|| Jai Sri Gurudev ||

Sri Adhichunchanagiri Shikshana Trust (R.)

S J C INSTITUTE OF TECHNOLOGY

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Proceedings of Emerging Trends in Electronics & Communication Engineering-2021

Manthana'21, 28th August 2021

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Prof. Madhukara S
Prof. Manjula K

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Message from Swamiji

The National Conference titled "Recent Trends in Electronics and Communication Engineering" – MANTHANA - 2021 organized by Department of ECE, SJC Institute of technology on 28th August 2021 at SJCIT Campus, Chikkaballapura provides platform for sharing new perspectives in the areas of Science and Technology with transforming context.

In MANTHANA-2021, many educators share their experiences, practices, and perspectives to accelerate educational changes in the environment of today's world that is always in a state of flux. The papers, discussions, and interactions during the conference will bring forth multiple viewpoints and address issues of critical importance.

It is a matter of joy for us to welcome the participants to this conference. My best wishes to all participants of the conference to make the most out of this event by learning innovative and advanced technologies.

Paramapoojya Jagadguru
Sri Sri Sri Dr. Nirmalanandanatha Mahaswamiji

Message form Principal

SJCIT Campus is a camouflage wealth of knowledge, innovation and technology that lies within. SJCIT in itself is a niche of opportunities to all aspiring engineers and researchers. The events in the conference are targeted towards researchers, practitioners, professionals, educators and students to share their experience, innovative ideas, issues, recent trends and future directions in field of Engineering and Science and Technology

It gives me an immense pleasure to be a part of the National conference on Emerging trends in Electronics & Communication Engineering (MANTHANA-2021). I strongly believe that this conference will provide tools and knowledge to overcome significant problems appearing in our industry and society by identifying innovative ideas and technologies introduced by the researchers and students.

The success of this conference will encourage us in introducing many more initiatives for innovative trends in the coming years. I wish the MANTHANA-2021 a great success.

Dr. G T Raju
Principal, SJCIT

About Organizing Institute

Sri Jagadguru Chandrashekaranatha Swamiji Institute of Technology (SJCIT) is a premier Institute imparting technical education since 1986. The Institute is managed by Sri Adichunchanagiri Shikshana Trust ® with the divine blessings of Byravaikya Jagadguru Padmabhushan Sri Sri Sri Dr. Balagangadharanatha Mahaswamiji and spiritual guidance of Jagadguru Sri Sri Sri Dr. Nirmalanandanatha Mahaswamiji. The Trust runs more than 485 Institutions all over country. SJCIT is affiliated to Visvesvaraya Technological University (VTU), Belagavi. The Institution is recognized by the All India Council for Technical Education (AICTE), New Delhi, Accredited by NBA(CSE,ECE & ME), NAAC and ISO 9001:2015 certified

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Content Table

Automatic Engine Locking System Using Alcohol Sensing

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Abstract

Now a days, drink and drive cases are serious societal problem that needs to be addressed. To minimize these kinds of accidents an attempt is made by using suitable technology that acts as a secondary tool to identify the drunken driver and initiate action on its own. The aim is to ensure human driving safe and to prevent from accidents. This system constantly monitors driver's breath, so if a driver is drunk and tries to drive the alcohol sensor will detect alcohol presence and locks the engine.

I. Introduction

According to Indian ministry of statistics reported 75% of the population uses private vehicles for transportation. Thousands of accidents happen every year, because of the driver's unstable condition due to alcohol consumption while driving. The rules in India are prohibiting the drivers to drink and drive so that it can be controlled. However, effective observation could be a challenge to the cops, road safety officers. Therefore, there is a need for alcohol detection system that can process without the restriction of time and place. For Blood Alcohol Concentration level from 0.4 to 0.6, the person feels confused and it's not safe to drive. From the level 0.7 to 0.8, the person's mental, physical and sensory functions are highly impaired. For BAC level of 0.2 to 0.3 continues not be safe to drive. India sets a legal limit of 30 mg/100 ml of blood alcohol concentration.

II. Methodology

We need to know the amount of consumption of alcohol. Then developing a system for alcohol detection with engine locking system. Implementing the proposal for four vehicles and heavy-duty vehicles. To prevent losses due to drunk and driving. Power supply is given to the project model. Sensor function is to sense the alcohol content and sending the signal to microcontroller. Microcontroller decodes the alcohol content from the given signal. The value will be decoded in the dedicated memory module along with date and time. Then it is compared with standard value. If the compared value is less than the standard value it allows the vehicle to turn on and if it's more than the standard value the vehicle stop accelerating or stops ignition.

III. Block Diagram

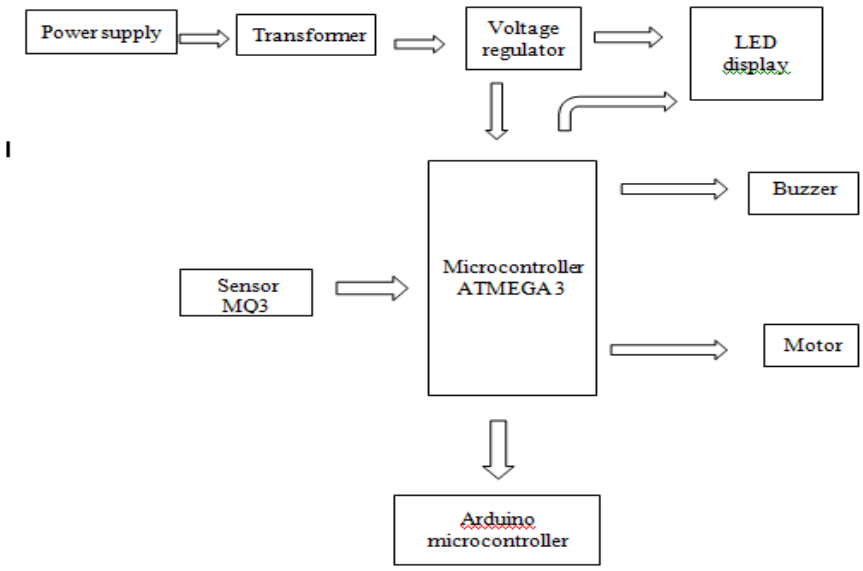

Fig 1: Block diagram of process

Power supply is given to the model. Voltage regulator keeps the voltage levels constant across the device. Alcohol sensor detects the consumption from the driver's breath and sends a signal to the microcontroller. Microcontroller takes input from the sensor and provides the output on the LCD screen. Motor controls the vehicles. Buzzer indicates the high alcohol content.

IV. Hardware Requirements

Microcontroller: ATMEGA328 it performs basic operations like calculations, sending and receiving signals storing data and controlling the motor.

Alcohol sensor: It senses the amount of alcohol content from surrounding and sends it to microcontroller in the form of voltage. It senses alcohol content from 0.04mg/L – 10mg/L

LCD Display: It can display in two rows with16 characters each. It is used to display the message when alcohol is detected. Voltage Regulator It is 24V to 5V IC and it is used to regulate the voltage sent to microcontroller, display, sensor as a power supply for proper working.

Transformer: It is a 12W transformer used to convert the high voltage mains to low voltage supply (230V-12V).

Push button: It is used as input to microcontroller and connected to reset pin of microcontroller. Once it is pressed it resets the microcontroller and program starts from the beginning.

Motor: It is 755-288W which is used to represent the engine or wheel motors. It is allowed to start as usual when no alcohol is detected; else engine is not allowed to start.

Buzzer and LED: Connected to output pins of the microcontroller and they are turned when sensor detects any alcohol content over the limit.

V. Software Requirements

Compiler

Keil µvision: For virtual compiling and simulation

MC programming language: C

VI. Flowchart

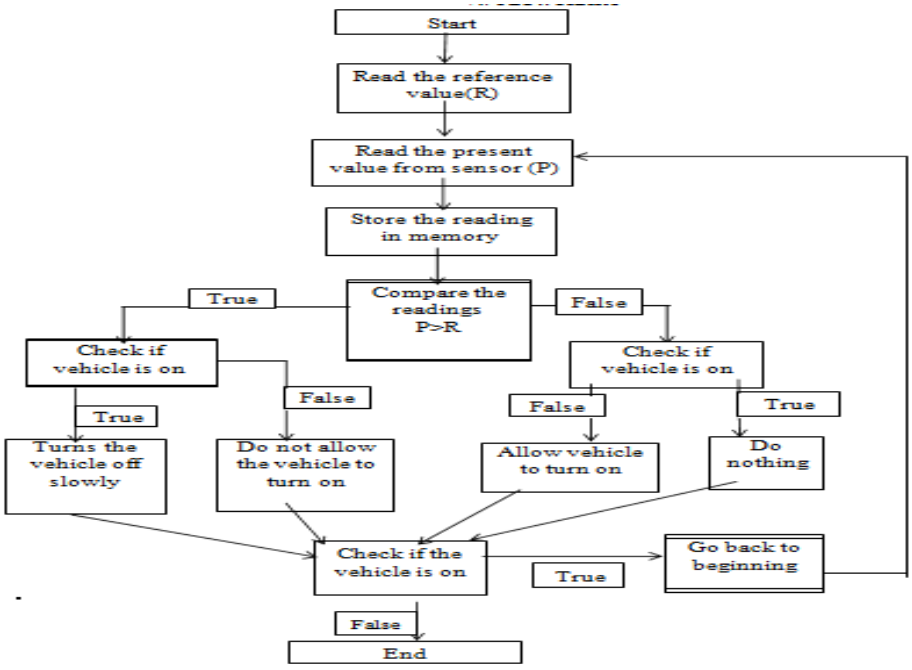

Fig 2: Flowchart

VII. Result

The displayed values on the LCD screen in figure 3, when the drunken driver enters in the vehicle and the sensor senses the alcohol consumption. Therefore, the buzzer rings and LCD displays the alcohol detection and the ignition of the vehicle turns off.

Fig 3: Output on LCD.

VIII. Advantages

- Its cost is much less than the one percent cost of the vehicle.
- There will be reduction of accident cases due to drink and driving.
- This device stores the previous data with time and date.

IX. Applications

- It can be used to minimize the accidents due drink and driving.
- Can be used as a marketing strategy for selling vehicles.
- It ensures the safety of passengers who travel using cabs and taxi.

X. Conclusion

This project is given an incredible and capable way to develop the smart systems for vehicles to reduce the number of accidents. This device is compatible and economical. The performance of the device can be verified through practical implementation.

XI. Future Scope

GPS location tracker can be connected to this project model. The tracker can locate the driver and provides information to the nearby control center. In future it can also connected to a mild shock generating device to the existing project model. Whenever driver is out of control shock is generated so that he can gain back to his senses.

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Design and Implementation of IOT Green House Monitoring and Control System

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Abstract

Now a day's technology is improving day by day in every field of life. Most of the people life is dependent on the development of agriculture. Most of farmers they fail to calculate the climate conditions. So, here we brought up the structure of "IOT on Greenhouse monitoring and control system" project design to maintain the specific condition in greenhouse. And it helps to protect the crops from many diseases. A lot of research has done to develop these greenhouse projects. The technique is used with the help of board ESP8266 Node MCU module. The soil moisture is used to measure content of soil. Temperature and humidity are controlled by their sensors.

Keywords: Node MCU, Relay, LED's, DHT11, Dc Pump, Soil moisture sensor, Arduino.

I. Introduction

Agriculture plays a very important in every human life. Most of the farmers is dependent on agriculture and they are trying to implement the trending technology. Sometimes they fail to undergo with a modern technology because of insufficient knowledge and less awareness. By using these IOT Greenhouse monitoring and control systems we can help them to develop the agriculture and increasing the productivity of crops, grains. And they can able to identify the climatic conditions easily. When we combine both technology and agriculture it gives a good results and better . Then we can see the better improvement in the agriculture field. By these we

can improve the productivity of food and we can develop the country too. In, this project we are mainly working with the three sensors i,e soil moisture sensor, temperature sensor and humidity sensor by using the Node MCU. In this paper we will show the overview of the project and applications based on the phenomenon. The basic concept behind of this designing project is to identify the climatic conditions and to maintain the proper agricultural fields. Here we can display the sensed values in the LED display. These sensors are connected to the Node MCU of arduino board. It contains sensors to sense the water level, temperature and humidity of the soil.

II. Methodology

This project says the parameter of values present in the soil via arduino software. The mobile app called Blynk will be in use to display values of moisture and temperature, humidity in air. By using that value the user will turn on or off the switch to meet the specific parameters in soil to make soil thrive in the soil. This makes use of wife to interconnect the module called Node MCU which will be linked to that mobile application which is Blynk and after that the user will set up the coloum of humidity, soil moisture and temperature in that app. and the main part is to set the switches which is used to switch on and off to control the moisture or water content in the soil and the output determines through that.

III. Block Diagram

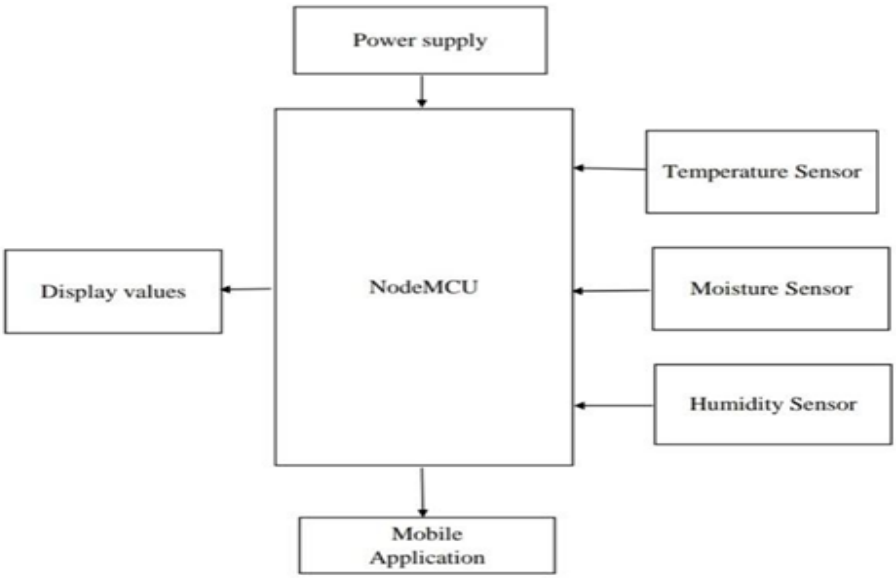

Fig 1: Block diagram of process

The main object of this project is to show the soil moisture, temperature, humidity values and if the parameters are less than the required and the final values will be shown in the mobile via blynk app. The user can make use of Node MCU to connect Wi-Fi module and finally the app shows the values of moisture of soil, temperature and humidity in the surrounding atmosphere.

IV. Hardware Requirements

Node MCU: Node MCU is the easily available source. This is affordable in cost. The language applied in firmware is Lua scripting.

DHT11 Temperature Humidity Sensor: This sensor contains temperature and humidity sensor complex with the combination of calibrated digital signal output.

Soil moisture sensor: It's type of sensor which detects the content of water present in soil. It changes the values based on the water content in soil.

Relay: These are the switches that are used to manage the circuit by less of power signal. These are terminals which contains a set of control

Hi Watt 9v Battery: It is a medium sized battery used for transistor radios. It's format can be easily found in carbon-zinc and alkaline chemistry.

Pump: It is a pump which pumps water. It powers by using a motor and makes water to go outside.

V. Software Requirements

Arduino IDE: It is a free source flat form available in online which we can use easily. C and C++ are included in it with some unique rules.

Blynk app: It is a mobile window that makes you to build fast interfaces for our project from the mobile by managing. After the app is downloading the user can see different options in the display like Switch ON and OFF.

VI. Flowchart

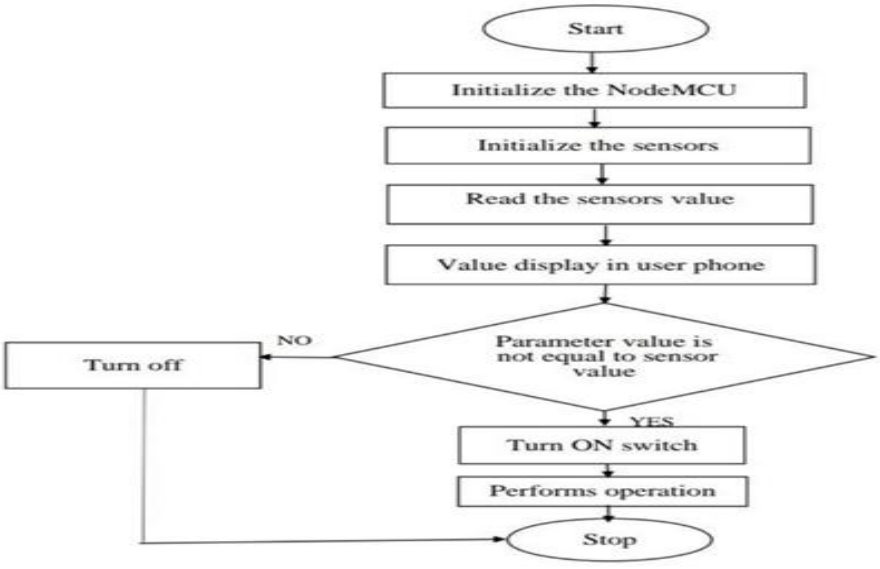

Fig 2: Flowchart of Progress

VII. Result

The figure 3 shows the values of soil moisture, humidity and temperature contents present in the soil where the user insered the sensor and maintain to level of stability by watching it correctly and neatly. For that we need good stable wifi module. By the displayed values of soil moisture temperature and humidity in the mobile app we will make use of switch to on and off. It depends on that displayed values whether to operate or not.

Fig 3: Level indication of Blynk display

VIII. Advantages

- Ensures crop yeildings.
- Leaching of nutrients are decreased.
- Crop quality is increased.
- Manual intervention is minimal.

IX. Applications

- Wide range in Agriculture field.
- Easily affordable for Farmers.
- Makes use of required amount of water and reduces wastage of water.

X. Conclusion and Future Scope

Water requirement for plants controlled by both hardware part and software part. This makes the plant to be alive by simply using an mobile app.

- In future this approach can eradicate the gardening problems which are facing in urban areas.
- Lastly the user can add properties of maintenance & precautions of plant avoiding some values.
- Revolution brings to the Indian agricultural field system.

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Ultra Sonic Sensor Bring Precision to Social Distancing

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Abstract

The current outbreak of the novel corona virus, also known as COVID-19, was declared as a public health emergency by the WHO, where over a million people have been affected by this disease. The two safety measure to avoid the COVID-19 disease is to wear mask and maintain social distancing. Maintaining social distance in workplace, factories is very difficult. In order to prevent this, we engineers have created a device. This is in the form of ID card. The ultrasonic sensor is used to maintain social distance among the workers. An ultrasonic measurement and alarm system with high precision was designed. Adopting the buzzer to alert the user, the device can measure distance truly and well. In addition, the system uses GSM Module which improves the ranging accuracy by sending SMS as a warning to user and notification to authorities in order to maintain social distancing.

Keywords: LED, Buzzer, IR sensors, Arduino UNO R3

I. Introduction

According to the data obtained by WHO of the global pandemic. COVID-19 has severely impacted. In the world and has now infected more than 10 million people worldwide. World Health Organization has recommended the physical, social distancing is used to prevent the spread of COVID-19. Wearing face mask and the following safe social distancing are two of the enhanced safety protocols needed to be followed in public places in order to prevent the spread of the virus to create safe environment that contributes to public safety. Social distancing is an effective measure against the novel Corona virus disease. As factories and companies are contributing high towards the development of a country, many workers have to work even in this pandemic situation. In this COVID-19 environments, where everyone is cautious about their safety, came up with the idea to prevent social distancing by using a device in ID card where every person can wear in their workspace.

People are conscious about their work and they neglect social distancing while working. The existence of a device that can automatically detect the distance from

object to the sensor and sound is produced from the buzzer. This device will give alert to the person if someone comes near him by producing sound. Wearing this ID card will help them in maintaining social distancing. Nowadays, social distancing succeeds in reducing the contact rate between individuals. These enhanced social distancing techniques almost exclusively use Wireless technology to implement some form of peer- to-peer range finding for proximity detection. By using this ID card will ensure that every worker will follow the rules and will be safe from COVID-19.

II. Methodology

The main aim of designing this device, which is in the form of ID card is to save people lives from the deadly virus by maintaining social distance. For this purpose using two phase: First is alerting the individual by alarm sound as warning and second is to inform or sending SMS notification to both individual and the higher authority.

In first phase Arduino UNO is connected with ultrasonic sensor, LED, Buzzer effectively. Ultrasonic sensor is used to detect the distance which is fixed in the ID card. If the individual / user did not maintain the fixed meter of distance Buzzer sounds and LED glows. After the two warnings of buzzer sounds the GSM module SIM 800L is connected with Arduino sends message to higher authority. If any worker violates the rule of maintaining social distance which is fixed in the ID card, the higher authority will take action against the worker who has violated the rule. The SMS is also be sent to the worker, that he has violated the rule of maintaining social distance among the workers in the work place.

III. Block Diagram

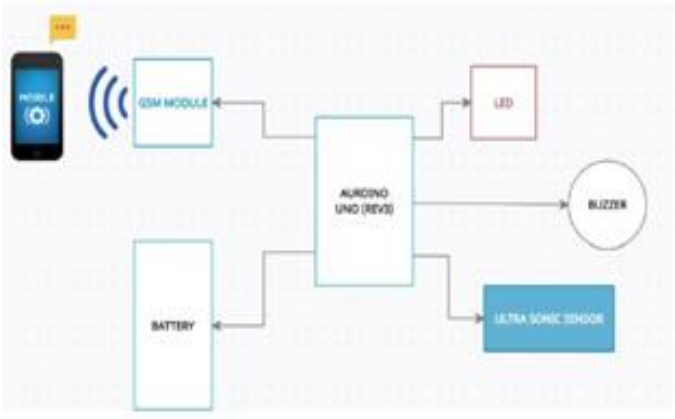

Fig. 1: Block diagram of the proposed system

In the below figure, the Arduino UNO (REV3) is acting as the main interface between all other components. LED is used for glowing purpose, Buzzer is used to produce sound, Ultrasonic sensor is used for measuring distance form object to the

source, and GSM Module is used to send messages and Battery for the Power supply.

IV. Hardware Components

1. Arduino UNO

The Arduino Uno is an open-source microcontroller board based on the Microchip ATmega328P micro- controller and developed by Arduino.cc. The board is equipped with sets of digital and analog input/output (I/O) pins that may be interfaced to various expansion boards (shields) and other circuits. The board has 14 digital I/O pins (six capable of PWM output), 6 analog I/O pins, and is programmable with the Arduino IDE (Integrated Development Environment), via a type B USB cable. It can be powered by the USB cable or by an external 9- volt battery, though it accepts voltages between 7 and 20 volts.

2. LED

A light emitting diode (LED) a semiconductor light source that emits light when current flows through it. Electrons in the semiconductor recombine with electron holds, releasing energy in the form of photons.

3. Ultrasonic Sensor

An ultrasonic Sensor is an electronic device that measures the distance of a target object by emitting ultrasonic sound waves, and convert the reflectiveness sound into an electrical signal. Ultrasonic waves travel faster than the speed of audible sound. The HC-SR04 ultrasonic sensor users SONAR to determine the distance of an object just like bats do. It offers excellent non contact rage detection with high accuracy and stable. Readings in an easy to do package from 2 centimeter to 400 centimeter or 1 to 13 feet.

4. Buzzer

A buzzer or beeper is an audio signaling device, which may be Mechanical, Electro mechanical or piezoelectric. Typical users of buzzers and peepers include alarm devices, timers and confirmation of user input such as most clicks or keystroke.

5. Battery

A 9 Volt battery is a common size battery that was introduced for the early transistor radios. It has a rectangular prism shape with rounded edges and a polarized snap connector at the top. This type is commonly used in smoke detectors, gas detectors, clocks, walkie talkies, electric guitars and effects units.

6. GSM Module SIM 800L

SIM800L a miniature cellular module which allows for GPRS transmission, sending and receiving SMS. And making and receiving voice calls. Low cost and small footprint and quad band frequency support make this module perfect solution for any project that requires long range connectivity.

V. Software Components

7. Arduino IDE

The Arduino Integrated Development Environment (IDE) is a cross-platform application (for Windows, mac OS, Linux) that is written in functions from C and C++. It is used to write and upload programs to Arduino compatible boards, but also, with the help of third party cores, other vendor development boards. The source code for the IDE is released under the GNU General Public License, version 1.8.5.

8. Fritzing

Fritzing is an open-source hardware initiative that makes electronics accessible as a creative material for anyone. We offer a software tool, a community website and services in the spirit of Processing and Arduino, fostering a creative ecosystem that allows users to document their prototypes, share them with others.

Flowchart

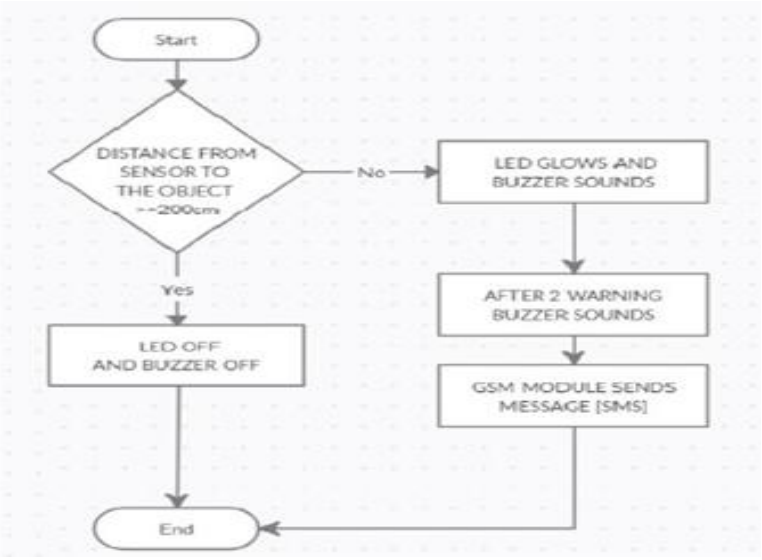

Fig. 2: Flowchart

Figure 2 describes the distance from the sensor to the object based on two cases:

- The first case is if the distance from the senor to the object more than 200cm the LED and Buzzer will be in OFF state.

- The second case is if the distance from the sensor to the object less than 200cm the LED is in ON state, LED glows and Buzzer sounds. After two warning buzzer sounds the GSM module sends message in the form of SMS.

VI. Advantages

- Social and physical distancing. Measures aim to slow the spread of disease by stopping Chain of transmission of COVID-19 and prevention.
- This device, which is made up of ultrasonic sensor, helps the people in the factories and workplaces to secure physical distance between people.
- The device helps in reducing the Contact with the contaminated or infected person by giving alarm as a caution.
- This helps in encouraging and sustaining Virtual social connections within the people in their respective workplaces.
- This device works on wireless localization, so it is easier to carry for a person.
- Alerts can be given easily by message and buzzer sound.
- It is a wearable device.

VII. Applications

- Protect/ Avoid human from the disease.
- Reduce the spread of COVID-19.
- Safety to the workers in their particular workspace and distance is maintained.
- Cost effective technology.
- Creates awareness to the people in their workspace regarding social distance.
- Significantly higher level of accuracy than other devices who are using Bluetooth for reference.
- "Contact prevention is better than contact tracing".

VIII. Resust

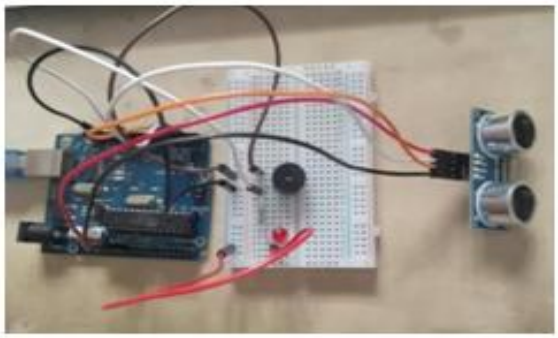

Fig. 3: Arduino UNO connected to sensor

The buzzer sounds and LED glows when the people come in contact with other person and after two warning buzzers is produced the GSM module will be activated.

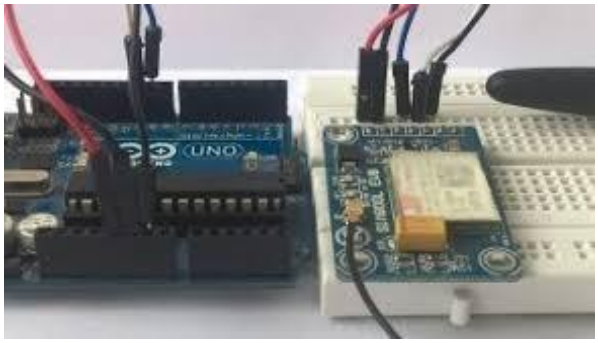

Fig. 4: Arduino connected to GSM Module

GSM module sends SMS to the worker and the higher authority for violation of the rule.

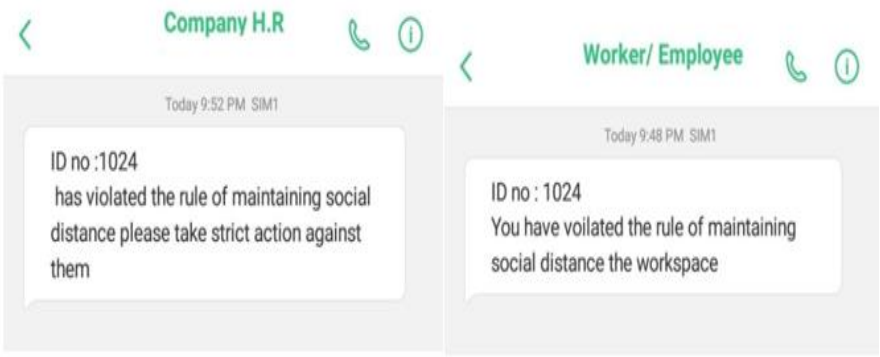

Fig. 5: SMS is sent to Higher Authority and Worker

IX. Conclusion

In this pandemic time, to control the number of deaths and spread of virus maintaining social distance is important .so, this device will be very useful. This can adapt to various surroundings and also alert the person to maintain distance in crowd. This small size and low power consuming device is best in tracing social distance which is now necessary for safer interaction in workplace. The device is very useful for every individual now and in future to protect them self from this covid situation or from any flues/virus in future days. For social distancing this will be the best device with high accuracy for future.

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AI Pandemic Vision

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Abstract

Now a day's all the peoples in the world are facing problems regarding COVID-19. COVID-19 virus spreads primarily droplets generated when an infected person coughs sneezes or speaks. To overcome this issue, most countries have laws which mandate the use of mask so, it is very important for peoples understand the risk of common symptoms like fever, dry cough, tiredness. Peoples who do not wear masks are at greatest risk of suffering from disease. In India, there is a rule that mask is compulsory for peoples otherwise fine will be charged so, to mandate this we have developed a system which is based on Tensor Flow & Open CV in the field of Computer Vision. System is able to detect whether a person is wearing mask or not, next it will detect the temperature, and finally medical conditions. If anyone of them is present with no mask then system will precisely observe the situation and declare as no mask. The system can be implemented in malls, offices, marts, school and college that only allows people to enter the premises only after detecting mask. It can help the peoples to reduce the disease and save the human life.

I. Introduction

The global spread of the COVID-19 pandemic has caused significant losses. The most critical issues, medical and healthcare departments are facing is the fact that the COVID-19 was discovered promptly. Therefore, it is of great importance to check the mask and temperature to reduce the number of infected people. Peoples wearing mask increase their possibility of survival appreciably over non-mask wearers. According to the law, every person must wear a mask while they are in public place, but many ignored to wear mask. The policeman tried to control this problem manually but it is inadequate for the real state of affairs. The amount of deaths has been expanding every day, especially in developing countries mask is the main safety equipment.

The infrared thermometer is used to measure human temperature without any human contact with a person's skin. Infrared thermometer work based on a phenomenon called black body radiation. If any person to have measured temperature more than 38-degree C then, that person is unhealthy and he want to check for COVID-19. It is difficult to know the people's medical conditions like, whether a person is infected by the COVID-19, Quarantine details of that person, and vaccine details. By using Realtime data analysis and face recognition, we can know the person medical conditions. This report aims about precautions should be taken by person to reduce the disease. Our model is based on finding the mask, temperature and verifying the person medical conditions. If they are not using any mask it can identity easily and taking actions based on it.

II. Methodology

1. AI PANDEMIC VISION is able to differentiating the face mask in real time video stream by using Raspberry pi and Camera module. In this section we are going to use OpenCV python library to do real-time face detection from a live stream via our camera module. Then by using TensorFlow python libraries, it will train the deep neural network to differentiate the face mask.
2. We are using Non-contact IR temperature sensor to get the temperature readings of that person. With the MLX90614 python library now we can use non-contact IR temperature sensor with our raspberry pi.
3. The firebase Realtime Database lets us to upload the details of the person from anywhere in the world with help of internet connectivity. In firebase application we are uploading details like Photo, Name, Age COVID-19 details, Quarantine details and Vaccine details and the details will be stored in the cloud storage.
4. By comparing Real time data analysis and face recognition technology, the Raspberry pi will predict person medical condition like COVID-19 details, Quarantine details and Vaccine details.

III. Litrature Survey

Akanksha Soni and et al [1] has proposed a technology for developing Helmet rule violation detection in this paper. Riders who do not wear helmets are at greatest risk of suffering a traumatic brain injury; if they met with an accident without protection, the head is susceptible to a harrowing impact in an accident. In India, there is a rule that mandate helmet only for riders but not even for passengers. Anyone may suffer from accident or head injuries whom are using motorcycle without helmet. It should be mandatory for everyone to wear helmet; even for children. So, to mandate this we have developed a system which is based on Tensor Flow & Keras in the field of Computer Vision. System is able to detect whether motorcyclists wear helmet or not even at real time. If anyone of them is present with no helmet then system will precisely observe the situation and declare the rule violations. The system can be implemented in malls, offices, marts, school and college that only allows people to enter the premises only after detecting helmet with automated barrier. The observer, which we would like to propose the solutions for Face mask detection by using face

detection technology.

Wang and et al [2] has proposed this paper. X-Ray examination is considered to be the most commonly used X-Ray examination method because of its low cost, wide range of application, and fast speed. It plays a pivotal role in COVID-19 patient screening and disease detection. By using this we prepare Real time data verification of particular person data, by comparing we can predict person is positive or negative.

Ning Bin and et al [3] has proposed development of infrared temperature measurement is helpful to non- contact, quickly and accurately measuring moving and high temperature objects. We develop an Infrared thermometer for high temperature object under the premise of high measuring accuracy and low cost. A quick and accurate measurement of the surface temperature for an object was realized.

IV. Block Diagram of System

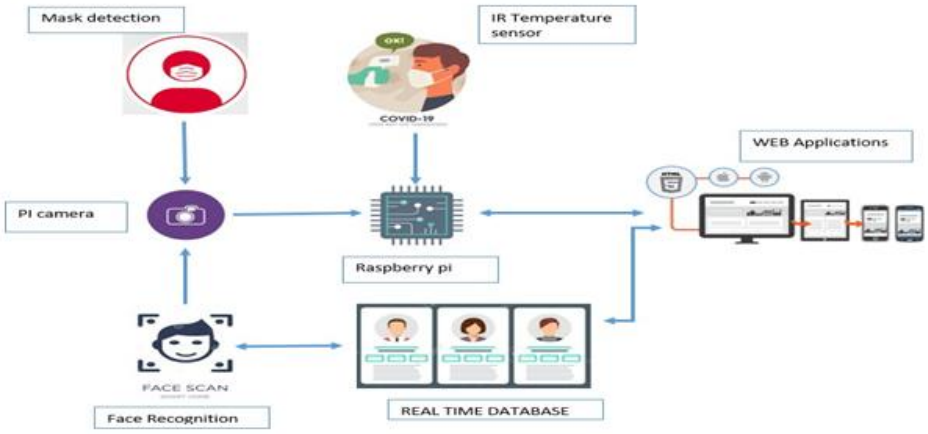

Fig.1: Block Diagram

Description

Figure 1 shows Primarily Face Recognition technology tries to detect if a person is wearing a mask or not. Once, the System has detected the mask it will find the best spot on the forehead of the person to take temperature. if temperature is more than limit it will send the alert message. In firebase web application we are applying person medical condition details like COVID-19 details, Quarantine details and Vaccine details. The web application will compare that person with real time database and face recognition. it will help to predict the person medical condition.

V. Hardware and Software Descriptions

1. Hardware Description

Raspberry pi: As figure 2 shows the Raspberry Pi 3 Model B is microcomputer with a 1.2 GHz 64-bit quad core processor, onboard 802.11n, and Wi-Fi, Bluetooth and

USB boot capabilities. it as faster 1.4 GHz processor and a three-times faster gigabit Ethernet (throughput limited to ca. 300 Mbit/s by the internal USB 2.0 connection) or 2.4 / 5 GHz dual-band 802.11ac Wi-Fi (100 Mbit/s). It is the main controller of the project for both IoT and brain wave sensor.

Fig. 3: Raspberry pi

Raspberry pi camera module: As figure 3 shows Raspberry pi camera module is a portable light weight camera that supports Raspberry Pi. It communicates with Pi using the MIPI camera serial interface protocol. It is normally used in image processing, machine learning or in surveillance projects.

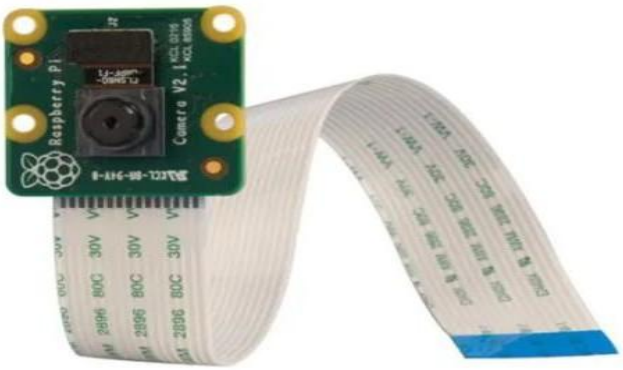

Fig. 3: Camera module

Non-Contact infrared sensor: As figure 4 shows Non-contact infrared sensor is highly developed sensor which have wide-spread application in industrial processing and research. This configuration facilitates temperature measurement from a distance without contact with the object to be measured.

Fig. 4: Non-Contact infrared sensor

2. Software Description

Raspbian OS: As figure 5 shows Raspbian is a free operating system based on Debian (the universal os) optimized for the Raspberry Pi hardware. An operating system is the set of basic programs and utilities that make your Raspberry Pi run, it as in-built IDE packages like python, c/c++, java and pearl. Here we are using python and Matlab programming language.

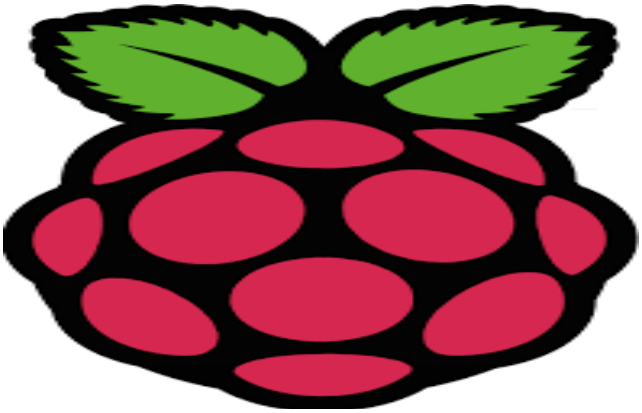

Fig. 5: Raspbian OS

a. Firebase Web Application: As figure 6 shows Firebase Web Application of software development kits (SDKs), which allow mobile and web developers to access cloud functionality simply, securely, and reliably. Firebase evolved to become a platform that allows mobile and web front-end developers to develop complete applications without the need for back-end servers.

Fig. 6: Firebase Web Application

VI. Hardware and Software Implementation

A. Model Design and Anaysis

Fig. 7: Top View

Figure 7 shows the top view of model it consist of circuit connection to camera module, temperature sensor, button, buzzer and leds. Buzzer is connected to GPIO pin 21, red led is connected to GPIO pin 12, green led is connected to GPIO pin 15, button is connected to GPIO pin 17.

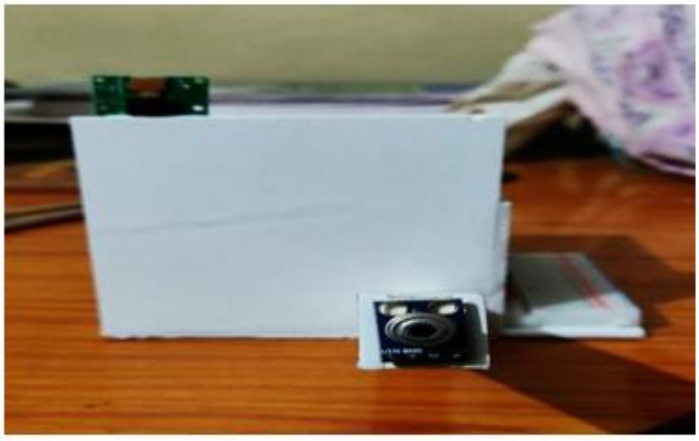

Fig. 8: Front View

Figure 8 shows the Front view of the model, it consists of camera module and non contact temperature sensor which are physically connected to the raspberry pi and it is covered by thick sheets. According to accurate measurements the model is designed. Four square planes of length =10cm, thickness =0.3cm and height =10cm.

B. Circuit Design and Interface

Raspberry pi with Camera module: In figure 9 easily we can connect our raspberry pi with camera module while compared to the other Processor. Because, Raspberry pi board has CSI (Camera Serial Interface) interface to which we can attach Pi Camera module directly. This Pi Camera can attach to Raspberry pi's CSI port using 15-pin ribbon cable.

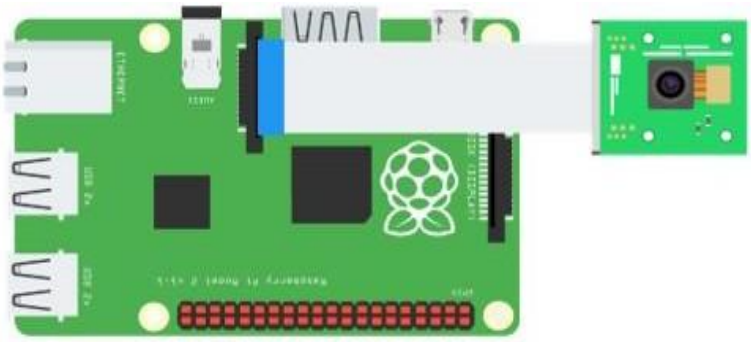

Fig. 9: Camera Module Interface

Raspberry pi with Non-contact Temperature Sensor: In figure 10 we are connecting our raspberry pi with Non-contact Temperature sensor by using GPIO pins. The communication between the sensor and Raspberry pi by using I2C. It enables the GPIO pin to communicate between the sensors. This is really useful when you want to have more than one microcontroller logging data to a single memory card or displaying text to a single LCD.

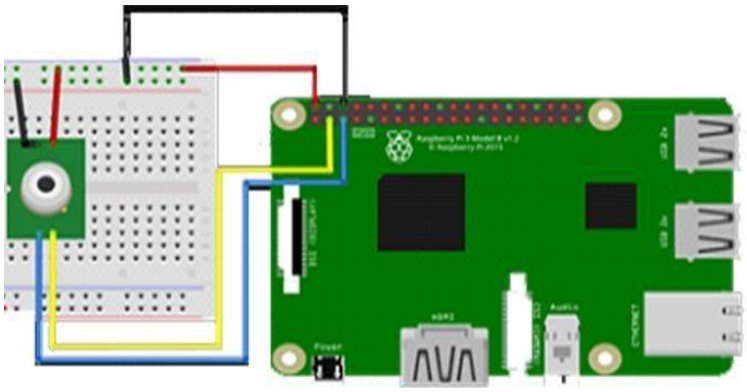

Fig. 10: Non-contact temperature sensor interface

Algorithm

Step 1: - Start
Step 2: - Face Mask Recognition If (Face Mask Found)
Return Step 4
Else
Return Step 3
Step 3: - Face Mask Not Found
Repeat Step 2

Step 4: - Face Mask Found
Step 5: - Temperature Measurement
If (Ambient Temperature<=Object Temperature)
Return Step 7
Else

Return Step 6

Step 6: - Object Temperature is higher than Ambient Temperature Repeat Step 5
Step 7: - Object Temperature is measured.
Step 8: - Comparing and Predicting the Details by using Real time Data Analysis.
Step 9: - Displaying Person Details Like- Covid-19 Details, Quarantine Details, Vaccine Details.
Step 10: -Exit/End.

b. Flow Chart

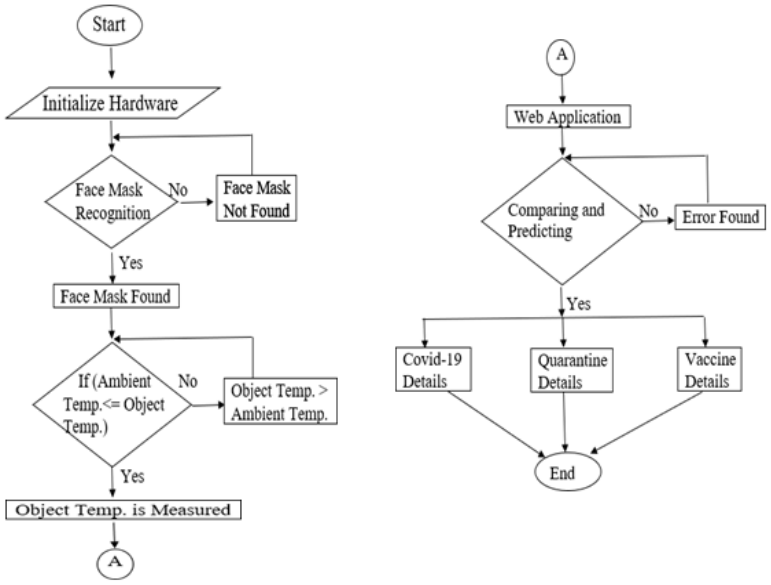

Fig.11: Flow Chart

VII. Results and Conclusion

1. Results

- The main intention of implementing this project is to reduce the risk of COVID-19
- Our model is able to provide accurate position of a person face with mask and without mask.
- Temperature of that person will be collected without any contact with human is possible.
- Automatically it will verify the person medical condition by using real time data analysis.

