady and correct biometric primarily based totally withinside the version is wanted for implementation the structures like sensing the

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fingerprints, iris, face and palm of the candidate who logged in for the examination has been one after the other finished via way of the researchers. These matters are the precise functions of all humans and consequently can discover the unauthenticated candidate easily. This is finished via way of the evaluating of sampled biometric towards a template taken via way of the earlier. Where biometrics is considered as an rising era, in reality, their use has been documented in the course of the records of mankind. Biometrics are unexpectedly evolving era that turned into broadly utilized in forensics, as crook identity and jail safety, and it has the ability to be broadly followed withinside the very extensive variety of civilian Applications. Application along with, banking safety, along with digital fund transfers, ATM safety, test cashing, and credit score card transactions, bodily get entry to manage, along with records device safety, airport get entry to manage; advantages distribution, along with welfare disbursement programs customs and immigration, along with get entry to to databases thru login privileges; authorities along with the Immigration and Naturalization Service Passenger Accelerated Service System (INSPASS) which lets in quicker immigration strategies primarily based totally handy geometry countrywide ID structures, which give a completely unique ID to the residents and combine distinctive authorities offerings for voters. At gift they're specifically 9 distinctive biometric strategies which can be both broadly used or beneath investigation, along with face, fingerprint, hand geometry, hand vein, iris, retinal pattern, signature, voice print, and facial thermo grams and every of those strategies, to a sure extent, satisfies the above necessities and has been utilized in sensible structures.

III. Existing Systems

Conventional structures to affirm a man or woman's individual depend upon records (mystery code) or ownership (ID card), besides codes may be unnoticed or stuck and ID playing cards may be misplaced or taken giving fakers the chance to by skip the character check. The usage of highlights indistinguishable type of man or woman's body essentially diminishes the threat of misrepresentation. Biometrics is going as a hotspot for distinguishing someone. This is applied for authentication and distinguishing evidence purposes. To defeat the regulations of unimodal biometric device multimodal biometrics appeared. It joins at the least biometric records acknowledgment outcomes like a mix of a topic's finger impact, palm and iris that builds the dependability of man or woman recognizable evidence device that segregates the supported and the faux Authentication. The problems which are encountered in the preceding identity structures are: Student impersonation, Insecure authentication of college students, Manual verification of scholar, Corruption in Examination System.

IV. Proposed System

The task is to increase biometric is primarily based totally on examination corridor authentication structures which assist with inside the removal of exam impersonation. Our device includes a fingerprint sensor related to Arduino microcontroller circuit. In registration mode, the device lets in to sign up as much as a hundred and twenty customers and shop their identification with respective identification number. After acquiring the values the controller assessments out whether or not the values are equal. If equal, then it is going to be show the output as authenticated in any other case it presentations unauthenticated. Also,

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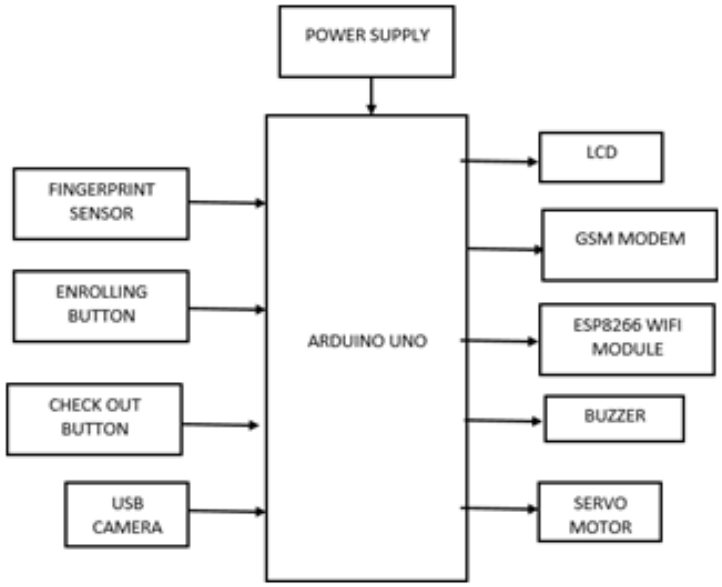
some other test-in is there to go into the corridor this is the fingerprint sensor related to Arduino. It will test the candidate's fingerprint with their respective ID and motor will open the door if the candidate is authenticated in any other case buzzer will sounds on and additionally a snap of the man or woman may be updated withinside the webpage.

Block Diagram



V. Hardware Requirements

- Arduino Uno
- Fingerprint Sensor
- Node MCU Camera
- Buzzer
- Servo Motor
- Gsm Modem
- Esp8266 WIFI Module
- Power Supply

VI. Module Description

Arduino Uno:

Arduino Uno is an open-supply microcontroller card primarily based totally at the Microchip ATmega328P microcontroller advanced via way of the company. The card is prepared via way of the virtual and analog input/output (I/O) pin groups, which may be related to numerous enlargement playing cards (shield) and different circuits. It has 14 virtual I/O pins (six with PWM output function), 6 analog I/O pins, are may be programmed with Arduino IDE (Integrated Development Environment) thru USB Type- B cable. It may be powered via way of a USB cable or an outside 9-volt battery, even though it could accept voltages among 7 and 20 volts. It is just like Arduino Nano and Leonardo. The hardware

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reference layout has been certified with inside the equal manner as Creative Commons Attribution 2.five license. It may be discovered at the Arduino website.

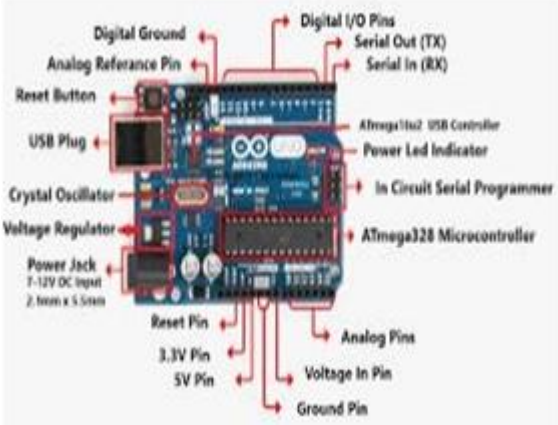

Figure: Hardware component Arduino uno

Wi-Fi Module

The ESP8266 WLAN module is an impartial SOC with an incorporated TCP/IP protocol stack, thru which every microcontroller can get entry to your WLAN community. ESP8266 can host APP or load all Wi-Fi community capabilities from some other APP processor. Each ESP8266 module has been pre-programmed. Use AT command Suite firmware, this means that you may plug it into an Arduino tool and feature as many Wi-Fi capabilities as a WIFI screen (prepared to use) The ESP8266 module is a rewarding circuit board with a massive and step by step developing community.

GSM Module

Digital cell technology along with GSM (Global System for Mobile Communications) are used to transmit cellular statistics and voice offerings. In 1970, Bell Labs found out this idea thru a cellular radio device. As the call suggests, that is the call of the standardization organization, which turned into mounted in 1982 to create a not unusual place European preferred for cellular phones. This era accounts for extra than 70% of the worldwide cellular virtual subscriber market. The era turned into advanced the use of virtual era. Today, GSM era helps 1 billion cellular telecall smartphone customers withinside the above 210 countries/regions. This era can offer easy to complicated voice and statistics offerings. This article presents an outline of GSM era.

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Fingerprint Module

A R305 is a finger print sensor module with TTL UART interface. The person can shop the finger print statistics withinside the module and might configure it in 1:1 or 1: N mode for figuring out the man or woman. The finger print module can immediately interface with the 3v3 or 5v Microcontroller. For interfacing with PC, A degree converter is required.

VII. Results

This layout such an implementation wherein we first gather or join the finger print of the college students who's going to put in writing the examination and shop them. When scholar input the examination corridor the device asks for fingerprint after which controller assessments that legitimate man or woman or now no longer. If he's a legitimate man or woman, it lets in him in any other case it intimates the invigilator thru BUZZER After the finger has been positioned at the scanner, the device will pick to show among those statements depend on the status of the challenge Authenticated, the statements are as

1. Authenticated
2. Access Denied, Student Not Registered,

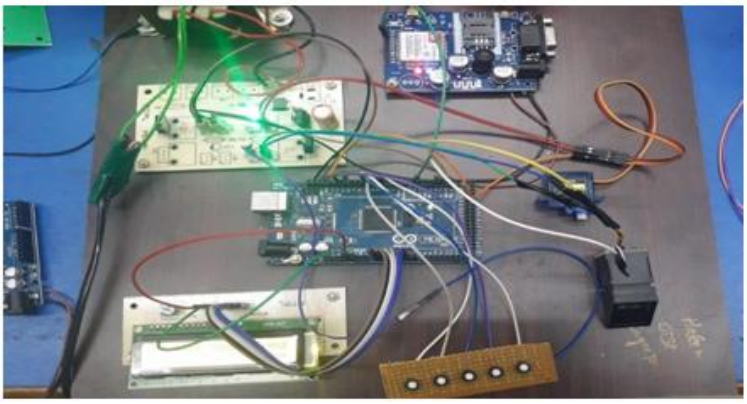

Figure (a): Hardware Implementation of Kit

The first declaration is show that once the scholar is actual get registered and is now telling the scholar to go into the password that is given to the scholar throughout registration.

Figure (b): Activation of LCD module of a Kit

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Figure(c): Finding Fingerprint to get access

The 2nd declaration is to inform the scholar that isn't always registered. Once the password entered is correct, the subsequent declaration is displayed and the door of the Hall is robotically opened, the declaration**: Access Granted.**

VIII. Conclusion

In this paper a Biometric Model for Examination impersonation and Biometric Access is a superior substitute for the usage of Identity card in confirming clients 'character Experience has proven the porosity of Identity playing cards in incredibly distinguishing man or woman regardless of cutting-edge Forgery innovation. The effortlessness within side the usage of precise finger impact makes it a reliable get entry to manage method. The manner that a patron currently don't necessities to bring individual playing cards and distinctive reviews for distinguishing evidence clarify the convenience. The Exam hall authentication device making use of fingerprints. The carried- out details extraction is considerably extra genuine and faster than our beyond spotlight extraction. In our proposed device exactly test the precise finger impact is valid patron or now no longer. On the off threat that valid patron, it allow going to the check else now no longer permitted. In this trial end result indicates the proposed method is suitable for all of the authentication primarily based totally software and moreover it vigorous.

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A Reliable Data Transmission for Military Services

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Abstract

In applications like military services and patient monitoring systems, more reliable information transmission is essential. In the communication system, noise is inevitable. The effect of system noise is that, the received data may have some errors. So, considering the effect of noise, we want to develop a digital communication system that can used for reliable information transmission with more accuracy. We develop a channel encoder which is a part of transmitter and channel decoder which is a part of receiver.

The overall system enhances the system reliability. The benefits of this system are, this system can be used as working model for error control systems and it can also be used for additional experiments for digital communication system laboratory course.

I. Introduction

A channel encoder which is the transmitter side can be constructed using cyclic codes. Cyclic codes form an important subclass of linear codes.

An (n, k) linear code C is called a cyclic code if every cyclic shift of a code vector in C is also a code vector in C.

Consider the vector space of dimension n. The subspace of this space is cyclic code if for any codeword c(c0, c1,…, cn−1) arbitrary cyclic shift cj(cn−j, cn−j+1,…, cn−1, c0,

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c1,…, cn−j−1) is another codeword. With every codeword c(c0, c1,…, cn−1) from a cyclic code, we associate the codeword polynomial c(x)=c0+c1x+c2x2+…+ c n−1 xn−1…….(1)

The jth cyclic shift, observed mod(xn− 1), is also a codeword polynomial c(j)(x)=xj c(x)mod(xn−1)……...(2)

It is straightforward to show that observed subspace is cyclic if composed of polynomials divisible by a polynomial g(x) = g0 + g1x + … + gn−kxn−k that divides xn − 1 at the same time. The polynomial g(x), of degree n − k, is called the genera ting polynomial of the code. If xn – 1 = g(x)h(x), then the polynomial of degree k is called the paritycheck polynomial. The generating polynomial g(x) and the paritycheck polynomial h(x) serve the same role as the generating mat rix G and paritycheck matrix H of a linear block code. nTuples pertaining to the k polynomials g(x), xg(x),…, xk−1g(x) may be used in rows of the k × n generator matrix G, whereas ntuples pertaining to the (n − k) polynomials xkh(x − 1), xk+1h(x) , … , xn−1h(x). may be used in rows of the (n − k) × n paritycheck matrix H.

Advantages of cyclic codes

1. Encoding and syndrome computation can be implemented easily by employing shift registers with feedback connections (or linear sequential circuits).
2. They have considerable inherent algebraic structure, it is possible to find various practical methods for decoding them.

Whereas the channel decoder which is the part of receiver is a Meggitt decoder. It's complexity and cost is relatively less. The overall system enhances the system reliability.

II. Literature Survey

In [1], error control codes: linear block codes and convolutional codes are analyzed, but there is no decoding, and [2] and [3] have been analyzed on the Meggitt decoder. We have developed a system whose overall performance improves system reliability.

III. Proposed Method

A. **Channel Encoder:** The channel encoder provides redundancy for the transmitted signal so that errors caused by noise during transmission can be detected and corrected at the receiver. The system encoding includes 3 steps: Encoding Algorithm:

Step 1: Premultiply the message m (X) to Xnok

Step 2: Divide Xn_ok.m (X) by the remainder b (X) from the polynomial generator g (X)

Step 3: Combine b (X) and Xn_ok.m (X) to get the code polynomial b (X) + Xnok m (X)

Consider the cyclic code (7, 4) and pass g (X) = 1 + X + X3 generates , let m (X) = 1 + X3 be the message to be encoded consider the cyclic code (7, 4) generated by

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g (X) = 1 + X + X3

let u (X) = 1 + X3 is the message to be encoded

divided by X3m (X) = X3 + X6 to g (X)

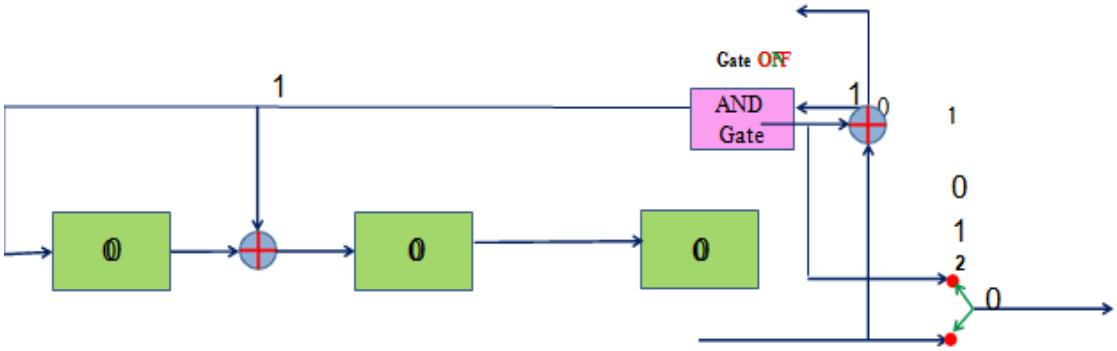
we get the remainder b (X) = X + X2

The polynomial code is c (X) = b (X) + X3m (X) = X + X2 + X3 + X6

The corresponding code vector is c = (zero 1 1 1 zero zero 1)

. Get the remaining part and pass it to Xnok. m (X) Get the word cl bird. Division process example :

$$
\begin{array}{r}
x^3 + x \\
x^3 + x + 1 \overline{)\, x^6 \qquad\qquad x^3} \\
x^6 + x^4 + x^3 \\
\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots \\
x^4 \\
x^4 \quad + \quad x^2 + x \\
\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots \\
x^2 + x
\end{array}
$$



1 0 0 1 1

Message bits

1 1 1 1

Figure:1. (7,4) Channel Encoder for the generating polynomial g(X) = 1 + X + X3

Operation

1. Reset all registers.
2. Open the AND gate and set the arm position to 1.
3. Move the bits of the message to the encoder and communication channel simultaneously, one bit at a time.
4. Once all the bits of the message are moved to the encoder, the contents of the trigger are nk parity bits.
5. Close AND gate, arm position is now set to 2, and then parity check moves to communication channel.

Table 1.Contents of shift register for the message 1001 bits

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Shift	*Input*	*Register Contents*
		0 0 0 (initial state)
1	1	1 1 0
2	0	0 1 1
3	0	1 1 1
4	1	0 1 1

Table 2. Message and corresponding code vectors

Messages	Code Vectors
(0000)	(0000000)
(1000)	(1101000)
(0100)	(0110100)
(1100)	(1011100)
(0010)	(0011010)
(1010)	(1110010)
(0110)	(0101110)
(1110)	(1000110)
(0001)	(0001101)
(1001)	(1100101)
(0101)	(0111001)
(1101)	(1010001)
(0011)	(0010111)
(1011)	(1111111)
(0111)	(0100011)
(1111)	(1001011)

Implementation: To implement encoder the followoing components are used: 7474 dual D Flip flops,74157 dual 2X1multiplexer, 7486 EXOR gate,7400 AND gate.

B. Introduction of error in the channel

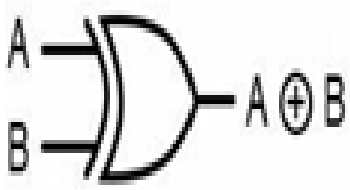

Figure:2. Error addition at the channel

The transmit bit is assigned to input A. If input B is "1", the output of is the complement of A. If input B is "0", the XOR output is the same as A, that is , the transmission is not affected. .

C. Channel decoder- Meggitt Decoder: The channel decoder uses this redundancy to facilitate the detection and correction of bit errors, thereby determining the original transmited bits.

Step 1: Forms a syndrome by moving the received vector to the syndrome register and storing the received vector in the buffer register.

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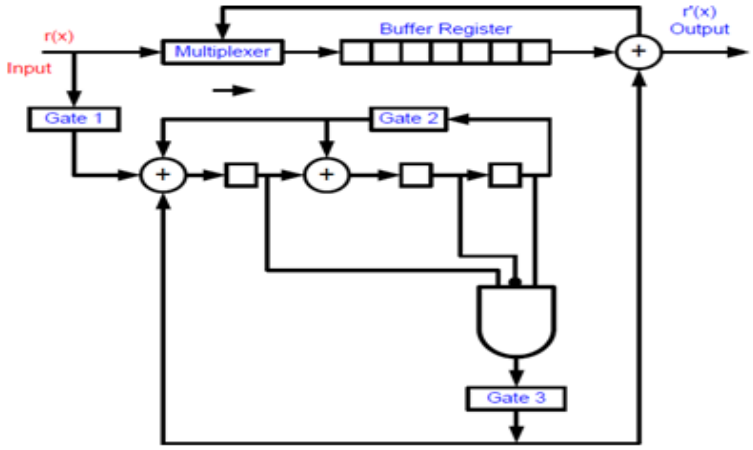

Figure 3. Meggitt Decoder

Step 2: The syndrome is read from the detector and the corresponding error pattern is tested. Detector is a combinational logic circuit designed in such a way that if the syndrome in the syndrome register corresponds to a correctable error mode and there is an error in h, its output is 1. If "11" appears in Yes "0 "appears, the symbol received at the rightmost level of the buffer register is considered incorrect, and the symbol received at the rightmost level of the buffer register is considered correct and does not need to be corrected. The detector output is the estimated error value of the symbol from the buffer.

Step 3: Read the first received symbol from the buffer If the first received symbol is detected as an error symbol, then the detector output is corrected . The detector output is fed back to the am syndrome register. This leads to a new syndrome, which corresponds to the modified reception vector shifted one position to the right.

Step 4: The new syndrome formed in step 3 is used to detect whether the second received symbol is an error symbol. Decoder repeats steps 2 and 3.

Step 5: Decoder decodes the received vector symbol by symbol in the above manner until the entire received vector is read from buffer register.

Table 3. Contents of syndrome registers

Shift	Register contents			Shift
	$s_0 = i_0 \oplus s_2^{(-1)}$	$s_1 = s_0 \oplus s_2^{(-1)}$	$s_2 = s_1^{(-1)}$	
	0	0	1	(initial state)
1	1	1	0	(first shift)
2	0	1	1	(second shift)
3	1	1	1	(third shift)
4	1	0	1	(fourth shift)
5	0	0	0	(fifth shift)
6	0	0	0	(sixth shift)
7	0	0	0	(syndrome s)

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IV. Conclusion

In this paper, we finally show that the error in third bit of received word 1 0 1 1 0 1 1 is corrected as 0.The corrected word is 1 0 0 1 0 1 1.Likewise we can correct the errors occurring in other bit positions. As an extension of this work, burst error detection and correction can be carried out.

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Smart Driver Alert and Rescue System

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Abstract

We proposed the GPS (Global Positioning System)/GSM (Global System for Mobile Communication) for driver assistance and vehicle surveillance in this article. To monitor the accident, an accelerometer and GPS monitoring device has been created. The system is made up of two cooperating components: a GPS device and a GSM module. In the case of an accident, if the automobile driver or passengers are injured, it is possible that lives will be lost owing to a delay in medical assistance. Keeping this in mind, we propose a system in which the automobile alerts the appropriate emergency services for quick response in the event of an accident or other emergency scenario. After an accident, this wireless gadget will send a brief message to family members, the local police station, and hospitals specifying the location of the car through GPS. The driver receives emergency medical services (EMS). The threshold method is used in real-time to estimate the speed of a motorbike and the likelihood of a fall or accident. The project works well in real time, locating vehicle travel locations in the form of longitude and latitude with a margin of error of no more than 6 meters from the actual position. This system also keeps a log. The project "Black-box for Vehicles" was created to provide a time tracking system as well as vehicle characteristics. The electronic nose detects alcohol intake by the driver; if he consumes alcohol, the engine will not start.

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Index Terms: GPS, GSM, MEMS, Eye blink, Alcohol detection

I. Introduction

Road accidents are becoming more common these days as a result of the driver's negligence. Other factors that may contribute to these incidents include intoxicated driving, tiredness, and sleepiness of the drivers. To prevent road accidents to the greatest extent possible, all of the above-mentioned variables should be taken carefully. According to the report, drunk driving is a key contributor to the rise in road fatalities. According to a recent research [5] a yearly average of 700,000 road accidents occur in India, which has surpassed China. The current yearly data published by the World Health organization (WHO) in its first Global status report on road safety many people are murdered on Indian roads owing to speed, and intoxicated driving, decreased usage of helmet, seat belts and kid restraints in cars. According to the most recent National Crime Records Bureau or NCRB [2] study, 40 persons under the age of 25 are killed in traffic accidents throughout the world.

According to the report, drunk driving is a key contributor to the growing number of road fatalities. To send prior to collision information to the car controller system, allowing the vehicle to avoid an accident and offer automotive safety and security. A technique to monitor and detect a fatigue/drowsy or a drunken driver has been explored in the field of automotive research for many years, but individuals died in alcohol-related collisions and sleepiness, both within and outside the city, are attributable to drunken driving and drowsiness. There is no testing technique in place to prevent these fatalities in those locations, therefore the sensor provides information. According to the World Health Organization, transportation-related accidents kill over a million people worldwide each year. Nowadays, many accidents occur as a result of the driver's or person's intake of alcohol.

As a result, drunk driving is a major cause of accidents in nearly every country across the world. The project is designed to capture informative data such as vehicle speed, engine temperature, and so on in order to change the area of motor vehicle accident investigation. With the aid of GPS and GMS technologies, it may also be used for vehicle mapping and accident alert. To respond to this scenario, the black box system takes the first step toward resolving this problem, which spans national lines and affects the safety and health of people all around the world. As we all know, the current accident ratio. The accident might have occurred for a variety of reasons. In order to prepare for any insurance, Policy Claims, we must consider the practical factors of the accident. Policies have numerous clauses; in order to meet each and every requirement, adequate documentation is required. That black box will assist us in obtaining. The black box will assist you and the insurance company in settling claims. In addition, an accident tracking system will be installed. When the car is involved in an accident, an Alert Message with the vehicle's current GPS location is sent to the home contact number.

II. Literature Survey

The article[1] have derived the driver’s condition in real time environment and we propose the detection of alcohol using alcohol detector connected to Arduino such that when

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the level of alcohol crosses a permissible limit, the vehicle ignition system will turn off and the GPS module will capture the present location of the vehicle. In addition, the GSM module will transmit a distress message to police or family members.

According to a recent report [2], over 70% of road accidents are caused by drunk driving, with a range of 44 percent to 67 percent in small cities. They also stated that 56 accidents and 14 to 15 deaths occur on our roadways every day as a result of people not wearing seat belts. In the currently existing technology, the alcohol sensor is mounted on the steering wheel and therefore controls the vehicle based on the presence of alcohol. However, road safety is essential in other ways, which is why we are managing the system depending on seatbelt use.

This article [3] discusses road discipline issues such as speed regulation in various locations and horn control in horn banned zones. Vehicle Speed Control in School Zone is one of the characteristics mentioned in this article, as is regulating the speed of the vehicle in various zones such as bridges, highways, cities, and suburbs. It also contains Horn Control of Vehicle in No Honking Zone-controlling horn disruptions in no honking zones such as hospitals, public libraries, courts, and schools, as well as Alcohol Detection to identify intoxicated driving.

In this study [4], an alcohol detection system for smart city road transportation safety was created utilizing. Internet of Things (IoT) technology. A microcontroller is used to establish and monitor two Blood Alcohol Content (BAC) limits. When the first threshold is achieved, the created system communicates the driver's BAC level as well as the vehicle's position coordinates to the central monitoring unit. When the second BAC level is reached, the IoTenabled alcohol detection system turns down the vehicle's engine, sounds an alert, and illuminates the warning light indication.

III. Existing Method

In existing systems, there are RF based and Zigbee based smart agriculture systems. In these systems there is limited distance communication and no continuous monitoring, In GSM based systems, we can only get messages when any of the sensors reaches its threshold levels and no live monitoring.

IV. Proposed Method

On-board diagnostics (OBD) is an automotive term referring to a vehicles self-diagnostic and reporting capability. OBD systems give the vehicle owner or repair technician access to the status of the various vehicle sub-systems. The amount of diagnostic information available via OBD has varied widely since its introduction in the early 1980s. In this proposed approach an alcohol detector is utilized in an effort to minimize traffic accident instances based on driving under the affect's alcohol. This project was created by integrating an alcohol sensor with a controller. The mq-3 alcohol sensor was utilized in this study to detect the presence of alcohol in human breath. Even while these approaches may identify driver tiredness, they are neither driver adaptive or interactive with an outside driving scenario. The system may come to a halt if the eye blinks continually, which might

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be caused by dust, insects, or eye issues. Brake control system comes to a halt in the middle of the road without preventing an accident. It may apply Brakes high altitude terrains while climbing a hill, which can cause the vehicle to fall from the up and cause severe accidents. All of these problems can be solved in this method by using sensors.

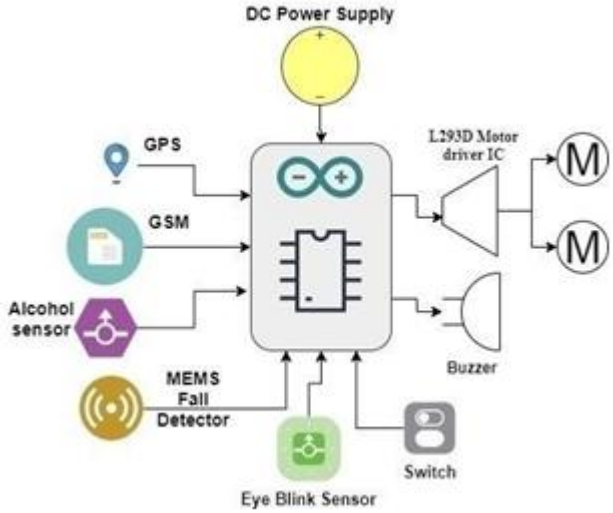

Figure 1 Block Diagram of the proposed model

Arduino Microcontroller:

1. High Performance, Low Power AVR® 8-Bit Microcontroller
2. Advanced RISC Architecture
3. 131 Powerful Instructions – Most Single Clock Cycle Execution
4. 32 x 8 General Purpose Working Registers
5. Fully Static Operation
6. Up to 20 MIPS Throughput at 20 MHz
7. On-chip 2-cycle Multiplier
8. High Endurance Non-volatile Memory Segments
9. 4/8/16/32K Bytes of In-System Self-Programmable Flash program memory
10. 256/512/512/1K Bytes EEPROM
11. 512/1K/1K/2K Bytes Internal SRAM
12. Write/Erase Cycles: 10,000 Flash/100,000 EEPROM
13. Data retention: 20 years at 85□C/100 years at 25□C(1)
14. Programming Lock for Software Security

Arduino is a free and open-source prototyping platform with simple hardware and software. Arduino boards can read inputs such as a light on a sensor, a finger on a button, or a Twitter tweet and convert them into outputs such as starting a motor, turning on an LED, or posting anything online. Arduino has been utilized in millions of different projects and applications because to its easy and accessible user experience. The Arduino software is simple enough for novices to use while still being versatile enough for expert users. It is compatible with Mac, Windows, and Linux. It is used by teachers and students to create low-cost scientific equipment, to demonstrate chemistry and physics principles, and to get started with programming and robotics.

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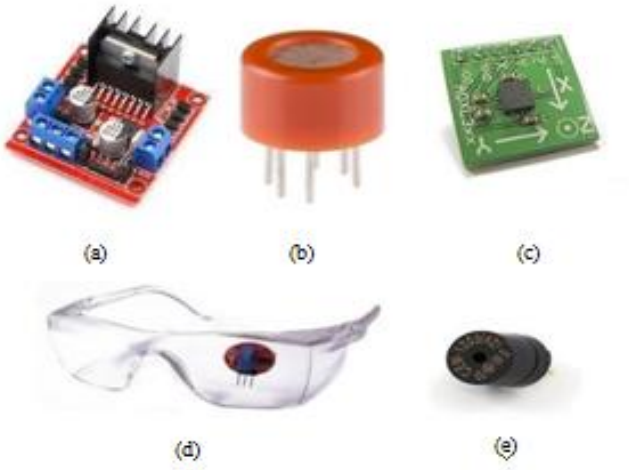

Figure 2 a) L298N Motor Driver, b) Alcohol Sensor,
c) MEMS, d) Eye Blink Sensor and e). Buzzer

L298N Motor Driver: The L298N module (Figure. 2a) is a high voltage, high current dual full-bridge motor driver module for DC and stepper motor control. It has the ability to regulate the speed and rotation direction of two DC motors. An L298 dual-channel H-Bridge motor driver IC is used in this module.

Alcohol Sensor: This alcohol sensor (Figure. 2b), like a breathalyzer, can detect the concentration of alcohol in your breath. It has a high sensitivity as well as a quick reaction time. Based on the concentration of alcohol, the sensor produces an analog resistive output. The driving circuit is extremely basic, using only one resistor. A 0-3.3V ADC might be a simple interface.

MEMS: A MEMS (Figure. 2c) electrical phenomenon detecting g-cell and a symbol learning ASIC are combined in a single device to form the Free scale measurement system. The detector is hermetically sealed at the water level using a bulk tiny machined cap wafer. The gcell is a mechanical structure formed by the abuse of semiconductor materials through masking and etching operations. The gadget is frequently modeled as a moveable beam that travels between two automatically attached beams. Two gaps are formed: one between the moving beam and the first stationary beam, and the other between the movable beam and the second stationary beam. The ASIC use switched electrical condenser methods to power the g-cell capacitors and retrieve acceleration information from the differential between the two capacitors. The ASIC also signal conditions and filters (through a switching capacitor) the signal, resulting in a digital output proportional to acceleration.

Eye Blink Sensor: An infrared detector (Figure. 2d) is a type of electronic radiation detector that is used to detect certain features of its surroundings by emitting and/or detecting infrared. It is also capable of measuring an object's heat and detective work movements. The human eye cannot see infrared radiation. Infrared sensors, including as black body radiators, W lamps, and carbide, are commonly used in systems for detecting infrared radiation. Infrared lasers and LEDs of specified IR wavelengths are used as sources in the case of active IR sensors. Following that is the transmission medium for infrared transmission, which includes vacuum, atmosphere, and optical fibers.

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Third, optical components such as quartz, CaF2, Ge, and Si optical lenses, polythene physicist lenses, and Al or Au mirrors are used to converge or concentrate infrared radiation. Band-pass filters are also useful for limiting spectral response. Finally, the infrared detector rounds up the system for investigating infrared emission. Because the detector's output is often quite small, pre-amplifiers and electronic devices are used to further process the incoming signals.

GPS: The only fully operational Global Navigation Satellite System (GNSS) is the Global Positioning System (GPS) (GNSS). The GPS system employs a constellation of 24 to 32 Medium Earth Orbit satellites that broadcast accurate microwave signals that allow GPS receivers (Figure. 3) to calculate their position, speed, and altitude. The United States Department of Defense created GPS. NAVSTAR- GPS is its official name. Although NAVSTAR-GPS is not an acronym, it has inspired a few backronyms. The GPS satellite constellation is administered by the 50th Space Wing of the United States Air Force.

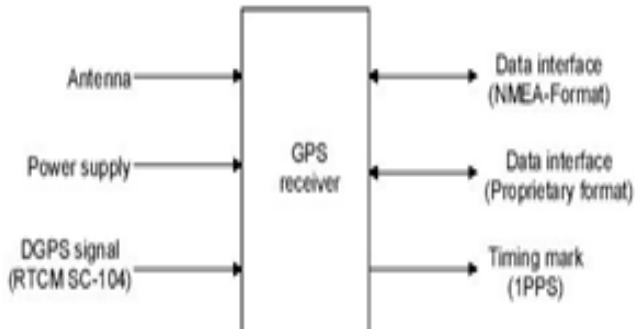

Figure 3 Block diagram of a GPS receiver with interfaces, Data interfaces

GSM: GSM (Global System for Mobile Communications) is a cellular network, which implies that mobile phones connect to it by looking for nearby cells. GSM networks use four distinct frequency bands. The majority of GSM networks run in the 900 MHz or 1800 MHz frequency bands. Because the 900 and 1800 MHz frequency bands have already been assigned, several nations in the Americas utilize the 850 MHz and 1900 MHz frequencies. AT commands are instructions used to control a modem. AT is the abbreviation of Attention. Every command line starts with "AT" or "at". That's why modem commands are called AT commands. GSM/GPRS modems and mobile phones support an AT command set specific to GSM technology. This includes SMS-related commands like AT+CMGS (Send SMS message). It's worth noting that the first "AT" is the prefix that notifies the modem that a command line has begun. It does not appear in the AT command name. For example, in ATD, D is the real AT command name, and in AT+CMGS, +CMGS is the actual AT command name. Some publications and websites, however, use them interchangeably as the name of an AT command.

Buzzer: A piezo buzzer (Figure. 2e) is a gadget used to generate sound. It is the phenomenon of producing electricity when mechanical pressure is applied to specific materials, and the inverse is also true. When exposed to an alternating field of force, they stretch or compress in line with the frequency of the signal, resulting in the production of sound.

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V. Results and Discussions

A unique technique of accident detection system was utilized to track the vehicle in this suggested study utilizing GSM and GPS technologies. In this system (Figure. 4), we utilized an eye blink sensor, an alcohol sensor, a mems sensor, a microcontroller, a GPS module, and a GSM module. When the car starts, the complete sensor goes into active mode and begins reading the parameters. As a result, the entire sensor will monitor the vehicle's performance. Because the control unit receives all of the data from the sensor, the core of the proposed system is a microcontroller. The microcontroller is linked to the whole peripheral sensor. All of the data will be saved in the microcontroller, which will be utilized as a black box to store the data. Ideally, the system would scan several data such as mems vehicle tilt to determine if an accident has occurred or whether the car is in a normal posture. When an accident occurs, GPS technology will be used to pinpoint the exact position of the occurrence. When an accident is detected, this system will obtain the current position coordinates from the GPS module.

The GSM module will send an alarm message to the victim's predefined contact number. Similarly, the alcohol sensor detects alcohol level and shuts off the car engine, as well as sending the position through SMS. The eye blink sensor will also identify the driver's sleepiness; if he falls asleep for 10 seconds, the car will stop and the location will be communicated to registered cell numbers, therefore preventing accidents.

VI. Conclusion and Futurescope

The suggested system would aid in the development of a safer mode of transportation since it aids in the avoidance of accidents and also sends notifications in the case of an accident to boost the help and rescue of the victims. In every way, the whole system is cost effective and efficient. The suggested technology will help with search and rescue operations as well as post-accident investigations. Future improvements might include autonomous driving systems, image processing methods for obstacle detection, obstacle avoidance maneuvering mechanisms, and other accident prevention mechanism.

Future enhancements could include autonomous driving systems, image processing methods for obstacle detection, manual driving mechanism for obstacle avoidance and other accident prevention mechanisms.

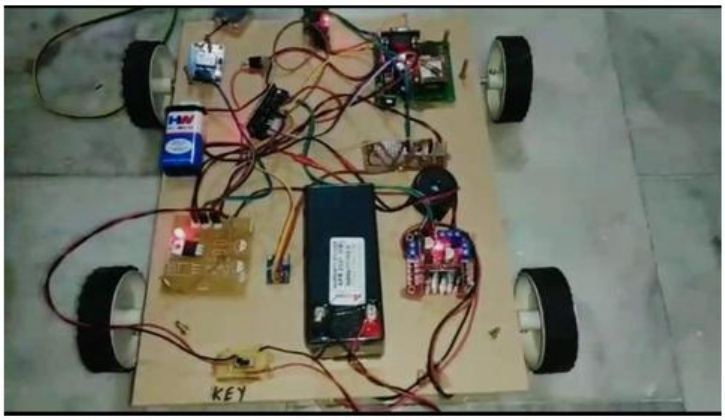

Figure [a] Proposed PrototypeSystem

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Figure [(b] Output Message for Alcohol Detection

Figure [c] Output Message for Accident Detection

Figure [d] Output Message for Drowsiness Detection

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Multifunctional Quadrotors

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Abstract

The Unmanned Airborne Vehicles (UAVs) applications or known as quad copter drones have been broadly making since the twentieth century through at this point. In this undertaking, we present the use of robot for plays out various tasks like surveillance, flower roping and in addition made for country jobs. The control structure was normal for a quad copter on '×' configuration, which licenses it to have six levels of possibility (6DOF) of headway, while prepared by four data sources given by the radio regulator (R/C). Accelerometers and spinners were utilized to get the information identified with the robot's immediate during the battle to have the decision to control it.

I. Introduction

The drones are used since the 1990's and now it has various applications. Recently the drones are widely used in agricultural purpose. The drones have become common to formers and they are utilizing them to crop monitoring, transporting from one place to anther place etc. Using drones has many advantages over manual forming. It helps in getting a better view of the field and can monitor large area in short time. Modern days the drones comes with lots of sensors so it is easy to get more details of the field so that one can know what crops are effected and how much water and pesticide they need.

The drones are widely used in surveillance because it is very easy to capture the images and vedieos by drones. The data which is capture by drones is very good in quality over the manual capturing. In military applications, the drones are commonly used for

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detecting landmines and other weapons. In this we introduce a single drone for multi-tasks like surveillance, flower roping and agricultural uses.

A. **Quadcopter Working Principle:** The quadcopters is basic plan with four rotor propellers with controller (Figure 3).The flight controller is the principle part of this vehicle. This flight controller controls all the activity told by us. The four rotors to make differential push and the quadcopter float and move agreement with the speed of those rotors .There are mainly two types of configuration in quadcopter development. One is plus(+) configuration and anther one is Cross(X) configuration. In this project we utilized Cross(X) configuration. Both models are same. But Cross(X) configuration is simpler than in addition to configuration model. Complete mass to lift is 4kg methods, the all out push created by rotors ought to be 8kg. The GPS direction framework is used here to explore the drone. Pre-Loaded direction gives the continuous directions to flight controller whereas in GPS, the microcontroller explores the drone.

II. Existing System

A drone is an unmanned aircraft and they are more formally known as unmanned aerial vehicles (UAV). Basically a drone is a flying robot and that can be remotely controlled or fly autonomously through software-controlled flight planes in their embedded systems. They are working with onboard sensors and GPS. Basically the drones are used for single purpose and it is given below. The below drone used for surveillance .It captures the images and vedieos etc.

Figure 1: Single perpose drone

III. Proposed System

In this project we implemented multifunctional Quadcopter by using Raspberry pi. In this project, we introduce the use of drone for multi-tasks like surveillance, flowerdroping and also developed for agricultural uses. The control system was designed for a quadcopter on '×' configuration, which allows it to have six degrees of freedom (6DOF) of movement, while commanded by four inputs given by the radio controller (R/C). Accelerometers and gyroscopes were used in order to obtain the data related to the drone's behaviour during the fight to be able to control it.

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IV. Block Diagram

A. Receiver Part

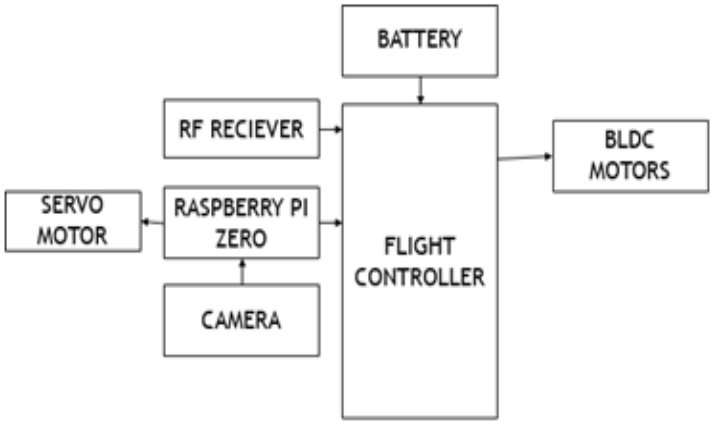

Figure 2: Block diagram of receiver part

B. Transmitter Part:

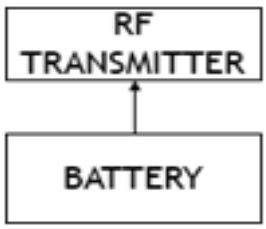

Figure 3: Block diagram of transmitter part

V. Module Description

A. Raspberry Pi: Raspberry pi3 is reliant on a Broadcom BCM2835 system on a chip (SoC). It incorporates an ARM1176JZF-S 700 MHz processor.

Figure 4: Raspberry Pi

The Raspberry Pi Foundation began served by a256MB RAM, that was labelled as Model A, and later made one B with 512MB RAM. The GPU used may be the Video Core IV, possessed through the Broadcom. The Raspberry Pi's GPIO port is arranged on upper left of

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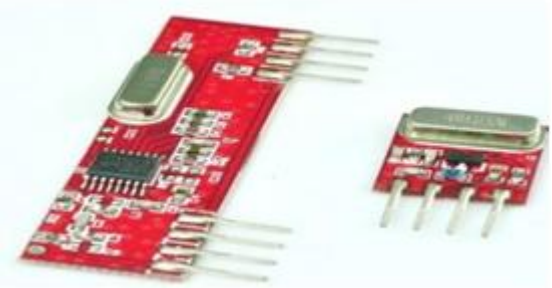

Figure 5: RF modules

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Farming requires a lot of manual labour in areas such as the distribution of seeds on the field. By using the drones in agriculture to decrease the manual labour. For capturing the images and vedieos the drone requires camera. The “multifunctional quadcopter” embedded with the technologies are used for serveillance, flower dropping, and agricultural purpose.

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Analysis of Blood Cell Images and Noise Removal Using Filtering Techniques

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Abstract

Image processing has its very own have an impact on in all fields, in particular in understanding of scientific images. Generally, pics are regularly degraded by using noise for the duration of picture capturing, transmission and reception etc. The end result of the noise elimination have a sturdy influence on the high- quality and its processing methods relying on the kind of the noise thru which photo is corrupted. This work is primarily based on segmentation and noise elimination manner via exclusive filtering techniques. Here current filters such as guided filters, bilateral filters, etc. are proposed and the performances of the blood cells pix on extraordinary kinds of filters are evaluate to the requirements filter such as inverse, median and imply filters, to acquire higher end result and higher overall performance of the reconstructed image. The approach is applied with few blood telephone pattern pics and the traits such as PSNR, SSIM, MSE are obtained. The simulation technique is carried out thru MATLAB.

I. Introduction

As digital imaging applied sciences come to be extra advanced, the trouble of picture denoising nonetheless stays Image denoising has end up a crucial step in processing of pictures and getting rid of undesirable noisy facts from the image. The photo denoising algorithms have to get rid of the undesirable noisy factors and hold all the applicable aspects of the image. The photo denoising algorithms have to tradeoff between the two parameters i.e. fine noise elimination and renovation of photo details. Images play a very necessary

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position in many fields such as astronomy, clinical imaging and pix for forensic laboratories. Images used for these functions have to be noise free to reap correct outcomes from these images.

II. Literature Survey

The reason for computerized photo preparing is to upgrade the possible insights for human understanding and handling of an image data for transmission, stockpiling and outline for independent PC discernment. The photo decent get corrupts because of disease of in excess of a couple of sorts of commotion. Added substance white Gaussian clamor, Rayleigh commotion, Impulsive clamor normally degenerate a photograph for the span of the methods of procurement, transmission and gathering and capacity and recovery. For a valuable and critical handling, for example, design center and picture division, have exceptionally accurate visuality in purposes like cell, TV, computerized cameras and so forth, the got picture sign must be denoised and deblurred.

Picture denoising and photograph deblurring are the two sub-spaces of picture rebuilding. Its will likely recreate the novel photograph or the higher assessment from the commotion records while keeping up with top notch photo subtleties. Added substance White clamor, (i.e., Gaussian commotion) is shown through remembering commotion to each pixel for a photo that is fair-minded from the obscure picture, and also it's anything but an impact on the absolute pixels of the picture. Both motivation clamor and gaussian is encouraged by utilizing breaking down pixels in the real machine, for example, digicam sensors, issue memory places in equipment or transmission of records in an uproarious channel. The pix undermined via uproarious pixels can take the most and insignificant expense in the powerful reach. It seriously debases the image extraordinary and also there is a deficiency of records subtleties. There are various strategies have been proposed for pushing off hasty clamor and Gaussian commotion from the check pictures. There are numerous and various denoising techniques have been proposed. The middle channel was once quite possibly the most well known nonlinear channels for pushing off the hasty commotion, i.e., consistent esteemed and arbitrary esteemed motivation clamor.

Middle channel usually replaces the profundity cost of the center pixel with middle worth. Be that as it may the channel cycles may obscure the picture, some top of the line significant focuses and edges of the check photograph will presently don't be protected. Because of its effortlessness in execution and moreover adequacy in clamor concealment, a lot changes have been acted in the channel, for example, Center weighted middle channel and weighted middle (WM) channel [2], [3]. The customary middle channel applies the middle activity to each pixel totally, that is other than considering whether it is loud or commotion charge pixel. Yet at the same time, separating strategies is oppressed and intentions in the image corruption. To conquer the difficulties of these middle channel, two exchanging plan was once presented. The main exchanging plan 1) Impulse finder – A locator examinations neighborhood characteristics of the 3x3 sliding window round each pixel the utilization of certain worries and denotes the commotion pixels in the comparing close by window. 2)The 2d exchanging plan Noise Filtering Process, exclusively the checked pixels are prepared as an option than the total spot pixels of a picture. The wonder of this plan is purported exchanging middle channels [4] & [5]. Notwithstanding middle channel, there are in excess of a couple of used to manage out the drive commotion.

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An alpha managed recommend essentially based strategy (ATMBM) was once proposed via Luo [6]. In this technique, motivation identification and in separating methodology it replaces the commotion pixel cost through a relentless total of its special pixel cost and the middle of its sliding window. In [7], Yu et al. proposed a position requested relative varieties (RORD-WMF) method to see tainted pixels dependent on rating the pixel in the sliding window. Dong and Xu has proposed another adjusted Directional Weighted middle (DWM) [8] strategy. The decision tree is a simple nonetheless investigation the more than one variable procedures more prominent without trouble [9]. It can harm down a muddled choices into the series of simpler choices, as an outcome give an answer which is routinely less convoluted to dissected [10]. In light of the above ideas, another choice tree essentially based denoising procedure (DTBDM) is presented here. To contrast, the results of disposal of incautious commotion, the impacts of reestablished pixels are composed as a period of enter information. Thusly, this methodology comprise of the pixel-power transaction to finish its separating usefulness in bringing down drive commotion, while holding photograph subtleties.

The absolute soonest systems of denoising are simple averaging channels like mean, middle, Gaussian smoothing channels, and two-sided channels [1]. There are strategies that profoundly change data to different bases for the intention of denoising like wavelet or curvelet principally based techniques.

The consciousness of this paper is on nonlocal capacity methods (NLM) that are supported when calculation intricacy is an issue. Most neighborhood techniques exclusively consider a close by fix round the objective pixel, expecting bordering pixels tend to have tantamount patches. On the diverse hand, nonlocal potential takes advantage of presence of an example or practically identical components in along with the non-nearby pixels [3]. NLM misuses self- similitudes in the hunt area to gauge the appropriate expense of the loud pixel.

Since the presentation of NLM, various releases have been proposed to moreover upgrade the methodology from an assortment of points of view. For instance, NLM with structure versatile patches (NLM-SAP) is analyzed in [4]. The work in [5], further develops NLM through a set up handling denoising step dependent on approach clamor smoothing. Another current improvement, probabilistic nonlocal potential (PNLM) [6], carries out another weight trademark essentially dependent on the circulation of the distances of practically identical patches. This weighting plan outflanks the Gaussian piece loads in customary NLM.

Notwithstanding the inclination of the loads, numerous different patches in the inquiry territorial are handled through NLM. Strategies like probabilistic early end (NLM-PET) [7] attempt to restrict this wide assortment through a pre-handling hard-thresholding. Nonetheless, the ordinary generally speaking execution of this strategy is more terrible than that of the common NLM. A pre-separating way is prescribed in [8] to dispose of silly fixes through assessing angle and normal dark expense of competitor practically identical patches.

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III. Proposed System

In this task we proposed to foster a novel structure for commotion evacuation in platelet pictures utilizing the customary sifting strategies. The schematic square outline of the proposed bloodcell picture denoising framework is displayed in fig(1). The proposed system initially considers the bloodcell image and initiates preprocessing operations on it. After that the preprocessed bloodcell image is subjected to the image denoising process to remove the noise with which the bloodcell image was degraded. Here an automated decision making strategy is implemented for selecting the suitable denoising filter.

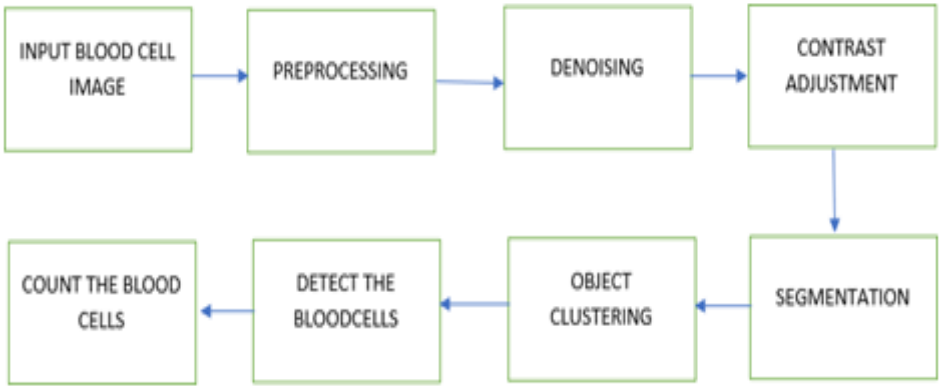

Figure (1): Schematic block diagram of the proposed system.

