JSS MAHAVIDYAPEETA

JSS SCIENCE AND TECHNOLOGY UNIVERSITY

SRI JAYACHAMARAJENDRA COLLEGE OF ENGINEERING

MYSORE-570006

Subject name: Advanced Communication Systems (EC520)

Report submitted as fulfilment of Event – 2 and Event – 4

Topic:
IOT Based Fire Alarm System

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I. ABSTRACT:

A fire outbreak is a major tragedy that must be avoided by every possible means due to the potential loss of lives and property, fire when not controlled can grow large and may require days to bring under control. Hence this technology must be applied to minimize or even eliminate this great hazard. In This Mini-Project, a fire alarm and detection system has been developed. This system is built with the GSM module embedded in it, which helps to send SMS (Short messaging service) to the home owners and the fire service personal, when there is fire outbreak before it gets out of control. Furthermore, this project provides a technology that would be accessible and affordable to the world at large so that homes, offices, and schools can adopt the technology in other to protect lives and property. If and when the developed system is commercialized, it will help reduce uncontrolled fires by 50% because it warns of dangerous conditions before a fire outbreak.

We have also Built an IOT Based Fire Alarm system using NodeMCU WIFI Module which sends notifications (Email, Blynk and Telegram Notifications) to the user warning that there might be a fire outbreak and immediate attention is required. For this implementation we have also considered the smoke factor and hence used MQ-2 Smoke sensor to detect the smoke too.

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Part-1: Software Implementation

1.1. Introduction:

Fire Alarm Systems are very common in commercial building and factories, these devices usual contain a cluster of sensors that constantly monitors for any flame, gas or fire in the building and triggers an alarm if it detects any of these. We have implemented by using one of the simplest ways to detect fire is by using an **IR Flame sensor**, these sensors have an IR photodiode which is sensitive to IR light. Now, in the event of a fire, the fire will not only produce heat but will also emit IR rays, yes, every burning flame will emit some level of IR light, this light is not visible to human eyes but our flame sensor can detect it and alert a microcontroller like Arduino that a fire has been detected and which further along with the help of GSM module provides SMS Alert Service. SMS based Fire Alarm system are very useful in remote locations where human interaction is limited. Such systems are useful in mines, industrial areas, factories etc.For this project, the development of home fire alert is built based on Arduino board as the main controller board that interacts with GSM module which works in the communication part. The interaction is for the user to know the current situation in the house. This system works totally on wireless network communication as GSM module is performed by sending an SMS to the user. The microcontroller inside the Arduino board is used as the mastermind of the circuit where it controls the circuit flows and execute all the decision as well.The GSM Module is responsible for the communication part of the circuit. It takes information from the Arduino on where to send information and what information needs to be sent. It uses a GSM SIM card for communication purposes. It is basically just a modem which uses serial communication to interface with and needs Hayes compatible AT commands for communicating with the Arduino. The alert message and the phone number of the recipient are given by the user through the project codes. As soon as fire is detected an SMS will be sent to the recipient's phone number from the SIM card inserted into the module for giving information to the user upon fire detection in the house.

1.2. Problem Statement:

An intelligent fire alarm system based on GSM network is designed. Microcontroller is main control chip, and the remote alarming and data exchanging are achieved by using GSM module. By adopting Flame detector (Based on IR) for sensing the fire we have proposed a circuit which is capable of alerting both in nearby environment (Through Buzzer and RED light) and remote as well.

1.3. Objective:

The main Objective of our mini-project is to build a Fire Alarm System that will detect the unwanted presence of fire by monitoring environmental changes associated with combustion using GSM SMS Alert system, it uses Flame Sensor for sensing Fire and 16x2 LCD is used to display the current Status of the system and also provided with a buzzer to alert the surrounding environment. The objectives of the work are:

1. To interface microcontroller with GSM, Flame Sensor, Buzzer and LCD.
2. To ensure security of our environment

1.4. Selection of Software:

1.4.1. Proteus Design Suite:

The Proteus Design Suite (Version 8.11) is a proprietary software tool suite used primarily for electronic design automation. The software is used mainly by electronic design engineers and technicians to create schematics and electronic prints for manufacturing printed circuit boards. Digital systems capable of altering their hardware configuration on the fly are labelled dynamically reconfigurable. Proteus is an OpenRISC-based computer optimized for Xilinx's FPGAs that can dynamically reconfigure itself. Proteus was conceived as a platform to facilitate the study of reconfigurable computing architectures by providing a turn-key solution that is openly available. This paper describes Proteus's architecture, its application to digital signal processing, its capabilities and ongoing research at several institutions. The required components for our project are easily available in this software and libraries can be easily downloaded online. Mainly the components like ARDUINO UNO, FLAME SENSOR, GSM MODULE, etc components are difficult in availability in various other software's, its easily available in the proteus.