2. Outputs

a. Non-contact Temperature sensor

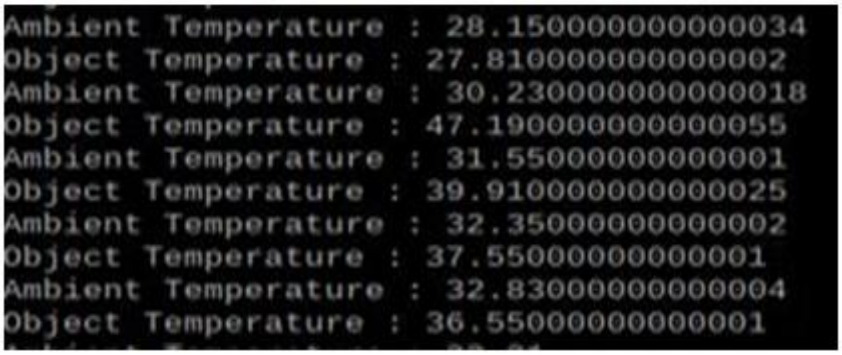

Fig. 12: Temperature Sensor output

The above figure 12 shows the Ambient Temperature and Object Temperature. Ambient Temperature is nothing but surrounding temperature and Object Temperature is nothing but person temperature.

1. Face Mask Identification

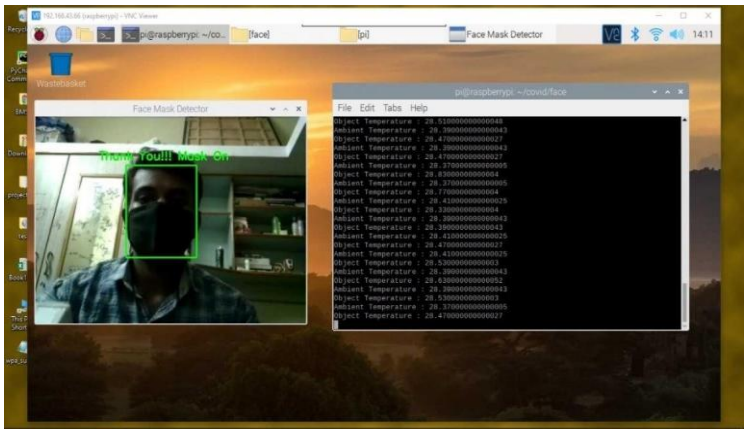

Fig. 13: Face mask found

The above image in fig 13 shows detection of mask and it allows people who wears mask by Real time data analysis, face recognition technology and the Raspberry pi will predict person medical condition like COVID-19 details, Quarantine details and Vaccine details.

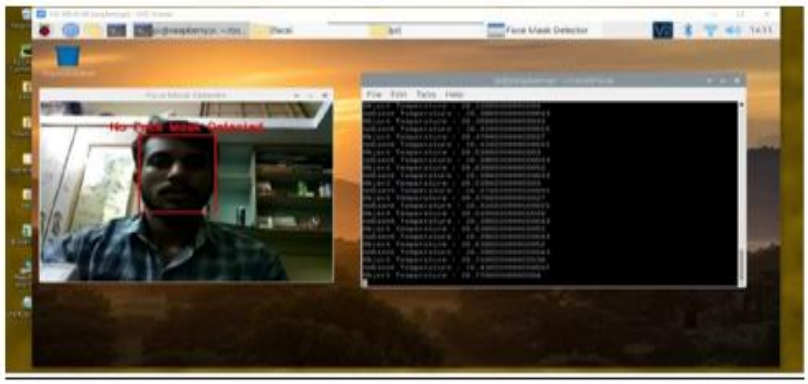

Fig. 14: Face mask not found

The above image in fig 14 shows that mask is not detected and People who do not wear masks are at greatest risk of suffering from disease. If anyone of them is present with no mask, then system will precisely observe the situation and declare the rule violations as shown above and it appeal everyone to wear mask and be safe and healthy.

Table. 1: Test case for face mask and Temperature

S/L No.	Activity	Expected O/P Message	Actual O/P Message
1.	Face without mask	No face mask	Face with mask
2.	Face with mask	Face with mask	Face with mask
3.	Temperature> 38 degree	Fever	No fever
4.	Temperature <38 degree	No fever	No fever

1. Firebase Application:

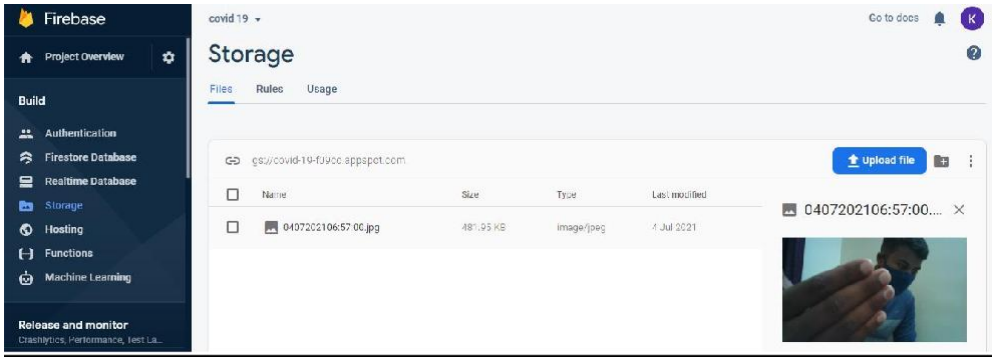

Fig. 15: Firebase Application Interface

The figure 15 shows the image in firebase application is sent from raspberry pi camera, when temperature of the Object is above 40 Degree.

Table. 2: Test case for web application detection

S/L No.	Activity	Expected O/P Message	Actual O/P Message
1.	Temperature> 38 degree	Alert	No alert
2.	Temperature< 38 degree	No alert	No alert

2. Conclusion

COVID-19 spreads between people who are in close contact. By using this model, we can solve the spreading of virus. If a person forgot to apply the mask, it will identify that person. The peoples can know their temperature so, it can easily identify the temperature without any contact. It is difficult to know the people's medical conditions like, whether a person is infected by the COVID-19, Quarantine details of that person, and vaccine details. By using Real-time data analysis and face recognition, we can know the person medical conditions.

This paper aims about precautions should be taken by person to reduce the disease. Our model is based on finding the mask, temperature and verifying the person medical conditions. If they are not using any mask it can identity easily and taking actions based on it.

3. Future Enhancements

There are further enhancements that can be added to the prototype for further development: -

- It can be further enhanced with a face mask signal-to-speech feature for additional support.
- The prototype can be introduced with GSM for person location identification.
- It can also be enhanced with message alert system.

VIII. Applications and Advantages

A. Applications

1. **It can be used by the malls, offices, marts, schools and colleges:** At the entrance of the gate the model can be used so, it does not allow a person to inside without face mask. If face mask is not found it will send an alert message until mask is found.

2. **It can be used as data base for finding the escaped person from hospitals:** If any person is escaped from the hospitals by using fire base web application can find that person from previously stored data.
3. **It can be used to detect whether the person took vaccine or not:** By using Real time data analysis we can check whether a person took vaccine or not and it will update person vaccine details in the application.

4. **It can be able to detect other diseases based on the data stored by the user:** If any new diseases are spreading then by using this data, we can identify that person based on real time data analysis.

B. Advantages

1. **Helps in not spreading the diseases: -** By using this technology, it can help not spreading the diseases because it will identify that without mask at early stage only.

2. **Automatically checks the temperature of body without any contact:** It can check the person temperature without contact only. If temperature is more than 40 degree, it will send an alert message to the web application.

3. **Low cost:** Model is low cost compared to other controllers because it is cheap and easy to install.

4. **Fast response to the peoples:** Easily it can identify the person mask and it will be updated to that person. Due to fast response it can identify more peoples at a time.

5. **Reduces the human risk:** It will reduce the risk of human during COVID-19 pandemic and it reduces the man power.

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Mileage Telematics

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Abstract

In today's digital world, surveillance systems are needed to track environmental changes in order to better understand current conditions and predict them. It's the same with gasoline tanks in cars. The actual record of completed fuel and fuel consumption on bicycles is not maintained. It causes financial losses. When people are traveling on highways or on hills, they do not know how long their car will be moving. We include counting miles per bike acquisition rate using IoT for this project. The proposed system is built on a Raspberry Pi computer that captures the details of the ultrasonic fuel tank sensor and analyzes this sensor data using telematics technology. This paper outlines the implementation of such a monitoring system based on IoT (IoT) technology to protect fuel from theft and to develop better savings strategies.

Keywords*:* *Internet of Things, Raspberry Pi, Ultrasonic sensor, Firebase, Flutter, OLED Display, Telematics, Mileage.*

I. Introduction

In everyday Life, we may have experienced tampering of the value count of the fuel level in the vehicle tank. Currently, most of the vehicles use traditional indicators that indicate the amount of fuel in the fuel tank with a symbolic indicator indicating E (empty), H (half), and F (full) indicators. As the

technologies evolve daily, many former technologies are updated to provide a solution to the problem. Significantly, the Internet of Things (IoT) can help control and monitor fuel consumption and fuel level in the tank. Internet of Things (IoT) technology allows for a variety of objects to be present in the area and to be connected via wired or wireless connections and different coping systems.

In this paper, we propose to measure the fuel level using an ultrasonic sensor. This sensor can provide accurate measurements, and the ultrasonic sensor uses sound waves to control the speed of moisture in the tank. Ultrasonic Sensors and Internet of Things (IoT) are connected to computer infrastructure (or) big data and mobile user device. Allows the user to get the exact amount of fuel on the user's mobile phone instantly. Fuel safety and security are of paramount importance. In recent years, rising demand for oil and energy costs is increasing - it is time to get the nearest petrol pumps. The system not only saves time but also saves space used for unnecessary data.

II. Existing System

The existing system in the vehicle is the traditional meter, and that meter does not show the correct fuel level in the tank. Due to this, cheating happens in the petrol pump, and the customer is not happy and unsatisfied. The measurement techniques of the existing traditional type and microcontroller are far from straightforward and cost-effective. We don't know the actual fuel level, so we neglect to fill the tank. The problem associated with this equipment is analyzing the amount of fuel left, and the distance traveled. Currently, most cars show the amount of liquid in the fuel tank with the help of other types of indicators showing indicators E (empty), H (half), and F (full). Today in this digitized world, if a digital system replaces the analog fuel indicators in the vehicles, then it will help us to know the exact amount of fuel available in the tank. Currently, a system to identify fuel for most vehicles is analog and does not show the actual level of fuel present in the tank. Therefore a two-wheeler digital display system is being considered in this project to solve the construction of a two- wheeler digital display system, which reflects the exact amount of fuel per liter.

III. Related Work

In proposed system to measure the fuel level of a vehicle tank, an Ultrasonic sensor is interconnected Internet of things (IoT). In proposed concept, data taken from the Internet of Things (IoT) sensor, digital data values are integrated into cloud computing (Firebase), to further process data and view (or) send data directly to mobile user device (Flutter) . The Internet of Things (IoT) sensors are less expensive compared to other devices on the market. The user can get real-time input directly on his mobile set. This app uses smart fuel theft detection with GPS tracking system. We are via the Raspberry pi microprocessor, the vehicle's real- time position and fuel content sent to the owner's mobile in case

of intrusion. The arrangements include an inbuilt GPS module in the Microprocessor, OLED, and a sensor. The inbuilt GPS module in the microprocessor transmits coordinates that convert data sent to user in text format. Therefore, this paper has proposed a program that helps the beneficiary in both cases. The fuel filling process corruption is fixed by using the fuel level gauge using a loading cell. Here, precision in size is made even for a milliliter for extra fuel monitoring the system's actual record. The system helps the owners of transportation network companies keep a particular form of their vehicles owned by their paid drivers. Without a standard measure, car theft can block Global positioning system (GPS) technology.

IV. Block Diagram

Presently, most motor vehicles display the fuel tank's amount with the help of a traditional meter. However, in daily life, we might have experienced Incorrect estimates of fuel level in the tank by the existing system. This problem is therefore being addressed in the work of developing a digital automotive digital display system that reflects the exact amount of fuel. The proposed method is the best alternative to fuel gauge strategies to help users with lower costs and requirements. Moreover, this system can overcome the existing system's demerits and give accurate values to the users. To detect the level of the tank ultrasonic sensor is used. The sensor is attached to the top of the fuel tank and measures the distance of the tank. The Raspberry pi converts the data on boarded from the sensor to liters. Thus, the fuel pump operator cannot provide false information about the flow of fuel in the vehicle's tank. If these lightweight products are manufactured to a larger scale, the cost of these devices could be greatly reduced. The Internet of Things (IoT) fuel gauge sensor of our device will get in hand when the user wants to measure fuel flow into the vehicle tank precisely.

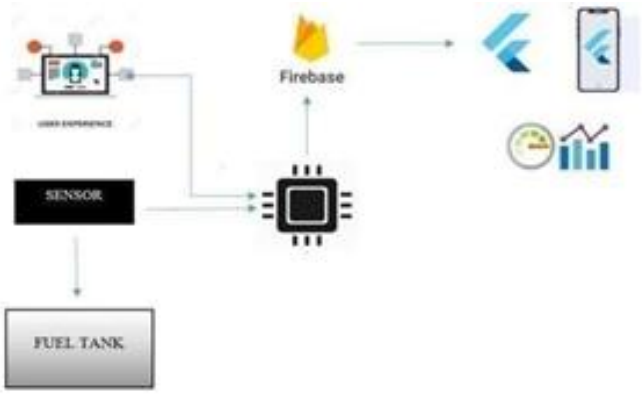

Fig.1: Block Diagram

V. Working and Results

Existing fuel gauges fail to accurately measure the amount of fuel in a vehicle's tank. The device will indicate the fuel level, and the accuracy will be

better than the existing systems and how much distance it can travel. Moreover, with the help of Android app, user can track the petrol station nearby when fuel goes to a particular level. The accuracy level of measurement is of percent 95 to 97.

Fig.2: OLED Display

Fig.3: Ultrasonic sensor connection

Fig.4: mobile app result

VI. Advantages and Applications

The system counts exact amount of fuel remaining and distance traveled can be easily known with digital fuel indicator. System navigates to the nearest fuel station. Cheating and fuel theft can be reduced. Prevent the accidents of the

vehicles. Risk free, less cost and easily portable. The system is designed for the vehicle safety and to assist towards the fuel station The Digital indication through Telematics can be installed for any automobile vehicle.

VII. Conclusion

Existing fuel gauges fail to accurately measure the amount of fuel in a car's tank. The device will indicate the fuel level, and the accuracy will be better than the existing systems and how much distance it can travel. Moreover, with the help of Android app, user can track the petrol station nearby when fuel goes to a particular level. The accuracy level of measurement is of percent 95 to 97. Thus, it is a portable system proposed to overcome theft of fuel from various petrol pumps during the filling of tanks. An efficient and reliable sensor technology is an ultrasonic distance sensing system with a microprocessor with a built-in correction action code using a fuel sensor signal according to measurements to provide the most accurate measurement of fuel level in the tank.

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Footpath Accident Detection and Alerting System

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Abstract

This project is mainly based on accident detection system on roadside when no people are present on that particular area or place. Mainly accident happen due to improper driving by the driver, when over speed, alcohol consumption and many more similar aspects were detected.

This idea basically works when a vehicle hits to the footpath, the vibration sensor detects the signal and sends to the registered receivers near to the accident zone, the system sends a message prompt that vehicle is met with an accident in that particular region or area with the help of google maps. In this approach, Arduino Mega, GSM transmitter and GPS System to send the signal to the receiver end which gets this information to the mobile via message, that message includes accident location. By clicking on to the link it will redirect in to the google map and receiver will get exact co-ordinates or location and comes to the spot to help the person who met with an accident.

Keywords: GSM, GPS, Footpath, Vibration Sensor (SW-420), Arduino Mega (ATmega2560), Piezoelectric, Transmitter (Tx), Receiver (Rx), Arduino IDE.

I. Introduction

In present days the rate of accidents can be increased rapidly. Due to increase in the population the usage of vehicles like cars, bikes are increased, because of this reason the accidents can be happened due to over speed. People are going under risk because of their over speed, due to unavailability of advanced techniques, the rate of accidents can't be decreased. To reduce the accident rate in the country this project introduces, an optimum solution. Automatic alert system for vehicle accidents is introduced, the main objective is to control the accidents by sending an alert message

to the registered mobile using wireless communications techniques. When an accident occurs at a city, the message is sent to the registered mobile through GSM module in less time. Arduino is the heart of the system which helps in transferring the message to different devices in the system. Vibration sensor will be activated when the accident occurs and the information is transferred to the registered number through GSM module. GPS system will help in finding the location of the accident spot [1].

II. Objectives

The main aim of the project is to:

- The vibration sensor detects the vibration and transmits the signal to Arduino Mega for further processing.
- The GPS system help in getting the accident location place and sends this information to the nearest receiver.
- The GSM transmitter sends signal to the nearest receiver indicating that accident has been taken place.

III. Problem Statement

Mainly accident happens due to improper driving by the driver, many vehicles are hit to the footpath in drunk and drive case, over speed. By implementation, of this project we can able to identify the accident spot or location immediately with the help of vibration sensor.

Many projects implemented this type of feature inside the vehicle itself, when the system is been hit with an accident it cannot be able to transmit the location. By implementing this type of project in our own way, the system cannot be damaged and if the system goes offline, it will transmit the last system online position to the receiver. Fig 1 shows the different ways of accident can happen.

Fig.1: Different ways of accident can happen [11]

IV. Structural Designing

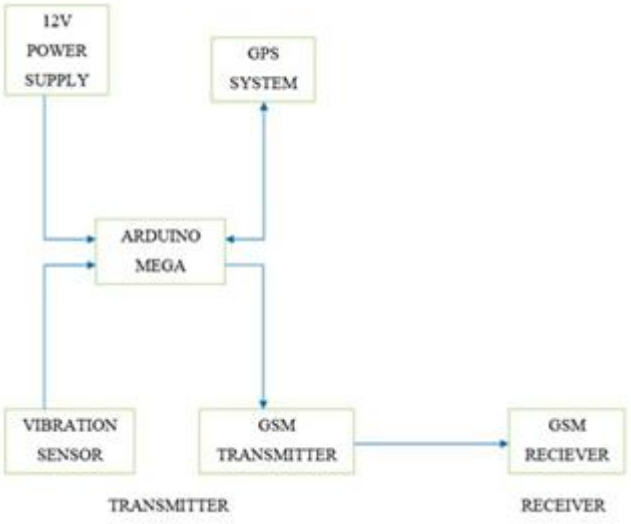

Fig. 2: Block diagram

In fig 2 shows that the transmitter part is installed on the footpath, for detection of accident when the vehicle is hit to the footpath the transmitter has a vibration sensor which detects vibration and sends this information to mega to get GPS coordinates, then GSM transmitter transmits message to the receivers, receivers are those persons who are nearer to the footpath like shopkeepers or response team members for immediate response when the vehicle is met with an accident.

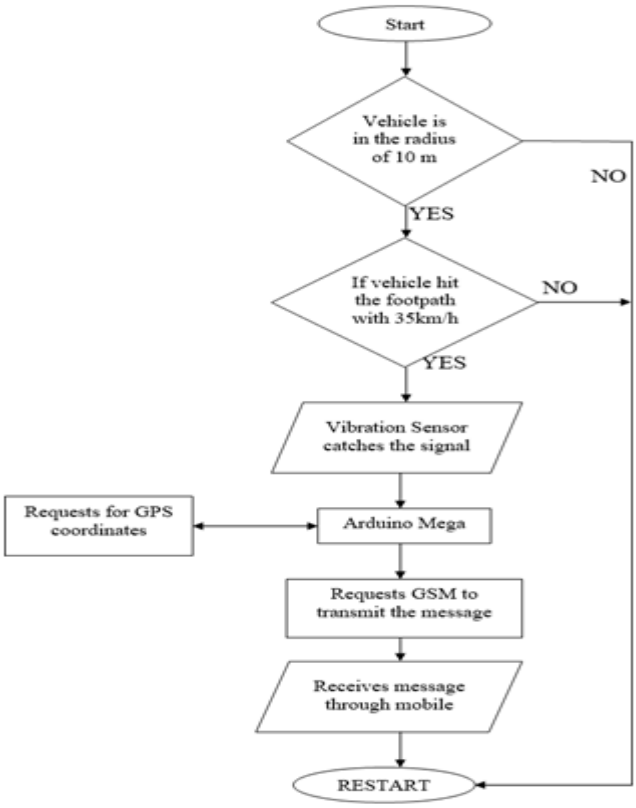

Fig. 3: Flowchart

- In start state device will be ON, if the vehicle is in the range of 10m to the footpath and the vehicle hits the footpath with 35km/hr velocity, the vibration sensor catches the signal.
- If this condition fails to satisfy, then the process gets terminated and moves to restart state.
- If vibration sensor catches the signal which is above 35km/hr and in the range of 10 meter, the vibration sensor will send the signal to the Arduino mega.
- The Arduino mega requests GPS system to send the coordinates of device location. Then, Arduino Mega receives the coordinates from GPS system and these coordinates are send to GSM transmitter.
- The GSM transmitter receives coordinates from Arduino mega and then GSM system sends the message to receiver, which includes the location of accident spot.
- At the receiver end the message will be received by mobile phone. This message will have the location of accident spot, which redirects in to the google map.
- After receiving the message, this process will be terminated and the sensor will be waiting for the next vibrations to receive, this state is restart state as shown in fig 3.

V. Hardware and Software Requirements

A. Hardware Requirements

1. **Arduino Mega:** 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 a AC-to-DC adapter or battery to get started. Specifications of Arduino Mega are ATmega2560 microcontroller which operates on 5V. Flash memory of 256 KB of which 8 KB is used by boot loader, SRAM of 8KB and EEPROM of 4KB with clock speed of 16MHz.

2. **Vibration Sensor:** Vibration sensor SW-420 which works similar to accelerometer, SW-420 has 3 pins they are VCC, Ground and I/O pin. VCC has an operating voltage of 5V, GND is connected to ground for neutralization purposes. I/O pin converts mechanical force caused by vibration or change in motion into electrical current by using piezoelectric effect. The pill of vibration sensor consists of a transducer and 10K potentiometer is installed on SW-420.

3. **GSM System:** SIM800A support Quad-band 850/900/1800/1900 MHz, it can transmit Voice, SMS, and data information with low power consumption. The SIM800A modem has a SIM800A GSM chip and RS232 interface while enables easy connection with the computer or laptop using the USB to the Serial connector

or to the microcontroller using the RS232 to TTL converter. Once you connect the SIM800A modem using the USB to RS232 connector, you need to find the correct COM port from the Device Manager of the USB to Serial Adapter. Then, open any terminal software and open a connection to that COM port at 9600 baudrate, which is the default baud rate of this modem. Once a serial connection is open through the computer or your microcontroller you can start sending the AT commands.

4. **GPS System:** Specifications of Neo 6M which is a Quad-band 850/900/1800/1900MHz, GPRS has a multi-slot class 12/10. Controlled via AT commands. Supply voltage is in the range of 3.4 to 4.4V. It is a ow power consumption and operates up to -40℃ to 85℃.

5. **12V Power Supply:** 12V power supplies (or 12V DC power supplies) are one of the most common power supplies in use today. Linear regulated 12V DC power supplies, regulate the output using a dissipative regulating circuit. They are extremely stable, have very low ripple.

6. **Mobile phone:** Mobile Phone must have either android or iOS operating system with internet connection of any specification of the device, which has message receiving ability to receive message transmitted from GSM module and pre-installed with google map app for the direction**.**

B. Software Requirements

7. **Arduino IDE:** The Arduino Integrated Development Environment (IDE) is a cross platform application that is written in the programming language Java. It is used to write and upload programs to Arduino compatible boards, but also, with the help of 3rd party cores, other vendor development boards. The Arduino IDE supports the languages C and C++ using special rules of code structuring. The Arduino IDE supplies a software library from the wiring project, which provides many common input and output procedures. User-written code only requires two basic functions, for starting the sketch and the main program loop, that are compiled and linked with a program stub main into an executable cyclic executive program with the GNU tool chain, also included with the IDE distribution. The Arduino IDE employs the program argued to convert the executable code into a text file in hexadecimal encoding that is loaded into the, Arduino board by a loader program in the board's firmware.

8. **Proteus 8 professional:** Proteus 8 Professional is software which can be used to draw schematics, PCB layout, and code and even simulate the schematic. It is developed by Labcenter Electronic Ltd. Many of the components in Proteus can be simulated. There are two options for simulating: Run simulator and advance frame by frame. The "Run simulator" option simulates the circuit in a normal speed. "Advance frame by frame" option advances to next frame and waits till you click this button for the next time. This can be useful for debugging digital circuits. You

can also simulate microcontrollers. The microcontrollers which can be simulated include PIC24, dsPIC33, 8051, Arduino, ARM7 based microcontrollers. You can download the compilers for Proteus or use different compiler and dump the hex files in the microcontroller in Proteus. You can even interact in real-time with the simulation using switches, resistors, LDRs, etc. There are even virtual voltmeter, ammeter, oscilloscope, logic analyzer.

VI. Result

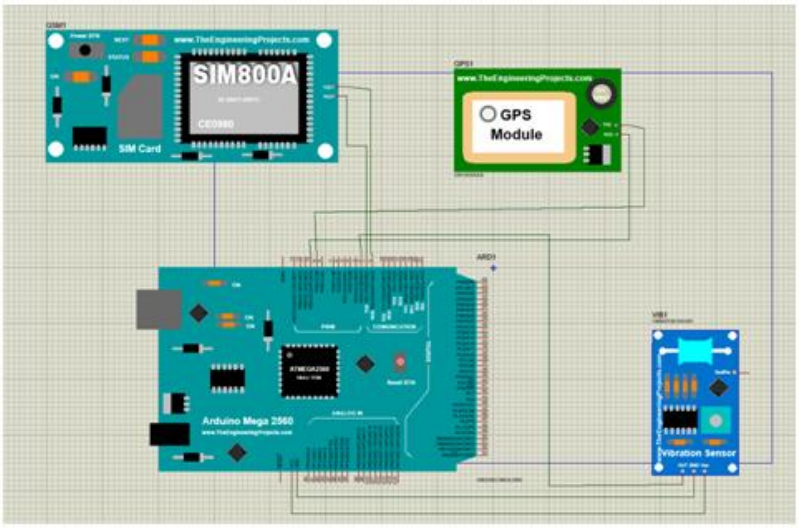

Fig. 4: Simulation of project

Figure 4 shows the simulation, which is done with help of proteus 8 professional with libraries of GPS-GSM, Arduino and vibration sensor. Connections of each module are shown in figure 5.1. The vibration sensor (SW-420) gets the input from its I/O pin. If the input is less than threshold value the process gets terminated and again waits for new input. If this new input is greater than the threshold value it sends signals to Arduino Mega, the output can be seen in figure 8**.**

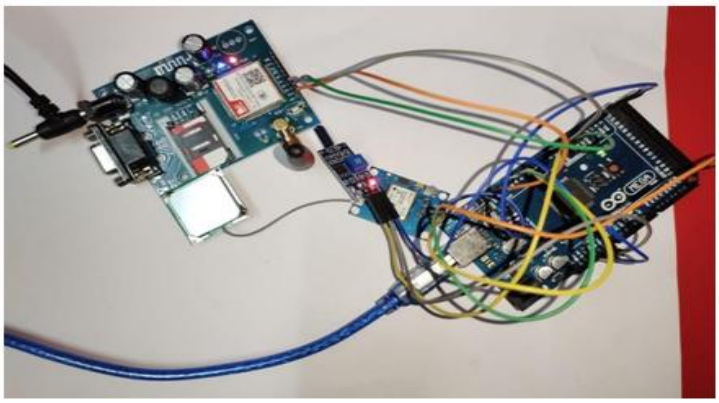

Fig.5: Hardware implementation

Pin 2 of Arduino Mega is connected to I/0 pin of SW-420 of vibration sensor. Tx0 and Rx0 pins of Arduino Mega are connected to Rx and Tx pins of SIM800A of GSM module respectively. Pin 9 and 10 of Arduino Mega are connected to Tx and Rx

pin of Neo 6M of GPS system. Ground pin of Vibration sensor, SIM800A and Neo-6M are connected to Ground pin of Arduino Mega. The VCC pin of Neo-6M is connected to 3.3V of Arduino Mega. VCC pin of SW-420 is connected to 5V of Arduino Mega. Both, Arduino mega and SIM800A is powered with 12V-2A of constant external power supply. This system is placed on the footpath with proper casing. SW-420 gets an input if the threshold value is greater than the velocity of 35 kmph. If the input is greater than the threshold value it sends the signal to Arduino mega. Arduino mega sends message with help of GSM system to the receiver that accident is occurred. If the input is less than the threshold value then this process is terminated and waits for the new input as shown in fig 5.

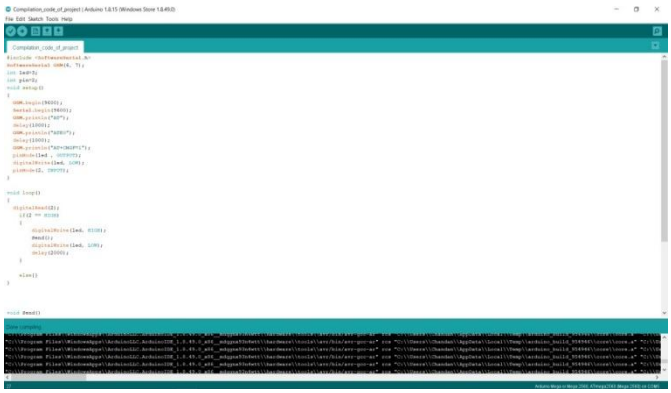

Fig. 6: Code is complied

Code is embedded into a microcontroller ATmega32 with the help of USB port. Code is written Arduino programming language and compiled in a software called Arduino IDE, Code has a header file of Software serial. In setup part digital and analog pins are set to HIGH or LOW state according to hardware implementation with baudrate of 9600. In loop part AT commands are used to get the coordinates from satellite with the help of Neo-6M, command like CMGS, CMGT, CMMS helps to transmit the message from SIM800A to receiver, the message is only transmitted when the input of vibrations sensor is greater than the threshold value, the message contains the information as shown in figure 7. Code is compiled with zero errors as shown in fig 6, then the same code is uploaded into Arduino Mega 2560 board, with COM port 5 is opened and contains program code of 4392 bytes.

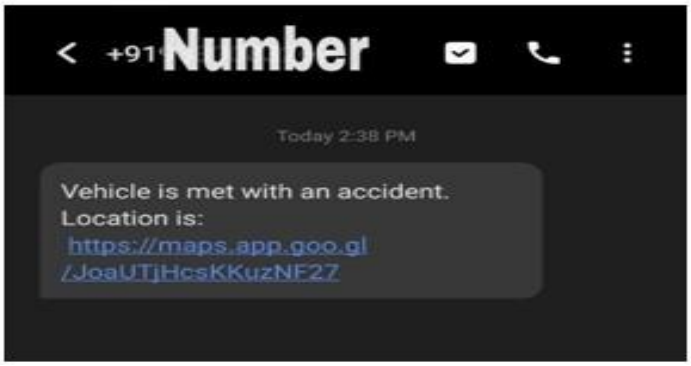

Fig. 7: Message delivered at receiver end

The receiver gets the message as shown in figure 7 which includes a message displaying that a vehicle is met with an accident and it also has the location of the accident spot, while clicking on the link it will redirect into google maps as shown in figure 8.

Fig. 8: Accident spot location

While clicking on the link obtained from message, the link opens like as shown in fig 8 on google map and has a direction to the accident spot.

VII. Future Scope

The proposed system deals with the detection of the accidents. But this can be extended by providing medication to the victims at the accident spot. By increasing the technologies, we can also avoid accidents by providing alerts systems to drivers like, if vehicle is overspeed to reduce the speed, vehicle is out of lane to get into lane, to keep minimum distance between two vehicles can stop the accidents up to some extent occurred due to vehicles.

VIII. Advantages

- It saves number of people lives.
- Reduces man power.
- Low power consumption.
- User friendly, eco-friendly.
- Easy to implement.

IX. Conclusion

The proposed system provides an excellent result concerned with preventing accident caused by drunk and drive and rash driving. The system also includes a special feature of accident detection system to prevent a loss of life mainly due to the delay in the emergency services. The proposed system provides efficient results when compared to the existing system and sustains even in case of failure of any one of the sensors.

X. Acknowledgement

We placed our gratitude to department of Electronics and Communication Engineering, SJC Institute of Technology, Chikaballapur supported to do this project.

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A Review on Wireless Stethoscope

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Abstract

Cardiovascular pathologies are the most common reasons behind the fatality across the globe. Most of the cardiovascular disorders are often diagnosed with the aid of the associated auditory cues of the corresponding activity. Hence development of a simple hardware for the detection of such cardiac problems is the need of the hour. One of the most significant tools used for diagnosis is stethoscope. Diagnosis such as respiratory and cardiovascular diseases, which is used to listen to acoustic signals for internal parts of human body. Stethoscope consists of three parts chest piece, connecting tube and ear piece, the chest piece and the connecting tube are known to aid the transmission of pathogens from person to person. To prevent this replace the connecting tube with a wireless communication system which will aid in the reduction of risk and allow further broadcasting of the signals to multi-users. In the first approach, we would be discussing about a wireless stethoscope which communicates via bluetooth. In this the heart sounds are transmitted wirelessly either to phone, laptop or to ear piece. The signals captured are processed and transmitted to a mobile device interfacing it with an application software for recording, listening and visual display of waveforms. Another approach was done by using different wireless transmission protocols here ZigBee was used. A microphone was used to pick up the audio signals. The output from the microphone pick up for processing and amplification which can be played with or without earphones. Heart sounds are processed, sampled, and sent wirelessly using the Zigbee module so that multiple doctors can listen to the body sounds. In the next approach, a wireless electronic stethoscope based on Radio Frequency as the wireless medium was used for transmitting information. The heart sounds are captured by a condenser microphone which was embedded in the diaphragm's head that converts sound signals to electric signals which can be visualized. The obtained electric signals are preamplified and filtered to remove unwanted sounds or variations. These signals are then transmitted wirelessly to the receiver using an RF (radio frequency) module.

There are many ways of implementing RF for wireless communication. There are IC chips available in the market directly for wireless transmission and receiving of audio signals, these chips can be used for heart sounds as well, just by adding some filters and by using sensitive transducers as the frequency and amplitude of the heart sounds are very low. Many ICs like NS73M as FM transmitting module and RDA5807M, TEA5767, SI4703/05, etc can be used as FM receiving module. Using good stereo amplifiers for amplifying the signals is also very helpful to listen to the audio signals via headphones or speakers.

I. Introduction

Auscultation refers to the listening of heart sound in human body and the instrument used for such purpose is known as a stethoscope. It is one of the basic diagnostic equipment. Cardiac auscultation using stethoscope is considered to be one of the most important and the earliest diagnosing procedures for the confirmation of pathologies of heart structure and assessing the current cardiac state.

One of the principal causes of human death all over the world is cardiovascular disease. Over all the deaths in the world, 25% of deaths are caused because of heart diseases i.e. one out of four deaths. Electrocardiogram (ECG), is one of the most popular, low-cost methods for the diagnoses of heart associated issues, but it has its own restrictions while detecting structural abnormalities or any defects in heart valves. A physiognomy of the heart auscultation is one of the most common techniques for revealing cardiac illness with the aid of heart sounds. The recent advancement in the electronic technology has developed an increasing rage for the implementation of a digital stethoscope. Digital stethoscopes are of different types based on the communication protocols to replace its analog part. And this stethoscope provides better sound quality with minimum noise, and also provides data for visualization and storage which is one of the most important aspect in this generation. Some electronic stethoscope comes with connecting cables between chest-piece and the ear- piece if the physician wants the experience of a traditional or conventional stethoscope.

The chestpiece of the stethoscope is made up of bell and diaphragm which is connected to the flexible tube called the connecting tube followed with the connection to metal earpieces to listen to the heart sounds. One of the most significant disadvantage associated with acoustic stethoscopes is that the audio level is exceptionally low causing short comes in the analysis of heart sounds, which causes lack of quantitative analysis techniques. Major amount of heart sounds or anybody sounds are of low frequency, which cannot be notable by doctors as the audible range for human beings is 20 Hz – 20 kHz, and hence the auscultation can be easily affected by the subjectivity of the doctor and measuring environment.

The chest piece is the most important part for capturing the sounds. The diaphragm of the chest piece is responsible for acquiring higher frequency sounds and the bell is used for acquiring lower frequency sounds. Placing the chest piece on skin

results in amplified vibrations in the body, these vibrations travels through the tubes and then transmitting the heart sounds that can be heard from earpieces.

The stethoscope is a medical device for listening to heart, lung and other body sounds. The most frequently used types are the acoustic and electronic based stethoscopes. Acoustic stethoscopes are known for their robustness and ergonomics; however, their attenuation of sound is proportional to their frequency occurrence of maxima and minima response at specific frequencies. With acoustic stethoscopes, intensities of captured sounds and murmurs are usually low, making it possible for signal intensities to be well below the threshold of hearing, leading to poor diagnostic decisions. Typically, signals that are picked from the body for analysis include that of the heart, lungs, and bowels. Electronic stethoscopes on the other hand are able to provide amplification, collect, store and transmit the signals in digital format. Many forms of electronic stethoscopes are developed and proposed as well to replace the traditional or conventional acoustic stethoscope. The basic goal of this improvement is to minimize interference, provide sound resolution, data visualization and storage. Although electronic stethoscopes have improved data quality, they still conform to the look and feel of acoustic stethoscopes with connecting tubes existing between the chest-piece and ear-piece. It has however been shown that the connecting tube is capable of serving as a medium for transmission of pathogens from one patient to another or from a physician to a patient. Other constraints of current electronic stethoscopes are restricted mobility of users due to the length of the connecting cable and limitation to single user. Introducing wireless technology in the design can minimize the spread of pathogens and facilitate sharing of details heard by a single user to members of a medical team. Furthermore, all the existing stethoscopes are limited to single users, which implies that details heard by one user within a specific period of examination cannot be confirmed by other members in a team unless the data is directly accessed from a third party device such as a computer. With the wireless design, the signal captured from a patient can be broadcast to multiple users of the device within operational range with restricted access For example, wireless based electronics stethoscopes such as Littman 3200 and other Bluetooth enabled devices still comes equipped with connecting tubes between the chest-piece and the head-piece with the chest-piece having a wireless module to transmit the signal to receivers such as computers for recording and listening to the sounds. To facilitate digital recording and analysis of heart sounds, a variety of stethoscope designs that support mobile application solutions have been developed. 3M United States20 in 2009 introduced a wireless stethoscope design (Littmann model 3200 and 3100) that uses a class 2 Bluetooth communication protocol to transmit body sounds captured by stethoscope chest-piece to computer for storage and review opportunities by multiple clinicians. Although the device is capable of providing desirable amplification of body sounds, suppression of background noise and wireless connectivity, the design still has connecting tubes between the chest-piece and the ear-piece. To eliminate the connecting tubes in stethoscopes, Think labs One21 introduced a digital stethoscope design that makes use of 3.5mm audio jack terminal that is integrated on the chest-piece to allow for cable connection to a mobile device as well as a headphone. Captured body sounds can simultaneously be transmitted through cable to the

recording mobile device and connected headphones for monitoring patients while recording. Demiao22 has also explored a mobile-based wireless digital stethoscope design that uses micro-electro-mechanical-system (MEMS) transducer system for capturing heart sounds. To eliminate the connecting tubes in stethoscopes. In attempts to minimize the use of hardware, other mobile based stethoscope solutions that do not require hardware stethoscopes have also been developed. These solutions depend on the sensitive microphone of the mobile device for capturing signals at the points of interest on the subject for recording and visualization of the waveform, and playback of the sound. Although this fully eliminates all external hardware, a possible drawback is the possibility of capturing broad range of noise sources during auscultation and also, the difficulty in getting correct orientation and physical placement on the subject.

Wireless electronic stethoscopes which are based on Zigbee and Bluetooth technology makes better choice for implementation when compared to others wireless communication protocols. However ZigBee and Bluetooth provides better sound quality but this problem is almost eliminated in RF based wireless stethoscope by using better front end circuitry such as using pre-amplifier with better gain, filters with cutoff frequencies and power amplifier with enhanced gains to achieve the noise free results as proposed by ZigBee and Bluetooth.

The two major problems of traditional stethoscope are they have low sound level and the analysis is for very short period of time. These limitations such as lack of amplification of heart sound, variability of gain, storage of the analog data for further analysis etc, can be overcomed by using the above mentioned techniques.

II. Background

Auscultated sounds are waves generated by the flow of blood and also by heartbeat, which are caused by opening and closing of bicuspid, tricuspid, pulmonary valves. Viewing Fig 1 we can classify heart sounds as S1 and S2 that is systole and diastole respectively.

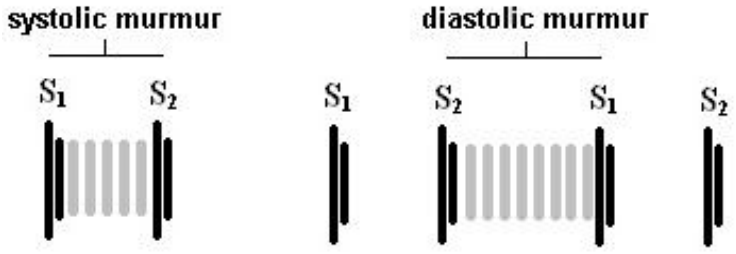

Fig. 1: Normal Heart Sound

There are many reasons for the valves to not function properly, such as due to less blood flow or due to leakage caused because the valve doesn't close properly, these cause murmurs. Murmurs can be systolic or diastolic as shown in Fig. 2. Murmurs and heartbeats have band limit frequencies between 100-1000 Hz and have a

relative low intensity hence making it difficult to perceive, therefore making it difficult to understand.

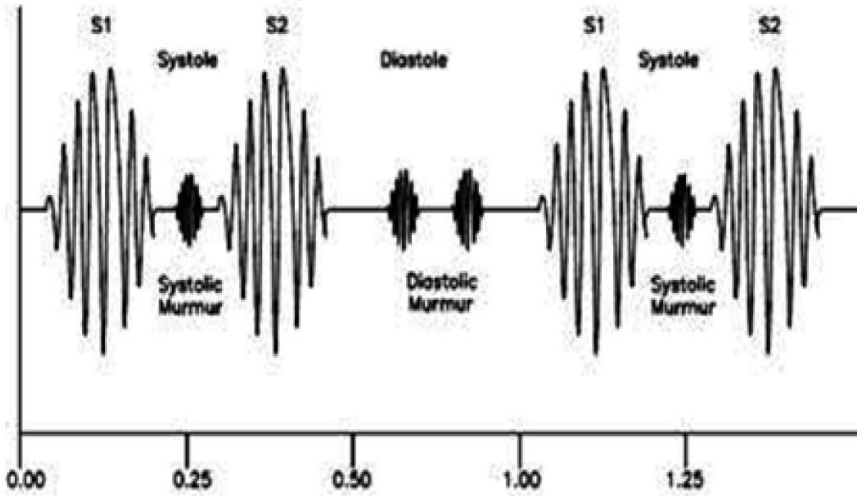

Fig. 2: Murmurs sound

A traditional stethoscope generally has two flanks the bell and diaphragm, which are used to perceive different frequency sounds as body sounds vary with the location from which it has been perceived. One uses 20 – 500 Hz range for hearing heart sound and pumping of blood vessels and other uses 200–1000 Hz frequency range to listening respiratory signals.

Considering such conditions filters are designed accordingly, that is low pass filters for heart sounds and band pass filters for other body sounds. This is done to attenuate unwanted signals and to enhance the quality of the required body sounds.

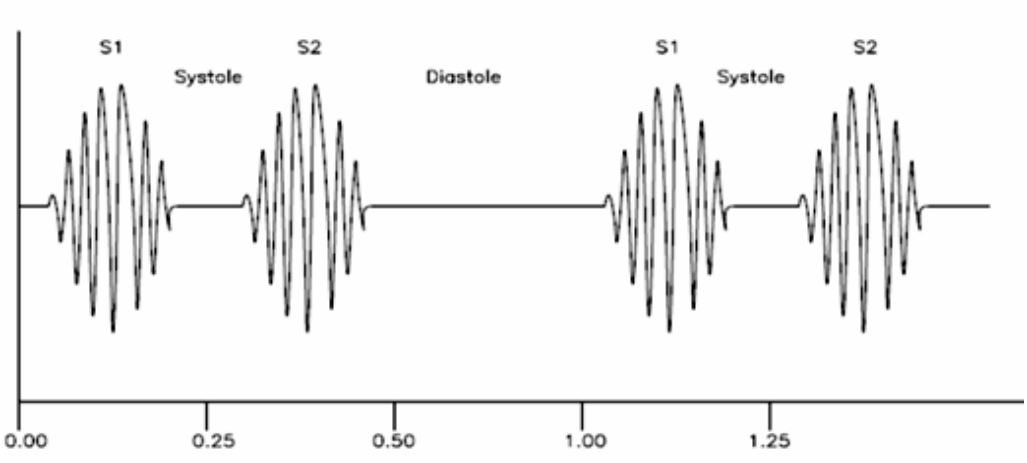

Fig.3: Phonocardiogram of Heart Sounds

S1 and S2 which are the most prominent sounds can be heard using a stethoscope. S1 is caused due to the closure of atrio-ventricular valves and S2 is caused due to the closure of semilunar valves. These valves shut to prevent the backflow of the blood. Atrio-ventricular valves prevent the backflow of blood for

ventricles to auricles and semilunar valves prevent the backflow of blood from pulmonary vessels to ventricles. A normal heart will produce two heart sounds, S1 and S2 as shown in figure 1. S1 which signifies the start of systole. It produces S3 and S4 as well but these sounds are not heard and are seen only in the phonocardiogram. S2 signifies the end of systole or contraction and the beginning of diastole or relaxation. The sound is created when the aortic and pulmonic valves close as blood exits the heart to the body and lungs. S3 and S4 can be caused due to murmurs as well and they are very prominent in some kids and aged people. S3 and S4 can be a symptom of heart failure as well.

A. History of Stethoscope

Rene Laennec, is a French physician who invented the first ever stethoscope in 1816. Initially a stethoscope consists of a wooden tube with trumpet-like ends, which further got improvised to get divided into two for listening to it very keenly than the previous module which can be heard only using one ear. Then the wooden tubes were replaced with flexible tubes and interactive designs. This design remained unchanged for about one and a half century. In 2004 Chien *et al.* proposed an idea for transmitting the heart sounds wirelessly by using Bluetooth as a transmitting protocol medium at both the ends to display and store in as a phonocardiograph data. In 2010 Jatupaiboon *et al.* suggested a prototype for storing the heart beat sound that is S1 and S2 for filtering it by using different filters such as low pass filters, In 2010 Tang *et al.*, proposed a wireless electronic stethoscope by using Bluetooth in integration with embedded processors for displaying the data on LCD and storing the data for computer-aided diagnosis. In 2011 Harsola *et al.* proposed a design of Peripheral Interface Controller based electronic stethoscope for visualizing and storing of sound data suggesting that the stethoscope should be physically connected and data will be sent through Lab View. In 2011 Gururajan *et al.* conducted a study based on different designs of wireless electronic stethoscopes and their viability based on user's viewpoint to identify issues when using these stethoscopes in telemedicine and e-health platforms. Im, *et al.* in 2012 recommended the use of Zigbee in wireless electronic stethoscope as a wireless medium for transmitting the sound data rather than using Bluetooth or other mediums for transmission, with the integration of an embedded processor. The distressing problem regarding all the previous work is the cost of a particular wireless electronic stethoscope using Zigbee or Bluetooth. Design methodology proposed in this paper consists of front end pickup circuitry followed by the low-pass filter and the design of pre-amplifier and amplifier for delivering a comparatively better audible sound compared to the existing methods. The proposed method due to the use of radio frequency module will also have considerable low cost then the existing proposed methods.