Next after successful removal of the noisy components from the bloodcell image, the denoised bloodcell image is subjected to the contrast enhancement process. After contrast enhancement, next image segmentation operation will be carried out on the contrast enhanced bloodcell image to get the individual objects which clustered and thresholded to detect the bloodcells. After successful detection, all the detected bloodcells will be counted and taken to the output. Then, at that point, every locale/valley is loaded up with an alternate tone subsequent to being started by watershed calculation from the focal point of the predefined valleys. As the areas develop, the close by valley will in general cover. Nonetheless, a raised watershed lines is made to forestall flood. This progression guarantees that every district is loaded up with various tones. Subsequently, each gathering of nonzero qualities will be distinguished and will separate every district independently. At the focal point of the locale it makes high pixel esteems and the pixel esteems merge to zero as the limits are drawn nearer. All in all as a pre-stage to apply the watershed calculation distance change, Otsu's yield picture is produced and handled by the watershed calculation. Distance change alludes to registering the distance between each zero pixel and the closest nonzero pixel in the double picture. This activity conjures the dividing between the various areas by making the valleys as expressed before. It creates high pixel esteems at the focuses of areas "focal point of valleys". Additionally, as the focal point of valleys moves toward the limits, the qualities join to zero in this manner it will causes to checking of platelets.

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IV. Results

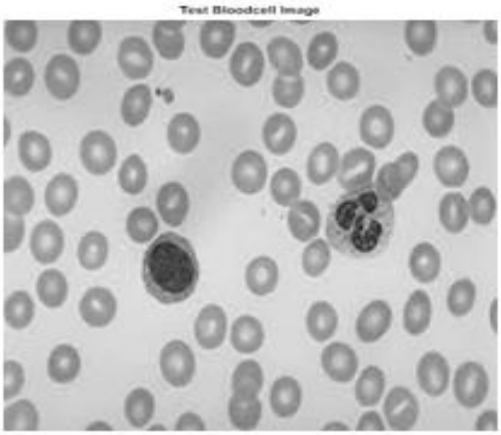


Figure: Test Bloodcell Image

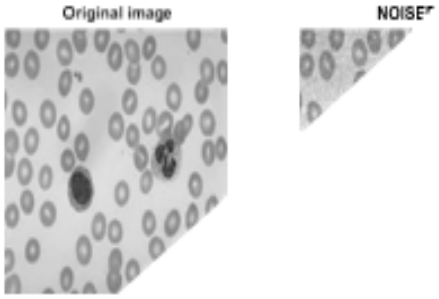
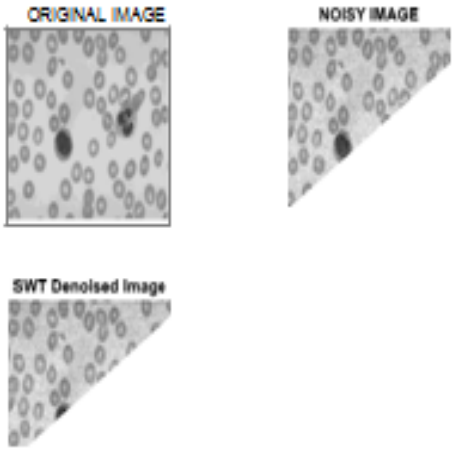
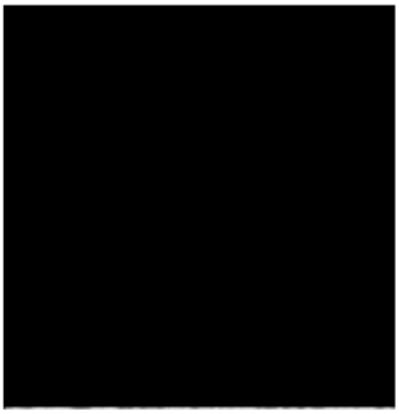
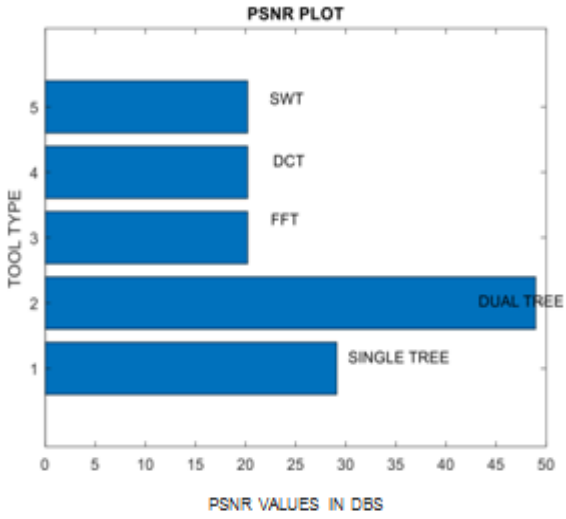


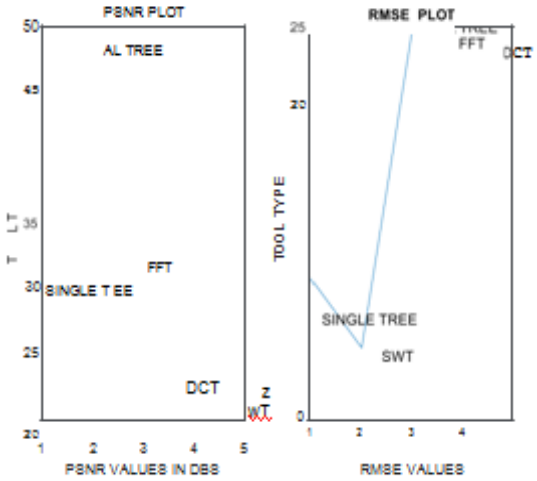
Figure Comparison Image





Output Image





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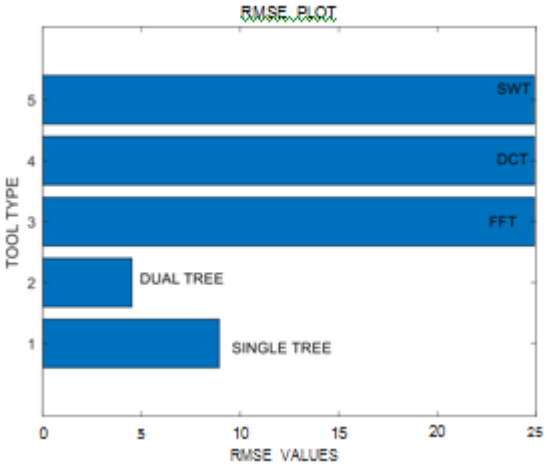

V. Conclusion

In this project, a blended de-noising algorithm primarily based on each Gaussian filter and wiener filtering is proposed. In contrast with events bilateral filtering algorithm, the blended denoising algorithm did greater successfully utilize the traits of white Gaussian noise with "zero mean", whilst disposing of the noise it can pick out pretty smaller σr parameter, in accordance to the experimental results, in evaluation with wiener filtering, the picture dealt with with combined de-noising algorithm was once extra easy with greater herbal shading effect, its textural function is greater nearer to unique image, and such technique can get even greater PSNR value. The combined de-noising algorithm inherited the neighborhood and suggest filter traits of wiener filtering, its calculation quantity solely had a little bit amplify in assessment with wiener filtering, and its de- noising impact was once of course higher than that of wiener filtering, as a result such technique can be anticipated to be broadly used then

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Multifunctional Quadrotors

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Abstract

The Unmanned Airborne Vehicles (UAVs) applications or known as quad copter drones have been broadly making since the twentieth century through at this point. In this undertaking, we present the use of robot for plays out various tasks like surveillance, flower roping and in addition made for country jobs. The control structure was normal for a quad copter on '×' configuration, which licenses it to have six levels of possibility (6DOF) of headway, while prepared by four data sources given by the radio regulator (R/C). Accelerometers and spinners were utilized to get the information identified with the robot's immediate during the battle to have the decision to control it.

I. Introduction

The drones are used since the 1990's and now it has various applications. Recently the drones are widely used in agricultural purpose. The drones have become common to formers and they are utilizing them to crop monitoring, transporting from one place to anther place etc. Using drones has many advantages over manual forming. It helps in getting a better view of the field and can monitor large area in short time. Modern days the drones comes with lots of sensors so it is easy to get more details of the field so that one can know what crops are effected and how much water and pesticide they need. The drones are widely used in surveillance because it is very easy to capture the images and vedieos by drones. The data which is capture by drones is very good in quality over the manual capturing. In military applications, the drones are commonly used for detecting landmines and other weapons. In this we introduce a single drone for multi-tasks like surveillance, flower roping and agricultural uses.

A. Quadcopter Working Principle: The quadcopters is basic plan with four rotor propellers with controller(Figure 3).The flight controller is the principle part of this vehicle. This flight controller controls all the activity told by us. The four rotors to make differential push and the quadcopter float and move agreement with the speed of those rotors .There are mainly two types of configuration in quadcopter development. One is

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plus(+) configuration and anther one is Cross(X) configuration. In this project we utilized Cross(X) configuration. Both models are same. But Cross(X) configuration is simpler than in addition to configuration model. Complete mass to lift is 4kg methods, the all out push created by rotors ought to be 8kg. The GPS direction framework is used here to explore the drone. Pre-Loaded direction gives the continuous directions to flight controller whereas in GPS, the microcontroller explores the drone.

II. Existing System

A drone is an unmanned aircraft and they are more formally known as unmanned aerial vehicles (UAV). Basically a drone is a flying robot and that can be remotely controlled or fly autonomously through software-controlled flight planes in their embedded systems. They are working with onboard sensors and GPS. Basically the drones are used for single purpose and it is given below. The below drone used for surveillance .It captures the images and vedieos etc.

Figure 1: Single purpose drone

III. Proposed System

In this project we implemented multifunctional Quad copter by using Raspberry pi. In this project, we introduce the use of drone for multi-tasks like surveillance, flower roping and also developed for agricultural uses. The control system was designed for a quadcopter on '×' configuration, which allows it to have six degrees of freedom (6DOF) of movement, while commanded by four inputs given by the radio controller (R/C). Accelerometers and gyroscopes were used in order to obtain the data related to the drone's behaviour during the fight to be able to control it.

IV. Block Diagram

A. Reciever Part:

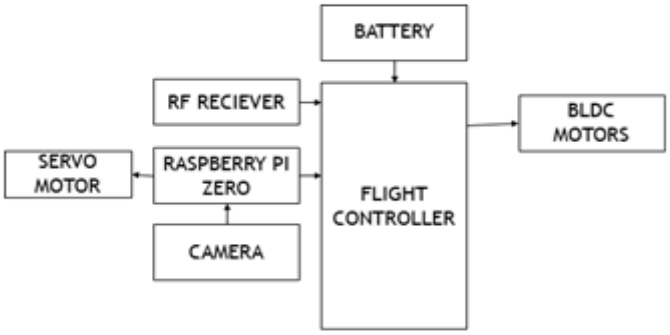

Figure 2: Block diagram of receiver part

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B. Transmitter Part:

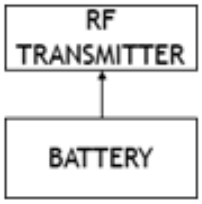

Figure 3: Block diagram of transmitter part

V. Module Description

A. Raspberry Pi: Raspberry pi3 is reliant on a Broadcom BCM2835 system on a chip (SoC). It incorporates an ARM1176JZF-S 700 MHz processor.

Figure 4: Raspberry Pi

The Raspberry Pi Foundation began served by a256MB RAM, that was labelled as Model A, and later made one B with 512MB RAM. The GPU used may be the Video Core IV, possessed through the Broadcom. The Raspberry Pi's GPIO port is arranged on upper left of the p cb, it's named as P1. It's a 26-pinport, fitted with two lines of 13 male 2.54 mm headers at the manufacturing plant [3]. The separating of those headers is especially significant: 2.54 mm pin dividing,) is a sort of sight in hardware, and it is the customary dispersing for prototyping plat structures which incorporate ss trip board and breadboards. Each pin of the GPIO port highlights it own motivation, with a few pins cooperating additionally it structures specific circuits. B.RF MODULE

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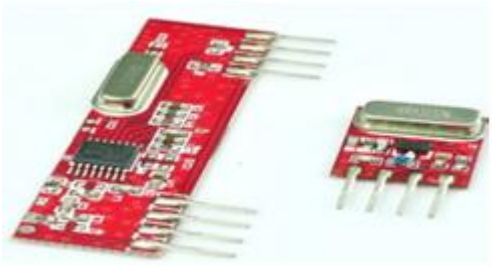

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Figure 7: Quadcopter Frame

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Farming requires a lot of manual labour in areas such as the distribution of seeds on the field. By using the drones in agriculture to decrease the manual labour. For capturing the images and vedieos the drone requires camera. The "multifunctional quadcopter" embedded with the technologies are used for serveillance, flower dropping, and agricultural purpose.

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Performance Analysis of Alzheimer's Disease Detection System with Various Classifiers

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Abstract

The beginning of dementia can be generally credited to Alzheimer's illness (AD). The reformist idea of AD causes the synapse crumbling that eventfully prompts actual reliance and mental incapacity which upsets an individual's ordinary life. A PC helped symptomatic framework is required that can help doctors in diagnosing AD continuously. In this undertaking we proposed a methodology for execution investigation of Alzheimer's stage detection framework and characterization framework dependent on deep features utilizing a pre-prepared Deep Learning Neural Network (DNN). The beginning of dementia can be to a great extent ascribed to Alzheimer's illness (AD). The reformist idea of AD causes the synapse disintegration that eventfully prompts actual reliance and mental inability which blocks an individual's typical life. A PC helped symptomatic framework is required that can help doctors in diagnosing AD continuously. In this undertaking we proposed a methodology for execution investigation of Alzheimer's stage detection framework and grouping framework dependent on deep features utilizing a pre-prepared Deep Learning Neural Network (DNN).

Keywords*:* Deep Neural Network, Relu ,Softmax and SVM Classifiers, Neuroimaging technique, Diffusion Magnetic Resonance(MR)

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I. Introduction

The AD stages arrangement stays a significant examination region. To extricate the deep-features, the conventional AI based and deep learning-based techniques regularly require enormous dataset and that prompts class irregularity and over fitting issues. To defeat this issue, the utilization a productive exchange learning engineering to remove deep features which are additionally utilized for AD stage classification. Alzheimer's illness (Alzheimer's or AD) is a reformist psychological degenerative infection prompting dementia that is set apart with physical and mental incapacity. This sickness included multi-stages from the subject with zero dementia signs to gentle, gentle, and moderate dementia.

Existing system: A staggered method was proposed for Alzheimer's detection is introduced. This technique parceled input pictures in the preprocessing stage to Cerebral Spinal Fluid, White matter, and GM. In this technique, the ROI based model was proposed and with the assistance of this methodology factual based features were removed. These features were subsequently utilized with clinical features to characterize subjects with and without AD side effects. The attention was on GM's volume contraction. It was seen that both locally and around the world the dim matter reduces with the assistance of voxel-based morphometry (VBM).

II. Proposed System

Detection of Alzheimer's illness at prodromal stage is vital as it can forestall genuine harm to the patient's mind. The detection of the Alzheimer's illness is done the clinical experts through specific advances, for example, CT check. The detection of the Alzheimer's infection is tedious utilizing CT examine. Consequently we are applying the AI innovation to foresee the Alzheimer's sickness. The proposed approach recognizes the different stages of Alzheimer's Disease, for example, moderate-crazy and non-sick utilizing Deep Learning Neural Network based Alzheimers sickness detection calculation. It lessens the time needed to foresee the yield and can be utilized for continuous forecasts. We depict the datasets utilized in this investigation and how the information was pre-prepared before the AI task. Highlight extraction utilizing head segment investigation and highlight choice methods were likewise utilized. After the information preprocessing is done, the proficient AI calculation that is DNN is applied to foresee the illness and ordered it into moderate psychotic and non hysterical. Information preprocessing alludes to all changes on the crude information before it is administered to the AI or deep learning calculation.

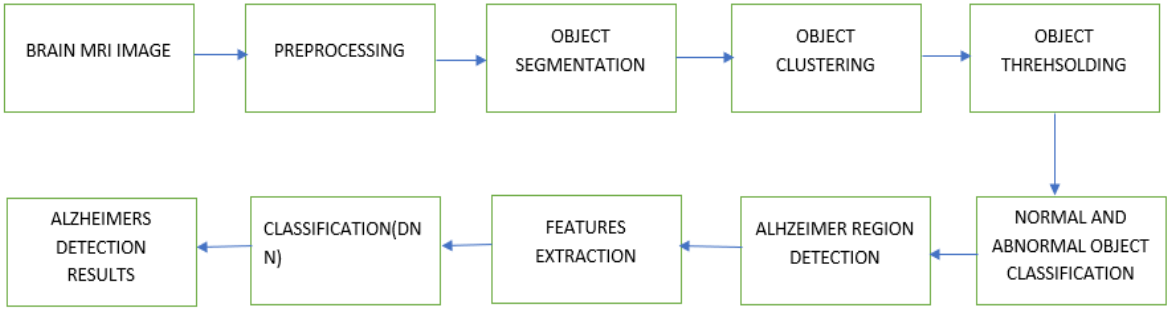

Figure: Schematic diagram of proposed system

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The schematic square outline of the proposed Alzheimers sickness detection framework is displayed in fig(1).The proposed framework first considers the test Brain MRI picture and performs preprocessing procedure on it to address its visual quality. Next the quality upgraded test MRI picture is exposed to the item division interaction to get individual portioned objects. Next with the assistance of a K-implies Clustering approach, the fragmented articles bunched into bunches dependent on their likeness and coherency. Subsequent to bunching the articles into bunch, next a thresholding activity is applied, to inspect the typical and unusual items in each item group. All the strange articles are assembled to distinguish the Alzheimer influenced areas with boundaries. Next the features are removed from ordinary and unusual items to identify and arrange the Alzheimer's infection influenced locales in the Brain with the assistance a Deep Learning Neural Networks with Ralu, Softmax and SVM classifiers and the exhibition of these three classifiers in a proficient detection and order of alzheimers influenced districts in mind images. For case, preparing a Deep Neural Network on crude pictures will presumably prompt terrible characterization exhibitions. The preprocessing is additionally imperative to accelerate preparing like grouping and scaling procedure. Highlight determination is a viable system to streamline the prescient exhibition of AI algorithms.MRI pictures were cut to get the perspective on various mind points for example Hub, Coronal, and Sagittal. Highlight vectors of this load of perspectives were framed on their CDR premise exclusively and later connected to pass them to various classifiers for characterization. The elicitation of point by point data on minimal and succinct information assessment of shading, surface, consistency, limit data, form, and edge subtleties are named as highlight extraction.The technique for GLCM for surface appraisal was at first introduced by Haralick in 1973. Later this calculation tested further, and 14 new measurable features were projected which were otherwise called GLCM features.

III. Implementation

The features are drawn out from normal and abnormal objects to detect and classify the Alzheimer’s disease affected regions in the brain with the help of Deep Learning Neural Networks with Relu, Softmax and SVM classifiers and the performance of these three classifiers in an efficient detection and classification of Alzheimer’s affected regions in brain MRI images.

IV. Software Tools

- Matlab Software
- Image Processing Toolbox
- Neural Network Toolbox
- Pattern Recognition Toolbox

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V. Result and Discussion

Relu classifier result:

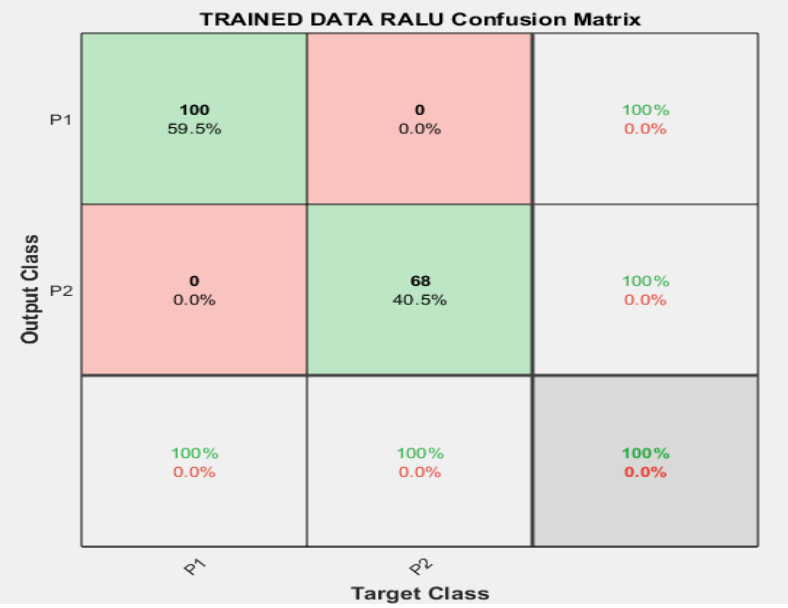
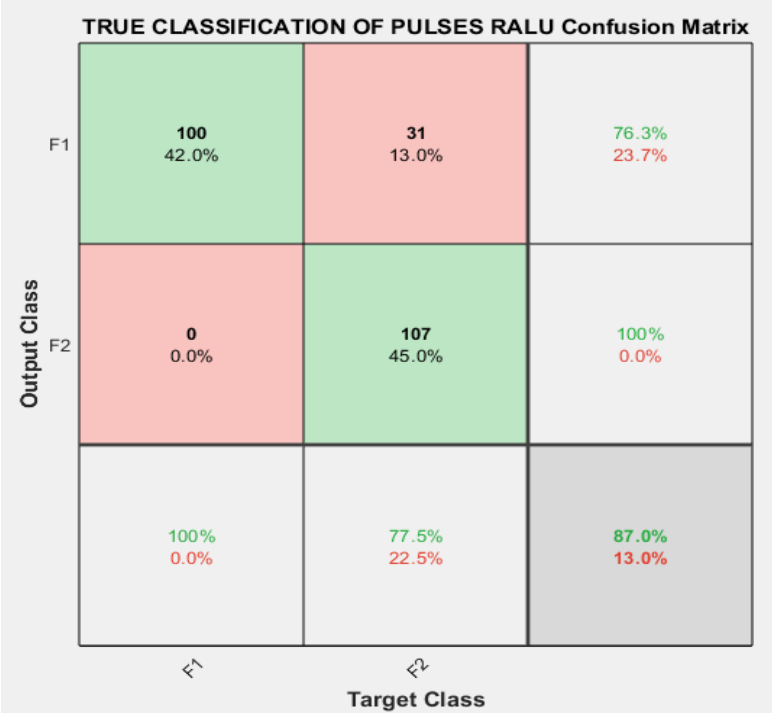


Figure 1: Trained data confusion matrix of Relu classification



Fiureg 2: True Classification of Alzheimer features confusion matrix

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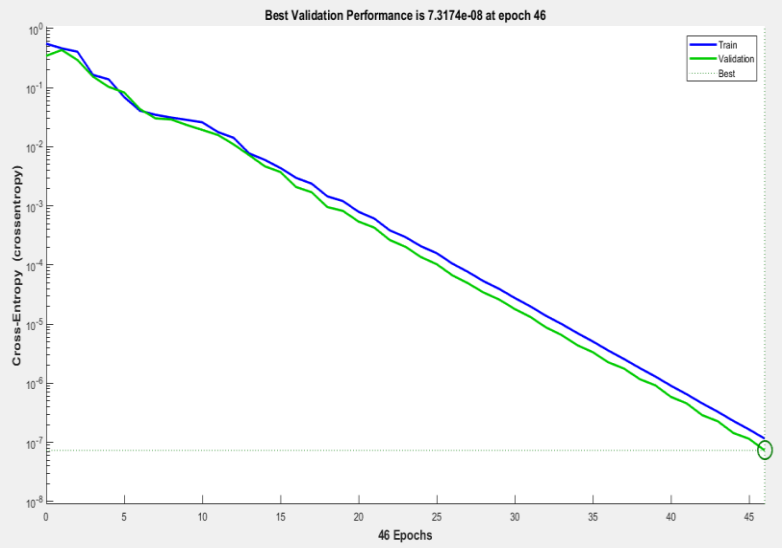

Figure 3: Performance validation of Alzheimer classification using Relu Classifier

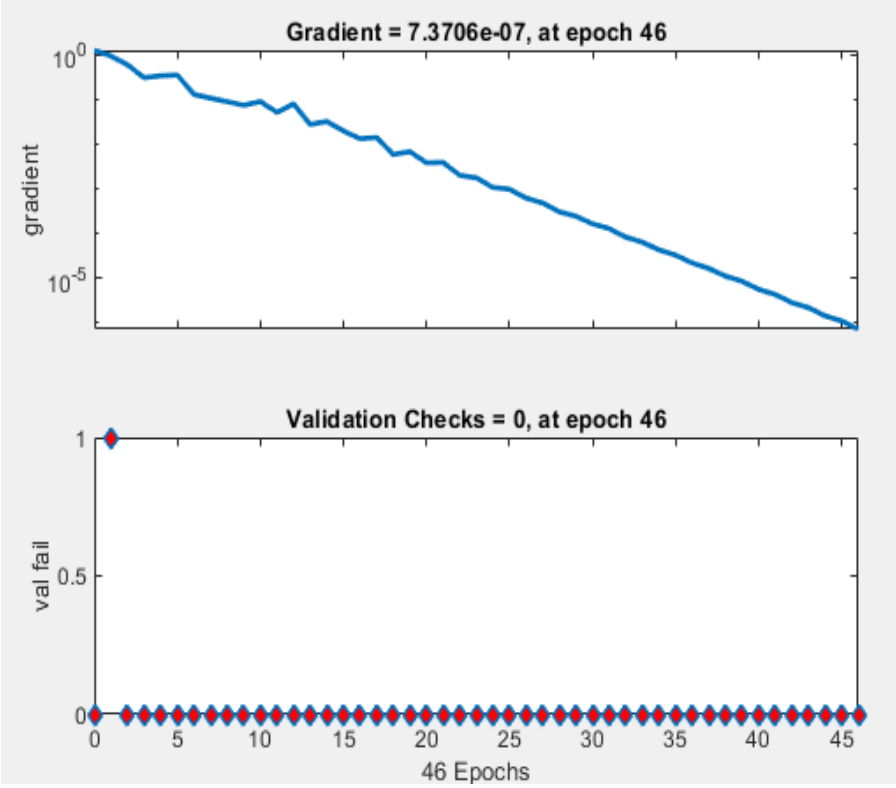

Figure 4: Training State diagram of the Relu Classifier

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Softmax classifier result:

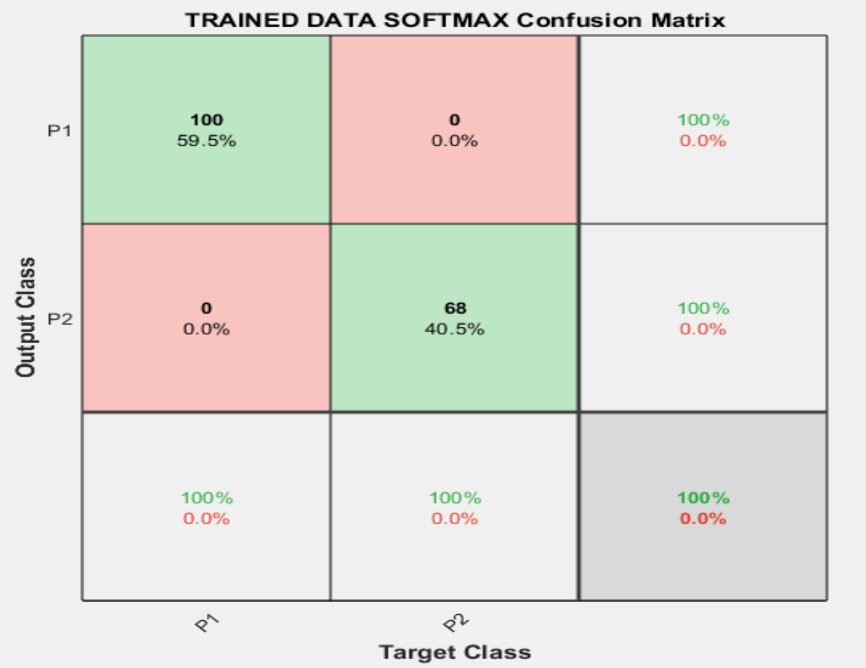

Figure *5: Trained data confusion matrix of Softmax classification*

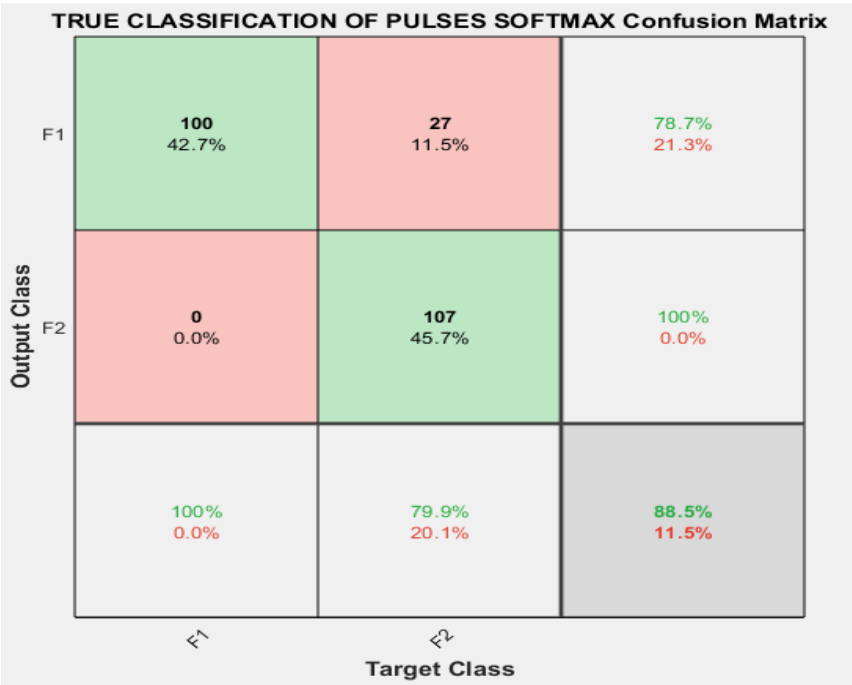

Figure 6: True classification of Alzheimer features confusion matrix

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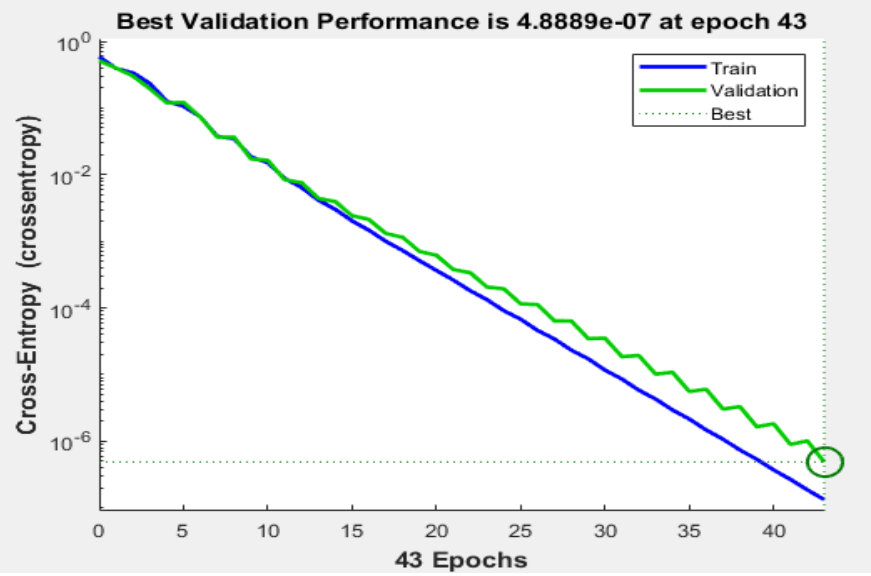

Figure 7: Performance validation of Alzheimer classification using softmax classifier

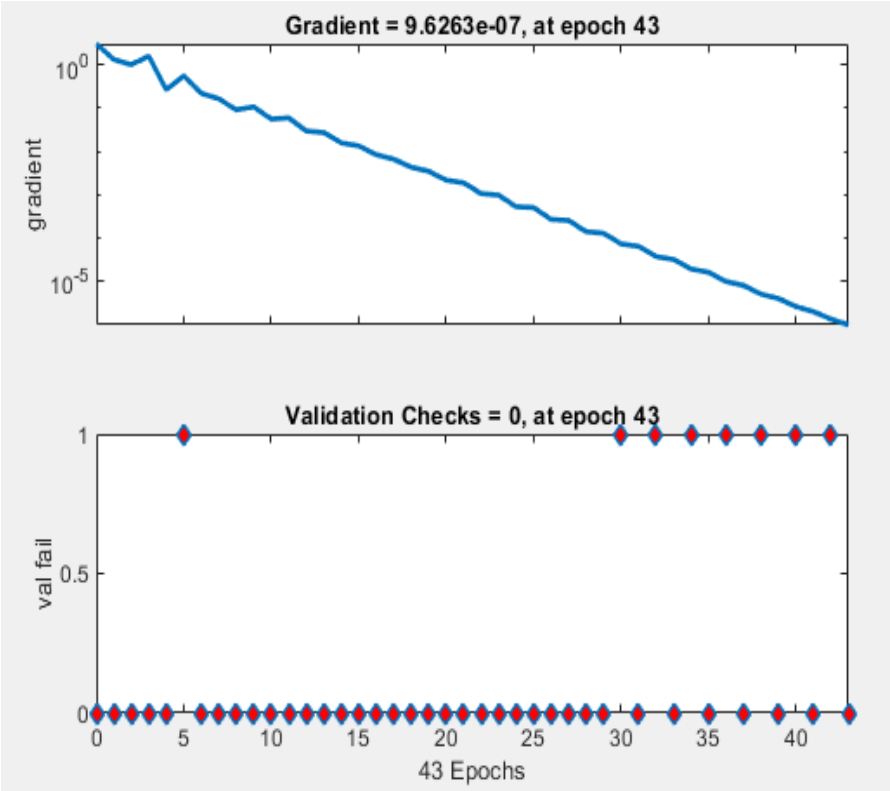

Figure 8: Training state diagram of the softmax classifier

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SVM classifier result:

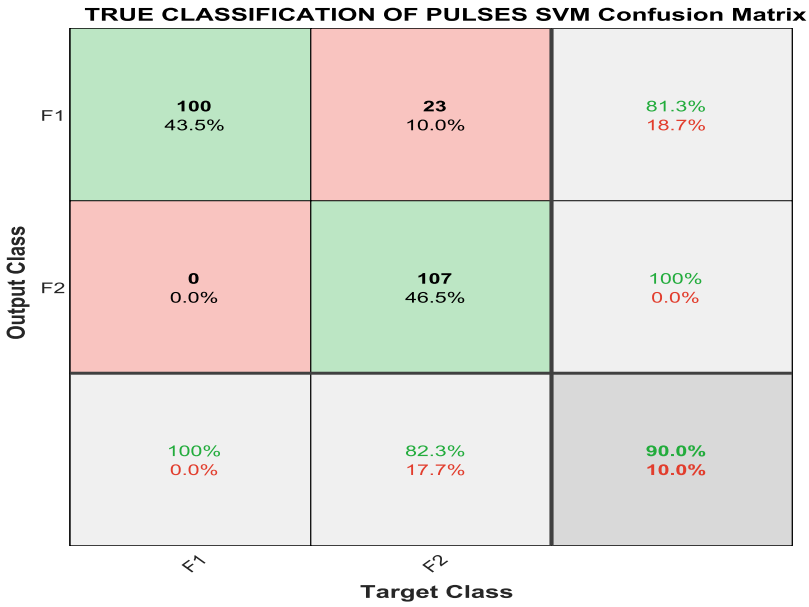

Figure 9: True classification of alzheimers features confusion matrix

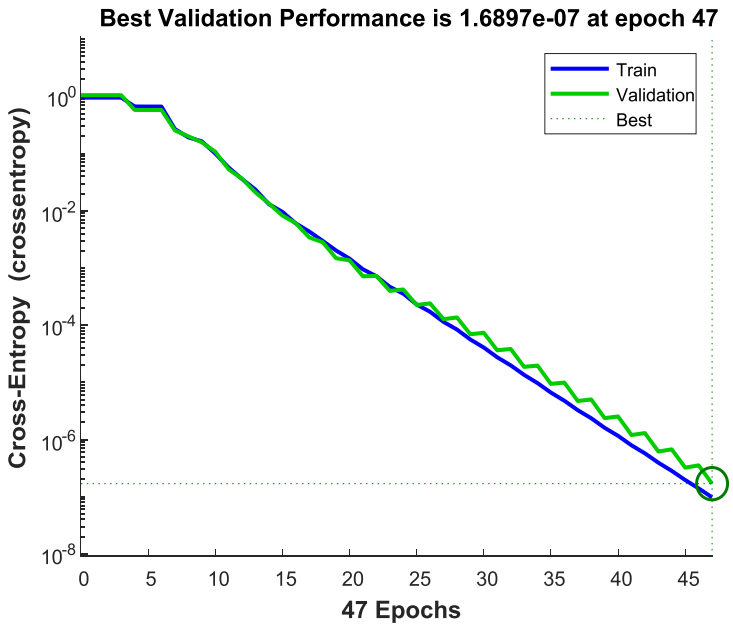

Figure 10: Performance validation of Alzheimer classification using SVM classifier

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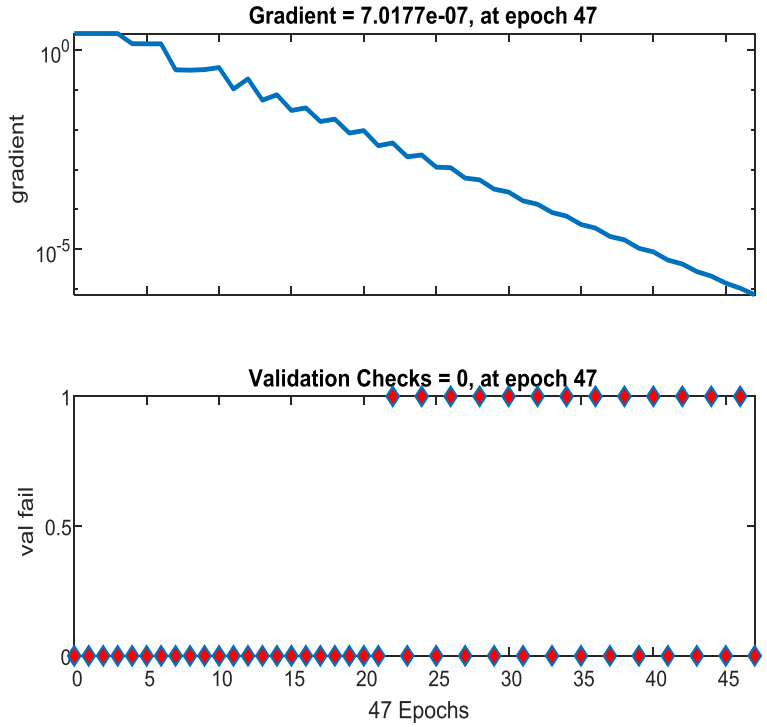

Figure 11: Training state diagram of the SVM classifier

Formulas:

1) Accuracy = (TP+TN)/((TP+TN)+(FP+FN))
2) Sensitivity = TP/(TP+FN)
3) Specificity = TN/(TN+FP)
4) Precision = TP/(TP+FP)
5) F_Score = TP/(TP+1/2*(FP+FN)) (OR)(2*Precision*Recall)/(Precision+Recall)

Where TP= True Positives
TN=True Negatives
FP=False Positives
FN=False Negatives

Comparision of Relu,Softmax and Svm Classifiers With Different Parameters

Name of the Parameter	**Classifiers**		
	RALU	SOFTMAX	SVM
True_classification	86.9748	88.4615	90
overall_accuracy	86.9748	88.4615	90
overall_sensitivity	88.7681	89.9254	91.1538
overall_specificity	88.7681	89.9254	91.1538
overall_precision	88.1679	89.3701	90.6504
overall_F_score	86.9635	88.4512	89.9907

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VI. Conclusion

The detection of Alzheimer's illness in beginning phases utilizing multiclass order has all the earmarks of being a difficult undertaking as it normally accomplishes standard outcomes if there should arise an occurrence of AD stage detection. In this tudy, we have proposed an ongoing deep and move learning features and order moves toward that effectively distinguish the multiclass arrangement of Alzheimer's infection. For move learning helped deep component detection, we have utilized a pre-learned Alex Net organization. We improved and changed these models to meet the necessity of our concern. Carefully assembled features are involved textural and measurable features. For deep features model and high quality component extraction model's appraisal, SVM, KNN, and RF are utilized as classifiers. we accomplished the best precision of 99.21% for a deep component and 92.85% for deep learning CNN. Results showed that obviously, considers dependent on move learning models performed well in contrast with different strategies. These models are pre-prepared with a lot of a dataset which reflects in these organizations results as they have accomplished the most noteworthy correctness's. Our proposed models showed very encouraging outcomes. As they have created high precision for multiclass characterization for early detection of Alzheimer's sickness.

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Design of Monopole Antenna for Brain Cancer Detection

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Abstract

Tumor in Brain could lead to death if not taken proper attention. Sometimes it may lead to most serious situations like brain cancer, which is Glioblastoma. The death rate is about 0.7 in last 2 years due to delay in the diagnosis. This distributed nature of the cancer also made this challenge in the treatment and diagnosis of the tumor or cancer in the brain muscles. Imaging techniques are traditionally used in detection of tumor in rain. Another approach is by using RF reflection approach, in which detect of tumor in brain done by analyzing variations in received signals from the head model with and without tumor. So, in this work a monopole patch of circular shape with pentagonal slot antenna is proposed that can detect the cancer related tumors in brain. The patch is pasted in the economical dielectric substrate FR4. The design has its dimensions of 36 × 39 × 1.6 mm3 and that can radiate with a maximum gain if 1.5 at ISM 2.4GHz with 0.84 GHz bandwidth from 2.16 to 3 GHz. The radiating efficiency of antenna is 74.5 %.

Keywords: Monopole Antenna, Brain Tumor, Monostatic Radar and radiation efficiency.

I. Introduction

In nature there are many health issued that cause human that, in which caner is one which causes significantly high death rates. This is happened due to late identification and also lack of self confidence [1-2]. There is high possibility of increasing patient life time, and sometimes cured if it identified in early stages like first and second stage. The many imaging techniques such as PET-CT (Positron Emission Tomography scan, Computed Tomography), Magnetic Resonance Imaging (MRI), Electro Encephalography (EEG), Magneto

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Encephalography (MEG), Magnetic Induction Tomography (MIT), and Electrical Impedance Tomography Technique (EIT) etc., are used in the detection of suspected tumors. But these methods require pre medical preparation of patient and need of experience doctor's observation. The process is time taking and costly. And also the results are not obtained instantly. So latest investigations in RF engineering is made to support the bio medical application such as in detection of tumor cells in human body with less time and low cost. In this sensor antenna plays a vital role. An impressive flexible antenna that used to detect various glands based on Electromagnetic Impedance Tomography technique using microwave frequency to detect tumor [3-4]. There are various works made bay changing substrate properties like Giigml1032, FR4, Taconic (TLY-5) substrate etc., and obtained satisfactory results detection of breast cancer in [5-8]. But the sizes are not comfort to patient to fit over breast. In [7] smart antenna using PCA and LDA classification algorithms also applied to differentiate cancer tumors form normal glands. Some works used the Inverse Fast Fourier Transform (IFFT) for spectral analysis to filter out the noise for accurate results. An antenna array is proposed in[10] to detect tumor, that is fabricated on PET substrate. A polyester based antenna array and head wearable array antenna for brain tumor detection is proposed by Alqadami et.al, it has multilayer and large size. [11-12]. The detection is done by imaging system. Compact a conformal antennas are also used based on EMIT technique to detect tumors.

From above literature, a pentagon slotted disc monopole antenna is proposed in this work. The proposed design is patched on 1.6 mm FR4 substrate with dielectric constant of 4.4. The article is organized to four sections. Section I includes introduction along with literature, the patch antenna design geometry is discussed in section II, Human head modeling using CST values covered in Section III, results and discussion are in Section IV, and finally Section V concludes the work. The design made to radiate at ISM 2.4 GHz band. Design and simulation is done using CST studio software and results are recorded.

II. Microstrip Patch Design Geometry

The proposed circular patch micro strip antenna is constructed by three layers; they are ground layer, substrate and patch. Here the shape of patch is considered as circular. The substrate material is FR4 dielectric material and the properties of this material are noted as: height is 1.6 mm, dielectric constant of 4.4 and 0.002 loss tangent. The micro strip line method is used to provide the excitation. The dimensions of substrate is 36 x 39 x1.6 mm3 and this is the size of proposed antenna. The width and length of feed line 3.115 mm and 15.51 mm. A pentagonal shape of slot is introduced in a circular patch. In this the ground is removed till the feed line that allows radiation in the desired ISM band frequency. The finalized design shown in Figure 1 is obtained by number of approximation using the software and the final design metrics of proposed antenna are listed in Table 1.

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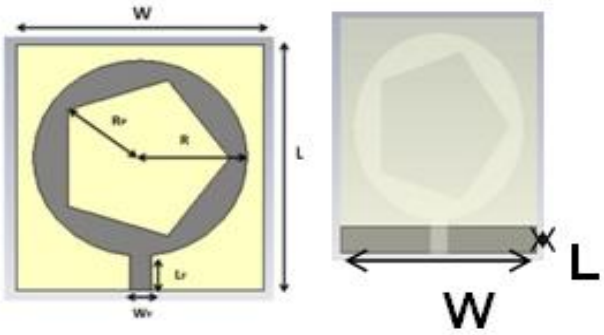

Figure 1: Design Model of the proposed antenna

Design Variable	**Symbol**	**Unit (mm)**
Width of substrate	W=WG	36
Length of substrate	L	39
Width of the feed	WF	3.12
Length of feed	LF	5.58
Radius of circular patch	R	15.5
Length of ground plane	LG	4.33
Radius of pentagonal slot	RP	13.5

III. Modeling of Human Head

The proposed antenna is designed for detecting the stroke in human brain. The human head model of seven layers were created in CST MW Studio with the help of dielectric properties. The seven layers of human head model is skin, muscle, fat skull, durra, cerebra spinal fluid, and brain. The dielectrical properties are, dielectric constant and conductivity depending upon the size and thickness of layers. The antenna can be kept at 5 cm above from the human skull model without tumor and provide the excitation to the antenna. The Figure 2 shows the placement of antenna in front of human head model. Then the antenna exhibits parameters like electric field, magnetic field, surface current and current density. These values are analyzed and then tumor of size 18 mm is placed on human head model. The same antenna parameters are analyzed and compared with previous parameters of antenna. The figure 3 shows the human head mode with stoke model (tumor).

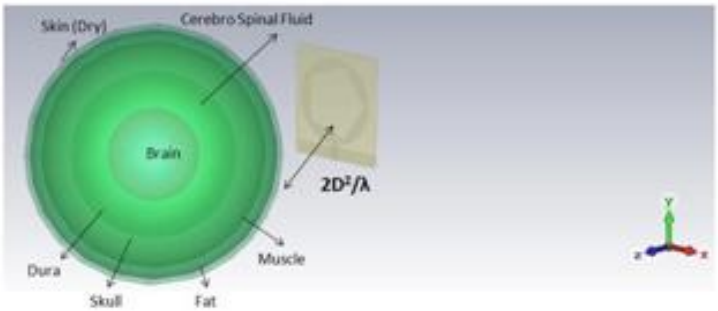

Figure 2: The positioning of proposed antenna in front human head model in CST MWS

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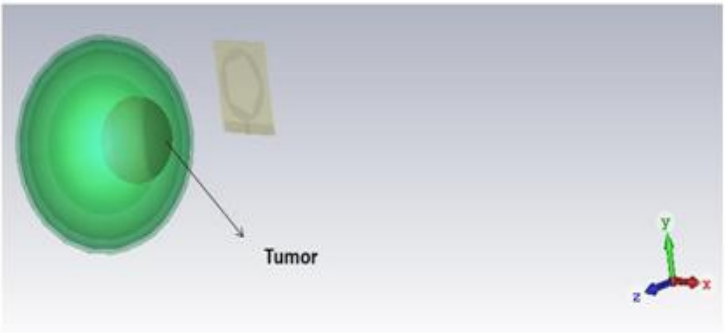

Figure 3: The spherical shape of tumor is introduce in human head in CST MWS

Table 2: Human head and tumor model

Head model	depth (mm)	εr	σ (S/m^2)
Skin (Dry)	2	38	1.5
Fat	2	5.3	0.1
Muscle	4	53.5	1.8
Skull	10	15	0.6
Dura	1	42	1.67
Cerebra Fluid	2	3.5	3.45
Brain	10	42.5	1.51
Brain tumor	12	58.2	2.54

IV. Results and Discussion

The simulation results of proposed micro strip patch antenna shown in figure 4. By observing the S- parameters graph(return loss Vs Frequency), the proposed antenna operate at 2.45 GHz frequency and it provide band width 857.3 MHz at -10 db return loss and reflection coefficient is -38.44822. An efficiency of 72.5% and gain is 1.421db in a normal position for proposed circular patch antenna which is being simulated in free space.