Figure 1:Proteus Design Suite

1.4.2. Arduino IDE:

The Arduino Integrated Development Environment - or Arduino Software (IDE) – is an opensource software which contains a text editor for writing code, a message area, a text console, a toolbar with buttons for common functions and a series of menus. It connects to the Arduino and Genuino hardware to upload programs and communicate with them. The Arduino Integrated Development Environment - the piece of software we use to program our Arduino uno - is written in C. The IDE translates and compiles our sketches into code that Arduino UNO can understand. Once our Arduino code is compiled it's then uploaded to the board's memory. The main code, also known as a sketch, created on the IDE platform will ultimately generate a Hex File which is then transferred and uploaded in the controller on the board. The IDE environment mainly contains two basic parts: Editor and Compiler where former is used for writing the required code and later is used for compiling and uploading the code into the given Arduino Module.

Figure 2:Arduino IDE

1.5. Methodology:

1.5.1: Block Diagram:

The Block Diagram of Fire Alarm system is as follows:

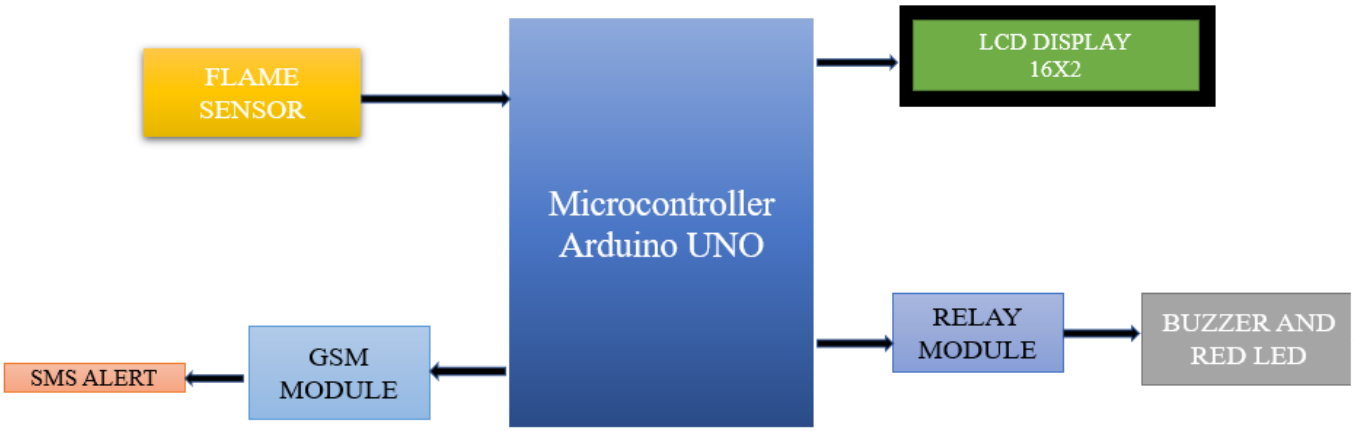

Figure 3:Block Diagram

The hardware design entails of two main components which are the connections between Arduino UNO and the GSM SIM900 and Arduino UNO with the Flame sensor, KY-026. When a fire has broken out in the house, Flame sensor will trigger the presence of Flame. Then it will directly send signal to the Arduino informing the Fire. Then Arduino will send an alert to the user about the situation through GSM module. An SMS will be sent promptly to the user to let the user know the existence of the fire in the house. At the same time, existence of the fire will be notified as well on the LCD display along with that buzzer and a red LED will turn ON.

1.5.2. Components Required in Detail:

- **Arduino UNO:**

Arduino Uno is a circuit board with ATmega328 built in it, the Arduino Uno which we are using consists of 14 digital input/output pins (where the 6 pins can be used as PWM output pins), 6 of them are analogue, there is also USB connecting port, a power jack, and reset button. This microcontroller is very basic and simple for the demonstration purpose. We can power the Board by AC-to-DC adapter or battery and by USB cable through the computer. One of the other best things about this microcontroller is that it has CPU which comprise a significant amount of RAM, ROM and some other components as well.

Figure 4:Arduino Uno

- Why we are using Arduino Uno?