III. Methodology

A classic stethoscope is made up of three components: the head-piece, chest-piece, and a connecting cable that serves as a communication link between the two main components. The chest-piece embodies the acoustic or electronic sensor which

captures the analog signals or sounds from the body and transmits the data in the form of voltage signals over the communication link to the head-piece. The wireless stethoscope design consists of two modules: an integrated chest-piece that serves as the transmitting system and an integrated headpiece that serves as a receiver system. The chest-piece system consists of the data acquisition interface that is integrated with the wireless module whereas the head-piece system consists of an integrated wireless receiver unit and a microcontroller.

There are already few implementations for the wireless communication of the stethoscope, such as a bluetooth based wireless stethoscope, zigbee based wireless stethoscope, Wireless electronic stethoscope using Radio frequency (RF), Wireless electronic stethoscope using Infrared rays (IR). In all these implementations the front end circuitry of are same, that is at first we have a diaphragm which is connected to a transducer that is mostly a microphone. This microphone is further connected to pre amplifiers, filters and amplifiers for processing of the signals. All these stages comes under front end circuitry. Let's first discuss about the initial circuitry of all the designs and then move to the wireless communication part.

A. Front end or initial circuitry of all implementations:

The first stage of the stethoscope design is data acquisition using a sensitive sound sensor that has a flat frequency response in the audio range. The chest-piece captures the analog signals or sounds from the human body using an electret condenser microphone as a transducer. The captured electrical signal is amplified using an analog amplifier circuit before encoding for transmission via the transmitter. To meet this goal, an Electret Condenser Microphone (ECM) transducer was used. A pre-amplifier with a small gain is first used before post-amplification and filtering. We first established the range of signal amplitudes that may be required by the device for the operation to ensure that gains provided will not lead to any irregularities that may arise due to abnormal signals from either consistent and inconsistent conditions. The output signal Vo from the pre-amplifier circuit is described by the expression:

$$Vo = Vs * (R3/R2)$$

Where Vs is the captured heart sound from the ECM transducer and the ratio (R3/R2) is the gain provided to the signal.

The captured auscultation signals from subjects are usually accompanied by background noise which comes from a variety of sources such as patient movement, ambient noise, movement of chest-piece, level of pressure imposed on the chest-piece, and friction due to movement of the body. To filter such interfering background noise in the captured signal, a second-order low pass Butterworth filter. This filter system serves as an anti-aliasing filter that prevents aliasing effects and suppresses the noise signals outside the heart sound bandwidth.

Aliasing filter that's used to prevent aliasing effects and suppress the noise signals outside the heart sound bandwidth. The output signal y(t) from the filter system can be described by the expression:

$$y(t) = [x_a(t) + x_n(t)] * h(t), \qquad (2)$$

where $x_a(t)$ is the heart sound from the pre-amplifier circuit, $x_n(t)$ is the background noise signal, h(t) is the impulse response of the filter system, and the operator " * " denotes the convolution operation.

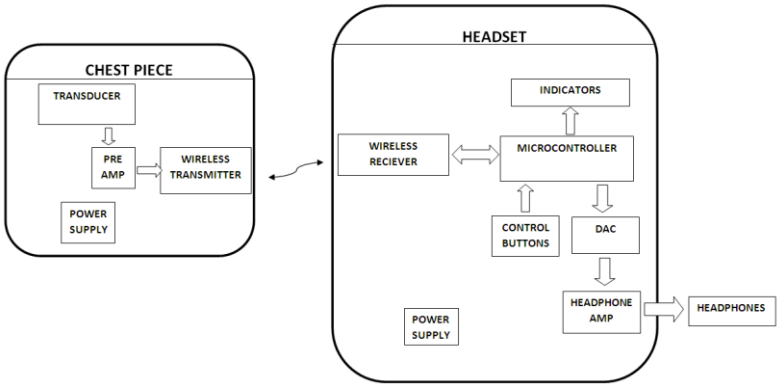

Fig. 4: Overview of the hardware architecture of the subsystems and interconnections

To process the heart sounds digitally, the filtered analog signals were discretized by the ADC on the microcontroller device in accordance with the equation:

$$V_{DO} = rnd(((V_{AN} - V_{min})/V_{FSR}) \times 2^N - 1), \qquad (4)$$

where VDO is the output discretized heart sounds from the ADC in decimal format, VAN is the input analog heart sounds to the ADC, VFSR = Vmax-Vmin, is the full-scale input range of the ADC where Vmax and Vmin are the maximum and minimum voltages that can be encoded, the function rnd (.) performs a round operation on the data to integer values, and the parameter N denotes the bit-depth of the ADC. We can use many windowing functions for designing a filter such as hanning, hamming, Blackman, rectangular, Bartlett, and Kaiser windows. Here we have considered the Kaiser window.

The Kaiser window function, W(n) used for the FIR filter design is based on the equation:

$$w(n) = \begin{cases} \dfrac{I_o\left(\beta\sqrt{1-\left(\frac{2n}{M-1}-1\right)^2}\right)}{I_o(\beta)}, & 0 \le n \le M-1, \\ 0, & \text{otherwise} \end{cases} \qquad (5)$$

where Io (.) is the zeroth-order modified Bessel function of the first kind, M is the length of the filter window, and β is the shape parameter of the filter.

B. Wireless communication part of all the implementations:

To transfer the data from the integrated chest-piece to earpiece or mobile located at a distance away we can use Bluetooth, Zigbee, FM modulation, or IR communication protocols.

An important aspect in wireless data transmission is the effect of intrusion on the strength of the transmitted and received signal. It is possible that several obstacles could be in the direct path of transmission. Since the objective is to broadcast the signal over a wider range, which links to effects such as attenuation, scattering, and free-space were factored into the design.

Let's discuss one after the other about all the designs.

Type 1: Bluetooth based wireless digital stethoscope

We saw the initial circuitry part wherein audio signals are converted to electric signals and are pre-processed, now it's about the wireless transmission part.
In Bluetooth communication to determine the coverage, range of the signal and loss effect, the following generalized path loss equation was used to determine the maximum allowable loss:

$$P_L(dB) = 20\log_{10}(4\pi d_0/\lambda) + 10\gamma\log_{10}(d/d_0) + P_0 \qquad d \geq d_0 \qquad (1)$$

In equation (1), *do* is a reference point beyond which the path loss becomes relevant, λ is the wavelength of the wireless signal, γ is the path loss exponent, *d* is the distance in meters measured beyond *d*o and *P*o is the shadow fading effect.

At the transmitter end that is at the chest piece, we connect the diaphragm to the transducer to convert mechanical signals (heart sounds) to electric signals. Then we connect the transducer to the front end circuitry which consists of a preamplifier, filter for amplification, and filtering the variations in the signals. This we connect to the transmitter module in this case we connect to the Bluetooth transmitter. At the receiver, a microcontroller-based receiver head-piece or speaker system includes in the receiver unit, a digital signal processor, control buttons, amplifier circuit. The signal processor which is a microcontroller performs filtering operations on the received wireless signal. This system serves as the means for observing patients from remote areas particularly quarantine units and can also be useful for training health personnel through the broadcasted signals which are recorded for future analysis and evaluations.

Not just using Bluetooth module we can use other modules for wireless transmission as well. Such as the Zigbee module.

Type 2: Zigbee based wireless digital stethoscope

In the Zigbee module, the other circuitry part is the same but the difference is in the transmitter and receiver, in the previous case we used the Bluetooth communication module but here Zigbee module is used. The transducer i.e. a microphone is connected to the preamplifier, filter, and amplifier and a microcontroller that converts analog signals to digital, and these are connected to the Zigbee transmitter module which transmits the data wirelessly to the receiver. At the receiver end, a Zigbee receiver used to receive the signals is connected to a microcontroller and the output of it is sent for digital to analog conversion and this is finally connected to a power amplifier for amplification and the audio is heard using a speaker or a headphone.

Till now we discussed protocols that transmit the data wirelessly only after converting analog to digital signals and at the receiver end, the signals are again converted to analog signals using digital to analog converter. While doing this there are possibilities of losing out some data because of digitizing so this problem can be solved by using the FM which is the frequency modulation transmission method.

Type 3: Wireless electronic stethoscope using Radio frequency (RF)

In this wireless transmission protocol, it's not necessary to convert analog signals to digital signals and hence the data is not lost. In this the frequency of the input signal is modulated by a carrier wave. The initial circuitry part in FM transmission is the same as before but a high-powered amplifier must be used and a bandpass filter must be used to filter out the noise or variation in the signals and to amplify the signals to hear the sounds. This uses telecommunication technology. There are many ICs available already in the market which can be used as transceivers such as NS73M, TEA5767, RDA507M, and SI4703/05, some of which require an external crystal or a clock generator.

Type 4: Wireless electronic stethoscope using Infrared rays (IR)

Similarly we can use Infrared rays for transmission. Let's discuss only about the transmission part as the other parts are same as previous digital stethoscopes. The transmitter consists of a photo diode and the receiver consists of photo transistor. Photo diode transmits the audio signals wirelessly using photons and this is received by photo transistor. The drawback in this implementation is that, if there is an obstacle in between the diode and transistor then the communication does occur, so this implementation is not reliable as its not possible to not have an obstacle always. But transmission using IR is very accurate and consumes less power than the other implementations.

Table 1: The table below gives the overview of the implementations done in the development of wireless stethoscope

Types	Design	Features	Pros	Cons
Type 1	Bluetooth based Wireless Digital Stethoscope	1. Data is transmitted at 1 Mbps using FSK. 2. Its covers upto a range of 5-10 meters. 3. Frequency is 2.4 GHz worldwide.	1. Bluetooth protocol is known for its effectiveness in short range. Communication and can therefore offer short range high efficiency data transfer in a simple device. 2. Data can be broadcasted to multiple head pieces.	1. Cannot record sounds by itself, it requires another device like smartphone, iPad to record sounds. 2. Noise reduction is not up to the expectations
Type 2	Zigbee based wireless stethoscope	1. Data rate is 250 kb/s, 40kb/s and 20kb/s. 2. Its covers upto a range of 10-20 meters. 3. Frequency is 2.4 GHz worldwide.	1. By using Zigbee, wireless auscultation is probable and patient can be monitored by multiple physicians at a time, which is same as Bluetooth based stethoscope but Zigbee covers more distance when compared to Bluetooth which is around 10-20 meters.	It has less data rate when compared to Bluetooth
Type 3	Wireless electronic stethoscope using Radio frequency (RF) waves.	1. Frequency ranges from 900MHz to 3.2GHz. 2. Wavelength between 1mm and 10 mm.	1. Can transmit analog signals directly without converting them to digital. 2. Can run on different frequencies.	Noise reduction is very poor, which can suppress the required signals in this case audio signals.
Type 4	Wireless electronic stethoscope using Infrared radiation (IR).	1. Travels at the speed of light. 2. Wavelength bands between 780 nm and 1mmare mainly used for IR wireless communication. 3. Frequency ranges from 300 GHz to 400 THz.	It's a secure way to transfer data, and provides good stability due to point to point mode of communication.	The transmission gets interrupted if any obstacle comes in between the transmitter and receiver.

IV. Discussion

Acoustic stethoscopes are used to monitor the internal sounds of the patients. Parenthetically, the connecting cable lying in the middle of the chestpiece and the earpiece of conventional stethoscopes which is used to aid as a medium for the transmission of pathogens from patients to physicians and visa-versa. A contactless stethoscope to be a more precise wireless stethoscope is a device in which the connecting tube is replaced by wireless communication methods. Electronic stethoscope already is in the market but most physicians prefer the connecting cable connecting the chest piece and the earpiece. For example, Littman 3200 are electronic stethoscopes that can communicate wirelessly. This contact list that is scoped helps the physician to not get in contact with the patient and hence prevents the transfer of pathogens from one to another. As a physician consults many patients this physician becomes a carrier of many diseases. This can be prevented by using a contactless stethoscope. A contactless stethoscope reduces the risk of cross-contamination. There are already many inventions where the chest piece is isolated and the data or auscultated sound from the subject's chest is sent wirelessly to the doctor using Bluetooth, ZigBee, Wi-Fi, etc.

In this study, the implementation of a handy heart sound capturing system is discussed. Which can also be called as a digital stethoscope, this stethoscope is designed by modifying a conventional or traditional stethoscope and by adding an analog front end with a microcontroller (MCU) which has built in bluetooth or can use any wireless communication protocol for digitization and transmission of the obtained signal.

The first discussion reports on the design and implementation of a Bluetooth based wireless digital stethoscope with mobile integration system to acquire, store patient data and provide visual analysis of internal acoustic sounds. The results demonstrated the ability of the proposed concept to separate the captured heart sounds into the different frequency modes of operation of the stethoscope (bell, diaphragm, extended modes) using FIR digital filter algorithm and wirelessly transmit data from the selected mode to a mobile receiver device for recording, visualization of the waveform to carry out a diagnostic assessment of the content, and playback of the recorded sound. With the emergence of the Internet of Things (IoT) coupled with mobile technology and cloud-based services, changing the design of electronic stethoscopes can play a key role in the healthcare delivery of the future. Thus, a paradigm shift in the design of stethoscopes can transform future designs of IoT applications and technology for healthcare delivery and services. Other components used in this are the same. That is a microphone used as a transducer to convert audio signals to electrical signals, filters to filter out the noise, preamplifiers and amplifiers are used with high gain, and microcontrollers are used for wireless communication using Built-in Bluetooth or by attaching Bluetooth modules to them. Results showed that wireless data can be broadcast to multi head-piece sets and the various operational modes selected for evaluation with the aid of a microcontroller. A full two-piece wireless electronic stethoscope will eliminate the connecting cables of the

conventional stethoscope and offer the easy movement of the device users around patients during auscultation, minimize the spread of infections, and contribute to teamwork, especially in auscultation training of healthcare practitioners, where data is broadcast simultaneously to the members in the team for evaluation. The drawback in this technique is the use of a Digital mode for communication and hence the output will be either Zeros or ones and none in-between. So if any sounds are at around 350-400 Hz they would be taken either as one or as zero.

Another way for transmission of audio signals wirelessly was discussed using Zigbee for wireless communication between the chest piece and earpiece. Other components used in this are the same. That is a microphone used as a transducer to convert audio signals to electrical signals, filters to filter out the noise, preamplifiers and amplifiers are used with high gain, and microcontrollers are used for wireless communication using ZigBee (as the communication protocol used is ZigBee) or by attaching Bluetooth modules to them. Microcontrollers are used both at the transmitter as well as at the receiver end. There are both advantages as well as disadvantages to using Zigbee over Bluetooth. The data transfer rate is faster in Bluetooth than ZigBee whereas ZigBee covers a larger distance than Bluetooth. So if we are transferring data at a short distance such as in the same hospital then Bluetooth would be preferred whereas if one wants to transfer the data over large distances the Zigbee would be preferred.

In all the methods mentioned above, the audio signals captured by a transducer (in this case microphone) are sent for pre-processing and then sent to the microcontrollers for transmitting the signal wirelessly. So in all the mentioned techniques, we are converting analog signals to digital signals transmitting wirelessly and at the receiver, end converting the received signals back to analog and listening to them either by using a headphone or speaker. There is another way of wireless transmission of audio signals without converting them to digital signals, that is by using AM or FM. AM stands for amplitude modulation and FM stands for frequency modulation. In amplitude modulation, the amplitude of the input audio signal is modulated using a carrier signal. The disadvantage with this variation is that the output signal is too noisy and hence it cannot be used for body sounds such as heart sounds as there are very low frequency and amplitude. So we use FM for wireless transmission of audio signals. In Frequency modulation, a carrier signal picks up the input audio signal and transmits it wirelessly via an antenna. The front-end circuitry for FM is the same as it was for Bluetooth or Zigbee that it using a transducer, preamplifier, filter, amplifier, and microcontroller if required. There are many IC chips available in the market which can be used as transmitters and receivers. For example, NS73M can be used as a transmitter to transmit the audio signals from the source and we can use RDA5807M, TEA5767, SI4703/05 can be used as receivers at the receiver end. There are many disadvantages of using FM, as it is analog circuitry it is prone to noise more than the digital circuitry and filtering techniques are very less for this.

Digital signal outputs only 0's and 1's, abnormal heart sounds consists of murmurs along with heart sounds while digitizing murmurs become either 0 or 1. Hence transmitting this signal gives erroneous output. So transmitting analog signals without digitizing gives us the exact output without missing any signals. This prototype can leap forward in implementing the e-health and telemedicine systems especially in the monsoon season when the country is heavily affected by the floods and people in rural and affected areas could not get proper medical attention.

V. Conclusion

Multiple cardiopulmonary pathologies and dysfunctional ties of the heart is viewed by the simple mechanism of auscultation. A physician must have the ability to correctly inspect a patient even with partial resources. A stethoscope is a dominant tool that is easy to use and checks on the direct effect of the pathogens on patient. With many sophisticated progresses made in medicine, which help in clinical diagnosis and management, it has made its way to influence even the simplest yet useful tool. With the development of a digital stethoscope the physicians can now hear heart and lung sounds with more accuracy and precision. In the digital stethoscope, we use amplifiers and filters which are used to amplify and remove unnecessary variations from the output signal. Bluetooth protocol is known for its effectiveness in short-range peer-to-peer communication and can therefore offer short-range high-efficiency data transfer in a simple device. A full two-piece wireless electronic stethoscope will eliminate the connecting cables of the conventional stethoscope and offer the easy movement of the device users around patients during auscultation, minimize the spread of infections, and contribute to teamwork, especially in auscultation training of healthcare practitioners, where data is broadcast simultaneously to the members in the team for evaluation. Making the stethoscope wireless not just prevents the transmission of the pathogen but also this data which is digitized can be used later for diagnoses and also for future studies. Using protocols such as Bluetooth, Zigbee can also useful for sending the data not just to one physician but to many at the same time within the specified range. Another mode of wireless transmission that can use which is FM frequency modulation. Hear the electric signal is transmitted to the receiver via the transmitter at a particular frequency by adding a carrier signal to the input signal. At the receiver end if we tune in to the specific frequency at which the signal is transmitted we can hear the audio signals in at a specified range, hence there can be more than one receiver.

By using such advanced technology auscultation has become very easy for various diseases like obstructive coronary artery disease, and other bruits and obstructive vascular diseases such as carotid artery stenosis, and also helpful for multi- frequencies examinations that may comprise pulmonary auscultation. Further there is also a possibility to influence patient care by escalating disease processes earlier and prevent fatal diseases. By using such technologies medical care can be provided to different remote locations, using this telemedicine technology one can transmitted the data from one place to other using internet and other mains for further check- ups and prevent many curable diseases as early as possible.

Furthermore, the proposed idea can increase the implementations of e-health and telemedicine systems in many places especially where good medical attention is not obtained.

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Yarn Imaging

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Abstract

The decentralized power loom sector plays pivotal role in meeting clothing need of the country and also in economic trade. Due to the technological advantages plus rise in demand the usage of power looms is getting upsurge. As the phrase "Every Advantage has its Disadvantage", power loom has also got some of its own defects. One comes 'warp streaks' the lengthwise yarn which runs from back to front of the loom are called warp. As warp is the base of fabric, it must be strong and break resistant. While weaving it may break and create a lag in the process, and produce poor quality fabric. Hence in this research as a ray of hope by adopting system based on image sensor technique using raspberry pi, which is customizable and programmable as a new idea of rescue from saving the process. So, by using image processing technique we are detecting defects in the warp yarn in simulation meathead as an idea.

I. Introduction

Textile industries has become second largest sector in the world. It mainly deals with the production of yarn and cloth. Loom means one of the machines used for textile production and device used to weave cloth and tapestry. A power loom is mechanized loom, and was one of the key developments in the industrialization of waving during the early industrial revolution. The first power loom was designed and build in 1786 by Edmund Cartwright. The first loom didn't start to evolve dramatically until the Middle Ages, after it gradually got upgraded step by step like using shuttle, cards with punched holes for design on fabrics. Later arrival of electricity takes place in the beginning of the 20th century by large electric motor.

In the present era, power loom is improving by using sensor technology like optical sensor, reed sensor, proximately sensor etc. Now, we are using Digital Image Processing on wrap yarn to enhance the productivity with minimizing damage of fabrics. Here we are using some image processing techniques and algorithms, to process the image. Utilizing this technology, we are detecting the defect in the warp yarn in power looms.

In Power Loom a shuttle is a tool designed to neatly and compactly store a holder that carries the thread of the weft yarn while weaving with a loom. Shuttles are thrown or passed back and forth through the shed, between the yarn threads of the warp in order to weave in the weft. A reed is part of a weaving loom, and resembles a comb. It is used to separate and space the warp threads, to guide the shuttle's motion across the loom, and to push the weft threads into place. The reed is securely held by the beater, and consists of a frame with many vertical slits. A beater or batten, is a weaving tool designed to push the weft yarn securely into place.

II. Methodology

The main objective of conducted experiment primarily is to monitor whether the warp yarn is proper or not so that it help in working progress of the machine simultaneously saving the time in the process. Then to analyses the warp yarn by image processing and there by detecting the defects of warp yarn.

In power looms weavers are facing some of the problems like missing of warp yarns while weaving this leads to damages of cloths, loss of weft and time of weavers. This defect mainly takes place due fault in weaving shuttles, defect in reed and if any splinter in Beater hand tree. To overcome this, we come with an idea called yarn imaging.

The system of a meathead used in particular area of study consist of image processing techniques that will recognize damage in warp yarn. This technique analyses difference between programmed image and the present image. So that in real time we can identify where exact defect as occurred in the warp yarn. This will give result in the captured form through monitor where it can be viewed

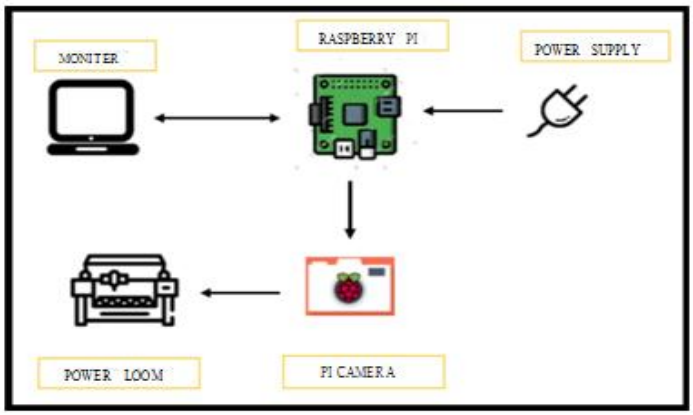

Fig 1: Black diagram of the yarn imaging process

III. Experimental Analysis

A. Simulation process

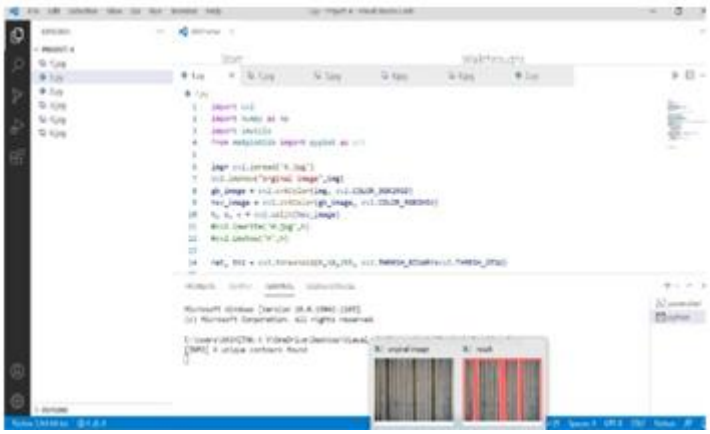

Fig 2: Simulation part

For software implementation we have used the VS Code tool for processing the image by installing the required library files. With Open CV virtual environment, we installed all library files. Captured image are taken and used for stimulation process which identify the defects of warp yarn in image and detected defects are highlighted by color.

B. Flow chart

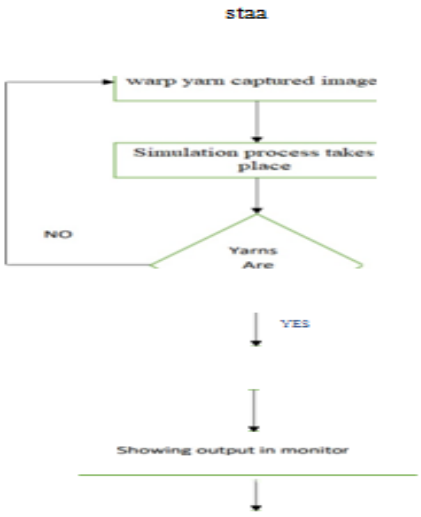

Fig 3: Flow chart

C. Algorithm

Step 1: Start
Step 2: Captured image of warp yarn.
Step 3: Further process take place in simulation Step 4: Check for condition state.

Step 5: If all the yarns are proper go to step 1.
Step 6: If any yarns are missing, highlight the missing yarn place.
Step 7: Show the output in monitor.
Step 8: End

IV. Results

Fig 4: warp yarn image without any defect

Fig 5: Defected warp yarn image

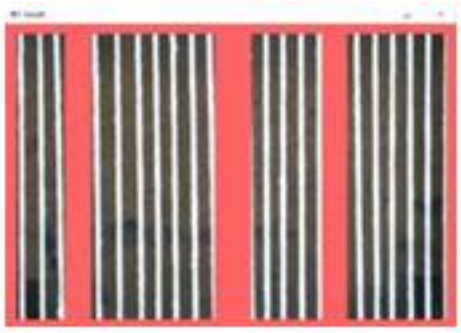

Fig 6: Final output

Fig 6 shows the stimulation Output of our project. It mainly deals with the identification of defective/missed yarns from the captured image by processing and analyzing. That will report missing yarn in the warp on monitor in a particular color coding. That makes easier for the weavers to identify the exact location of defective yarn in "No time" and prevent weavers from producing defective fabrics.

V. Conclusion

It was wonderful learning experience for us while working on this project, because we have gain knowledge about structure and working of power loom and also image processing. By this Imaging weavers get know the defect of yarn in wrap earlier, which prevents the wastage of cone and saves the time. By this we achieve more production of fabric and helps in better marketing in future.

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Detecting COVID-19 from Lung X-Ray Images Using Deep Transfer Learning

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Abstract

The COVID-19 pandemic is causing a major outburst in most of the countries in the world, causing a major impact on life and health of people across the world. One of the most important steps in fighting against COVID-19 is to detect the corona virus infected patients in early stages, and put them under proper care. Detecting this infection from X-ray and CT scan images is one of the best ways to diagnose the patient. Few of the studies showed some abnormalities in the radiograms of the COVID-19 infected patient. Based on early works, the applications of deep learning models are used to detect COVID-19 from chest X-ray images. It is required first prepare the chest X-rays images dataset from publicly available datasets. By using the chest X-ray images presence of COVID-19 infection is identified radiologist. Transfer learning on subset of radiograms are used to train the convolutional neural networks, like ResNet18, ResNet50, Squeeze Net and dense net-121, to identify COVID-19 infection in chest X-ray images. Further analysis is required on a large set of COVID-19 images, to have better accuracy rates.

Keywords: COVID-19, CNN

I. Introduction

Since last year, a novel corona virus has spread from China, and to many other countries of the world. By April 2020, more than 2 million cases were confirmed, and reported more than 150,000 deaths in the world. Due to unavailability of vaccine and

proper treatment for novel COVID-19 disease, early detection of the disease is very important to provide immediate isolation of suspected patient. It helps to decrease the chance of infection to healthy large population. This proposed method uses deep learning techniques for the classification of their results on diagnosis of respiratory symptoms. Considering more number of suspected people and limited medical facilities, automatic methods for identification of disease can assist the diagnosis procedure and increase the rate of quick diagnosis with high accuracy. Artificial intelligence and machine learning solutions are powerful tools for solving such problems. Due to the lack of availability of public images of COVID-19 patients, detailed studies reporting solutions for automatic detection of COVID-19 from Xray images are not available. Recently a small dataset of COVID-19 X-ray was collected, which made it. To increase the number of sample images, data augmentation is used to create transformed version of COVID-19 images. Instead of training these models from scratch, it is better to fine-tune the last layer of the pre-trained version of these models on ImageNet.

II. Methodology

The proposed COVID-19 detection based on deep learning based technique the following steps

Step 1: First Collect the X-ray and CT scan images for the dataset from healthy person and COVID-19 patients
Step 2: Using data augmentation technique generate 1000 X-ray images of chest.
Step 3: Represent the images in a feature space and apply deep learning.
Step 4: Divide the dataset into a training and validation sets.
Step 5: Evaluate the performance of the detector on the validation set. Step 6: The multi-SVM classifier is used to classify COVID-19 patients

Convolutional Neural Networks: The important issue in training the deep models is the concern of overfitting. It occurs from the gap between a large number of learnable parameters and the limited number of training samples. This can be overcome by Convolutional networks using convolutional layers. This requires minimal preprocessing by considering the 2D images as an input, and hence it is designed to retain and utilize the structural information among neighboring pixels.

III. Block Diagram

The block diagram contains mainly 4 parts such as modalities, preprocessing networks, and output.

The modality part consists X-ray and CT scan images where these images are given to preprocessing in which there is 2 parts which are segmentation preprocessing and classification preprocessing where segmentation and classification process takes place. Then the result from preprocessing part is given to the DL (data link layer interface) network part in which different types of convolutional neural networks are

present such as AE auto encoder, DBNs deep belief networkers recurrent neural network, GANs generative adversarial network. And then from data link layer interface is given to the output. block where the performance evaluation is done and the output is given if the person is infected with COVID-19 or is he normal.

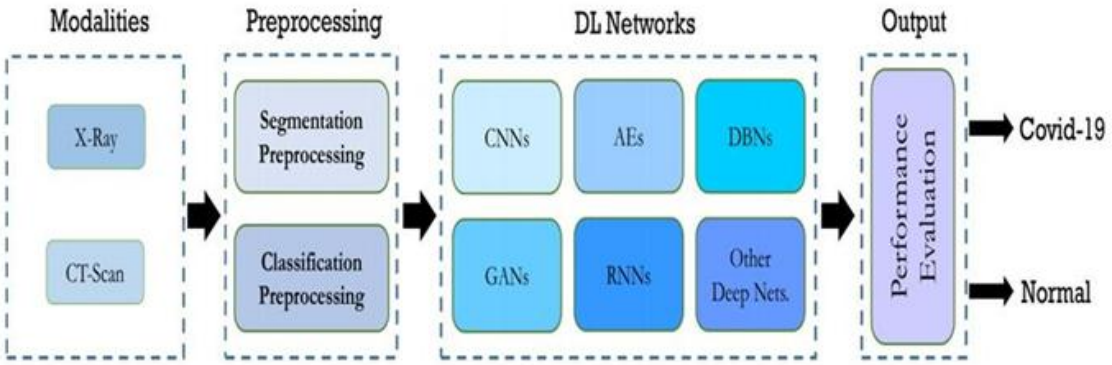

Fig 1: Block Diagram of COVID-19 detection system

IV. Working and Result

The different steps to be followed to identify the COVID-19 positive or negative are as follows.

Step 1: Collecting the X-ray images
Step 2: Filter the images in the matrix form and convert it into dataset
Step 3: Classify the dataset with COVID-19positive and COVID-19 negative.
Step 4: Train the dataset using CNN.
Step 5: A new model will be created.
Step 6: The predicted images is confirmed when the percentage is greater than 60%.
Step 7: If the predicted image is less than 50% then it is normal person

Fig 2: COVID positive image with probability of 0.99

Figure 2 shows image which is to be tested and then there is a predict button. If we click on predict then it will predict whether the person is COVID positive or negative. The probability term which shows the probability of the image being positive or negative. The figure 2 shows COVID positive with probability of 0.99.

Fig 3: COVID Negative Image and Its Probability Is 1

Figure 3 shows image which is to be tested and then there is a predict button. If we click on predict then it will predict whether the person is COVID positive or negative. The figure 3 shows COVID negative with probability of 1.

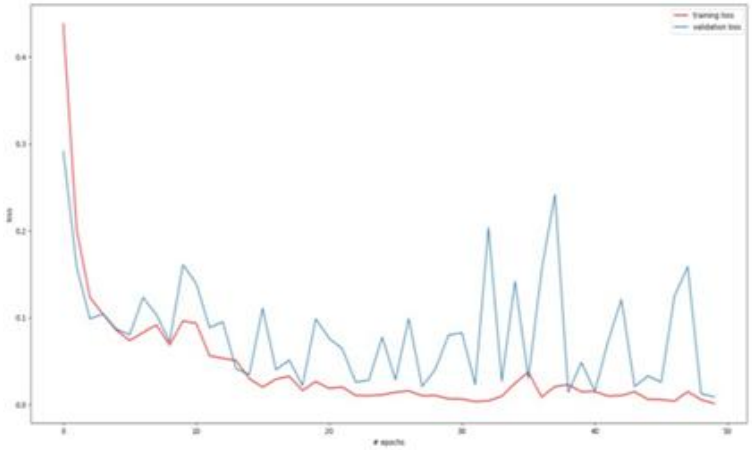

Fig 4: Graph of validation and training loss

In the figure 4 red line indicates the training loss and blue line indicates the validation loss

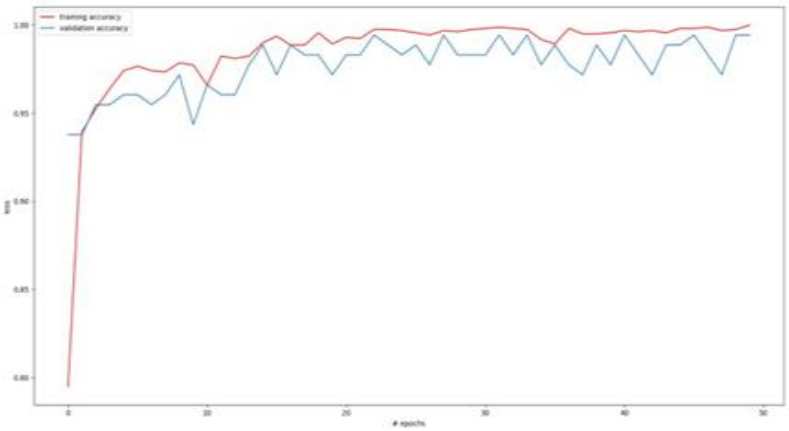

Fig 5: Graph of validation and training accuracy

In the figure 5 the red line indicates the training accuracy and blue line indicates validation accuracy

V. Application and Conclusion

Automating the analysis of medical image is one of the most important applications of deep learning. One of the important research directions of deep learning in ambient intelligence will be compression. If deep neural networks are compressed, they can be embedded in smart sensors. This proposed system focusses on deep learning for corona virus infections. The applications of deep learning models are used to detect COVID-19 from chest X- ray images. This system improves the COVID-19 diagnostic capabilities. Experimental analysis is performed to evaluate the performance of the test images set of X-ray dataset, this study is conducted on images of COVID and non-COVID persons. However, to obtain more accurate results, further experiments are needed on a larger set of COVID-19 images.

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Design of Robotic Vehicle for Detection of Human Based On Internet of Things

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Abstract

Technological revolution, earnest endeavours in the latest high-speed technology, and the advancements in the capabilities of modern computers leads to a realistic chance for a brand-new robot controls and controls and enlightens upon the latest strategies of the control theory. This technical advancement and the necessity for top performance and efficient robots created quicker, accurate and many intelligent robots exploiting the new robot control devices. Natural disasters are not stopped from happening, however, we the human race is getting more and more aware and cautious within the competition of intelligent rescue operations in such disastrous areas, precious life and materials rescued even though such disastrous situations are not avoided. Thus, the data have collected are efficiently by the rescue operators and saves valuable human lives. In security applications for surveillance, these robots are used.

Keywords: Arduino Uno, PIR sensor, Ultrasonic sensor, H Bridge, DC motor.

I. Introduction

A disaster is the result of a hazard uncontrollable in a highly vulnerable community, often resulting in mortality and morbidity. Indeed, the disasters may

destroy and effectiveness of the rescue teams. The complex and hazardous nature of these accidental sites links a great threat and risk to the rescue workers and hostages trapped in the disasters. These disasters induce a disruption in the social and economic balance of the society. In such cases, rescue robots designed to search and mapping.

Building and programming a robot is a combination of mechanical, electronics and programming fields and problem solving fields as well. Some traditional methods increase the chances of causalities due to their risky and time taking approaches. Hence, in this, a new approach for detecting humans using a specific set of sensors and microcontroller proposed. We experiment with this robot, and it gave us better results than other existing ways.

II. Methodology

In this paper, a sensor called a Passive infrared sensor, which is a motion sensor, detects the movement of humans. It has the digital output and directly given to the digital pins. It operates at 5V DC. As the human body emits thermal radiation, the PIR sensor receives it. The movement of the robot, carried by using an H bridge, as it is simply an arrangement of switching the polarity of the voltage applied to the DC motor. Here we use the L298N DC motor driver, which controls the speed, direction of the robot. As a Bluetooth module controls the whole movement of the robot, a key is pressed on the mobile phone. When the robot carried in disaster area and mounted, the path covered by the robot, viewed on a computer display using an ESP32 wireless camera. A number of LED lights are fixed for effective lighting for the clear appearance of surroundings. Once the PIR sensor detects any movement of the body, it gives a high signal on its output pin and sends the signal to the pc. Whenever there is an obstacle, it is detected by an ultrasound sensor and sends the signal to the PC to change the direction of the robot. Then the robot is manually driven to the area to look closer. If the lighting conditions are poor, the led is enabled for extra lighting. These are connected to an Arduino Uno board, which is programmed by a code. The camera is used to see the surrounding details.

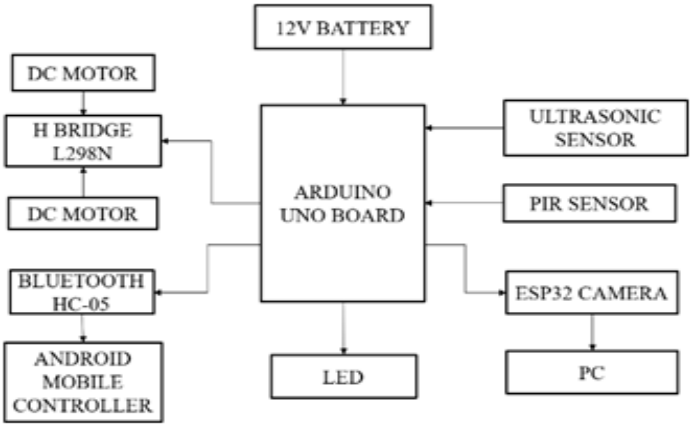

Fig1: Block diagram of the proposed system

III. System Design

Arduino Uno: The Arduino Uno is an open-source microcontroller board. The board is implemented with sets of digital and analog input/output (I/O) pins that may be interfaced to various expansion boards and other circuits. 6pins can be used as PWM outputs, a 16 MHz ceramic resonator, a USB connection, a power jack, an ICSP header, and a reset button. In addition, some pins have specialized functions. Serial Pins 0 (RX) and 1 (TX). Used to receive and transmit TTL serial data [3].

Motor Driver

- A Bluetooth HC-05 used as a Bluetooth serial port protocol module, designed for transparent wireless serial connection setup.
- H Bridge is an electronic circuit that switches the polarity of a voltage applied to a load. An L293D motor driver IC. This 16 pins dual H-bridge motor driver will allow us to control the direction and speed of the motor.
- DC motor is a type of electric machine that converts electrical energy into mechanical energy. It takes electric power to direct current and converts this energy into mechanical energy.

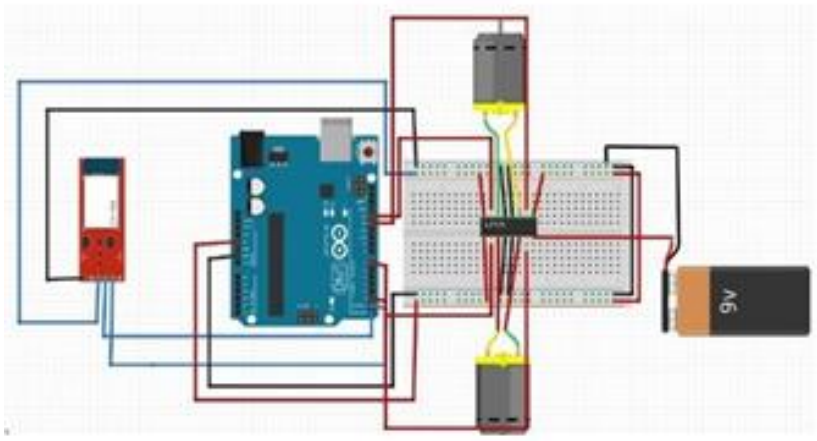

Fig. 2: Circuit diagram of motor driver

The Circuit: The HC-05 will be receiving serial data when sent out from the master Bluetooth device, which will be communicated to the Arduino through its receive or transmit pins, RX/TX, connected to the pins 5 and 4 of the board. Its GND and VCC pins will be respectivly connected to GND and 5V. The H-bridge in the L293D will allow us to control the direction of the motor, by opening or closing a pair of switches, 4 of which are arranged in the shape of an H. To enable the motor, connect "Enable 1, 2" , VCC1 to 5V, and VCC2 to the 12V battery. Connect input1 to pin 13 of the Arduino, input pin 2 to pin 12 of the arduino, input pin 4 to pin 7 of the arduino, input pin 3 to pin 2 of the arduino. Switching between these will allow us to switch the rotational direction. Finally connect the DC motor 1 to output 1 and 2, connect DC motor 2 to output 4 and 3.

PIR Sensor

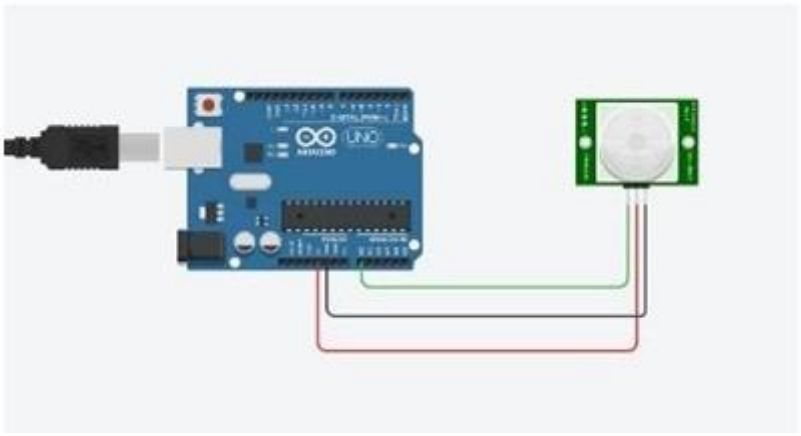

Fig. 3: Interface of PIR sensor to Arduino Uno Board

A Passive Infrared sensor is an electronic sensor that measures infrared light radiating from objects in its field of view. They are more often used in PIR based motion detectors. In this design, a PIR sensor module has only 3 pins one is VCC which is a 5V input, a GND pin and finally the digital output pin. Connect 5V from arduino to VCC of PIR sensor module, connect the GND from arduino to GND of PIR sensor and finally connect the output pin to digital pin of arduino.

Ultrasonic Sensor: Ultrasonic sensor work by sending out a sound wave at a frequency above the range of human hearing. The transducer of the sensor acts as a microphone to recive and send the ultrasonic sound. The pin configuration of Ultrasonic sensor is VCC, TRIG, ECHO, GND. The supply voltage of VCC is connected to 5V of arduino, GND is connected to GND of arduino, TRIG pin is connected to pin 9 of arduino and ECHO pin is connected to pin 8 of arduino.

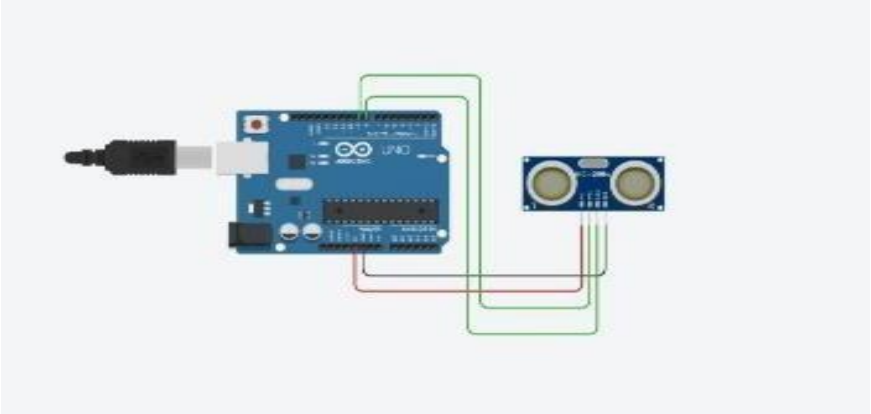

Fig. 4: Interface of Ultrasonic sensor with Arduino Uno Board

IV. Software Requirements

Autodesk Tinker cad Software: Tinker cad is a free online collection of software tools that help people all over the world think, create and make. We are the ideal introduction to Autodesk, the leader in 3D design, engineering and entertainment software.

V. Results

Fig. 5: Obstacle detected by Ultrasonic sensor reepresented by using Tinkercad software

When the obstacle is present in the distance of less than 100 meters, the motor stops. Ultrasonic sensor sends signal to pc and shows "obstacle is detected' in serial monitor and also shows distance between sensor and obstacle.

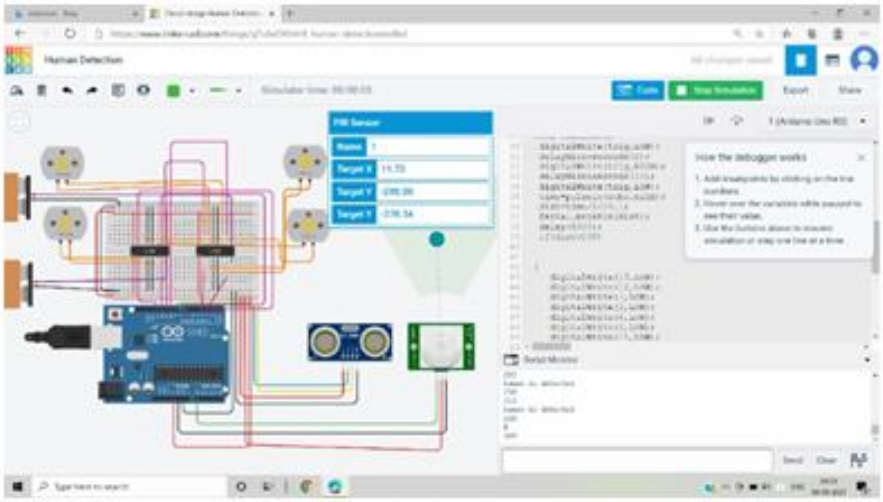

Fig.6: Human detected by PIR sensor represented by using Tinkercad software

PIR sensor detects the signal whenever it detects the human represented in serial monitor.