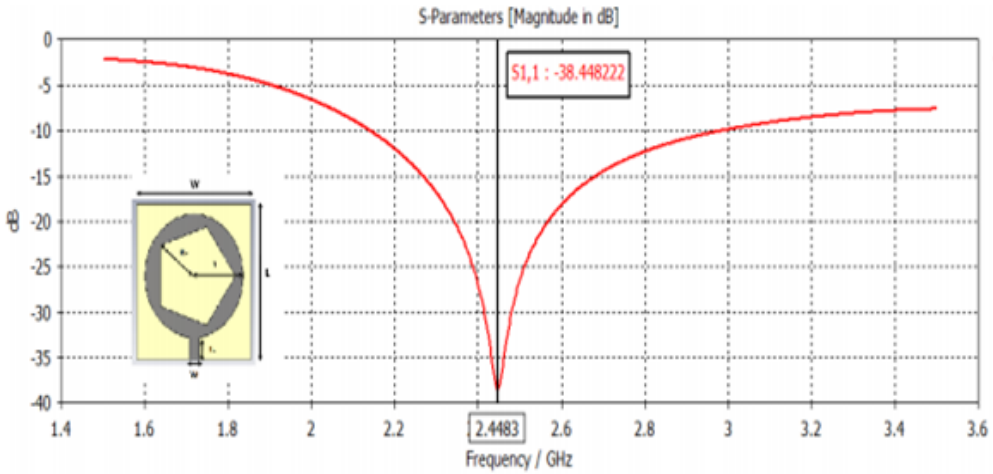

Figure 4: S-parameter plot for the proposed micro strip patch antenna

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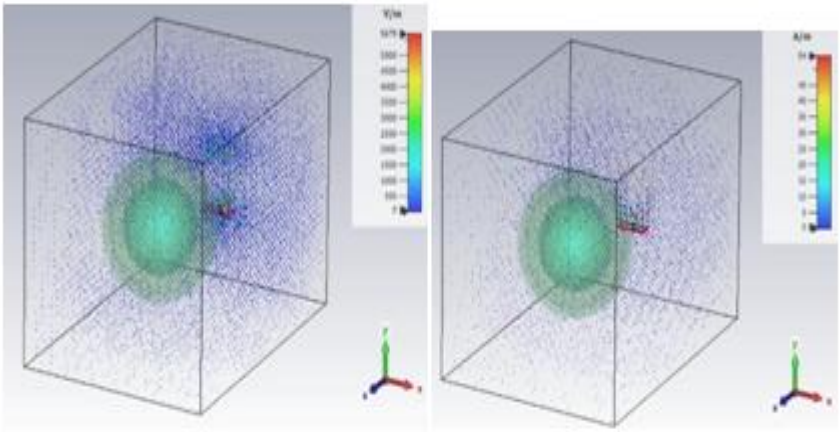

Figure 5: Electric and Magnetic Field values of the proposed antenna with head model in CST MWS

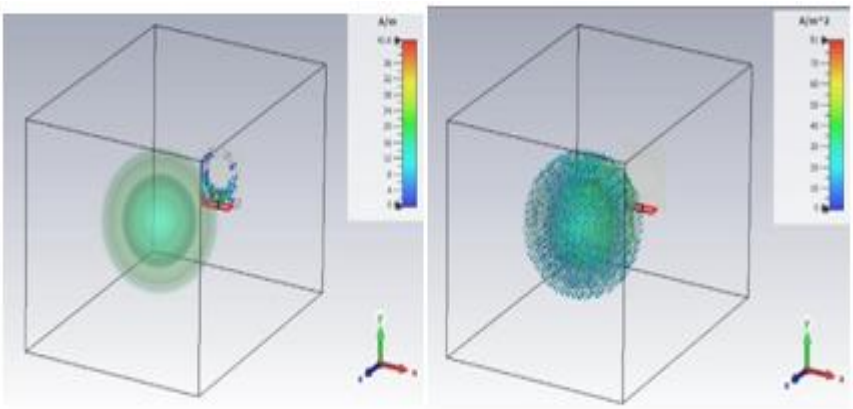

Figure 6: Surface current and current density values of the proposed antenna with head model in CST MWS

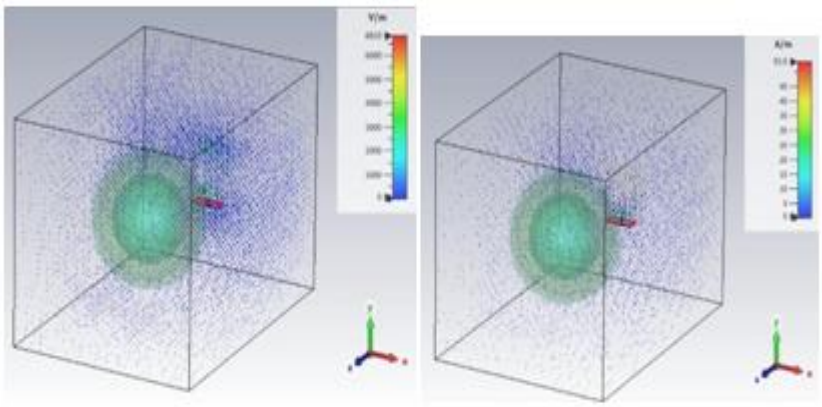

Figure 7: Electric and Magnetic Field values of the proposed antenna with head model and tumor in CST MWS

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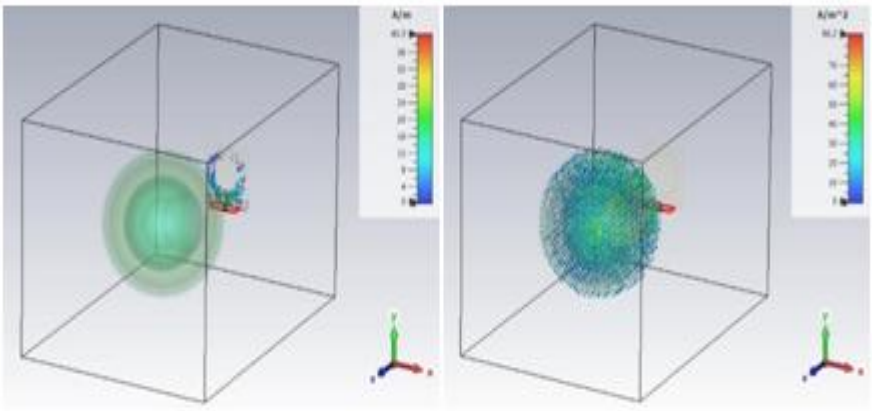

Figure 8: Surface current and current density values of the proposed antenna with head model and tumor in CST MWS

Table 3: The result comparison among the proposed antenna without tumor and with tumor

Model	Electric Field (V/m)	Magnetic Field (A/m)	Surface current (A/m)	current density (A/m^2)
For proposed antenna with head model without tumor	5679	54	41.6	81
For proposed antenna with head model and tumor	6810	53.5	40.3	86.2

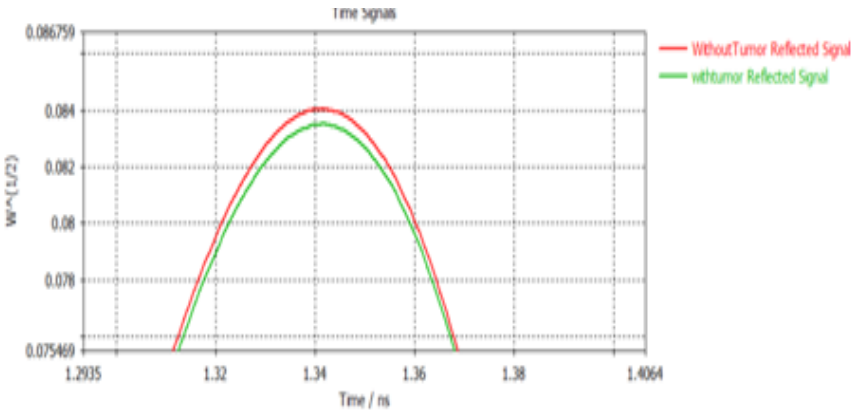

Figure 9: Amplitude Variation between Reflected signals with and without tumor model

Table 3 shows the comparison of antenna parameters among the proposed antenna without tumor and with tumor. From the above table, electric field, magnetic field, surface current and current density values for without tumor and with tumor are varied, with help these threshold values and also using the variation in Reflected signals with and without tumor model (shown in figure 9), the proposed circular patch antenna able to detect tumor in head.

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V. Conclusion and Future Scope

In this article a pentagon slotted disc shaped microstrip patch is proposed for tumor tissue detection in brain that can radiate 2.4 GHz. It has significant radiation band from 2.16 to 3 GHz allows S and applications along with ISM 2.4GHz band. Removal of complete ground gives the radiation similar to monopole. The slot provided in the patch makes the patch radiate at low frequencies, so one can treat it as electrically small antenna. The size 36 × 39 × 1.6 mm3 shows compactness and easy to use with patient. More accuracy can be obtained by using a group of such pact antennas by forming a bowl shape to suit the skull structure.

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An Approach for Single MR Image Resolution Enhancement Using Channel Splitting Framework

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Abstract

High goal attractive reverberation (MR) imaging is alluring in numerous clinical applications because of its commitment to more exact ensuing examinations and early clinical analyses. Single picture super-goal is a viable and cost proficient elective strategy to work on the spatial goal of MR pictures. In the previous few years, SISR strategies dependent on profound learning methods, particularly convolutional neural networks (CNNs), have accomplished cutting edge execution on regular pictures. Nonetheless, the data is bit by bit debilitated and preparing emerged to be gradually troublesome as the network develops. The issue is more genuine for clinical pictures in light of the fact that lacking superior grade and powerful preparing tests makes profound models inclined to underfitting or overfitting. By and by, numerous present systems handle the progressive highlights on various channels comparably, which isn't useful for the models to manage the various leveled includes discriminatively and targetedly.To this end, we present a channel splitting network (CSN) to facilitate the illustrative weight of profound models. The proposed channel splitting network model divided the progressive features into two branches, i.e., remaining branch and thick branch, with various data transmissions. The leftover branch can advance feature reuse, while the thick branch is useful to the investigation of new characteristics. Plus, we likewise embrace the union and-run planning to facilitate information joining between various branches. Broad analyses on different Magnetic Resonance pictures, show that the proposed CSN model accomplishes better execution over other best in class SISR strategies.

Keywords: Resolution, CSN model, Magnetic resonance image

I. Introduction

Spatial goal is maybe the principle imaging limits for attractive reverberation imaging (MRI).In numerous medical applications, high resolution (HR) MRI is normally favored in

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light of the fact that it can give more huge construction and surface subtleties with a more modest voxel size, in this way advancing exact resulting investigation and early finding. However, it is restricted by a few elements, equipment gadget, imaging time, wanted sign to-clamor proportion (SNR) and body movement and so forth, and expanding spatial goal of attractive reverberation (MR) pictures normally diminishes picture SNR and additionally builds imaging time.

Picture super-goal (SR) is an ordinary not well presented converse issue in PC vision local area, which chiefly targets deducing a HR picture from at least one low goal (LR) pictures. It's anything but an all around examined issue in both regular picture (NI) and MR picture preparing. High resolution implies that the pixel thickness of a picture is higher than its LR partner. Along these lines, HR pictures can offer more subtleties that might be basic in different applications, for example, clinical imaging elevated ghastly imaging and far off detecting imaging and security and observation where high recurrence subtleties are vital and significantly wanted.

II. Existing System

In the existing systems the super resolution methods proposed up to now are (i) interpolation methods(ii) modeling & reconstruction methods eg.; IBP projection. The exhibition of these strategies is innately restricted on the grounds that the extra data accessible for taking care of this badly presented converse issue is likewise exceptionally restricted, for example, the insertion strategies utilize the essential smoothing priori by verifiably expecting that the picture signal is constant and data transfer capacity restricted, and customary AI based techniques can learn deficient data because of the restricted illustrative capacity of these shallow systems. The medical image processing society has perceived these advances and few medical image SR methods based on deep learning have also emerged. Thus, by using deep learning for medical image resolution it has become somewhat easier. So, instead of mapping all the features from preceding layer to the succeeding layer. splitting feature maps into two different parts (branches) with different information transmissions will takes place.

III. Proposed System

In this project we proposed an efficient approach for Single Magnetic Resonance Image Super Resolution using the Robust Channel Splitting Network. The presented channel splitting network model partitions the various leveled highlights into two branches, i.e., remaining branch and thick branch, with various data transmissions. The leftover branch can advance element reuse, while the thick branch is gainful to the investigation of new highlights. Moreover, We additionally receive the union and-run planning to work with data coordination between various branches. The proposed system first considers the low resolution magnetic resonance image and preprocesses it accordingly. Next the proposed system implements a channel splitting approach, where the preprocessed image is decomposed into its residual and dense feature channels. Now the core conceptual work is to magnify the residual features using retinex approach, Whereas the poor resoluting components in the dense features are magnified contrast limited adaptive histogram equalization approach. After processing, the processed residual and dense features are

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suitably combined to obtain the final resolution enhanced image. The schematic representation of the proposed design is shown below.

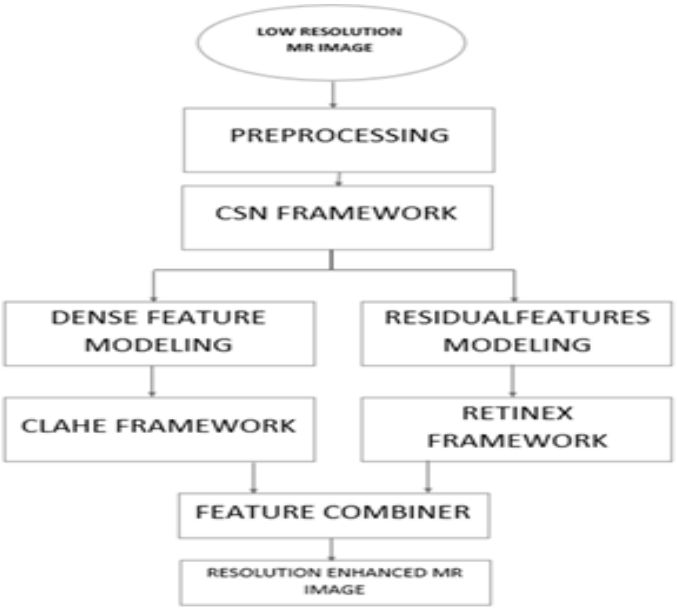

Figure 1: Schematic block overview of the proposed Resolution Enhancement Framework

Huge number of experiments on various magnetic resonance images tell that the proposed CSN model gets superior performance on other state-of the-art single picture super goal strategy .In this process, an additional knowledge was added during reconstruction by taking reference another high resolution image. Using a high resolution image as reference but in another way to generate high resolution images. By this method very little information was added because they use only a single high resolution image as reference.

IV. Results

The original image given as the input is shown below.

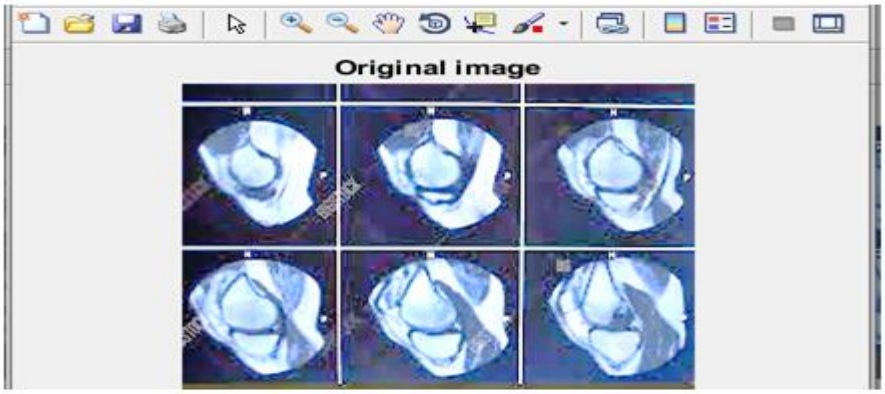

Figure 2: Original Image

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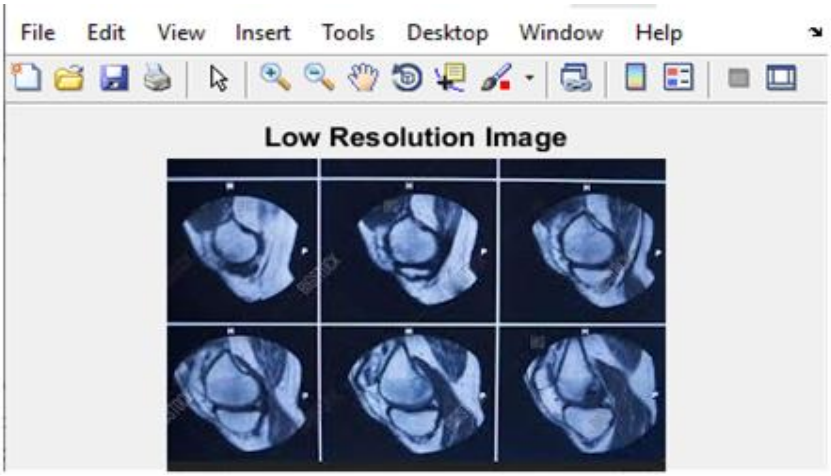

Figure 3: Low Resolution Image

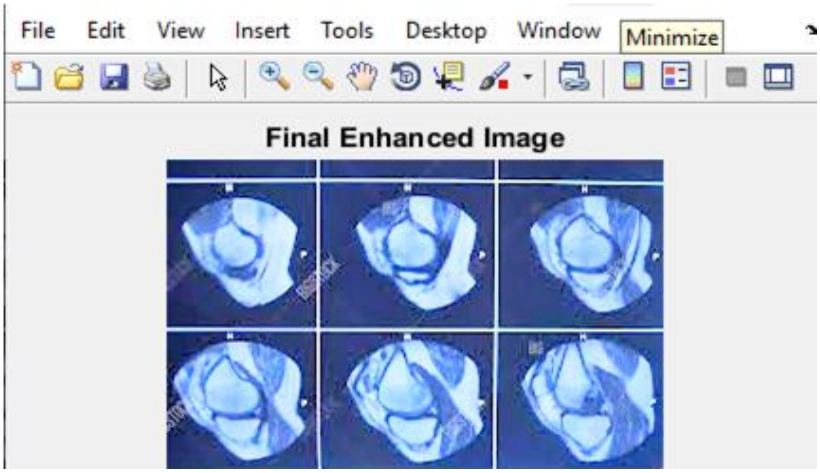

Figure 4: Final Enhanced Image

The final super resolution enhanced image after the simulation using channel splitting framework is shown below.

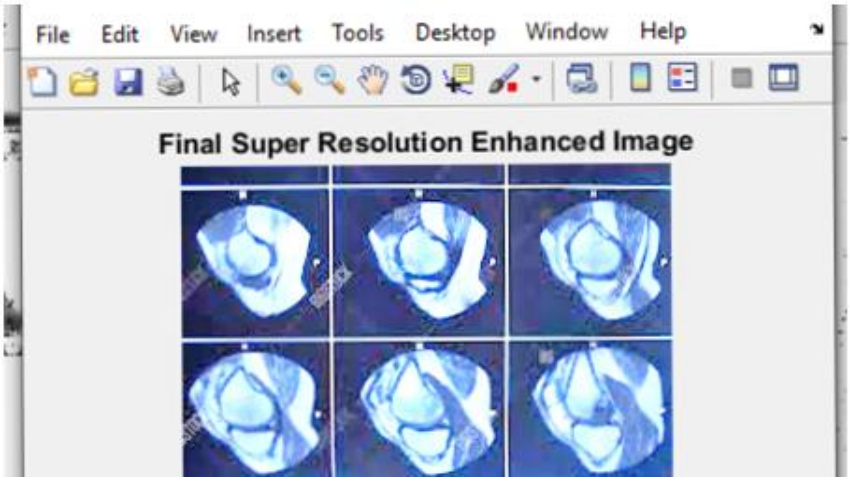

Figure 5: Final Super Resolution Image

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V. Conclusion

The main issue using deep models to super resolve magnetic resonance images is due to low quality and lack of training samples which gives rise to degradation of performance and deep modeling failure. In this project, a deep channel splitting network is presented to do two dimensional magnetic resonance image super-resolution, that is mainly taken up using a sequence of cascaded channel splitting blocks. Residual and dense branches are used to divide the ranking characteristics, that assist the model to differentiate various characteristics precisely. Merge and Run mapping for merging the characteristics on various fork. The profundity of the system and the diverseness of converting the ranking characteristics can be done easily with the help of Channel . So the proposed system execution development was assisted from both parts and extra execution was also achieved by searching other fork structures. As it upgrades the difficulty in the middle of upgrading system execution and relieving model training to some range. Medical images, such as CT, ultrasound and PET etc. are also dealt using this.

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A Novel Proposal of MIMO Systems in Underground Tunnels for Future Mobile Communications

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Abstract

The MIMO (Multiple Input Multiple Output) buildings can efficiently mitigate the extreme multipath fading results in underground tunnels. Due to the unique tunnel channel characteristics, there exist pinnacle of the line antenna geometries that can maximize the MIMO channel capacity. In this paper, an excellent MIMO antenna geometry sketch scheme is developed based totally on the comparison of the channel possible in underground tunnels. The MIMO channel capacities in every empty tunnels and tunnels with obstructions are analytically expressed to facilitate the antenna geometry design. Simulation penalties show off that the MIMO system with designed antenna geometry has obvious enhancements in channel possible than the machine with the ordinary linear array antenna geometry.

I. Introduction

The potential of Ultra Wide Band (UWB) technological know-how is sizable due to its super benefits such as the functionality of offering excessive velocity facts quotes at brief transmission distances with low strength dissipation. The swift increase in wi-fi verbal exchange structures has made UWB an tremendous technological know-how to exchange the traditional wi-fi applied sciences in today's use like Bluetooth and wi-fi LANs, etc. A lot of lookup has been executed to improve UWB LNAs, mixers and complete front- ends however now not that a great deal to enhance UWB antennas. Recently, educational and industrial

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communities have realized the tradeoffs between antenna diagram and transceiver complexity. In general, the transceiver complexity has been increased, with the introduction of superior wi-fi transmission techniques. In order to beautify the overall performance of transceiver except sacrificing its high-priced architecture, superior antenna plan ought to be used as the antenna is an necessary section of the transceiver. Also,the complexity of the basic transceiver is reduced. The UWB science affords the actual wi-fi freedom with current lengthy vary radio applied sciences such as Wi-Fi, global interoperability for microwave get entry to (Wi MAX), wi-fi nearby region community (WLAN), and mobile broad vicinity communications via changing quick wired links. UWB presents the suited cost-effective, power-efficient, excessive bandwidth answer for transmitting more than one digital video and audio streams information amongst the quick vary devices.

There are many challenges to overcome ,in implementation of UWB technology. The principal task is to plan an antenna with an running bandwidth overlaying the complete UWB (3.1- 10.6 GHz) and succesful of receiving on related frequencies at the equal time [FCC(2002)]. The hardest mission in designing a UWB antenna is to gain wide impedance bandwidth with excessive radiation efficiency. The concurrent surge of wireless devices, with high degree of miniaturization and excessive frequency of operation, has improved the activity in designing excessive overall performance antenna types. Therefore, there is a developing demand for small and low value UWB antennas that are in a position to supply first-class overall performance in each time and frequency domains. The style in latest wi-fi systems, such as UWB primarily based systems, are to construct small, low-profile built-in circuits so as to be like minded with transportable wi-fi devices. Also, the dimension impacts the obtain and bandwidth. Therefore, the dimension of the antenna is viewed as one of the crucial problems in UWB machine design. Recently, there is a demand to enlarge the information price of present wi-fi verbal exchange systems.

The transmitted strength stage of UWB indicators is strictly confined in order for UWB units to peacefully coexist with different wi-fi systems. Such strict strength hassle poses good sized challenges for designing UWB systems. One predominant assignment is to reap the preferred overall performance at ample transmission vary the use of constrained transmitted electricity . Another project is to layout UWB waveform that correctly makes use of the bandwidth and electricity allowed by using the FCC spectral mask. Moreover, to make certain that the transmitted electricity stage satisfies the spectral mask, sufficient characterization and optimization of transmission strategies (e.g., adaptive electricity control, obligation cycle optimization) may additionally be required.

II. Literature Survey

Lu et al.(2004) introduced Diamond and rounded diamond antennas which had wide-band houses suitable for ultra-wide-band (UWB) applications. In their work, the authors performed theoretical analysis, simulations and experiments in addition symbolize these two antennas in phrases of radiation pattern, achieve versus frequency, impedance properties, etc. It was once proven that the diamond antenna can be approximated by using a simplified analytical mannequin composed of easy linear elements. The mannequin lets in for characterizing of the diamond antenna, its conduct and methods of enhancing its performance. "Rounding" the diamond antenna, i.e., a rounded diamond used to be proven to function higher than the traditional diamond for UWB purposes. The mannequin used to be

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tested by way of simulation. The simulations used to be proven via experimental measurements performed in an anechoic chamber. The method of the authors circumvents dimension difficulties and hooked up self belief in the usage of simulation software program for reading UWB antennas.

Bolin et al. (2005) suggested variety attain overall performance of a two-antenna setup in an workplace environment. The terminal used to be handheld in front of the person simulating a information mode state of affairs whilst strolling around. The twin polarised base station area antenna is positioned at the stop of a corridor. The consequences indicated that experimentally finished range performance is comparable to in the past estimated theoretical data.The antenna designed by means of the authors was once designed in the UWB range.

Chong et al., 2006 described UWB is a radio technology, which operates in the frequency vary of 3.1 GHz to 10.6 GHz at very low energy degree for short-range communications barring inflicting interferences to the licensed users. People desire higher freedom and comfort in connecting all sorts of gadgets such as private computer, handheld customer electronics and cellphone telephone etc. when the person is transferring into the domestic and office. The UWB technological know-how gives the actual wi-fi freedom with current lengthy vary radio applied sciences such as Wi-Fi, international interoperability for microwave get right of entry to (WiMAX), wi-fi neighborhood region community (WLAN), and mobile extensive vicinity communications by using changing quick wired links.The authors introduced an UWB antenna which gives the applicable cost- effective, power-efficient, excessive bandwidth answer for transmitting more than one digital video and audio streams records amongst the quick vary devices. In a conversation system, antenna is one of the most essential constituent. Hence, in order to diagram an UWB antenna, which conduct have to be predictable and constant throughout the whole running vary affords incredible challenges to the antenna designers.

Migliore et al(2006) introduced novel kind of multiple-input multiple-output (MIMO) antenna using parasitic factors . A desirable mannequin for the parasitic-MIMO device used to be first mentioned and then numerically and experimentally investigated. The consequences proven by way of the authors appreciably multiplied the overall performance of the conversation gadget with a minimal influence on the complexity and value of the common system.

III. Proposed Work

In underground mines and avenue tunnels, strong and dependable wi-fi networks with excessive throughputs are wished to assurance the safety, to enhance the productiveness and to supply handy communications. Since the wi-fi indicators are limited to the inside house of the underground tunnels, the multipath fading in these environments is an awful lot extra extreme than the terrestrial wi-fi channels [1]. By in search of spatial diversity, MIMO (Multiple Input Multiple Output) structures furnish greater spectral effectivity and hyperlink reliability. They can notably mitigate the have an impact on of the multipath fading in terrestrial wi-fi verbal exchange structures [2], [3].

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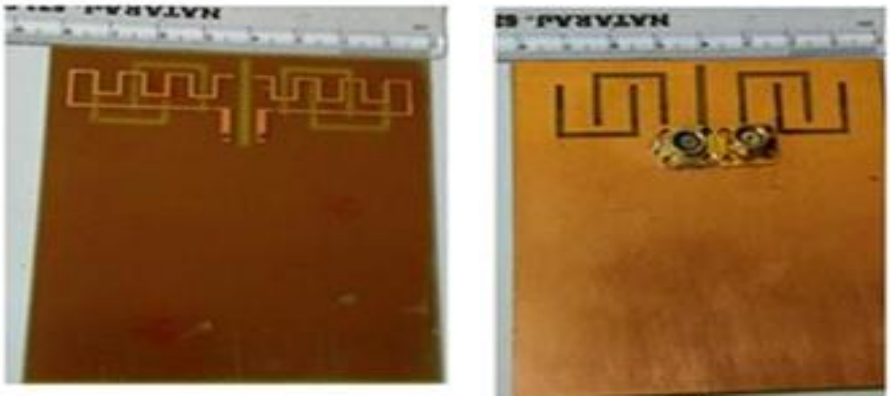
In underground tunnels, the MIMO approach additionally has the workable to tackle the multipath fading trouble to enhance the gadget robustness and reliability, as nicely as to extend the throughputs by means of multiplexing facts onto a couple of transmit antennas. According to our preceding evaluation on the underground tunnel channel [1], the positions of the transmitter and the receiver have enormous influences on the channel acquire (or route loss). Hence the antenna geometry of the MIMO gadget might also have an effect on the MIMO channel potential a lot. Since the electromagnetic (EM) waves have positive propagation patterns (modes) in underground tunnels, it is viable to locate the optimum MIMO antenna geometry to maximize the channel capability in accordance to the EM area distribution of the modes. In this project, we furnish an top-quality MIMO antenna geometry sketch scheme to maximize the channel potential in underground tunnels. Specifically, we first increase a channel mannequin in tunnels with obstructions primarily based on our preceding work [1]. Then an analytical expression of the MIMO channel potential is furnished in accordance to the channel model. An most appropriate MIMO antenna geometry plan scheme is developed based totally on the channel capability analysis. Simulations are performed in each empty tunnels and tunnels with obstructions. It is proven that the MIMO machine with designed antenna geometry has apparent enhancements in channel potential than the machine with the regular linear array antenna geometry.

IV. Results and Discussions

Fig. 4.1 shows the fabricated prototype of the proposed antenna. A Vector Network Analyser hasbeen used for measurement and verification of the antenna performance. The return loss of the antennawasmeasured by excitingone of the ports of the antenna, where as the other wasterminated with a 50Ω load. It is evident from the graph that both simulated andexperimental results are in goodagreement.



(a) (b)

Figure 4.1: Fabricated proto type of the proposed antenna (a)FrontView(b)BackView

1. **Radiation performance:** The radiation characteristics of the proposed antenna at its operating frequencies for E plane atϕ=00 and ϕ=900 is given in Fig. 4.2(a) and Fig. 4.2(b) respectively.It is clear that the proposedantenna is radiating in broadside direction and has a good gain at the operating frequencies. The gainat different resonant frequencies has been tabulated (seeTable4.1) along with the value ofits reflection and coupling coefficients. Maximum gain of 8.35 dB has been achieved at

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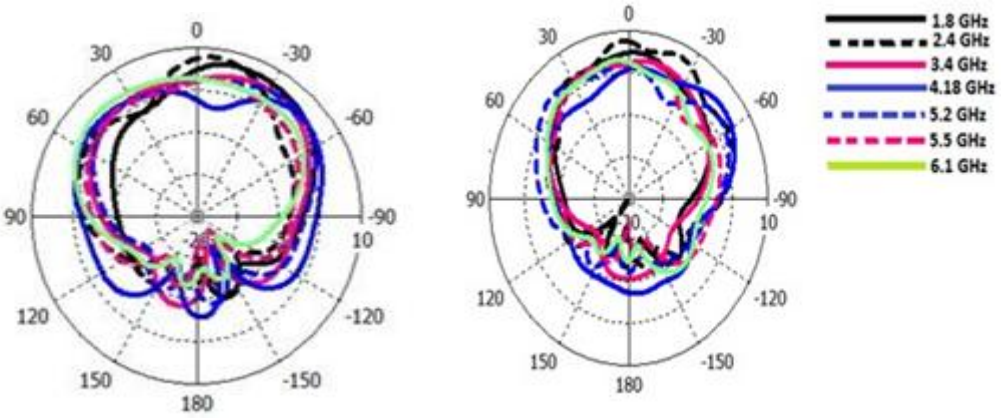
2.4 GHz.The maximum isolation between the two elements is -57 dB at 1.8 GHz.Also, at other operatingfrequencybandsthe isolation ishigherthan -20dB.



(a) (b)

Figure4.2:Radiationcharacteristicsofproposedantennaf orE-planeatoperatingfrequencybands(a)ϕ=00
(b)ϕ=900

Table4.1:GainandS-parameters(measured)atdifferentresonantfrequencies

ResonantFrequency (GHz)	Gain(dB)	S_{11} dB)	S_{21}(dB)
1.8	7.59	-22	-55
2.4	8.35	-20	-37
3.4	6.11	-18	-22
4.18	5.8	-16	-19
5.2	6.28	-13	-25
5.5	4.47	-24	-24
6.1	5.69	-14	-25

2. **Diversityperformance:** Animportant consideration in the diversity system is to implement receiverantenna diversity. The antenna diversity performance consists offinding envelopecorrelation coefficient (ECC) between the two antenna systems. ECC is a measure of the isolation and correlation between theradiation patterns of MIMO receiving antenna pairs. Hence,it is mandatory to achieve a lowenvelope correlation coefficient (ECC).

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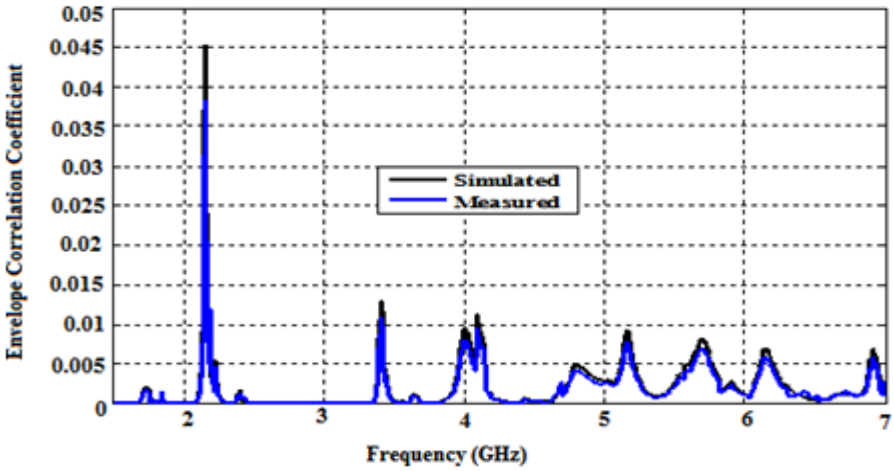

Figure4.3: Measure denvelope correlation coefficient

3. **Specificabsorptionrate:** SAR is an abbreviation for Specific Absorption Rate.It estimates the amount of power absorbedin the living tissues of human body while using a mobile phone. The higher the value of SAR, themore radiation will be absorbed into human head, and causes undesired biological hazards [121].SAR can bedefined as:

$SAR=P=\sigma E2$…….4.5

$\rho \quad 2\rho$

Where P is the density of power absorbed inthe human head, ζ and ρ are the electricalconductivity (Kg/m3) and density (S/m) of the head tissue respectively, and E is the inducedelectricfield (V/m).UnitofSARisW/kg.

The values of SAR at different operating frequencies have been calculated for the proposed structure with and without DGS (see Table 4.2).The value of SAR has been estimated over 1g and 10g headtissues. It has been observed that the antenna with DGS haslesser SAR valuesareas compared to antenna without DGS. This may be attributed to the improvement in the radiationperformance of the antenna. These values are well below the acceptable limits set by ANSI/IEEEand FCC.

Table4.2:SARvaluesofthedesignedantenna

Frequencies(GHz)	**WithDGS**		**WithoutDGS**	
	SARover10g (W/Kg)	SARover1g (W/Kg)	SARover10g (W/Kg)	SARover1g (W/Kg)
1.8	0.880	1.16	0.980	1.28
2.4	0.178	0.484	0.196	0.532
3.4	0.799	1.01	0.897	1.13
4.18	0.328	0.943	0.343	0.975
5.2	0.397	0.847	0.409	0.896
5.5	0.503	0.653	0.514	0.738
6.1	0.413	0.946	0.423	0.988

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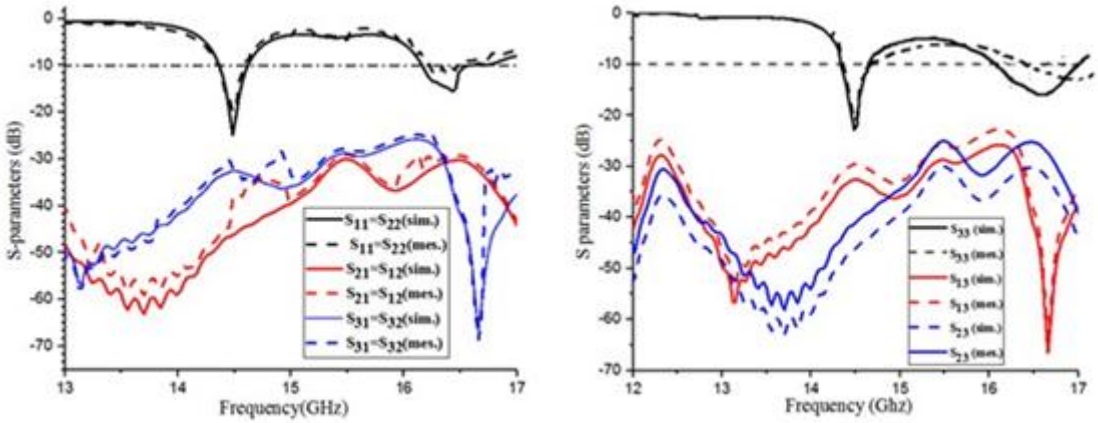
4. Discussion of mimoantenna results

Return loss response and current distribution: The simulated and experimental results of the MIMO antenna are shown in Fig. 6.13. The Sparameters for port 1 and port 2 are same as the S parameter for single element antenna. But Sparameter for port 3 at 16.1 GHz is different from other ports due to its placement. It can be seen from the figure that the simulated value of is olation parameters is less than-30d B with out any use of isolation enhancement technique. This has been achieved due to novel technology i.e. substrateintegrated wave guide. The simulatedimpedanceb and width(IBW)forelements1and2 are 5.01 % centered at 16.1 GHz and for element 3 is 6.21 % centered at 16.1 GHz. Thesimulated surface current distribution is represented in Fig. 6.5 for the cases when each port isexcited individually. Fig. 4.4 shows that at 14.4 GHz, it is completely behaving asendfireradiator andat16.1 GHzasbroadsideradiator[137].



4.4.1.1 (b)

Figure4.4 :Simulated and measured Sparameters of Hshaped MIMO substrateinte gratedwaveguide Hplanehorn antenna(a)Port1andport 2(b) Port3

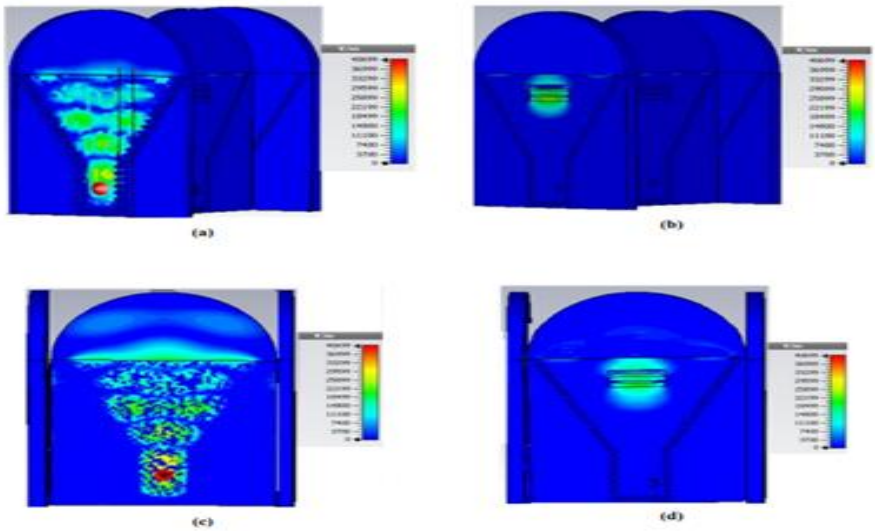


Figure4.5 :Current distribution of Hshaped MIMO substrateintegrated wave guide Hplanehornantenna(a)at 14.4GHz(b) 16.1GHz (whenport1isexcited) (c)at14.4GHz (d)16.1GHz (whenport3isexcited)

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Radiationper formance: The simulated 3-D far field radiation pattern at 14.4 GHz and 16.1 GHz is shown in Fig. 4.5 forthefollowingthreecases:(a)when port-1isexcited,(b)when port-2isexcitedand(c)whenport-3 is excited.The simulated andmeasured radiation patterns of theantenna element are shown in Fig.6.16. From the figure, it clearly shows that the antenna is perfectly end fire and broadsideatfrequencies14.4GHzand16.1GHz.with simulated peakrealized gains around dBi and 8.87 dBi (Fig. 4.4 (a) and Fig. 4.5 (b)). The measured results are calculated byexciting one port at one time with anechoic chamber. As, seen the Fig. 4.4 and 4.5 , it clearlyindicated that the antenna is perfectly endfire and broadside at different ports of the antenna. Hence , the coverage area of theantennaisin creasedwhich leads to high data rate.

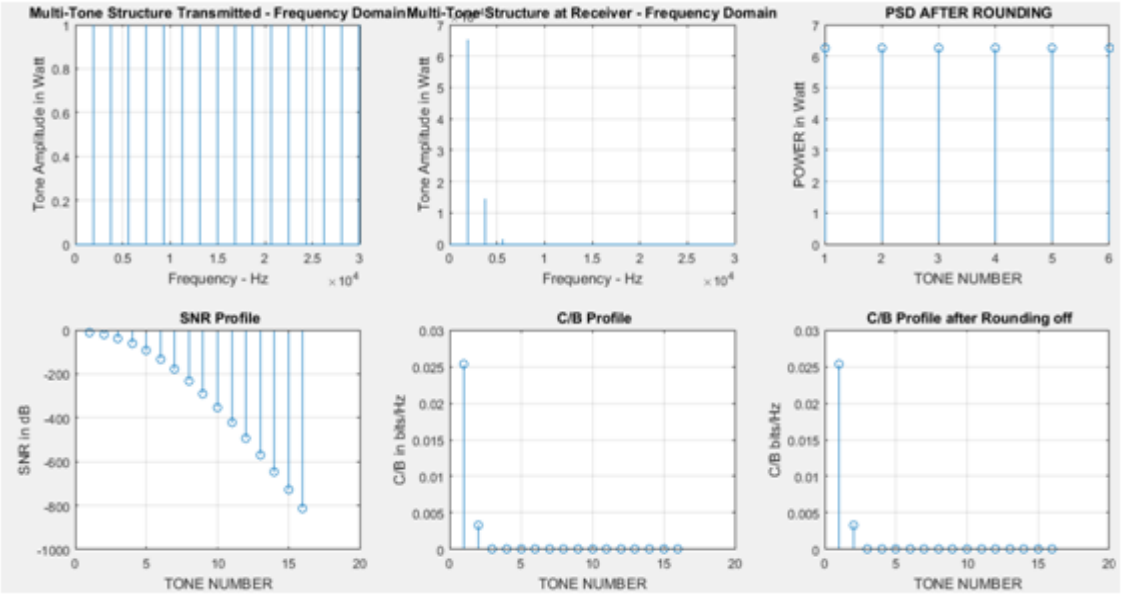

Figure 4.6 :Schematic SNR and Channel Bit rate analysis of the proposed Underwater communication links.

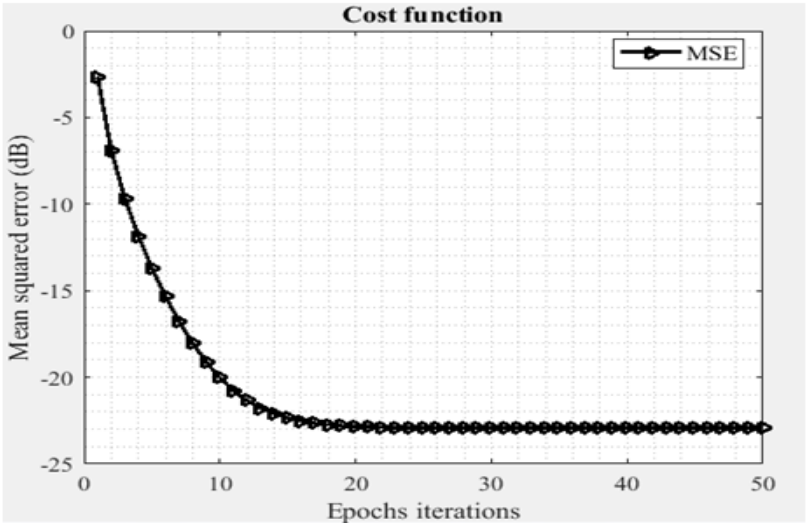

Figure 4.7 :Graphical variation of the overall Mean Square Error as a function of the no of iterations.

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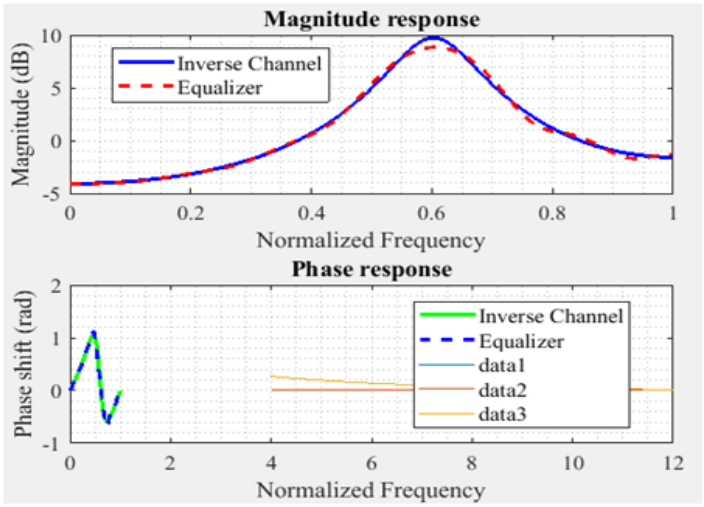

Figure 4.8 :Frequency Response Characteristics of the proposed system.

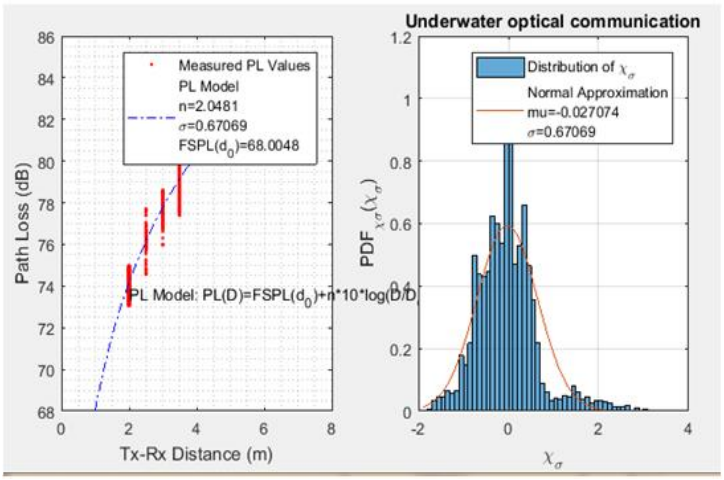

Figure 4.9 :Overallpathloss analysis of the proposed Underwater Communication system.

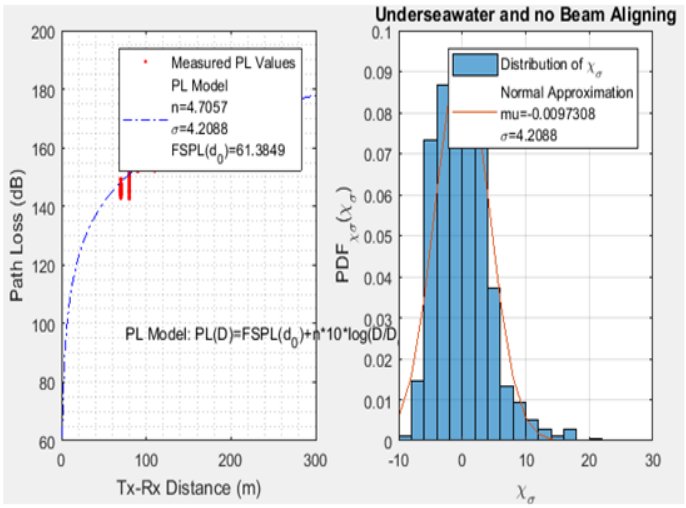

Figure 4.9 :Overallpathloss analysis of the proposed Underwater Communication system under no beam alignment condition.

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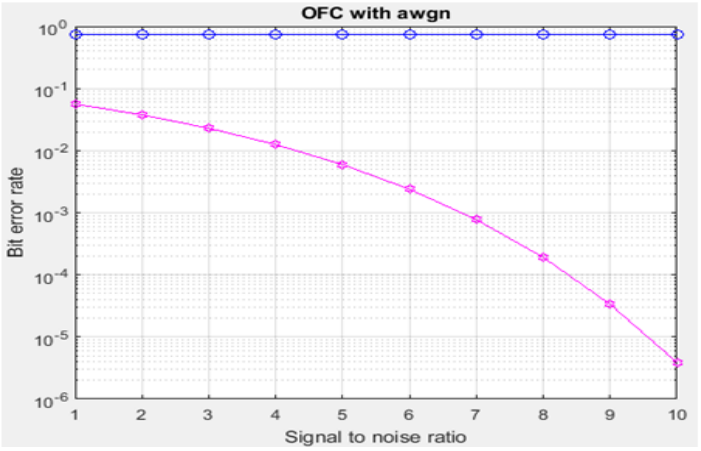

Figure 4.10 :Signal to Noise Ratio versus Bit Error Rate performance of the proposed system.

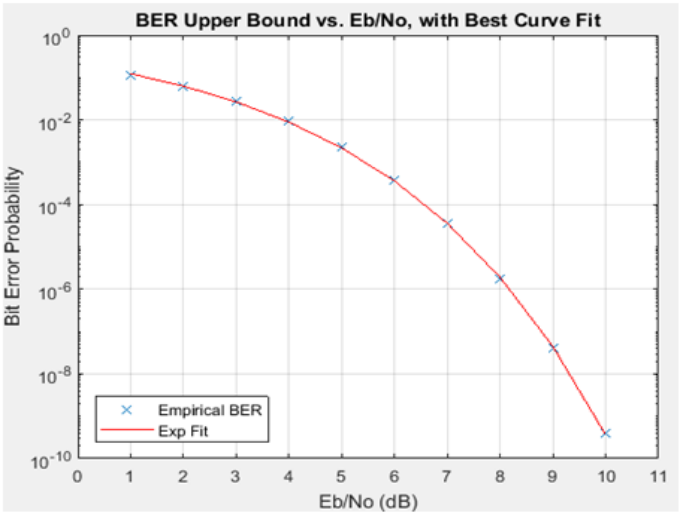

Figure 4.11 :Upper bound empirical Bit Error Rate performance of the proposed system.

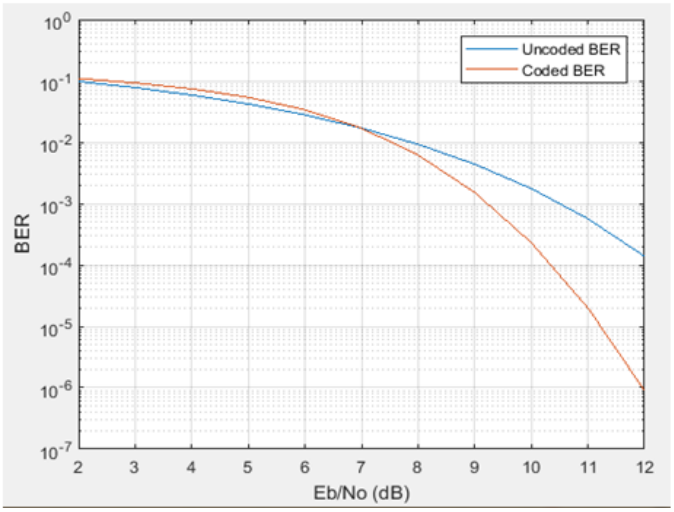

Figure 4.12 :Bit Error Rate performance of the proposed system under coded and uncoded conditions.

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V. Conclusion

In this project, an most desirable antenna geometry format scheme for MIMO structures in underground tunnels is developed based totally on the evaluation of channel characteristics. It can be concluded that: in tunnels with a massive variety of random obstructions, the channel is stochastic the place the modes are coupling with every other. The norm of the coupling coefficients have the Rayleigh distribution. In empty tunnels, the channel is deterministic and can be divided into N impartial sub-channels. Each sub-channel corresponds to a vast mode in the tunnel. To maximize the MIMO channel capacity, the antennas with most desirable geometry need to be in a position to successfully excite and acquire these modes that have sizable power. Hence the antenna factors are positioned at the positions the place the eigenfunctions of the sizable modes attain their extrema values. In empty tunnels, much less antenna factors are wished seeing that the variety of tremendous modes come to be much less and much less as the transmission distance increases. In tunnels with obstructions, extra antenna factors are wished considering the fact that obstructions can couple the decrease order modes to the greater order modes.

Future Scope:

- The introduced MIMO antennas consist of a most of 4 elements. Massive MIMO antenna can be designed by using setting extra range of antennas. Massive is an extension of MIMO antenna which surely agencies collectively the antennas at transmitter and receiver to grant higher throughput and higher spectrum efficiency. Massive MIMO antenna has an utility in 5G technology. It will supply super- quickly 5G networks.
- Size of the Horn antenna can be decreased by way of the use of folded substrate built-in waveguide (FSIW) and 1/2 mode substrate built-in Waveguide (HSIW) technology. Folded SIW is essentially used to reduce measurement of the antenna. The width of the SIW is decreased to half of and top is increased.
- Smart antenna can be designed the use of this technology

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MIMO Visible Light Communication System with Energy Efficiency Optimization Technique

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Abstract

High information rates for indoor communications can be supported by Multiple-Input Multiple-Output (MIMO) Visible Light Communication(VLC)frameworks. In this paper, the EE optimization for MIMO VLC frameworks will be centered. This is based on the non-negativeness of the transmit signal, the optical and electrical force constraints, the information rate and bit error rate (BER) requirements. For this a difficult nonlinear fractional program will be considered. Visible light communication (VLC) frameworks can be implanted into the existing illumination infrastructure and ordinarily consist of multiple light sources. To achieve spatial multiplexing and backing high information rates, multiple light emitting diodes(LEDs) can be used. Flexibility is the another benefit provided by deploying multiple LEDs for dimming control to meet the illumination requirement. In this way, it is normal to utilize multiple input multiple-output (MIMO) transmission in VLC frameworks.
Key Words: Energy efficiency, Visible light communication(VLC), Multiple Input Multiple Output(MIMO)

I. Introduction

As of late, a couple of works investigated the EE issue for VLC frameworks. To maximize the EE of a VLC framework, the force and bandwidth were jointly optimized[7]. Till now fewer efforts have been made to optimize the EE of MIMO VLC systems. The

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creators investigated the EE optimization for single-input single- output (SISO) and multiple-input single-output (MISO) VLC frameworks under the optical force and minimum information rate constraints[1]. Up until this point, nonetheless, less endeavors have been made to optimize the EE of MIMO VLC frameworks[4]. In VLC frameworks the transmitted signal should be genuine non-negative, and it has to satisfy both the optical and electrical force constraints[5]. Henceforth, the existing transceiver designs of MIMO RFC frameworks cannot be directly applied to MIMO VLC frameworks, which results in new transceiver designs.