VI. Test Cases

SL. NO.	SENSOR	TEST ACTION	EXPECTED RESULT	ACTUAL RESULT
1	Ultrasonic Sensor	Distance of obstacle 80m	Obstacle has to be detect	Obstacle is detected
2	Ultrasonic Sensor	Distance of obstacle 90m	Obstacle has to be detect	Obstacle is detected
3	Ultrasonic Sensor	Distance of obstacle 110m	Obstacle will not detect	Obstacle is not detected
4	Ultrasonic Sensor	Distance of obstacle 120m	Obstacle will not detect	Obstacle is not detected
5	PIR Sensor	Distacnce of human 80m	Human has to be detect	Human is detected
6	PIR Sensor	Distacnce of human 90m	Human has to be detect	Human is detected
7	PIR Sensor	Distacnce of human 100m	Human will not detect	Human is not detected
8	PIR Sensor	Distacnce of human 110m	Human will not detect	Human is not detected

VII. Conclusion

Hence, many lives saved by using this robotic vehicle and this indeed help the rescuers in detection of human beings. These are also user friendly, economical and efficient device by software programming interfacing for detection. It can be done in short duration, which avoid time consuming and unaffected, if it done manually. The sensors used are cheaper and easily available.

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Implementation of Noise Detector with Automatic Recording System Using Arduino

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Abstract

Noise pollution is a growing problem in modern cities, thanks to rapid population growth, urbanization and new technologies. Moreover, at times, a noisy neighbor or co-worker can drive crazy and affect the well-being of a society. Talking loudly is an annoying habit in an office or school environment. Having a loud co-worker or student can cause distractions and reduce the efficiency of the work and harm the productivity. To solve this problem, a noise detector with automatic recording system is implemented in this project. This device notifies users whenever it detects loud noise , when the sound crosses certain limits, as well as it automatically records the sound and saves this recorded sound in a file. This Noise Detector System can be used in library, office and classroom environments to identify noisy people so that necessary action can be taken against them.

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I. Introduction

It is absolute that speaking loudly is an annoying thing. Having such a co-worker in the office environment will influence the work and productivity. When it comes to schools and colleges pedagogue or a preposter can't monitor every last one all the time. It is very difficult to identify a noisy person. So, it becomes obligatory to control students and monitor the situation. This project is set to overcome these problems. So whenever sound crosses the certain sound limit it will notify us and makes a small beep sound and also it records the sound which is above the set limits. So that one can identify the noisy people and can take the necessary actions. It is not just noise generated by humans that are of concern but electronic devices and other equipment can also make a loud noise which may disturb the students and faculty. Though this such noises can also be detected and also can take necessary actions.

II. Objective

The main objectives of the project are to Identify if there is an external sound. When the external sound goes above the threshold it will trigger the circuit. It notifies whenever it detects loud conversation and it also records the conversation and saves it in a file. It automatically records the sound that is above the threshold. This Project can also be used to overcome cheating that is happening in the exam, if the sound increases above the set limit it will record and identify the concerned.

III. Problem Statement

Increases in sound have proven to be a major problem in schools and offices. A pedagogue or a pre-poster can't monitor every last one around the clock. To solve this, this device is being designed, a Noise detection with an automatic recording system using Arduino. This device notifies whenever it detects loud conversation and it also records the conversation and saves it in a file. These devices are used in silent zones like hospitals, libraries, laboratories, and also in schools and colleges to maintain silence and also be implemented as a safety device so that it can record gunshots or screams, this information can be used to send help or take the necessary actions immediately.

IV. Structure Designing

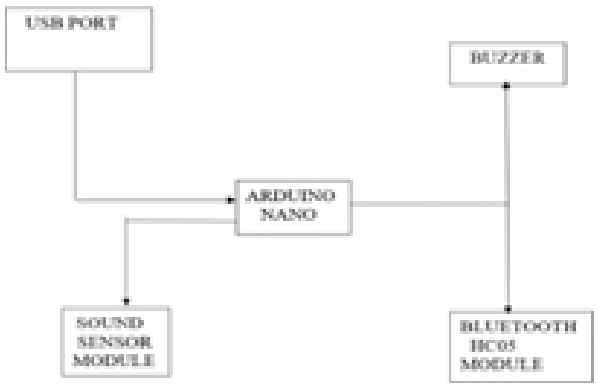

Fig: 1

In Fig 1 shows the block diagram of the Noise detector with the Automatic Recording system using Arduino. The Arduino nano is directly connected to USB port of the Personal Computer and Arduino is further connected to the Sound sensor which detects the intensity of the sound. Bluetooth HC 05 module is connected because it is specially designed for the wireless communication with is directly connected to the mobile application with Bluetooth. Buzzer is used because it starts beeping when the sound is above the threshold value and these connections are connected with the connecting wires the jumper wires .so, this about the description about block diagram of the Noise detector with automatic Recording system using Arduino.

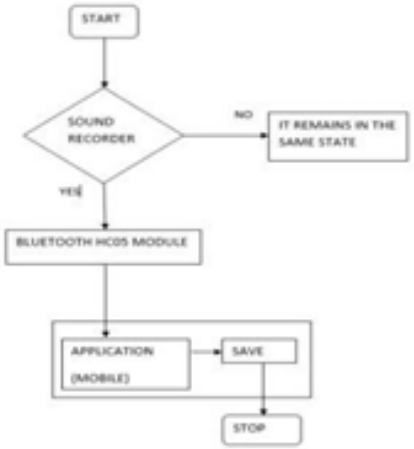

Fig: 2

Figure 2 shows the Flow chart represents the step-by-step progression through a procedure. Generally, the sound sensor detects the intensity of the sound. If the sound is below the threshold value, then it remains in the same state, if the value is above the threshold value, then buzzer starts beeping. Later the buzzer will send the signal to the Bluetooth HC 05 module. The Bluetooth HC 05 module further sends signal to the mobile application through Bluetooth. The mobile application receives the signal and starts the recording process. These recordings or the files get saved in mobile once the external noise that triggered the circuit falls below the designated threshold value.

V. Hardeare and Software Requirements and Their Specifications

A. Hardware Requirements

Arduino Nano: Arduino Nano is a small, complete, and breadboard-friendly board based on the ATmega328P released in 2008. It offers the same connectivity and specs of the Arduino Uno board in a smaller form factor. It is used to produce a clock of precise frequency using constant voltage. There is one limitation using Arduino Nano i.e., it doesn't come with DC power jack, means you cannot supply external power source through a battery.

Sound Sensors: The sound sensor is one type of module used to notice the sound. Generally, this module is used to detect the intensity of sound. The applications of this module mainly include switch, security, as well as monitoring. The accuracy of this sensor can be changed for the ease of usage.

Bluetooth Module: HC-05 Bluetooth Module is easy to use Bluetooth SPP (Serial Port Protocol) module, Designed for transparent wireless serial connection on setup. Its communication is via serial communication which makes an easy way to interface with controller or PC. HC-05 Bluetooth module provides switching mode between master and slave mode which means it able to use neither receiving nor transmitting data.

Buzzer: A buzzer or beeper is an audio signalling device, which may be mechanical, electromechanical, or piezoelectric (piezo for short). Typical uses of buzzers and beepers include alarm devices, timers, and confirmation of user input such as a mouse click or keystroke. The buzzer consists of an outside case with two pins to attach it to power and ground. Inside is a piezo element, which consists of a central ceramic disc surrounded by a metal (often bronze) vibration disc. When current is applied to the buzzer it causes the ceramic disk to contract or expand .

B. Software Requirements

Arduino IDE: The Arduino Integrated Development Environment (IDE) is a cross platform application (for Windows, mac OS, Linux) that is written in the programming language Java. It is used to write and upload programs to Arduino compatible boards, but also, with the help of 3rd party cores, other vendor development boards. The source code for the IDE is released under the GNU General Public License, version 2. The Arduino IDE supports the languages C and C++ using special rules of code structuring. The Arduino IDE supplies a software library from the wiring project, which provides many common input and output procedures. User- written code only requires two basic functions, for starting the sketch and the main program loop, that are compiled and linked with a program stub main into an executable cyclic executive program with the GNU tool chain, also included with the IDE distribution. The Arduino IDE employs the program argued to convert the executable code into a text file in hexadecimal encoding that is loaded into the, Arduino board by a loader program in the board's firmware.

MIT App: MIT App Inventor is a web application integrated development environment originally provided by Google, and now maintained by the Massachusetts Institute of Technology (MIT). It allows newcomers to computer programming to create application software (apps) for two operating systems (OS): Android, and iOS, which, as of 8 July 2019, is in final beta testing. It is free and open-source software released under dual licensing: a Creative Commons Attribution Share a like 3.0 Un ported license, and an Apache License 2.0 for the source code.

VI. Result

Fig: 3

Figure 3 shows the front-end design of the application layout. Installation of the MIT App Inventor was completed. The bock codes available in the library were used to create a basic layout of the application. This application was later integrated with the Bluetooth HC05 module. When the 'Connect' button is pressed on the screen, it will display the available devices in the range of the Bluetooth module in the phone. After pairing the Bluetooth HC05 module to the mobile app, the 'Initiate' button is to be pressed in order for the system to receive the input. Once the threshold value is being crossed by the noise, the inbuilt recorder begins to record until the value of the noise falls below the predetermined threshold value

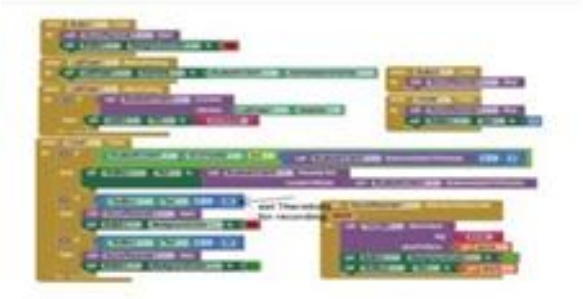

Fig: 4

Figure 4 shows the back-end design of the application block codes which were used to create the interface of the application. When the Bluetooth device is paired with the HC05 module, the Client1 is initiated in order to receive text number of bytes.

Fig: 5

Figure 5 shows that the Arduino code has been compiled without any errors and was successfully uploaded to the Arduino AtMega328P microcontroller. The initialisation of different variables in the code to store values and pin numbers and then include the Software Serial library. The Pin modes for the Arduino pins and the baud rates for the Bluetooth sensor is set. Following this an 'if' condition loop is set which checks the incoming number from Bluetooth. This number is used to set the threshold level for noise sensor. The loop function jumps to other function i.e., sensor that collects the average sensor data.

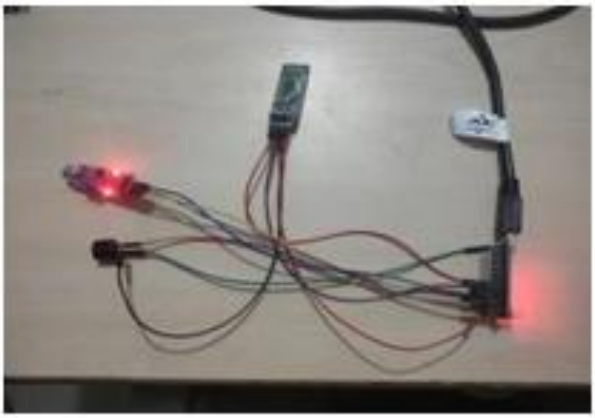

Fig: 6

Fig 6 shows that the Hardware components that were connected as per the block diagram. Pin A7 of Arduino NANO is connected to the sound sensor out, the 5V power supply is connected to VCC and sound sensor, GND is connected to the GND of Bluetooth and sound sensor, Pins D4 and D3 are connected to RX and TX respectively, D12 is connected to buzzer VCC and GND is Buzzer GND.

Test Cases: Table 1 shows the output tested for 6 cases taken in random. The threshold value being 59dB.

Table 1 Test Cases

SL. NO.	ACTION	EXPECTED OUTPUT	ACTUAL OUTPUT
1	Threshold= 50dB	Same state	Same state
2	Threshold = 58dB	Same state	Same state
3	Threshold = 59dB	Recorder triggered and noise recorded.	Recorder triggered and noise recorded.
4	Threshold = 61dB	Recorder triggered and noise recorded.	Recorder triggered and noise recorded.
5	Threshold = 65dB	Recorder triggered and noise recorded.	Recorder triggered and noise recorded.
6	Threshold = 70dB	Recorder triggered and noise recorded.	Recorder triggered and noise recorded.

VI. Future Scope

Schools and Colleges, to maintain silence and also be implemented as a safety device so that it can record gunshots or screams, this information can be used to send help or take the necessary actions immediately. Also in the hospitals, banks, and airplanes if there are any type of terrorist attacks or bank robberies or plan hijacking this device can record all the necessary proofs that can be used in the future investigation.

VII. Advantages

- Security Systems.
- Burglar Alarms.
- Device Control.
- Door Alarms.
- Consumer electronics such as phones, computers, music systems.
- Home automation such as lighting the house by detecting whistle/clap instead of physically turning the light switch.

VIII. Conculsion

Created a mobile application to record the sound whenever the sound raises above the pre- determined threshold level then the starts beeping, later the buzzer sends the signal to the Bluetooth HC05 Module. The Bluetooth HC05 Module Further sends signal to the Mobile application through Bluetooth. So, that the Recordings or files get saved in the Mobile. The code required to run the project was successfully compiled without any errors. The hardware and software components were integrated with each other successfully according to the block diagram. The project functioned according to the flow chart and gave the Expected output.

IX. Acknowledgement

We placed our gratitude to department of Electronics and Communication Engineering, SJC Institute of Technology, Chickaballapur supported to do this project.

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Implementation of Instinctive Overheat Detection and Cooling System for Waterpumping Motor

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Abstract

Modern technology is largely depends on automation and control system. Automation and control system refers the use of various control systems for operating equipment such as machinery, processes in factories, boilers and heat treating ovens, switching on telephone networks, steering and stabilization of ships, aircraft, automobile and other applications with minimal or reduced human intervention. However, it is also used to save energy and materials and to improve quality, accuracy and precision. Because of these advantages, nowadays automation and control system is using in every sector. The aim of this project is to design and to develop such type of automatic cooling system for a motor which will aid in protecting the motor from overheating by means of signals through a temperature sensor. This signal and cooling system mainly consists of temperature sensor circuit, Arduino and LCD. The temperature sensor is fixed to the Arduino, and operating temperature is measured by this. This produces the signal when the motor temperature exceeds the set temperature limit. LCD continuously shows the operating temperature of motor

Keywords: Motor, Temperature, Arduino

I. Introduction

In recent years water pumping motor overheating and damaging has become one of the important concern in household appliances .such failures may cause undesired shutdowns and service disruption, though some components may not fail

immediately but their lifetimes maybe significantly reduced due to overheating ,It is reported in that lifetime of an motors decreases exponentially with the increase of the operating temperature

Finally the generated heat dissipation can also lead to negative environmental implications .However now We all may have seen Computer/Laptop, it has a cooling fan inside. Normally this fan is off. When the computer's motherboard starts to heat up, then the cooling fan automatically starts rotating and cools down the motherboard temperature. In this way, the cooling fan protects the components from overheating and damage. This type of system used in various devices.

In this project, we will learn in case of water pumping motor how this type of system work and how we can build it. This System is known as an Over Heat Detector and Auto Cooling System. The Project working concept is very simple. This system continuously measures the temperature of a component, if the system detects that the component has started to overheat, then the system turns on the fan automatically. When the temperature comes to normal condition then the system turns off the fan and automatically motor starts working normal.

II. Methodology

In order to execute the plan of detecting overheat and cooling the system automatically, we need to detect the temperature of motor that is being overheated to prevent it from damage. So we are using LM35 temperature sensor to detect overheat and transfers that data to Arduino through jumper wires. We use breadboard, jumper wires and resistor of 220 ohms as well while designed the circuit and we code the program using Arduino Uno which is mandatory to detect whether the motor exceeds the limited temperature or not. And then we display that temperature value on LCD 16x2. So that user can get clear information about working status of motor. We have used DC motor with blades (Fan) as cooling system. If the temperature exceeds limit, then it starts rotating so that the system gets cooled down.

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III. Block Diagram

At first, Will start from household water pumping motor and then we will initialize the motor in the sensor and then we should wait till motor gets heated and reach the maximum limit after reaching the maximum limit or sensing by the sensor than the data will transfer from motor to Arduino kit through jumping wires, if motor is overheated which was detected by the Arduino or program, if it is overheated then cooling system is activated if it is not overheated then it get backs to the motor to be heated and then cooling system gets activated after cooling, the motor works normally, suppose if the motor not cooled it get back to the cooling system to make the motor cool and finally the end, this process repeats.

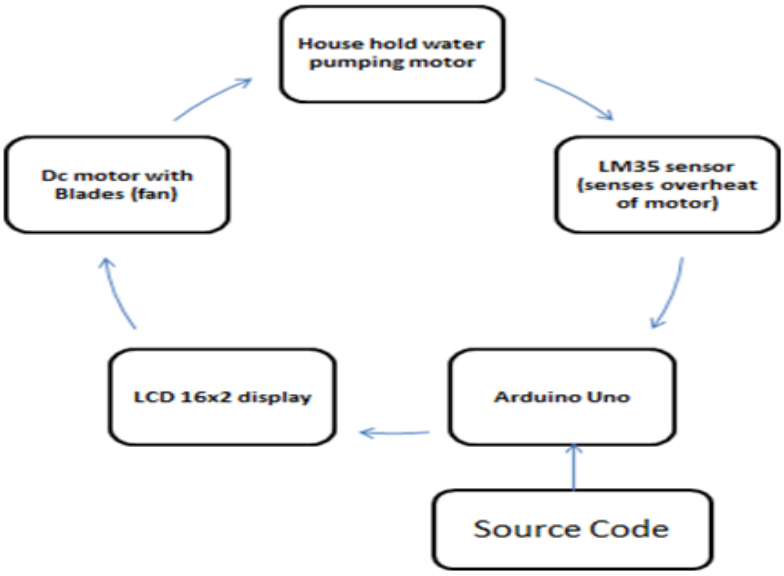

Fig 1: Block diagram of the proposed system

IV. Hardware Components

Water Pumping Motor: A Motor pump is a mechanical device, used to move the liquids/gases from one place to another by using mechanical action. The working principle of the water pump is, it converts the motor's energy from mechanical to fluid flow. All pumps use basic forces of nature to move a liquid. As the moving pump part (impeller, vane, piston diaphragm, etc.) begins to move, air is pushed out of the way. The movement of air creates a partial vacuum (low pressure) which can be filled up by more air, or in the case of water pumps, water.

Lm35 Sensor: The LM35 series are precision integrated-circuit temperature devices with an output voltage linearly-proportional to the Centigrade temperature. The LM35 device is rated to operate over a−55°C to 150°C temperature range, while the LM35C device is rated for a −40°C to 110°C range(−10° with improved accuracy). LM35 is used to measure precise centigrade temperature. The output of this sensor changes describes the linearity. The output voltages of this sensor are linearly comparative to the Celsius temperature.

LCD 16x2: A 16x2 LCD means it can display 16 characters per line and there are 2 such lines. The LCD (Liquid Crystal Display) is a type of display that uses the liquid crystals for its operation. Here, we will accept the serial input from the computer and upload the sketch to the Arduino. The characters will be displayed on the LCD.

DC Motor with Blades (FAN): A DC motor is an electrical machine which converts electrical energy into mechanical energy. The basic working principle of the DC motor is that whenever a current carrying conductor places in the magnetic field, it experiences a mechanical force. It basically works as a fan in this project to cool down the overheated motor.

Breadboard: A breadboard is a rectangular plastic board with a bunch of tiny holes in it. These holes let you easily insert electronic components to prototype (meaning to build and test an early version of) an electronic circuit, like this one with a battery, switch, resistor, and an LED (light-emittingdiode).

Jumper Wires: Jumper wires are simply wires that have connector pins at each end, allowing them to be usedto connect two points to each other without soldering. Jumper wires are typically used with breadboards and other prototyping tools in order to make it easy to change a circuit as needed.

Resister 220 Ohms: Resistors are elements of electrical circuits that resist and reduce the flow of current through the electrical circuit. They can also be used to provide specific voltages to active components. Resistors are available with fixed or variable resistance values.

V. Software Components

Arduino UNO: Arduino refers to an open-source electronics platform or board and the software used to program it. Arduino is designed to make electronics more accessible to artists, designers, hobbyists and anyone interested in creating interactive objects or environments. The word "uno" means "one" in Italian and was chosen to mark the initial release of Arduino Software. Arduino Uno is a microcontroller board based on the ATmega328P.The Arduino Uno is one of the most common Arduino boards available, and it has some user- friendly features, including large 2.54mm pitched sockets for connecting to external devices, an onboard LED, inbuilt power handling (such as an external DC power jack), and a large USB B connector for connecting to a PC. There are several types of Arduino kits. They are: Arduino Uno (R3), Arduino Micro, Arduino Due, LilyPad Arduino Board, Arduino Bluetooth, Arduino Diecimila, RedBoard Arduino Board, Arduino Mega (R3) Board, Arduino Leonardo Board, Arduino Robot, Arduino Esplora, Arduino Pro Mic, Arduino Ethernet, Arduino Zero Fastest Arduino Board. We have selected Arduino uno because of its specification such as ATmega328P Microcontroller, Operating Voltage of 5V, Input Voltage of 7-12V, Inout Voltage (limit) of 6-20V. The Arduino UNO has only 32K bytes of Flash memory and 2K bytes of SRAM. The memory of Arduino uno can be increased by accessing through the SD card.The Arduino Uno is programmed using the Arduino Software (IDE), our Integrated Development Environment common to all our boards and running both online and offline.

VI. Flowchart

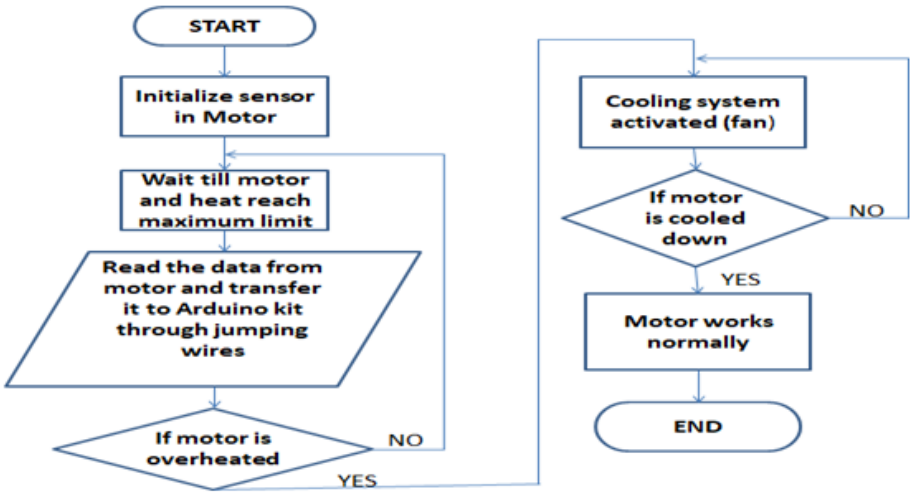

Fig 2: Flowchart

This is the graphical representation of the implementation of instinctive over heat detection of water pumping motor with cooling system using Arduino.

VII. Applications

- It has an application in agricultural field where the motors work for more than 3 to 4hoursand get damaged due to overheat.
- Small scale industries and factories where the motors work for hours to run bigmachines and get damaged due to overheat.
- Serial Motors which are used in hydraulic turbines, where the damage of one motordue to overheat may affect the working of turbine.
- Motors which are installed in cutting machines in mechanical labs.
- The device helps in reducing the Contact with the contaminated or infected person by giving alarm as a caution.
- It can also be used in service station where motors work for hours in pumping water.

VIII. Advantages

- It Increases efficiency of the motor.
- It avoids the explosion due to overheat.
- The Life span of motor increases.
- It is a User friendly.
- It is Easy to implement.
- It is Cost efficient.
- It prevents the damage of the motor.
- The Space requirement is very less for this.
- It can be used in all kind of motors which work on ground.

- It doesn't affect the motor if we implement this system for it.

IX. Result

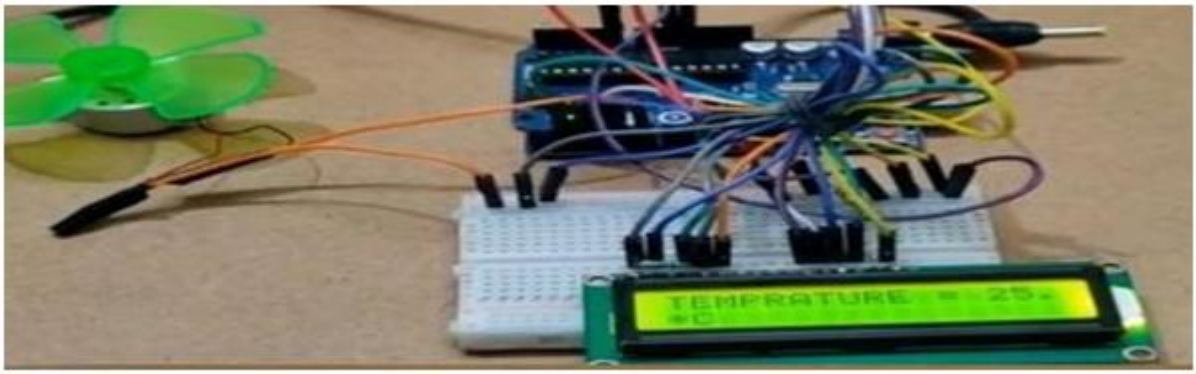

Fig 3: Output OFF state

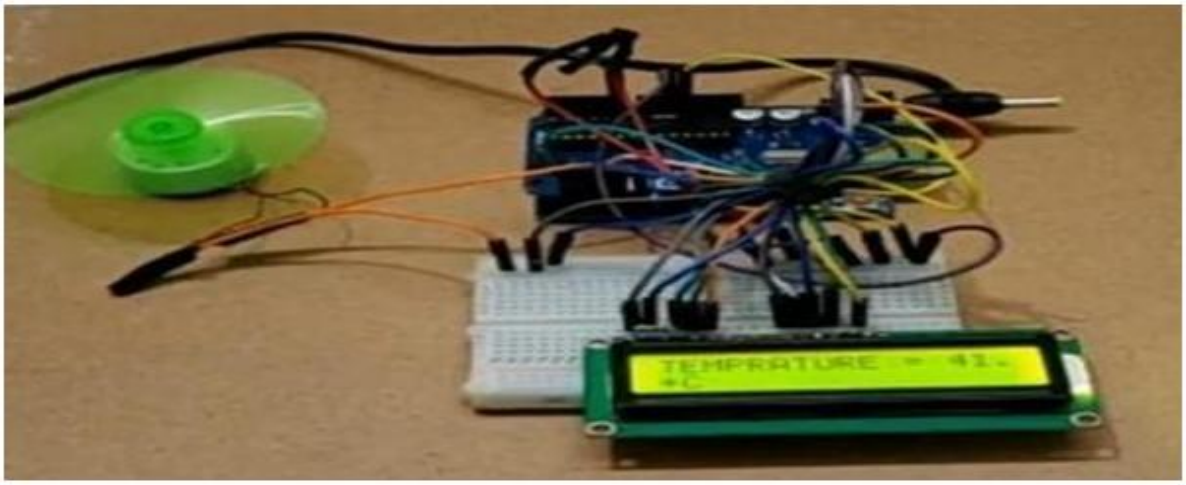

Fig 4: Output ON state

At first, cooling system will be in off state. When the system starts heating and crosses the maximum limit set by the designer, automatically sensor starts to detect the overheat and fans starts rotating to cool down the motor which is overheated.

X. Conclusion

This project is based on the monitoring of temperature, where monitoring of temperature is very essential in every devices, because excess of temperature may decrease the efficiency and accuracy of the water pumping motor and slowly it damages the motors. Motor gets affected by high temperature during its operation. Hence motor overheat control system was designed to measure and control the temperature as well as avoiding the effect of high temperature on the water pumping motor. This is done by cooling the machine when it exceeds the maximum allowable degree using a fan which operates automatically using Arduino. This project is of lowcost and effective. It has a wide application in agricultural field where the motors work for more than 3 or 4 hours and it has application in vehicle service station. It is used for house hold appliances and it prevents the damaging of the motor. This

System is known as an Over Heat Detector and Auto Cooling System. The Project working concept is very simple. This continuously measures the temperature of a component, if the system detects that the component has started to overheat then the system turns on the fan automatically. When the temperature comes to normal condition then the system turns off the fan and motor starts working normal automatically.

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Phone Call Controlled Obstacle Detection & Avoidance Robot

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Abstract

In this paper, a robotic vehicle with the help of DTMF technology that will allow to send data via a call is presented. One can operate the robot by calling on the mobile phone connected to the robotic vehicle. The use of a microcontroller interfaced to the ultrasonic obstacle detector, night vision camera, and motor driver. The paper can overcome the limitation of RF-operated robotic vehicles. The 8051 Microcontroller depends upon the code which is generated by the DTMF decoder to move the robot right or left and forward or backward by rotating both DC motors. The ultrasonic obstacle detector detects if any obstacle is in front of the robot.

The robot gets stopped once it detects any obstacle and then waits for the user's commands. We have used the night vision wireless camera which can transmit videos of the surroundings to the receiver unit connected to the Laptop/PC. With the help of a night vision spy camera, the user is able to view the surroundings shot by this wireless camera which will be connected on the robot. The user can view the surrounding captured by using the night prescient camera each during the sunlight hours in addition to in the course of the night time. The area captured by means of this wireless camera may be viewed at the laptop. For that reason with the help of DTMF technology, the robot allows the users to govern the robot's motion through cell cellphone and prevent its movement if an impediment is detected.

Key Words: 8051 Microcontroller, DTMF Technology, Obstacle Detection, Ultrasonic sensor, DC Motor.

I. Introduction

The demand for robots is increasing to do repetitive work and keep away from jobs that risk existence, inclusive of bomb diffusion, business operations, household duties, etc. This has look at is based at the mobile telephone control machine of independent robots. The appearance and functioning of robots may also range, all robots percentage the skills of a mechanical, movable shape underneath some shapes of control. The control of the robotic entails three levels: notion, processing, and motion. Usually, the sensors are set up on the robot, the processing is performed with the aid of the microcontroller, and the task has performed by the use of cars or with few different actuators. The paper allows operating a robot a robot regardless of the gap of the character working it. This device lets in no longer the handiest to manipulate the robotic's actions but also to stop the robotic as quickly because the robotic encounters an impediment. The consumer of this device shouldn't worry about the gap to operate the robotic to make the robot circulate.

At present almost everything used is operated by remotes. The most important obstacle of far flung manage is its constrained frequency level. To overcome this hindrance you could use a satellite and connect to a satellite then perform it from any part of the arena. This can be without difficulty performed with the aid of using one of the maximum unfold networks of the world the cellular network. This paper will advise a way for manipulate of the robotic the usage of the DTMF tone generated while the user pushes cell phone keypad buttons linked with robotic vehicle.

This device lets in to govern of the robotic's moves and to forestall the robot when the robotic encounters an impediment. The person of this machine doesn't must fear approximately the distance to function the robot. The system does this with the use of dtmf generation which allow the sending of facts commands thru a name. The user who wants to perform the robot will simply have to name at the cellular telephone connected to this machine. This device includes an 8051 microcontroller that's interfaced with the ultrasonic obstacle detector, wireless digicam and the gadget additionally makes use of a battery.

The ultrasonic impediment detector help to hit upon any impediment this is in the front of the robot. The robotic stops as soon as it detects any obstacle after which waits for the consumer's instructions. To function, the consumer has to make a name to the cellphone that is related to this robot. The receiver telephone will must obtain the call-to- statistics commands essential for the robotic's moves. The data instructions will make the robotic either go in forward, backward, left, or right course. The gadget makes use of a night time imaginative and prescient- enabled undercover agent digicam with the help of which the person can view the place captured via this undercover agent digicam that allows you to be set up on this robotic. The consumer can view the location captured via this wi-fi digicam now not most effective in the course of the daylight but additionally all through the night time.

All the regions captured by this secret agent digicam can be regarded on the pc. Consequently with the assist of dtmf era, the device allows the customers to control the robotic's motion thru a cellular telephone and prevent its motion if an obstacle is encountered.

Major Problems in RF Operated Robotic Vehicle

At present, nearly the entire used robots is operated through remotes.

The biggest issue of faraway managed robotic is its:

- Confined frequency level.
- Limited control.

The major issues in society:

- Damage and loss to human life in the military.
- Difficulty in search and rescue during natural calamities like earthquakes.
- It is difficult for a common human being to reach some extreme places in extreme conditions.

Objectives

The primary goal of the proposed paper is as follows:

- Overcome this limitation of RF-operated robotic vehicles.
- Use of DTMF technology to connect the devices and operate them from any part of the world.
- To develop this robot for the surveillance inside the battle field or border areas to lessen attack from the enemy aspect.
- Overcome the issues faced insociety.

The robot consists of a night time vision wi-fi digicam which could transmit videos of the battle area to save you any damage and loss to human existence. The robotic facilitates inside the protection sector to lessen the loss of human life and also will prevent unlawful activities.

II. Literature Survey

Aliyu, J. G. Kolo, O. O. Mikail, J. Agajo, B. Umar and O.I. Aguagba, "An ultrasonic sensor distances elicited automatic braking automobile collision avoidance system". This paper offers the thought to design and develop a robotic vehicle using DTMF technology for operation from distant places connected with a wireless camera for observance purposes. The receiver decodes before passing the data to a microcontroller to drive DC motors via motor driver IC for necessary work [1].

M. S. Uddin, M. Gianni, and A. Lab, "Long vary robot teleportation system supported net of things", Nowadays, one can no longer imagine that net will be thought-about simply a network of computers. one can even have to state that it's changing into even a lot of a network of things [2].

MacMillan, Neil, etal."Range-based navigation system for a mobile robot", The aim is to support operators throughout things within which the remote control devices lose the reference to the on-board receivers [3].

R. Chinmayi et al., "Obstacle Detection and avoidance Robot", planned the event of associate obstacle turning away artificial intelligence. the target of the project is to develop an associate obstacle avoiding robot employing a microcontroller associated with an ultrasonic sensing element to observe the object ahead of it. This model is provided with an associate ultrasonic sensor and therefore the distance calculations are done within the microcontroller. This prototype is additionally equipped with a wireless camera for live video transmission which might be received by varied terminals like smartphones, tablets, PC, etc [4].

R. Sharma, K. Kumar, and S. Vig, "DTMF based mostly device System", a trial has been created to handle automation supported dual-tone multi-frequency device system for industrial and unit applications. During this work, we tend to style a tele remote system. The system is enforced on existing telephone lines to allow a leading-edge advantage over typical Infrared remote systems [5].

W. Farooq, N. Butt, S. Shukat, N. A. Baig and S. M. Ahmed, "Wirelessly Controlled Mines Detection Robot", during this paper, we have a tendency to target in of human beings and consequently the automaton; the robotic is supplied with unique range sensors that facilitate in keeping off the barriers inside the area via specially detecting the placement of barriers. A wi-fi camera is added to the robotic, that captures and pronounces the contemporary area of the automaton. Small controller instructions the automaton. [6].

Yun Chan Cho and Jae Wook Jeon, "Remote robot control system based on DTMF of mobile phone", The robot can be managed the usage of dual tone multi-frequency (DTMF) era. This DTMF gives a bonus over the RF; it will increase the range of running and additionally gives realistic results in a case of motion and direction of the robot using cellular via microcontroller. This form of wi-fi communique gives the faraway managing operation of the robot the usage of DTMF [7].

In this paper, by the way of developing this robotic vehicle, we've were given conquer the drawbacks of RF communication that have a confined range whereas this car may be controlled from any place truely using this DTMF generation. In this venture with the utilization of mobile for robotic management one is able to overcome these limitations. It offers the blessings of strong manipulate, working range as big because of the coverage space of the carrier supplier, no interference with exclusive

controllers, and as much as 12 controls. Even though the arrival and abilities of robots range immensely, all robots proportion the options of a mechanical, movable shape below some style of control.

III. Block Diagram

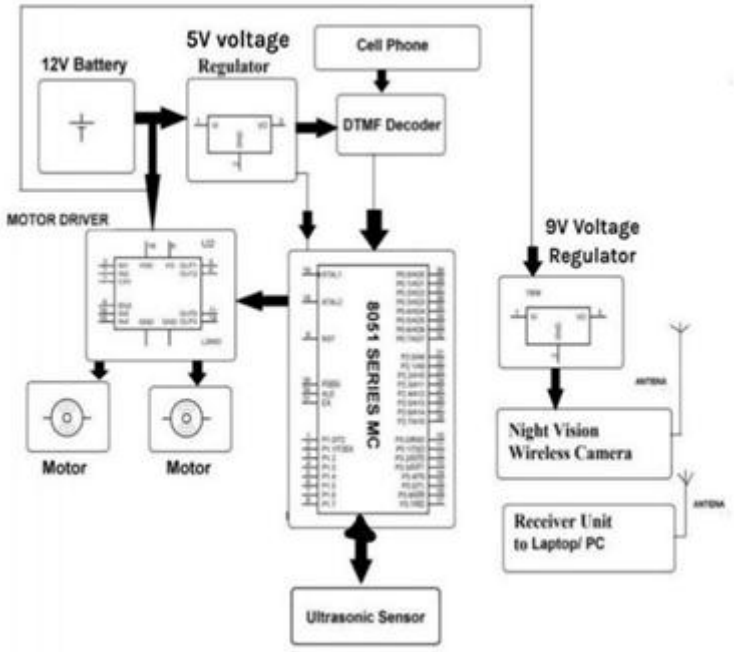

Fig 1: Block Diagram of Phone Call Controlled Obstacle Detection Robot

This project allows not totally to control the robotic's actions however conjointly to prevent the robotic as soon because the robotic encounters an impediment. The person of this gadget doesn't have to fear approximately the distance at some stage in this undertaking lets in not completely to control the robotic's movements but conjointly to prevent the robotic as quickly because the robot encounters

An obstacle. The user of this method doesn't were given to fear concerning the distance for you to work the robotic. The gadget does this with the assistance of dtmf era that lets in sending facts instructions through a name. The consumer choice to operate the robotic can certainly have to call on the cellular telephone connected to this device. This device consists of an 8051 microcontroller that is interfaced to the ultrasonic impediment detector, undercover agent digicam and the and consequently the and conjointly the device also uses a 12 v battery.

The ultrasonic obstacle detector enables to locate any obstacle that comes inside the way of the robot. The robot robotically stops as soon as it detects any obstacle after which waits for the person's commands. On the way to work the device, the user has got to build a call to the telephone connected to this golem. The receiver phone can got to acquire the call that allows you to statistics commands vital for the robot moves. The data commands can create the robotic either cross in ahead,

backward, left, or right direction. The system uses a night time imaginative and prescient-enabled undercover agent digicam with the help of that the consumer will read the place captured by using this undercover agent camera which may be set up on this robotic. The person will study the area captured via this wireless camera not only for the duration of the daytime however conjointly for the duration of the night.

All the areas captured by this undercover agent digital camera is viewed at the laptop. Consequently with the help of dtmf technology, the gadget presently permits the users to manage the robot's motion thru mobile phone and stop its motion if an impediment is encountered.

8051 Microcontroller: It is the 8051 microcontroller. All remaining hardware peripherals area unit connected to the microcontroller for receiving, processing, and sending information.

Mobile Phone: Mobile is employed to send commands to robots from anyplace in the world. this is often done by connecting any GSM mobile to induce a broad range to regulate the robot. A mobile that allows you to construct and receive phone calls over a hyperlink whereas traveling a massive geographical place. It does so via connecting to a mobile network furnished through a cell operator, permitting get right of entry to to most of the people smartphone community.

DTMF Decoder: The mobile will be connected to the DTMF decoder for accessing the commands sent by the remote mobile in audio format (DTMF) and therefore the decoder decodes the audio format to the binary equivalent in four-bit that is then sent to the microcontroller for more process.

Motor Drivers: Motor drivers are connected to drive robot motors having high power necessities. based on the DTMF commands, The microcontroller sends a sign to the motor driver to force the cars for the robotic's actions. The l293d will be a quad, excessive-contemporary, half-h driver designed to supply bidirectional pressure currents of as much as 600 ma at voltages from four5V to 36V. It makes it less complicated to pressure the dc automobiles. The L293D consists of 4 drivers.

DC Motors: DC in gear motors of twelve volts connected to the robot for providing mobility to the robot. The DC motor gets a signal from the motor driver which is connected to the microcontroller.

Wireless Camera: Night vision wireless camera works on ip protocol that provides live streaming video data to the remote receiver. The receiver could be a mobile phone or computer. If the camera gets internet access then live video may be seen from any place within the world.

Ultrasonic Sensor: The HC-SR04 ultrasonic sensor uses an echo sounder to determine the distance to an object. Therefore it will find obstacles and avoid obstacles. cellular phone decision controlled obstacle detection could be a system that will be controlled with a mobile.

Voltage Regulator: The characteristic of the voltage regulator is to deliver a stable dc voltage for powering one of a kind electronic circuits. The voltage regulator have to be able to providing a considerable output present day. They need to offer a relentless voltage regardless of adjustments in load present day, temperature, and ac line voltage. The transformer may be designed victimization op-amps, while it gives the short and best manner for functioning. Ic voltage regulators are versatile and comparatively inexpensive and are supplied with features any such programmable output cutting- edge/voltage boosting inner short-circuited contemporary restricting.

IV. Flowchart

The steps followed the run the robot are as follows:

STEP-1. Start.
STEP-2. Begin the system by switch on the power supply module.
STEP-3. The continuous observance of command inputs from the mobile through theDTMF decoder.
STEP-4. When the command is received, the DTMF decoder starts the motion of the robot based on the command received by the mobile phone.
Press key 2 for Forwarding motion Press key 4 for Leftward motion Press key 6 for Rightward motion Press key 8 for Backward motion Press key 5 for stopping
STEP-5. Throughout the robot motion if any obstacle gets detected then the robot will be stopped instantly.
STEP-6. The camera will continuous streaming regardless of the commands received or the motion of the robot.
STEP-7. End.

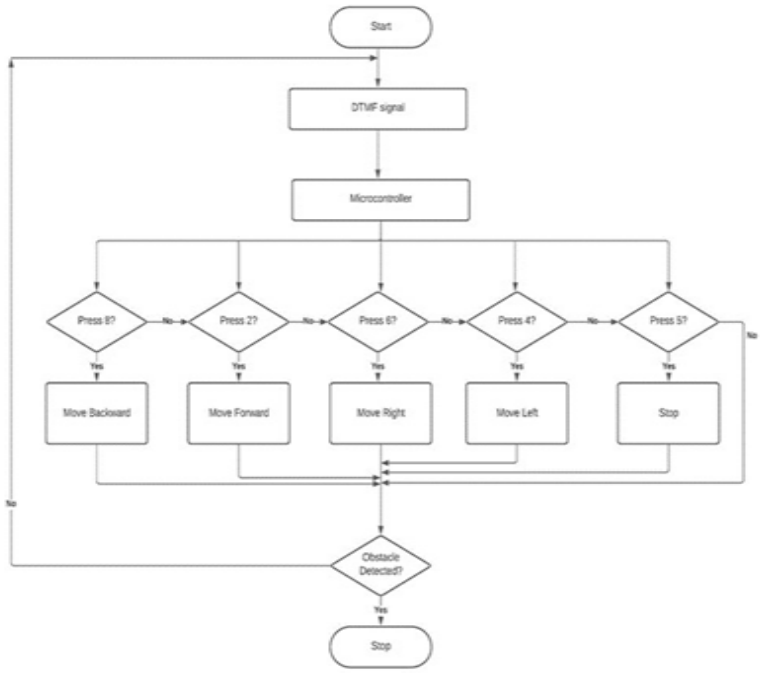

Fig 2: Flow Chart

V. Results

Fig 3: Cell Phone call controlled robot

In this project, the robot is controlled by a cellular phone that produces a choice to the cellular smartphone connected to the robot as proven in fig.3. Within the call, if any button is pressed, a unique tone paying homage to the button hit is detected at the opposite cease of the decision. This tone is termed the 'Dual tone multiple-frequency' (DTMF) tone. The robot perceives this DTMF tone with the assistance of the cellphone stacked on the robotic(fig.4). The utilization of a cellular telephone for robot manipulate will triumph over these boundaries of the frequency range. It affords the gain of sturdy manipulate, a running range as large because the insurance space of the carrier provider, no interference with opportunity controllers, and as much as 12 V.

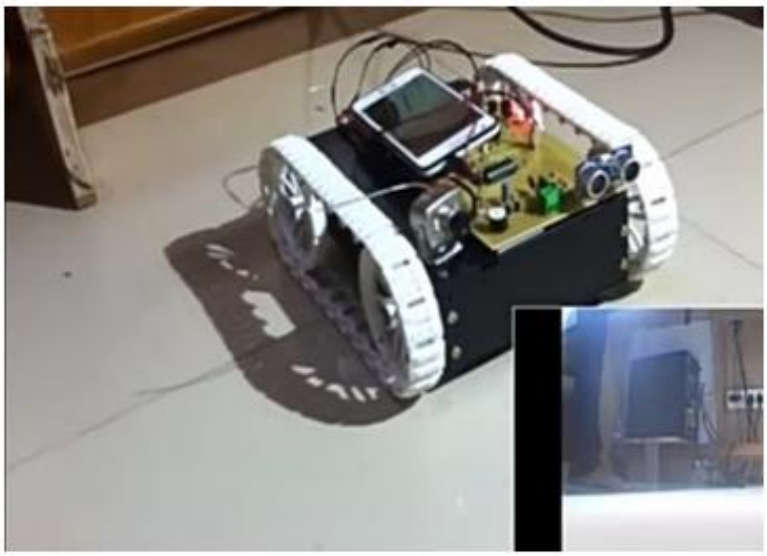

Fig 4: Movement of robotic vehicle

This project permits not solely to regulate the robotic's movements however also to prevent the robotic as quickly because the robot encounters an impediment. The user of this machine doesn't need to fear regarding the distance with a purpose to

control the robotic. The system does this with the assistance of DTMF generation that lets in sending facts instructions via a call. The consumer wishing to manipulate the robot can clearly want to name on the mobile telephone connected to this device. This technique includes an 8051 microcontroller that is interfaced to the ultrasonic obstacle detector, wireless night vision spy camera and consequently also the device additionally makes use of a 12 v battery.

Fig 5: Ultrasonic obstacle detection

The ultrasonic obstacle detector (fig.5) helps to take a look at any obstacle that comes on the way of the robot. The robot automatically stops once it detects any obstacle then waits for the person commands. In an effort to control the device, the user desires to make a call, a connection from the smartphone is done to this robotic vehicle. The receiver phone will want to acquire the call for you to information commands required for the robot moves. The instructions can make the robotic vehicle to either pass in ahead, backward, left or right course.

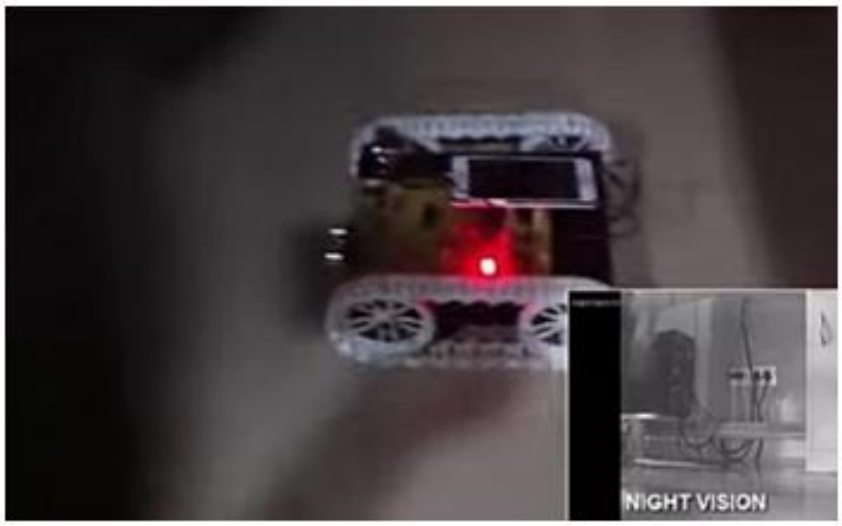

Fig 6: Night vision spy camera image obtained during night or dark places

The device makes use of a night-sight-enabled spy camera (fig.6)with the assistance that the user will see the place captured by using this secret agent digicam with the intention to be hooked up on this robotic vehicle. The consumer will test the location captured by means of this wi-fi camera at some point of the daylight hours conjointly throughout the night. All the region captured by way of this spy digicam is viewed inside the mobile/ laptop. So with the help of DTMF technology, the robot will now permit the user to regulate the robot's movement via cellular and stop its motion if an impediment is encountered.

Fig 7: Results Obtained

During tests, the proposed model worked as expected. This robot is tested to the best of our capability. One might take a look at as it should be what's taking place, the machine would not motive any damage. DTMF controlled robotic is run by using some commands which can be despatched via cellular. The utilization of the DTMF operates of mobile telephones. Right here the utilization of the mobile to suggest the working of the project. One is that the user mobile that we are going to is used to make a 'remote cellphone' and therefore the alternative this is linked with robotic's circuit the usage of aux twine. For this cellular one must name 'receiver cellphone'. First, one need to construct a call by means of using a far off phone to the receiver telephone so attend the choice manually or computerized answer mode. Presently here is however this DTMF managed robot is controlled by using mobile cellphone: once '2' is pressed by means of remote cellphone, the robotic begins to transferring ahead and transferring keeps forward till succeeding command comes, once '8' is hit phone, the robotic exchange his state and begin shifting in backward course till every other command comes once '6' is pressed robot turned to pressed as soon as 'four' is pressed robotic became to left and for preventing robot '5' is pressed.

This will be operated with the aid of sitting anywhere with none frequency hassle. The undertaking will find out the impediment and keep away from a collision. Instead of using more than one cameras, one will use a movable undercover agent robot. With the aid of developing this robotic vehicle with its multitasking feature, the drawbacks are conquer of that visible in RF based robots that had a constrained range

whereby this automobile is controlled from anywhere via the usage of DTMF generation. Thinking about all the matters this can be used for police investigation and army applications with the assistance of installing the digital camera.

VI. Conclusion

By building this robot, one can reduce the shortcomings of low RF limitations as we have been able to control this vehicle from anywhere in the world using this DTMF technology. The great advantage of the robot car is that it can reach anywhere such as small mines and pipelines, for these reasons it was widely used in military and research processes. It is a mobile robot, so it is now used for research, mining, and military purposes because of its wide range of control and wide range of operations.

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Photonic Integrated Circuits for Modern Telecommunication

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Abstract

Photonic Integrated Circuits allow you to meet the growing demand for online communication systems40% per annum. This growth is driven mainly by the increase of video in online networks. This growth is now accelerating as well mobile access, with video clients being sent to all smartphones and tablets, making the video easy to use via the network to communicate anywhere and anytime. This paper reviews multiple platforms for integrated photonic circuits and compares them performance. This paper also describes new approaches to the design and construction of photonic integrated optical transceiver regions of the next terabit period era.

Keywords: Integrated photonics, photonics integrated circuit, optoelectronics, optical transport network.

I. Introduction

The development of virtual transport network technology is fueled by emerging services such as data center cloud services, ultra-bandwidth video services, and 5G mobile network services that will drive future optical communications network development and structural change. Some industry studies show that the total value of the internet is growing by about 40% per year. This growth is driven mainly by the increase in video on networks - Netflix now takes up to 30% of the internet bandwidth at peak times and new competitors such as Amazon, Hulu, Youku, and BBC I Player are growing rapidly. This growth is now accelerated by mobile access, with video clients being sent across smart phones and tablets, making video easy to access via any network connection, anytime.

The flow of monthly mobile data via smartphone continues to increase in all regions. North America is widely used, and traffic is expected to reach 7.1 Gigabytes (GB) per month per smartphone by the end of 2017 and increase to 48 GB by the end of 2023. is set to reach 4.1 GB by the end of 2017 and 28 GB by the end of 2023.

Western Europe will be the region with the highest rate of monthly mobile data traffic growth per smartphone during the forecast period. India's high-end consumption - estimated to reach 3.9 GB per month per smartphone by the end of 2017 - is largely due to the LTE presentation introduced by the operator during the last half of 2016, which included voice traffic and free data. Data flow rates are expected to continue to grow, reaching 18 GB per month with a smartphone in2023.

Features that will drive high usage, typically, include an increase in the value of LTE subscriptions, improved device capabilities, and less expensive data systems, and an increase in critical content content. As real technology and the unpopularity of taxpayers we see become more widely accepted, content will become more powerful in data. The total mobile data rate is expected to increase at a combined annual growth rate of 42 percent. Total mobile data traffic for all devices is anticipated to increase by 8 times during the forecast period, reaching around 110 EB per month by the end of 2023. At close to 85 percent, data traffic generated by smartphones is already accounting for the largest proportion of mobile data traffic. Going forward, smartphone data traffic will become even more dominant and is expected to increase by 9 times during the forecast period to account for close to 95 percent of the total mobile data traffic by the end of2023.

The new Ethernet Alliance is following an Ethernet route from 10 Mb / s at today's speed of 1 to 400 gigabit Ethernet, and is looking forward to future speeds of up to 1.6 terabits and beyond. Figure shows the emergence of Ethernet speeds and future future speeds [2]. The forward-looking map also provides guidance on basic technology, current and future connections, and multiple application gaps in which Ethernet plays a key role. Construction and industrial applications highlight the need for low-speed Ethernet solutions in challenging environments This will include the creation of more legacy protocols, furthering the promise of Ethernet mufti- level integration at high altitudes, as 2019 forecasts point to 165 million ports per year. Service providers have been pushing for higher Ethernet solutions for decades.

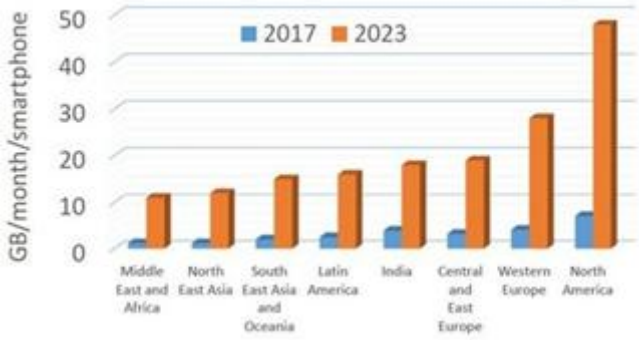

Fig1: Data traffic pre active smartphones in Gigabytes per month.

Router connectivity, optical side optics of optical transport tools (OTN), and wireless backhaul continued to advance Ethernet at higher levels and distances to meet the needs of wireless connectivity. And with global demand by video consumers, this shows no signs of change.

II. Photonic Integrated Circuits

The integration of optical material with large PIC functions shows significant benefits when combined with a visual communication system. It enables greater power, space and cost savings, new functionality and increased power transfer capacity for communication systems. PICs are still more expensive orders than their microelectronic counterparts, which has hindered their application in a few niche markets. In microelectronics there is a noticeable improvement in the number of transistors per chip, which has doubled every two years on average over the past forty years. This act is known as Morey's law. Figure.1 reveals the same growth in micro photonics, even if it is still in its infancy and spread much larger than its microelectronic counterparts. If we limit ourselves to AWG-based devices, with less or less comparable technology (AWGs with integrated amplifiers and / or machines) most vendors disappear, however, suggesting that photonic integration takes the same approach to development in microelectronics, perhaps further similar advances in equipment.

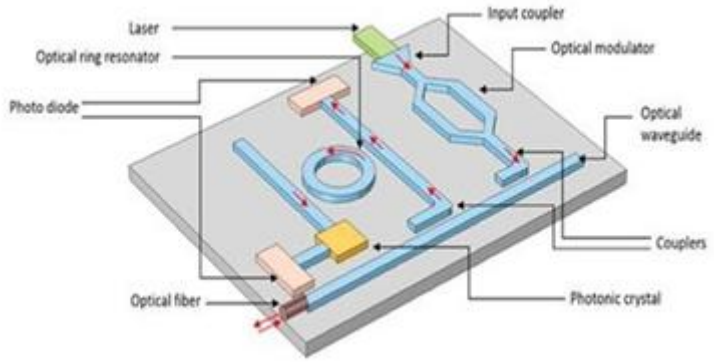

Fig2: Block diagram of photonic integrated circuit.

An integrated circuit is a chip that contains electronic components that make up an active circuit, such as those embedded within your smart phone, computer, and other electronic devices; a photonic integrated circuit (PIC) is a chip that contains photonic components, which are light-emitting substances (photons). Silicon photonics can be defined as the use of generation-based silicon materials (electrical-to-light conversion), guide, control, and acquisition (light-to-electrical conversion) light to communicate with distance information. The most advanced extension of this concept is to have a complete set of optical and electronic functions available to the designer such as monolithically constructed building blocks in a single piece of silicon.

Intel's silicon photonics research is an end-to-end effort to build integrated photonic devices in silicon for communication and other applications. In order to "siliconize" photonics, there are six main areas or building blocks for research and investigation. Inexpensive light source. Devices have routes, separators, and light directly on the silicon chip. Modulator for encoding or converting data to an optical light signal. A photodetector to convert the optical signals into electrical digital data bits. over all devices are Low-cost, high-volume assembly methods. providing

electronics for intelligence and photonics control. A laser diode, (LD), injection laser diode (ILD), or diode laser is a semiconductor device similar to a light-emitting diode in which a diode Pumped directly with electrical current can create lasing conditions at the diode's junction. Laser diode scans recombination of an electron with a hole. Due to the drop of the directly convert electrical energy into light. Driven by voltage, the doped p-n-transition allows for electron from a higher energy level to a lower one, radiation, in the form of an emitted photon is generated. This is spontaneous emission. Stimulated emission can be produced when the process is continued and further generate light with the same phase, coherence and wavelength.

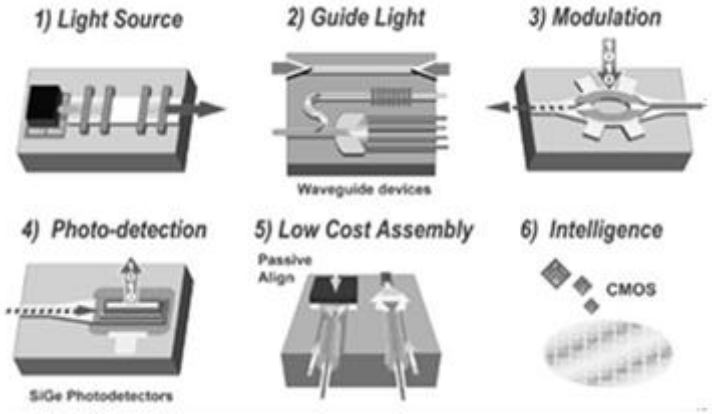

Fig3: Building Blocks of Silicon Photonics.

A light guide is "a thin, thin layer of tube, such as glass or plastic, that can transmit light signals in a series of total internal reflection mechanism. For such fiber to direct light, the proper relationship between the refractive index and its surrounding cladding refractive index difference must be maintained. Electro-optic modulator (EOM) (or electro-optic modulator) is a tool that can be used to control power (-- power modulators), phase (-- phase modulators) or light polarization with an electronic control signal. It usually contains one or two Pockels cells, and perhaps additional optical components such as polarizers. The simplest type of electro-optic modulator is a phase changing modulator consisting of only a Pockels cell, in which the electric field (inserted into the crystal with an electrode) changes the delays of the laser beam sent by the crystal. The polarization of the input beam must be aligned with one of the visible crystals of the crystal so that the state of polarization is notaltered.

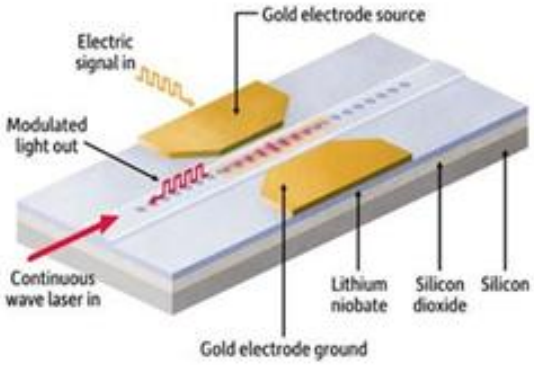

Fig 4: Op to-electric modulator.

Depending on the type and shape of the non-linear crystal, and in the direction of the electric field used, phase delay may depend on the direction of the polarization state. The Pockels cell can thus be seen as an electrically controlled waveplate, and can be used to adjust the polarization state. For a streaked input polarization (usually directed at 45 ° to crystal axes), the output separation will be elliptical, rather than simply a vertical dividing point with a rotating direction. A Photodetector is a key device in the front end of an optical receiver that converts an incoming optical signal into an electrical signal, known as an O / E converter. Semiconductor photodetectors, commonly referred to as photodiodes, are the most prominent types of photodetectors used in fiber-optic communication systems because of their small size, fast detection speed, and high acquisition efficiency. Similar to laser diode structures, photodiodes are also derived from PN shields.

The term "Laser" is an acronym for Light Amplification through Stimulated Emission of Radiation. The stimulated emission is created by changing the state of electrons – the subatomic particles that make up electricity. As their state changes, they release a photon, which is the particle that composes light. This generation of photons can be encouraged in many objects, but not silicon because of its material properties. However, another process called Raman Effect can be used to increase light(optical amplification is employed) in silicon and other materials, such as glass. Intel has benefited from the development of research by creating an optical device based on Raman Effect, which enables silicon to be used for the first time to magnify signals and make continuous laser beams. This breakthrough opens up new opportunities for making optical devices in silicon. Raman Effect is widely used today to make amplifiers and lasers in fiber optic. These devices are built to direct the laser beam - known as pump beam – in to fiber.

III. Comparison

PICs use a laser source to inject light driving peripherals, much like opening an electric injection switch that drives electrical peripherals. Using light instead of electricity, integrated photonic technology provides a solution of electronic limitations such as integration and production of heat, taking devices to the next level, a concept called "More than M0RE" to maximize power and speed of data transfer. PICs offer benefits such as miniaturization, high speed, low temperature effects, high integration power, and compliance with existing operating flows that allow for high yield, volume production, and low prices. Integrated photonics applications are extensive - from data communication and hearing in the automotive industry and the astronomy field.

IV. Advantages

Photonic integrated circuits having the following advantages as compared to electronic integrated circuits.

- Immunity from electromagnetic interference(EMI).
- Freedom from electrical short circuits or groundloops.

- Safety in combustible environment.
- Security from monitoring & Low-loss transmission.
- Large bandwidth (i.e. multiplexing capability) , Small size, lightweight.
- Inexpensive, composed of plentiful materials.
- Expanded frequency (wavelength) division multiplexing (FDM ORWDM).
- Low-loss couplers, including bus accesstypes.
- Expanded multipole switching (number of poles, switching speed).
- Smaller size, weight, lower power consumption.
- Batch fabrication economy.
- Improved reliability.
- Improved optical alignment, immunity tovibration.

V. Result And Conclusion

The photonic integrated circuits provide a better solution to overcome the destruction of electrical devices due to electromagnetic interferences and also freedom from electrical ground loops. this technology providing low transmission loss and also a high level of security to our data. optical communication mechanism incorporated with integrated board helps to expand the frequency range in frequency division multiplexing and also wavelength division multiplexing techniques which increase the data transmission rate. it also reduces the overall power consumption of the device and also size.

This paper reviews a major application to increase internet demand and the arrival of the terabit era in the optical transport network, in cloud and advanced computer applications. We have discussed the basic architecture of photonic integrated circuits, discussed the opt oelectrical modulators, and their working. we have also discussed the many advantages of PICs over electronic integrated circuits, and also discussed the individual blocks of the PICs.

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Smart Helmet Controlled Vehicle

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Abstract

The invention of the automobile is one of the greatest successes of mankind, greatly contributing to the development of the country. However, it is impossible not to mention the number of deaths caused by these cars, of which tens of thousands of people lose their lives or have life-changing accidents. Traffic accidents are mainly caused by vehicle collisions and human losses are due to lack of safety equipment. The first step to know if the helmet is worn or not. If a helmet is worn, the ignition starts, otherwise it stays off. For this, a temperature sensor is used to detect the human temperature. The second step is alcohol detection. The MQ3 alcohol sensor is used as a breath analyzer to detect the presence of alcohol in the breath of a cyclist. The third step is whether the headset is locked or not in this condition, the lock switch will be used. When these three conditions are met, only ignition starts. All conditions are displayed on LCD. Each condition is assigned with a unique character that is transmitted through the zigbee. If runners are involved in an accident, they may not get immediate medical help, which is one of the leading causes of death. The invention of the automobile is one of the greatest successes of mankind, greatly contributing to the development of the country. However, it is impossible not to mention the number of deaths caused by these cars, of which tens of thousands of people lose their lives or have life-changing accidents. The causes of traffic accidents are mainly due to vehicle collisions, loss of life due to lack of safety equipment. The first step in knowing if the helmet is worn or not. If a helmet is worn, the ignition will start otherwise it will remain off. For this, the temperature sensor is used to detect human temperature. The second step is alcohol detection. The MQ3 alcohol sensor is used as a breath analyzer which detects the presence of alcohol in the driver's breath. In the third step of seeing if the headset is locked in this condition, the lock switch is

used. When these three conditions are met, only the ignition starts. All conditions are displayed on LCD. Each condition is assigned a unique character which is transmitted through the zigbee. If the runner is the victim of an accident, he cannot get immediate medical help, which is one of the leading causes of death.

Keywords—Smart Helmet, Accident detection, Helmet recognition, SMS alerts, GPS Location, Alcohol detection.

I.Introduction

The helmet is made of fiberglass and thermoplastic, it acts like a shell to protect our brain. Now, wearing a helmet every day has become an essential part. The government has established many regulations on helmet wearing. Because wearing a helmet is good for people's lives, the public doesn't care about wearing it. In this proposed system, wireless communication between bike to helmet, bike to signal part, bike to Arduino board is used. The system will consist of a helmet module that includes a microphone and a bike mount. The system will use various wireless communication protocols such as radio frequency protocol, Bluetooth protocol and ZigBee protocol [1].

The helmet system is designed with stereo speakers, microphone and wireless communication device. Using this system, the rider can communicate wirelessly with the bike. For example, if a cyclist wants to turn on the correct indicator light, it is not necessary to do so physically. The rider just needs to speak directly into the microphone placed in the helmet and then the data is transmitted wirelessly to the bike part using the bluetooth module. Likewise, it is possible to control a bike's entire automatic system such as headlights, horns and turn signals from the helmet without any physical changes. The mobile phone with bluetooth technology can be synchronized with the bluetooth module of the headset, so that the pilot can join calls, listen to songs The bluetooth function of the phone will be activated during the bluetooth module of the headset. Whenever a mobile phone is synchronized with the Bluetooth module of the helmet, all the automation of the bicycle which has to be done manually by the racing driver has to be done manually by the driver.

These are the three main issues that drove us to develop this project. The first step to know if the helmet is worn or not. If wearing a helmet, the ignition will start, if not, it will turn off until the helmet is not worn. The second step is alcohol detection. Alcohol concentration sensor used

As a breath analyzer that detects the presence of alcohol in the pilot's breath if the range is exceeded, the ignition cannot start. It will send a message to the registered number. The MQ3 sensor is used for these. When these two conditions are met, ignition begins. The third major problem is accidents and late medical assistance. If the driver has an accident, he cannot get immediate medical help, which is the leading cause of death. . Every second a person dies due to late medical assistance. Thanks to this mechanism, it detects whether an accident has occurred or not. The aim of this

project is to create a protection system in the helmet to ensure good safety for cyclists. The smart helmets we produce are attached with sensors that act as if to detect whether a helmet is worn or not [1].

II. Literature Survey

Implementation of Smart Helmet

In this article, an IoT product called Smart Helmet is offered, which consists of two units, a motor unit and a headset unit. It consists of various sensors and a transmitter circuit. The transmitter side microcontroller has three sensors, namely alcohol sensor, vibration sensor and infrared sensor. The receiver-side microcontroller consists of a liquid crystal display, a global system module for mobile communications, an RF receiver, a receiving antenna, a DC motor, a L293D reader and a global positioning module. System [1].

III. Methodology

This unit includes various sensors and a transmitter. The microcontroller contains three sensors namely alcohol sensor, vibration sensor and temperature sensor An alcohol sensor is used to detect alcohol concentration. The alcohol sensor will be located near the pilot's mouth, inside the helmet. Vibration sensors are used to locate the accident. Another microcontroller contains two sensors, a pulse sensor and a UV sensor. The pulse sensor was used to measure the pulse rate. As the pulse increases, it will stimulate LED1 to flash white light. The UV sensor will detect the moving vehicle to avoid a collision and also control the accident. If a vehicle is detected near our vehicle, the activated LED2 will flash red. An RF transmitter can transmit information from any standard controller or encoder IC used. The RF transmitter transmits information from the microcontroller on the headset side to the receiver on the vehicle side through the transmitter antenna.[3]

IV. Working

Transmitter (Hemet Section)

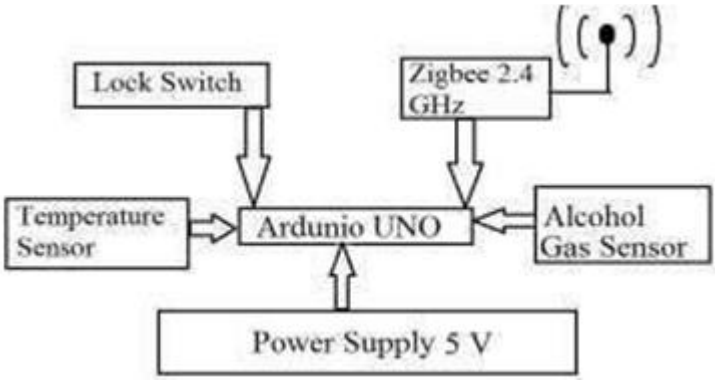

Fig. 4.1 Transmitter (Hemet Section)

Fig. 3.1 shows helmet section consists of temperature sensor, alcohol sensor, Bluetooth module, lock switch. Temperature sensor is a 3 terminal device. Since output of temperature sensor is an analog, so we can convert to digital form by using ADC. Temperature sensor can be directly interfaced with Arduino. It can provide 5V DC and ground from Arduino. The sensor data pin can also be directly connected to any of Arduino digital I/O pins. Alcohol sensor is used for alcohol detection. It consists of 4 pins, digital pin of alcohol sensor is connected to 8th digital pin of ardunio UNO, VCC and ground pin of alcohol sensor is connected to 5 V pin and ground of arduino UNO respectively. The Gas sensor can detect or measure gasses like LPG, Alcohol, Propane, Hydrogen, CO and even methane. The module version of this sensor comes with a Digital Pin which makes this sensor to operate even without a microcontroller.

The analog output voltage provided by the sensor A0 pin varies in proportion to the alcohol concentration in the air, the higher output voltage, where as lower concentration gives lower output voltage.

Receiver (Bike Section)

The receiver is placed on the bike; it includes link in Zigbee nursing receiver, MCU node and visual instructions. The Zigbee receiver receives the encrypted data transmitted by the Zigbee transmitter and transmits them to the receiver's ardunio. Ardunio operates the motor of the vehicle after receiving digital information from the generator part, it operates the motor through the relay circuit, but it cannot operate the relay directly, and therefore, interface relays are also used here.

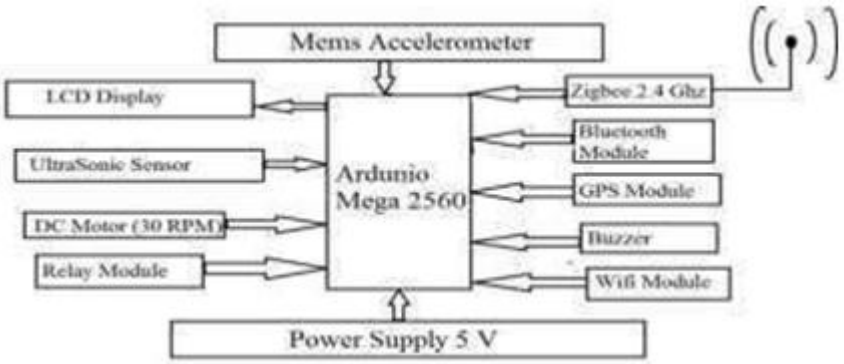

Fig. 4.2 Receiver (Bike Section)

The framework is given by the mechanized vehicle division to keep away from unusual conditions. Coming up next are the transient clarifications of the functioning principle of the various significant squares or areas utilized in the framework. This module includes a LCD, GSM module, RF beneficiary, Get radio wire, DC engine, drive L293D and GPS module. This works with remote correspondence. Get radio wire gets data from the communicate recieving wire then, at that point ships off the RF collector which gets the data and sends it to the microcontroller for additional Taking care of. In the happening to a mishap, the GPS module will acquire the

directions of the mishap site. These co-ordinates are sent through GSM module to a pre characterized number. The individual who has a place with this number gets the identification of mishap alongside area with the assistance of GPS. The beginning status is constrained by the microcontroller depending upon various conditions. Any sensor detects their action DC engine reduce speed using a drive called L293D driver. The LCD screen is used to display the operating conditions of the sensor [4].

V. Hardware Requirements

Arduino

Arduino is an open source hardware and software company, project and user community that designs and manufactures single-board microcontrollers and microcontrollers for building digital devices and interactive objects capable of sensing and manipulating both physical and digital. Its products are licensed under the GNU Lesser General Public License or the GNU General Public License, which allows anyone to manufacture Arduino boards and distribute the software.

Fig 5.1 ARDUINO [5]

Bluetooth Modules

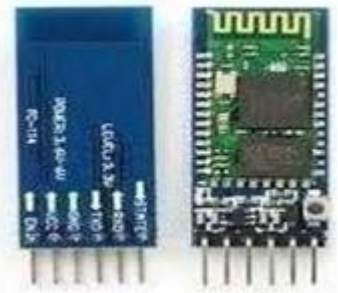

Fig 5.2 BLUETOOTH HC 05 [5]

The HC05 is a very interesting module that can add two-way wireless functionality to your projects. It can be used to communicate between two microcontrollers like an Arduino or to communicate with any device with Bluetooth functionality like a phone or laptop. The module communicates using USART at 9600 baud, so it is easy to interface with any microcontroller that supports USART. He can also configure module defaults using command mode. So if you are looking for a wireless module capable of transferring data from a computer or mobile phone to a

microcontroller or vice versa, this module might be the right choice for you. [5].

ALCOHOL SENSOR

Fig 5.3 ALCOHOL SENSOR [6]

The MQ303A is a highly sensitive tin dioxide semiconductor gas sensor with a fast response rate. This model is suitable for detecting alcohol, such as portable wine tester or car ignition interlock system. Construction The gas-sensitive semiconductor material is a small bulb, and a heating coil and an electrode wire are integrated in the element. The sensing element is installed in a metal housing using a double stainless steel mesh (100 mesh) on the path of the gas stream. The net has the function of explosion-proof [6].

ACCELEROMETER

It can measure the static acceleration of gravity sensing applications, as well as the dynamic acceleration due to movement, shock or vibration. The user selects the accelerometer bandwidth using the CX, CY and CZ capacitors at the XOUT, YOUT and ZOUT pins. Bands can be selected depending on the application, with a range of 0.5 Hz to 1600 Hz for the X and Y axes and a range of Hz to 550 Hz for the Z axis. C' is an electromechanical device used to measure accelerating forces and the forces will be static or dynamic. An accelerometer will measure the vibration of the material and is used to continuously monitor the inclination of the rider's head and the position of the helmet and is useful for calculating the probability of an accident [6].

5.5 GPS MODULE

Fig 5.5 GPS MODULE [8]

The Global Positioning System (GPS) is a satellite navigation system for sending and receiving radio signals. The GPS receiver picks up these signals and provides the information to the user. Thanks to GPS technology, location, speed and time can be determined free of charge, 24 hours a day, in all weather conditions, anywhere in the world.

GPS is officially called Navigation and Positioning Satellite. The Global Positioning System was originally developed for the military. Due to its ubiquitous navigational capabilities and the fact that GPS technology is accessible using small, inexpensive equipment, the government has made the system available for civilian use. The SIM card must be inserted into the SIM card port of the modem and can be used with mobile devices, which can send and receive messages from stored numbers [8].

VI. Applications

- Accidents can be avoided
- Easy to implement
- Cost effective
- Reduces Manual effort
- Automated System

VII. Advantages

- Automobiles
- Military applications
- Consumer electronics
- Medical applications

VIII. Algorithm

Step 1: The first step in knowing if the helmet is worn or not. If you are wearing a helmet, the ignition will start, otherwise it will remain off.

Step 2: Temperature sensor is used to detect human temperature.

Step 3: Alcohol MQ-3 sensor is used as breath analyzer which detects the presence of alcohol in rider's breath.

Step 4: In this step whether the helmet is locked or not in this condition lock switch is used.

Step 5: In this step MEMS accelerometer sensor in bike unit is used. Whenever X, Y and Z coordinate changes it indicates accident direction has been changed. By this mechanism accidents can be detected.

Step 6: GPS module sends to exact location of longitude and latitude will share through message in telegram app to the family members.

Step 7: Ultrasonic sensor is used to measure the distances of behind the vehicle, when object is closer it indicates object is detect.

Step 8: Bluetooth indicator it will detect the voice, when he/she tells left it will on left indicator, same as right it will on right indicator.

XI. Results

Fig. 9.1 Receiver (Bike Section)

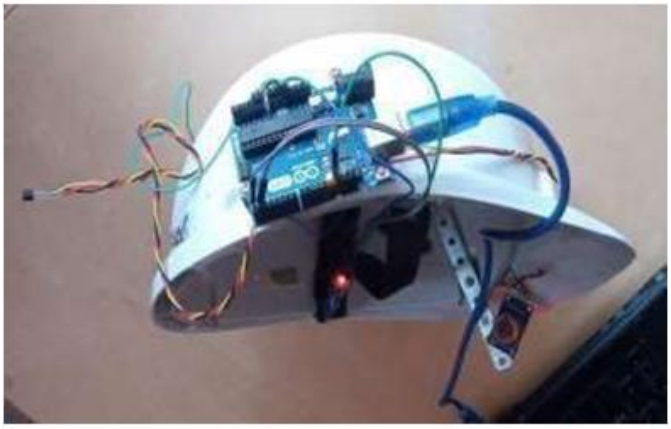

Fig 9.2 Transmitter (Hemet Section)

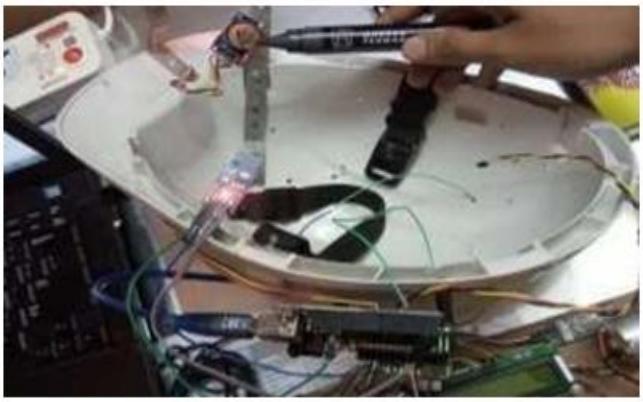

Fig 9.3 Alcohol Detection in Hemet Section

Fig 9.4 Alcohol Detected Engine off

Fig 9.5 Left indicator on via Bluetooth

Fig 9.6 Right indicator on via Bluetooth

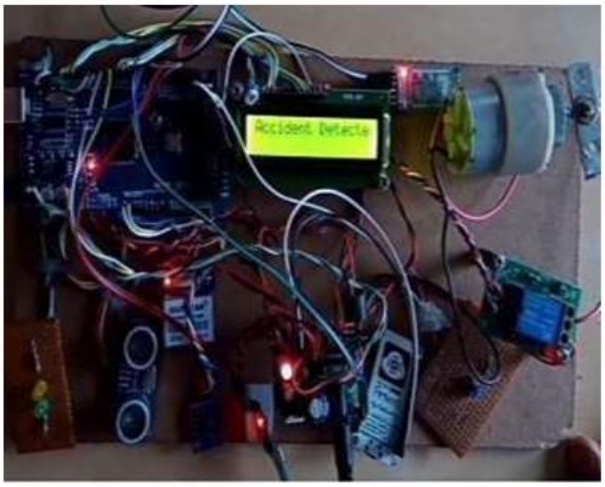

Fig 9.7 Acciendent Dected

Fig. 9.8 Accident emergency message and live location

Fig 9.9 Live location

IX. Conclusion

Smart helmets are designed to ensure the safety of cyclists by making the wearing of helmets mandatory and also ensuring that cyclists do not drink more than the legal limit. In the event of non-compliance with basic safety rules, the system recommends preventing the cyclist from starting. The system also makes it possible to deal effectively with the after-effects of an accident by sending an SMS with the location of the cyclist to the police station. This ensures that victims receive appropriate and prompt medical care in the event of an accident [9].

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AI Mask Detection

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Abstract

AI defines machines with intelligence and performs tasks. Advancement is improving in the field of AI example machine learning, deep learning creating incredible difference in the field of science. Covid19 pandemic making people so tough. It is very much important to wear mask to avoid virus. To fight against virus, we need essential equipment. Firstly, face mask was not mandatory for everyone but as the day progresses scientist and Doctors have recommended everyone to wear face mask. Now To detect whether a person is wearing Face Mask or not, we will use Face Mask Detection Technique. Face Mask Detection Platform utilizes Artificial Network to perceive if a person does/doesn't wear a mask. The application can be associated with any current or new cameras to identify individuals with/without a mask.

Keywords: Artificial Intelligence (AI), Machine Learning (ML), Deep learning (DL)

I. Introduction

The corona virus COVID-19 pandemic is causing a global health disaster so the effective safety techniques is carrying a face mask in public areas according to the (WHO). The COVID-19 Figure1 pandemic forced governments internationally to impose lockdowns to prevent virus transmissions. Reports indicate that wearing facemasks clearly reduces the threat of transmission. An efficient and economic technique of using AI to create a safe environment in a production setup. A hybrid version the use of deep and classical ML Model for face mask detection could be supplied.

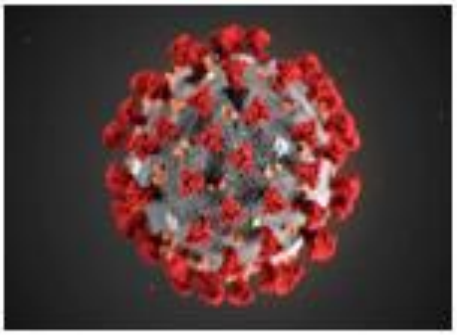


Fig1. COVID19 virus

We'll use OpenCV to do real-time face detection from a live stream from our Pi cam using a face mask detection dataset that includes with and without mask photos. Using Python, OpenCV, Tensor Flow, and Keras, we will use the dataset to build a COVID-19 face mask detector with computer vision. Our aim is to determine whether or not the person in the image or video stream is wearing a face mask working as a greeter at a department store and telling customers to put on their face masks is one of the toughest jobs in the world right now.

Instead of making a human check for mask compliance, we can create a Raspberry Pi-powered mask detector that uses image recognition. Then unruly pattern can yell at a Raspberry Pi screen instead. In this article, we'll show you how to set up a Raspberry Pi Face Mask Detection System when someone is not wearing their face mask. This project was inspired by a video of a mall in Asia where an entry gate could only be activated by a user wearing a face mask.

We need to assemble a framework that can recognize faces in real world videos and distinguish if the identified appearances or faces are wearing masks or not. Anyway, what do we mean by real world recordings? In the event that you take a look at individuals in recordings caught by CCTV cameras, you can see that the appearances are little, hazy, and low resolution. Individuals are not gazing directly to the camera, and the face points differ occasionally. These true recordings are completely not the same as the recordings caught by webcams or selfie cameras, making the face mask recognition issue considerably more troublesome practically speaking. In this blog entry, we will initially investigate cover/no veil grouping in raspberry Pi camera recordings, and next, shift to the mask/no mask order issue in genuine recordings as our last objective.

Our announced model can recognize faces and arrange masked faces from unmasked ones in Pi camera recordings just as certifiable recordings where the appearances are little and hazy and individuals are wearing masks in various shapes and tones. We will clarify more insights regarding the face identifier in the following part. One of the most exceedingly terrible positions on the planet right presently is being a greeter at a retail location who needs to confront individuals directly masks. Rather than making a human check for cover consistence.

II. Experimental Details

A. OpenCV Python

It is used for solving problems in computer vision, it uses Python, Java, C++ for programming. This API uses to combining both OpenCV and python Figure 2 for high imaging analysis. This library file is open source, it processes the images and videos to identify objects, characters' face etc ,it is integrated with library files like NumPy for numerical operations and some advance stuff.

Fig 2 OPENCV PYTHON

B. Tensor Flow And Keras

Tensor Flow is an open-source platform for ML and DL.it has flexible system with tools and libraries files. To build ML Models and execution uses a high-level API like keras. It accepts the data in the form N-D called Tensors. Multi-dimensional vectors are very hard to handle. it is developed for computing large numbers of data and it is applied more in the field of deep learning.

After developing the library ML and DL training part becomes easy, before it was to train and code each neuron or program in the neural network to do the work. Its coding mechanism take too much time and complex. Tensor Flow Figure 3 Supports all GPUs and CPUs, to train Image data takes too much time, it consists of N – D matrix calculation.

Fig 3 TENSOR FLOW

Keras is an open-source programming library that gives a python interface for neural network organizations. Keras goes as an interface for Tensor Flow library. Keras contains various implementations of usually utilized neural network building squares like layers, destinations, capacities, analyzers, optimizers and a large group of instruments to make working with image and text information simpler to improve on the coding important for composing deep neural network code. The code is facilitated

on GitHub and local area support gatherings includes GitHub issues page and a Slack channel.

Keras produce clients to productize deep models on smartphones (iOS or android) on the web or on the Java Virtual Machine. It also permits utilization of distributed and profound learning of deep neural networks on bunches of Tensor Handling Units and Graphics Handling Units (GPU).

C. VNC and SSH

Virtual Network Computing (VNC) is a graphical desktop-sharing system that uses the Remote Frame Buffer protocol (RFB) to remotely control another computer. It transmits the keyboard and mouse input from one computer to another, relaying the graphical-screen updates, over a network. Secure Shell provides strong password authentication and public key authentication, as well as encrypted data communications between two computers connecting over an open network, such as the internet Figure4.

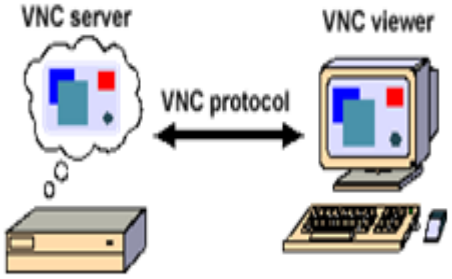


Fig 4 VNC

III. Equipments

A. Hardware

- Raspberry Pi
- Pi Camera

B. Software

- VNC
- VS Code
- Raspbian OS

IV. Proposed Methodology

The work flow is divided into three forms:

- Training of data
- Classification
- Model testing

Step 1: frame extraction using Raspberry PI camera or camera.

Step 2: loading of pre trained models for both mask and face detections. (face net, mask net).

Step 3: Region of interest's calculation for mask and labelling them.

Step 4: Classifications of images

Step 5: Display

Data visualization

Here we are visualizing the total number of images in our dataset in both the categories. One set of class with mask and other set of class without mask. The pre trained face detection model appears to turn out extraordinary for this case and it distinguishes faces even though the masks are covered partially. Along these no compelling reason to retrain anything for the model.

Data Augmentation

Augmentation of data is done to include a greater number of images for our training. To make it more vigorous to blurry and less clear images we are applying this that comprises of irregular rotations, interpretations and shading jittering.

Face Net: The model used to identify where in the picture faces are

Mask Net: Classifier model wherein classifies the face mask

Training of Data: The frames capture by the camera is divided into train and test data. Each train and test data have two labels with mask and without mask, this process is called data visualization. Each frame is trained by models and later classifies the images based on accuracy of the model.

Classification

- ROI provides regions for mask and face.
- Model trained with Tensor Flow and keras for image computation
- Based on the feature it will classify the images

Model testing

- To test the model according to the input images or number of images took.
- This will give us accuracy of the model for further advancement of the project.
- By plotting the accuracy vs loss function will get know about the problems of model.

V. Block Diagram

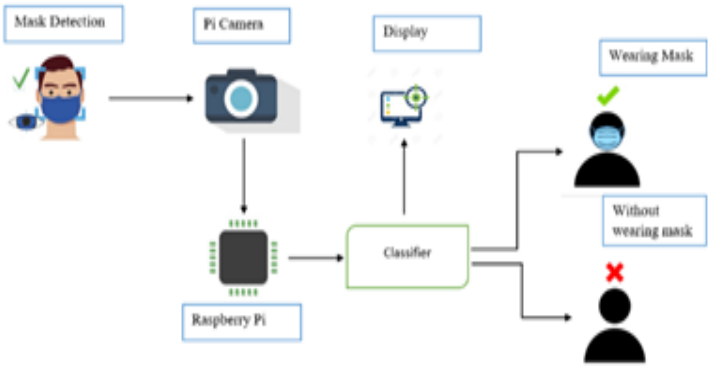
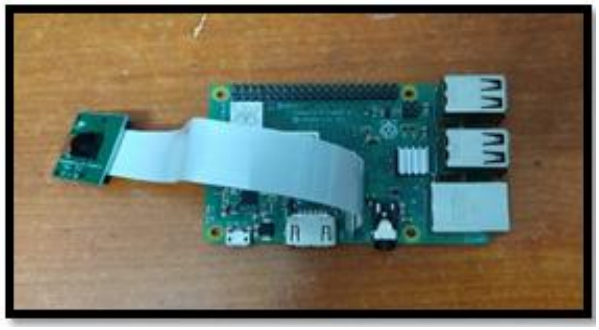


Fig5: Block diagram

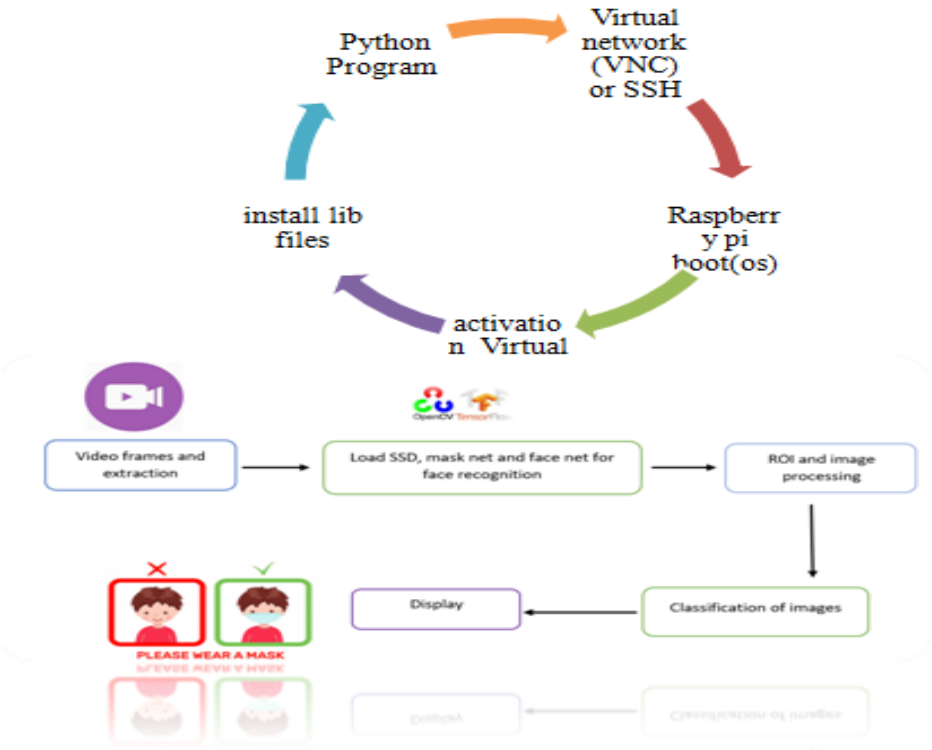
Hardware Implementation

A. Circuit Analysis



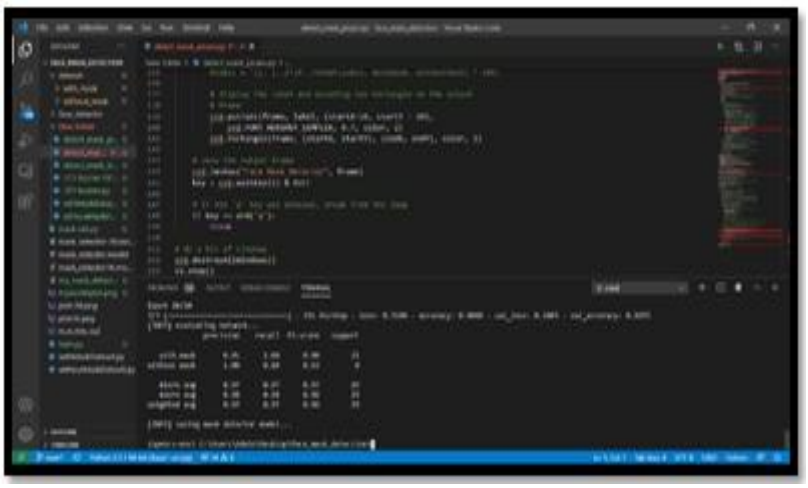
- Raspberry pi cam is connected to pi vis CSI (Camera serial interface)
- Raspberry pi is connected to 5V 3amp power adaptor to power the circuit
- It consists of OS, python library files which is used for data computation
- Since it is very difficult to load all library files, we create virtual env
- Env consist of all OpenCV, TensorFlow and keras library files.
- It is cable of SSH and VNC So we have used both to access the pi remotely.