Motivated by the demand for improving the energy efficiency in mobile multimedia communication systems, various resource allocation optimization schemes aiming at enhancing the energy efficiency have become one of the mainstreams in mobile multimedia communication systems, including transmission power allocation, bandwidth allocation, sub channel allocation [7], and etc. Multiple-input multiple-output (MIMO) technologies can create independent parallel channels to transmit data streams, which improves spectrum efficiency and system capacity without increasing the bandwidth requirement. Orthogonal-frequency division- multiplexing(OFDM) technologies eliminate the multipath effect by transforming frequency selective channels into flat channels. As a combination of MIMO and OFDM technologies, the MIMO-OFDM technologies are widely used in mobile multimedia communication systems[3].

Light Emitting diodes (LEDs) Vertical MIMO model(LVM) is commonly used[8]. In LVM model, illuminance distribution is not uniform enough for office and optical channel is highly correlated which degrades the system performance especially in cases with small emitter separation[9],[10].

II. Proposed System

In this undertaking, the EE optimization for MIMO VLC frameworks will be centered. By taking the non-negative signal, the optical and electrical force, the minimum information rate and the bit error rate (BER) into the consideration, the transmit power, the balance allocation and the modulation size are jointly optimized. The given issue which has a complicated structure and doesn't gives a simple solution will be changed into an equivalent fractional program . Then, Dinkelbach's algorithm and the duality-based technique will be used to resolve this issue and it provides a semi closed structure solution. The block diagram of the proposed design is shown in the fiure(1).

A MIMO VLC channel includes VLC links between multiple LEDs and PDs. Each VLC link contains two components: the line-of-sight (LOS) component and the non-line-of-sight (NLOS) component. The proposed solution mainly includes two parts namely, singular value decomposition (SVD) of channel matrix and the Lagrangian dual based iterative algorithm. An energy efficiency model with statistical QoS constraints is proposed for MIMO-OFDM mobile multimedia communication systems.

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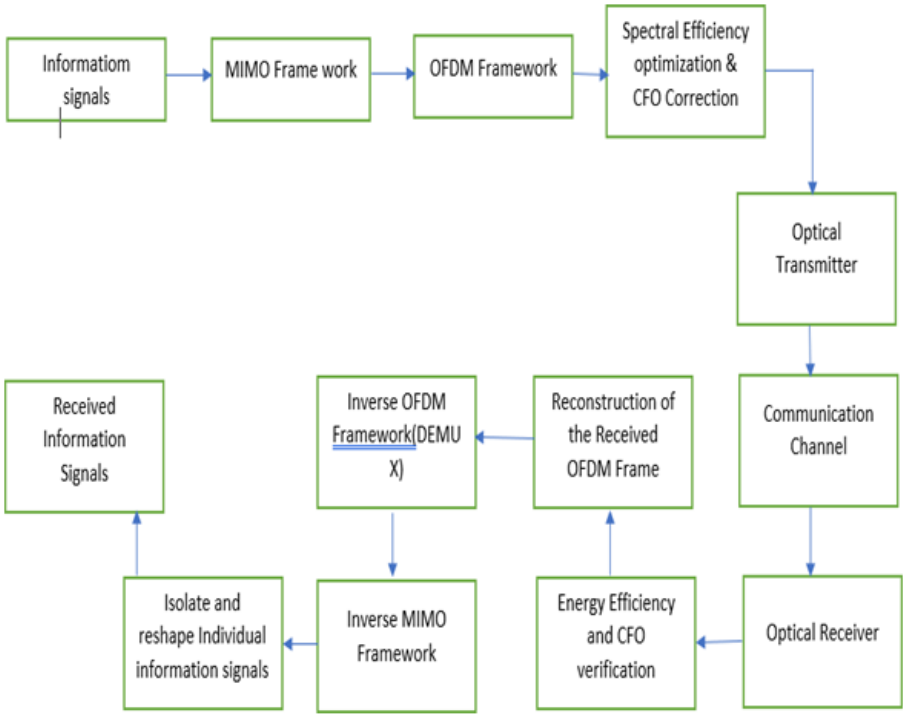

Figure 1: Block Diagram of the Proposed method

A sub channel grouping scheme is designed by using the channel matrix single-value-decomposition (SVD) method, which simplifies the multi-channel optimization problem to a multi-target single channel optimization problem. Based on marginal probability density functions (MPDFs) of sub channels in different groups, a closed-form solution of energy efficiency optimization is derived for MIMO-OFDM mobile multimedia communication systems. A novel algorithm is developed to optimize the energy efficiency in MIMO-OFDM mobile multimedia communication systems. Numerical results validate that the proposed algorithm improves the energy efficiency of MIMO-OFDM mobile multimedia communication systems constraints.

The block diagram of the proposed method is shown in the fig(1). Multiple information signals that are coming from multiple sources are going to be properly structured and properly analyzed and then they are going to be subjected to MIMO frame work. Here, the isolation between the signals will be checked because these signals are going to be multiplexed. After multiplexing, the information streams must not mix with each other. Hence, the block called OFDM frame work is provided.

At OFDM frame work, all the information streams will be multiplexed and the signals are converted into a single composed stream. After multiplexing the positive and negative sufferings are going to be separated. While separating these sufferings, the Spectral Efficiency and Cross Frequency Offset(CFO) will also be checked. Then the sufferings will travel through optical transmitter. Here, the OFDM frames will be modulated with optical carrier signals which are generated from LED sources. Then the modulated signals will reach optical receiver over a communication channel. At optical receiver, optical techno operation will be performed to separate the optical carrier signals and OFDM frames. These

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reconstructed OFDM frames are then subjected to Energy Efficiency and Cross Frequency Offset verification.

In communication channel, the signal may undergoes several degradation mechanisms such as attenuation, dispersion, absorption, scattering and bending. In addition to these degradations, noise also degrades the quality of the signal. Hence, the frames are subjected to the verification. The energy wasted due to all these degradations in the form of losses will be calculated here. CFO will also check whether the frequency offset is maintained properly or not. Then the positive and negative sufferings will be combined to get composed frame work. The composed frame work is subjected to the inverse OFDM frame work to de-multiplex the composed information stream. The de-multiplexed signals are subjected to the inverse MIMO frame work. Finally, the signals are isolated and reconstructed and then safely sent to the respective destination to which we need to transmit the information with high energy efficiency and by consuming less power.

III. Results

The performance advantages were verified by simulation results for the proposed system as shown in the figures given below. A massive MIMO Visible Light Communication System was developed which transmits the given information from source to the destination with high energy efficiency which consumes low power and the are shown in the following figures. The code was developed using MATLAB software by giving some commands and executed successfully. Finally, the graphs were plotted for the respective input which shows in the simulation results.

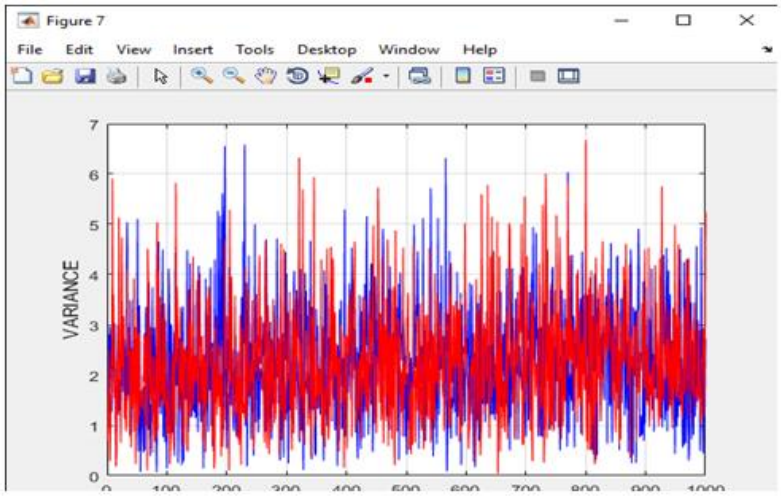

Figure 2:Symbol number Vs variance

Signals were plotted on the real axis and imaginary axis as shown in the fig(2).The symbols (Numbers) and variances were calculated for the given signals.

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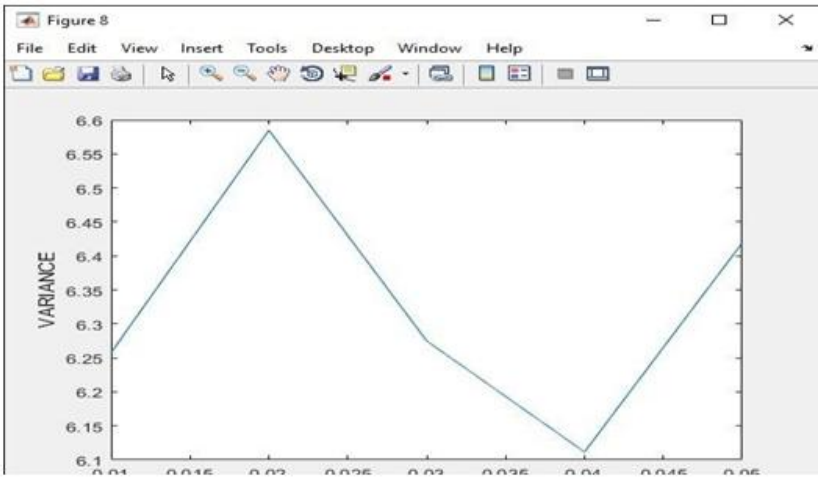

Figure 3: Offset Vs Variance

The system's performance was verified at different cases by giving the values for frequency offset and noise variance and the results were plotted as shown in the fig(3).

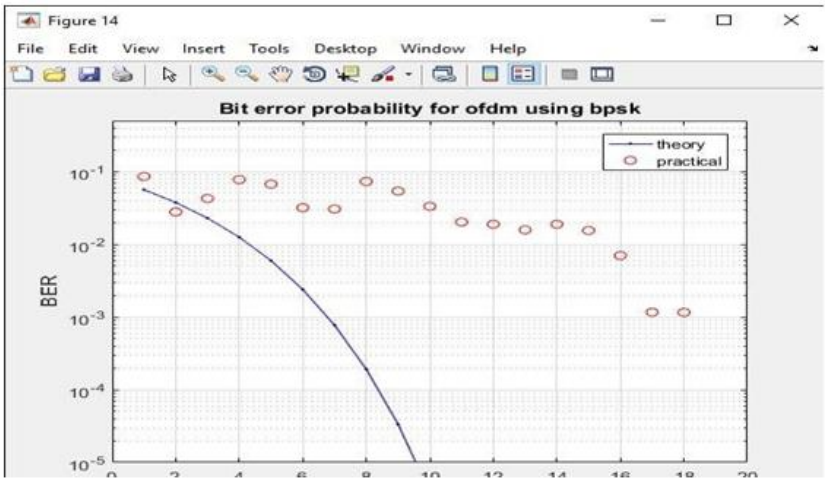

Figure 4: Bit error probability for OFDM using BPSK

Bit error probability for OFDM was observed using BPSK. The results were plotted as shown in the fig(4)

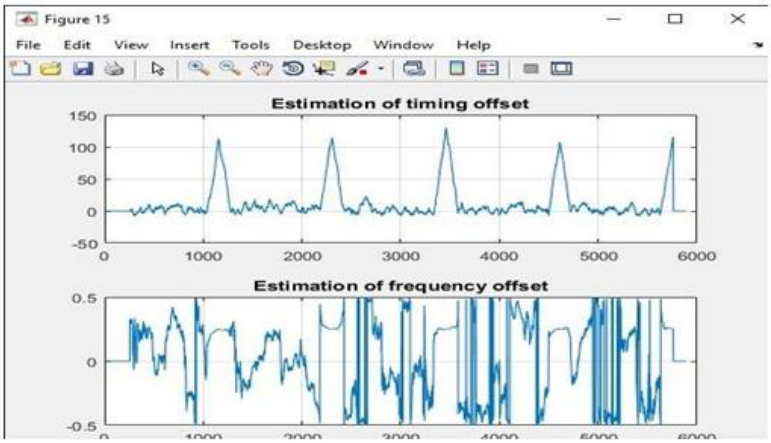

Figure 5 : Estimation of timing offset and frequency offset

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The timing offset and frequency offset were estimated and the noise characteristics were analyzed as shown in the fig(5). OFDM symbols were generated by declaring the parameters.

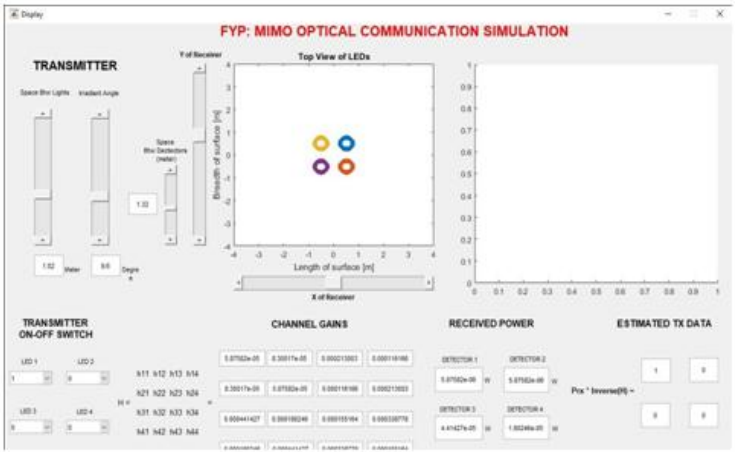

Figure 6 : MIMO Optical Communication Simulation

Fig(6) represents the MIMO Optical communication simulation. The data was transmitted over a communication channel by adding some sort of channel gain with high energy efficiency by consuming low power.

IV. Conclusion

The energy efficiency for Multiple-Input Multiple-Output Visible Light Communication frameworks was investigated. This was done by jointly considering the non-negativeness of the transmit signa, the optical and electrical constraints, the information rate and the Bit Error Rate(BER)requirements. By using the Dinkelbach algorithm and Lagrangian strategy, an efficient algorithm was fostered, in which the optimal image distance was obtained in a semi closed structure. Higher EE esteem was provided then the SE optimal solution and it was observed by using the simulation results.

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Image Fusion Based Underwater Image Enhancement

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Abstract

A combination calculation is used for the purpose of enhancing and restoring of underwater images. Color balance, contrast improvement and histogram extending are conveyed. To mitigate the impact of color shift in an underwater image, the scalar upsides of R, G, B channels are restored with the goal that the conveyances of the three channels in histogram are comparable. A histogram extending calculation dependent on red channel is used to additionally enhance the quality and brilliance of underwater images. To confirm the viability of the proposed combination calculation, exploratory underwater images are dealt with. From the results it is proved that the underwater images is enhanced in terms of abstract special visualization and target assessment.

Key Words: Reconditioning, enhancing, color balance, contrast, underwater image.

I. Introduction

Subaquatic missions are backbreaking during personage investigations on sea. Underwater data is crucial for achieving submarine missions like [1], aquatic life acknowledgment [2], subaquatic prehistoric studies [3], underwater climate checking [4], underwater inquiry and rescue [5], and so on. Regularly, constriction brings to shift color while dissipating the light to make an underwater image obscured and an abatement of quality. For instance, the development of water or fish reef can cause alleged movement obscure [6]. It is noticed that marine snow is a quite certain yet universal commotion for submarine conditions, brought about by natural and air pockets [7]. Marine snow brings about extra light backscattering that shows images as masses of different shape and size, that influences submarine perceivability [8], [9]. Another choice to get great underwater images is the method of image handling. It is portrayed by high productivity and minimal expense. Lately, underwater image handling has become an interesting issue in underwater innovation.

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During last decade, numerous sorts of enhancing underwater image calculations were introduced. Regularly utilized strategies incorporate histogram leveling, wavelet change. Hence proposed a color steadiness theory calculation dependent on dark world speculation to take care of the color bending issue of underwater images. Guraksin tended to the utilization of a strategy framed by the wavelet change and the differential advancement calculation. Tang introduced the underwater image and video enhancement dependent on Retinex.

II. Proposed System

Color balance calculation, upgraded contrast calculation and histogram extending calculation are proposed for improving the nature of underwater images. Images from hazy climate and from submarine climate contains similar characteristics. So, hassling calculations (for example Dark Channel Priority algorithm) are used to manage images from submarine. It is observed that weakening of light varies with various conditions. In outside hazy climate, the weakening of light with various frequency are practically similar. In the remote ocean if the image is taken without illumination of light, in such situation red light having longer wavelength is consumed. Hence, the part of red channel is disappeared in the histogram.

A. Color Balance Algorithm: Apparently, an image acquired in hazy climate are comparable with that of images obtained in submarine climate. Consequently, hassling calculations (for example Dark Channel Priority algorithm) are applicable to manage submarine images. Nonetheless, the outcomes are not acceptable. The primary explanation is that the lessening of light varies in various conditions. In outside hazy conditions, the lessenings of lights with various frequencies are practically something very similar. While in underwater conditions, the weakenings of lights shift with frequencies.

B. **Optimized Contrast Algorithm:** Though the color balance algorithm can reduce the color shift in subaquatic images, quality of the image should be improved. In order to improve the quality of an aquatic image optimized contrast algorithm is proposed which is an extension of dark channel prior algorithm. Instead of strain on transition, the optimized contrast algorithm provides the new way to determine the transition.

C. H**istogram Stretching Algorithm Based On Red Channel** : Histogram extending is used for further improving the brilliance and quality of submarine images. It is realized that the water climate has particular retention of various colors of light. Red light is the most seriously weakened, particularly in profound water. The issue of extreme remuneration of the red channel happens for most image enhancement calculations. In the investigation, a histogram extending calculation dependent on the red channel is proposed. In the calculation, the activity of histogram extending relies upon the force of red light.

III. Results

The Enhancement of an Underwater image is done by using three strategies including Colour Balance, Contrast Optimization and Histogram stretching based on the red channel. Results of the underwater images are shown in the below figures.

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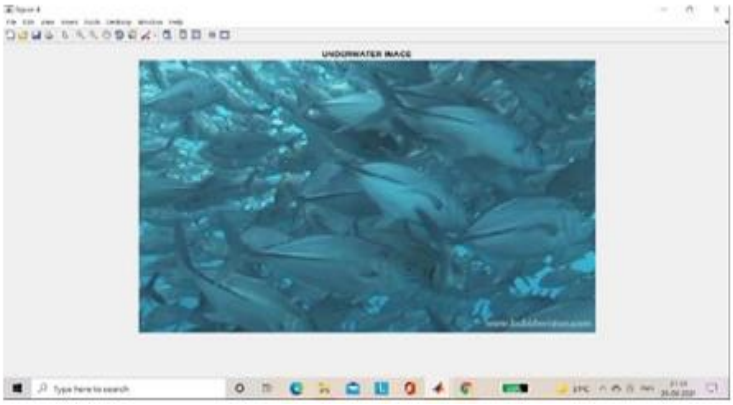

Figure 1: Underwater Image

Figure 1 shows the underwater input image that is captured by using a camera or a sensor which is to be enhanced for a clear visibility.

Figure 2: Final Denoised Image

Figure 2 shows a final denoised image in which the entire noise that is present in the underwater image is eliminated.

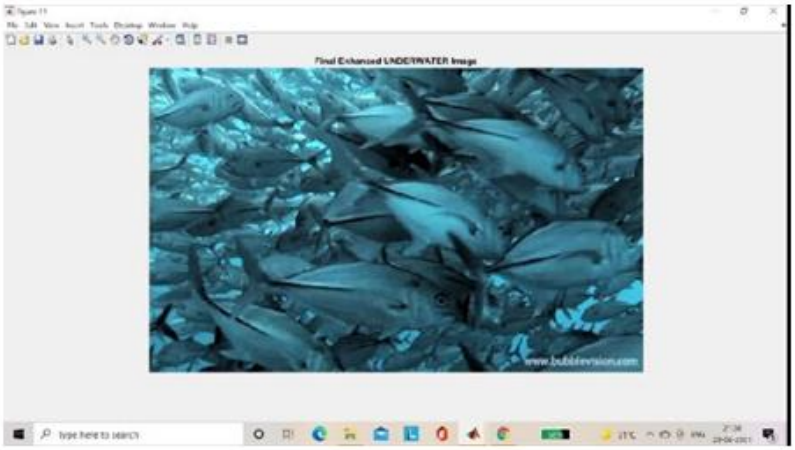

Figure 3: Final Enhanced underwater Image

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Figure 3 shows the final enhanced image that is obtained by using the three proposed strategies including colour balance, contrast optimization and histogram stretching.

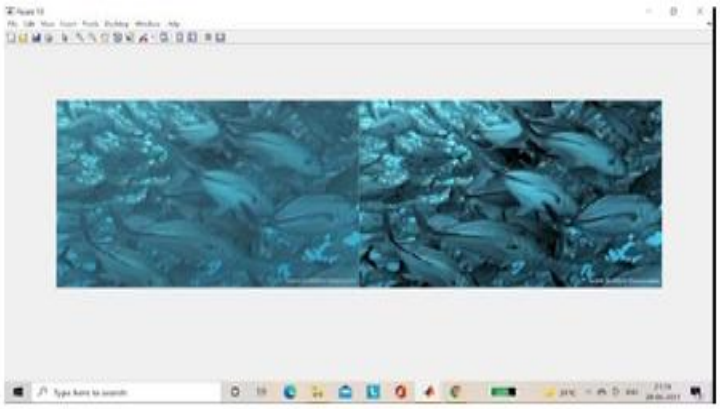

Figure 4: Degraded Vs Enhanced Image

Figure 4 shows the degraded vs enhanced image in which we can see the clear difference between the input image that is captured and the image that is enhanced by using the proposed strategies.

Figure 5: PSNR and RMSE Values

Figure 5 shows the PSNR and RMSE Values of a Final Image.

IV. Conclusion

A combination calculation is proposed in this paper for enhancing and restoring of underwater images. Then, at that point, an advanced contrast calculation is utilized for hassling image. As per the qualities of underwater light weakening, an altered histogram calculation dependent on red channel is proposed to enhance the quality and lucidity of underwater images in the wake of hassling. Through the proposed combination calculation, underwater images are upgraded by wiping out color deviation, uncertainty and improving contrast. Examinations exhibit the adequacy and adaptability of the proposed technique. Correlation results demonstrates the upsides of the proposed calculation over different

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calculations, both as far as capacity and power. The constant presentation can't be ensured particularly when managing countless images.

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Design of High Speed Finite Impulse Response Filter by Using Data Scaling Technology with Fixed Width Booth Multipliplier

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Abstract

In this paper, we propose a data scaling technology (DST) for use in a low-error fixed-width Booth multiplier (FWBM) to decrease the truncation errors. The modified DST reduces the number of redundant bits in the multiplicand, yielding more efficient bits in low-error FWBMs. The truncation errors in FWBMs are decreased by summation of a circuit integrating the modified DST to it as well as an error-compensation circuit. Long-width DST-FWBM attained an exactitudeapproachin the ideal value of a post-truncated multiplier (P-TM). The modified DST method is used to improve the accuracy of FWBMs, execution this technology suitable for use in DSP techniques. In this paper, a new FIR filter is intended by using the modified booth multiplier.The FIR filter using modified booth multiplier is used to reduce the power consumption and delay time in the circuit. Hence, the modified FIR filter with fixed width booth multiplier achieves better performance compared with the previous designs.

Key Words: FIR filter, FWBM, Booth Multipler

I. Introduction

In digital world, communication is the major concern in all the digital signal processing applications, in which to accelerate the multiple fields like multimedia, communications etc. These digital signal processing have multiple arithmetic operations to perform the multiple tasks, and carry a large data to provide security also. These are done in Fast Fourier Transform (FFT), Discrete Cosine Transform (DCT), Finite Impulse Response (FIR) filters and signal convolution. These are done with the help of the arithmetic operations, hence efficient multipliers and adder designs are required to improve the performance of the FIR filters. Different adders and multipliers are implemented and evaluated the performance of the FIR filters to achieve high speed and lesser area.

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Based on the observation that an addition can often be subsequent to a multiplication the Multiply-Accumulator (MAC) and Multiply-Add (MAD) units were implemented for DSP algorithms compared to the conventional ones, which use only primitive resources. Several architectures were been modified to optimize the enactment of the MAC operation in terms of area occupation, power consumption or critical path delay. The forthright design of the AM unit, by first assigning an adder and then driving the output of it to the input of a multiplier, rises both critical path delay and area of the circuit. Targeting an optimized design of AM operators, fusion techniques are developed using the direct recoding of the summation of two numbers in its Modified Booth (MB) form. Thus, the C- PA of the conventional AM design is eradicated results in considerable gains of the performance.

A special extension of the pre-processing step of the recorder was needed for carry-save(C-S) representation. The first stage transforms the C-S form of the input number into signed-digit(S-D)then recoded in the second stage for matching the form of the MB digits request. In recent times, this technique was been used for the design of high performance flexible co-processor architectures focusing on the computationally intensive DSP applications. Hence advance booth multipliers and parallel prefix adders are implanted in the FIR filter design to improve the performance and obtain the accuracy of the design.

II. Literature Survey

MBalgorithm have made the multiplication in an easier way. It consists of recoding table used for minimizing the partial products of multiplier. An adder and the multiplier operator of the unit is combine to form a single add-multiply unit. The fusion of the these two operators resultant in Fused Add-Multiply(FAM) operator. In this paper different structured recoding techniques are used to implement the MB encoder incorporating in FAM. Along with the implementation of recoding techniques, comparison has been done with the existing and the designed Modified Booth recoder.

Complex summation operations are mostly used in Digital Signal Processing (DSP) applications. In current work, will be focusing on optimizing the design of the FAM operator for rising performance. Alsoexplore techniques for direct recoding of the sum of two numbers in its (MB) form. Byintroducinga structured efficient recoding technique,and explore three different schemes by uniting them in FAM designs. Which use existing recoding schemes, the modified method yields considerable decrease in terms of hardware,critical delay, power consumption and complexity of the FAM unit.

Booth recoding is mostly used to decrease the number of partial products in multipliers. This is used mainly in area reduction in multipliers to the enormously smaller adder tree, while delays remain on the same range. In this work the XOR-based implementation gives lowdelay numbers and area.An implementation of a radix-4 butterfly is been developed reduced number of stages. This reduction comes from the fact, to achieve a throughput compared to that of radix-2. Consequently, the implementation of the radix-4 butterfly is suitable for high speed applications, since the power consumption and latency are reduced. In order to reduce the number of calculation steps for the partial products, MBA algorithm has been implemented, where Wallace tree has taken the role of rising the speed to sum the partial products.

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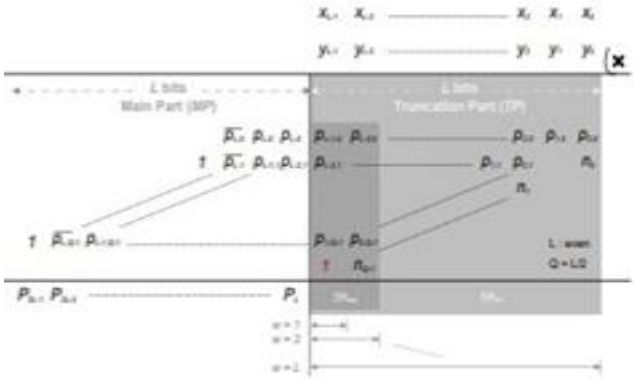
III. Existing System

In digital signal processing applications multipliers are widely used to compute the two input signals. Hence accuracy is the high concern for the FIR filter architectures and accurate multipliers for implementation purpose.

The Booth multiplier is used in the FIR filters are used for the accuracy and to reduce the delay. In the booth multiplier different techniques are used to improve the performance and reduce the delay of the design. Probability methods for reducing the simulation time have been presented; these methods calculate the probability of an element being in the truncated partial products of multipliers. The generalized PEB (GPEB) method was used to obtain a more accurate estimation of the area penalty by using information from more columns (w) in the truncation part, the GPEB circuit provides aappropriate trade-off between area and accuracy. However, much time is spent setting up some parts of the circuits in these hybrid methods. The multilevel conditional-probability (MLCP) method was adopted, in which conditional probability is more complex. Although a high accuracy can be achieved with the use of MLCP, the area cost increases. However, with this method, a signal-to-noise ratio (SNR) similar to the ideal SNR value of a post-truncated (P-T) FWBM can be obtained on the basis of the column information (w = 3).

Modified Work Data Scaling Technology



1. **Structure of FWBM**

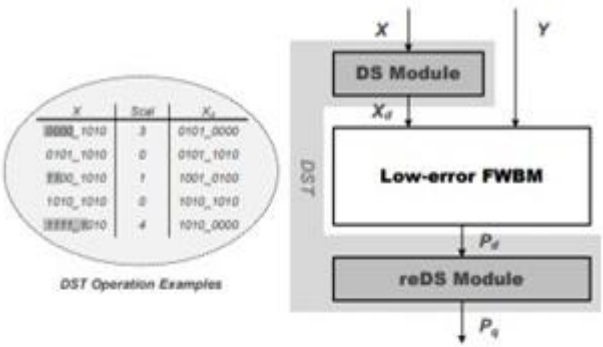


Figure 2. Modified DST used in low-error FWBMs.

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The modified DST method is incorporated as an additional circuit in low-error FWBMs. Thus, the circuit performance of the FWBMs is retained, with the DST circuit improving the accuracy of the low-error FWBM. In DST, the redundant bits of the multiplicand are employed to obtain more information from the truncated T. There are two DST Modules (DS Module and reDS Module). One of them is inserted above the low-error FWBM, and the other is inserted below the FWBM. Thus, in this study, the trade-off between accuracy and area cost was considered. Thus, the modified DST circuit uses (2L − 1) D-to-1 MUXs, and the area of the entire DST- FWBM circuit is the sum of the area of the low-error FWBM and the (2L − 1) D-to-1 MUXs.

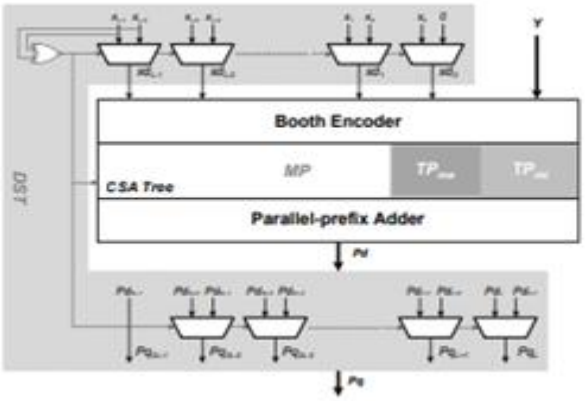

Figure 3. Architecture of modified DST-FWBM with DSb = 1.

The FWBM is surrounded by the DST circuit and consists of a Booth encoder, a carry-save adder (CSA) tree, and a parallel prefix adder. The CSA, which consists of either full adders or half adders, adds the partial products from the MP. Finally, the high- speed parallel prefix adder calculates the products Pd, and the final results Pq are obtained by using the DST circuit.

Finite Impulse Response: FIR filters are is widely used in different applications such as biomedical, communication and control due to its easily implementation, best performance and stability. Its non-complexity makes it attractive for many applications, where it is need to decrease computational requirements.

Filters play an important role for removal of unwanted signal or noise from original input signal by removing the selected frequencies from incoming signal. They have become very popular due to the rise of the digital signal processing.

A FIR filter is structure that can use implement for any sort of frequency response only digitally. It is used in implementing a series of multipliers,delays, and adders to create the filter's output. The delays result in operating on prior input samples. The h, k values are the coefficients used for multiplier, so that the output at time n is the addition of all the delayed samples multiplied with its appropriate coefficients.

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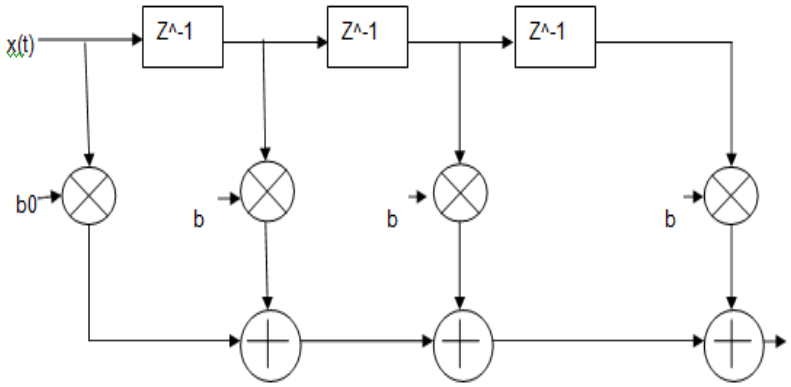

Figure 4. Block diagram of an FIR Filter

In this FIR filter structure the modified DST FWBM is implemented in the multiplier place. It achieves the lesser delay and high accuracy due to the performance of the modified multiplier architecture the FIR filter also achieves high speed compared with the previous FIR filters. Here multiple multipliers are placed and tested overall the modified DST FWBM achieves comparatively high results and good accuracy compared to all the previous architectures.

Simulation Results

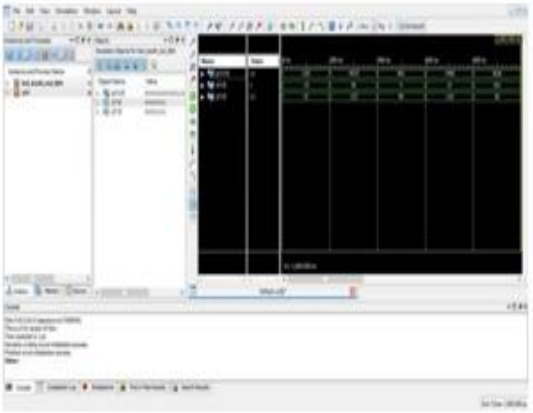

Figure 5: Simulation result of the 8 bit booth multiplier

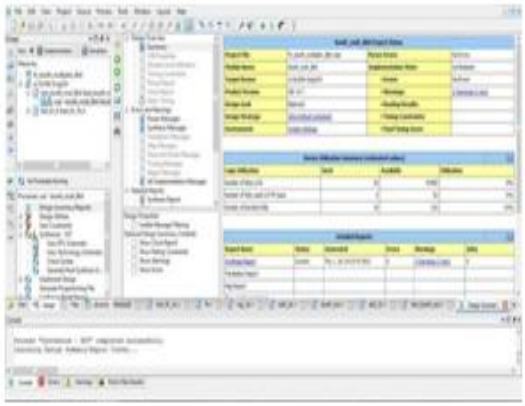

Figure 6: Summary report of the 8 bit booth multiplier

Figure 7: Delay report of the 8 bit booth multiplier

Figure 8: Simulation result of the 8 bit fir filter using booth multiplier

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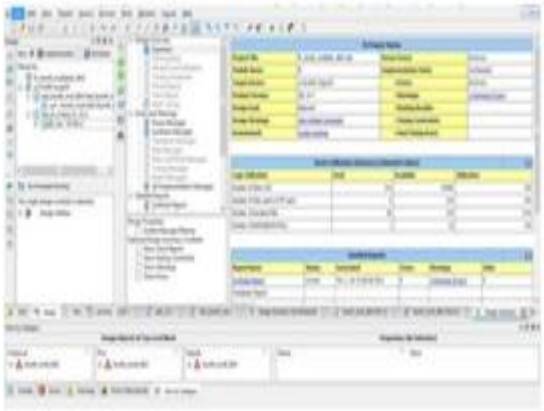

Figure 9: Summary report of the 8 bit fir filter using booth multiplier

Figure 10: Delay report of the 8 bit fir filter using booth multiplier

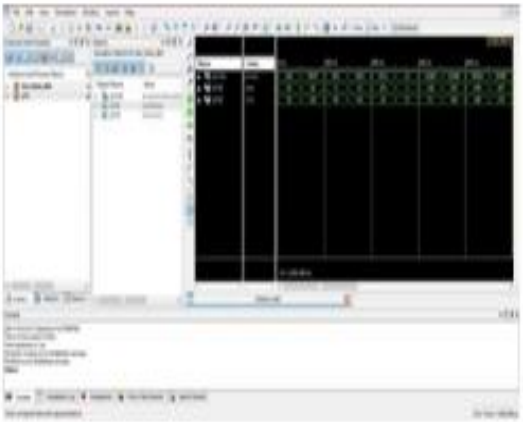

Figure 11: Simulation result of the 8 bit Fixed Width Booth Multiplier

Figure 12: Summary report of the 8 bit Fixed Width Booth Multiplier

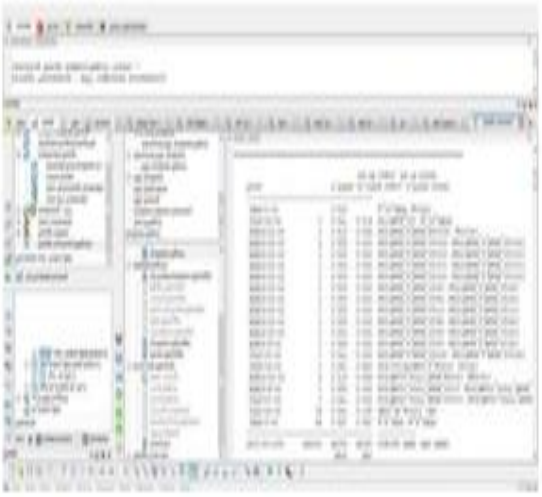

Figure 13: Delay report of the 8 bit Fixed Width Booth Multiplier

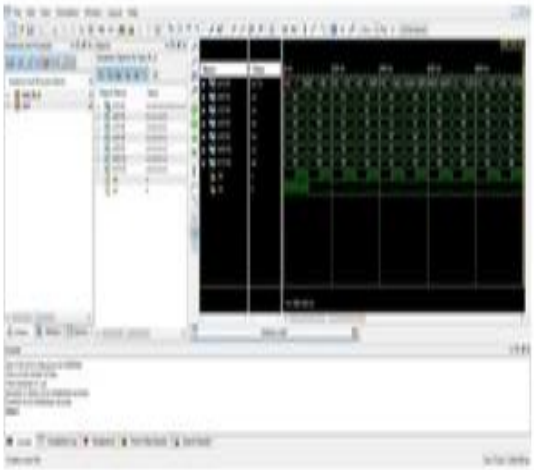

Figure 14: Simulation result of the 8 bit FIR filter using fixed width booth multiplier

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Figure 15: Summary report of the 8 bit fir filter using

Figure 16: Delay report of the 8 bit fir filter using Fixed Width

Figure 17: Simulation result of the 16 bit booth multiplier

Figure 18: Summary report of the 16 bit booth multiplier

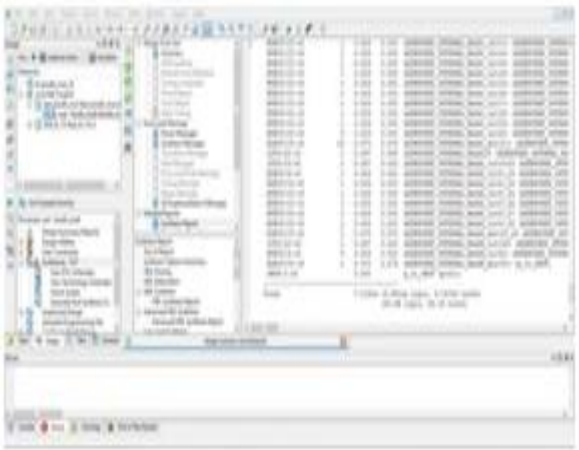

Figure 19: Delay report of the 16 bit booth multiplier

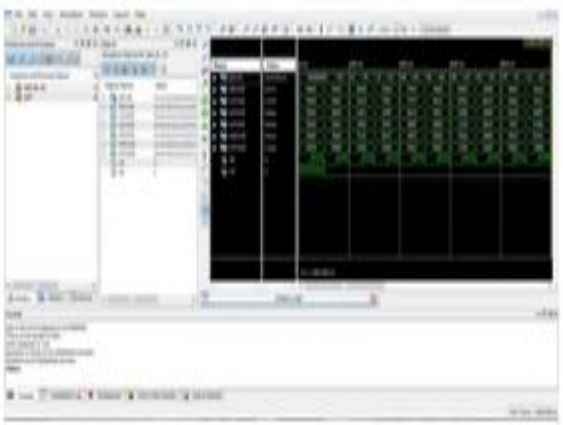

Figure 20: Simulation result of the 16 bit fir filter using booth Multiplier

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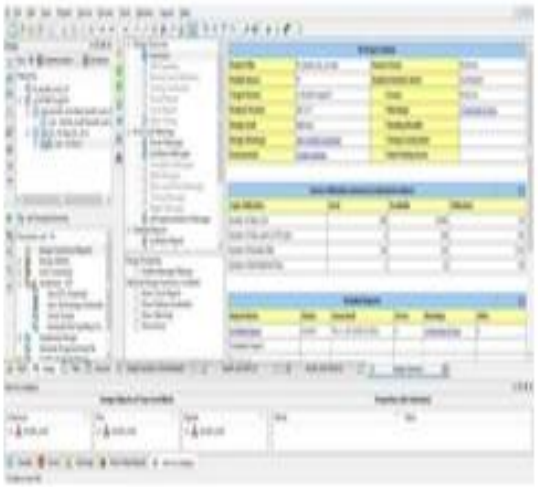

Figure 21: Summary report of the 16 bit fir filter using booth multiplier

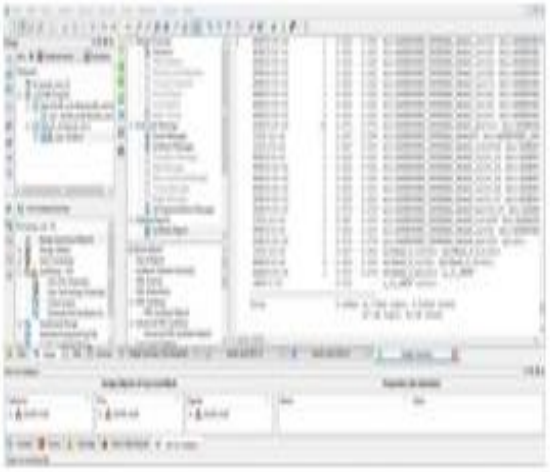

Figure 22: Delay report of the 16 bit fir filter using booth multipli

Figure 23: Simulation result of the 16 bit Fixed Width Booth Multiplier

Figure 24: Summary report of the 16 bit Fixed Width Booth Multiplier

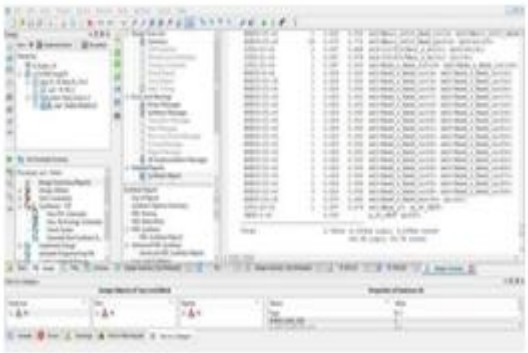

Figure 25: Delay report of the 16 bit Fixed Width Booth Multiplier

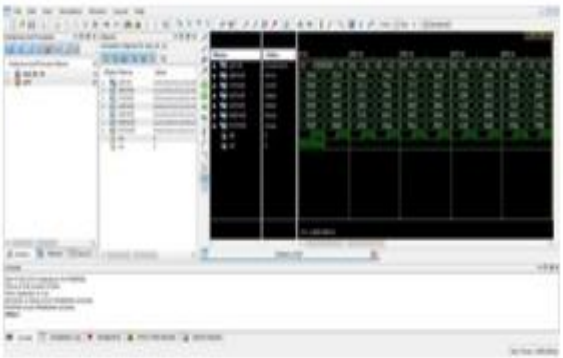

Figure 26: Simulation result of the 16 bit fir filter using Fixed Width Booth Multiplier

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Figure 27: Summary report of the 16 bit fir filter using Fixed Width Booth Multiplie

Figure 28: Delay report of the 16 bit fir filter using Fixed Width Booth Multiplier

Table 1: Comparison of booth Multiplier and FIR filter using Booth Multipliers

Parameter	Area (in terms of LUT)	Delay in ns
Booth Multiplier 8bit	92	4.961 ns
Modified DST FWBM 8bit	98	4.939 ns
Booth Multiplier 16bit	335	7.023 ns
Modified DST FWBM 16bit	152	5.762 ns
FIR filter using Booth Multiplier 8bit	214	6.221 ns
FIR filter using Modified DST FWBM 8bit	211	5.908 ns
FIR filter using Booth Multiplier 16bit	928	8.294 ns
FIR filter using Modified DST FWBM 16bit	432	7.118 ns

IV. Conclusion

The modified FWBM is designed using DST which improves the accuracy of the multipliers. The modified FWBM achieves the accuracy level almost equal to the ideal multiplication process and the delay is also reduced. Here the accuracy level is achieved with the usage of DST circuit. Hence the modified FWBM is implemented in the FIR filter to check the performance of the filters. Hence the modified FIR filter achieves better results compared to the previous designs in term of area and delay.

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Design of a Microstrip Patch Antenna in Ism 2.4 GHz Band Breast Tumor Detection

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Abstract

Breast tumours can frequently transform into cancer glands. Breast cancer is the most common kind of cancer in women. This affects the majority of youngsters in particular. Till now no root cause is identified, and it has no permanent solution. Unlike other cancers, this is curable or controllable when diagnosed at early stage. The detection techniques involve self observation or clinical test. Self observation may not give good results. So clinical testing is most suitable for early detection. Mammogram is traditional clinical test for breast tumor detection. For large breast tissues, it has low accuracy and resolution. As an alternative, biosensor-based solutions are used. Micro strip patch antennas are used to make the sensors.In this paper, a micro strip patch antenna for the ISM 2.4GHz band is presented. The suggested antenna is built on a flexible poly amide substrate with a dielectric constant of 3.5, a loss tangent of 0.002, and a poly amide thickness of 4.5 mm, with dimensions of 38 X 8.7 mm2.The design and simulation done by using CST studio and results includes return loss, various current densities etc. are recorded

Key words: breast cancer, mammogram, bio-sensor, micro strip, tumor.

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I. Introduction

Breast cancer has been reported to have been the most prevalent malignant neoplastic condition in women worldwide in the preceding decade, with a high mortality rate and a higher malignancy than other forms of cancer. As a result, early cancer detection is critical for effective treatment, surgery, and patient survival after intervention. Although numerous factors, including as cigarettes, obesity, lack of physical activity, alcohol, infections, genetic and biochemical processes, may increase cancer risk. There is no apparent explanation why people get breast cancer at this period. Most common methods to detect tumors in breast are mammography with X-ray, ultrasonography, and magnetic resonance imaging (MRI) are presently the techniques.

The mammography technique is presently the most widely used method of breast tumour detection in clinical practice. Its main use is only prediction, but the main disadvantages inaccuracy in detection and even it's some inconvenience of the patient in preparation the setup. Even it has falls detection rate of 34% the same is using, because it's economical, no other sophisticated and fast resulting techniques are not developed. In mammography if it detects for tumor, the patient need to go through the biopsy test to get conformation. But the mammography will give the primary detection any tumor. Some breasts high mass and density is due to high estrogen levels. In such case it suffers from low resolution imaging. To get improved resolution image, mammography involves to increased level of breast compression by pressing the breast. This is not comfort to patient in both physically and mentally. The other technique in breast tumor detection is ultrasonography, it has been more commonly used to observe fetal growth and MRI scans is good resolution of image; both are not economical.

As a result, technology in medicine begs low-cost, high-positive-rate, and simple-to-understand techniques to tackle the increasing issue of female breast malignancies. Microwave frequency with high- megahertz to low gigahertz usage in biomedical application are traditionally using for last decades. The same can be a best alternative to the standard breast detection given above. A micro strip patch antenna used to detect the tumors in human body when operating at ISM band.

Some good work is being done on biosensor-based approaches to detect cancer. It is equipped with a bio- transducer and bio-receptor system for detecting malignancies. They have to place on the top and bottom of the breasts, which can be inconvenient for the patient. Li et al. in 2017 developed a microwave scanning device to identify changes in the breast (see Figure 1). For breast scan images on individuals, a breast-shaped bowl constructed of dielectric material was devised. It contains a 16-element microwave sensor array inside the bowl that faces the breast. A gel or liquid was injected into the space between the skin and the dielectric bowl walls. This configuration permits the bowl to be used for breasts of any size or shape. The arrangement and methodology is shown in the same figure.

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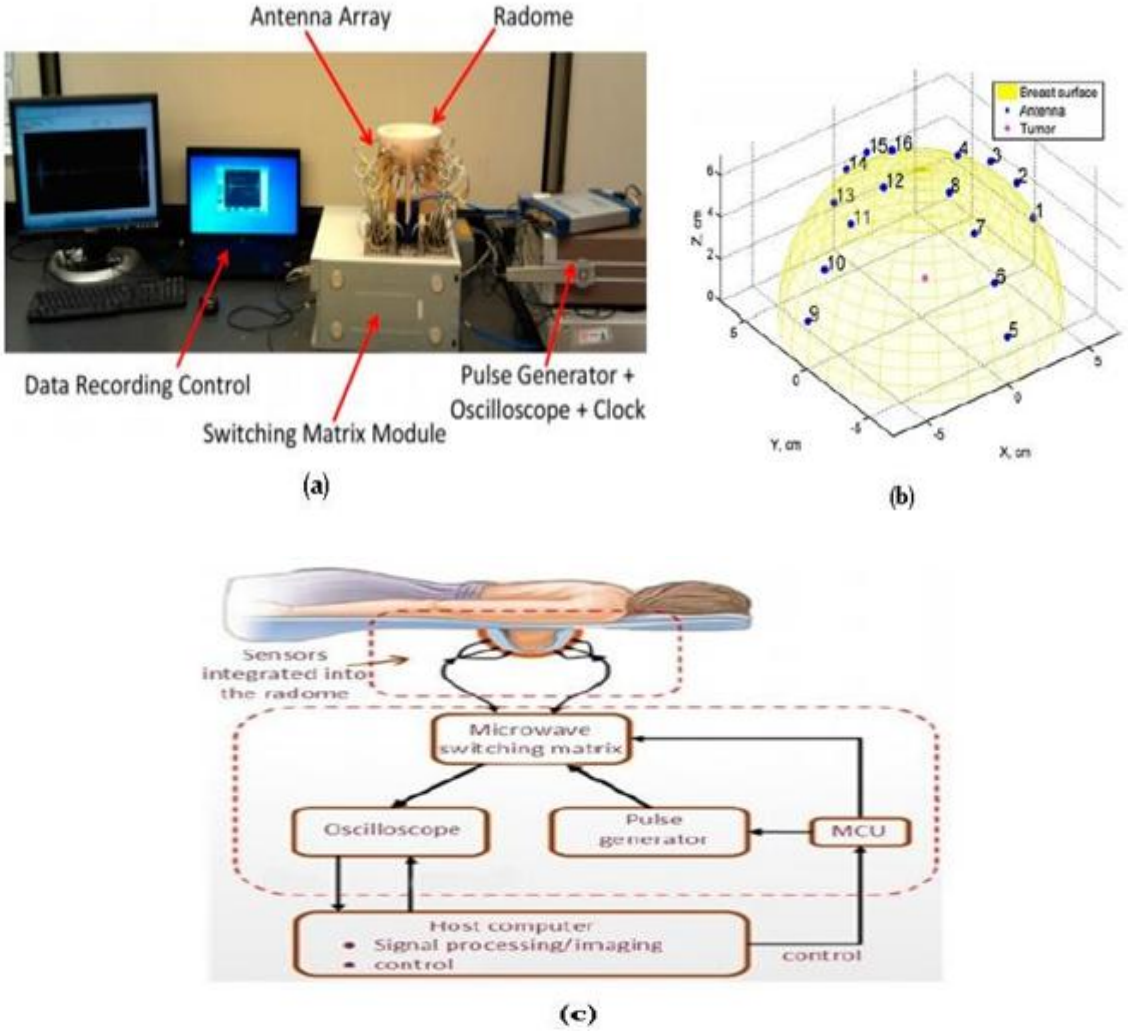

Figure 1. (a) Microwave imaging measurement system developed by Li et al. (b) Microwave sensor array configuration (c) Schematic diagram of experiment. Reprinted with copyright permission from Li et al.

Ting et al. showed a bow-tie antenna for biomedical application with a range of frequencies of 2 to 5 GHz It has a very low cross-polarization level and has a very small cross-polarization degree. The antenna is made of RO4003 ad substrate, and the results of the experiments show that the novel proposed antenna improves cross-polarization over a large beam width. Due to its great selectivity, sensitivity, and specificity, lab-on-chip based biosensors have been examined in more recent studies for cancer detection. An I-shaped dual C-slotted antenna for breast tumour detection was presented by T.V.Padmavathy et al. in 2018. The frequency range covered by this antenna is 4 GHz to 10 GHz. A single edge feed line was used to feed the FR-4 substrate antenna. The SAR value, as well as absorbed power, return loss, and gain, were utilized to diagnose tumours. These findings were compared between a breast model with and without a tumour. Variations in fields, SAR values, and Current Density in the absence and presence of tumour can all be used to detect malignancy. The distance between the antenna and the human breast phantom affects the sensitivity of tumour identification. The sensitivity of detection improves as the distance between the

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antenna and the breast phantom decreases. Most researchers use textile substrates because they provide a smooth surface and provide comfort to the patient. Fawzy Alsharif et al. reported a novel design for a wearable microstrip patch ultra-wideband antenna in this area in 2018. The operational frequency of the proposed antenna is between 1.6 and 11.2 GHz. The wearable properties were supported by a substrate made entirely of cotton with a dielectric constant of 1.6. A stairwell was employed to increase the Return Loss value. With above literature, am microstrip patch antenna is proposed hear to detect the tumors in the breast tumor detection. It's operated in 2.4GHz band. The design used a polyamide flexible substrate with a dielectric constant of 3.5, loss tangent of 0.002 and the thickness of the polyamide is 4.5 mm, with dimensions of 38 X 8.7 mm2. CST studio software is used in the design and summation. Section 1 gives the introduction along with literature, section 2 is the antenna design, results and discussion are in section 3, and finally section 4 concludes the work.

II. Antenna Design and Simulation

The designing strategy is to build an antenna which thus resonates at a specific frequency by establishing the correct dimensions required to build the antenna, in that we must first start with a golden design and a final conclusion, which in this case is a sample taken from Balanis' book Antenna Theory. Then, in each iteration study, new parameters are used to carry out various iterations. This process would assist us in customizing the antenna by examining the many iterations and making changes to make it radiate at a specific frequency. Simultaneously installing many types of microstrip feeds to determine which one best suits our design application. Finally, reconstruct it by incorporating each fractal order one at a time to better understand the performance differences between traditional patch antennas and fractal antennas, as well as how performance changes with each order.

Patch Antenna: Using the reference of Balanis' Antenna theory equations, a sample patch antenna was initially developed and tested (2005). The rectangular patch in Figure 4.2 is generally 0.3333 0 L 0.5 0, with 0 being the free-space wavelength. The patch thickness is 0.5 mm, which really is near to the free-space wavelength, and the dielectric thickness is normally 0.003 0 h 0.05 0, so we can use these parameters as defaults to build the sample patch antenna, which will then be reviewed in the time domain solver using CST Microwave Studio using a waveguide port. The wave guide port, as shown in Figure.2, is created on the microstrip's edge face.

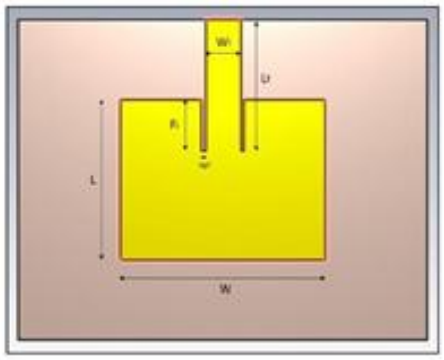

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Figure 2 – Geometry of Patch antenna

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The yellow region in Figure 4.2 represents the copper patch, while the grey region represents the FR4 substrate with even a relative dielectric constant of 4.3 and a thickness of 4.5 mm; using these numbers, we can calculate the length and width of the patch using Equations 4.1 and 4.2. (We neglect fringing effect to avoid complications). Because the antenna is intended to function in the GSM 1800 band, the center resonance frequency should be 1.8 GHz. We now have a length of 38 mm and a breadth of 51 mm by substituting r with 1.8 GHz and r with 3.3, and c with the velocity of light in empty space.

$$L = \frac{c}{2fr\sqrt{(\varepsilon_r)}} = \frac{3\times10^8}{2(1.8\times10^{-9})\sqrt{(4.3)}} = 38\ \text{mm} \quad (1)$$

Where, f – Frequency of resonance
L – Length of the patch
εr – relative dielectric/permittivity

$$W = \frac{c}{2fr}\sqrt{\frac{2}{\varepsilon_r+1}} = \frac{3\times10^8}{2(1.8\times10^{-9})}\sqrt{\frac{2}{(4.3+1)}} = 51\ \text{mm} \quad (2)$$

We can now start the building process by giving the software environment basic boundary conditions, while the remainder of the variables, such as the length of the microstrip slot, can be computed using the conductance (G) expression, which yields the input impedance at the leading edge of the patch. Using equation (4.3) and the required impedance, which in our instance is 50 ohms, we can calculate the insert feed distance y0.

$$R_{fn} = R_{in}cos^2\left(\frac{\pi}{L}y_0\right) \quad (3)$$

Where, Rfn – Input impedance desired
Rin – Input impedance at the leading edge
L – Length of the patch
y0 – Insert feed distance

The intended input impedance and the leading edge impedance are both 50 ohms in this example. As a result, we'd end up with a 12.5 mm feed length. L=38 mm, and the substrate is FR-4 (lossy) with εr=4.3. It's also possible to reconfirm the resonance frequency by inserting these numbers in equation 4.1, with the resultant frequency being 1.9 GHz (close to 1.8). One of the most user-friendly CST modifications is that the user may simply save the acquired values in a CST parameter list with various expressions, making it easy to retrieve the parameters at any time throughout the design. Furthermore, by changing these variables, the entire model may be redesigned as needed. Figure 3 depicts the suggested patch model, while Table 1 details its dimensions.

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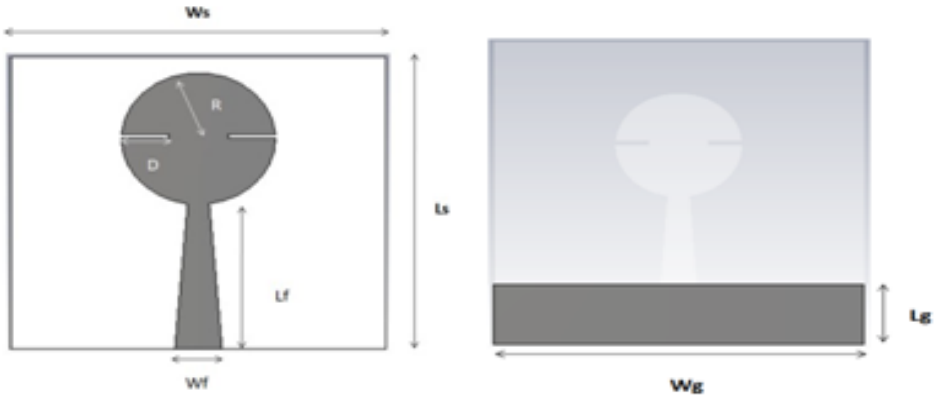

Figure 3. Top and bottom views of proposed antenna

Table 1: Design parameters of the proposed antenna

Variable Name	**Symbol**	**Unit (mm)**
Substrate width	Ws	35
Substrate length	Ls	35
feeding line width	Wf	4.4
Substrate thickness	T	1.5
feeding line length	LF	17.134
circular disc radius	R	6
ground plane one side length	LG	5.9
ground plane one side width	WG	35
Length of one side slot in patch	D	4.4
Width of one side slot in patch	D1	0.5

Breast Phantom: The breast design in CST and arrangement of antenna to detect the tumor is shown in Figure 4 and its design properties are in Table 2

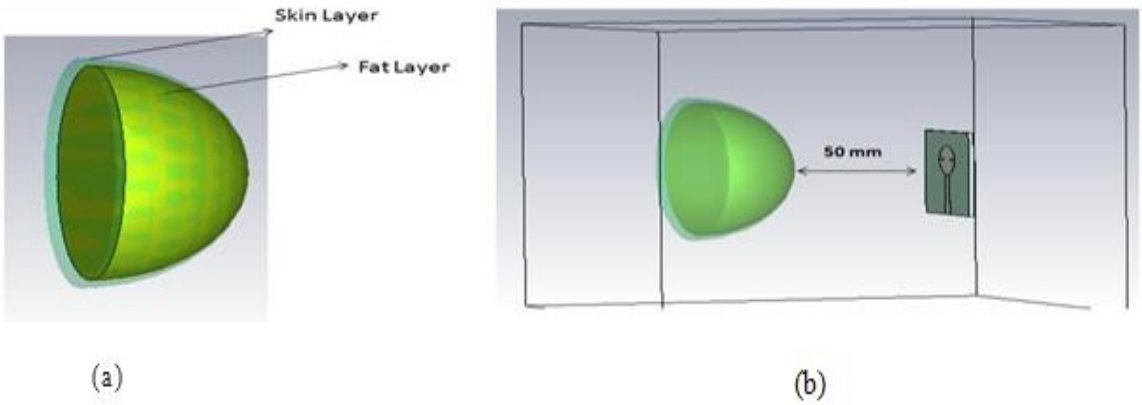

Figure 4. (a)Breast Phantom model (b) Tumor detection methodology

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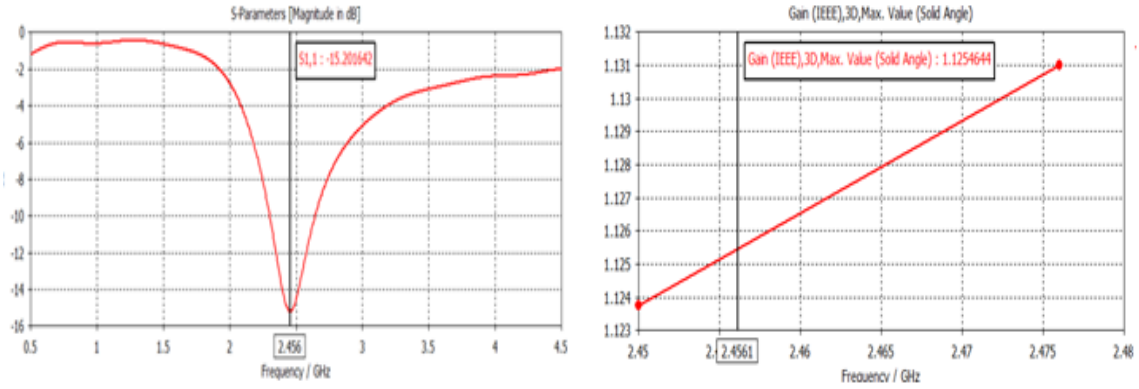
Table 2: Dielectric properties of the breast phantom model

Human Body Layers	radius (mm)	Permittivity	Conductivity(S/m^2)
Skin	30	36.587	2.3404
Fat	28	4.84	0.262
Tumor	4	67	49

III. Results and Discussion

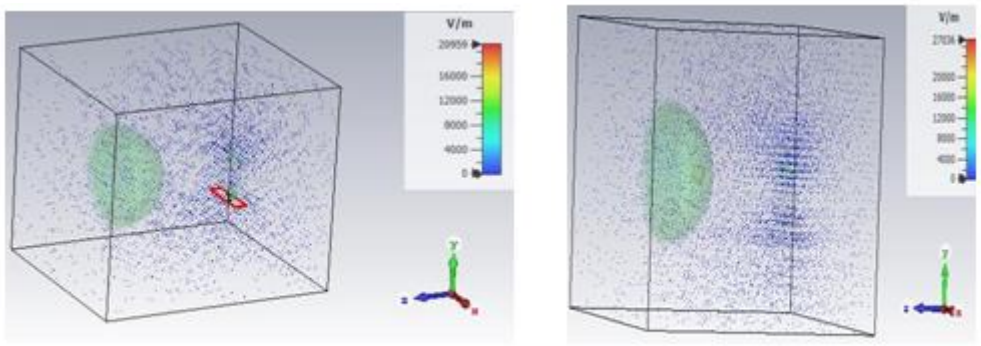
As seen in Fig. 5, the proposed antenna bandwidth (|S11| ≥ 10 dB) ranges from 2.45 GHz in simulation, gain plot,



(a) (b)

Figure 5: (a) Return loss (S11) (b) Gain at 2.4GHz

When modelled in free space, the suggested antenna has a 65.4 percent efficiency in a flat configuration. In free space, the suggested antenna has a gain of 1.125 dB in the flat position at 2.4 GHz. Figure 6 depicts the electric field distribution in the rest and antenna, whereas Figure 7 depicts the tumour.



(a) (b)

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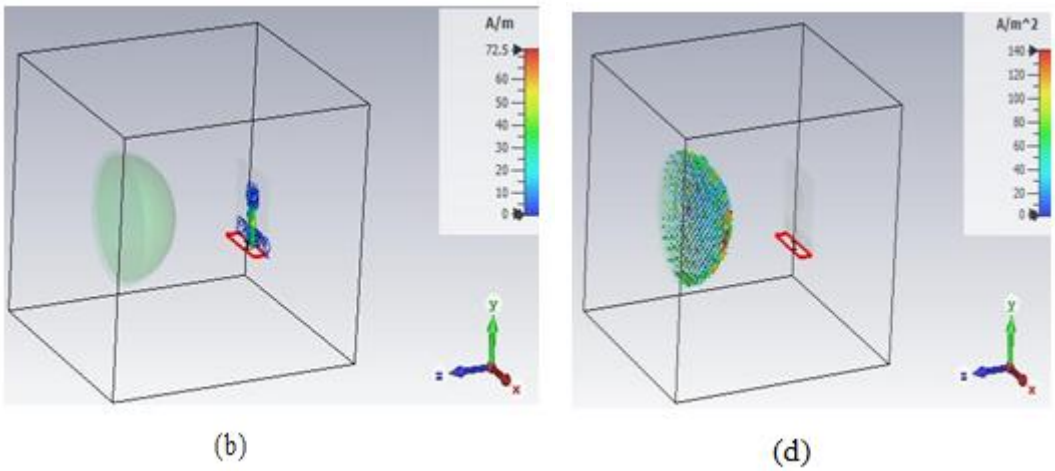

Figure 6. (a): The proposed antenna's electric field with a 2-layer human breast model (b) the proposed antenna's surface current with a 2-layer human breast model (c): With a 2-layer human breast model and a tumour size of 4 mm, the suggested antenna's electric field was measured. (d) Current density of the proposed antenna with 2-layer human breast model

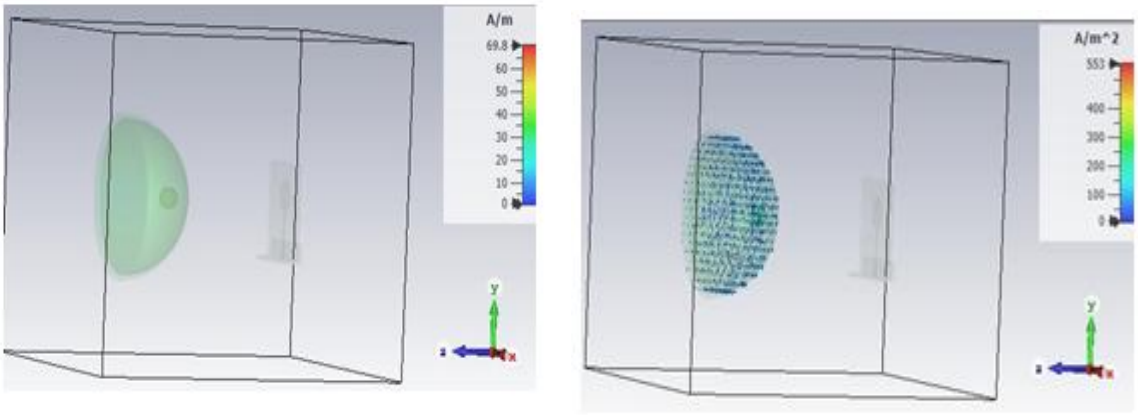

Figure 7(a): Surface current of the proposed antenna with 2-layer human breast model and 4 mm size tumor (b) Current density of the proposed antenna with 2-layer human breast model and 4 mm size tumor

The following table shows results of the proposed model with and without tumor. In Figure 8 the reflected time signals are shows with and without tumor.

Table 3: The result comparison among the proposed antenna without tumor and with tumor

Model	Electric Field (V/m)	Magnetic Field (A/m)	Surface current (A/m)	current density (A/m^2)
For proposed antenna with Phantom without tumor	20959	82.3	72.5	140
For proposed antenna with Phantom with tumor	27036	83.1	69.8	553

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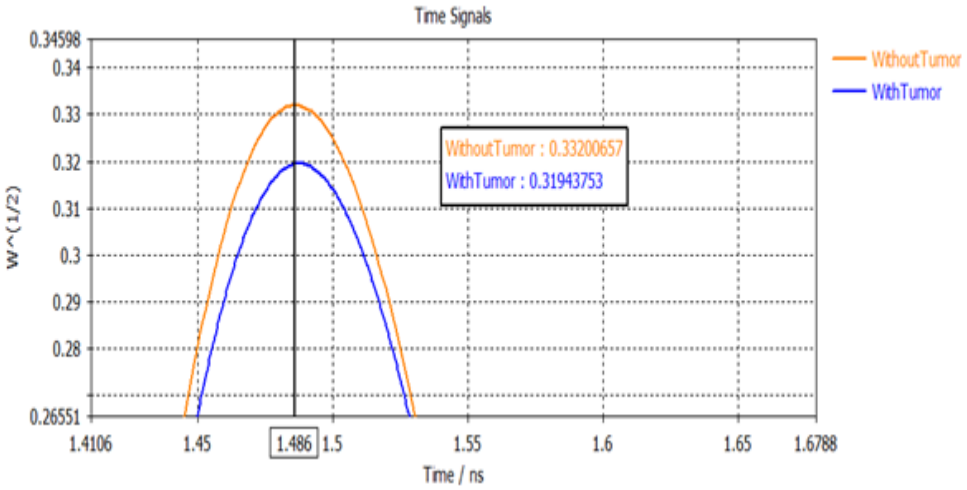

Figure 8. Variation in Reflected time signals with and without tumor model

Table 3 shows the comparison among the proposed antenna without tumor and with tumor. The electric field, magnetic field, surface current, and current density values for without tumour and with tumour are different, and we can identify tumour in skin using these threshold values and the variance in Reflected time signals with and without tumour model (shown in figure 6.11). Table 4 shows the SAR results comparison among the proposed antenna without tumor and with tumor.

Table 4: The SAR result comparison among the proposed antenna without tumor and with tumor

Model	**SAR Value (for 1gram tissue) (W/kg)**
For proposed antenna with Phantom without tumor	0.143151
For proposed antenna with Phantom with tumor	0.204373

IV. Conclusion

The proposed antenna is designed on a polyamide flexible substrate with a dielectric constant of 3.5, loss tangent of 0.002 and the thickness of the polyamide is 1.5 mm. By etching out the sides of a circular patch radiator and tapering the ground plane to achieve a 2.45 GHz frequency. This is utilized in biomedical research. In CST MWS V'19, a simulation was built up using a breast model (with the same dialectical characteristics as a human breast) placed parallel to the antenna with a 2.468 GHz operating frequency. It is possible for the antenna to send pulses to the breast model and receive backscattered signals from it. The difference in reflected output between a breast model with tumour and a model without tumour aids in the identification of any cancerous cells in the breast tissues. In addition, the SAR analysis contrasted tumours with and without tumours. As a result, the suggested antenna is well-suited for early detection.

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Advance Eye Controlled Wheelchair for Disabled Person

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Abstract

This venture is an endeavour to make lives of individuals experiencing this marvel straightforward and by less difficult which will along these lines re-establish their certainty and their joy. The thought is to make an Eye Monitored System (EMS) which permits development of the patient's wheelchair relying upon the eye movements. We realize that an individual experiencing patient limbs problem can halfway move his eyes and slant his head, accordingly introducing a chance for recognizing those movements. We have made a gadget where a patient sitting on the Wheel Chair gathering gazing straight toward the eyeblink sensor can move toward a path just by glancing around there. As indicated by the situation of the eye, wheelchair motor will be coordinated to move left, right and forward. The eyeblink sensor gives signal to the Arduino uno, which will then guide the motors wired to the AtMega328 Microcontroller over the Serial Interface to transport in a specific direction. The machine is low cost and therefore may be utilized by suffered people unfold over a huge financial system range. In this system we are using RF module. RF module is used to communicate between eyeblink sensor through Arduino controller.RF transmitter is placed at the eyeblink sensor part and RF receiver is placed at the wheels part.

I. Introduction

Progressed Wheelchair for Disabled Person is a very robotized wheelchair incredibly supposed for people experiencing lack of movement or for really examined spirits. Loss of movement can attack people from more than one factors of view and pretty probable the maximum volatile type is Quadriplegia. Quadriplegia is the sort of kingdom of frame in which the man or woman cannot pass any of his appendages. Along those strains Paralysis of

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each one of the 4 appendages is referred to as Quadriplegia. Accordingly, truly it's miles unthinkable for people with this difficulty to paintings the run of the mill wheelchair on hand withinside the marketplace as to paintings those wheelchairs on hand in marketplace, the man or woman wishes to use quite a few real energies to transport the wheels of the wheelchair. Lives of such human beings has grown to be certainly tough and therefore as an small try to make their existence easier, this device is brought in which the affected person can use his eyes to manipulate the wheelchair. The cause for this mission is to foster a wheelchair so that it will be confined via way of means of the eyes of the man or woman located withinside the wheelchair. Eye improvement managed wheelchair is to empower absolutely incapacitated affected person simply as vintage to make their existence extra achievable. Individual who cannot stroll and are utilising wheelchair, practice lot of strength utilising real unity to transport the wheels. With usage of this wheelchair handicapped might keep strength and will make use of their hand and arm for specific exercises. Right now, there are various eye primarily based totally method applied for controlling wheelchair, for example, EOG, ECG, EEG primarily based totally eyeball detecting technique, Face discovery and eye identification. A few calculations are applied to find out correct understudy region direction. Haar direction like factor reputation calculation can likewise be applied. The precept segments applied on this device are net camera, MATLAB and Arduino. The device catches the snap shots utilising a webcam so that it will be related to the PC set at the wheelchair of the user. These stuck snap shots could be shipped off the MATLAB in which it'll evaluation the snap shots and the pre facts snap shots and deliver the vital yield to the Arduino. Arduino is then related to the motor of the wheelchair. Hence with those sequential orders given to the motor via way of means of the Arduino via MATLAB will select bearing of the wheelchair. The orders given to the MATLAB can comprise orders like Left, Right, Stop, Forward, Reverse and so on

II.Existing System

The hand gesture-based system used the transfer of hand gesture information commands to move the wheel chair.

The issues with the existing system are:

- Unable to adapt to external conditions.
- Less identification accuracy.
- Classification techniques employed are complex.
- Time consuming and costly.

III. Proposed System

We have made a machine wherein an affected person sitting at the Wheel Chair get collectively observing immediately in the direction of the eyeblink sensor can circulate in the direction of a direction simply via way of means of glancing round there. As in line with the scenario of the eye, wheelchair motor may be coordinated to transport left, proper and forward.Theeyeblink sensor offers sign to the Arduino uno, so as to then manual the cars stressed out to the AtMega328 Microcontroller over the Serial Interface to transport in a specific direction. The machine is value powerful and consequently may be utilized by sufferers unfold over a huge financial system range. In this machine we're the usage of RF

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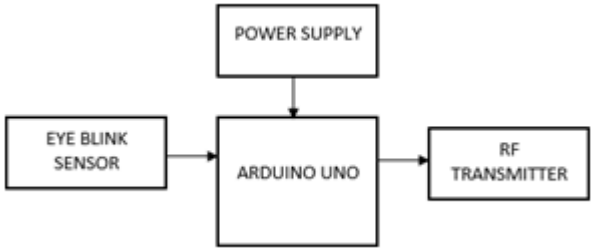
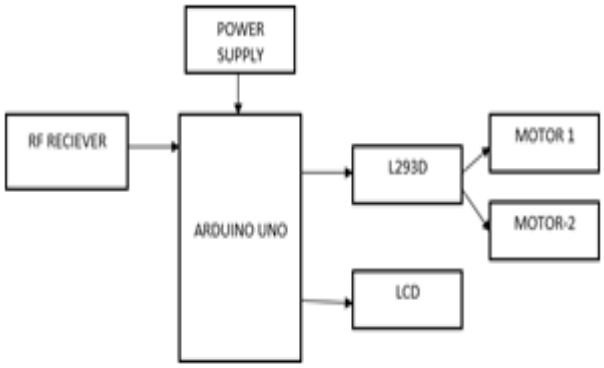
module.RF module is used to speak among eyeblink sensor thru Arduino controller transmitter is located on the eyeblink sensor component and RF receiver is located on the wheels component.

IV. Block Diagram

Transmitter Part



Reciever Part



V. Hardware Description

Arduino Uno

Arduino Uno is a microcontroller board primarily based totally on 8-bit ATmega328P microcontroller. Alongside ATmega328P, it incorporates special segments like gem oscillator, sequential correspondence, voltage controller, and so forth to assist the microcontroller. Arduino Uno has 14 superior info/yield pins (out of which 6 may be applied as PWM yields), 6 easy data sticks, a USB association, A Power barrel jack, an ICSP header and a reset button. Arduino may be applied to talk with a PC, every other Arduino board or different microcontrollers. The ATmega328P microcontroller offers UART TTL (5V) sequential correspondence which must be viable utilising superior pin 0 (Rx) and automated pin 1 (Tx). An ATmega16U2 at the board channels this sequential correspondence over USB and indicates up as a digital com port to programming at the PC. The ATmega16U2 firmware makes use of the same old USB COM drivers, and no outer driving force is required. Notwithstanding, on Windows, a .inf report is required. The Arduino software program consists of a serial reveal which permits easy textual records to be despatched to and from the Arduino board.

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Figure 1: Arduino UNO

RF Module

This RF module is a aggregate of RF Transmitter and RF Receiver. The transmitter/collector (Tx/Rx) pair works at a recurrence of 433 MHz.The RF transmitter receives sequential data and sends it remotely thru its RF recieving wire. The transmission occurs on the tempo of one Kbps – 10 Kbps. RF receiver gets the transmitted data and its miles running on the equal frequency as that of the transmitter...

Figure 2:RF Module

Eyeblink Sensor:

This Eye Blink sensor senses the eyeblink the usage of infrared. The Variation Across the attention will range as according to eye blink. In the occasion that the attention is close the yield is excessive anyways the yield is low. Eye Blink Sensor EYE Sensor unit 3-pin girl header. This Eye Blink sensor detects the eyeblink utilising is infrared. The Variation Across the attention will extrade consistent with eye flicker. On the off hazard that the attention is close, the yield is excessive anyways the yield is low. This object is carefully restricted for amusement pastime tasks and now no longer recommended for continuous.

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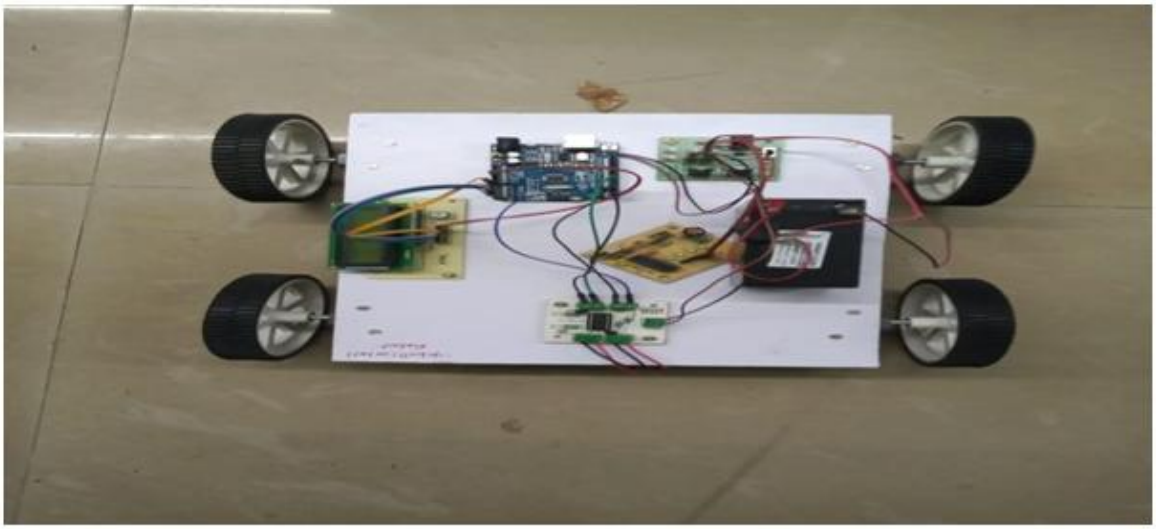
Figure 3: Eyeblink Sensor

V1.Results



V. Conclusion

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This hardware in conjunction with the software program can show to be an powerful gadget to make the lifestyles of the paralytic sufferers independent.

The handiest aspect approximately mission is, it removes the want of assistant for the patient. The factor of this gadget is to feature to the overall public in a bit way with the aid of using starting up a concept for a gadget that can in fact higher the existences of hundreds of thousands of people throughout the globe.

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Object Sorting Based on Shape and Colour Using Raspberry Pi

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Abstract

Generally more man power is required for sorting large number of objects and lot of money is required for paying salaries to the workers. Sorting more number of objects can take a long time and the quality of the product is also not up to the mark. In this paper a highly automated system is proposed which uses Raspberry Pi for detecting the colour and shape of the object which are passes through conveyor belt. Here Raspberry pi plays a key role which is runs on linux. In this project Arduino mega is used to control the conveyor belt mechanism and the objects are scanned with the help of USB Camera which are passes through on conveyor belt. The scanned images of objects are processed using Open CV library functions for detecting the shape and colour of the object. In this paper, sorting of objects of two different shapes and two different colours.

Key words: Raspberry pi 3, Arduino Mega, Conveyor belt, USB Camera, OpenCV, Colour, Shape, Object

I. Introduction

Robotics has tracked down a wide application in ventures. Mechanization offers much better support to clients wiping out the dreary work by human, accomplishing exactness and speed in work. They are high sought after and are exploit to complete the majority of the work which saves time and is more productive. The utilization of Open-Source climate makes

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it savvy, Linux based Operating framework utilized in Raspberry Pi (Raspbian OS), and GNU Octave, Python and Arduino IDE are unreservedly accessible for client to utilize and furthermore to create [2]. The paper is composed with an all encompassing methodology keeping the application in the field of industry to give a computerized material taking care of arrangement. The motivation behind this is to give a mechanical arm that sorts the objects in the most productive manner and in also cost effective manner. Technology that is expanding and is widely used at present is image processing. Image processing is basically a form of signal processing, where the input is an image which is processed to obtain some values, parameters or the set of characteristics related to that particular image[3].

Sorting of items in an industry is a dreary mechanical interaction, which is by and large did physically. Constant manual sorting makes quality consistency issues. Liked by businesses which includes visual perception performed by individuals[1]. This is a methodology where human workers are made to work for greatest chance to accomplish the ideal undertaking . At the point when we think about the enormous scope enterprises, isolation of objects that are mass in number turns into a dreary errand for workers which burn-through part of time.

Perceiving a specific object and putting it's anything but a necessary spot is a tiring work, wherein one needs to sort a majority of objects with more prominent load in fast time. This is moderate and non-reliable when the human workers do it physically. Now and again people are confined to work in the unsafe conditions and it is where mechanization assumes a significant part.

Sorting of objects is widely utilized in numerous businesses like food preparing enterprises, toy ventures, and so forth to guarantee that the nature of the item is sufficient. This interaction is improved by the utilization of computerization. Mechanization is the utilization of control frameworks like PCs or robots for taking care of various interaction and apparatuses to supplant an individual and gives mechanical help[7]. This not just diminishes manual endeavours, time burned-through, gives more opportunity for promoting, yet additionally forestalls threat which may happen when individuals work in perilous conditions.

II. Proposed System

In the present situation, the machine with high exactness, high yield, and no mistake is sought after, the exact work or tedious work is better finished with machines, for the computerized frameworks the sensor or camera is presence of mind for the machine like picture handling to recognize and distinguish an object and its qualities which assists with playing out a necessary errand[2]. Raspberry pi can choose the object dependent on shading like Red and Blue and shape like circle and square utilizing camera and picture preparing in Raspberry pi. To decide continuous and profoundly precise qualities of little objects in a quick streaming stream would open new headings for modern sorting measures. The current paper identifies with a contraption and strategy for ordering in and sorting little estimated objects.

In this paper an exceptionally computerized framework is proposed which utilizes Raspberry pi for recognizing the shape and shade of objects which are goes through conveyor

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belt. Here Raspberry Pi board runs on Linux. In the present innovation, raspberry pi has been a key in a significant number of uses in computerization.

The aim is to look at its utility and successful use as a mechanical framework in Sorting of Objects.There is a web camera that checks the picture of the specific object to be sorted. The filtered picture is then additionally prepared utilizing OpenCV to recognize the shape and shade of the object.

In this project, objects of 2 different shapes, i.e. circle and Square and two different colours i.e., red and blue.In this system there are five IR sensors ,i.e., one is to detect the object is present or not and another four sensors for sorting objects. Here Raspberry pi controller and Arduino MEGA controller are used for detecting and sorting.Raspberry pi interfaced with camera is used to detect the shape and colour of the object and the servomotors are interfaced with Arduino MEGA which helps in sorting mechanism. Servo motors mainly concentrate on the pushing of objects on respective trays.

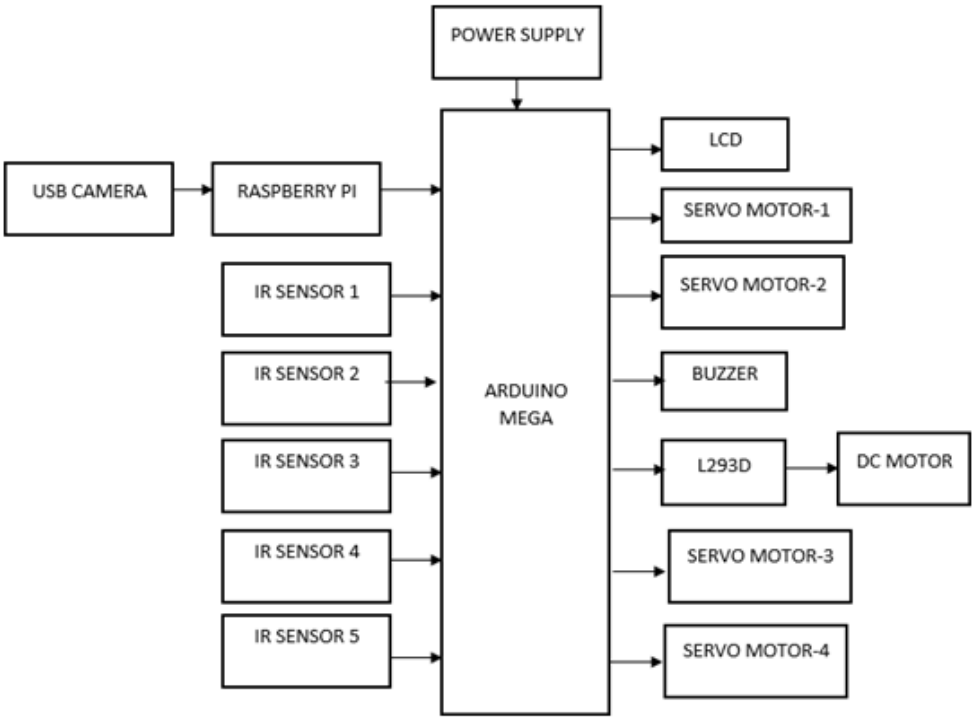

Figure 1: Block diagram of proposed system

The block diagram of the proposed method shown fig(1) consists of five IR sensors , i.e., one is to detect the object is present or not and another four sensors for sorting objects.Here Raspberry pi controller and Arduino mega controller are used for detecting and sorting. Raspberry pi interfaced with camera is used to detect the shape and colour of the object and the servomotors are interfaced with Arduino mega which helps in sorting mechanism and a colour sensor is used to detect the colours.

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Module Description

A. Raspberry Pi: Raspberry pi3 is depend on a Broadcom BCM2835 system on a chip (SoC)as shown in figure(2). It incorporates an ARM1176JZF-S 700 MHz processor.

Figure 2 :Raspberry Pi

Initially a 256MB RAM which was named as model A was served to the Raspberry Pi Foundation thereafter another one with 512MB RAM named as model B was served. The GPU used may be the Video Core IV, possessed through the Broadcom. The Raspberry Pi's GPIO port is arranged on upper left of the p cb, it's named as P1. It's a 26-pinport, fitted with two lines of 13 male 2.54 mm headers at the manufacturing plant [3]. The separating of those headers is especially significant: 2.54 mm pin dividing,) is a sort of sight in hardware, and it is the customary dispersing for prototyping plat structures which incorporate ss trip board and breadboards. Each pin of the GPIO port highlights its own motivation, with a few pins cooperating additionally it structures specific circuits.

B. USB Camera: A camera which is shown in fig(3) is an instrument that records pictures that can be put away straightforwardly, sent to another area, or both. These pictures might be still photos or moving pictures like recordings or films. The word camera derived from the word camera obscura(Latin for "dim chamber"), an early mechanism for projecting pictures. The cutting edge camera developed from the camera obscura. The working of the camera is fundamentally the same as the working of the natural eye.

Figure 3: Camera

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C. Servo Motor: A servo motor is an electrical device which can push or rotate an object with great precision. It is simply comprised of straightforward motor which go through servo mechanism. In the event that motor is utilized is DC controlled, it is called DC servo motor as shown in fig(4), and assuming it is AC fueled motor, it is called AC servo motor. We can get an extremely high force servo motor in a little and light weight bundles. Doe to these highlights they are being utilized in numerous applications like toy vehicle, RC helicopters and planes, Robotics, Machine and so forth

Figure 4: Servo motor

D. Arduino Mega: A microcontroller Arduino Mega 2560 board which is based on the ATmega2560 as shown in fig(5). Arduino mega contains 54 digital input/output pins, 16 analog inputs, 4 UARTs , a 16 MHz crystal oscillator, a USB connection, a power jack, an ICSP header, and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with an AC-to-DC adapter or battery to get started.

Figure 5:Arduino Mega board

E. IR Sensor: IR sensor is an electronic device, that produces the light to detect some object of the environmental factors. An IR sensor as displayed in fig(6) can measure the warmth of an object just as identifies the movement. For the most part, in the infrared range, every one of the objects emanate some type of warm radiation. These kinds of radiations are undetectable to our eyes, however infrared sensor can recognize these radiations.The producer is just an IR LED (Light Emitting Diode) and the identifier is essentially an IR photodiode . Photodiode is delicate to IR light of a similar frequency which is produced

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by the IR LED. At the point when IR light falls on the photodiode, the protections and the yield voltages will change with respect to the extent of the IR light got.

Figure 6 :IR Sensor

III. Results

In below figure(7) and figure(8) , The shape and color of the objects were sorted using Open CV software installed in Raspberry pi.OpenCV is a library used mainly for processing images and videos to identify shapes, objects, text etc. It is mostly used with python. In this article colour and shape of the image have been identified. For this cv2. Find Contours() function of Open CV is required, and also cv2.drawContours() function to draw edges on images. A contour is an outline or a boundary of shape.

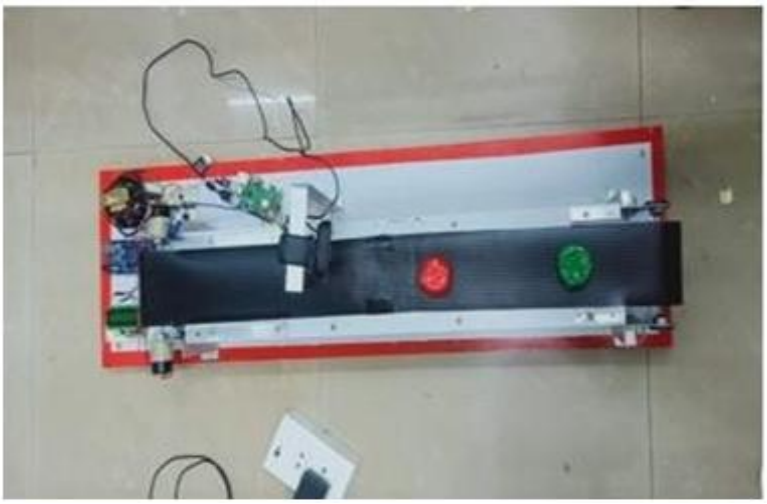

Figure 7: Circular shape Objects on the conveyer belt

The automated system was made that has the capability to pick a pre-specified object and place it in separate divisions based on colour and shape.The automated system outlined above provides cost effective,low time consuming and technically simple approach for sorting of objects.This system uses Raspberry pi 3 which makes the model easy to use and more efficient

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Figure 8: Square Shape detection on the conveyer belt

IV. Conclusion

The object sorting automated system based on shape and colour has been successfully designed.Here a linux based board raspberry pi, interfaced with USB camera to capture the images of the objects and store them.The stored images will be processed for calculating their shape and colour characteristics by using fundamental digital image processing techniques.It ensures remarkable processing capacity as well as peerless performance including colour detection.By applying the idea of this project an industry can easily sort the required products according to its colour and shape.

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Shape and Colour Sorting Automated System Using Raspberry Pi

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Abstract

Robotization, despite the fact that had driven into the advancement as far as refinement of human endeavors in bringing out large scale manufacturing of all the more definitely made merchandise; yet it somehow or another it should be altered to be a more astute smart framework. Typically sorting of items is finished bodily utilising human paintings. Perceiving a selected item and placing it with inside the vital role is a tiring paintings especially with inside the discipline of enterprise wherein in a single desires to type a heft of items in rapid time and moreover the burden is extra outstanding than what a human can convey. In this paper we have a look at approximately sorting the items depending on their form and shading. Here we use Raspberry p, that is an open sourced Linux primarily based totally board and it's miles .Interlaced with digital digicammodule.First and foremost we get up to speed the images of objects which are needed to be sorted out by utilizing the camera. By applying the essential standards of advanced image processing we analyze the shading segments of the obtained image and separate the objects. This whole grouping of steps of results in our ideal yield of sorting out objects naturally.

Key words : Raspberry pi 3,Arduino Mega,OpenCV, Camera

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I. Introduction

In assembling industries, there emerges a want to type items. The items is probably of similar or numerous sorts. The framework must have the choice to apprehend the items and later on separate the items from each other depending on their properties. Objects may also have numerous shapes or numerous shadings. The items is probably of equal form and equal tone hut particular texture. Consequently, numerous items and numerous situations require various type of managing. Our factor is to set up items utilising various image making ready calculations at the limitations like cone form, texture[1] The statistics image may be organized for distinguishing the shading segments.This robotized framework doesn't requires any uncommon human carefulness and accordingly diminishes the likelihood of man made blunders. The yields of the framework are totally solid which can be additionally connected with tremendous working frameworks.

Sorting of items is widely used in various industries like food handling industries, toy industries, and so on to guarantee that the nature of the item is sufficient. This cycle is improved by the utilization of robotization. Mechanization is the utilization of control frameworks like PCs or robots for taking care of various cycle and apparatuses to supplant an individual and gives mechanical help. This not just decreases manual endeavors, time devoured, gives more opportunity for showcasing, yet additionally forestalls threat which may happen when people work in perilous conditions.Regularly sorting of factors is done physically requiring human work. Recognizing a specific item and submitting it in the necessary request is a burdening work particularly in the modern field wherein one requirements to sort an enormous number of objects in a little time frame and furthermore weight of the objects is a lot bigger than what a normal human can bear.

II. Proposed System

Here we are using Raspberry Pi.It an open source board based on Linux. In today's technology, raspberry pi has been a key in a major number of applications in automation. Our aim will be to examine its utility and effective use as a mechanical system in Sorting of Objects. We are making use of a web camera that scans the image of the particular object to be sorted. The scanned image is then further processed using OpenCV to detect the shape and color of the object. Here we are using objects of 2 different shapes.These shapes are circle and Square . and two different colours .These are red and green.In this system we are using five IR sensors .And one is used to detect the object is present or not.And another four sensors for sorting objects.Here we are using Raspberry pi controller and Arduino MEGA controller for detecting and sorting.Raspberry pi interfaced with camera is used to detect the shape and colour of the object.And the servomotors are interfaced with Arduino UNO which helps in sorting mechanism.

Hardware Requirements:

- ARDUINO mega
- IR SENSORS
- RASPBERRY PI
- SEERVO MOTORS
- DC GEAR MOTOR

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- MOTOR DRIVER
- USB CAMERA
- POWER SUPPLY
- BUZZER
- LCD
- L293D

Block Diagram

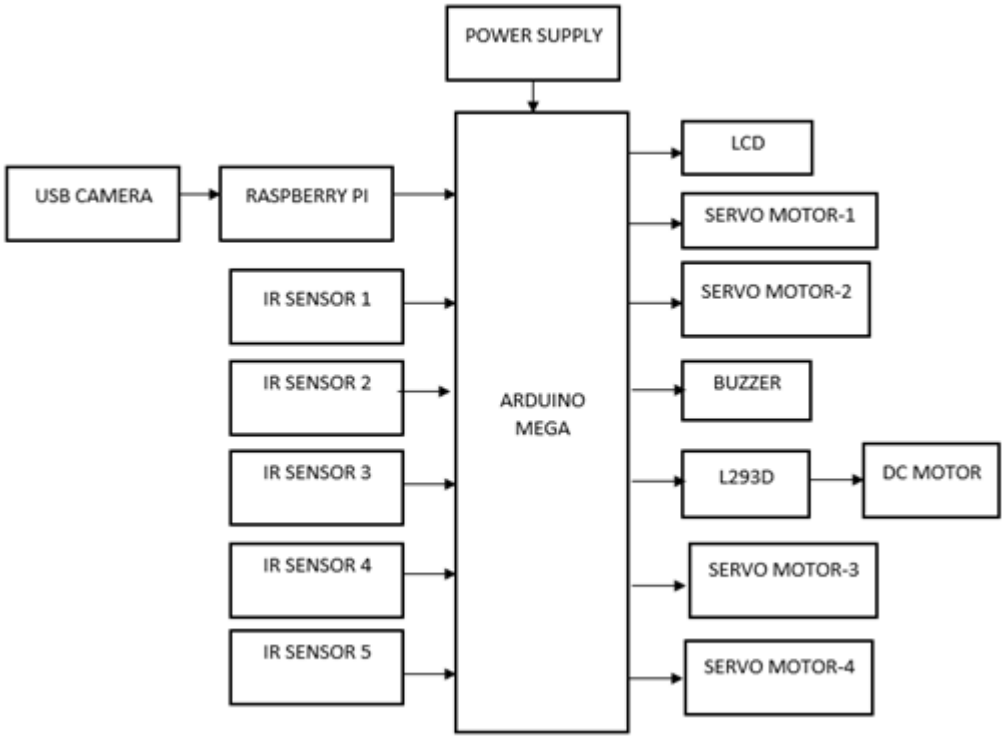

Figure 1: Block diagram of proposed system

Theblock diagramof the proposed method shown fig(1) consists of five IR sensors .And one is to detect the object is present or not and another four sensors for sorting objects.Here we are using Raspberry pi controller and Arduino mega controller for detecting and sorting.Raspberry pi interfaced with camera is used to detect the shape and colour of the object and the servomotors are interfaced with Arduino mega which helps in sorting mechanism and a colour sensor is used to detect the colours.

Module Description

A. Raspberry Pi: Raspberry pi3 is reliant on a Broadcom BCM2835 system on a chip (SoC). It incorporates an ARM1176JZF-S seven hundredMHz processor.

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Figure 1: Raspberry Pi

The Raspberry Pi is a 256MB RAM, that was labeled as Model A, and later made one B with 512MB RAM. The GPU used may be the Video Core IV, possessed through the Broadcom. The Raspberry Pi's GPIO port is arranged on upper left of the p cb, it's named as P1. It's a 26-pinport, fitted with two lines of 13 male 2.54 mm headers at the manufacturing plant [3]. The separating of those headers is especially significant: 2.54 mm pin dividing,) is a sort of sight in hardware, and it is the customary dispersing for prototyping plat structures which incorporate ss trip board and breadboards. Each pin of the GPIO port highlights its own motivation, with a few pins cooperating additionally it structures specific circuits.

B. USB Camera: A camera which is displayed in fig(3) is an optical instrument that records pictures that can be taken care of clearly, shipped off another space, or both. These photos may be still photographs or moving pictures like accounts or movies. The term camera comes from the word camera obscura(Latin for "faint chamber"), an early system for projecting pictures. The state of the art camera created from the camera obscura. The working of the camera is essentially equivalent to the working of the regular eye.

Figure 3: Camera

C. Servo Motor: A servo motor is an electrical tool which could push or rotate an item with exquisite precision. If you need to rotate and item at a few unique angles or distance you then definitely use servo motor li is truly created from sensor motor which undergo servo mechanism. In the occasion that motor is applied is DC controlled, it’s miles referred to as DC servo motor as proven in fig(4), and assuming it’s miles AC fueled motor, it’s miles referred to as AC servo motor. We can get an exceptionally excessive pressure servo motor in a bit and mild weight bundles. Doe to those highlights they may be being applied in severa1 programs like toy vehicle, RC helicopters and planes, Robotics, Machine and so on

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Figure 4: Servo motor

D. Arduino Mega: The Arduino Mega 2560 is a microcontroller board primarily based totally at the ATmega2560 as shown in fig(5). It has fifty four virtual input/output pins (of which 15 may be used as PWM outputs), sixteen analog inputs, four UARTs (hardware serial ports), a sixteen MHz crystal oscillator, a USB connection, a electricity jack, an ICSP header, and a reset button. It carries the entirely had to guide the microcontroller; truly join it to a laptop with a USB cable or electricity it with an AC to DC adapter or battery to get started.

Figure 5: Arduino Mega board

E. **IR Sensor**: IR sensor is an digital tool, that produces the mild to stumble on a few Item of the environmental factors.An IR sensor as displayed in fig16) can degree the warm temperature of an item simply as identifies the movement. For the maximum part, withinside the infrared range, each one of the items emanate a few kind of feat radiation. These sorts of radiations are undetectable to our eyes, but infrared sensor can apprehend those radiations. The manufacturer is simply an IR LED (Light Emitting Diode) and the identifier is basically an IR photodiode. Photodiode is sensitive to IR mild of a comparable frequency that is produced via way of means of the IR LED At the factor while IR mid falls at the photodiode the protections and the yield voltages will alternate with appreciate to the volume of the IR mild got.