B. Working



Software Implementation

- We used VS Code IDE to process the images, we have installed necessary library files. With Open CV virtual environment, we installed all library files.
- Laptop Camera is used for software implementation. It uses Tensor Flow and keras frame works for loading the model and train the model.



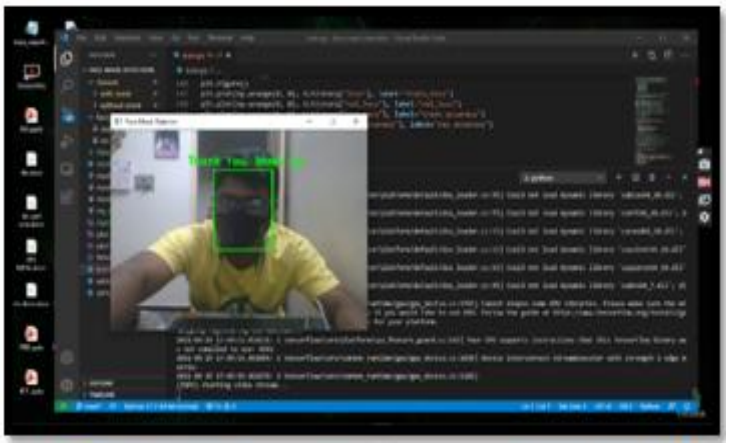
VI. Results

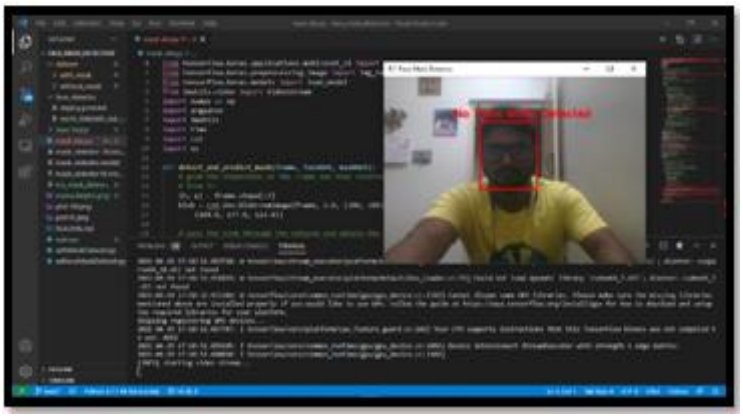
Hardware Output

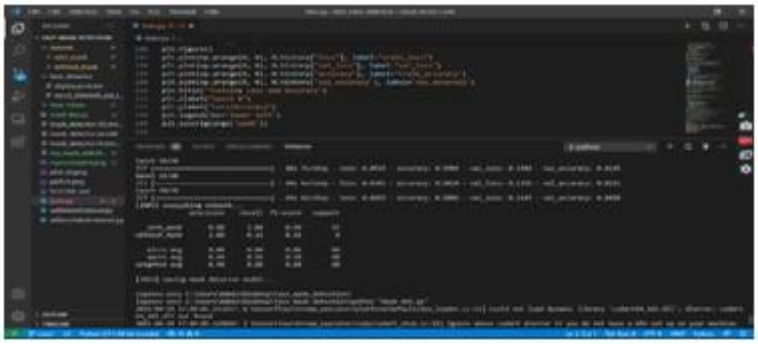
User interface of Raspbian OS

Mask detection

Software Output:







Training Loss and Accuracy

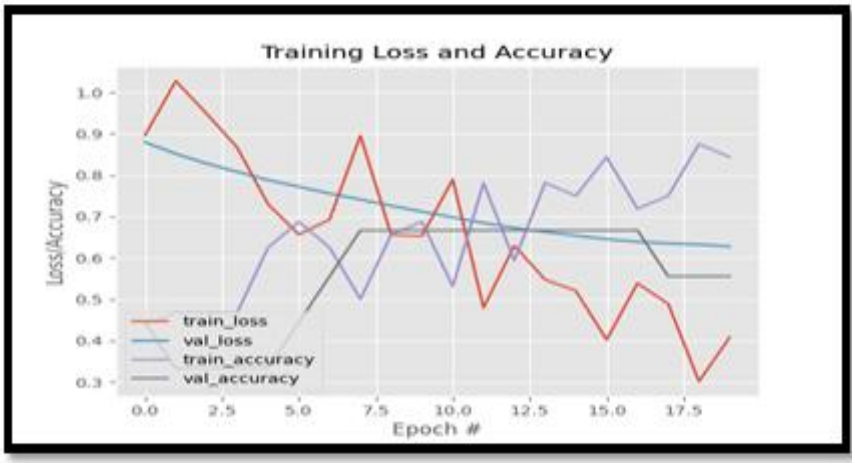


Table1: Precision and accuracy

Precision	Recall	F1-score	Support
with mask	0.95	1.00	0.98	21
without mask	1.00	0.88	0.93	8
micro avg	0.97	0.97	0.97	29
macro avg	0.98	0.94	0.96	29
weighted avg	0.97	0.97	0.96	29

VII. Conclusion

The COVID-19 pandemic has presented a number of issues to the world, and the virus's spread must be stifled, since the virus has infected over one crore people worldwide, with the number continually rising. Wearing a mask is one of the most important precautions to take in order to prevent the spread of sick individuals' respiratory droplets to healthy people through coughing or sneezing. So far, we've shown a method that uses a deep learning algorithm, and we've used the mask net, face net framework, as well as Python's Tensor Flow and OPENCV, to implement it. According to the findings, the suggested model is capable of recognizing persons with or without masks in photos and video streams.

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Smart Mirror Using Raspberry PI

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Abstract

Smart mirrors are the mirrors of the future. This mini project depicts the design and improvement of a product called Smart Mirror with Raspberry Pi that meets the requests of common person also receive the general information like date, day, news, time, weather, face recognition with emotions of human beings and also other needed information. For This mirror is designed through the ability to collect for this information during the research of a morning daily life in direction to more efficiently as well as easily. To make this additional interesting mirror, we could develop our produces to include a change of control methods, and music and other entertaining. In future we hope that the mini project based on smart glass will enhance innovative and modern way of life. The face recognition feature will improve the application level of the mirror.

Keywords: Raspberry Pi, date, day, time, weather, news, face recognition.

I. Introduction

Everything in the world is trending towards a greater development and everything is connected. Day by Day, everything in the world is being connected to one another. Everything is getting into Smart. Usually Mirrors are used for grooming purposes in a man's daily life. Internet plays a vital role for getting connected and it plays a key role for being Smart. Smart Mirror is a device which displays various information like date, day, weather report, news updates and reminders. A man in his hectic life finds it difficult to find time to read news-paper or to get some important

updates. An individual while getting ready in the morning, he/she can check out the weather forecasting and can plan day accordingly. And can also check out the reminders and complete their tasks. Multi-tasking has become a part of an individual's life and these mirrors are very useful [1].

Several devices are being established which use ideas of multimedia communication, artificial intellect, internet of tings to developing the way we achieve our various day to day responsibilities in our household, offices or even activities. The interactive mirror enhanced the features such as climate of the city, most recent updates of news and headlines and native time corresponding to the site which was previously established by the references. The Smart Mirror would help in evolving smart houses with embedded artificial intellect, as well as finding its applications in industries, clever workplace and other requests [9].

It can do all the work which we command it to, as it has a personal assistant which will attend to your commands and will response according to it. Maximum of us use mirrors each day to look by ourselves, wesensitivelycooperate with the hand mirror every day to checkered how we appearance and how our wear is while receiving ready for our effort or universities. The Smart Mirror has microphone through which it will listen to the commands, and there is speaker from which it will give its response. The Smart Mirror must take the voice commands as the input and give the required response to the user. Daily monotonous tasks similar reading paper, getting routine updates, weather conditions updates etc. then providing all that facts to the user although he/she gets prepared. The Smooth Reflect is also able to perform face recognition using web camera, such as emotion recognition it classified into seven emotions as happy, sad, fear, disgust, angry, neutral and surprise.

II. Literature Survey

SuryanshChandel, AshayMandwarya, SUshaukhanyain this paper defines the designing and operation of a voice measured wall mirror, called magical mirror. It is a method that can purpose both as a mirror also an interactive display showing multimedia content such as period, date, weather and news concurrently. The user can interrelate with it using voice guidelines. The Magic Mirror contains of various functionalities alike real time data as well as information updates, voice guidelines, face detection/acknowledgment using LCD display, microphone as well as webcam[4].

Anna D. Sergeeva, Alexander V. Savin in this paper describes the problem of the reaction recognition from the micro- expressions is measured. The psychological background of this problematic from the modern viewpoint is labeled in short. There are seven worldwide emotions which are usually could be documented. The application fields of the emotion credit are indicated. The most known databases for the massage micro-expression research are decorated. The state-of the- art of the micro-expression seeing and recognition approaches is given. One of the main initial steps before the emotion credit is investigated more methodically. It is the task of

penetrating for the areas of a face and eyes in the copy.

Sun Yong, GengLiqingin this paper describes Smart mirror using raspberry pi this paper defines the designing and enactment of a Smart Mirror By means of Raspberry Pi. The method that works as a numeral display performance the contents such as period, date, weather and news simultaneously. The user can interconnect with the mirror by substantial instructions to it, so it container also be referred as an communicating display. It has various requests like showing real time information apprises and applications switch [10].

III. Methodology

The smart mirror shows the information in accordance to the user command as well as work as a regular conventional mirror. The monitor is connected to the Raspberry Pi 3B+, then required real time data update is accessed by the user via Wi-Fi. A woody surround is attached to the LCD monitor. The monitor screen is recycled to shows the required material for the user such as period and date, weather conditions forecast, agenda, reminders too daily newscast updates or captions are showed on the reflect.

Fig 1: Flow chart of Smart Mirror

Figure1 shows the flowchart of smart mirror, it is explained that when mirror is switched on the booting of Raspberry pi is takes place. Once raspberry starts user give a voice command to the mirror. Then raspberry pi identifying this user command and performing respected action on mirror. This process will continue in loop.

The smart mirror can perform various functionalities is as follows:

- The mirror everything as a regular thoughtful mirror so person or any worker containers use it as a conventional reflects.
- Anyone can by means of this reflect will change to actual period data-updates of stock updates, newscast, date, weather conditions updates, period etc.

IV. Proposed System

System Overview

On the separate, the hardware is summarized within a wooden surround. On the forward-facing, a two-way reflect is located in obverse of a LCD screen. This way, the scheme can act as a looking glass when not presently in use, though the LCD schemes through the reflect when in usage. The wooden surround has a bezel on the obverse which the reflect and LCD piece are pressed in contradiction.

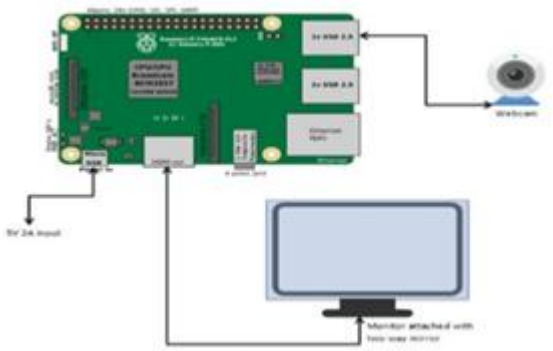

Fig 2: Outer structure

On the outdoor, the hardware is summarized within a woody frame. On the obverse, a reciprocal mirror is located in opposite of a LCD display. This way, the organization can act as a reflect when not presently in use, though the LCD schemes through the mirror while in use. The woody frame has a bezel on the obverse which the mirror as well as LCD board are constrained beside.

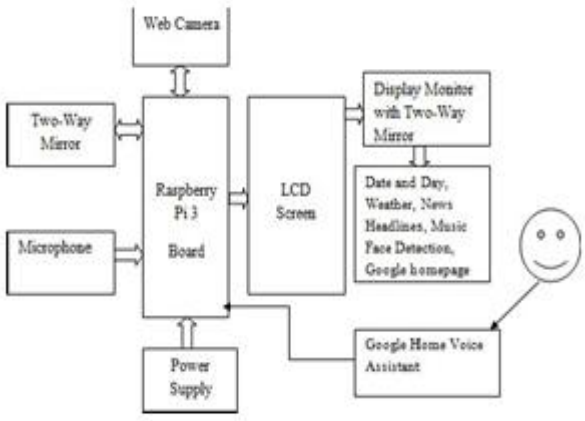

Fig 3: Basic Figure of Smart Mirror

Figure3 indications the Smart Mirror using Raspberry pi contains of USB microphone, Raspberry Pi 3 board, web camera and monitor display with two way mirror. The voice commands is given by the user to microphone it is attached to the Raspberry Pi 3 board. The power source is already connected to Raspberry Pi.Smart Mirror will turn ON whenever there is a person in front of the web camera detects the

person and display the information in accordance to the user command.

V. Result

The smart mirror scheme that provides info like time, date, weather conditions report besides latest news inform while observing and training in front of mirror as well as alos recognize look emotions.

Fig 4: Final result of Smart Mirror

Fig 5: Emotion Recognition

VI. Conclusion

The Smart Mirror delivers the user through enhanced mirror knowledge. By making usage of multiple shows, the operator can stay bring up to date on the time, weather conditions, and news headings while making for the day in through the fully efficient smart mirror that delivers natural communication between operators and the ambient home-based facilities. The mirror show is providing by a flat LCD exhibition screen which displays all the essential info which is valuable for the consumer.

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UVC Home Protecting Agent

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Abstract

In this covid-19 pandemic situation, the people are struggling with a lot of problems, this situation we all are giving more importance to our health to be good, to do that our big task is to maintain our working area and home to be viruses free. buying things from outside we don't know how it is safe from viruses. More countries are facing a lot of problems in this situation, some of them are the production of a huge amount of sanitizer, masks, and also some of the home cleaning and vegetable cleaning liquid products. hence in order to reduce the usage of more sanitizer, we are developing a device called UVC home protecting agent. this device contains UVC lamp which produces radiation of wavelength 207nm-222nm in UV region of the electromagnetic spectrum. this range of radiation scientifically proves that it is very less dangerous to human tissue and still lethal to viruses and bacteria and this radiation is capable of killing 90% of coronaviruses, >95% of aerosolized H1N1 influenza viruses, SARS-Cov Corona subgroups such as alpha (Hcov-229E) and beta (Hcov-0Ch3), and other airborne mediated microbial viruses. this device having 0-180 degrees of rotational mechanism towards both horizontally as well as vertically to kill viruses efficiently and also this device can be controlled using a smartphone with an android app to support more user-friendly.

Keywords: UVC-ultraviolet c, H1N1-influenza, SARS-Cov, Hcov-229E,Hcov-0Ch3.

I. Introduction

The newest coronavirus disease COVID-19 is a highly transmittable and pathogenic viral infection caused by the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2),The responsible pathogen, SARS-CoV-2, is an enveloped single-stranded RNA virus and a member of the coronavidae family of order nidovirales. All viruses in this family show very similar characteristics. They have a spheroid shape of about 100-150 nm, are covered with spike proteins on the

outside, and have a RNA strand length of 27-32 kb(kilobase) on the inside. the following four types of coronaviruses are known as causative agents, which cause the common colds they are HCoV-229E, HCoV-NL63, HCoV-OC43 and HCoV-HKU1 which cause only milder infections. whare as coronaviruses belongs to MERS-CoV (MERS: Middle East Respiratory Syndrome) SARS-CoV and SARS-CoV-2 which destroyed many lives [2]. To prevent the spread of SARS-CoV-2, a number of measures such as social distance maintaining and wearing face maskstaken. Among other things, hygiene procedures have been strengthened. Antibiotics applying (sanitizers) is one procedure that has been successful against the coronaviruses. Radiation disinfecting, especially ultraviolet (UV) radiation, is another well-known mechanism of action against all microorganisms and viruses that offer certain benefits in addition to liquid antibiotics and heat-retardant contraceptives. It can be automated and kill the microorganism in disinfect surfaces, liquids, air and chambers, and is very efficient process.

The ultraviolet spectrum is divided into 4 phases: Radiation between 100 and 200 nm is called vacuum ultraviolet radiation (VUV). It is usually not included in the disinfection purposes because it is highly absorbed by the air. Ultraviolet distances are best known for UVC, UVB, and UVA spectral spectrum of 200-280 nm, 280-315 nm, and 315-380 nm, respectively. UVC light is electromagnetic radiation at wavelengths of 200 to 280 nm. It is known 100 years ago that UV light, especially UVC at 240-280 nm kills most germs. UVC light at 254-nm wavelength is easily produced from low pressure mercury-vapor lamps and is often used to disperse and kill many types of viruses [2]. It has been reported that the penetration capacity of short-UVC light (approximately 200-230 nm) with natural biologicals materials is very limited because short UVC light is absorbed mainly by proteins, especially peptide bonds, and other biomolecules. Short UVC light is reduced by half by only 0.3 um of tissue. The 207-nm UVC lamp produced by the krypton-bromine excimer lamp can make activity of bacteria more inactive, in addition, show less cytotoxic and mutagenic damage to human keratinocytes. Recently, a krypton-chlorine (Kr-Cl) lamp was developed to emit 222-nm UVC light. The germicidal and cytotoxic properties of 222-nm UVC light have been investigated to determine whether this light is harmful to viral tissues but not to human tissues.

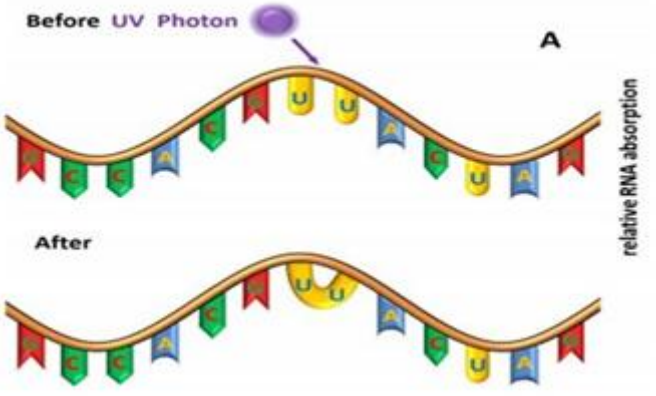

Fig1. Dimer formation due to UV-RNA-Mechanism.[2]

Pyridimine dimers (e.g.uracil dimers) which are formed due to to UVC radiation absorbed by RNA, this inactivation mechanism is illustrated in fig.1.1. Although it is known that this type of UVC radiation has the effect of not working on all microorganisms and viruses, all viruses require different doses of UVC irradiation in order to work effectively. For the successful inactivation of the middle east respiratory syndrome coronavirus (MERS-CoV) needs an irradiations wavelength of 254nm. Similarly for the human corona virus (HCoV-229E and HCoV-OC43) need irradiation wavelength of 222nm with log reduction dose rate of 0.56 mj/cm2.in liquid medium MERS-C0V needs inactivation radiation of wavelength 254nm and also log-reduction dose rate of 27.47mj/cm2.

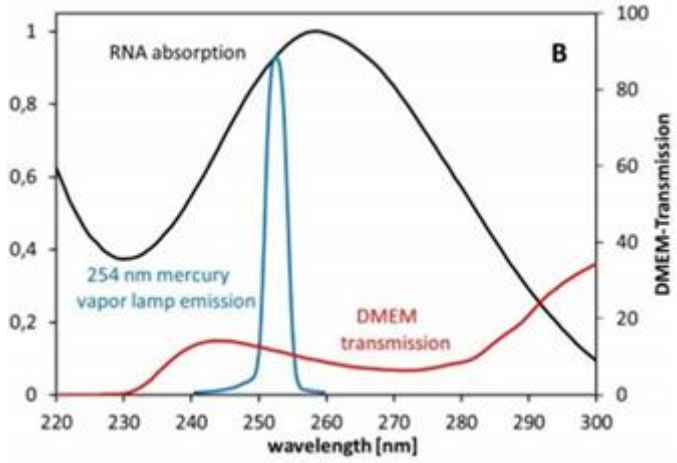

Fig 2. Relative absorption spectra of RNA.[2]

The data were employed to calculate the log reduction dose, i.e., the irradiation dose required to reduce 90% of the virus. The calculated and measured results, provided as log reduction doses, show extreme variability, either within the Results 254 nm.

II. Block Diagram of Thedevice

The below figure shows the block diagram of the approached device. This device mainly consists of the fallowing components named as fallows AC to DC converter (220v 50Hz to 12v DC), Microcontroller (ATmega328p), Bluetooth module (HC-05), manual control system with push buttons, stepper motor, LED (visible region of wavelength 380 to 700nm range), UVC lamp (of wavelength around 254nm range).

The Atmega328p microcontroller is High Performance, Low Power AVR8-Bit Microcontroller with advanced RISC architecture.it has 131 powerful instructions and also 32*8 general-purpose working registers. . Its operation is fully static with up to 20 MIPS Throughput at 20 MHz.it has High Endurance Non-volatile Memory Segments,32K Bytes of In-System Self-Programmable Flash program memory,1K Bytes EEPROM,2K Bytes Internal SRAM.23 Programmable I/O Lines. Six Sleep Modes: Idle, ADC Noise Reduction, Power-save, Power-down, Standby, and

Extended Standby. Operating voltage between 1.8v to 5.5v. . here we are using the 220v ac to 12v dc converter which consists of a step-down Transformer with 1A 13V Rating, four 1N4007 Diodes,1000uF Electrolytic capacitor with the 25V rating. A step-down transformer is used to convert the high voltage AC to the low voltage AC.it is a 1-ampere 13-volt transformer. However, during the load, the transformer voltage drops approximately 12.5-12.7 volt. The diodes are used to make a bridge converter which is an essential part of the AC to DC conversion circuit. rectifier diode 1N4007 is used to rectify the AC input.12 v supply is regulated using the 7805-voltage regulator to supply constant 5v regulated power to the microcontroller.

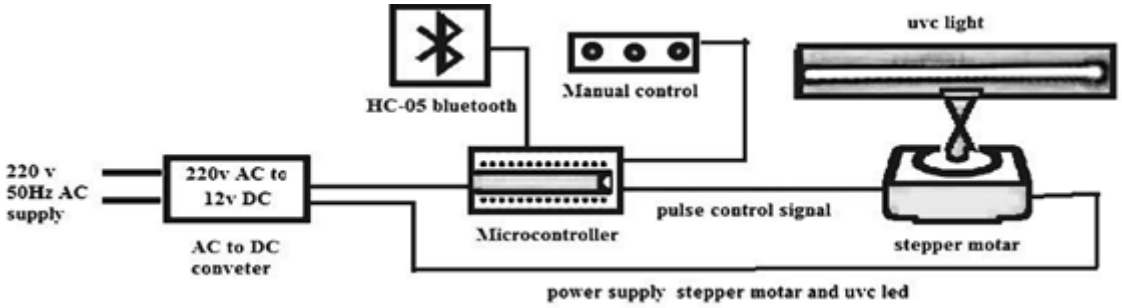

Fig 3. Block diagram of the device.

The HC-05 is a popular Bluetooth module that can add two-way (full-duplex) wireless functionality to our projects. Arduino uses this Bluetooth serial module and other microcontroller. its operating voltage is 4v to 6v and operating current 30mA, communication distance less than 100m, serves with serial communication (USART) and TTL compatible, FOLLOWS IEEE 802.15.1, Use Frequency-Hopping Spread Spectrum (FHSS). we can easily interface with Laptop or Mobile phones with Bluetooth. its supporting baud rate is 9600,19200,38400, 57600,115200, 230400,460800. our device systems use low-pressure, mercury-arc germicidal lamps which are designed to produce the highest amounts of UVC radiation - where 90% of energy is typically generated at 254nm. This radiation is very close to the top of the 265nm microbial curve, which is the most lethal length for microorganisms.

III. Working of the Device

The prototype of our working model is as shown below figure, which consists of the Arduino Uno development board it has amounted ATmega328p microcontroller,220v AC to DC converter followed by 7805 voltage regulator which provide constant 5v power supply to the board. here we are using two control mechanisms for relay and stepper motor, manual and Bluetooth control mechanism. the 5v relay is used to turn on-off the UVC germicidal lamp and ordinary LEDs based on control signals from the Arduino board according to the requirement of the applicant. the two stepper motors change their orientation vertically as well as horizontally based on control pulses signal from Arduino board.

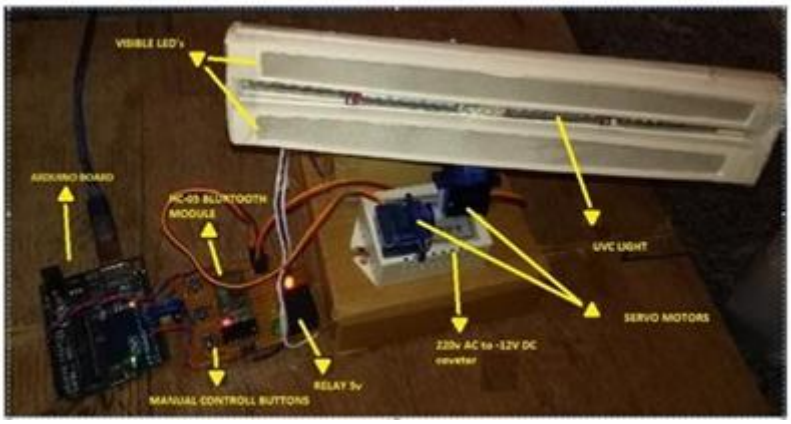

Fig 4. prototype of the proposed device.

The manual control mechanism consists of the three pushbuttons which send the signal to the i/o pins of the Arduino controller. among three pushbuttons two are used to control the orientation of the stepper motors and another one for mode changing. in this device, three modes are available visible ordinary mode, UVC germicidalmode,andautomaticmode.whenvisibleordinarymodeenabledthevisiblelight(380nmto700nm wavelength) emitted from the LED,at this time UVC germicidal lamp is turned OFF. similarly when UVC germicidal mode low-pressure mercury vapor UVC lamp is turned ON .and visible light is turned off. in the automatic mode the device Turn-ON the UVC lamp and start to focus on every region inside the room from 0- 180 degrees from left to right as well as top to down to kill the viruses, its action takes about 5minutes of time after that it get back to the visible mode.

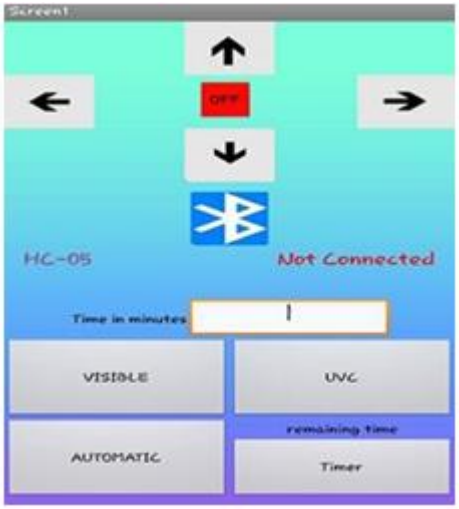

Fig 5. Android app to control device through Bluetooth connectivity.

The smartphone is connected to the device through Bluetooth, by using the android application we can send the control signal to the Arduino board as similar to a manual system. when we open the android app its looks like as shown in fig3.2. initially, we have to set up a Bluetooth connection by clicking the Bluetooth logo image on the screen. up, down, left, and right arrows are used to change the orientation of the stepper motor. the red button on the screen is used to turn On-OFF

the device. its four modes, in which three of them are similar to the manual control, the fourth mode is timer mode in this mode we should mention the duration for the Turn-ON state of the UVC lamp.

IV. Advantages And Applications

The device has the advantage that we can reduce the usage of sanitizers. one-time investment, and installation, and also cost price is also low so poor people can afford it. Reduction in usage of fruits and vegetable cleaning liquid. It has capable of killing viruses on clothes very easily. This device acts as both a normal visible LED and also a UVC virus killer so budget-friendly. the power consumption of the device is low and also environment friendly. It requires low space for installation as similar to the normal LED bulb. Very easy to interface the Device with a smartphone. we can use this device in Home, Schools and colleges, malls , fruit &vegetable shops, Grocery store ,Cloth shops ,Offices and daily working indoor areas and ,Buses and cars.

V. Result And Conclusion

In our prototype, we are using a low-pressure mercury-vapor lamp to produce UVC radiation emission at around 253nm wavelength(>90%), To inactivate the middle east respiratory syndrome coronavirus(MERS- CoV).similarly to inactivate the activity of the severe acute respiratory syndrome coronavirus (SARS-CoV), we are using the same wavelength with Log reduction dose rate is around is 10.6mJ/cm, but more precise estimation is 3.7mJ/cm2. To know more about the inactive irradiation wavelength and log reduction dose rate for different viruses refer to reference paper 2.we can also use an Excimer lamp or Far-UVC lamp instead of a low-pressure mercury-vapor lamp its irradiation range is 222nm wavelength which causes less damage to human DNA rather than a mercury lamp. the performance of the prototype is reached our expectation, controlling the device from the smartphone is efficient and user-friendly. the orientation ranges of the servo motors are also good.

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Alphabet Recognition Using Hand Gestures

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Abstract

Physically handicapped people face difficulties to communicate with the outside world, to overcome this we proposed Alphabet Recognition Using Hand Gestures to replace the basic pointing devices used in computer system to reduce the limitations that stay due to the legacy system such as mouse and Touchpad. The proposed system uses hand gesture, mostly number of fingers raised within the region of interest to perform operations of categorizing the alphabets. A static control board restrains the versatility of client and limits the capacity of the client like a remote that can be lost, dropped or broken while, the physical nearness of client is required at sight of activity and that is a limitation of the user. Not just as a means of communication for the impaired ones but in many of the environments where language communications cannot be made, hand gestures can deliver the messages to achieve the purpose of communication. Hand gestures is one of the prime communication methods.

Keywords—Recoginition, Hand Gestures, Alphabet Recognition.

I. Introduction

In today's world, computers have become an integral part of life and are used in a variety of fields, but the methods we use to communicate with computers are outdated and have various problems, which we will discuss later in the project. Thus, a new sector has emerged that is trying to overcome these problems which are HUMAN COMPUTER INTERACTIONS (HCI). Although computers have made great strides in both the Software and Hardware sectors, however, the basic way people communicate with computers remains the same, that is using a basic mouse-pointing device and an advanced Keyboard or Recognition System, or perhaps processing Natural Language. This has made communication more human and easier for us.

Hand gestures are one of best way for people with disabilities to speak and communicate with the normal people. A gesture in a sign language is a particular moment of hand with which specific shapes are made out of them. A design for recognizing the sign formats and interpreting them is done. This acts as a means between the impaired ones and the normal person being successful in conveying the information rendered by the impaired ones to the normal person.

Gesture recognition has been a very interesting problem in Computer Vision community for a long time. In our project we are introducing Hand Gesture Recognition, which will display character based on the input gestures. Touch recognition can only be used for touch communication without physical contact with the machine itself. Using touch recognition, one can point to the computer screen and use touch to select and use different applications on the device.

Image processing is often used for action recognition as it provides features such as pattern recognition, texture comprehension, content retrieval, compression and much more. Convert that segmented image into binary, apply feature extraction on the binary image, for extraction of the features the techniques used are distance transformation. All input images are captured by web camera. The output text is displayed on the screen based on the gesture showed to the camera.

II. Literature Survey

The Communication [1] it is an essential part of human life. But for dumb and deaf people, communication is a challenge. To understand them, a person must learn their own language, that is, sign language or finger language. The proposed plan for this project aims to address this issue to some extent. In this paper, the motive was to create a tracking application to interact with a computer, and to develop a personal computer communication device. The motive for this system is doubled. It has two modes of operation: Teach and learn. The project uses a webcam to detect gestures and signatures made using mountain recognition and removes Sign Language from a PC in a simulated action. This will convert webcam action into audio output that will allow ordinary people to understand what is being transmitted. Therefore, our Sign Language project into Speech Converter aims to convert Sign Language into text and audio.

In [2] the paper, Computer language recognition is an important research problem to enable communication with the deaf. This project introduces an efficient and fast algorithm for identifying the number of fingers opened with an action representing Binary Sign Language characters. The system does not require the hand to be properly aligned with the camera. The project uses a photo processing system to identify, especially English sign language used by deaf people to communicate. The primary objective of this project is to develop an intelligent computer-based system that will enable deaf people to communicate with all other people using their natural hands.

III. Proposed Work

Gesture recognition has a wide range of uses including human machine communication, sign language, focused game technology etc. Keeping in mind, the similarity of human structure with four fingers and one thumb, the proposed work aims to introduce real-time hand recognition system based on the acquisition of some basic features such as orientation, institution. centroid, finger shape, thumb by hand raised or folded hand and position in image i.e.:

1. Using technologies to benefit humanity.
2. This would make education more accessible to a greater number of people.
3. The system will catch hand gestures and navigate gesture to recognize the character or alphabet, which it would use to allow muted people to see.

The objectives of the proposed work are as follows:

- To design Hand Gesture recognition system for deaf or deaf-blind people.
- To implement the system by using Image Computer Vision (open CV).

To build an innovative, natural, user friendly way of interaction with the computer which is more familiar to human beings.

In this paper [6], a simple and effective step to observe hand gestures from images with very low resolution was presented. Improving low-resolution images has always been the focus of digital photography. Images with a low resolution such as [50 × 50 pixels] are also taken for viewing. The touch imagined here was a number of fingers (one, two, three, four or five) raised by a person. Photographs of a small image made on a cell phone, web camera, or low-cost cameras were processed to determine the number of fingerprints.

Simple logic of the geometry of the hand has been used for the identification of hand gesture from the input low declaration images. The projected method extracts the hand gesture directly from the low-resolution image without the need of renovation to a high- resolution image or use of any classifier. The proposed method is based on the creation of a mask for the image which was vital in the recognition of the hand gesture recognition.

Almost [7] all consumer electronics today use the independent controls of the user interface. Or, the type of individual types and directions that focus on the division of each order further raises a number of issues: difficulty in obtaining the required unreachable order, disruption of button design, replacement title and more. The dominant design of hand-operated electronics technology was a new customer connection that solved the problems of using many inaccessible controls for home appliances.

Proposed system automatically identifies a set of symbols that are blocked from hand matching for the purpose of electronic equipment command by sequencing

the actual results and mathematical results from PC to wireless device manager circuits. Hand recognition was a challenging problem in its universal context. We look at a fixed set of visual instructions and a well-structured environment, and then move on to a simple, yet productive, sign-language approach.

IV. Proposed Frame Work

The architectures of the proposed work are shown in the figure 1.

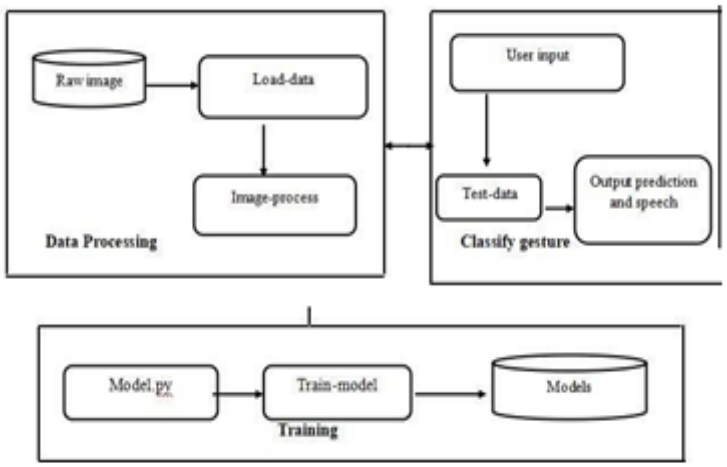

Fig. 1: Architecture of Alphabet Recognition System (1) Data Processing, (2) Classifying Gesture, (3) Training the Models

- **Data Processing:** Data upload script.py contains Raw Image Data loading functions and save image data such as NumPy arrays in storage. The data.py process will upload image data from data.py and process the image by resizing / decrypting the image, and applying filters and blending of ZCA to enhance features. During the training the image data used was categorized into training, validation, and test data and recorded in storage. Training includes a data database script that loads the appropriate data to be divided into Database categories. Using a trained model in touch detection, each image is uploaded and processed from a file system.

- **Training:** The model training loop contains the train.py model. The model is trained with hyper parameters found in a config file that calculates reading rate, batch size, image filtering, and number of epochs. The configuration used for model training is saved as well as the construction of a model for future testing and to obtain improved results. Within the training loop, training and verification data sets are loaded as Data carriers and the model is trained using Adam Optimizer with Cross Entropy Loss. The model is periodically tested on the verification set and the model with the most accurate verification accuracy is stored in continuous testing and use. Upon completion of the training, error and loss and loss training are kept on disk, as well as error and loss training with training.

- **Classify Gesture:** Once the model is trained, it can be used to separate a new ASL action that is available as a file in the file system. The user installs the touch image file path and the test screen data.py will transfer the file path to process the data.py upload and process the file in the same way as the model is trained.

- **Data Collection:** The main source of data for this project was an integrated American Sign Language (ASL) dataset called ASL Alphabet from Kaggle. The database contains 87,000 images of 200x200 pixels. There are 29 classes in total, each with 3000 pictures, 26 A-Z characters and 3 characters space, delete and nothing. These images are then cut, redeemed, and labelled for use.

- Image whitening is a method that uses the decay of a single matrix value. This algorithm decorates data, and removes unwanted, or obvious information from the details. This allows the neural network to look for complex relationships, and to find the underlying structure of the patterns in which it is trained. Image covariance matrix is set to identity, and definition to zero.

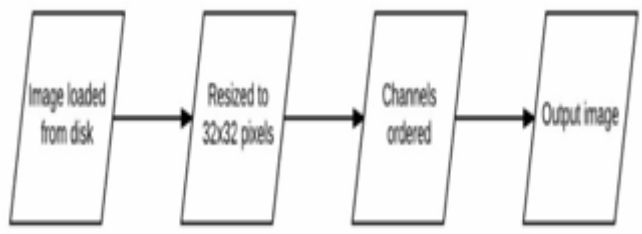

Fig. 2: Alphabet Recognition System

V. Results

The results of the proposed work with relevant images for the different signs are shown in the below figures number 3, 4, 5 and 6 for the different symbols.

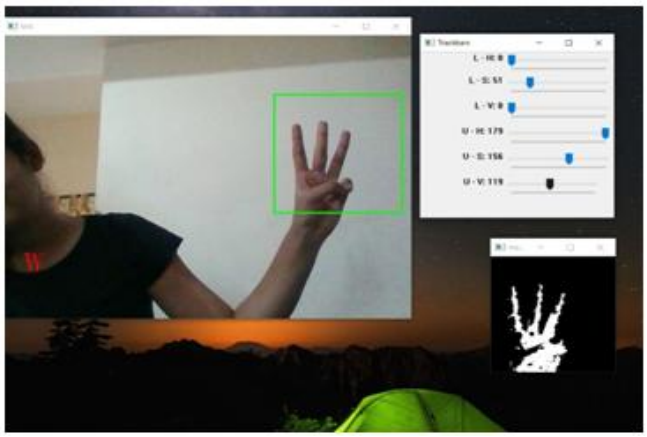

Fig. 3: Recognition of alphabet W.

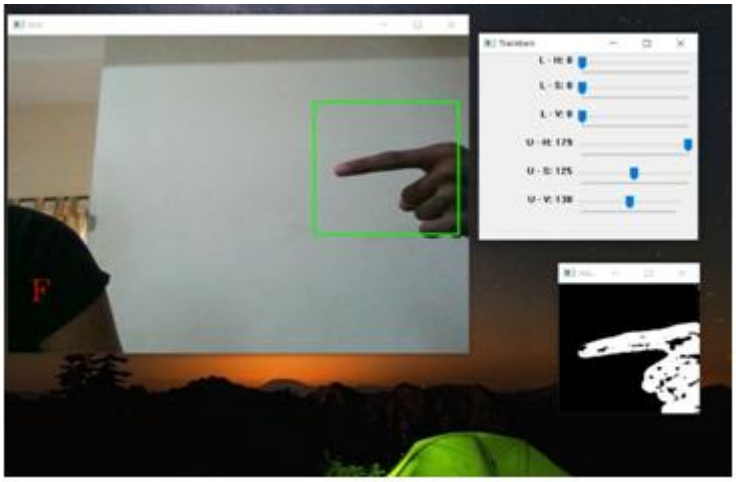

Fig. 4: Recognition of alphabet F.

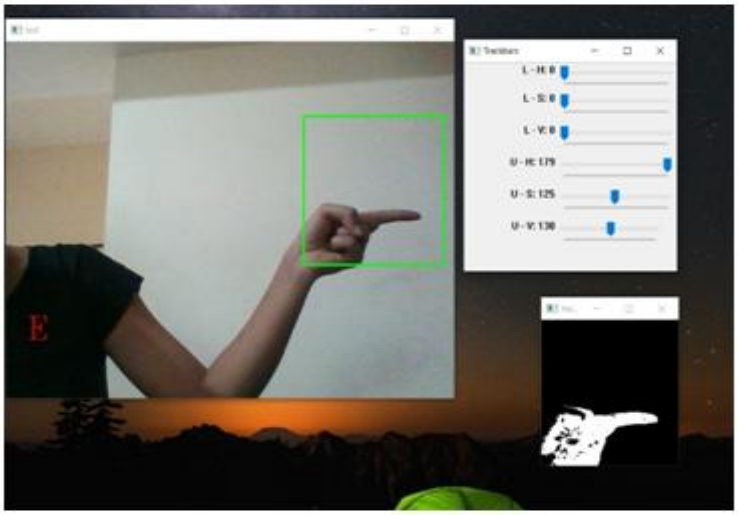

Fig. 5: Recognition of alphabet E.

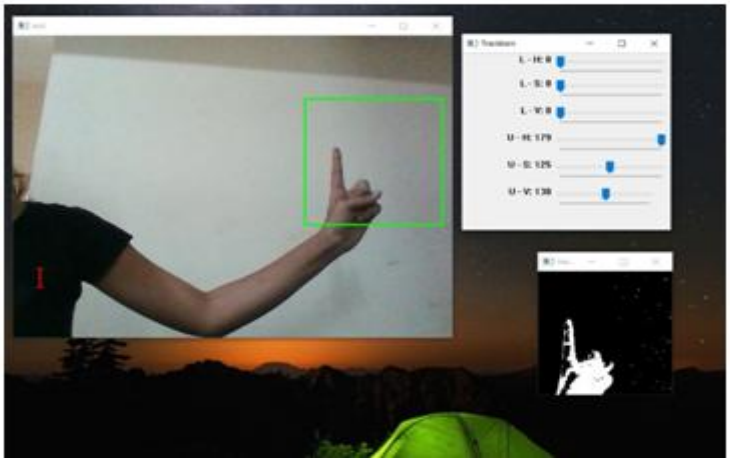

Fig. 6: Recognition of alphabet I.

VI. Applications

Hand gestures have become an exciting and convenient field that provides natural communication methods and reduces the cost of using sensors in relation to data gloves. Common methods of interaction depend on different devices such as mouse, keyboard, touch screen, play stick and play machine controls. The following sections describe some of the popular hand-held programs. The diagram shows the typical location of an application that operates through a hand touch detection process.

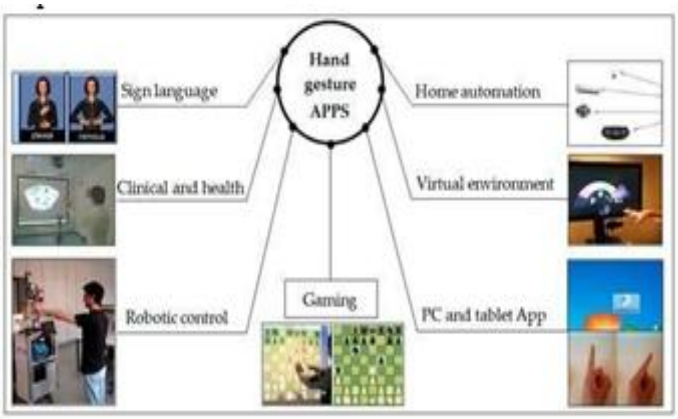

Fig. 7: Application areas of alphabet recognition system.

VII. Conclusion

Proposed work presents the various hand gesture recognition approaches for Sign Language. An important goal of gesture recognition system is to build an efficient human- machine interaction. Characters from A-Z are recognized. The advantage of the system lies in the ease of its use. The sign language recognition system is feasible for muted persons, they can easily communicate via this system.

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Quad Legged Camouflage Robot for National Security

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Abstract

Fundamentally, A Robot that is equipped for performing errands, for example – Motion, detecting the harmful gases, for detecting the metals and bomb in an underneath surface. The size of these robots is not contactable enough to reach the most compact places without getting identified by others. The Method that we are going to propose will be addressing these solutions and It is named as "Camouflage robot". These Robots play a vital role in saving many human lives in the border. The System consists camouflaging feature, a wireless high speed surveillance camera, Moisture and Humidity checking features and a bomb detecting features. This proposed solution will have a Transmitter (Robot) and Receiver –(Joystick), Both of this module will work simultaneously i.e.,

Transmit and Receive together in wireless mode. The Receiver module will have an addition feature to view surveillance camera and the mentioned parameters in internet through a Node MCU module which also proves it to be an IOT Model.

Keywords:-Camouflage Robot, IOT, Node MCU

I. Introduction

Human lifestyles comes to danger at locations wherein human being cannot continue to exist, conflict fields, excessive altitude areas, etc. As human's life is always previous than anything else, the proposed robot is substitution to human existence in which in it acts as a safety. The recommend device analyzes the encompassing vicinity and additionally provides live pictures to the observer, and additionally Robot presents the entire statistics approximately the climatic conditions and additionally the gap and the altitude [1] .the robot implemented is used for the national security in which it can spy and give the information. If any trade in the condition the robotic will use camouflage function to protect itself from the enemies. In this proposed gadget the variety of the conversation accelerated by means of the usage of NRF24L01 (RF module). [2] The basic nice of all present secret agent robot is to do the surveillance element and other assigned duties. In our proposed gadget the main intention of our robot is just too unique from the opposite undercover agent

robots. The robotic can without problems enter into enemy vicinity without their information and the robot can reveal the situation that arise at the working subject the leaf antenna camera in the robot can capture the video and transmit to the observer. If any alternate inside the circumstance the robot will use its camouflage technique to protect itself from the enemies.