Figure 6:IR Sensor

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III. Results

In this proposed device, Raspberry pi is honked up with a USB digital digicam wherein OpenCV wrapper with python is used wherein CIELAB shadeation area is used to type the items in line with its shadeation. This will make our paintings extra clean and efficient. Fig (7) Objects at the conveyer bell Fig (8) Colour detection at the conveyer belt

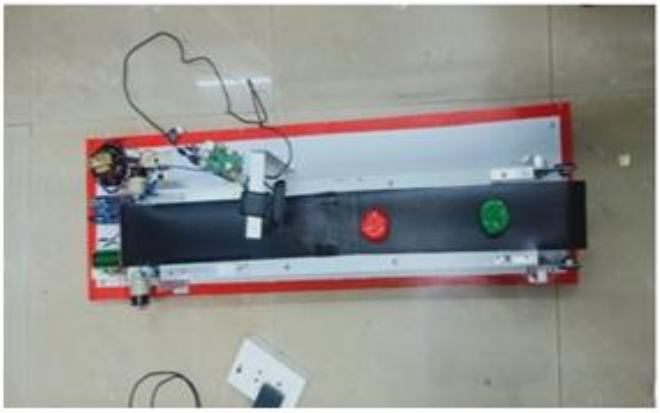

Figure 7: Circular shape Objects on the conveyer belt

Figure 8: Square Shape detection on the conveyer belt

IV. Conclusion

An photo processing set of rules for item shadeation, form detection, frequency calculation and sorting has been applied successfully. The device offers correct consequences for melyRedandgreen coloured items. Due to apply of automation in a device requiring item sorting primarily based totally on shadeation and form, human efforts are decreased which results in progressed accuracy in conjunction with saving time and money

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Power Efficient Gm-C DSM's with High Immunity to Aliasing, Clock Jitter and ISI

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Abstract

Ongoing advancement in continuous time Delta Sigma modulators according to study by employ an inactive RC low-pass channel (LPF) in the input way can altogether further develop the force proficiency of a continuous time delta sigma modulator. Then again, to accomplish elite, a CT DSM faces the unfavorable developments of clock fridget, intersymbol impedance (ISI), and corruption of antialiasing capacity. And these difficulties are very hard to handle all the while without devouring unnecessary force. This paper suggests a Gm-C DSM with a consolidated RC , exchanged capacitor low pass filter frontend step to accomplish a superior contrary associating, clock jitter, and inter symbol interface at the same time while processing an incredibly less force utilization. Transistor level replications on a sound band manipulator and a 10-MHz transfer speed modulator are given, checking the high resistance of the suggested circuit to intersymbol interface, clock jitter and associating while at the same time achieving a force productivity likely 7.45 fJ/change level.

Key words: Gm-C Integrator, Antialiasing, CT DSM, Clock Jitter

I. Introduction

DELTA SIGMA Modulators (DSMs) been implemented in an assortment of products of biomedical gadgets along a tight recurrence scope of many Hertz to remote correspondence networks with a data transmission preferable several megahertz or higher. A Delta-sigma modulator is proposed by Omid Rajaee et al. The specified modulator utilizes high resolution, distributed channel quantization and combines them with the shaping of noise characteristics of delta sigma modulator. Therefore, the integrator's requirements for gain, ripple, and response are significantly reduced. Delay channelization quantization to improve noise shaping. These advantages result in lower power loss, higher stability and higher resolution.

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DSMs are essentially two classes of executions i.e, Continuous Time Delta Sigma Modulators, and Discrete Time sigma delta modulator. Continuous time Delta sigma modulators are appealing because of their steady info interference, antialiasing highlight and loosened up transfer speed, and the large rate prerequisite of enhancers contrasted and their partners carried out by exchanged capacitor (SC) circuits.

A consistent info impedance disposes of the signal dependent accuse injection related of a switched capacitor input, provides the information current smoother than the quickly varying current heartbeats in a switched capacitor input, consequently reduces the force of the information cushion, adding to the reduction of the force of the entire framework. The antialiasing capacity prompts the disposal of the frontend channels which additionally power saving for the entire framework.

II. Existing System

An unadulterated Gm-C execution introduced in [1] accomplishes high goal however has an extremely restricted information range. A input resistor and a multibit criticism DAC are proposed to understand a subtractor to produce a harsh virtual ground infront of the Gm-C integrator, yet a source-declined transconductor is as yet expected to improve the straight info range, which incredibly corrupts the force effectiveness of the Gm-C channel.Late distributions [3]–[8] bring up that applying a uninvolved RC low pass channel (LPF) in a CT DSM can essentially further develop its force proficiency by lessening the oscillate of the blunder sign to its first and most critical active integrator.

A Digital to analog converter (DAC) converts the digital data into an analog data and Analog to digital converter(ADC) performs reverse operation of DAC ,it converts the Analog data into digital data. Several architectures of DAC are there, the DAC is suitable for a selected utility is determined with the aid of figures of merit together with: resolution, maximum sampling frequency and others. DACs are utilized in music players as they convert digital data into analog audio signals. DACs also are utilized in televisions and mobiles as they convert virtual video statistics into analog video signals.The voice DAC is a high resolution type and less frequency whereas the video DAC is a low to medium resolution type and high frequency .

Because of the difficulty and the want for exactly matched additives, all however the maximum specialised DACs are applied as a integrated circuits (ICs). These usually take the shape of metal–oxide– semiconductor (MOS) mixed-sign (IC) integrated circuit chips that combine each analog and virtual circuits. Discrete DACs (circuits made from more than one discrete digital additives as opposed to a packaged IC) could usually be extraordinarily high-speed low-decision power-hungry types, as utilized in army radar systems. Very high-pace check equipment, specifically sampling oscilloscopes, might also use discrete DACs.

III. Proposed System

The specified Gm-C continous time delta sigma modulator circuit design is displayed in below Fig.1(a).The scramble boxed portion is a consolidated switched capacitor for the criticism sign and resistor capacitor for the information signal Low pass filter, in need of help

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as RSC Low Pass Filter. The RSC Low pass filter makes the transconducatnce modulator resistant to ISI, clock jitter, and associating while at the same time accomplishing a powerful productivity. To see the value in the improvement of the RSC-LPF, the methodology of utilizing a RC Low Pass Filter for both information and criticism signals, are displayed in the Fig. 1(b).

As continuous time signal has antialiasing ability it reduces the aliasing effects. By using transconductance amplifier it amplifies the given signal and reduces the power consumption. In these analog signal is given as input and it is provided by RSC-LPF the output of these block is given to the transconductance amplifier, to amplify the signal and decreases the power utilization. The exchange function of this circuit is given by

$$\frac{\varepsilon(s)}{V_{\mathrm{IN}}(s)} = \frac{1}{2 + sR_{\mathrm{in}}C_P}$$

where the post area of the LPF is controlled by the RinCP steady. By adjusting the swap between the in band quantization commotion and warm clamor, putting the post at the sign band edge is an appropriate decision . The resistive way for the input can execute a NRZ or RZ DAC, be that as it may, being delicate to clock fridget. To stifle the clock-jitter effect, R f is supplanted by a capacitor C1 exchanged in the testing recurrence fs, as displayed in Fig. 1(c).

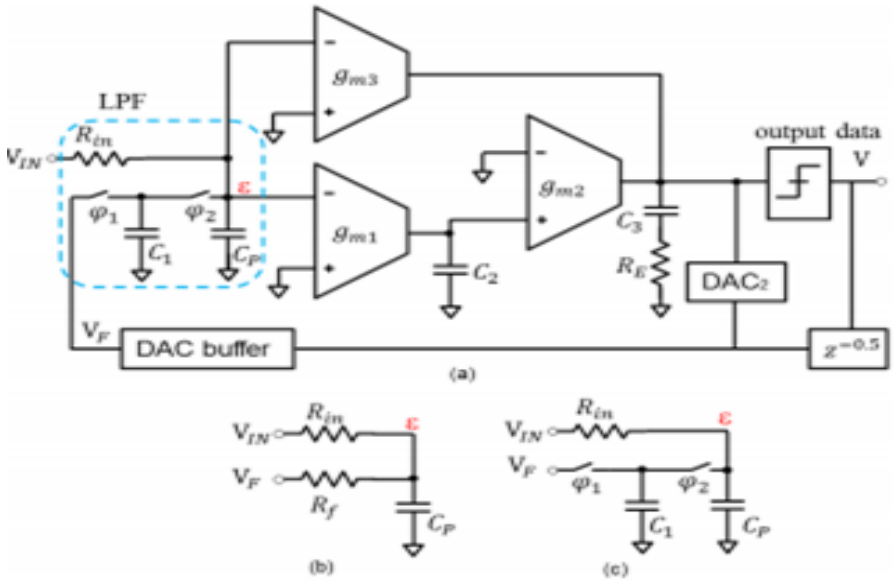

Figure 1. (a) Gm-C Continous Time DSM with RSC LPF front end and v gives the output digital data (b) RC Low Pass Filter. (c) RSC Low Pass Filter.

Ordinarily, R f rises to Rin. At the point when f fs, i.e., in the sign band the exchanged capacitor C1 copies a resistance of significant worth Req = Ts/C1, where Ts = 1/fs. The exchange function from VIN to ε is as yet given in the sign band.

The operational transconductance amplifier i.e, OTA is an amplifier whose produces an output current by its differential voltage input. OTA is a voltage controlled current source (VCCS). And there is generally a further input for a current to manipulate the transconductance of a amplifier. The OTA is much like a popular operational amplifier in that

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it has a excessive impedance differential input degree and that it could be used with terrible feedback.

An Analog to Digital Converter converts a both continuous time and continuous amplitude analog signal to a discrete time signal and discrete amplitude digital signal. The Analog to digital conversion involves quantization of the input, so it necessarily introduces a less amount of noise or error.

IV. Results

The schematic representation of the proposed design is shown below.

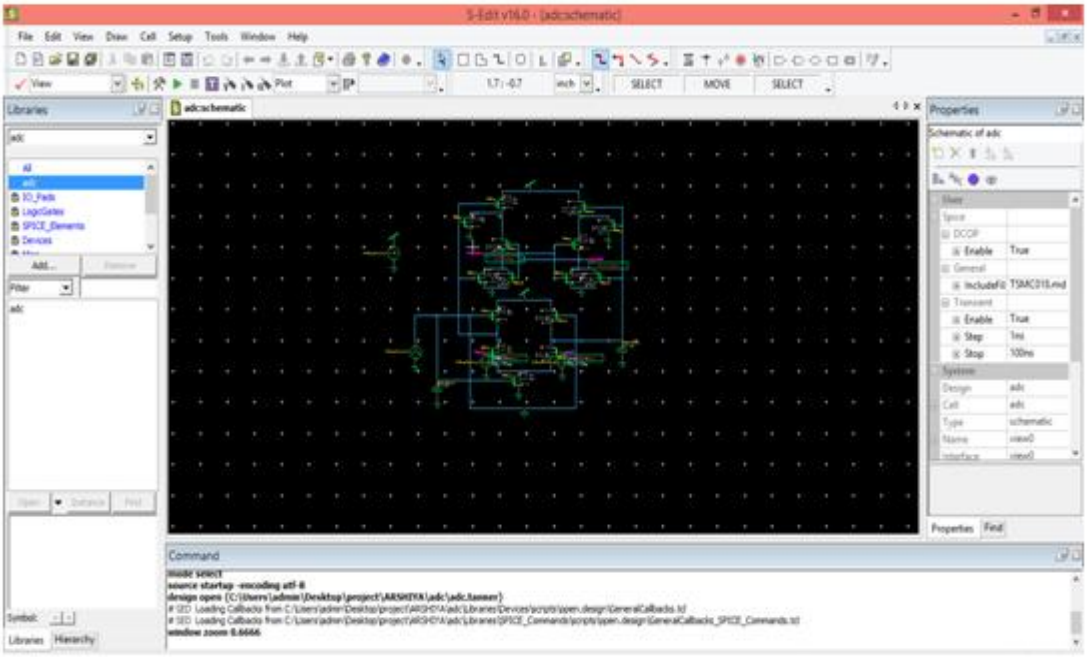

Figure 2: Schematic Representation of CT-DSM

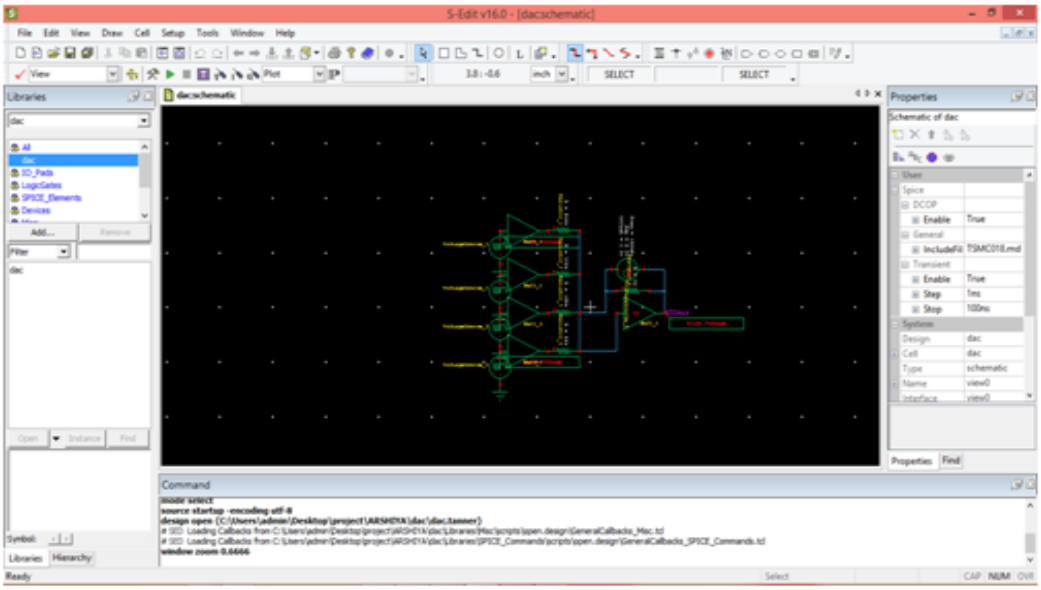

Figure 3:Schematic Representation of DAC

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The simulation results of proposed design is shown in figures.

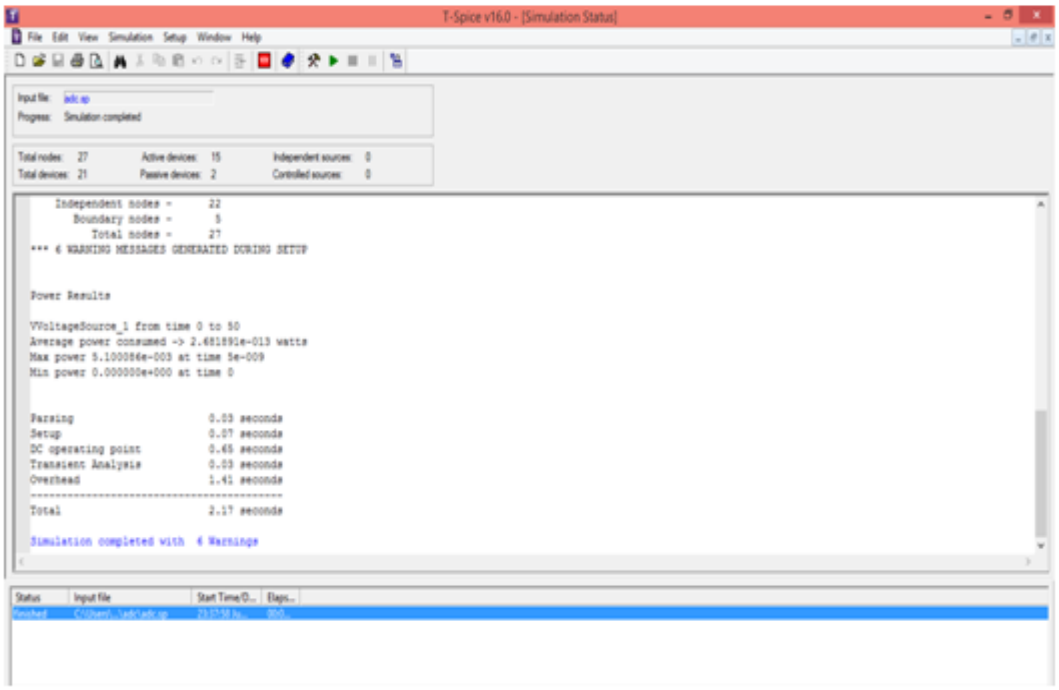

Figure 4: Simualtion results of CT-DSM

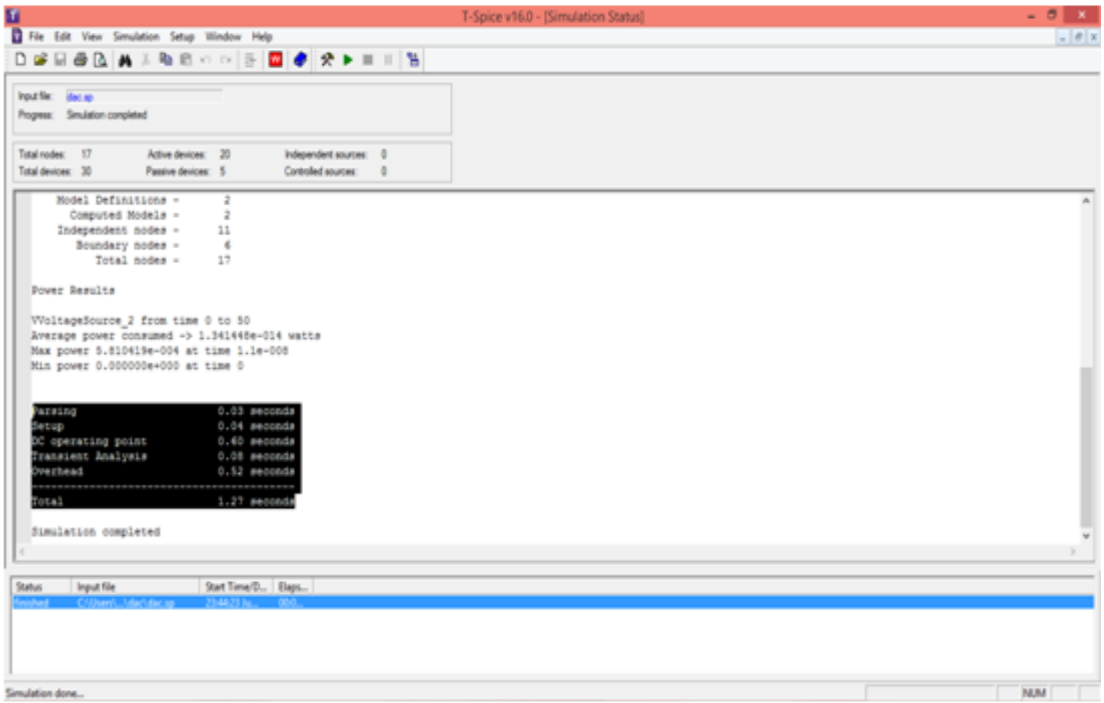

Figure 5:simulation results of DAC

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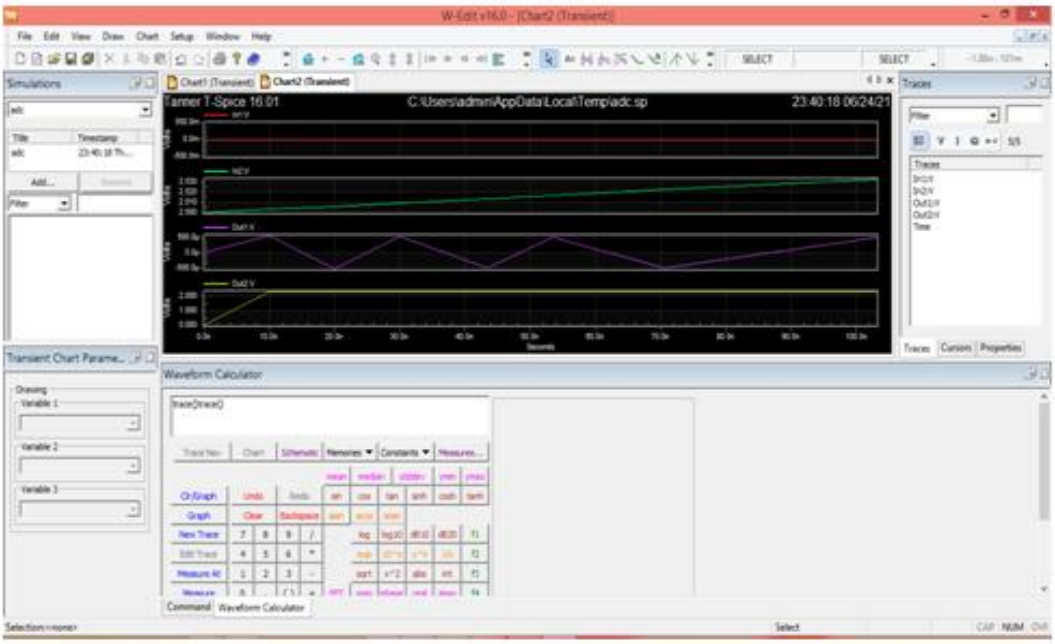

Figure 6: Waveforms of CT-DSM

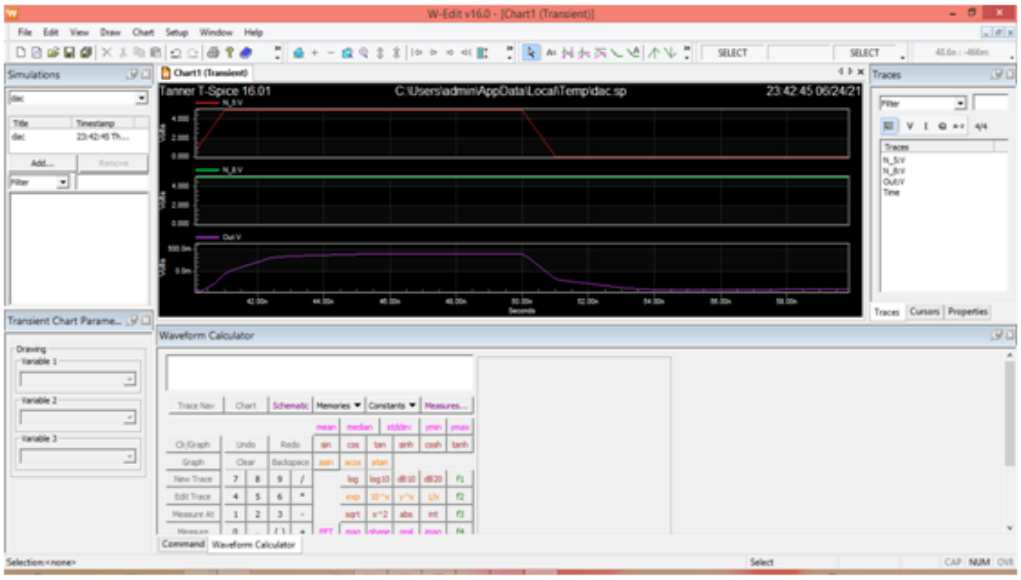

Figure 7: Waveforms of DAC

V. Conclusion

This paper has presented a force productive Gm-C DSM frontend step so can accomplish superior contrary to clock jitter and ISI and associating. The forefront level is a blend of a RC low pass filter for the information and a switched capacitor LPF for the signal. It essentially diminishes the signal fluctuations at the allowance of the unfolded-circle Gm-C integrator for steep linearity at less force application, receives the clock-fidget insensitive of the SC DAC although not monumental any discharge prerequisite to the OTA, and lessens

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the result of weakening the sign prior to it is trail by the SC DAC. The fidget, inter symbol interference, and correlated execution of the suggested strategy appeared autonomously examined as well as approved at transistor level reproduction.

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A Novel Adaptive Framework for Chaotic Image Watermarking Based on SVD and Robust IWT

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Abstract

Image watermarking plans dependent on singular value decomposition (SVD) have gotten famous because of a decent compromise among strength and intangibility. In any case, the bogus positive issue (FPP) is the principle downside of SVD-based watermarking plans. The singular value is the fundamental driver of FPP issues since it a fixed value that doesn't hold primary data of an image. In this paper, another SVD-based image watermarking plan that utilizes a chaotic map is proposed to defeat this issue. The mysterious key is first separated from both the host and watermark image. This key is utilized to create another chaotic framework and chaotic various scaling factors (CMSF) to expand the affectability of the proposed plot. The watermark image is then transformed dependent on the chaotic framework prior to being straightforwardly implanted into the singular value of the host image by utilizing the CMSF. The extricated secret key is one of a kind to the host and the watermark images, which improves security and defeats FPP issues. Trial results show that the proposed plot satisfies all watermarking prerequisites as far as power, impalpability, security, and payload. Besides, it accomplishes high strength with various scaling factors, and outflanks a few existing plans.

Keywords: chaotic map, image watermark, integer wavelet transform (IWT), singular value decomposition (SVD)

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I.Introduction

With the boundless development of advanced applications and improved organization innovation benefits, the interest for upgraded information security strategies have extraordinarily expanded because of unlawful duplicating, altering, appropriation, and trustworthiness issues. Watermarking innovations have been acquainted with give extra security on top of existing cryptographic advances. Advanced watermarking utilizes installing or concealing strategies to give copyright assurance to media information. Inserting and extraction are the fundamental cycles of computerized watermarking plans, whereby the installing interaction shrouds watermark data in another piece of advanced information like images, though the extraction interaction includes recovering the implanted data. At the end of the day, advanced watermarking can be alluded to as an implanting strategy for restricted intel. Advanced watermarking doesn't just give copyright insurance however can likewise be utilized for different purposes like substance distinguishing proof and verification, computerized criminology, alter recognition, broadcast checking, fingerprinting, and media record chronicling [1]. Advanced image watermarking can be ordered into two classes: apparent and undetectable. Noticeable watermarks are utilized to embed logos or marks into a host image as verification of substance possession. Apparent watermarks are not difficult to perceive however are handily assaulted and eliminated by foes [2]. Conversely, imperceptible watermarks are all the more generally utilized on the grounds that it is hard to be seen by the human visual framework (HVS). Imperceptible watermarks depend on the idea of implanting watermark data into obscure pieces of a host image. All current undetectable watermarking plans are dependent upon three primary necessities: strength, subtlety and security. A vigorous watermarking plan is one which guarantees that the separated watermark stays unmistakable even after the watermarked image has been exposed to mathematical and non-mathematical assaults. A subtle watermarking plan is one which won't prompt a recognizable or noticeable distinction between the host and watermarked image. Thusly, it is hard to track down the installed watermark or distinguish designs that are brought about by the inserting cycle [3]. Finally, a safe watermarking plan is one that is secure against different assaults.

II. Literature Survey

The process of embedding a watermark in a multimedia object is termed as watermarking. Watermark can beconsidered as a kind of a signature that reveals the owner of the multimedia object. Content providers want to embed watermarks in their multimedia objects (digital content) for several reasons like copyright protection, content authentication, tamper detection etc. A watermarking algorithm embeds a visible or invisible watermark in a given mealtime-1 Multimedia object refers to images, video and audio clips or any digital content that can be used for the purpose of information hiding. IA object. The embedding process is guided by use of secret key which decided the locations within the multimedia object (image) where the watermark would be embedded. Once the watermark is embedded it can experience several attacks because the multimedia object can be digitally processed. The attacks can be unintentional (in case of images, low pass filtering or gamma correction or compression) or intentional (like cropping). Hence the watermark has to beavery robust against all these possible attacks. When the owner wants to check the watermarks in the possibly attacked and distorted multimedia object, s/he relies on the secret key that was used to embed the watermark. Using the secret key, the embedded watermark sequence can be extracted. This extracted watermark may or may not resemble the original watermark because

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the object might have been attacked. Hence to validate the existence of watermark, either the original object is used to compare and find out the watermark signal (non-blind watermarking) or a correlation measure issued to detect the strength of the watermark signal from the extracted watermark (blind watermarking). In the correlation based detection the original watermark sequence is compared with the extracted watermark sequence and a statistical correlations test is used to determine

III. Existing Method

Advanced image watermarking can be grouped into two classes: noticeable and undetectable. Apparent watermarks are utilized to embed logos or names into a host image as confirmation of substance possession. Apparent watermarks are not difficult to perceive however are effortlessly assaulted and eliminated by foes. In contrast, invisible watermarks are all the more normally utilized on the grounds that it is hard to be seen by the human visual framework (HVS).Invisible watermarks depend on the idea of inserting watermark data into obscure pieces of a host image. All current imperceptible watermarking plans are dependent upon three primary necessities: vigor, A vigorous watermarking plan is one which guarantees that the removed watermark stays unmistakable even after the watermarked image has been exposed to mathematical and non-mathematical assaults. A subtle watermarking plan is one which won't prompt a discernible or noticeable distinction between the host and watermarked image. All things considered, it is hard to track down the installed watermark or recognize designs that are brought about by the inserting cycle.

IV. Proposed Method

The corner to corner values in S are profoundly steady. When there are little changes to these singular values, there will be scarcely any impact on the subsequent image pixels. Accordingly, watermark data can be implanted without influencing the visual impression of the host image. Because of how the singular values in S are in plunging request, the more modest values are situated towards the finish of the framework. Adding or refreshing these more modest values during the recuperation stage has insignificant impact on image quality. Likewise, adding new little values in all situations in S additionally has negligible impact on image quality.

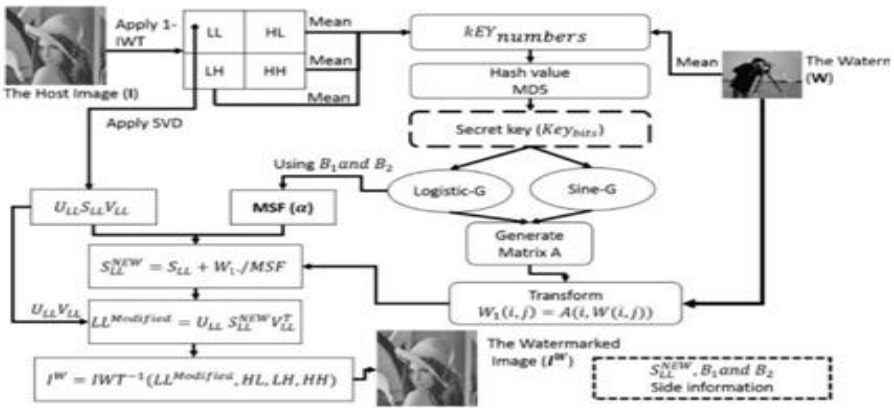

Figure 4.1. The proposed scheme embedding process.

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V. Proposed Scheme

The proposed scheme consists of three phases: key generation, embedding, and extraction. The key generation phase involves extracting information from the host and watermark images, then hashing them to generate the secret key of the proposed scheme. This secret key is used to generate initial conditions and system parameters of the chaotic maps, which are then iterated to produce a matrix that will be used to transform the watermark prior to the embedding process. The use of the transformed watermark protects the original watermark against attacks. Figures 6 and 7 visually summarizes the embedding and extraction schemes respectively, which will be discussed in detail in the following subsections.

A. Key Generation: Secret keys are commonly used in symmetric encryption schemes to ensure the confidentiality of information. Generally, a secret key should be at least 128 bits long to withstand brute force attacks. Any algorithm using a secret key should be highly sensitive to any slight changes to its key bits [45]. In the proposed scheme, the secret key is generated from the host and watermark images. The key bits are then used to generate initial conditions and system parameters of the enhanced chaotic maps. The maps are then iterated to produce a matrix that will be used to transform the watermark.

B. Watermark Embedding :

1. The steps of the proposed embedding process are as follows: 1) Select the LL sub-band of host image and apply SVD to it
2. Transform the watermark, W into a new matrix W1 using the chaotic matrix, A. The transformation process is defined as
3. The values from the matrix W1 is embedded into SLL. The process can be mathematically defined as

Where • is the dot product operation and α is the scaling factor. As mentioned in Section I, there are two types of scaling factors, SSF and MSF. In SSF, α is the only value used in watermarking scheme. When α is small, the imperceptibility between the watermarked image and the host image will be high but the scheme will lack robustness. On the other hand, MSF has multiple scaling values which can provide a good balance between imperceptibility and robust. Most existing schemes use optimization algorithms to select optimal MSFs, which can achieve good trade-offs between these key metrics [13], [15], [25]. In this paper, the logistic-G map is used to generate new chaotic scaling factors without the use of optimization algorithms. Chaotic points that are generated from the logistic-G map are employed to generate α of size W. The CMSF consists of scaling factor elements that are suitable for the proposed scheme, and requires less computational effort to generate as compared to optimization algorithms

C. Watermark Extraction: The extraction process starts off by extracting W0 1 from the watermarked image. Then, W0 1 is transformed into the watermark, W. The extraction steps are as follows:

1. Apply one-level of IWT on the watermarked image I W (possibly distorted due to an attack) to obtain the four sub-bands, LLI W , LH, HL and HH.
2. Further decompose LLI W by SVD
3. Obtain WW 1 by computing

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Where α is computed based on the secret key, Keybits and β values from Eq. 15, and S new LL is obtained from the side information. Before transforming WW 1 into the watermark, Wnew, the secret key of the claimant (individual claiming ownership to the host image) will be compared against the secret key stored by the trusted third party. If the two keys match, the transformation process will be allowed to continue. Otherwise, the process will be halted. Thus, adversaries with forged secret keys will not be able to successfully prove ownership of the host image.

D. **Key Management:** For copyright verification, the secret key must be registered and saved with a third party known as a certified authority (CA) [22], [46]–[49]. This will circumvent attacks whereby adversaries embed their own watermark and generate their respective secret keys. Without the CA, any adversary can claim ownership of the watermarked image. To solve this issue, the CA will play a role in linking each image to its side information, secret key or its ownership share in zero-watermarking scheme

VI. Results

Here are the results for the input code:

Figure: 6.a. data image

Figure :6. b. cover image

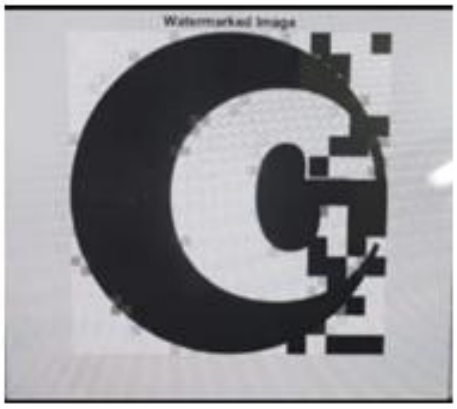

Figure:6.c.Watermarked image

Figure:6.d.Output image

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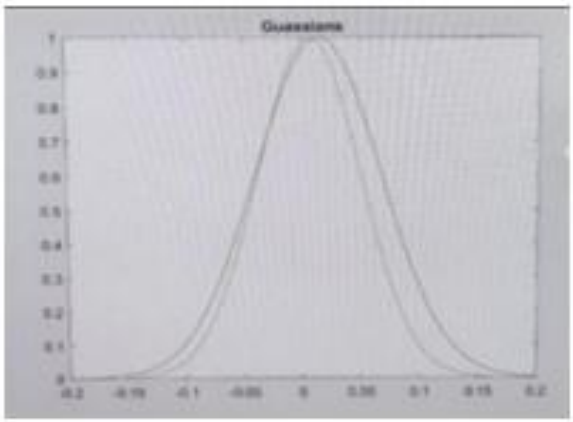

Figure :6.e.Correlation

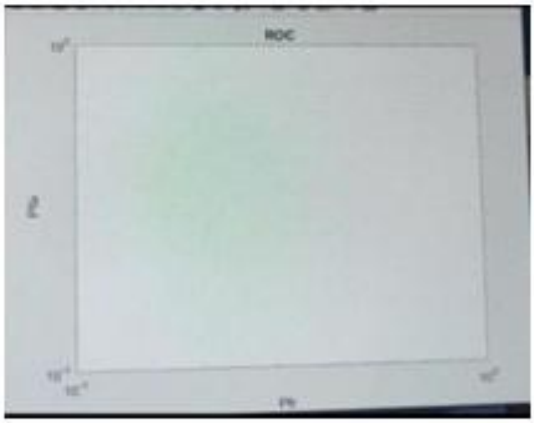

Figure:6.f.ROC

VII. Conclusion and Future Scope

Another bedlam based SVD image watermarking plan in the recurrence area was proposed in this paper. The new plan presented the utilization of a mysterious key, created from the host and watermark images, as a focal part in the inserting, extraction, and proprietorship confirmation measures. Introductory conditions and control boundaries of two chaotic maps were created dependent on the mysterious key. The chaotic map directions were then used to transform the watermark into a chaotic grid which is then installed into the host image. Moreover, MSF values were produced by the chaotic maps and mystery key to accomplish high vigor and subtlety. The host image was first transformed by a one-level IWT then the LL sub-groups were chosen. Then, SVD was applied on LL, and SLL was modified by the CMSF and chaotic framework during the inserting cycle. The extraction measure includes an extra key coordinating with stage, whereby if the mysterious key is legitimate, the extraction interaction will keep on creating a separated watermark that is indistinguishable from the first watermark. Something else, a dark image will be delivered. Subsequently, the proposed conspire can go around FPP, prompting improved security. Likewise, the proposed plan can oblige diverse watermark measures by installing them into various sub-groups for higher adaptable and bigger limit. Be that as it may, the proposed conspire produces side data during the installing stage which is utilized in the extraction interaction. This side data alongside the mysterious key should be kept classified. Our future work is to conquered this disadvantage, whereby the implanting stage will just depend on the mysterious key without side data. Different procedures like cell mechanization, block chain or profound learning can likewise be investigated to accomplish visually impaired or safer watermarking frameworks.

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Public Transport System (Salutary) In the Covid-19 Pandemic by Using Iot

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Abstract

The objective of the SALUTARY system (safe and reliable public transport systems) is to apply modern information and communication technologies (ICT) to proactively face congestion in public transport systems (PT), as a consequence of the limitations due to COVID-19. In particular, it is proposed to adopt in different segments of TP systems (buses / trams / trains, train stations / metro stations and bus stops) appropriate crowd detection techniques based on Internet of Things (IoT) technologies, they actually measure - the Number of users.

When smart card is attached to RFID reader. Validator reads the data from card and sends it to the server via internet. Microcontroller receives data and if balance is positive it displays "Payment Received" green LED turns on and sends data back to server so that server can update data and deduct money from balance, if balance is not enough Microcontroller displays " Not Enough Balance" Red LED turns on.

I. Introduction

ONE of the most significant consequences of the coronavirus disease pandemic (COVID-19) will relate to the transport sector and mobility, especially public transport (PT) systems in urban areas. A recent study conducted in China [1] estimated that private car use would roughly double as a result of the outbreak, increasing from 34% to 66%, while public transport (bus / metro) use would be more than halved, falling from 56%. at 24%. Furthermore, due to distrust in PT systems, more than 70% of surveyed people who did not have a car stated that they intended to buy a new one, with negative consequences for the environment (landscape and air pollution) in urban areas. In Italy, both national and regional authorities have enacted a series of rules aimed at limiting the use of PTs, as well as avoiding overcrowding of buses and metros, which severely limit their capacity to around 60% of nominal capacity before the outbreak. The effects of such constraints have not yet been fully

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elucidated due to the breakthrough of mobility patterns associated with the widespread use of smart work and e-learning practices in education. However, they are expected to seriously affect the fruit of PT in the recovery phase, when the demand for transportation will start to increase. Moreover, given that new attacks could occur in the coming months / years, it is likely that some features of the PT system need to be adjusted to cope structurally with these limitations. In many countries, to counter the shift to private car use, governments favor the use of individual means of sustainable mobility and micromobility, such as bicycles, electric scooters, and segways, and plan and install related infrastructure (emergency bike paths) or power services. vehicle exchanges, which can transfer a certain percentage of short and medium trips in this way of transport. However, due to the large number of passengers transported by PT systems in urban areas, it is of the utmost importance to adopt measures aimed at ensuring the safe and reliable use of PT systems. To this end, the first measures adopted (during locking) were dedicated to reducing the risk of infection, such as boarding the yard, cashless business, frequent repairs of vehicles and stations, implementation of social distance, requiring passengers to wear personal protective equipment (e.g. , face masks and / or gloves). Other medium-term measures focus on interventions in PT system operations, such as modification of schedules, frequencies, paths, use of modal integrations, etc. Some of these measures, such as increasing the frequency of PT services to compensate for reduced vehicle capacity, are considered by PT companies to be effective [2], but unsustainable in the long run due to the limited number of drivers and vehicles

II. Literature Survey

Bhupendra Singh; Ankit Gupta in their study addresses the issue of increasing problems in the traffic management with the help of new technologies used in ITS. Particularly in developing countries like India, Brazil, South Africa etcITS is still new concept. This study addresses primarily four major elements of ITS i.e., Advanced Traveler Information System (ATIS), Advanced Public Transportation System, Advanced Traffic Management System (ATMS), (APTS) and Emergency Management System (EMS). The objective of this study is to understand different models and architectures used in ITS developed over the period by different researchers. The use of GIS and WWW platforms in ITS system have their own advantages which are explored by developed countries. The GPS technology have high analysis capability while WWW platform operates on real time information processing. The synchronization of these two technologies can be highly useful. By these technology use travel time and response time can get decreased considerably. In developing countries while implementing ITS mixed traffic conditions are required to be considered. The installation and operating cost of ITS implementation is crucial factor in the developing countries. The new technology like Zigbee and RFID can also be useful in future. The mobile phone penetration is high which can also be useful gazette in implantation of ITS.

P.Vijayakumar, V.Vijayalakshmi, Aakash Nigam, Anubhav Jain, Somprakash Bandopadhaya discussed in their research about different ITS technologies which can combine with Bus Rapid Transit (BRT) to enhance network performance focusing on reliability, travel time, operational efficiency, convenience, security and safety. The research objective majorly concentrates on use of Radio Frequency Identification (RFID) for BRT. The Real Time Locating Systems (RTLS) uses technology like RFID and IEEE 802.15.4 wireless communication standard. In this paper advanced technology use in BRT is discussed in first section, second part addresses the conventional technology used in BRT and third part

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focuses upon use of RTLS in BRT architecture and Section four discusses ITS implementation using RTLS. The signal synchronization of different vehicles requires high attention for improvement. This paper proposes a prototype for ITS using RFID and IEEE 802.15.4 based wireless communication.

Geetanjali Singh, NeelimaChakrabarty, Kamini Gupta discussed the burning issue of traffic in India, due to poor road infrastructure and behavior of road users in India. Vehicular Ad-hoc Network (VANET) system applied worldwide to manage traffic congestion due to less expensive, distributive and collaborative nature. Overall cost of project reduces drastically by this system. The average speed of Indian traffic movement in cities ranging from 16 km/hr to 20 km/hr. The VANET system can be used to detect traffic density and address the parking problems faced in most of the cities. The VANET architecture takes into account wireless connectivity of two vehicles to enhance communication. A case of Delhi demonstrates that the VANET system adaptation with non-Lane based traffic system. The VANET have a technical challenge such as security, congestion and collision control, environmental impact and infrastructure support. The other issue of Parking can also effectively address by VANET system. Development of parking clusters probably addresses the major issue of parking of vehicles in the city in general.

III. Proposed System

In our proposed system the main functionalities and some potential applications of the SALUTARI system concept. In particular, system-level review reports confirm the feasibility of integrating state-of-the-art wireless IoT technologies into different segments of the PT infrastructure. The proposed system is based on some basic components and subsystems, which will be used as building blocks for the application of evolved ITS, capable of monitoring and predicting situations in real time, as well as for disseminating useful information to users at bus stops and / or via mobile transport applications. For example, success in preventing the introduction and subsequent transmission of COVID-19 to schools and universities depends to a large extent on preventing disease transmission in the PT system used by students, families, teachers, school staff, and all community members.

IV. Design Methodology

The objective of the SALUTARY system is to integrate / increase the ITS system already available in an urban PT system with innovative functionalities, aimed at intelligent and proactive control and the reduction of passenger crowding. It is based on the integration of heterogeneous detection and communication technologies, depending on the operating scenario and ICT. Figure 1. Concept of the SALUTARY system. infrastructure available in the urban area where the system must be implemented. Detailed systems design involves strong interdisciplinary skills, including transportation engineering, telecommunications, computing, electronics, data analytics, artificial intelligence, and machine learning (ML).

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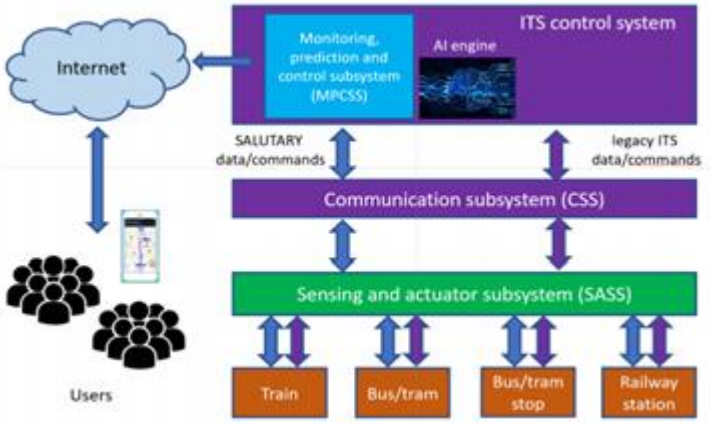

Figure 1. The SALUTARY system concept.

SALUTARI system consists of (Figure 1) three subsystems: 1) subsystem sensors and actuators (SASS); 2) communication subsystem (CSS); 3) Monitoring, Forecasting and Management Subsystem (MPCSS). The proposed system introduces new data streams (marked in blue in Figure 1) compared to the existing data exchange (purple) found in next-generation ITS systems for TP services. The core and main innovative part of the system is SASS, with a special focus on IoT reading technologies, while the executive part mainly

Table 1 Comarison of Avalable sensing technologies for the SALUTARY System

	Technology	Frequency	Maximum range	Power consumption	User cooperation	Scenario
Visual-based	Optical	Visible	100 m	Low	No	Railway/metro station, bus stop
	Thermal	Infrared	500 m	Low	No	Railway/metro station, bus stop
	Laser	Ultraviolet, Visible, Near infrared	1 km	Low-high	No	Railway/metro station, bus stop
Non-visual based	NFC	13.56 MHz	10 cm	Very low	Yes	Train and bus/train, Railway/metro station
	PIR	Infrared	10 m	Very low	No	Train and bus/train
	BLE	2.4 GHz	100 m	Very low	Yes/No	Railway/metro station, bus stop
	WiFi	2.4/5 GHz	50 m	Low-high	Yes/No	Railway/metro station, bus stop
	LTE	800/1800/2600 MHz	10 km	High	Yes/No	Railway/metro station, bus stop
	5G	Sub-6 GHz	10 km	High	Yes/No	Railway/metro station, bus stop
	5G	MMW band	< 1 km	High	Yes/No	Railway/metro station, bus stop
	SAR	Ku/Ka band	< 10 m	Very high	No	Bus stop

covers the flow of information to users, such as audio speakers, changeable message boards or screens, which are usually already present in PT systems, or can be easily installed at bus stations or at the train station (and even in vehicles). Because of its central importance in our concept, we turn our attention to this subsystem in Section IV. The characteristics of CSS largely depend on the communication infrastructure available in the urban area of interest or on the communication network owned by the TP service operator. In general, they include

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public wireless networks (such as mobile networks) and / or private wired and / or operator-owned wireless networks, such as e.g. For example. Global System for Mobile Railways (GSM-R) or LTE for Railways (LTE-R). To deal with this heterogeneity, it is envisaged that at the protocol level stack CSS can easily communicate with other subsystems using a standard interface and / or through simple customization layers. MPCSS performs data collection and real-time crowd prediction, also using AI and ML techniques. Based on such predictions, changes in transport services can be implemented in real time, related control data are sent to service operators (drivers, supervisors, etc.), while service information is sent to passengers via screens and / or mobile transport applications. The same applications could report this information to all PT users, to discourage access to crowded stations and / or bus stops, andpropose alternative travel solutions. In our concept, the MPCSS is strongly integrated (and typically colocated with) the ITS control system of the PT service operator.

V. Results, Innovations and Advantages Provided by the Salutary System

The SALUTARY system can provide original and innovative functionalities that are not present in the legacy ITS:

Actor	Advantages
PT service operator (manager)	Having real-time crowding data of the different segments of the PT system allows one to plan services more efficiently and to quickly readapt them to tackle critical situations, localized in space and time
PT operators (drivers, inspectors, etc.)	The possibility to know in advance crowding situations at the bus stops or stations allows one to tackle critical situations (planning for examples possible holding, stop-skipping, or alternative routes)
Users	Knowing crowding situations allows one to use alternative means or to make the trip in another hours, if not strictly necessary; by the reservation system, if available, the users can access vehicles without unnecessary crowding at the bus stops or stations
Police forces	Knowing in real-time and/or predicting possible crowds - potentially dangerous for public health and/or for public order - allows one a more timely and targeted intervention
Sanitary system	Smart reduction of crowding resulting from an agile management of the PT system allows one to reduce the diffusion of infection and prevent further outbreaks
General population	Reduction of private car usage, less pollution

Proactive control of access to the station: in railway / metro applications, based on the knowledge of the number of passengers of the trains that arrive and forecasting those that leave the station, it will be possible to program the number of accesses to the stations using a small margin of error and in real time. . This number can be displayed to users (displayed at stations or in mobile transportation applications), and can be used by security operators to screen passengers on turntables. Priority policies can be envisaged, such as taking into account the time already spent in the queue or the motivation to travel (for example, priority could be given to health professionals, disabled or elderly users, law enforcement agencies and teachers / students).

Vehicle access reservation: On bus / tram journeys, a vehicle access reservation system can be used, in which a sensor at the bus station detects the presence of users and exchanges information with their device (ie a smartphone) to allow you access on board. the first bus to arrive (virtual queue system) or put it on an overbooked list (with priority) to allow it to

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board the next The application can generate an electronic ticket with access approval (for example, KR code) that can be confirmed on board at the ticket machine.

Crowding information dissemination: Users receive information on the capacity (in terms of number of seats or as a percentage) of arriving buses and trains and / or crowds at bus stops / stations through screens placed in correspondence with bus stops or at the entrance of stations, or alerts issued via mobile app transport, to avoid unnecessary waiting and crowding, and perhaps to switch to your movement. Crowd-aware route planning: Users can plan their trips through the mobile transport app, taking into account not only geographic data and travel time (static data), but also traffic and congestion information about vehicles and bus stops / stations during the trip (dynamic data). The application can suggest not necessarily the shortest route, but the one with the least traffic, taking into account the level of traffic measured during the trip. This feature not only helps reduce congestion and the consequent risk of infection, but also distributes the load more efficiently in the transport network.

At first glance, the SALUTARI system can be seen as a technique designed to implement measures of social exclusion. However, its scope is broader, because at the same time it tries to optimize the performance of TP systems. In practice, SALUTARI aims to increase the flexibility and adaptability of PT systems, partially recover deficiencies and inefficiencies through the adoption of rigid social distancing measures and avoid the use of private cars with an obvious negative impact on air quality. in urban areas. The main advantages of the SALUTARI system are summarized in Tab. II. In addition, the SALUTARI system can also be used at the end of a pandemic, allowing for more efficient real-time planning and control of PT systems, compared to static methods, such as traditional origin-destination based compilation. in survey matrix flows. AI and ML algorithms can use a large amount of data generated to better understand and plan a number of aspects that are generally related to improving the quality of life in urban environments and smart cities. The SALUTARI system can also be useful in allowing schools and universities to open up to personal learning in the safest and fastest way possible. In fact, to allow schools and universities to open and remain open, it is important to adopt and implement actions to curb the spread of COVID19, not only within the school, but also in the PT system, through optimal schedule adjustment and dynamic.

B. **Kit Results:**

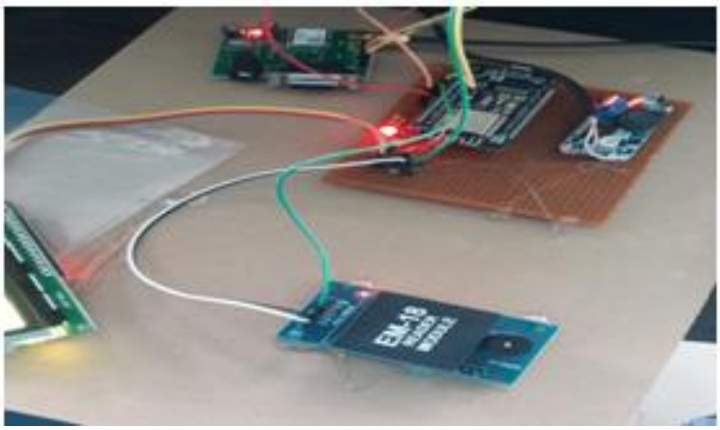

Figure:2. Kit for Public Transportation Systems (SALUTARY) in the COVID-19 pandemic by using IOT

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Figure 3: GPS TRACKER IMAGE

Figure 4: Blynk IOT App

VI. Conclusion

The main functionalities and some potential applications of the SALUTARY system concept. The potentials of the SALUTARY system go beyond the scope of dealing with typical social distancing problems, by potentially allowing real-time optimization and management of the PT system. For instance, the success in preventing the introduction and subsequent transmission of COVID-19 in schools and universities is strongly dependent on preventing disease transmission in the PT system used by students, families, teachers, school staff, and all community members.