II. Methodology

Robot and manage of Remote can be explained in 3 stages

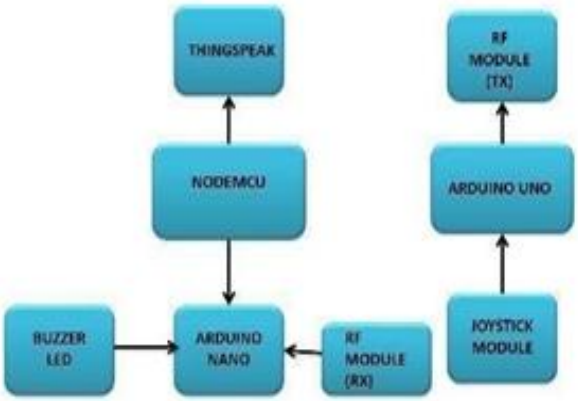
Stage 1: Control of Robot Joystick module, Arduino Uno, NRF-TX (transmitter) for Remote and for Robot Rx(Robot) will examine those values coming wirelessly and based on the ones facts the bot will pass ahead (it's going to manage the servo automobiles to transport the legs ahead).

Stage 2: Sensors in action DHT 11, BME 280, Metal detector, Arduino, NRF-TX for bot and NRF, Arduino, Node MCU- RX + Internet for far flung are used.the Arduino at the bot facet will measure all of the sensors and will transmit those values NRF The equal values are acquired via Arduino + NRF at remote and is again despatched to Node MCU after which into the cloud.

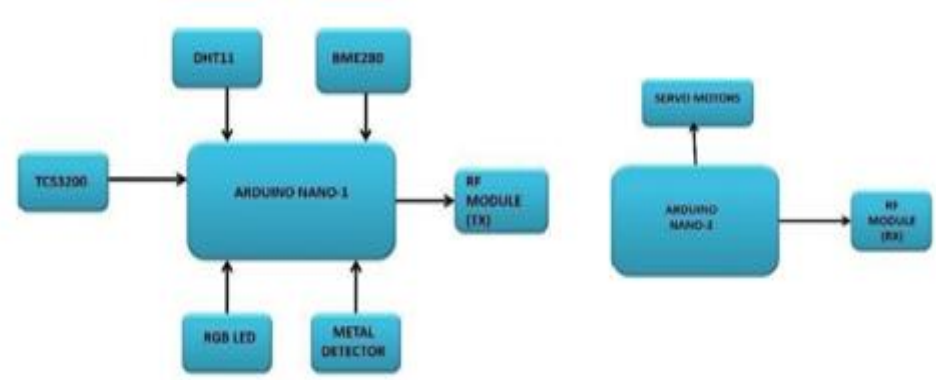
Stage 3: Camouflage (sensing and converting the RGB shades) absolutely in bot aspect. TCS3200 is sensing RGB values and the same values are fed to the RGB LED that's honestly converting the coloration of the bot which is known as Camouflage method Camera motion (live digital camera/visuals): Camera is shooting the video and audio, the digital camera transmitter is transmitting the records (audio/video) wirelessly. The OTG receiver is gets the video and audio and sending it to the cell smartphone.

III. Block Diagram

Remote Side



Robot Side



IV. Hardware And Software Specifications

A. ARDUINO UNO: Arduino Uno is board based microcontroller which uses ATmega328P.it has has 6 anlog pins and 14 output pins. Arduino uno is used at receiver end of the remote part to receive the sensors data from the robot.

B. ARDUINO NANO: The Arduino Nano is bread boars friendly using ATmega328. In the project three arduino nano boards are used for helping and storing the transmitted and received data.

C. DHT11: The DHT11 is a low cost digital temperature and humidity sensor with a 4.7k or 10k resistor which will be operating at the voltage of 3.5v to 5.5v and this sensor can detect the temperature from 0oc to 50oc and humidity range from 20% to 90% . In the project DHT11 is used to calculate the temperature and humidity at the connected to arduino nano in the robot. This sensor can also be used in the local weather station and environment monitoring.

D. BMP280: The pressure is measured by the BMP280 and also measures BMP temperature and altitude. The sensor is connected to the arduino nano in the project to collect the sensed pressure and temperature from the surrounding.

This uses 12C or SPI communication protocol to exchange the data with a microcontroller. Sensor is used for weather forecast and home weather stations and health care applications.

E. TCS3200: The color sensor TCS3200 is used to sense the colors in the surroundings which helps it in camouflaging in the project. The white LED's are used for providing proper lighting for the sensor to detect the object color correctly. It can work from -40oc temperature to 85oc temperature.

F. SERVO MOTOR: The servo motors are used for the movement of the robot each leg of the robot consist of three metal servo motors. Here metal servo motor is used instead of plastic servo motors to lift extra weight and to get more torque.

As long as the signal is receiving from the radio frequency module robot will be movement.

G. NRF24L01: Radio frequency module is used for the communication in the project and works with the help of SPI communication. It is a wireless transreciever module that means it can both receive and transfer the data. It is mostly used in wireless applications and radio frequency remote controlled devices. This can be operated at 3.3v so it can be easily used with 3.2v systems or 5v systems.

H. COLOR SENSOR: RGB LED: This is the commonly used component in electronics. In general it is used for indication purpose. Red, blue, green color LED's are there. The light will be detected by the photo diodes and the output will be showing the color on the top.

LED's are used in the project in chamoflauge technique to sense the surrounding colors and changing the robot into same color of the surroundings

I. METAL DETECTOR: This metal detector is used to detect the metal around the robot and this is capable of detecting the objects between 1cm to 7cm near the robot.

On detecting the metal around the robot the sensor will pass a signal to the receiver end of the remote module so that a beep sound will be arrived and will get to know that a metal is present.

J. THINGSPEAK IOT PLATFORM: Here in the project thing speak IOT is used to display the received data from the robot to the remote through radio frequency modules and which is sent to the internet through NodeMCU . Thing speak is an online IOT cloud platform.

K. CAMERA: Here in the project a leaf antenna camera is used to get the audio and video of the place and surroundings where the robot is present.

Camera receives the signal and transmits the collected footage through radio frequency modules that which is connected to the robot.

V. **Implementation**

In the implementation for the robot fiber body parts are used and the robot consist of four legs and each leg consist of three metal servo motors to move the legs , here for implement the sensors arduino nan is used and sensors like DHT11, BMP280, TCS3200, metal detector are used to detect the temperature, pressure, humidity and for detecting the metal near the robot metal detector is used , here four NRF modules

REMOTE SIDE: In the remote side we have divided into two parts one is receiver side and another one is transmitter side on receiver side it will collect the information and sends to ardiuno nano and that will send the data NodeMCU then it will process the data and sends to the internet and will be seen through thing speak iot platform . On the transmitter side it will the transmit the signals to the robot for the movement of the robot.

ROBOT SIDE: On the robot side it is divided into two parts on receiving end all the signals which are sent for the movement are received and implemented.
On the transmitting side all the sensor data collected will be transmitted through rf module to the remote.

VI. Applications

Camouflage Robots may be used in protection services like defense sectors. Robot is on the whole used in military with the intention to update the person electricity and to reduce the lack of human lives. this Robot is to serve the defense forces in knowing the enemy's secrets and techniques. The proposed machine offers a helping hand to the safety of forces in detecting of enemies. The Robot also can be used in high altitude areas in which human cannot live to tell the tale. Moreover, camouflaging function makes difficult to hit upon the Robot by means of necked human eyes.

VII. Results

Fig :1:sensors

Figure 1 :Sensors used in the project are of different types like BMP280, DHT11, TCS3200, Metal detector and color sensor .The sensors are to calculate the temperature, humidity, pressure at the place where the robot is placed and to detect the metals and colors around the robot [11].

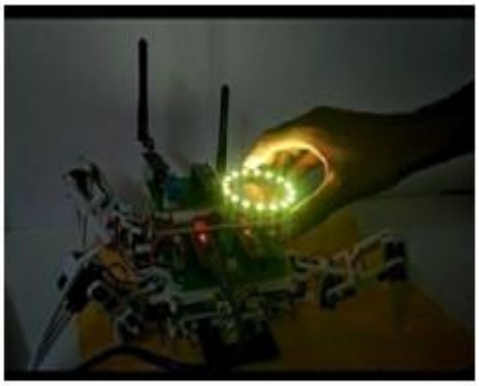


Fig:2 **Fig:3**

Fig:2 &3: chamouflage technique

Figure :2&3 : chamouflage technique:The robot should change the color of the body to merge with the surroundings to hide from the enemies so, here chamouflage technique is used to hide the robot [7].The robot id made as a prototype of the chamouflage technique [8]

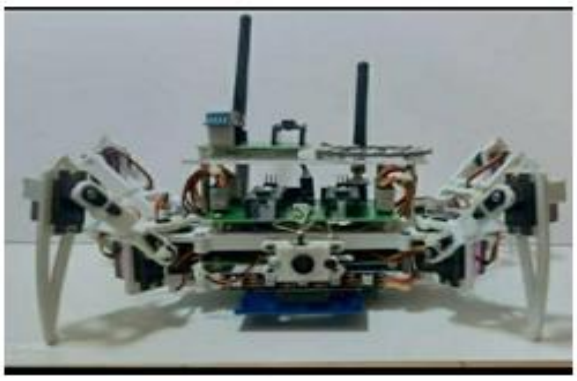


Fig:3: robot

Figure:3: The robot is named as quad legged wireless chamoflauge robot [12].As the title says the robot is a prototype of chamouflage technique, and collects the information through sensors, and video by using camera and also it walks using servo motors [14].

Fig:4:camera working

Figure: 4: Camera is used for collecting the live videos of the enemies, here leaf antenna camera is used, and camera will collect the entire video of the enemies.

VIII. Conclusion

The main goal of our project is to secure the border through by using chamouflage technique [2] and to communicate wirelessly by using radio frequency module which acts better than Bluetooth and wifi networks.

By using all the sensors that are integrated in the robot, the robot can collect the data about the temperature, altitude, distance, pressure and humidity at which enemies are present.

In this project leaf antenna camera is used for the video and audio reception so that observer can get the live videos about the enemies and can protect the nation from others.

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Digital Twin – Challenges, Applications & Enabling Technologies

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Abstract

The Digital Twin movement is at the forefront of the Industry 4.0 revolution , which is being propelled forward by current data analytics and Connectivity in the Internet of Things. Internet of Things has expanded the amount of information available for use in healthcare, industry, and environments for smart cities. Internet of Things vast nature, paired using data analytics, supply a necessary resourcefulness forecast the upkeep and problem to mention a few, as well as smart city projects and industrial process future health[1]. in addition assisting with detecting anomalies in patient care, smart city traffic control, and fault detection[2],[3]. Through the development of a real and linked virtual twin, Digital Twin address the problem a seamless combination of data analytics and IoT. In a Environment of the Digital Twin, live real-time analysis choices may be using precise investigative. The article draws on a number of scholarly publications that were discovered using keywords related to data analytics and IoT. The following is how the paper is structured: The first section will define the terms "applications" and "digital twin." The problems are discussed in Section II. Section III: Digital Twins' Key Enabling Technologies The paper comes to a close with Section IV.

Keywords: Digital Twin; Industry 4.0; Internet of Things.

I. Introduction

According to NASA, a Digital Twin is a multiscale, integrated metaphysics, probabilistic simulation of an as-built vehicle or system that uses the best available sensor updates, physical models, fleet history, and other parameters to match the life of its equivalent flying twin [1],[2],[3],[4].The digital twin, according to Chen 2017 [5], is "a system that describes all functional aspects and connects them to working parts or a digital representation of a real device." Madni [6] According to the experts, a Digital Twin is a virtual instance of a physical system (twin) that is continually updated with maintenance, performance, and health status data throughout the life cycle of the real system.

II. Digital Twin Applications

The next section will focus on the Digital Twins' applications. This will begin with a description of the domain, prospective applications for Digital Twins, industries, and specific challenges that Digital Twin technology may solve. The idea and phrase "digital twin" appears to be gaining traction in academics, and Artificial intelligence (AI) and Internet of Things (IoT) advancements (IoT)are allowing this

expansion to accelerate [7]–[8][9][10][11][12] . The primary areas of focus in this movement include development, with certain healthcare-related applications and smart cities using Digital Twin technology.

A. Smart Cities: Due to rapid improvements in interconnection through Internet of Things, possibility and use of Digital Twins substantially operational inside a intelligent city rising day by day. More linked the more smart cities there are, the more communities there are. The Concept of Digital Twins are used. But the more data there is, the better. we collect from Internet of Things sensors integrated in our very core city ministration will pave the path for research targeted at developing sophisticated AI algorithms [3], [8], [9].

B. Manufacturing: The major the reason behind this because developers are always looking for new ways to monitor and track their products in order to save time and money. crucial driver and motivation for every developer. In addition, as a intelligent city grows, connection is one of them most compelling reasons manufacturers adopt The Concept of Digital Twins. Present expansion consistent with the concept of Industry 4.0, which ushers in the fourth industrial revolution. This regulates device connection in order to make the Digital Twin concept a reality industrial operations [1], [10]–[11][12][13].

C. Healthcare: Another industry in which Digital Twin technology is being used is healthcare. The impact of innovation and growth-enabling technology on healthcare is unrivalled, as the once unthinkable becomes attainable. Significantly, IoT devices are less expensive and easier to set up, resulting in an increase in connection [14], [15].

III. Challenges

This section begins with a discussion of the problems connected with Digital Twins, However as the study as time goes on, becomes obvious that the problems encountered in IoT and IIoT, as well as data analytics, are very similar to those encountered in Digital Twins, as seen by some of the topics highlighted below.

A. IT Infrastructure: In terms of both analytics and IoT, the issue is the present IT infrastructure. The Digital Twin requires infrastructure that enables data analytics and IoT to succeed; they will speed up the Digital Twin's successful operation. The Digital Twin will be ineffective in accomplishing its objectives unless it is supported by a well-connected and well-thought-out IT infrastructure.

B. Useful Data: The data necessary for a Digital Twin is the next obstacle. It must be classified data that is devoid of noise, has a continuous data stream, and is consistent. If the data is inconsistent and faulty, the Digital Twin may underperform due to missing data and poor performance. A critical component for Digital data is the volume quality of IoT signals. To determine the relevant data to be acquired as well as for efficient usage in order to employ a Digital Twin,

inspection and device planning are necessary.

C. Privacy and Security: Apparent that privacy and security are respected issues connected with Digital Twins a problem, even by industry standards. First and foremost, as well as the massive quantity of data they have utilise, second, because of the danger this poses to sensitive system information. To address this obstacle, essential supporting technologies for IoT and data analytics are examples of digital twins, must adhere to current privacy and security rules. Consideration of privacy and security for Digital Twins data aids in the resolution of trust concerns with Digital Twins.

D. Trust: Both the user and the organisation have problems when it comes to trust.To guarantee that end-users and organisations understand the benefits of a Digital Twin, with an emphasis on addressing the trust challenge, the technology must be explored further and presented at a concrete level. Another method to overcome trust issues is to validate models. Validating that the Digital Twins are working as intended is critical to maintaining user confidence. With more information, faith in Digital Twins grows. The enabling technology will provide a better knowledge of the actions that must be taken to guarantee that privacy and security practises are followed throughout the development process, therefore addressing trust issues.

E. Expectations: Despite industry giants GE and Siemens accelerating Digital Twin adoption, greater awareness is needed to call attention to the obstacles that exist for Digital Twin expectations and the need for additional information. Solid foundations for Internet of Things infrastructure, as well as a better knowledge of data, are necessary to execute analytics that will ensure that organisations adopt The technology of digital twins. Difficult to overcome the notion Digital Twins should be used employed just due to current trends.Benefits and drawbacks of assuming Digital Twins must be considered in order to take appropriate action while implementing Digital Twin systems. It is apparent that the problems faced by Industrial IoT/IoT as well as data analytics are likewise challenge faced by the implementation of a Digital Twin.

IV. Technologies

Table 1: Enabling Technologies for Digital Twins

Domain	Enabling Technology
S1 Application Domain	Data collection and Pre – processing, Model Architecture and Visualization, Software and APIs
S2 Middleware Domain	Data Processing, Storage Technology
S3 Networking Domain	Wireles Communication, Communication Technology
S4 Object Domain	Sensor Technology, Hardware Platform

The concepts for enabling technology and functional domains of Digital Twin are presented above. S1 represents the application domain, S2 represents the Middleware domain, S3 represents Networking, and lastly S4 represents Object .

S1, is the application, which is composed of three layers, the first of which is visualisation layer and architecture model, which is required for generating high fidelity models of physical entities. Digital Twin architecture and visualisation modelling are made possible by this layer. More than one model is used to create digital twins than simply physical entity operation. Tools like Twin Builder and Simulink make it possible. The API and software in the second tier are primarily to help in the simulation of a Digital Twin architecture, allowing the third layer, which includes pre-processing and collecting, to proceed more quickly. This application's last layer is required make sure that details is gathered correctly, such as with Predix, Mindsphere are all included., a few data collecting implementation. Guarantees that details collected appropriately in order to make it easier to utilise of analytics and IoT for a Digital Twin, as well as connecting domains S1 and S2.

Two enabling layers make up S2, the middleware domain. The first is the technique of storage. Which uses Mongo DB, MySQL services, to speed up data storage, which is required for the use of Digital Twins. The next layer, which deals with processing of data, required to transmit details from S2 to S3.

The Network Domain of S3 has two qualifying levels, the first of which is the Layer of Communication Technology, which ensures that details gathered is transmitted across territory. Wireless communication is the functional block's second tier of the network domain for Digital Twins, and it is required to guarantee that data transfer wirelessly meets the right terms within the context of a Digital Twin architecture, as well as delivering data to the next domain, S4.

Two enabling layers are present in S4, the object domain. The hardware platform is the first, while sensor technology is the second. Both are required to guarantee that the necessary hardware for Digital Twin investigation is in place, as well as to allow data gathering via sensor technologies.

V. Conclusion

In recent years, there has been a change in the usage of Digital Twins, which has been driven as a result of a rise in the number of industry leaders spending substantially in creating Technology Digial Twin and publishing papers on the subject. It would not be feasible without the same advancements in AI, IoT, IIoT, and other disciplines that are proving to be critical enablers for Digital Twins. The manufacturing industry receives a lot of attention in Digital Twin research, as seen by the high number of articles in this subject examined above.

Manufacturing has a far greater number of publications than papers about intelligent city and hospitals will benefit from digital twins, indicating research

shortages in these fields. The preceding analysis focuses on two increasing areas of interest: intelligent city and hospitals will benefit from digital twins. The article goes through each of these topics in detail, showing how academics are building Digital Twins as well as the obstacles and important enabling technologies. The article also specifies the notion of a Digital Twin, proving that the word has not changed significantly since it was originally created in 2012.

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Electronic Weather Station

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Abstract

The IoT based weather monitoring system monitors and reports the weather conditions at a region, regardless of time. Observing climatic conditions manually is tough. This work is to develop an automated system that monitors weather. The proposed system is an advanced solution for weather monitoring using Internet of things (IoT). This is an advanced solution for connecting things through internet. Here the sensors used are for monitoring temperature, relative humidity, pressure and light intensity. The data that is collected stored into the cloud and plotted accordingly. The data uploaded can be accessed through SMS or through the website.

I. Introduction

The weather conditions are required to be monitored to maintain healthy growth of crops. The motivation behind taking up this project is the wide range of utility in industries and agricultural institutions. The weather conditions of the region where the module is placed can be monitored remotely. The growth of technology makes way to read the environmental parameters easy compared to past. The sensors are the miniatured electronic devices used to measure the physical and environmental parameters. The system proposed in this paper describes the implemented flow of the electronic weather station. Sensors are the essential components in many applications which are used not only in industries but also in daily life applications such as buildings safety and security monitoring. Internet of Things, which consists of multiple on/off devices connected to the Internet. That includes just about everything you can think of, mobile phone to building maintenance and jet engines. Medical devices such as pulse monitors and farm animals can send data through the network and are members of the Internet of Things. They also assist in environmental matters and in the department of agriculture. Wireless communication is the transmission of information at a distance without the use of wires. Distances may be short (a few

metres as in the television remote) or long (thousands or millions of kilometres for radio communications. Digital weather stations can be categorized as personal and business stations. The personal weather stations are characterized to have relatively low cost with limited capabilities fitted sensors are less sensitive and generally do not have the ability to record or transmit data. On the other hand professional stations are more costly.

II. Methodology

There are a lot of high end systems available these days for round the clock weather monitoring. But these systems are implemented on a very large scale, for monitoring real time weather for a whole city or state. Implementing such system for a small area is not feasible, since they are not designed for it and the overhead for maintaining such systems for a small area is very high. Our proposed system makes use of 3 sensors to measure the weather/environment factors such as temperature, humidity, light intensity, dew point and heat index. The values read from the sensors are processed by the Arduino micro-controller and stored in a text file which can be processed upon to derive analysis. The readings are also displayed on an on board LCD for quick viewing. All these readings can be analyzed to get the weather characteristics of a particular area and record the weather pattern.

These recorded parameters are essential and vary from places to places. All these requirements are fed into the database and these values are essentials and recorded over time. Using these values as input and then plot a weather chart of a particular area over time. Based on the present weather factors and preset values the set actions are done. The set action can include turning on the heating system when the temperature is colder than the set value and turning on the cooling system when the temperature is hot or humid beyond the set values.

The serial output from the Arduino micro-controller which are the values read from the sensors can also be stored in a database. The database can be used as a source for data if needed to display values through a website or a standalone application. The modules that make up the weather monitoring system have been carefully and well thought of, to make sure that the sensors used are giving the most accurate reading and are compatible with the Arduino micro-controller.

III. Block Diagram

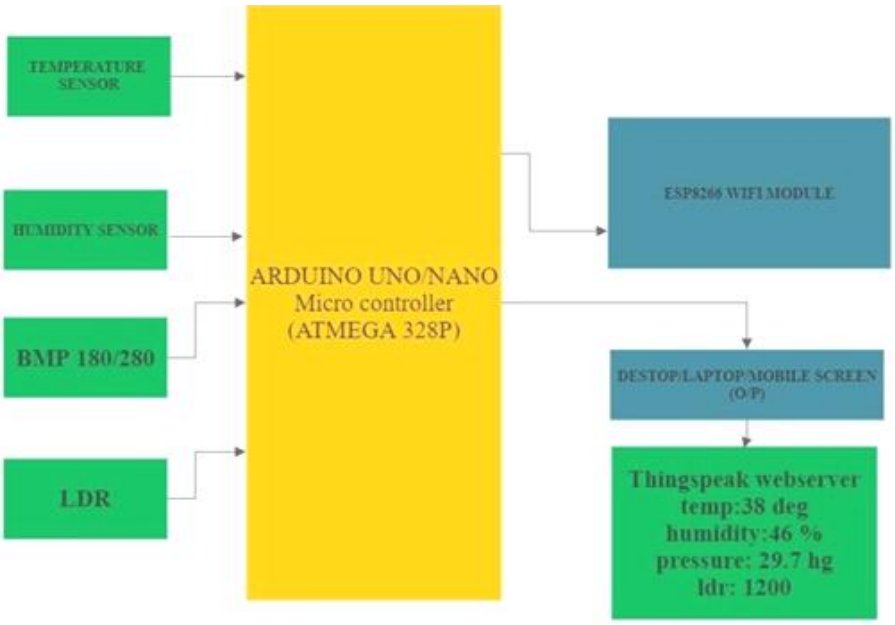

Fig 1: Block Diagram of Proposed System

IV. Hardware and Software Specifications

ARDUINO UNO: Arduino Uno is board based microcontroller which use ATmega328P.it has has 6 anlog pins and 14 output pins. Arduino uno is used at receiver end of the remote part to receive the sensors data from the robot.

ARDUINO NANO: The Arduino Nano is bread boars friendly using ATmega328. In the project three arduino nano boards are used for helping and storing the transmitted and received data.

DHT11: The DHT11 is a low cost digital temperature and humidity sensor with a 4.7k or 10k resistor which will be operating at the voltage of 3.5v to 5.5v and this sensor can detect the temperature from 0oc to 50oc and humidity range from 20% to 90%. In the project DHT11 is used to calculate the temperature and humidity at the connected to arduino nano in the robot.This sensor can also be used in the local weather station and environment monitoring.

BMP280: The pressure is measured by the BMP280 and also measures BMP temperature and altitude. The sensor is connected to the arduino nano in the project to collect the sensed pressure and temperature from the surrounding.This uses 12C or SPI communication protocol to exchange the data with a microcontroller.Sensor is used for weather forecast and home weather stations and health care applications.

LDR: The LDR gives out an analog voltage when connected to VCC (5V), which varies in magnitude in direct proportion to the input light intensity on it. That is, the

greater the intensity of light, the greater the corresponding voltage from the LDR will be. Since the LDR gives out an analog voltage, it is connected to the analog input pin on the Arduino. The Arduino, with its built-in ADC (analog-to-digital converter), then converts the analog voltage (from 0-5V) into a digital value in the range of (0-1023). When there is sufficient light in its environment or on its surface, the converted digital values read from the LDR through the Arduino will be in the range of 800-1023.

ESP8266: ESP8266 wifi module enables internet connectivity to embedded applications. It uses TCP/UDP communication protocol to connect with server/client. To communicate with the ESP8266 wifi module, microcontroller needs to use set of AT commands. Microcontroller communicates with ESP8266-01 wifi module using UART having specified Baud rate (Default 115200).

Thingspeak IOT Platform: Here in the project thingspeak IOT is used to display the received data from the robot to the remote through radio frequency modules and which is sent to the internet through Node MCU. Thingspeak is an online IOT cloud platform.

V. Implementation

Arduino IDE with inbuilt libraries was used. DHT11 and Adafruit libraries were installed with their latest versions. An Arduino program was written to obtain temperature and humidity from DHT11 sensor in Fahrenheit and Degree Celsius. It was connected to the open-source data collection tool using python programming which gets connected to the MYSQL database server in which the data in being stored in specific intervals. The COM4 port interacts with the python program, the program contains the database name which will be used to store data. The task scheduler is used to carry out the task in specified intervals of time for the amount of days data needs to be monitored.

VI. Applications

- Used in coal mine, bio gas manufacturing centers.
- Used in power plant generation.
- Agriculture field monitoring.
- Home automation.
- Industrial purpose.
- It does not require any human attention.
- People can get prior alert of weather conditions.
- The low cost and efforts are less in this system.
- Accuracy is high.

VII. Results

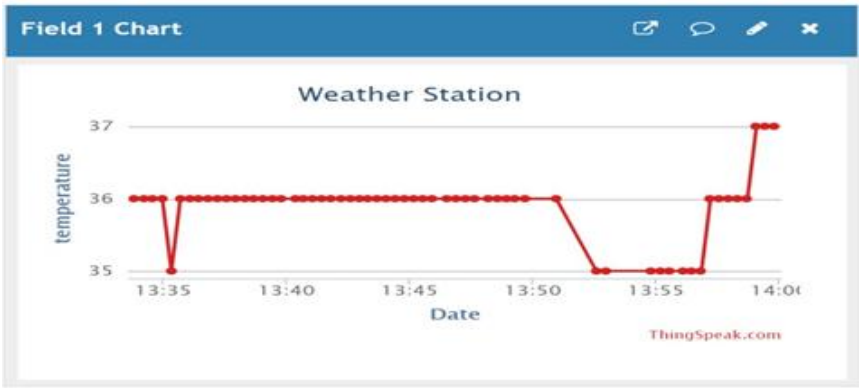

Fig 7.1: Temperature Graph.

The figure 7.1 shows the temperature readings of the weather. The temperature of the day remains constant unless the climate changes, the cloudy or sunny will results in the change in temperature. The temperature sensor sends data to the data base & it is stored in cloud.

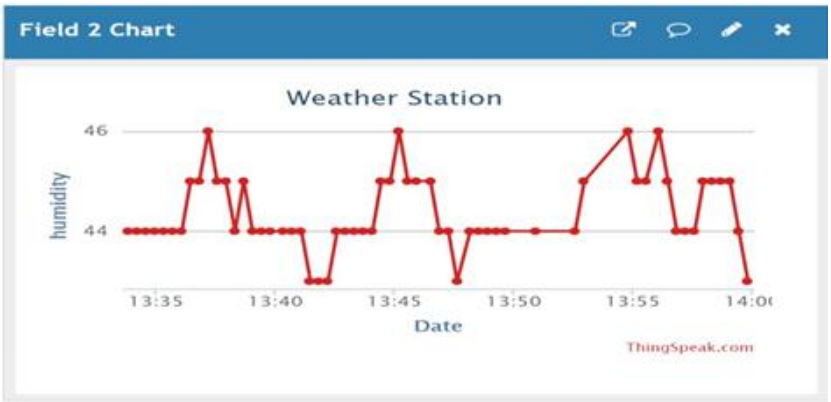

Fig 7.2: Humidity Graph.

The figure 7.2 shows the Humidity readings of weather. Humidity sensor acquires the data from surroundings & sends to data base .The humidity is nothing but water vapour in the air which changes rapidly for every minute. The moisture in the air is due to cloudy -ness or rainfall or dew.

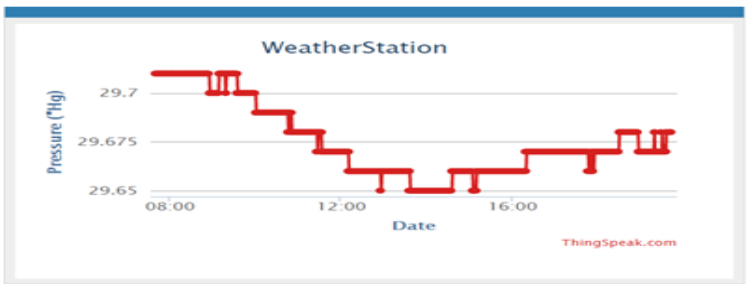

Fig 7.3: Pressure Graph

The figure 7.3 shows the Pressure graph .Pressure sensor (BMP180/280) acquires the data from the surroundings the data is send to data base & stored in cloud.

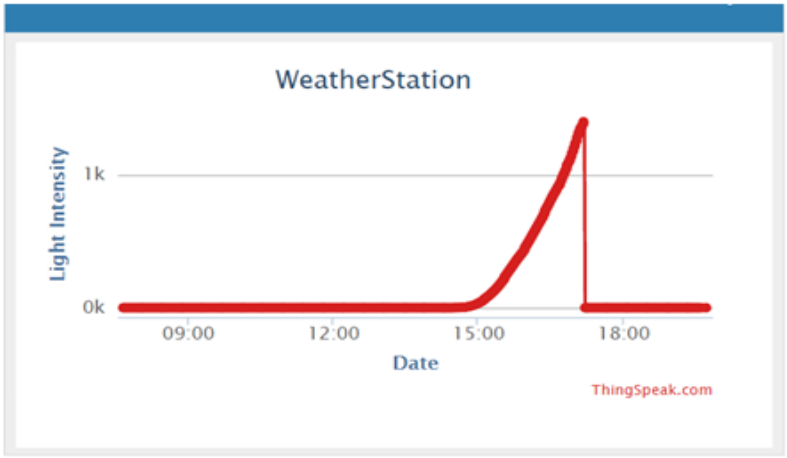

Fig 7.4: Light Intensity Graph

The figure 7.4 shows the light intensity values of weather .Light dependent resistor (ldr) sensor acquires the data & sent to cloud storage The light intensity is nothing but brightness whether it is cloudy , sunny, drizzy, higher the value higher the brightness (sunny).

VIII. Conclusion

The system works as a supervisor controller, which govern places depending on the fluctuations of the weather or other conditions via feedback operation principles. Hereby, concluding that the proposed system can be separated in to two different parts. The first part is excessively helpful for the companies and other organizations that are put in charge to plane and manage their works based on weather situations; such as, Transportation systems, Airways, and the Agriculture as a high priority, etc. The second part is designed mainly to control the sites based on the change in the states of user specification depending on a feedback reported by input changes due to weather fluctuations; such as, Houses, Markets, Schools, Colleges, and even the Cars / Trains.

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Design and Implementation of Advanced Patient Monitoring System

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Abstract

In our country near about 1/4 of the patients lose their lives due to interrupted health monitoring system. In most of the hospitals, doctor visits patients once or twice in a day. A situation might arise where the patient's health becomes critical in between that interval when a doctor is not available with a patient and the patient might lose their life. Therefore, to overcome these issues of existing system we are proposing health monitoring design and implementation of advanced patient monitoring system, where patient's health is monitored and it will be updated to the doctor throughout the day. The proposed health-care monitoring system is that it can measure various physiological parameters of the human body and is secure, reliable and better than conventional Wireless Fidelity (Wi-Fi) technology. Results of the prototype model show better performance in terms of accessibility and portability of the physiological sensor. Proposed system is user friendly, cost effective and will have impact on the upcoming days in the hospitals.

Key Words: Wireless Fidelity, Physiological parameters, Security

I. Introduction

Health Monitoring provides software services that collect and analyze health care data to illuminate complex health issues. The rising costs and complexity of health care require a greater understanding of regional and national health problems.

In a health monitoring program patient parameter such as heart rate need to be monitored regularly. Modern technology allows medical professionals to make realistic use of the world of real-time monitoring, diagnostic, and therapeutic risks. Doctors and nurses working in a hospital monitor the patient's condition on a regular basis. In developing countries such as India because of a shortage of specialist doctors, it was difficult for the same physician to care for more patients.

In today's world, health care problems are growing at an alarming rate such as heart disease, obesity, and lung failure that cause a mortality rate of 7.2 million people a year which is why it takes an hour to overcome all such problems. IoT is rapidly changing the healthcare industry. In the proposed methodology, we built the IoT Based Patient Health Monitoring System using ESP8266 and Arduino. The IoT platform used for this proposed system is ThingSpeak. ThingSpeak is an open source Internet (IoT) Internet application and API for storing and retrieving data from HTTP protocols via the Internet or Local Network. This IoT device can read the pulse rate and measure the ambient temperature. It continuously monitors heart rate and ambient temperature and updates it on the IoT platform.

In this system many sensors are used to monitor many health parameters to detect the level of recovery and abnormalities in the state of health. In addition, the program uses IoT's WiFi technology where the "ThingSpeak" system is used here to show the health status of the affected person in a coma online via mobile phone. Our proposed health care system can provide a smart and affordable health care system to provide a comfortable life for people with chronic illnesses with the use of advanced technology and new technologies. As a result, the need for duplication of physicians decreases as information reaches everywhere. Implementing wireless communication technology in monitoring systems is now easier due to its patient-friendly approach

In the next section, this paper discusses existing literature research in the health monitoring system on the emergence of human health. The proposed system model and performance-based results will be discussed in the next section of the paper. The proposed system is very helpful for physicians, who can monitor patients simultaneously even when doctors are not in their room, and will be monitored closely for the patient's condition. This will greatly reduce the workload of doctors and emergency workers.

II. Literature Survey

An IoT-based patient monitoring system using an ECG sensor is discussed in [1]. This paper proposes a smart patient screening program that automatically scans the patient's health status using a variety of sensors. What is the continuous monitoring and clear representation of patient information that helps to assess the patient's condition were addressed. In addition, if the condition is serious, notice is sent to the doctor / nurse.

Paper [2] proposes an IoT based model for long-term patient health monitoring, with the help of a sensor. The proposed system is able to track important basics such

as temperature, blood pressure, heart rate and ECG at home or in a remote area. The proposed model is of great benefit to the community and will add to the existing health monitoring solutions.

The wireless patient monitoring system is discussed using an integrated ECG module, pulse oximeter, blood pressure and interviewed temperature sensor [3]. This paper outlines the development and development of a mobile patient monitoring system. Advances in technology have led to increased costs in the health care sector, so the proposed sensory-based system will no longer focus on technology but will be more costly. This paper measures four key parameters for different patients.

R. G. Landaeta, et al [4] described a system for determining health parameters based on the concept of photoplethysmography Bradycardia and Tachy cardia. The proposed model can be used to identify various arrhythmia conditions by analyzing the practice of recorded data. This model is ready for early detection and monitoring of heart conditions so that we can remain vigilant and take steps to prevent any serious situations in the future. Although the program was effective, physicians needed to be physically present to overcome the wireless patient monitoring program [5] was suggested.

E-Health provides health care services by installing telephone communications. Here is a simple device that can transmit the details of a patient's vital signs to a distance. All in all although the above health monitoring systems monitored the patient's health was not real time so measuring the health limits in real time the system was proposed for the ZigBee-based patient [6].

The monitoring system used to monitor a patient's body with RTOS provides much better results than other conventional methods. It works more efficiently during automated systems compared to the existing system and to advance this system a patient monitoring system using GSM Technology [7] was proposed. The development of remote and portable devices is an important component that can empower patients with chronic heart disease to live and live a normal life wherever they want, while at the same time being monitored for any heart disease.

To implement the most advanced health monitoring system the android Based Heart Monitoring and Reporting System Heart rate Android Application was developed by [8]. The main objectives of this system are listed below: To measure heart rate, measure body temperature, continuously display the effect on an Android device, continuously view the patient's state of health.

In this proposed system a heart rate measurement is performed using the fingertip and a new integrated tool for improving this level is developed. With the increase in heart disease, the need for an accurate and inexpensive device to measure these heartbeats is needed or cardiac monitoring is essential to ensure quality of life.

III. Proposed Frame Work

The health monitoring system is designed in the proposed manner. Data transfer by illumination by sending data via LED light bulb. The proposed system includes some physical measurement sensors such as heart rate, temperature and saline sensor and ECG. Here the heartbeat sensor works on the principle of fluctuations in light. This sensor contains IR Tx and IR Rx, where the finger is placed on the LED and the light is transmitted via Tx and Rx with the audible volume of light inside the finger. When operating in the circuit, the LM35 regularly checks the temperature.

A bottle of salt usually contains a solution of 500 ml. Threshold level of salt is maintained as 350 ml. When the salt level is below 350ml the doctor will be notified to take appropriate action by removing the saline finder. Body parameters are found in the human body given to the microcontroller from the sensors that control the system. Depending on the application and the type of signal sensor processing will be performed on the microcontroller.

The formatted data used is also converted to analog signal using the built-in DAC PIC microcontroller DAC. The removal of the microcontroller is then transferred from the patient monitoring system into the physician / nurses' monitoring room as shown in figure1. The LCD display is used to display body sensor output for better readability in the proposed prototype.

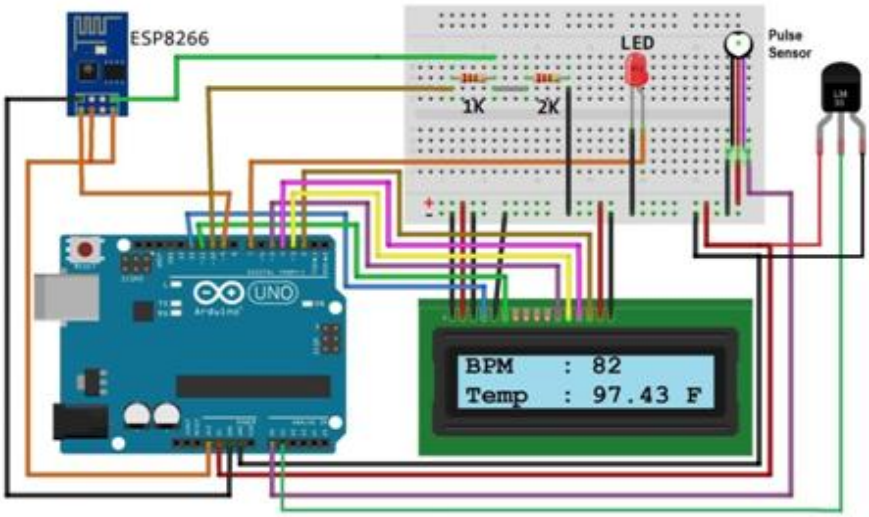

Fig 1: Implementation of Automated Patient Monitoring System

Information from the patient's room is continuously sent to the doctor's room and a small change in the patient's health can be seen by the doctor without physical presence. This is shown in Figure 1. It takes input from the pic controller in the form of electrical signals and converts it into optical signals with an electric diode image.

IoT Based Patient Health Monitoring System as shown in Figure 1 using ESP8266 & Arduino. The Pulse Sensor and LM35 Temperature Sensors measure BPM and Environmental Temperature respectively. Arduino processes the code and displays it in Display. ESP8266 Wi-Fi module connects to Wi-Fi and sends data to IoT device server. The IoT server used here is ThingSpeak. Finally, data can be viewed from any part of the world by logging into the ThingSpeak channel.

IV. Results

The proposed system has been implemented using Hardware and software and the results obtained of a specific type are shown and assumptions are drawn according to the results written in this section. The proposed system uses advanced IoT platform to speed up the process as shown in Figure 2. This technology is a new technology that emerges from the slope. It provides data transfer by illumination by sending data via LED light bulb which is part of the proposed system used in the hospital to save the patient's life and make all information automatically available to the doctor and nurse. To detect any differences in body temperature to diagnose the disease is one of the most widely used parameters of human body temperature. The proposed LM 35 sensor is used.

The system works well with the above setup. It captures continuous data from the heartbeat and temperature sensor and stores values in the cloud. Graphs generated in the cloud from sensory-based readings. It also analyzes temperature and heart rate values to set the notification parameter value to 0 or 1. Depending on the latest entry temperature and the pull-down graph graph is set.

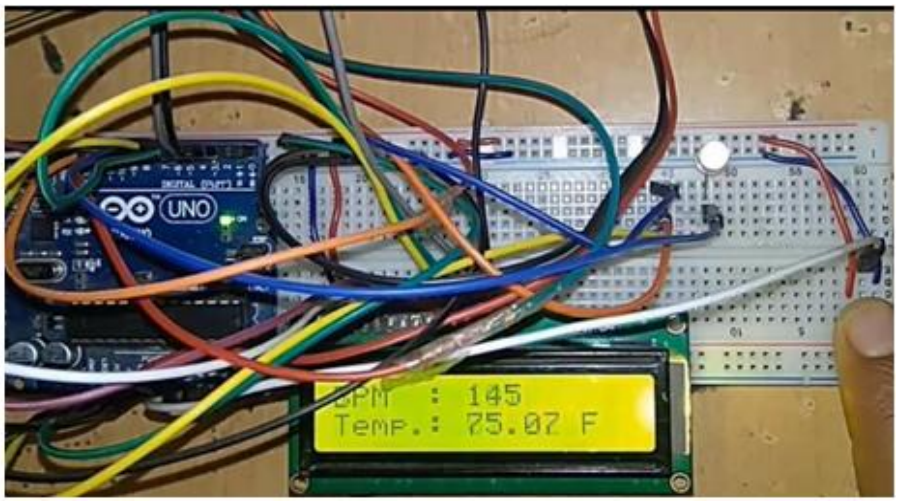

Fig 2: Prototype Automated Patient Monitoring System

The system works well with the above-mentioned setup as shown in Figure 3. It captures continuous data from the pulse Rate sensor and temperature sensor and stores values in the cloud. Graphs generated in the cloud from sensory-based readings. It also analyzes temperature and heart rate values to set the notification parameter

value to 0 or 1. Depending on the latest entry temperature and the pull-down graph graph is set.

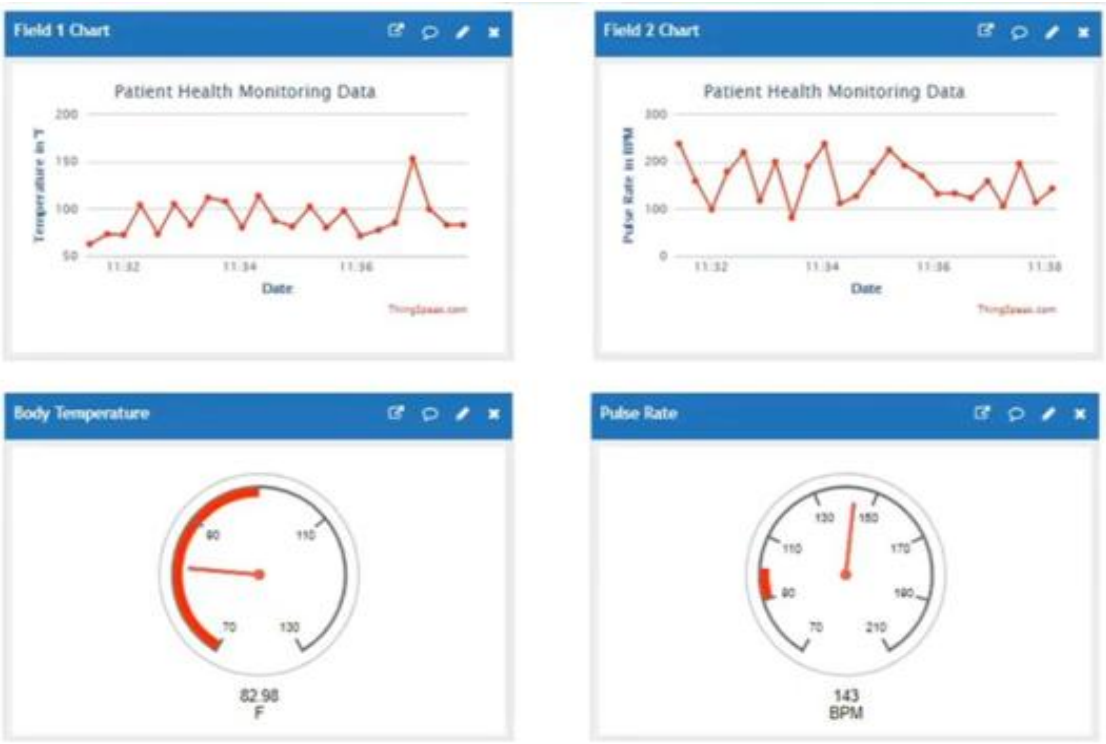

Fig 3: Measured Parameters on ThingSpeak

V. Conclusion

The proposed system is implemented by using ARM and PIC microcontroller. This advance health monitoring system not only achieves higher data rates but it also aces the patient monitoring process with minimal cost. This technology is implemented in hospital to save the life of patients and to make all information automatically available to doctor and nurse. Communication between the doctor and patients is achieved at faster rates successfully for the transmission of the physiological parameter such as temperature, saline and pulse rate of the human body. This technology in medical field makes diagnosis faster and which can be done full automation in the future generation.

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Brain Computer Interface Based Home Automation Using Mindwave Device

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Abstract

Mind controlled based home automation system is mainly built on Brain Computer Interface (BCI). Today people have become physically disable for stroke and traumatic brain injury. BCIs are systems that can bypass conventional channels of communication to provide direct communication and control between the human brain and physical devices. The proposed system worked by translating different patterns of brain activity into commands in real time.

The brain wave sensor will sense brain signals and it will convert the data into packets and transmit through Bluetooth. Then the control command will transmitted to the relay circuit. With these entire steps, system can control any home appliances through brain signals, which connected to the relay circuit.