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Implementation of High Speed and Energy Efficient Random Number Generation Using Quantum Dots

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Abstract

True random number generators (TRNGs) are painstaking as an inventive basis to obtain an erratic and irreproducible digital bit-streamby communicationsand in secure systems. Because of its extremely-small size features,ultra-low power and, the quantum-dot cellular automata (QCA) are most auspicious Nano-electronic technology for executing digital systems with security capabilities. In this work we presents a novel QCA enactment of TRNG, which is involved of proposed cross-coupled (CC)circuit and cross-orientedstructure(C-OS), in order to produce exact random numbers. This executionexcerpts the haphazardness from the oscillatory trajectory (OT) of QCA CC loop that is self-possessed of XNOR gates only to assurance the quality of randomness. Besides, it deeds the oscillatory metastability ensuing from zero-energy QCA cells of C-OS that is connected across (C-C) outputs to increase the quality of randomness. Consequently, the proposed QCA-based TRNG can be reflectedas a future security application in Nano communications.

Key Words: TRNG, QCA,

I. Introduction

TRNG's has become an indispensable component in so-many cryptographic systems, including password generation/ PIN, key generation,authentication protocols, nonce generation andrandom padding. A TRNG circuit uses an un-deterministic random process, as a basic cradle of randomness. Along with the noise source, a noise harvesting mechanism to

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extract the noise and a postprocessing stage to provide a uniform statistical distribution are other noteworthy components of the TRNG. Main focus is to design an improved FPGA based TRNGs, using virtuously digital components. Using DBB for TRNGs has the adv. that the designs are relatively simple and for FPGA design.

Reconfigurable devices has an integral part of many embedded digital systems, assumed to become the platform of choice for general computing in the near future. From being mainly reconfigurable systems,prototyping devices, as they can provide suitable to high processing rate at much lower cost and faster design cycle time. So, we present a TRNG for Xilinx-FPGA -based application, which has a tunable jitter control capability DPR capabilities available on Xilinx FPGAs. The major contribution of this brief is the development of an architecture which allows on-the-fly tunabilty of statistical qualities of a TRNG by utilizing DPRcompetences of modern FPGAs for fluctuating the DCMmodelling parameters. The first described work which includes tunability in a TRNG.

Using DPR, the clock frequencies produced can be changed onthe-fly by regulating the corresponding DCM parameters. Design methodsoccur to prevent any malevolentoperations via DPR which in other ways may adversely affect the security of the system [2]. Finally the process is first design, then analysis and further implemented tunable TRNG for the FPGA platform. The following are the contributions.

II. Literature Survey

Ray et, al. [1], presented an automated methodology for generating hardware-based random number generator (RNG) strategies for arbitrary deliveries using the inverse cumulative distribution function (ICDF). The ICDF is evaluated by way of piecewise polynomial estimate with a hierarchical segmentation scheme that includes uniform segments with size varying the power. Generating random numbers from ADs provided that the ICDFs are known.

While implementing the LFSR design and Multi LFSR architectures on FPGA, the speed of the design is improved and the area consumption is little bit increased and with these designs the power consumption is also reduced. While increasing the bit length the design architecture is getting complexity and there is a more area consumption. By comparison with other URNGs, Leap-Ahead LFSR architecture has very good Area Time performance and Throughput performance that are 2.18×10-9 slices×sec per bit and 17.87×109 bits per sec.
Paw et, al. [4] presented “FPGA Implementation of Chaotic Pseudo-Random Bit Generators” Modern communication systems (including mobile systems) require the use of advanced methods of information protection against unauthorized access. Therefore, one of the essential problems of modern cryptography is the generation of keys having relevant statistical properties. In contemporary years, the cryptographers pay anhigh attention to base on chaos theory. For the data security and pseudo random generations these designs are used to improve the performance of the design and with these the power consumption and delay are reduced.

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III. Proposed Work

Several approaches to generating random numbers exist, and trade-offs between various figures of merit often must be weighed in selecting a solution suitable to the requirements of the particular application. In some cases, pseudorandom numbers deterministically generated using either hardware or software approaches may be adequate. When PRNGs do not provide adequate information entropy, approximate approaches to randomness, such as entropy-gathering may be used. Nonetheless, entropy-gathering techniques are not without vulnerability, and sometimes true randomness is desired: stochastic processes may be used to build true random number generators (TRNGs).

Measurement in quantum systems is known to be truly stochastic, and it is has been used in commercially available TRNGs. Random distributions generated using quantum hardware but this comes at the additional conventional computational resources cost of latency and. Here, localized charge states of a single mobile electron encode a bit. Adjusting the detuning between the quantum dots changes the ground state and thus the probabilities of measurement for the localized states. Repeated measurements yield a random bit string, which may be used generally in any application of random numbers, or specifically as a stochastic number in stochastic computing.

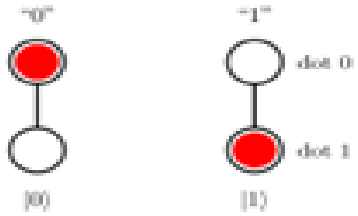

Figure 1: Localized states of a single electron (red disc) on a coupled pair of quantum dots (black circles) encode two binary states.

Strings of random bits may be generated in parallel using one measurement from each of many DQDs in an array; or in series, by taking many sequential measurements on the same DQD.

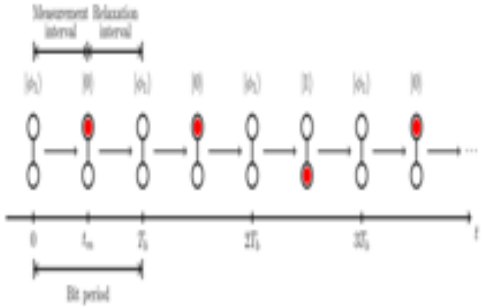

Figure 2: A series of measurements on a single DQD produces a random bit string

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IV. Simulation Results

Figure 3: Simulation result for the TRNG 32bit

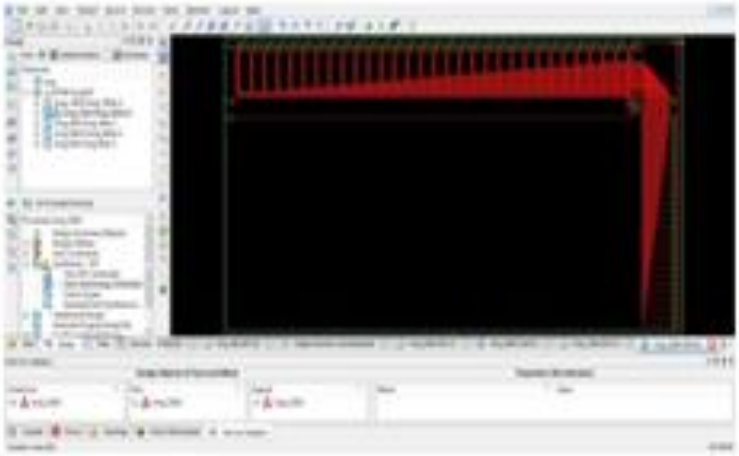

Figure 4: Technology schematic for the TRNG 32bit

Figure 5: Summary report for the TRNG 32bit

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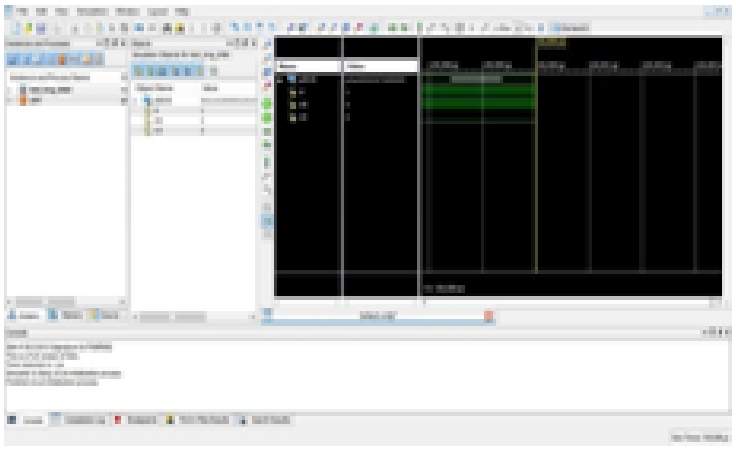

Figure 6: Simulation result for the TRNG 64bit

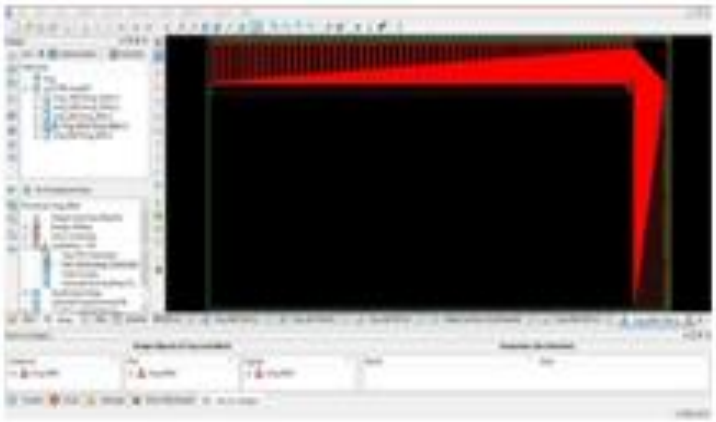

Figure 7: Technology schematic for the TRNG 64bit

Figure 8: Summary report for the TRNG 64bit

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V. Conclusion

In this paper, a straight-forward, minimalistic hardware approach to a tunable quantum random number generator. A random bit is generated by taking a position measurement of the ground state of a mobile charge on a coupled pair of quantum dots. A random bit string is simply a sequence of such measurements, the mean value of which may be tuned by varying the bias of the DQD system. We discussed both a molecular implementation of the DQD, as well as a metallic implementation. Such devices could be integrated in quantum computing or quantum communication systems. Also, the proposed QRNG could provide a low-power, hardware-based approach to a tunable stochastic number generator for stochastic computing.

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Ber Performance of Uplink Massive Mimo with Low-Resolution Adcs

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Abstract

Massive multiple-input multiple-output (MIMO) is a great technology for subsequent era wi-fi conversation structures (5G). In this technology, Base Station (BS) is made up with a giant lot of antennas.These more number of antennas having lot of power consumption and high cost at base station.We sum up low resolution ADCs for uplink large MIMO to find out the Bit Error Rate (BER) performance by using detection techniques like (MMSE, ZF) and great modulation techniques like (QPSK, 16-QAM) to discover an most appropriate quantization resolution. Our consequences disclose that the BER overall performance of uplink large MIMO structures with a few-bit decision ADCs is related to the case of having high precision ADCs. We find out that the most effective quantization technique and gives the good performance at the BS.

I. Introduction

This theory discuss the basics about the optical OFDM. It will be explained in the following order: firstly, focus one the basic things of Frequency Division Multiplexing; and, secondly, focus on the blocks and concepts used for the digital generation of subcarriers and the analogue to digital conversion.

1. **OFDM:** The Orthogonal Frequency Division Multiplexing is a modulation technique where the information is sent modulated into different subcarriers or channels. A basic block diagram is shown in Figure 1.1. The input bits i.e., some of input bits are mapped

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into Large symbol and after serial to parallel conversion, are sent in N different subcarriers. In the Figure 1.1, M=2 (4-QAM) and N=8.

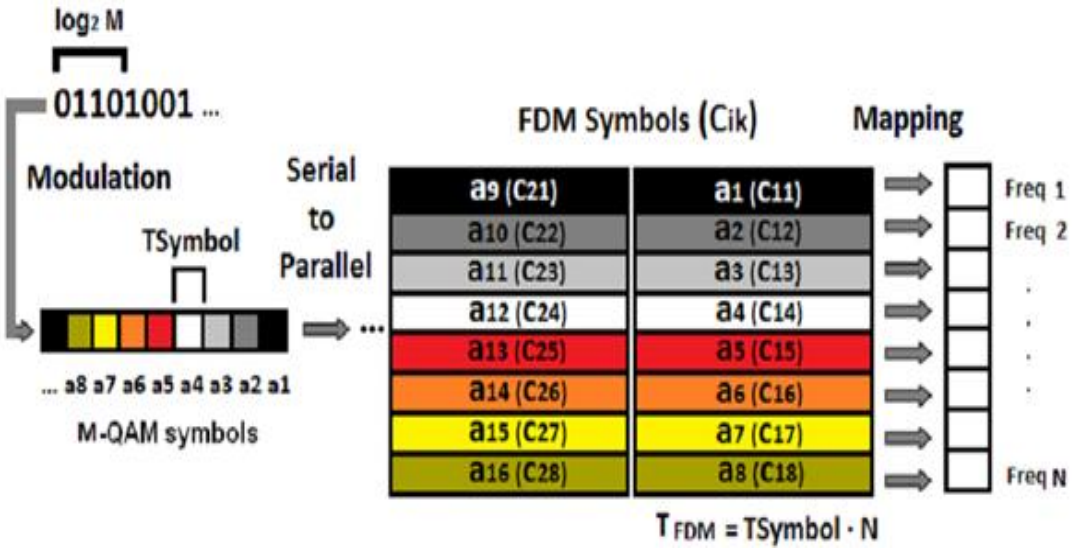

Figure 1.1 FDM symbols coding general scheme [T3]

The advantage is lies in the in the presence of channel's selective frequency fadings only part of the symbols is lost whereas in a single -carrier system all the information is affected.

The alter way to explained to considering that a high speed signal is divided into lot of lower speed signals sent in parallel. When the symbol is made longer than the channels impulse response, ISI affects one symbol at most and it can be easily equalized.

The spectral efficiency is boost when the subcarrier spacing (Δf) is equal to the inverse of the symbol length (TOFDM). In this case, it can be seen that the dissimilar subcarriers are perpendicular to each other and thus, the spectral of the separete subchannels can be recuperate in on in spite accept of spectral overlap. The following Figure 1.1, the mathematical expression of an OFDM signal x(t) in the time domain is as follows in Equation 1.1:

$$x(t) = \sum_{i=1}^{\infty} \sum_{k=1}^{N} C_{ik} e^{j2\pi\Delta f(t-iT_{OFDM})} \cdot p(t - iT_{OFDM})$$

The p(t) is known as the shaping pulse and in the ideal case is a perfectly squared pulse of length TOFDM, a sinc function in the spectral domain. So as to simulate a more practical condition, the step up cosine function with a roll-off factor (α) we can also used in this simulations. The ideal square pulse similar to the case α=0. See Annex A.

By Using ( ), the above may be written:

$$x(t) = \sum_{i=1}^{\infty} \sum_{k=1}^{N} C_{ik} e^{j2\pi f_k t} \cdot p(t - iT_{OFDM})$$

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The Equation 1.2 is validated if this condition ( ) is completely fulfilled. We can alsoshown in Chapter 4, Because of multiple detection with decorrelated optical carriers in the upstream direction, the entire expression in Equation 1.1 we have to be used.

In this time domain, the orthogonality condition can be understood from the point of view that the subcarriers have an integer number of periods interior the shaping pulse and, therefore;

$$\int_{t}^{t+T} s_n(t)s_m(t)dt = 0 \rightarrow when\ m \neq n$$

$$\int_{t}^{t+T} s_n(t)s_m(t)dt = 1 \rightarrow when\ m = n$$

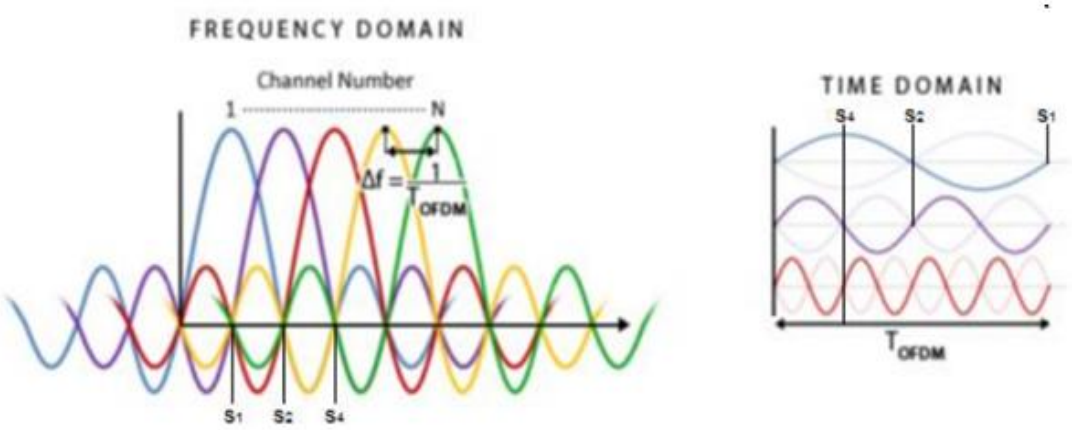

Figure 1.2 Orthogonality in frequency and time domain [P1]

Digital OFDM systems: If now we take Equation 1.2 and consider it is sampled every t=n•Ts , it is obtained:

$$X(nTs) = \sum_{i=0}^{N_{OFDM}} \sum_{k=0}^{N-1} C_{ik} \cdot e^{j2\pi k \frac{1}{N.Ts} nTs} = \sum_{i=0}^{N_{OFDM}} \sum_{k=0}^{N-1} a_{ik} \cdot e^{\frac{j2\pi kn}{N}}$$

The Equation 1.4 corresponds to the statement of the digital IFFT. This method that the OFDM signal can be gain by applying the IFFT algorithm, later that the serial to parallel conversion of the symbols, as shown in Figure 1.3.

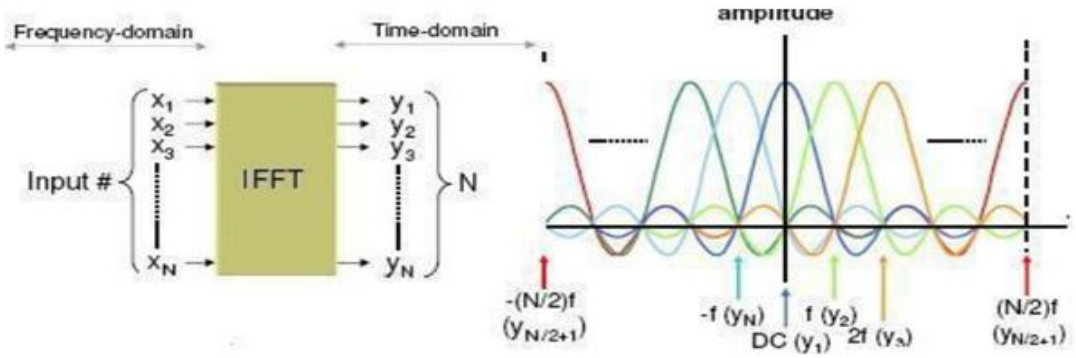

Figure 1.3 IFFT block and the frequency domain OFDM symbol at its output [P1]

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The symbols of the IFFT input are set in the spectrum beginning from the zero (DC) frequency. The second half of the input symbols would be located at frequencies which are higher than the Nyquist frequency. In this methods, these frequencies are removed by using the DAC and because of the periodicity to the discrete IFFT, they will be found at the left hand side (negative) part of the spectrum [B3].

It is worth noting at this point that the ideal OFDM at the spectrum at subcarrier corresponding to the Nyquist frequency is build both the positive and negative side of the spectrum. This will be very important when the individual OFDM spectrum of all the users get together in a bigger spectrum at the same time to detected at the OLT, in chapter 5.

The orthogonality condition can be understood in the digital OFDM by evaluate that the FFT operation is taken at the receiver, the discrete FFT is a sampled version of the spectrum of an OFDM frame. The samples are taken exactly at the points where one of the subchannels gain its maximum value and the rest of subchannels go to zero, Figure 1.3.

1.Transmitter: In Figure 1.4, the following steps are required to get the OFDM signal. From input to output, we can also seen firstly, that the bit stream has to be arranged at the used in modulation. This is the uses in 4-QAM modulation, so it will be two bits are mapped onto one symbol thus, the four different values for each symbol. Then, it has to be done a serial to parallel conversion in order to we get a parallelized version of the obtained symbols. Then the zero padding is inserted. The kind of zero padding considered in the figure has the purpose of shifting away the aliases produced by the DAC.

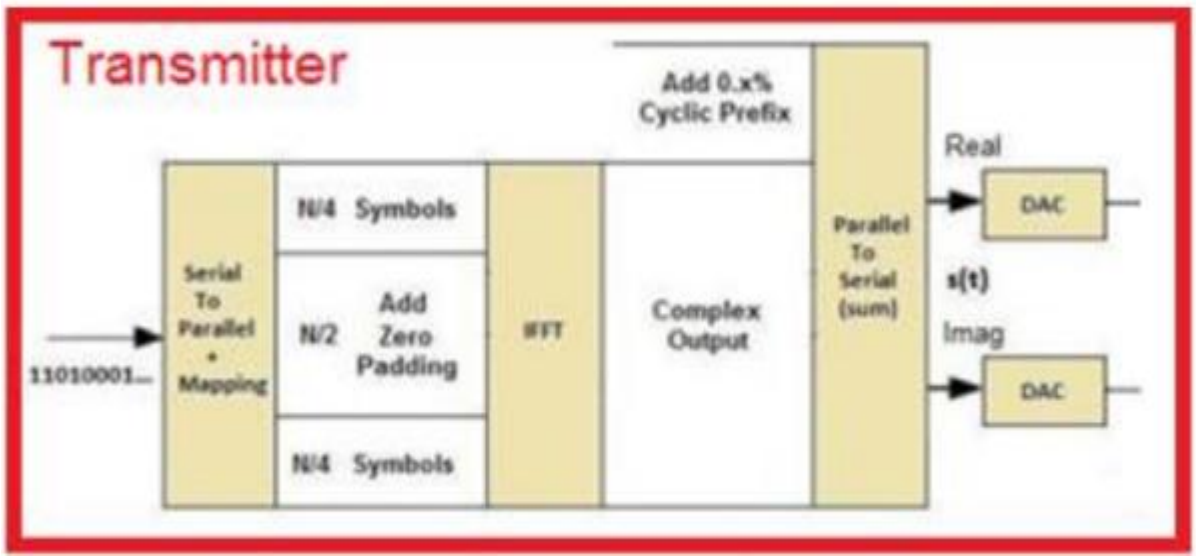

Figure 1.4 Digital OFDM transmitter [T1]

After that, IFFT is performed to get the digital OFDM signal. This can be seen, mathematically in the Equation 1.4. After the IFFT stage, cyclic prefix is added in order to eliminate ISI and ICI. This will be explained in subsection 1.3.1.2.

Finally, the symbols are arranged and serialized. The real and imaginary parts are sent to two different DACs where they are converted from the digital to the analogue domain.

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II. Literature Survey

1. **E. Larsson, O. Edfors, F. Tufvesson, and T. Marzetta,"Massive MIMO for next generation wireless systems," IEEE Communications Magazine, vol. 52, no. 2, pp.186-195, 2014**

Multi-user MIMO has several advantages over traditional point-to-point MIMO: it may be used with low-cost single-antenna terminals, it does not require a good scattering environment, and it simplifies resource allocation because each active terminal uses all of the time-frequency bins. Multi-user MIMO, as originally envisioned, with nearly equal numbers of provider antennas and terminals and frequency-division duplex operation, is no longer scalable. Massive MIMO (also known as large-scale antenna systems, very massive MIMO, hyper MIMO, full-dimension MIMO, and ARGOS) is a modern-day exercise that makes a simple damage with the usage of a large additional of providing.Extra antennas aid in focusing power into ever smaller areas of area, resulting in significant increases in throughput and radiated strength efficiency. Other benefits of massive MIMO include the extensive use of less expensive low-power components, reduced latency, MAC layer simplification, and resistance to intentional jamming.The expected performance is predicated on the propagation environment providing asymptotically orthogonal pathways to the terminals, but thus far, no barriers have been discovered.While huge MIMO renders many standard lookup troubles irrelevant, it uncovers absolutely new troubles that urgently want attention: the project of creating a large number of low-cost, low-precision factors that work together properly, acquisition and synchronization for newly connected terminals, the utilisation of more levels of freedom provided by the addition of provider antennas, lowering interior electricity consumption to achieve complete strength effectivity reductions, and discovering new deployment scenarios. This article offers an overview of the big MIMO thought and modern-day lookup on the topic.

2. **F. Rusek, D. Persson, B.K. Lau, E.G. Larsson, T.L. Marzetta, O. Edfors, and F. Tufvesson, "Scaling up MIMO: Opportunities and challenges with very giant arrays," IEEE Signal Processing Magazine, vol. 30, no. 1 , pp. 40-60, 2013**

MIMO (multiple-input, multiple-output) technology is maturing and being integrated intogrowing wireless broadband requirements such as long-term evolution (LTE) [1]. For instance, the well-known LTE standard allows for up to eight antenna connectors at the base station. Essentially, the more antennas the transmitter/receiver has, and the more levels of freedom the propagation channel can afford, the better the overall performance in terms of data rate or connection reliability.On a quasi-static channel with only one time and frequency coherence interval, the reliability of a point-to-point MIMO link scales as Prob(link outage) SNR-ntnr, where nt and nr are the numbers of transmit and receive antennas, respectively, and SNR is used to signify signal-to-noise ratio. The plausible pricing scales as min(nt, nr) log(1 + SNR) on a channel that fluctuates surprisingly as a function of time and frequency, and the place occasions allow coding over several channel coherence intervals.Multiuser structures have even more interesting characteristics, since they allow you to send data to a large number of users at once and choose which consumers to schedule for reception at any particular time [2].

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III. Proposed Work

The vast majority of image detection systems suggested in the literature are divided into three categories: a) impartial equalisation and decoding [53, 54, 55, 56, 57], b) impartial equalisation and decoding, and c) impartial equalisation and decoding. When computing the transmitted image estimate, Ref. [53] presents an MMSE lter that takes into account not only the amplitudes but also the derivatives of subcarrier amplitudes. Ref. [54] proposes MMSE detection in time area the place the time various nature of the channel is exploited as a issuer of time diversity. In [55], a pre-equalizer to reduce the ICI in massive size image structures such as DVB-T2 the place the image is split into smaller sizes and a compensating the iterations of the frequency are repeated. the interfering electricity and a single faucet channel selectivity is equaliser to compensate and proposed. In [56], an iterative decision comments equaliser (DFE) is planned to function ICI cancellation such that the modified machine grid turns into the frequency slanted in the frequency area and consequently [28], the equalizer turns into single tap. In [57], the acquired sign is cut up into little division such that the channel stays about still at some stage in every suitable small segments. Suitable sign process is carried out on every of these division such that the ensuing channel matrix is made slant. b) successive cancellation of the interference [58, 59, 60].

Ref. [58, 59], recommend ICI (due to insufficient CP or mobility) elimination in time domain. The sign is then transformed to density area accordingly ensuing in a diagonal frequency do-main device matrix. Hard selections are made on the adjust sign following which it is transformed again to time area and the iterations time-frequency are repeated. In [60], suggest cost of the image is counted the use of the decoded the values from LLR which then is used to take away from the ICI obtained symbol, ensuing in a diagonal device matrix. A modified little complexity MMSE equalizer that takes the choice error into deposit is now collected. The image error chance is computed the use of LLRs and is used in the MMSE equalizer for estimation of the transmit symbol. These estimates are used for computing the LLRs which are dispatched for decoding and c) rapid like iterative equalization [39, 42, 40, 61, 62, 63, 64]. Authors of [40] endorse MMSE based totally decreased complexity TE the place the computational complication is O(N3) or O(N2) whereas the unique TE proposed via [39] has exponential complexity. In [42], a couple of get right of entry to attachment (MAI) and inter image Interference (ISI) in a static multitrack environment are eliminated in a code-division-multipath-access (CDMA) system the use of aggregate of gentle iterative interference cancellation and Linear MMSE lterring. Authors of [64] suggest a modified LMMSE equalizer primarily based on a scheme that gives an extra correct design of the facts of the two quadrature factors of spread image and is collect to have higher overall performance in contrast to [40]. Ref. [65] extends MMSE-TE to greater order modulations. Authors of [61] proposes an iterative equalization with a channel estimation scheme for hastily various channels for conversation structures that function underneath water. The channel that is pretended observe a limitation mannequin is guessed the use of rounded development methods in an duplication styles. Three equalizer buildings based totally on MAP, MMSE and ZF standards are proposed. Iterations are carried out for countless parameter mixtures in a systematic manner till a decoder success is observed. In [62] difficulty [29], for choosing OFDM structures is suggested. Proposed breakthrough consecutively estimates the transmit symbols and dispose of the interference due to these symbols from the remark for that reason bringing down the search area progressively, as a result significantly lowering the clarification difficult. The consecutive image search is made

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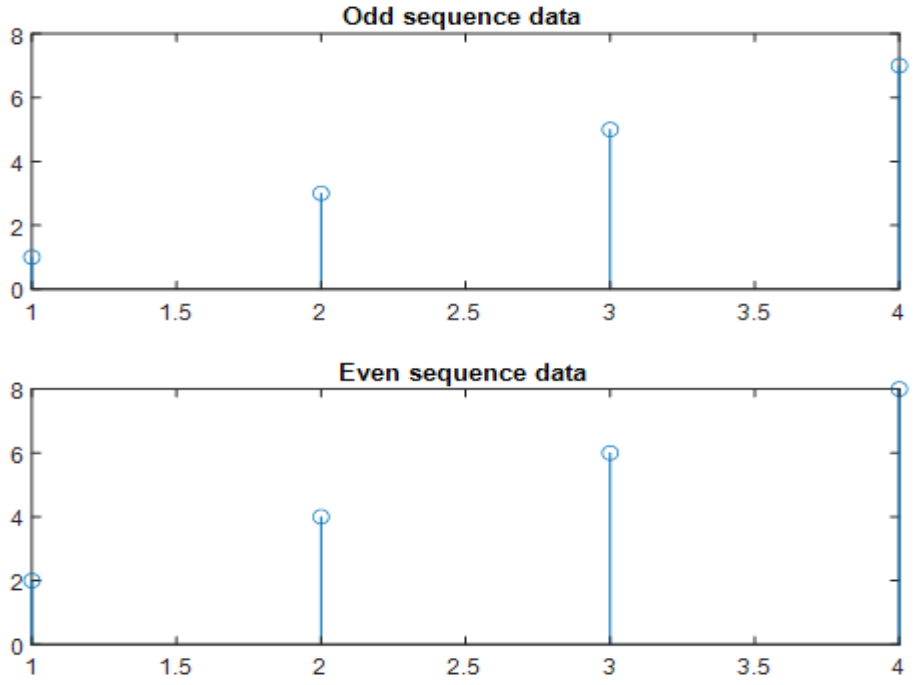
in a mathematically efficient manner via manufacturing use of the Markov chain Monte Carlo (MCMC) with Gibb's selection method. In [63], a method for linear of the inversion machine of equations known as \operator-perturbation manner" is made use of to cancel ICI iterative. Turbo like reputation program, in generic are located to have choicest overall fulfilment the above. However faster program above is sidled in common with excessive figuring complication (equalised or every now and then cubic in the range of sub carriers). Such sensible software challenges inspire us to come up with a new program with higher change o between overall performance and achievement complexity [66, 51].

Determined through the MMSE based totally rapid balance [42, 40], a giant wide variety of little complexity reputation OFDM balance program have been proposed [67, 2, 1, 68]. They take advantage of the taped nature of the frequency area channel matrix to deliver down the balance complication to linear in the quantity of sub-carriers. The preferences above propose, is general, both a new approach for reputation MMSE linear equalisation the usage of priors on the delivered sub matrix round the essential diagonal or a new approach to compute the smooth statistics from the image estimates.

IV. Results and Discussions

In order to verify the working effectiveness of the proposed system ,we have designed, coded and tested in the Matlab environment. These are the simulation results whichare presented as follows. Monte Carlo simulations whichare used to indicate the effect of low resolution ADCs on the BER performance of uplink massive MIMO systems. We can consider the channel H to be i.i.d Rayleigh fading and the noise at each antenna as an additive zero-mean white complex Gaussian. Two transmission modulation schemes of QPSK and 16-QAM are employed by the K-users, and the BS uses ZF and MMSE detection techniques.



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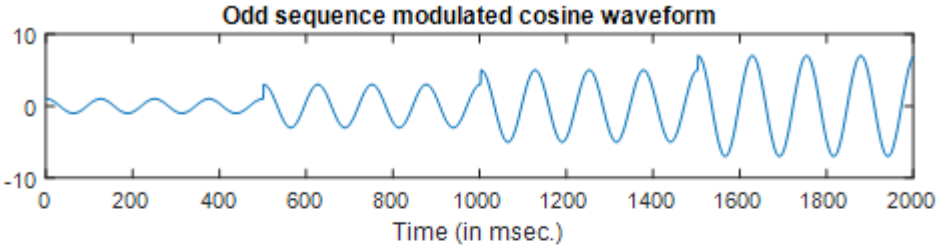

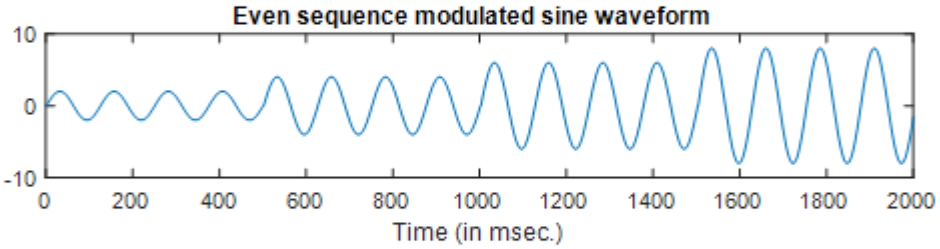

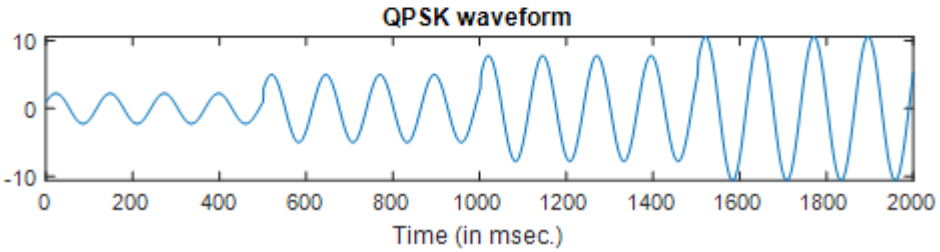

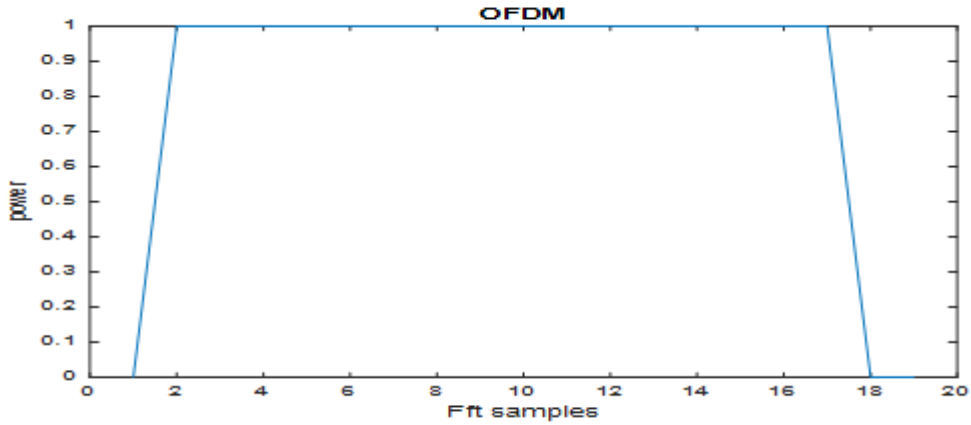

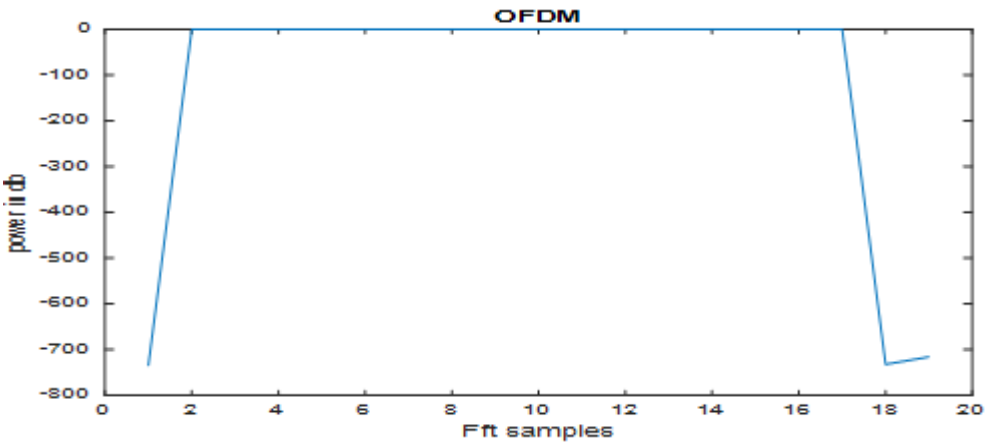

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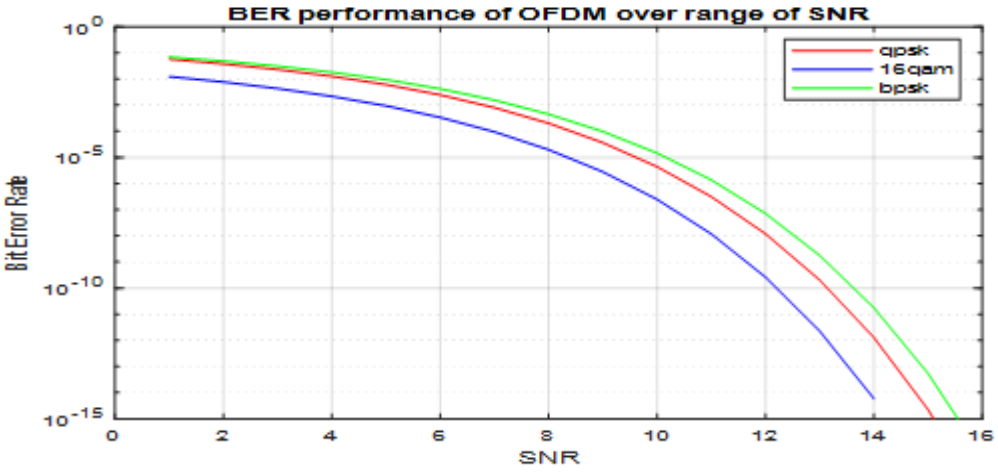

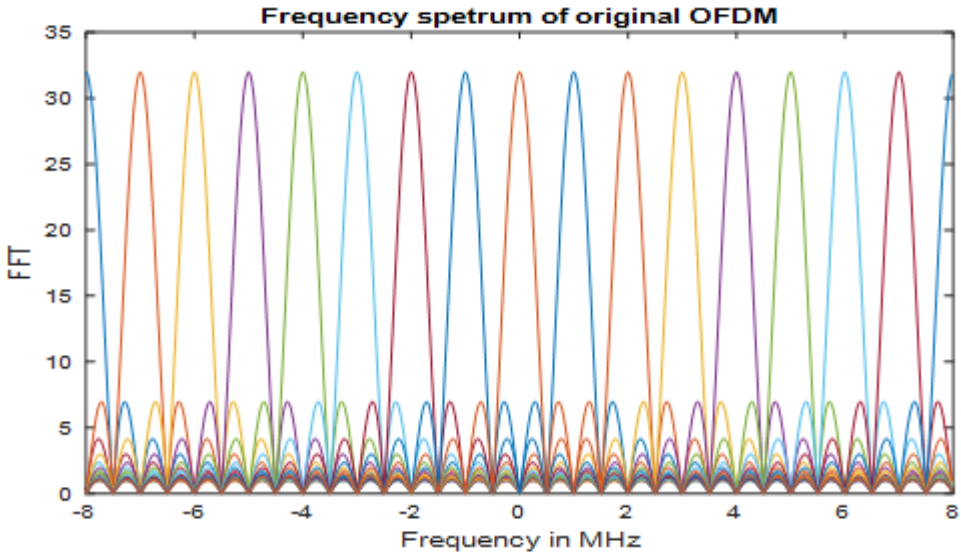

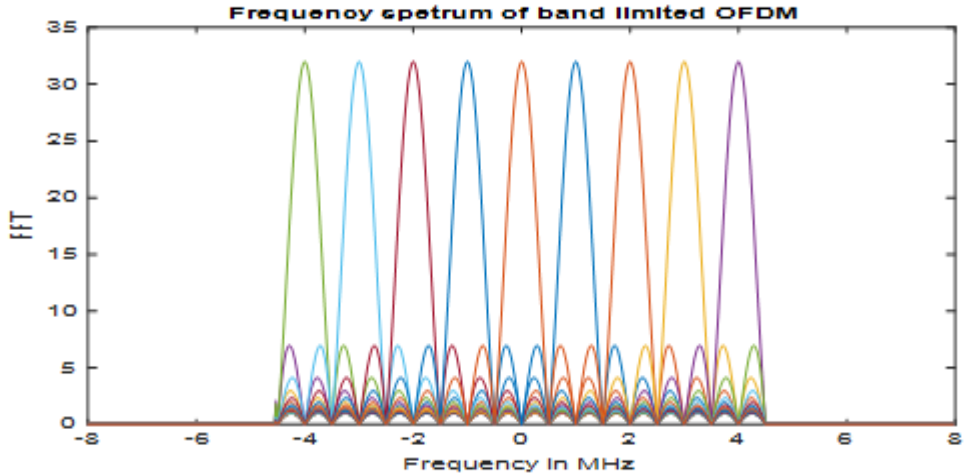

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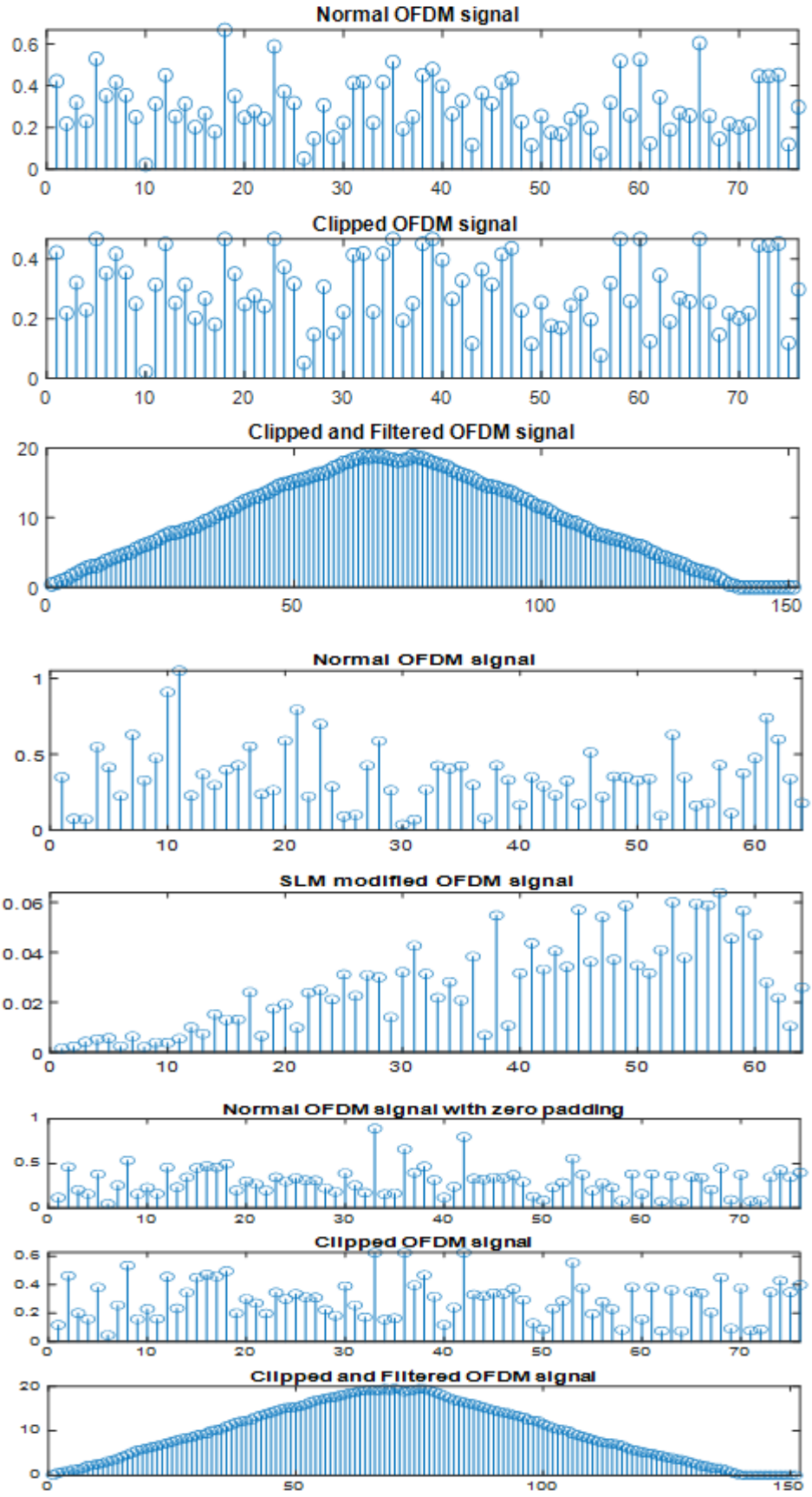

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V. Conclusion

The overall performance of BER versus SNR (in dB) for 16-QAM is in equal way as shown in Figure 5 and Figure 6. In this case the BER overall performance reduced severely by the 1st-bit and 2nd-bit quantization. By using the 3-bit ADCs for this case it can achieve the BER performance by some extent. Although for large values of SNR the overall performance hole is growing. However by having 4-bit quantization decision and above then it the BER overall performance is very close to the full precision quantization. When we compare the consequences of QPSK and 16 QAM, we see that when the order of modulation increases the BER also increases for a precise ADC resolution. Therefore to gain the identical performance the greater quantization decision is required for greater order modulation. Here in the fig 7 it shows BER overall performance reduction as a characteristics of ADC decision for detectors like ZF and MMSE. To plot the reduction of BER, at first think about reference on SNR to reap a BER fee 10-4 for full precision quantization. For more SNR (in dB) it required to get equal BER , for different ADC resolutions which are calculated and portrayed in figure. We can examine the usage of 1-bit ADCs in QPSK and there is a giant greater SNR of about 11.5 Db.

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Heart Disease Identification Using Machine Learning Classification

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Abstract

The data extracted from medical dataset. The dataset contains the several kinds of heart disease types. The system is developed based on classification algorithms include KNN. The experimental results show that the accuracy, precision, recall and F1 score. After that, we can predict the type of disease. It shows the results of the prediction. At first, the data extracted from medical dataset. Hence the brief about the dataset which contains the several kinds of heart disease types. The system is developed based on classification algorithms include KNN. The experimental results show that the accuracy, precision, recall and F1 score. After that, we can predict the type of disease. It shows the results of the prediction. This is developed due to the heart disease is one of the complex diseases and globally many people suffered from this disease. On time and efficient identification of heart disease plays a key role in healthcare, particularly in the field of cardiology. In this article, we proposed an efficient and accurate system to diagnosis heart disease and the system is based on machine learning techniques. The features selection algorithms are used for features selection to increase the classification accuracy and reduce the execution time of classification system. The suggested diagnosis system (FCMIM-KNN) achieved good accuracy as compared to previously proposed methods. Additionally, the proposed system can easily be implemented in healthcare for the identification of heart disease.

Keywords: Heart disease, Abnormal, Normal

I. Introduction

A. Overview: Heart disease is mainly attributed to the patients by the long period elevated blood sugar, blood pressure and blood cholesterol. Now first here we dealt with blood sugar in detail as follows

Among various life-threatening diseases, heart disease/se has garnered a great deal of attention in medical research. The diagnosis of heart disease is a challenging task, which can offer automated prediction about the heart condition of patient so that further treatment can be made effective. The diagnosis of heart disease is usually based on signs, symptoms and physical examination of the patient. There are several factors that increase the risk of heart disease, such as smoking habit, body cholesterol level, and family history of heart disease, obesity, high blood pressure, and lack of physical exercise.

A major challenge faced by health care organizations, such as hospitals and medical centres, is the provision of quality services at affordable costs.1 The quality service implies diagnosing patients properly and administering effective treatments. The

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available heart disease database consists of both numerical and categorical data. Before further processing, cleaning and filtering are applied on these records in order to filter the irrelevant data from the database.2 The proposed system can determine an exact hidden knowledge, i.e., patterns and relationships associated with heart disease from a historical heart disease database. It can also answer the complex queries for diagnosing heart disease; therefore, it can be helpful to health care practitioners to make intelligent clinical decisions. Results showed that the proposed system has its unique potency in realizing the objectives of the defined mining goals.

Records of large set of medical data created by medical experts are available for analyzing and extracting valuable knowledge from it. Data mining techniques are the means of extracting valuable and hidden information from the large amount of data available. Mostly the medical database consists of discrete information. Hence, decision making using discrete data becomes complex and tough task. Machine Learning (ML) which is subfield of data mining handles large scale well-formatted dataset efficiently. In the medical field, machine learning can be used for diagnosis, detection and prediction of various diseases. The main goal of this paper is to provide a tool for doctors to detect heart disease as early stage. This in turn will help to provide effective treatment to patients and avoid severe consequences. ML plays a very important role to detect the hidden discrete patterns and thereby analyses the given data. After analysis of data ML techniques help in heart disease prediction and early diagnosis.

Similarly long-term elevated blood pressure and blood cholesterol level will affect the blood vessels of patients permanently and it will lead mainly heart disease. Here Data mining is a relatively new concept used for retrieving information from a large set of data.

B. Objectives of the Work: Data mining is a relatively new concept used for retrieving information from a large set of data. Mining means using available data and processing it in such a way that it is useful for decision-making. Data mining is the process of discovering patterns in large data sets involving methods at the intersection of machine learning, statistics, and database systems. Data mining is an interdisciplinary subfield of computer science and statistics with an overall goal to extract information (with intelligent methods) from a data set and transform the information into a comprehensible structure for further use. Data mining thus has evolved based on human needs which can help humans in identifying relationship patterns and forecasts based on pre-set rules and stipulations built into the program.

Data mining helps in pattern identification and categorizing data records by conducting cluster analysis, identification of odd records also called detecting anomalies and association rule mining or dependencies describes data mining as the process of extracting implicit and previously undisclosed important information about data sets that can be used for effective decision-making. The process is termed as Knowledge Discovery in Database, such discovered knowledge can be very useful in many areas of sciences, and health care is no different having a Knowledge Discovery in Database would help in predicting trends of many kinds of diseases and illness. So, doctors, rather than depending on their own knowledge and experience, can use data mining and specifically Knowledge Discovery in Database to predict or to forecast and to predict trends that would lead to better diagnoses, reduce cost and save person-hours for the

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organization. Data mining is placed as a statistical interface, data mining lies in the interface of statistics, database technology, recognizing patterns, machine readable data, and intelligent expert systems. The prime objective of data mining is to extract information from data sources and alter it into a comprehensible assembly of information for more uses. Data mining is a process that is used to locate correlations between data and form pattern of relationships among cluster fields in the enormous interactive database. With data mining techniques, doctors around the world will be able to predict illnesses effectively and be better equipped to manage potential high-risk candidates. Such analysis and predictions become critical if the objective is to provide relief to millions around the world. This research addressed the main challenging issue confronting the health care industry, which is lack of quality service at minimal cost implying from diagnosing to the predicting patients correctly or sometimes even understand the complications that may result from the diseases. This issue can lead to unfortunate clinical decision that can result in devastating consequences that are unacceptable. The availability of patient's medical data has derived the need for clinicians and patients for alternative computer-based assessment tool that can assist in decision – making for example, the physicians can compare analytical information of numerous patients with the matching condition and physicians can equally confirm their results with the conformity of other part of the country.