As a result of various forms of illnesses or accidents such as spinal cord injury (SCI) or a form of motor neurons disease or ALS, many people suffer from a severe motor function loss and are forced to accept a reduction in the value of life, depending on the care of others. BCI can provide logistic support to those suffering from said disease.

Brain Computer Interface BCI helps to develop Brain actuated applications like home automation using EEG brain waves using EEG device

Keywords: Brain-computer, interfaces (BCI),EEG

I. Introduction

The human brain is consisting of large number of linked neurons; the arrangements of cooperation between these neurons are expressed as thoughts and emotional states [1]. Every intercommunication between neurons builds a small electrical discharge; alone these charges are hardly possible to measure from outside the skull. However, the action created by hundreds of thousands synchronous discharges accumulates into waves which can be measured.

Different brain states are the result of distinct arrangement of neural interaction. These arrangement lead to waves represented by different amplitudes and frequencies [2]; for instance, waves within 12 and 30 hertz, Beta Waves, are linked with concentration while waves within 8 and 12 hertz, Alpha Waves, are linked with relaxation and a state of mental calm as shown in figure 1. The contraction of muscles is also linked with unique wave patterns. By using these patterns NeuroSky devices detect blinks.

All the available electrical appliances produce similar waves; hence, it creates some level of diffusive noise intercede with the waves originate from the brain, and this is why most Electroencephalogram (EEG) apparatus will take up values from sensor even if they are not on a present on person's head. Calibrating mental activity over these waves is like trying to listening on a conversation at a loud concert. In the previous works, EEG devices deceived this problem by calculating these signals in surroundings where electrical activity [3] is strictly controlled and increasing the signal strength of the data received from the brain through the application of a conductive solution.

With this operation we can easily find out the needed action should be performed by the user automatically with the aid of mind wave sensor and can give input or command to the particular function or devices to do exact task.

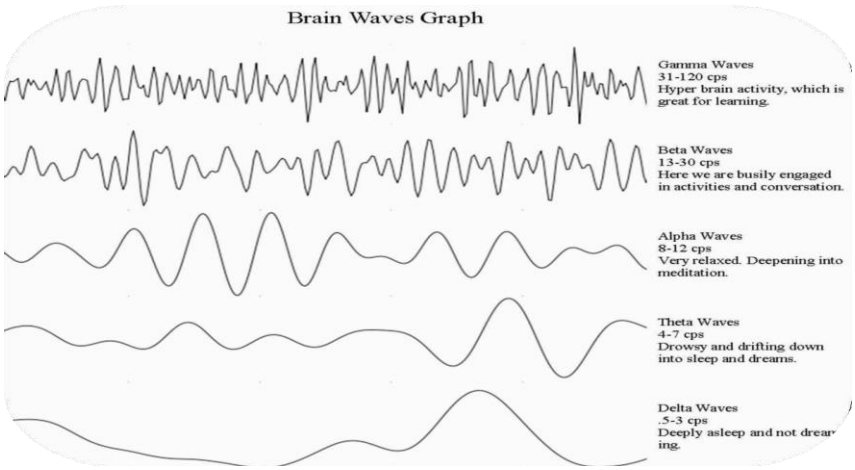

Fig1: Classification of brain waves

II. Problem Statement

Analysis in the field of ER is ever growing as the operations that utilize the Brain Computer interaction is also developing. Making robots acts socially, where socially means being able to read other emotion and act accordingly would increases the effectiveness of HRI (Human Robot Interaction).

Millions of humans around the world experience from mobility deterioration and majority of them rely upon powered mechanical wheelchairs to get on with their activities of daily living. However, many patients are not recommended powered wheelchairs at all, either because they are physically incapable to regulate the chair applying a conventional interface, or they are unable of driving harmlessly..

III. Methodology

The brain signals used here are instinctive EEG signals. These signals are related with different aspects of brain activity related to mental exercise carried out by the subject at his/her own will. The mental activities such as attention, eye blinks, meditation [8] are used for on or off of home gadgets.

The brainwave starter kit compass dry sensors which does not use application of a conductive gel between the sensors and the scalp. Also, this component is much less weighted and beneficial for usage when compared to the conventional EEG sensors as it requires only one electrode for sensing. One more convenience in this kit is that the data or brain signals are transported to the signal processing unit via Bluetooth network.

The signal processing unit used in this operation is a laptop/PC [9]. The brain signals are transferred from the headgear via Bluetooth to the laptop. The digitized value is then moved on to Arduion as represented in fig 2.

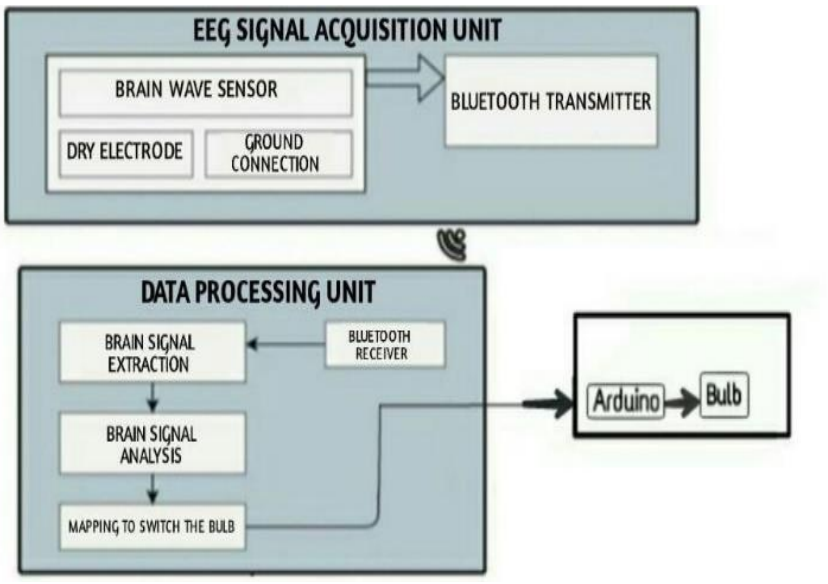

Fig 2: Block diagram of BCI based home automation

Here for this work an Arduino uno has been selected and coded with embedded C. Coding in C language, helps us obtain accurate real-time output. In this work, efficient use of the Arduino uno has been demonstrated. Mind wave sensor is used here to detect the EEG signals of human being. Using microcontroller kit we are able to regulate the home appliances. As per the need of human being the bio signals will be identified by the mind wave sensor and the signal is given to the LED unit and operate them like ON and OFF. This operation procedure is as shown in fig 3 below.

Fig 3: Hardware View of BCI Control Home Automation Using Mind Wave Device

The Mind wave sensor is an hardware equipment handled for supervising electrical signals developed by neural actions in the brain. The equipment is worn on the forehead and contains a headband, an ear-clip and a sensor arm containing the EEG electrode which resides on the forehead atop the eye. Correlated to conventional EEG devices, it is low-cost, easy to operate, and unobtrusive.

The Mind wave sensor collects the electric waveforms signals developed by neural actions in the brain and interprets them by employing algorithms to yield readings on a scale of 0-100. It presents information on a user's brainwaves (Delta, Theta, Alpha, Beta and Gamma) in order to find levels of attention, meditation and strength of eye blinks.

Arduino is an open-source physical computing platform. It's supported an easy I/O board and a development environment that implements the Processing / Wiring language. Arduino are often wont to develop stand-alone interactive objects Otherwise it are often connected to software on your computer.

A physical Input / Output board (I/O) with a programmable microcircuit (IC) as shown in figure 4. The Arduino Uno R3 may be a microcontroller board supported a removable, dual-inline-package (DIP) ATmega328 AVR microcontroller. Its 20 digital input/output pins.

Programs are often loaded on thereto from the easy-to-use Arduino computer virus. The Arduino has an in depth support community, which makes it really easy thanks to start working with embedded electronics. The R3 is that the third, and latest, revision of the Arduino Uno.

Fig 4: Arduino Uno

IV. Results

The coding is done in C# Language using the software Visual studio 2019, which gives an opportunity to analyze the signals coming to the Mind wave device. The Mind wave keeps throwing the rates of attention, meditation and blink strength. These values can be captured by using the key word, "tgParser. ParsedData[i]" in combination with the strings namely, "Attention, Meditation and Blink Strength"

At first, all the communication ports are validated to find the availability of device. The communication ports from 4 till 17 are verified. The Bluetooth device in the system selects one of the ports and does transmission with the help of this device. If the device is not found in any of the ports, a message "Device not found" is shown. The two scenarios are shown with the help of screenshots as represented in fig 5.

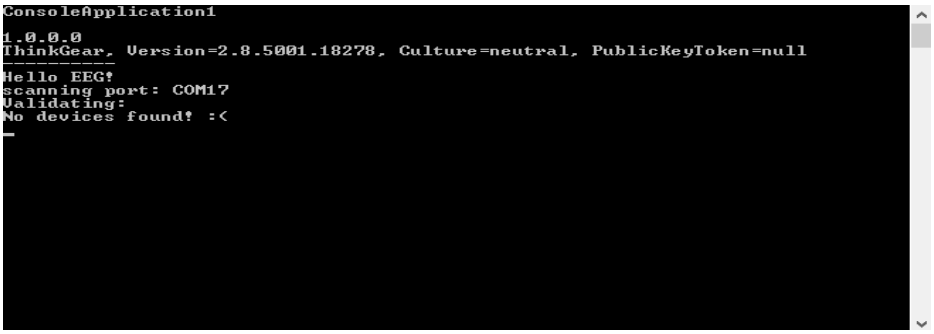

Fig 5: Validation of Device

Secondly, the signal strength has to be checked. If the Device is not properly placed on the forehead or the reference electrode, connected to the ear lobe is not proper, signal acquisition becomes difficult. This can be rectified by properly showing

the signal strength in terms of numerical value ranging from 0 – 225. Also, a message, "Signal: is poor" or "We have good contact with subject" is displayed accordingly. This is shown with a screenshot as represented in figure 6 and 7.

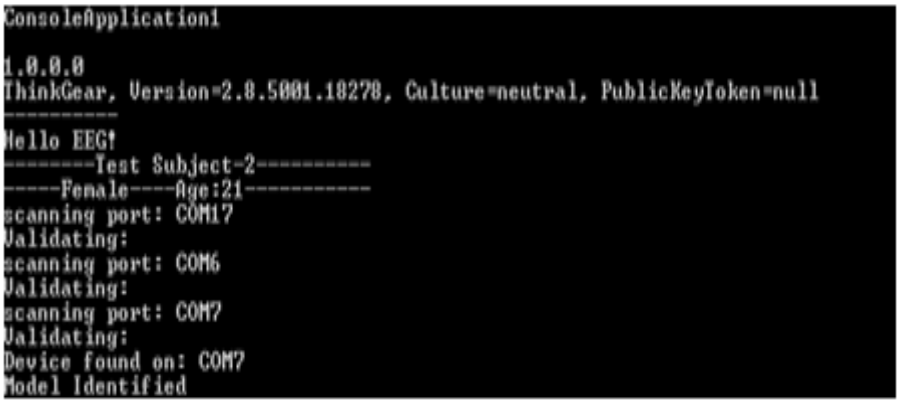

Fig 6: Channel Establishment on COM7

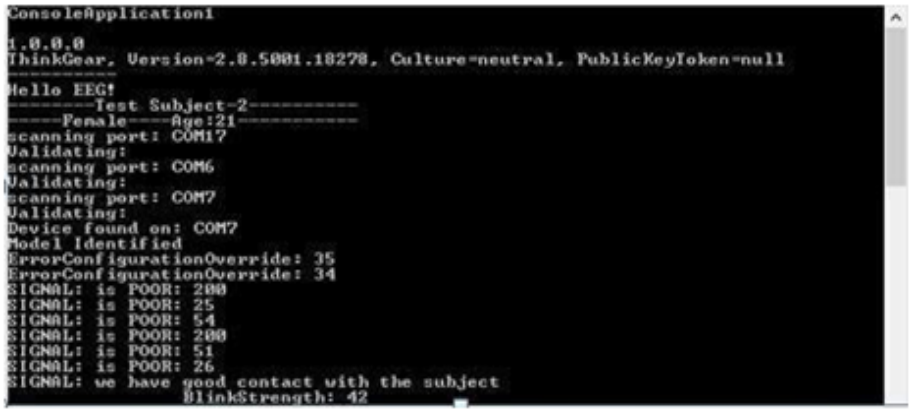

Fig 7: Checking the signal strength

The Attention values are being measured according to the Mind wave signal. If the attention value rises above 50 the bulb turns on, if the value is below 50 then the bulb turns off as shown in figure 7.

Fig 8: Pictorial view of final result

V. Applications and Advantages

The Applications are (a) Provide disabled people with communication, environment control and movement restoration (b) Provide enhanced control of devices such as wheel chairs, vehicles or assistance robots for people with disabilities (c) Provide additional channel for control in computer games (d) Monitor attention in long distance drivers or aircraft pilots, send out alert and warning for aircraft pilots (e) Develop intelligent relaxation devices

The Applications are (a) Cost effective and portable. (b) Non-invasive BCI is easy to wear and has no issues of scar tissue formation.(c) Mapping of brain signals to corresponding motor movements (d) Less power consumption

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IOT Based Underground Cable Fault Detection

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Abstract

In large cities, underground cables are used in industry rather than overpower or internet cables. Underground cables are prone to a variety of faults due to underground conditions, deterioration, rats. It is difficult to traverse the underground cable to find a fault location. Finding a faulty location is difficult because the entire queue has not been stolen for error detection. In this paper we use an IoT-based process with an IoT cloud database and using electronic circuits to use Ohms Law to detect errors in a base station in kilometers. The advantage of this error detection system is that the faulty location can be detected without digging down to check for underground cable faults, so the necessary action can be taken in a short time at low cost.

I. Introduction

Underground cable is buried underground. They distribute electricity or may be used to provide internet connection. The overhead cables are often replaced by underground cables. Urban areas with many tall buildings tend to have little or no above ground; this is for aesthetic purposes because underground cables are not seen and they are not dangerous for people because they are off the road. They are very expensive to install, but they last a long time. They contain one medium core or multiple cores (2,3 or 4) of disposable condoms separated from each other by paper or concrete or fertilized bitumen.

Underground cables are used for power use where it is difficult or dangerous to use high lines. They are widely used in densely populated urban areas, factories or factories and even in supplying electricity from the top to the consumer area.

Underground cables are used to provide internet connectivity in urban areas. For example, Jio Fiber. The benefits are listed below:

- Is not worth harm in worse situations.
- It offers lower storage costs. Low power consumption during normal operating conditions and low probability of error.

The underground cable contains following parts namely conductor, insulation, bedding, Armour, Sheath and serving. The construction of 3 core cable is as shown in the Figure 1.

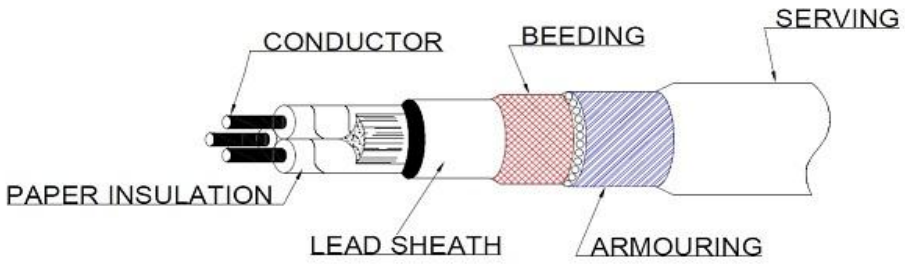

Fig. 1 : Underground Cable

- Cores or Conductors: The number of cores in a cable depends on usage. For example, in three-phase system, a three-line cable is used. Canned copper or aluminum conductors are used and sealed to provide flexibility.
- Closure: The correct size of the installation is provided for each component so that the cable operators can tolerate electrical power. The size of the insulation on the core is proportional to the working or capacity. Coatings are built of pregnant paper, polish cambric or an elemental compound of rubber.
- Sheath Metallic Pouch: It covers the partition on the core provided to safeguard the separation from moisture, oils, liquids, gases etc. present in the atmosphere and soil. It is usually made of aluminum (Al) or lead (Pb).
- Ding Bed: The bed is surrounded by the bag. It consists of fibers such as hessian tape or jute. They protect the bag from physical damage by weapons. It can be viewed as the key to shock.
- Armouring: It lies over the bed to protect the cable from damage to the machine while using and sleeping. It consists of one or more layers of stainless steel. Weapons supply is not provided on the other cable.
- Serving: Other parts of cable, just protect the conductor and sheath from physical injury or chemical attacks. Bedding, Armouring and Servings are very important parts of cable. In their absence, insulation of the cable will degrade.

Underground cables are divided into two types; by voltage, or by construction. The choice of a specific type depends on the operating capacity and the service

requirement. However, the cable must do some basic work requirements. The requirements are as follows:

- The material used will be fitted with a copper (Cu) or aluminum (Al) conductor for better performance. The size of the conductor will be sufficient to carry the current load without any known heating and cooling.
- The cable should have the correct installation size to provide maximum safety and flexibility to the volume being operated.
- It should be of proper protection against malicious handling while lying on the cable.
- The materials used in the preparation of the cable must be such that there is complete stability throughout. Most of the faults occur when moisture enters the insulation. The paper insulation provided inside the cable is hygroscopic in nature. Other causes include mechanical injury during transportation, laying process or due to various stress encountered by the cable during its working life. The lead sheath is also damaged frequently, usually due to the actions of atmospheric agents, soil and water or sometimes due to the mechanical damage and crystallization of lead through vibration.

One of the major limitations of underground cables is error. Since the wires are placed under (directly or inside the piped pipes), the test viewing methods do not work well. In order to identify errors in the cable, we need to develop special methods. The different types of faults that occur in underground cables and how to detect the errors are explained below:

1. Open Circuit Error

This error involves open rotation for drivers. When one or more cable conductors (cores) break, it leads to termination. This malfunction also occurs when the cable comes out of its junction due to mechanical stress. This is known as open circuit error. The open circuit is characterized by constant resistance. This is used for error detection. The conductors at the end of the joint are assembled (shortened) and eaten. Thereafter the resistance between each conductor and the ground is measured using a megger. If there is an open circuit in the conductor, the megger will read endlessly when connected between the conductor and the ground.

2. Short Circuit Error

It only happens on multicore cables. When two or more conductors on the same cable meet, this is called a short circuit error. It is impossible to get visually without splitting the cable. A short circuit error occurs when an individual cord injury is damaged. It can also be accessed using a megger. Short circuit is shown to be zero resistance. This is used for error detection. The resistance between any two conductors is measured using a megger. This is for all drivers, two at a time. If a megger reads zero, it indicates that a short-term error occurred between the two drivers.

3. World Error

When any of the cable conductors meets the ground, it is called a ground fault. This usually occurs when the outer spine is damaged by chemical reactions in the soil or by mechanical vibrations and repairs. It is almost like a short circuit error as the current also takes the opposite path and flows into the world. This can also be obtained using a megger. The megger is connected between the conductor and the ground and the megger reading is known. This is repeated for all cable operators. If there is a global error, the megger will show almost no learning.

II. Related Work

A great deal of work has been going on both in these fields. A wide range of perspectives have been given on the various methods that can be utilized. The literature reviews of few of the works and papers are as follows:

Lakshmi Goswami [1] has stated the different methods of underground fault detection i.e., In Murray Loop method, fault is detected using Wheatstone bridge. Another method makes use of ohm's law to establish the short circuit shortcoming. DC voltage is tested at the feeder side over a series resistor relay on the distance for end to end of shortcoming of the cable current deviation. The voltage leaks crosswise and the series resistor adjusts consequently, this voltage drop is used in the estimation of fault zone. The division and Phase are shown in the 16*2 LCD using ATMmega8 microcontroller (8 pieces). To decide the area of the issue, a heartbeat is useful to the transmission line. Fault is detected by using Node MCU module Wi-Fi system and Google database enables us to check the status signal of the transformer whereas the spot of the fault is detected using MCU model.

Roshani Shingrut et.al has demonstrated the determination of symmetric and unsymmetric faults. In this voltage regulator is used to convert variable dc voltage into constant dc supply[2]. The voltage across resistance is fed to the ADC of the Arduino. Using this value, the Arduino computes the distance. Finally, the distance of the fault from the base station is displayed in kilometer. From this reference paper involved Proteus ISIS [System Design] and Proteus Ares [PCB Design] which is Fully integrated user-friendly advance PCD design software.

Mehrdad Froodi Jahromy et.al has stateed about Computer Simulation Technology(CST) software that solves the Maxwell integral equations by finite integration technique which gives the magnetic field. In this we measure the line used to obtain the distribution of the cable magnetic field[3]. Vertical measurement is used to find the direction perpendicular to the cable. The routine of cable is done using parallel scan.

Simimar Preet Kaur et.al has proposed to convert an ac power into dc power and feed it to the 8051-microcontroller integrated circuit which calculates the error site and drives the transmission driver that controls the transmission. The automatic

transmission, stored in the control panel panel, indirectly controls the region during a change in the same or another circuit. Here, the LCD is inserted into the 8051 Integrated Circuit Manager which indicates the state of the cable or the default location. A crystal with an average frequency of 2-20 MHz is required, connected to ports[4].

Mr. A R Hans [5] mentioned various methods of concealment of error, namely, Murray's method and Ohm's legal method. The Murray method is used to detect Earth error or short circuit error. This applies to Murray or Varley tests applicable to the principal of the Wheatstone bridge. If the resistance varies according to the temperature, then the balance falls. Therefore, we need to use less or less current voltage in this circuit. Ohm's legal method is used to detect short circuit errors. The distance and phase are shown on a 16X2 LCD connected to a microcontroller. The bridge methods used to detect faults for underground cables are derived from the modified Wheatstone region where direct current is used to measure the resistance to calculate the error distance by a percentage of the total line length. The Murray and Glaser bridges use the same principles when calculating error distance.

Dushyant Chandra [6] stated that power outages throughout the series of repairs are therefore used to supply the faulty area. The microcontroller is nothing but part of the control unit and performs the necessary calculations in relation to the error range. The Microcontroller drives a transmitter driver that controls the switch of the transmission cable to the correct cable connection in each phase. The section contains an LCD display with a microcontroller that shows the cable status of each section and the cable distance in a particular section, in case there is an error display.

III. Proposed Work

The proposed system determines the presence of an open fault and its location in the underground cable we will use two devices which have been given the code-words "Merger" and "Auto".

AUTO: The Auto is a Bluetooth-controlled device which will be deployed along the path of the underground cable. It will help us make prediction about the exact point at which the fault might have occurred in the underground cable.

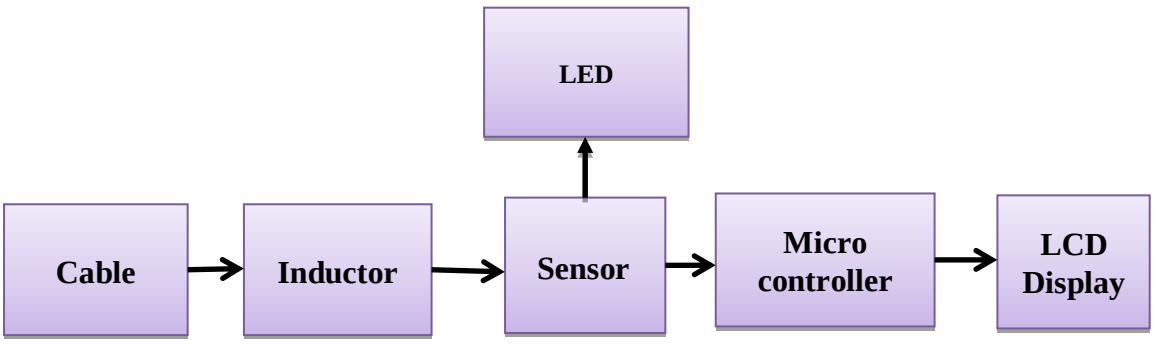

Fig.2 :Block diagram of Auto

The concept of ADC (Analog to Digital Conversion) is used. The Hall Effect Sensor and Arduino Uno are used to measure the strength of the magnetic field produced by the underground cable (which acts as the current conductor that generates the magnetic field). The Operating Hall sensor feels magnetic field energy and supplies a variety of electrical energy with an output equal to the field strength. This sensor absorbs field energy from 'Gauss' units. Field energy as various electrical energy is obtained with this sensor. The ADC element is used to convert this voltage into a number. This number represents field strength and is displayed on the LCD. All magnetic fields have two distinct features. First, flux density means the amount of magnetic flow that passes through the unit area, and secondly, all pulses include two sides (North and South poles).

The outlet sensor signal of the Hall effect represents the magnitude of the magnetic field around the device. The Hall Output Sensors have a pre-set limit, and when the magnitude of the magnetic flux exceeds this limit, the device is able to obtain a magnetic field by producing an effect called 'Hall Voltage'.

The Hall Output sensors all have a small piece of semiconductor material inside them, which transmits continuous electrical energy itself to produce magnetic energy.

The new Arduino IoT Cloud dashboard comes with a host of advanced features. It is used to collect and display data from multiple IoT devices in a single dashboard, and control those devices as needed in the dashboard to fully integrate the solution. It imports historical data to the dashboard to provide a background view of all required properties, which is why creating a new dashboard does not mean losing past data. All data can be brought to the dashboard as far back as data is collected.

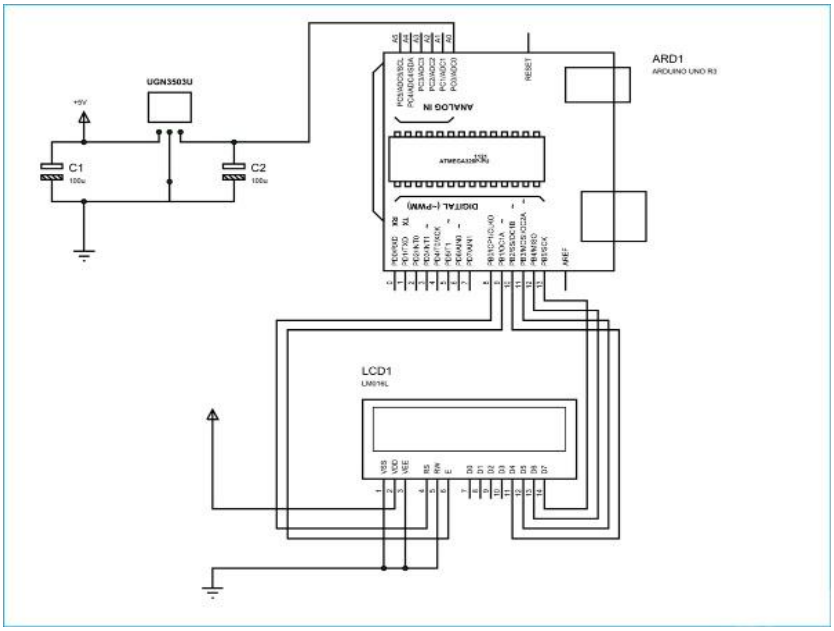

Fig. 3: Circuit Diagram of Auto

Merger: is used to determine whether an error has open errors or a short error nature. The assembly will be sent to a low-level station or to any place where the cables may be tested the proposed system is used to find the kind of fault in underground cable and also make a prediction regarding the location of the fault.

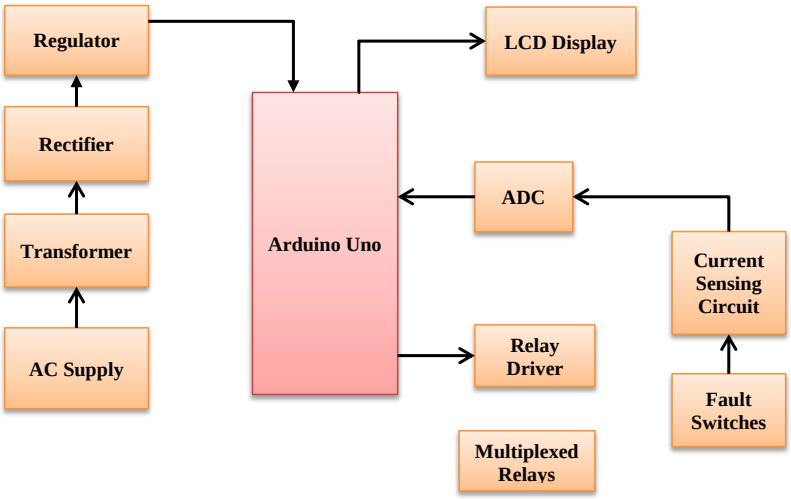

Fig. 4: Block diagram of Merger

The project uses the standard concept of Ohms law i.e., when a low DC voltage is applied at the feeder end through a Cable line, then current would vary depending upon the location of fault in the cable. In case there is a short circuit (Line to Ground), the voltage across series resistors changes accordingly, which is then fed to inbuilt ADC of Arduino board to develop precise digital data for display in kilometers and the circuit diagram for fault detection is as shown in figure 5.

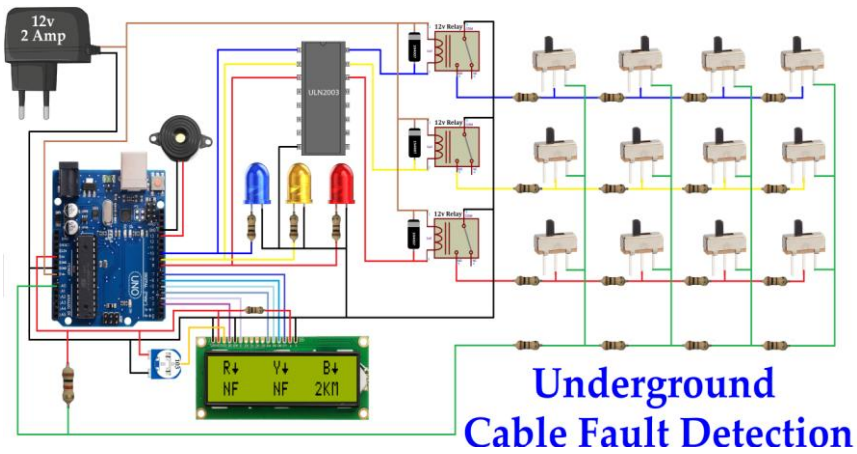

Fig. 5: Circuit Diagram of Merger

This project is combined with a set of resistors representing cable length in KM's and the error making is made a set of changes across all known KMs to cross to check the same accuracy. An error occurs at a location and the appropriate section is

displayed on the LCD connected to the Arduino. This project has been developed by measuring the strength of a cable that can get an open circular cable.

The ULN2003 is a 16-pin IC. It has seven Darlington Pairs inside, where each can drive loads up to 50V and 500mA. For these seven Darlington Pairs we have seven Input and Output Pins. Adding to that we can a ground and Common pin. The ground pin, as usual is grounded and the usage of Common pin is optional. It might be surprising to note that this IC does not have any Vcc (power) pin; this is because the power required for the transistors to work will be drawn from the input pin itself.

IV. Results

Underground cable fault detection using IoT is used to predict the various faults such as open circuit error, closed circuit and global error. The below figure 6 and 7 depicts the final result of the Merger circuit from which exact location of the fault is able to detect. When the powers supply is turned on three parallel wires are simulated across the nine resistors as depicted in the above figures. When any one of the switches are turned on then the wire is short circuited. This is a simulation of an open fault and the switches are used to simulate it.

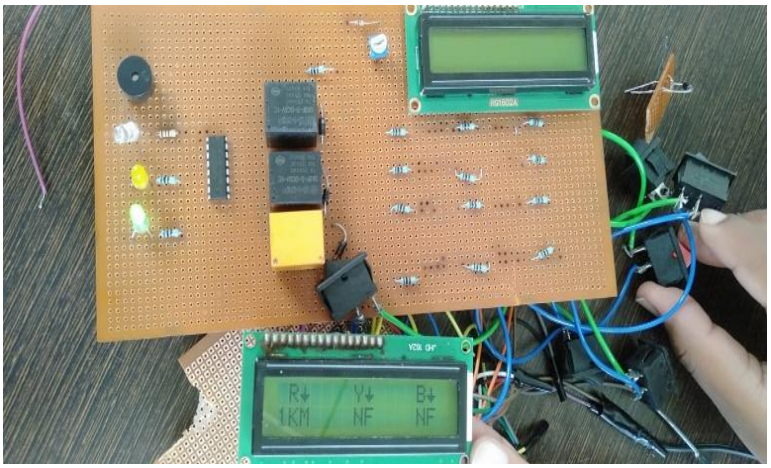

Fig. 6: Merger circuit depicting the fault of Red wire

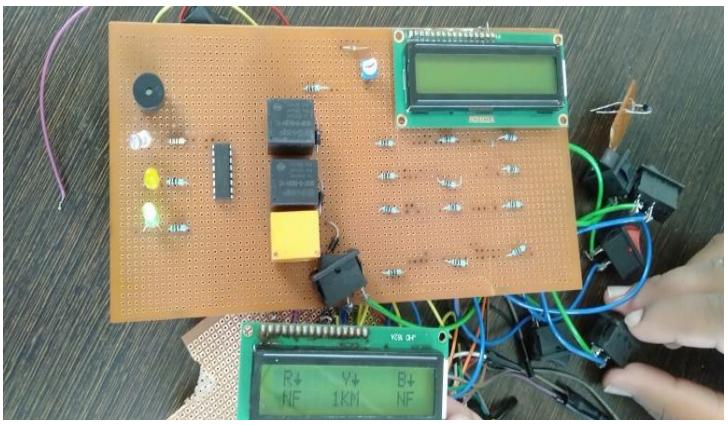

Fig. 7: Merger circuit depicting the fault of yellow wire

The firmware in the Arduino Uno Microcontroller measures the voltage across the parallel wires. When the switch is turned on input is given to Arduino and the respective relay is closed thus the corresponding LED turns on and the buzzer buzzes. The LCD display now predicts the distance of the fault from the Base station in Kilometers. The Auto circuit should now be deployed at the predicted location to make an even more accurate prediction. In the fig 6 there is a fault in the first (Red) wire. In fig 7 a fault is observed in the second (Yellow) wire.

Figure 8 represents the Auto circuit being mounted on a Bluetooth Controlled device. This device was built using Arduino Nano, DC Motors, Wheels, Chassis and Battery power supply. The device is controlled using Arduino BT Joystick. The Auto circuit consists of Hall effect sensor (UGN3503), Arduino Uno, NodeMCU and power supply. When it is deployed along the path of the underground cable the hall effect sensor picks up the magnetic field and its readings are calculated using the Arduino Uno which is as shown in figure 8.

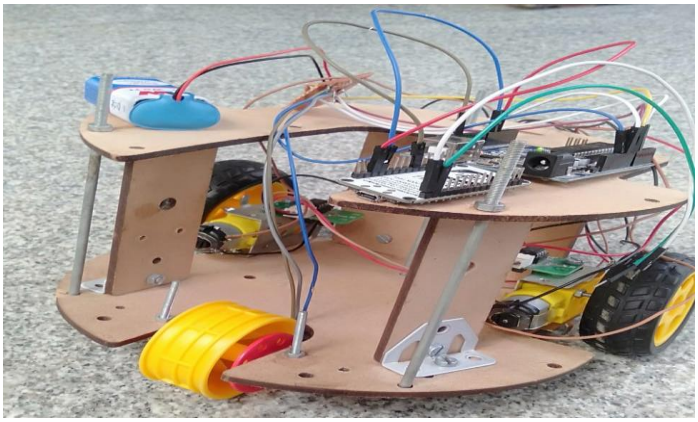

Fig. 8: Auto Circuit

This data is transmitted to the Node MCU using Serial communication Protocol. The Node MCU is connected to an internet hotspot and it transmits the data to the Arduino IoT Cloud Service where a custom Dashboard has been built to view the magnetic field values as shown in Figure 9.

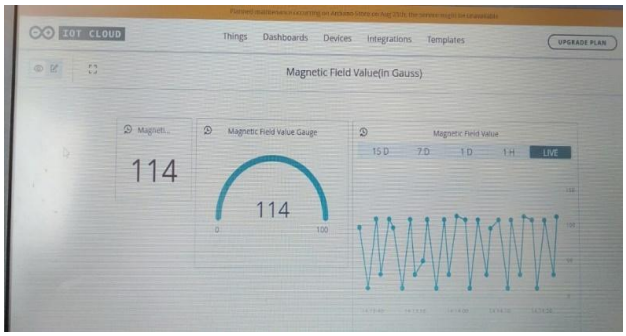

Fig. 9: Dashboard of Auto Circuit

When any irregular data at a point, which is out of the range for an underground cable's magnetic field, is displayed on the Dashboard that particular location could be the fault in the underground cable.

V. Conclusion

The proposed work depicts the understanding of the various types of losses present in the underground is discussed. The underground cable fault detection system was developed using the merger and auto circuit through which one can able to detect the type of fault and rectify the fault successfully which makes fault detection more accurate and easy. It will clearly predict and determine the location where exactly the fault has occurred. Hence the proposed method operates in a sequential manner and proves to be useful in detection and location of faults in underground cables. Finally the results for the open circuit fault and short circuit fault has been obtained and has been displayed in the LCD display. Future advancement can include replacing the battery power supply with a renewable energy source to power the Auto circuit and the Bluetooth control device to minimize the usage of battery. Machine Learning, Data Analysis and distributed computing can be implemented upon the magnetic field values to predict the fault location.

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Smart Glasses for Blind People

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Abstract

These "SMART GLASSES" are designed to help the blind people to read and translate typed text which is written. These kinds of inventions consider a solution to motivate the blind students to complete their education despite all their difficulties. Its main objective is to develop a new way of reading texts for blind people and facilitate their communication. The first task of glasses is to scan any text image and convert it into audio text, so the person will listen to the audio through a headphone that's connected to the glasses. The second task is to translate the whole text or some words of it by pressing a button that is connected to glasses as well. The glasses used many technologies to perform its task which are optical connected recognition and google translation. Detecting the text in image was done using the OpenCV and Optical Character Recognition technology with tesseract and efficiency and accurate scene text detector. In order to convert the text to speech, it used text to speech technology. For translating the text, the glasses used google translation API. These glasses will provide blind people for improvement in the field of education, studies etc. It may help them to lead their life in normal way. Blind people will be having the necessary of special needs, but all of them cannot afford these special needs because of expenses and special schools will not be present everywhere. Since government schools are present everywhere Smart Glasses may help them to study.

Keywords- API, tesseract.

I. Introduction

In our lives, there are many people who are suffering from different disease or handicap Smart glasses" is to help blind people and people who have vision difficulties by introducing new technology to scan any written text and convert it into audio text Also. Those people need some help to make their life easier and better. The main goal of it can translate words from English to Kannada using google API. The goal of "Smart Glasses" is helping those people in different life aspects. For example, these glasses effectively helpful in the education field. Blind people and people with vision difficulties can be able to read study and learn everything from any printed text images. "Smart Glasses" encouraged blind people or people with vision difficulties to learn and succeed in many different fields.

About 90% of the worlds visually impaired live in low income settings. India is now home to world's largest number of blinds. The assistance can be from human beings, dogs or special electronic devices. There are already many existing devices which help a blind person in walking. The most common is simple walking stick or cane. The blind man uses it to detect the obstacle by sweeping the cane back and forth but unfortunately sometimes the blind man gets aware about the obstacles too late.
Glasses are designed to the eye for the blind person and people who suffer from vision difficulties to make their life easier and to be able to continue living their life as normal human to follow up and achieve their goals and dreams.

Convert printed text to audio. Inform the user by location of the classes is green zone. Help to translate any English word to Kannada using Google translator. RFID sensor is present that scans the classes IDs and sends the classes number by a voice message.

II. Methodology

In smart glasses first the task of glasses is to convert the text in image into audio. The python code is used to control the ultrasonic sensor detection then be able to measure the destination. The webcam is going to capture a picture when the button is pressed, in order to detect and recognize the text from image.

OCR mechanism is used to convert typed, printed or handwritten text into machine encoded text. OCR is an abbreviation of Optical character recognition. In our mini project Tesseract version 4 is used because it is best open source OCR engines. OCR consists of multiple stages. First is preprocessing, the main goal of this step is to reduce the noise that resulted from scanning the document where the character might be broken or smeared and causes poor rates of recognition. Second stage is Segmentation; in this process the characters or words will be isolated. Third stage is Feature extraction, this process will capture the significant features of symbols and it has two types of algorithm which are pattern recognition and feature extraction. Fourth stage is classification; OCR systems use the techniques of pattern recognition that assigns an unknown sample into predefined class. Last stage that is fifth stage of

mechanism is post processing, this process includes grouping and error detection and correction.

Detecting the text in image was done using the OpenCV and Optical character recognition (OCR) and tesseract and efficient and accurate scene text detector (EAST). In order to convert text to speech, it used Text to speech technology (gTTs). For translating the text, the glasses used google translation API. The RFID reader is mainly used to collect the information from RFID tag with help of electromagnetic fields. All the computing and processing operations were done using Raspberry pi 3B and Raspberry pi 3B +.[20]

III. Block Diagram And Working

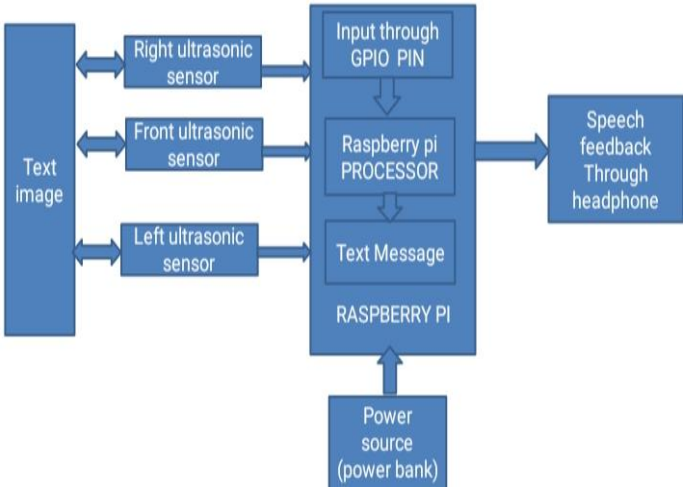


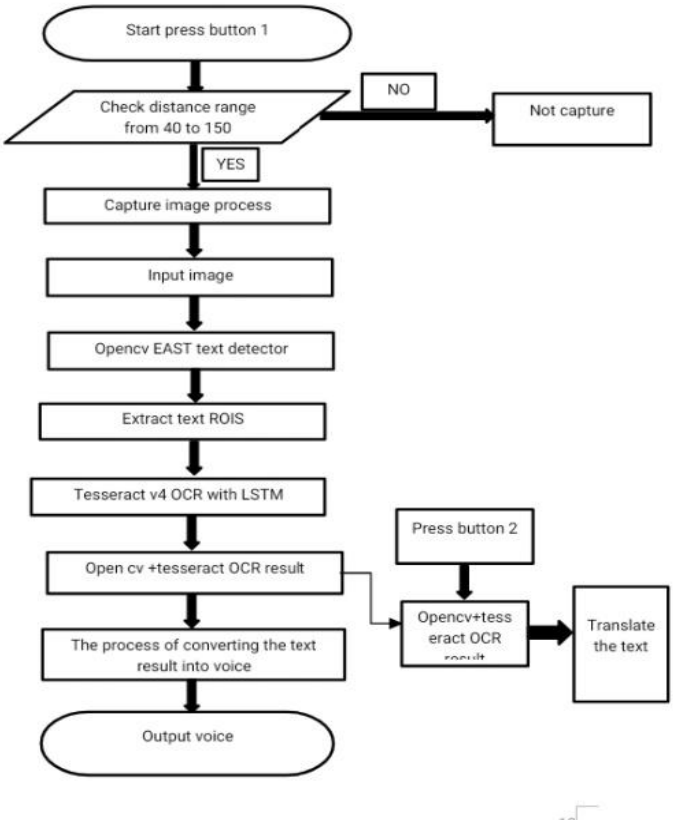
Figure 1. Block diagram of smart glasses for blind people[19]

This prototype helps end user to reach at their destination as shortly as attainable. Here the texted image is input, The ultrasonic sensor is detecting text from the text image. The distance should from 40 to 150cm. And it transmit the text image to the raspberry pi , it will capture the text image and convert to audio , and through headphone the person can hear that text image. The power bank is connected to raspberry pi, it uses a power of 5V and 2.5A because the student can use the power everywhere in the university.

The working process is follows first setting the raspberry pi and interfacing of raspberry pi with raspberry pi camera locate the camera module port . make sure that connections in right way . go to the main menu and open the Raspberry pi configuration tool. select the interfaces tab and ensure that the camera is enabled. Reboot raspberry pi. Now camera is connected and the software is enabled , text image recognition is done using python. here we use the open cv library to detect and recognize the text image , and the tesseract library is used to read the characters . so before proceeding further, first install the open cv library is used to detect and

recognize the text images. Install open cv in raspberry pi3 .type the required code to perform the required functions. [19]

IV. Flow Chart and Results



Glasses first we need to press button1 in webcam by using an ultrasonic sensor it checks the range between the camera and image if it is in the range of 40 to 150cm then only the webcam takes pictures if is not in the range then it doesn't capture a picture. if it is in the range then the camera takes input as an image. Detecting the text in the image was done using the open cv EAST text detector it is an Efficient and accurate scene text detector. then it Extracts text from ROIS using Tesseract V4 OCR with LSTM(Long Short term memory). If we need to translate the one language to another then press button 2 to translate text then it converts the text to voice then it gives output as a voice[20].

Results

The Smart Glasses with all components to make sure that everything is working. The firstly was to make sure that the camera is taking a picture after pressing the button and checking the distance between 40cm to 150 cm if it is in the required range. The secondly was to see if the text in the picture has been detected and recognized. The thirdly was to make sure that the detected test has been converted into audio text. The next stepwas to see if the button pressed the detected text has been translated. The final was to check if the RFID can identify the classes ID. Finally it

gives output has a voice then the user detects what is in front of him and takes directions.[20]

V. Advantages and Applications

The system enables the blind peoples to move with the same ease and confidence of the sighted people. Since the system is linked with ultrasonic sensor and RFID sensors it provides the direction information. Avoids obstacle based on ultrasonic sensor and facilitates the easier communication in case of emergency. It allow blind people and those with limited sight to 'feel the space' through sounds. These glasses use an algorithm to convert spatial and visual information into audio. The dependency on others for studying will be reduced for blind people. Blind people can be able to read, study, learn everything from any printed text images. Smart glasses are going to improve the rate of schools and universities that educate blind people and also increase the education level for blind people. In text recognition technology used to recognise text inside images, such as scanned documents and photos.

VI. Conclusion

Technology played a very important role in our life. We use it almost everywhere and every time. The distinct and quick development that we discover each day proof for us that there is no point to give up and struggle with our obstacle in life. Technology offers us a lot of significant solutions to our problems and disapplies. Our role is to use it properly to reach the success level that benefits individual, society and whole country as well. The "smart Glass for Blind People" is practically, a feasible device and conveniently carried out by any blind people.

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