This research applies Naive Bayes classification technique on the dataset obtained from Fudawa health care center, josh plateau state Nigeria. The dataset was preprocessed to remove noise and null fields using Weka tool and it was further divided into training dataset and test dataset. The following parameters were used for detecting and classifying the diabetes into positive and negative class, the parameters are: age, insulin, smoke cigarette, age first smoked, where survey was taking. Support vector machine is a method that uses the concept of computer science and statistics to analyze data and support pattern recognition, which are then used in classification which makes prediction based on the set of accepted input, in which every given input, there are two feasible classes that form the inputs. Support vector machine is designed based on the principle of structural risk minimization principle with the basic idea of finding hypothesis with lowest error. However, the drawback of this learner is that its computation is highly expensive thereby running slow on high dataset and it does not offer probability estimate directly. It also does not perform very well on large dataset because higher training time is required. Naive Bayes classification is simple and particularly suited when the dimensionality of input is high. Despite its simplicity, it can outperform more sophisticated classification method. This classifier works on the assumptions that: the data must be categorical in nature, occurrences of attributes independent and predict accurately on high volume dataset.

II.Literature Survey

The clinical presentation of diabetes in a patient is the symptomatic features presented by the patients. This feature is an indication of the disease cause and has direct impact in guiding clinicians about the decision to take. In case of classifying positive and negative diabetes, the following parameters were considered: age, insulin, smoke, age first smoked and where the survey was taking.

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Positive class label (P): patients can be confirmed to have positive diabetes, when the patient has one or more symptoms of diabetes and has also been confirm by laboratories. Since these features are the most occurring symptoms in a patient with diabetes.

Negative class label (N): patients may have some of the parameters (symptoms) of positive diabetes, but after several trying of diagnostic test confirm, the diabetes is undetectable. This means that the existence of the signs may be as a result of the other concomitant disease.

Naive Bayes Classifier

The Naive Bayes classifier is based on Bayes theorem with the independence assumptions between predictors. A Naive Bayesian model is easy to build, with no complicated iterative parameter estimation which makes it particularly useful for very large datasets. Despite its simplicity, the Naive Bayesian classifier often does surprisingly well and is widely used because it often outperforms more sophisticated classification methods. It works on the assumptions that: classifying categorical data, occurrences of an event independent and predict accurately on high dataset.

Disadvantages

- **Low Accuracy in learning method and Misclassification.:** Data mining is the process of extracting information or discovering usable data from complex database. Medical field contains huge heterogeneous data which is being converted into useful information by applying data mining techniques and then this useful data is utilized by the physicians to diagnose various diseases with satisfactory accuracy. In this work, authors have been focused on the diagnosis of thyroid diseases by using neural net, vote ensemble and stacking ensemble methods, where the classifiers are compared in terms of accuracy, precision, recall, and error rate. Experimental result shows that Stacking ensemble method has highest accuracy than any other methods and also has better prediction accuracy when compared with the related existing literature [1].

Advantage

- Achievable accuracy and robustness have increased at an exponential rate.

Disadvantage

- One of the major disadvantages of eye movements is the need to collect data over time.

As Record keeping has turned into an unavoidable action in our everyday life, Medical aspect of this isn't immaculate medical data in digitized structure for example images is gathered from medical health centers. We need a successful quickly developing application to store, procedure and break down such a gigantic measure of information. Information mining approaches comprises of a lot more systems to break down future prediction and decision making. In our proposed procedure, Ensuring the storage of image dataset we perform hybrid technique of data mining approached such as CBIR technique to extract the features for region of interest, based on similarity of attributes like color, texture, shape, attribute, and text domain concepts and then deal with the classification of images using KNN. The performance statistics shown based on the accuracy of the classified brain images [2].

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Advantages

- Delta, Theta, Alpha, Beta, and Gamma achieves more feature stability.

Disadvantages

- The inconvenient acquisition setup for users, consisting of a number of electrodes placed on the scalp

As technology is growing every day, the need for the technology is also becoming essential in every field. The amount of data generated by the healthcare industry is becoming tough to manage and to examine it in efficient manner for future use. In the healthcare field, massive amount of data is generated, from individual patient's information to health history, clinical data and genetic data. The analysis of patient's data is becoming more important, to evaluate the medical condition of patient and to prevent and take precautions for future. With the help of technology and computerized automation of machines, data can be analyzed in more efficient manner. Managing the huge volume of data has many problems interrelated to data security, data integrity and inconsistency. Process mining and data mining techniques have opened a new access for diagnosis of disease. Similarly, to provide effective treatment for a disease's triennial prevention, data mining can be used. Big data mining can aid in analyzing medical operation indicators of hospitals for a period to help hospital administrators provide data support for medical decision-making. In this manuscript, the various applications of big data mining techniques have been analyzed to improve the healthcare systems [3].

Advantages

- Validation of ear-EEG, combined with its unique advantages (noninvasive, unobtrusive, user friendly, and discreet)

Disadvantages

- More iteration will take. Hence leads to the more time.

The healthcare industry collects huge amounts of healthcare data which, unfortunately, are not "mined" to discover hidden information for effective decision making. Data mining has been a current trend for attaining diagnostic results. Huge amount of un-mined data is collected by the healthcare industry in order to discover hidden information for effective diagnosis and decision making. Data mining is the process of extracting hidden information from massive dataset, categorizing valid and unique patterns in data. Researchers all over the world are working in either multi agents or in ontologies for developing system in health care domain. It might have happened so many times that you or someone need doctor help but they are not available due to some reason. The health management system is an end user support and online consultation work. Here we propose a system that allows users to get guidance on their health issues through an intelligent health care online system. The objective of our paper is to predict Chronic Kidney Disease (CKD), Heart Disease and Liver Disease using clustering technique, K-means algorithm [4].

Advantages

- Large data warehouses and using advanced information infrastructures for redirecting and monitoring chronic non-communicable diseases

Disadvantages

- Due to the large data processing, the time of the process is high.

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Brain Computer-Interfacing is a methodology that provides a way for communication with the outside environment using the brain thoughts. The success of this methodology depends on the selection of methods to process the brain signals in each phase. This paper aimed at addressing the various methodologies required to be adapted in each phase of brain signal processing. Prior to this survey, previous surveys have been listed various methods, some experimental results and compared them [5].

Advantages

- A clear representation of various signal processing methods used in each level of BCI signal processing is presented in this paper. The results of this survey give a way to select methods required for processing signals

Disadvantages

- Research in to BCIs at the moment is at a fairly basic level considering the complexity of the problem.
- BCIs are currently fairly inaccurate in terms of classifying neural activity.

An attempt is made to find the best classification algorithm and feature extraction technique by comparing some of the prominently used algorithms on a same base dataset. Feature extraction techniques like discrete wavelet transform (DWT) and cross-correlation have been studied and compared. Five classification algorithms have been implemented which are logistic regression (LR), kernalized logistic regression (KLR), multi-layer perceptron neural network (MLP), probabilistic neural network (PNN) and Least-square support vector machine (LS-KNN). Dataset Ivan of BCI competition III has been used as a base dataset to test the algorithms [6]

Advantages

- Among the feature extraction techniques, it is DWT and among classification algorithms, it is LS-KNN which are giving better classification results for EEG signal classification

Disadvantages

- Cross correlation is giving good results but may not be preferred as it may cause the EEG signal to lose its temporal information.

State-of-the-art open-source data mining suites are in boon for extraction from voluminous data to the required useful data. New techniques are required owing to the size and complexity of data collections in different dimensions like: administration, business and science. Today is an era of diseases where they are the major causes of death. The rising growth of medical problems has given popularity to use data mining techniques. Data mining has potentially improved the clinical decisions and survival time of patients. Choosing the appropriate data mining technique is the main task because accuracy is the main issue. Earlier diagnosis done was based on doctor's experience or expertise but still wrong cases were reported. The objective is to give an exposure on variety of data mining techniques used with the most effective technique among the all techniques, so that the researchers can have direction to research on incurable diseases which are costliest diseases so as to save money and lives of the patient [7].

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Advantages

- The new advanced method such as FS was used for the feature extraction that showed better results

Disadvantages

- BCIs are currently fairly inaccurate in terms of classifying neural activity.

Electroencephalography (EEG) based Brain Computer Interface for mental task detection has gained lot of interests from researchers in last decade. The main components of EEG based BCI are EEG signal acquisition, EEG signal preprocessing, feature extraction from EEG signal and classification of EEG signal (mental tasks). This paper reviews and discusses the components of EEG based BCI system: EEG signal acquisition techniques, preprocessing methods, different feature extraction methods and different classification techniques used for mental task classification [8].

Advantages

- The advantage of MLPNN is that its fast operation, ease of implementation and requiring small training sets.

Disadvantages

- If improper features are extracted then they cannot help classifier to classify the mental tasks properly, which makes BCI inappropriate.

The problem of diabetic prediction has been well studied in this paper. The disease predictions have been explored using various methods of data mining. The use of medical data set on the prediction of diabetic mellitus has been analyzed. This paper performs a detailed survey on disease prediction using data mining approaches based on diabetic data set. The presence of disease has been identified using the appearance of various symptoms. However, the methods use different features and produces varying accuracy. The result of prediction differs with the methods/measures/ features being used. Towards diabetic prediction, a Disease Influence Measure (DIM) based diabetic prediction has been presented. The method preprocesses the input data set and removes the noisy records. In the second stage, the method estimates disease influence measure (DIM) based on the features of input data point. Based on the DIM value, the method performs diabetic prediction. Different approaches of disease prediction have been considered and their performance in disease prediction has been compared. The analysis result has been presented in detail towards the development [9].

Advantages

- Classification is performed by the KNN and our experimental result shows that the classification accuracy of the proposed method reaches 90% as compared to the current reported best accuracy of 84%.

Disadvantages

- CSP feature is quite sensitive to the frequency range of the band pass filter and it is subject specific. However, it is very time consuming.

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III. Syetem Design

A. Proposed Work

- The data is performed on the medical data by using the machine learning.
- The system is developed based on classification of the types of disease by means of the KNN classifier.
- We can predict the types of disorder in large amount of data.

Advantages

- Predict the Accuracy, Sensitivity and Specificity.
- Display the visualization graph.

B. Syetem Architecture

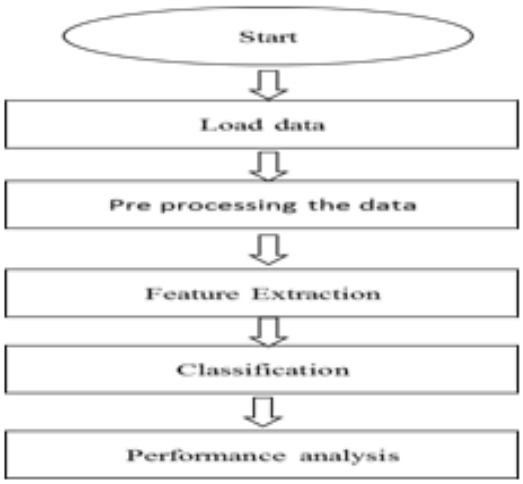

Figure 1: Architecture Diagram

C. Testing

1. Unittesting: Unit testing is the testing of each module and the integration of the overall system is done. Unit testing becomes verification efforts on the smallest unit of software design in the module. This is also known as 'module testing'. The modules of the system are tested separately. This testing is carried out during the programming itself. In this testing step, each model is found to be working satisfactorily as regard to the expected output from the module. There are some validation checks for the fields. For example, the validation check is done for verifying the data given by the user where both format and validity of the data entered is included. It is very easy to find error and debug the system.

2. Integration Testing: Data can be lost across an interface, one module can have an adverse effect on the other sub function, when combined, may not produce the desired major function. Integrated testing is systematic testing that can be done with sample data. The need for the integrated test is to find the overall system performance. There are two types of integration testing. They are

- Top-down integration testing.
- Bottom-up integration testing.

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3. White Box Testing: White Box testing is a test case design method that uses the control structure of the procedural design to drive cases. Using the white box testing methods, we derived test cases that guarantee that all independent paths within a module have been exercised at least once.

4. Black Box Testing

- Black box testing is done to find in corrector missing function
- Interface error
- Errors in external database access
- Performance errors and Initialization and termination errors

In functional testing is performed to validate an application conforms to its specifications of correctly performs all its required functions. So, this testing is also called black box testing. It tests the external behavior of the system. Here the engineered product can be tested knowing the specified function that a product has been designed to perform, tests can be conducted to demonstrate that each function is fully operational.

5. Validation Testing: After the culmination of black box testing, software is completed assembly as a package, interfacing errors have been uncovered and corrected and final series of software validation tests begin validation testing can be defined as many, but a single definition is that validation succeeds when the software functions in a manner that can be reasonably expected by the customer.

6. User Acceptance Testing: User acceptance of the system is the key factor for the success of the system. The system under consideration is tested for user acceptance by constantly keeping in touch with prospective system at the time of developing changes whenever required.

7. Output Testing: After performing the validation testing, the next step is output asking the user about the format required testing of the proposed system, since no system could be useful if it does not produce the required output in the specific format. The output displayed or generated by the system under consideration. Here the output format is considered in two ways. One is screen and the other is printed format. The output format on the screen is found to be correct as the format was designed in the system phase according to the user needs. For the hard copy also output comes out as the specified requirements by the user. Hence the output testing does not result in any connection in the system.

D. **System Implementation**: Implementation of software refers to the final installation of the package in its real environment, to the satisfaction of the intended users and the operation of the system. The people are not sure that the software is meant to make their job easier.

- The active user must be aware of the benefits of using the system
- Their confidence in the software built up
- Proper guidance is impaired to the user so that he is comfortable in using the application

Before going ahead and viewing the system, the user must know that for viewing the result, the server program should be running in the server. If the server object is not running on the server, the actual processes will not take place.

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User Training: To achieve the objectives and benefits expected from the proposed system it is essential for the people who will be involved to be confident of their role in the new system. As system becomes more complex, the need for education and training is more and more important.

Education is complementary to training. It brings life to formal training by explaining the background to the resources for them. Education involves creating the right atmosphere and motivating user staff. Education information can make training more interesting and more understandable.

Training on the Application Software: After providing the necessary basic training on the computer awareness, the users will have to be trained on the new application software. This will give the underlying philosophy of the use of the new system such as the screen flow, screen design, type of help on the screen, type of errors while entering the data, the corresponding validation check at each entry and the ways to correct the data entered. This training may be different across different user groups and across different levels of hierarchy.

Operational Documentation: Once the implementation plan is decided, it is essential that the user of the system is made familiar and comfortable with the environment. A documentation providing the whole operations of the system is being developed. Useful tips and guidance are given inside the application itself to the user. The system is developed user friendly so that the user can work the system from the tips given in the application itself.

System Maintenance: The maintenance phase of the software cycle is the time in which software performs useful work. After a system is successfully implemented, it should be maintained in a proper manner. System maintenance is an important aspect in the software development life cycle. The need for system maintenance is to make adaptable to the changes in the system environment. There may be social, technical and other environmental changes, which affect a system which is being implemented. Software product enhancements may involve providing new functional capabilities, improving user displays and mode of interaction, upgrading the performance characteristics of the system. So only thru proper system maintenance procedures, the system can be adapted to cope up with these changes. Software maintenance is of course, far more than "finding mistakes".

Corrective Maintenance: The first maintenance activity occurs because it is unreasonable to assume that software testing will uncover all latent errors in a large software system. During the use of any large program, errors will occur and be reported to the developer. The process that includes the diagnosis and correction of one or more errors is called Corrective Maintenance.

Adaptive Maintenance: The second activity that contributes to a definition of maintenance occurs because of the rapid change that is encountered in every aspect of computing. Therefore, Adaptive maintenance termed as an activity that modifies software to properly interfere with a changing environment is both necessary and commonplace.

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Perceptive Maintenance: The third activity that may be applied to a definition of maintenance occurs when a software package is successful. As the software is used, recommendations for new capabilities, modifications to existing functions, and general enhancement are received from users. To satisfy requests in this category, Perceptive maintenance is performed. This activity accounts for the majority of all efforts expended on software maintenance.

Preventive Maintenance: The fourth maintenance activity occurs when software is changed to improve future maintainability or reliability or to provide a better basis for future enhancements. Often called preventive maintenance, this activity is characterized by reverse engineering and re-engineering techniques.

E. System Modules

- Input Data
- Preprocessing
- Classification
- Retrieval

Input data

- The input data are taken as the heart disease data.
- Hence the data is taken from the dataset.
- The data consist of attributes and it values.
- The data contains both the normal and as well as the abnormal data.
- The user can get the input as the .mat file format.
- MAT is the format, which stores the numerical and strings.

Preprocessing

- The Preprocessing consist of data deployment and data alignment.
- The data is deployed in the table.
- Hence the values are assigned with the specific attributes.
- All the values are assigned with the specific attributes

Classification

- In this step, the input data are segregated as the test feature, train feature and then labels.
- These features are matching with each other to generate the classification result.
- Hence the classification result shows the process output.

Retrieval

- In this step, based on the matching result, the data which is matched with the dataset will be retrieved.
- Those retrieved data will be displayed.
- Among the n number of data, the corresponding related data only be retrieved and the other unwanted data will be neglected.

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IV. Result and Discussions

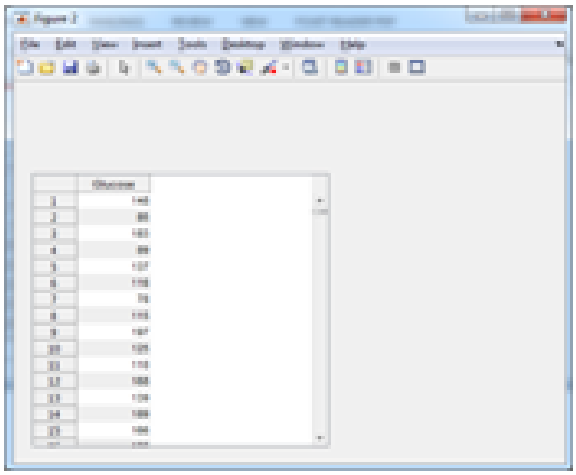

Figure 2 : Number of Patients

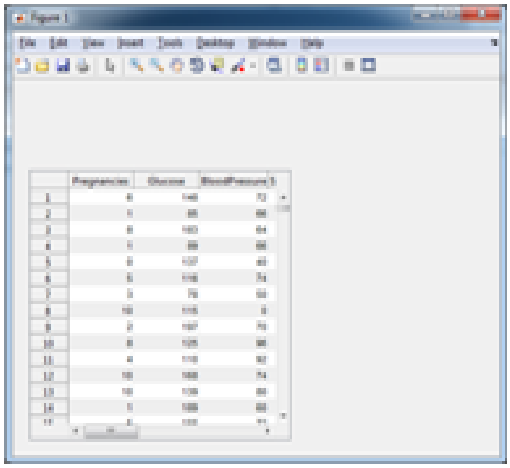

Figure 3 : Gulcose Level of all Patients

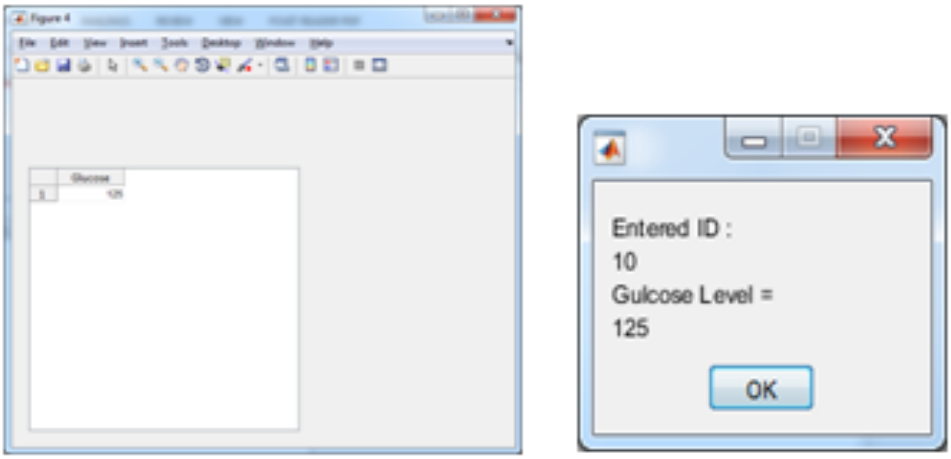

Figure 4 : Gulcose level of One Patient

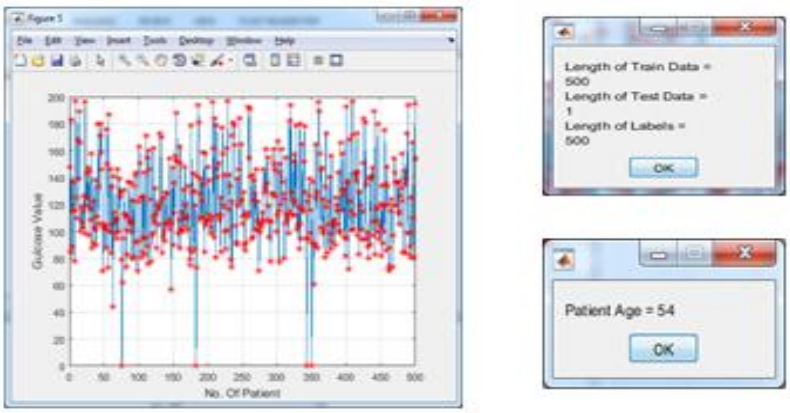

Figure 5 : Graph level of all Patients and Age

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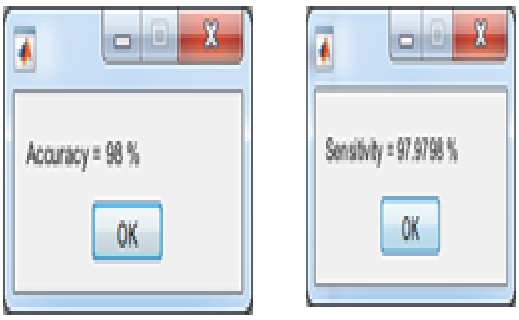

Figure 6: Accuracy and Sensitivity

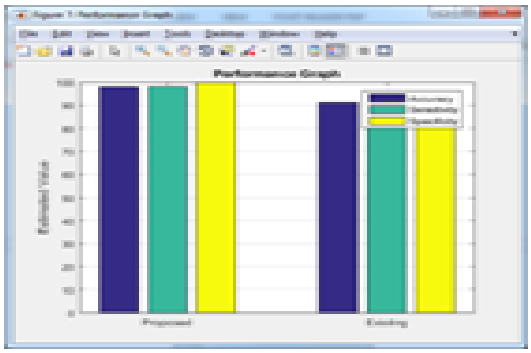

Figure 7: Perfomance Existing and Proposed System

V.Conclusion and Future Enhancement

The existing system is not wearable and it occupies more space and is less accurate. The proposed system measures various parameters using sensory platform, then it sends the data to doctor. The proposed system is compact in nature and wearable. When the patients' data will be received, doctor analyzes it and provides suitable treatment. The proposed system will be helpful to pregnant ladies to avoid miscarriage and the Physicians can also suggest healthy diet. In proposed system vital health parameter such blood pressure, kicking, body temperature, heart rate, fetus heart rate are analyzed and report will be generated which can be used for observation.

VI. **Conclusion**

In this work we used KNN classifier to predict the dataset. KNN classifier predicts whether it is normal dataset or abnormal dataset for heart disease. Normal dataset heart disease possibilities are low and in abnormal dataset high possibilities in heart disease. So, we predict possibilities of heart disease accurately on compared to existing system

VII. Future Enhancement

In this work we deal with the various technologies for earlier prediction of heart disease person from the given data for isolating the heart disease person or possible feature heart disease persons for giving earlier and correct treatment for bringing them into normal health condition. Now we suggest that in future the micro level technology such as Nano-technology or various other micro level technologies may be found out and will be adopted for diagnosing the given data for very fast detection and dissolution of heart disease person for giving earlier treatment.

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Programmable Detection of COVID-19 Infection Using Chest X-Ray Images through Transfer Learning

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Abstract

The new coronavirus (COVID19), declared by the World Health Organization as a pandemic, has infected more than 1 million people and even killed people. Infection with COVID19 can develop into pneumonia, which can be detected by chest X-ray. In this article, we propose a method for automatic detection of COVID19 infection based on chest X-rays. The data set created for this study included 194 X-rays of patients diagnosed with coronavirus and 194 X-rays of healthy patients. Since there are few publicly available images of COVID19 patients, we apply the concept of knowledge transfer to this task. We use various convolutional neural network (CNN) architectures trained on Image Net and adjust them to feature extractors for X-ray images. Then combine CNN with established machine learning techniques, such as k Nearest Neighbour, Bayes, Random Forest, Multilayer Perceptron (MLP), and vec support. The results show that for one of the data sets, the most effective extractor-classifier pair is the InceptionV3 architecture, which has an SVM classifier with a linear kernel, which provides accuracy of 99.421%. Another record, the best pair, is ResNet50 with MLP, which has an accuracy of 97.461% Therefore, the proposed method shows the effectiveness of detecting COVID-19 on X-rays.

Key words : covid-19, machine learning, deep learning, python, transfer learning

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I. Introduction

The COVID-19 pandemic has become a serious health problem and has been the focus of media attention since December 2019 [1], [2] . In approximately 74% of cases, COVID-19 causes mild (18%) or moderate (56%) symptoms [3]. However, the remaining cases range from severe (20%) to severe (6%) [3]. To date (2,0200,403 cases), the total number of reported cases is approximately 1,015,667, with 53,200 deaths worldwide and 212,991 fully recovered. In addition, the number of active cases is 749,476 [4], [5]. The main symptoms of a suspected infection are shortness of breath, fever, and cough. Even if the infection is more serious, the virus can cause pneumonia.

In addition to pneumonia, infection can also cause severe acute respiratory syndrome, septic shock, multiple organ failure, and eventually death. Studies have shown that men (about 60%) suffer more than women (about 40%), and before that, the mortality rate of children under 9 years of age has not increased significantly. Despite the rapid development, due to the simultaneous increase in demand for intensive care units, many countries in the first world are facing the collapse of the health system .With the development of new technologies around the world, the time for virus detection is becoming less and less.
The diagnosis of COVID19 infection includes a chest examination to check the condition of the lungs. If the patient is diagnosed with pneumonia, it is considered COVID19 infection. This method enables the authorities to isolate and treat patients in a timely and active manner. One of the methods that can be used to detect pneumonia is through chest computed tomography. Intelligence is being developed to detect, quantify, and monitor COVID19 infection, and to distinguish healthy lungs from diseased lungs .Ke et al. Based on the basic image characteristics and the collaborative analysis of neural networks and heuristic algorithms, the process is divided into the following steps: first use the basic descriptors of the network neurons to make a preliminary analysis of the possibility of detecting respiratory diseases, and then apply the heuristics The algorithm quickly recognizes the affected lung tissue, because the recognition ability is very important.

Pope et al. He Shan et al. Developed heuristic or deep learning segmentation research. These studies are aimed at segmenting the entire lung area where the infection is present, isolating the affected area from other areas, thereby examining the unique pattern of the area to identify the area in the new sample. Attempt to develop an early detection model that can use computed tomography and deep learning techniques to distinguish between COVID-19 pneumonia, influenza A pneumonia and healthy lungs. A study by Wang et al. Based on the changes presented in the CT scans of COVID19 patients, a deep learning method was developed that can capture graphical features and provide a faster clinical diagnosis than waiting for pathogen testing. Following the same framework, Chouhan et al. Use various neural network models previously trained on ImageNet to extract the features of the investigation. These attributes are used to obtain individual ranking results for each network.
The result combination of each network uses a majority vote, so the diagnosis corresponds to the category with the most votes. Radiography is an imaging technique used to examine fractures, displaced bones, pneumonia, and tumors. X-rays have been used for decades and are a very fast method of visualizing the lungs, so they can be a useful tool for detecting COVID-19 infection. They can generate images that show lung damage, such as SARSCoV2 pneumonia . Because X-rays are very fast and cheap, they can help classify patients in certain places. In places where the health system has collapsed or far away from major centers, more

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advanced technology can be used. In addition, there is a portable X-ray machine, which can be easily transported to the place where it is needed . CT scans advanced the use of X-ray principles to examine the soft structures of the body. It is also used to obtain clearer images of organs and soft tissues . On the other hand, X-rays use less radiation , so the use of X-rays is faster, less harmful and cheaper than computed tomography. It is recommended to automatically detect COVID-19 through chest X-ray and CNN. Apostolopoulos et al. also suggested automatic detection of diseases, but analyzed three categories: COVID-19, common pneumonia and normal conditions. In this article, we propose an automated system for grading chest X-rays of COVID-19 patients or healthy patients using convolutional neural network learning transfer.

II.Literature Survey

1. **Real-time forecasts of the COVID-19 epidemic in China from February 5th to February 24th, 2020:** The underlying bunch of extreme pneumonia cases that set off the COVID-19 pestilence was distinguished in Wuhan, China in December 2019. While early instances of the illness were connected to a wet market, human- to-human transmission has driven the quick spread of the infection all through China. The Chinese government has executed regulation systems of city-wide lockdowns, screening at air terminals and train stations, and separation of suspected patients; be that as it may, the aggregate case check continues to develop each day. The continuous flare-up presents a test for modelers, as restricted information are accessible on the early development direction, and the epidemiological qualities of the novel Covid are yet to be completely explained.

2. **Prediction of criticality in patients with severe Covid-19 infection using three clinical features**: a machine learning-based prognostic model with clinical data in Wuhan: Foundation COVID-19 showed up in Wuhan, China in December 2019, and from that point forward it has promptly become a genuine general medical issue around the world. No particular medication against COVID- 19 has been found up to this point. Be that as it may, mortality hazard in patients might actually be anticipated before they send to fundamentally sick.

   Techniques we screened the electronic records of 2,799 patients conceded in Tongji Hospital from January tenth to February eighteenth, 2020. There were 375 released patients including 201 survivors. We fabricated a prognostic forecast model dependent on XGBoost AI calculation and afterward tried 29 patients (included 3 patients from other medical clinic) who were cleared after February nineteenth.

3. **Clinical and computed tomographic imaging features of novel coronavirus pneumonia caused by SARS-CoV- 2**

   Purpose: To investigate the clinical and imaging characteristics of computed tomography (CT) in novel coronavirus pneumonia (NCP) caused by SARS-CoV-2.
   Materials and methods The imaging results of patients with confirmed COVID19 pneumonia who received chest computed tomography and postoperative treatment were retrospectively analyzed. Analysis of clinical and imaging data.

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Results: Fifty patients were selected, remembering gentle sort for nine, normal in 28, extreme in 10 and basically serious in the rest three. Gentle patients (29 years) were essentially (P<0.03) more youthful than one or the other normal (44.5 years) or serious (54.7) and basically extreme (65.7 years) patients, and normal patients were likewise altogether (P<0.03) more youthful than serious and fundamentally extreme patients. Gentle patients had low to direct fever (<39.1°C), 49 (98%) patients had ordinary or marginally diminished leukocyte tally, 14 (28%) had diminished tallies of lymphocytes, and 26 (52%) patients had expanded C-receptive protein. Nine gentle patients were negative in CT imaging. For the wide range of various kinds of NCP, the injury was in the right upper projection in 30 cases, right center flap in 22, right lower flap in 39, left upper flap in 33 and left lower flap in 36.The injury was principally situated in the fringe region under the pleura with conceivable expansion towards the pneumonic hilum. Even sores were found in 26 cases and hilter kilter in 15. The thickness of injury was for the most part lopsided with ground glass mistiness as the essential show joined by halfway union and fibrosis.

III. Existing Method

The existing system used the combination of MobileNet with SVM with the linear kernel, since it reached an Accuracy of 95.051%, We can also observe that RF achieved the slowest test times independently of the CNN architecture, which is related to its high number of estimators. MobileNet with SVM (Linear) reached a test time of 0.92 ms and an extraction time of 21 ms; then, this time is attractive for real-time implementations, since it would take, approximately 21.443 ms to define if an image is from class COVID-19 or Healthy. Furthermore, the system infrastructure does not have GPU and its configuration is not high-end, the proposed approach has not achieved satisfactory extraction and training times, then clinics and hospitals need to acquire new equipment for a system to aid in the medical diagnosis.

In a real life application, this means that not many patients will be misclassified as not infected, then increasing the spread of the disease and not allowing them to have the proper treatment increasing the probability of their contamination.

IV. Proposed Method

COVID-19 detection based on chest X-ray and computed tomography using four transmission learning algorithms: VGG16, ResNet50, InceptionV3, Xception model trained on about 1000 chest X-rays and about 750 CT images on Google Colab GPU for 500 epochs.

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Block Diagram:

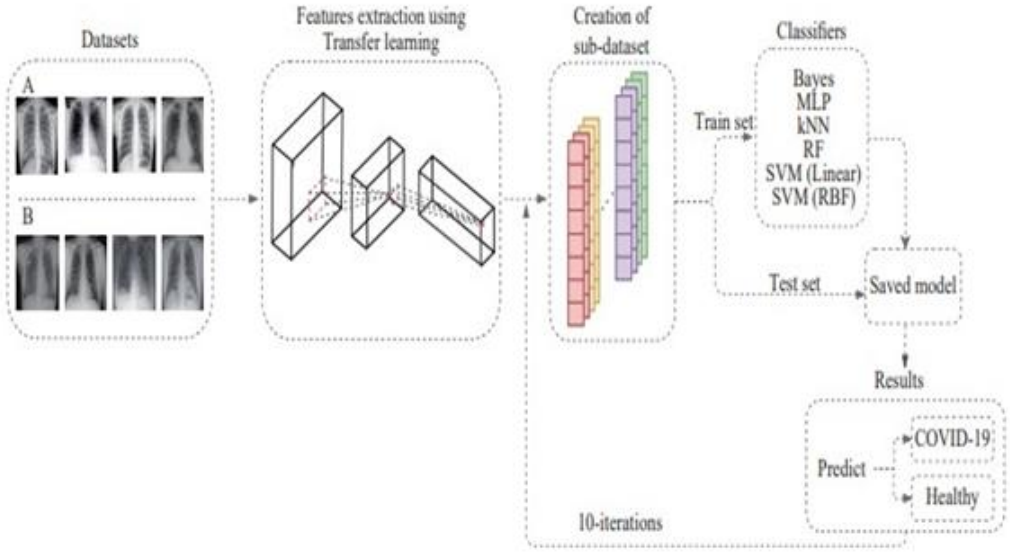

Figure 1 : Block Diagram Representing Architecture of The Proposed System Implementation

1. **Data Acquisition**: Since machine learning relies on the available data of the system to make decisions, the first specific step in the architecture is data collection, preparation. And case scenario separation based on certain characteristics related to the decision-loop execute and send the data to the processing unit for further classification.

2. **Data Processing:** The data obtained at the data collection layer is then sent to the data processing layer, where advanced integration and processing are carried out, including data normalization, cleaning, conversion and coding. The data processing layer decides whether to store the data in transmission or rest.

3. **Data Modeling:** The layer of the architecture involves the selection of different algorithms that might adapt the system to address the problem for which the learning is being devised, these algorithms are being evolved or being inherited from a set of libraries. The algorithms are used to model the data accordingly this makes the system ready for the execution step.

4. **Execution:** This stage of machine learning is the place for experimentation, testing, and adjustment. The overall goal is to optimize the algorithm to extract the desired results from the machine and maximize system performance. Del Paso Result is an advanced solution that can provide the data needed by the machine to make decisions

5. **Deployment**: Like any other software output, machine learning output must be live or broadcast for further exploratory processing. Output can be viewed as a non-deterministic query that needs to be implemented in a decision- making system.

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IV. Comparision of Existing and Proposed System

Algorithm	Training Time(ms)	Testing Time(ms)	Accuracy (%)
INCEPTION V3(Proposed)	0.059	0.454	99.421
VGG 16(Proposed)	0.080	0.482	98.833
XCEPTION(Proposed)	0.152	0.692	98.33
RESNET 50(Proposed)	0.174	0.752	97.461
MOBILE NET(Existing)	0.442	0.921	95.051

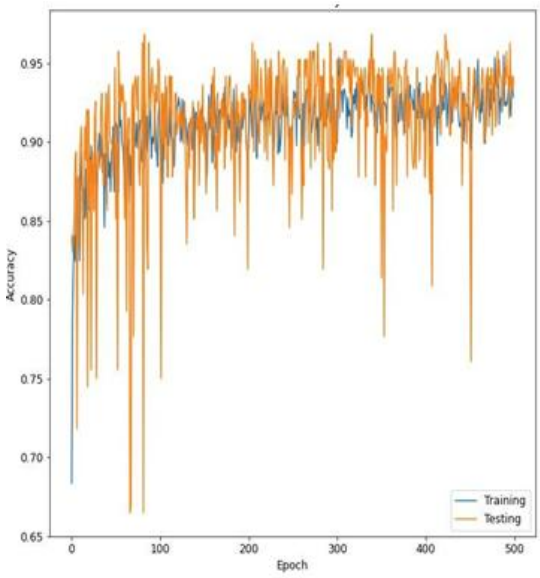

Figure 2: Graph representing Time and Accuracy of INCEPTION V3 algorithm

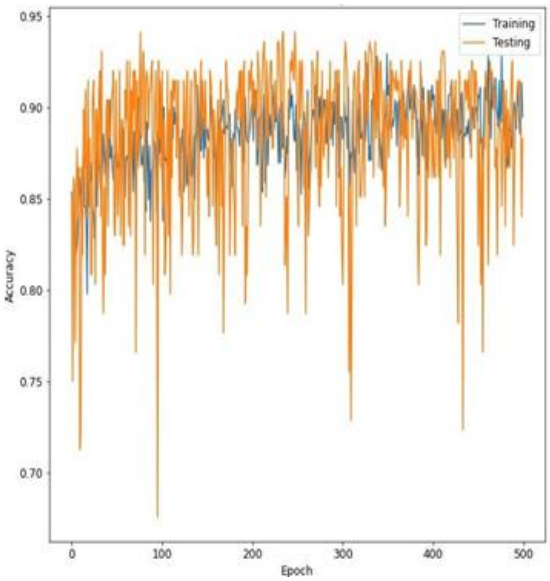

Figure 3: Graph representing Time and Accuracy of VGG 16 algorithm

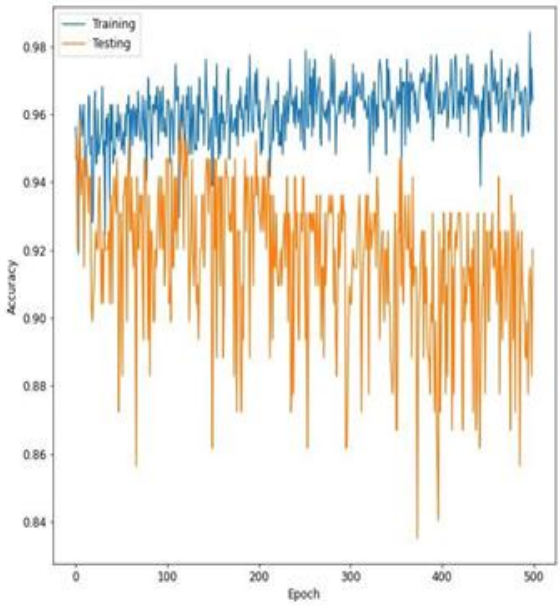

Figure 4: Graph representing Time and Accuracy of XCEPTION Algorithm

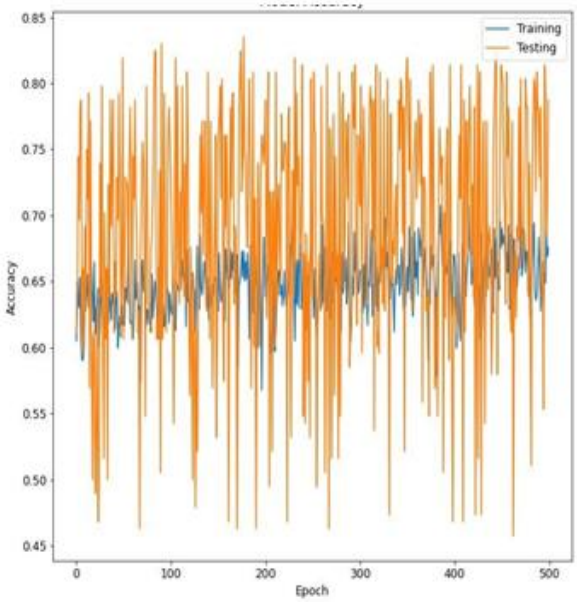

Figure 5: Graph representing Time and Accuracy of RESNET 50 algorithm

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V. Result

Here are the results of the four different algorithms used to diagnose COVID-19

Fig 6: Figures representing Outputs of Inception and VGG

Fig 7: Figures representing Outputs of Xception and Resnet50 Algorithms. Algorithms

VI. Conclusion and Future Scope

Early detection of patients with the new corona virus is essential for choosing appropriate treatments and preventing the rapid spread of the disease. Our results show that using CNN to extract features, applying the concept of transfer learning, and then using a unified machine learning method to classify these features is an effective way to classify x-rays as normal or positive for COVID19. For data set A, the combination with SVM (linear) performed best, achieving average Acc and average F1 scores. In addition, it can classify new images in just ms, which is not only the accuracy rate, but also for record B. The best pairing is to use MLP to achieve average Acc and average score F1. Although the accuracy and F1 are slightly lower, the images are only classified in milliseconds, which is faster than the best combination in dataset A. Under these circumstances, our work is helping to develop an accurate, automatic, fast, and inexpensive method for diagnosing COVID-19 using chest X-rays. The goal is to increase the size of the data set by adding new COVID-19 patient X-rays and X-rays of other lung diseases when these images are available to ensure the effectiveness of the proposed method. In addition, our goal is to test the proposed method on an imbalanced data set. We also intend to integrate our method into a free online image classification platform .This allows hospitals and medical clinics around the world to identify diseases on chest X-rays without having to build a classification platform. Let's compare the proposed method with the fine-tuning method and train the network from scratch.

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IOT Based Smart Bank Locker System

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Abstract

In today's world, security becomes a very important issue. We are always concerned about the security of our valuables. In this paper, we propose an IOT based intelligent smart locker with OTP and bimetric approach, which provides security, authenticity and user-friendly mechanism. This smart locker will be organized at banks, offices, homes and other places to ensure security. In order to use this locker firstly the user have to login. User has to send an unlock request code (OTP) and after getting a feedback Email with OTP, he/she will be able to unlock the locker to access his/her valuables. We also introduce biometric approach to our proposed smart locker to ensure security and authenticity.

The main aim of this paper is to design and implement a bank locker security system based on Radio Frequency Identification (RFID) and Global System for Mobile (GSM) technology which can be arranged in bank, secured offices and homes.

Key Words: Bank Locker system, Fingerprint, GSM, Internet of Things, Wi-Fi module.

I. Introduction

Over the decade, everyone is concerned about the safety of their valuables like jewelry, money, important documents etc. For ensuring the safety of these valuables bank can be an effective solution. However, due to the increasing rate of criminal approach it becomes

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difficult to ensure security of the valuables. Banks are considered as a soft target of criminals. In this circumstance, ensuring security of bank lockers should be taken into consideration. Therefore, in a paper we propose a smart locker, which is mainly, an IOT based intelligent locker.

Many researchers have implemented a smart locker system. Many of them have proposed a lot of idea to implement a smart bank /house locker system. A multilevel security system for bank locker [1] is proposed by Aishwarya Shah et.al to improves the security. This multilevel security system is mainly based on Fingerprint scanner, user password, RFID, temperature and IR sensor, Android application [11]. An intellectual bank locker security system [2] is designed by S.V. Tejesviet.al which is mainly based on fingerprint [8] and GSM technology [9,10].Another bank locker security system [3], which mainly based on RFID [12, 13] and GSM technology. The main advantage of this security system is that two different password is required for verifying authenticate user. This system firstly checks the validity of user id number, then it sends SMS (Short Message Service) request to the authenticated person mobile number for the original password to open the locker. Then microcontroller verifies the password with the password entered by the keyboard. If these two passwords are matched then the locker will be opened, otherwise the locker will be remained locked. A system [4] is used to control home appliances especially when the owner is away from home. Another smart home security system is proposed [5]. This system allows the owner to monitor and control the home appliances by using a mobile phone by sending SMS and also allow checking the status of the home appliances. To ensure security of valuable an IOT based security system is proposed in [6]. In this system authenticate person is verified by using OTP, face recognition techniques and PIN (personal identification number). In this system, OTP will be sent to user via SMS and email notification will be to the users. In this system, GSM (Global system for mobile communication) will help the owner to track the intruder with the help of police officials. A framework that will produce OTP (one-time password) is proposed in [7].

II. Existing System

In automatic security systems generally passwords, identification cards and PIN verification techniques are being used but the disadvantage is that the passwords could be hacked and a card may be stolen or lost.

III. Proposed System

In this system only genuine person can recover money from bank locker. We have arranged a bank locker security system based on Radio Frequency Identification (RFID) and Global System for Mobile (GSM) technology which include door locking system using on Radio Frequency Identification (RFID) and Global System for Mobile (GSM) which can activate, authenticate and validate the user and unlock the door in real time for bank locker secure access. The main merit of using passive on Radio Frequency Identification (RFID) and Global System for Mobile (GSM) is more secure than other systems. This system is made up of microcontroller, Radio Frequency Identification (RFID) reader, Global System for Mobile (GSM) modem, keypad, MEMS sensor, servo motor, buzzer, WIFI module and Liquid Crystal Diode (LCD). In this system the RFID reader reads the id number from submissive tag and send to the microcontroller, if the id number is valid then microcontroller send the

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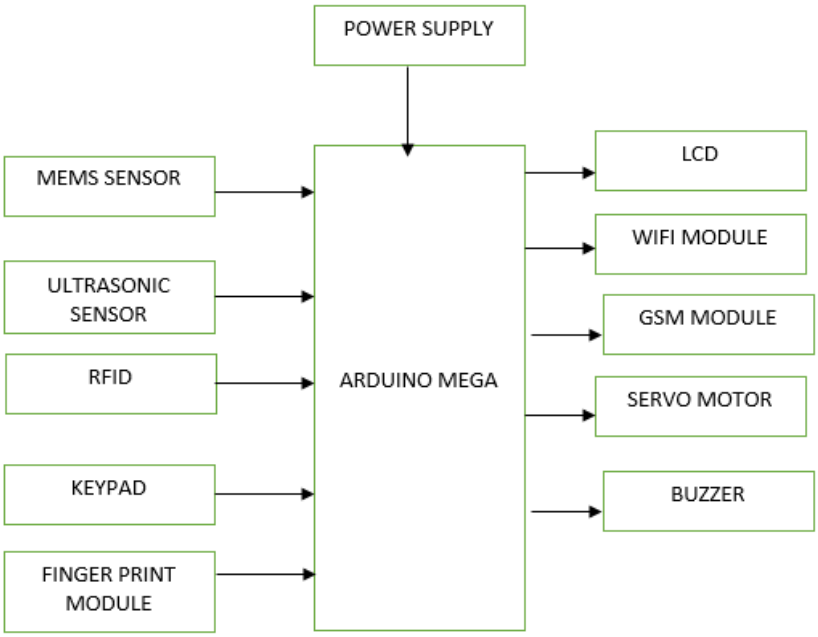
OTP (One time Password) to the authenticated person mobile number, if the person enters the OTP through keypad to the microcontroller, which will verify the OTP entered by the key board and received from authenticated mobile phone. If these two OTP's are matched the locker will be opened otherwise it will be remain in locked position. In this system, we are using MEMS sensor and Ultrasonic Sensor to detect the theft. If MEMS sensor is disturbed, it will send SMS to authorised person i.e., theft detected and also buzzer will ring. The Status of all sensors will be monitored through things peak using WIFI module.

Block Diagram



A. Arduino Mega: The Arduino Mega 2560 is a microcontroller board based on the ATmega2560. It has 54 digital input/output pins (of which 15 can be used as PWM outputs), 16 analog inputs, 4 UARTs (hardware serial ports), a 16 MHz crystal oscillator, a USB connection, a power jack, an ICSP header, and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with an AC-to-DC adapter or battery to get started.

Figure :Arduino Mega board

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B. **Wifi Module**: The ESP8266 WLAN module is a free SOC with a coordinated TCP/IP convention stack, through which each microcontroller can get to your WLAN organization. ESP8266 can have APP or burden all Wi-Fi network capacities from another APP processor. Each ESP8266 module has been pre-customized. Use at command Suite firmware, which implies you can plug it into an Arduino gadget and have as numerous Wi-Fi capacities as a Wi-Fi screen (prepared to use)The ESP8266 module is a worthwhile circuit board with a huge and consistently developing local area.

Figure 2: Wi-fi module

C. EM-18 RFID Reader: EM-18 is used like any other sensor module. First we choose the mode of communication between MODULE and CONTROLLER. Next we will program the controller to receive data from module to display. Next power the system. When a tag is brought near the MODULE it reads the ID and sends the information to controller. The controller receives the information and performs action programmed by us.

Figure:3 RFID Reader

D. GSM Module: Digital cellular technologies such as GSM (Global System for Mobile Communications) are used to transmit mobile data and voice services. In 1970, Bell Labs realized this concept through a mobile radio system. As the name suggests, this is the name of the standardization organization, which was established in 1982 to create a common European standard for mobile phones. This technology accounts for more than 70% of the global mobile digital subscriber market. The technology was developed using digital technology. Today, GSM technology supports 1 billion mobile phone users in the above 210 countries/regions. This technology can provide simple to complex voice and data services. This article provides an overview of GSM technology.

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Results: The RFID Reader reads the ID No from passive tag and send to the Micro Controller, if the ID No is vilid then Micro Controller send the SMS request to the authenticated person Mobile Number, for the Original Password to open the Bank Locker, if the person send to the Micro Controller.

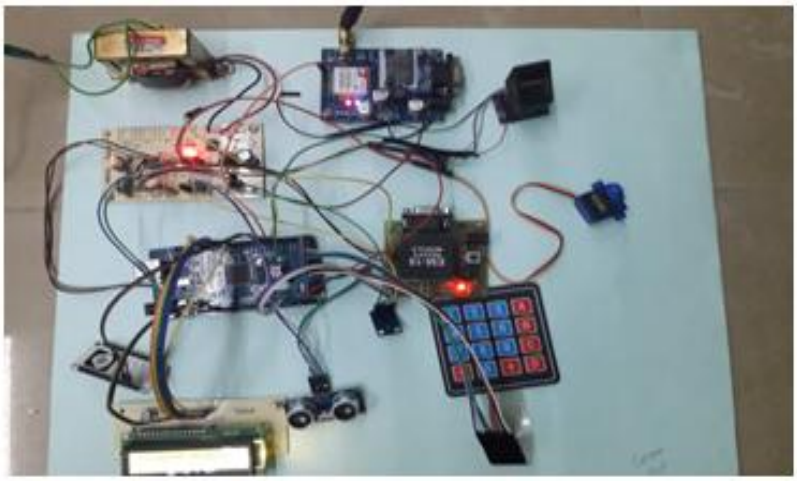

Figure A: Hardware implementation of Kit.

Figure B: RES KEY TO FORMAT

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Figure D: Finding Fingure Print to get access

The statement is to tell the Person that is not registered. Once the Password entered is correct, the following statement is displayed and the door of the Bank Locker is opened, the statement ”ACCESS GRANTED”.

IV. Conclusion

In this paper, we have proposed an IOT based smart locker to ensure the security of valuables. It ensures security by provided OTP. In this system, firstly, a user has to send request to the server for an OTP and server will provide this OTP by sending a feedback Email to user. This system has also face detection approach that will count the number of user’s presents in front of the locker at any particular time. If the system detects more than one face at same time, then a notification will send to the user. This smart locker is much better than traditional locker because it does not require any traditional key to unlock the locker. It is highly reliable system to ensure the security of our valuables.

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