In the market there are a lot of micro-controllers. To name some of them are: Raspberry Pi, Net media's BX-24 etc. There are some others as well but based on their usage and functionality, specifically their features comparatively Arduino Uno is the best microcontroller which can fulfil our purpose. Some of the major functionalities of choosing this microcontroller is because its Inexpensive, Cross-platform, Straightforward, Open source.

Table 1. Specifications of Arduino Board

Operating Voltage	5V
Input Voltage (recommended)	7-12V
Input Voltage (limits)	6-20V
Digital I/O Pins	14 (of which 6 provide PWM output)
Analog Input Pins	6
DC Current per I/O Pin	40 Ma
DC Current for 3.3V Pin	50mA
Flash Memory	32 KB of which 0.5KB
SRAM	2 KB
EEPROM	1 KB
Clock Speed	16 MHz
Length	68.6 mm
Weight	25g

- **Connecting Wires:**

We are also required to use the jumping wires so that the internal connection between the different components and the Arduino Uno could be established.

- **Relay:**

In order to control the voltage and power of the Arduino Uno, we have fitted it with the Relays module which ultimately controls and prevents the high voltage through its electromagnetic behaviour to detect the current and along with relay we are also using a transistor BC547 combined, they act as a switch in controlling the buzzer.

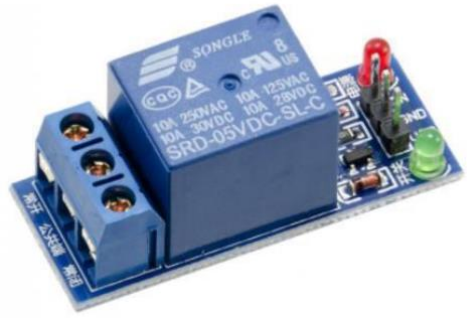

Figure 5: Relay Module

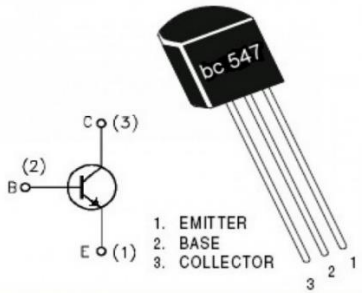

Figure 6: BC547 Transistor

- **IR Flame Sensor:**

Figure 5:IR Flame Sensor

This is the Flame Sensor Module which is also known as the Infrared IR Fire Sensor Detector. This Flame Sensor is extremely sensitive to IR wavelengths between 760-1100nm light. This flame sensor is ideal for short-range fire detection and can be used to monitor projects or as a safety, precaution to cut devices OFF / ON or to turn ON buzzers or Send SMS. It can be used in hundreds of projects. We have found that this Flame Sensor is mostly accurate up to about 3 feet.

When fire burns it emits a small amount of Infra-red light, this light will be received by the Photodiode (IR receiver) on the sensor module. Then we use an Op-Amp to check for a change in voltage across the IR Receiver, so that if a fire is detected the output pin (DO) will give 0V(LOW), and if the is no fire the output pin will be 5V(HIGH). It can detect infrared light with a wavelength ranging from 700nm to 1000nm and its detection angle is about 60°.

From Figure 5, On the right, we have a black IR LED sensor. The Flame Sensor Module has a total of 4 male headers on the left side which are clearly labelled as

1. A0 which is the Analog output pin of the Flame Sensor
2. G this is the ground pin and it should be connected with the ground pin of the power supply or the Arduino board.
3. + pin is the input supply pin and this is where we connect 3.3v or 5v from the Arduino Board.
4. D0 is the digital output signal pin which can be connected with any i/o pin of the Arduino board or it can be directly connected with TTL supported circuits for directly controlling the buzzers and relays etc.

This Flame sensor module is also provided with a Potentiometer which can be used for adjusting the Fire Flame detection sensitivity. The Flame sensor module is also provided with two LEDs L1 and L2. One LED is turned ON when you power up the Flame Sensor module while the other LED only lights up when it detects the flame. This IR Flame Sensor module is based on the LM393 low offset voltage dual comparator.

- **Buzzer:**

The buzzer which we are using is a 5v buzzer which is connected to the relay. It has a total of two pins. The + (long) pin is connected with one of the Arduino's I/O pins while the – (short) pin is connected with the ground terminal.

Figure 6:Buzzer

- **GSM Module:**

This is the GSM Sim900A Module. The first thing that you will notice about this GSM module is that it has no onboard voltage regulator, so be very careful while applying the voltage; Because voltages greater than 5 volts can easily damage this module. The ideal voltage for this GSM module is 4.7v but you can easily power up this GSM Sim900A module using a 5v adaptor.

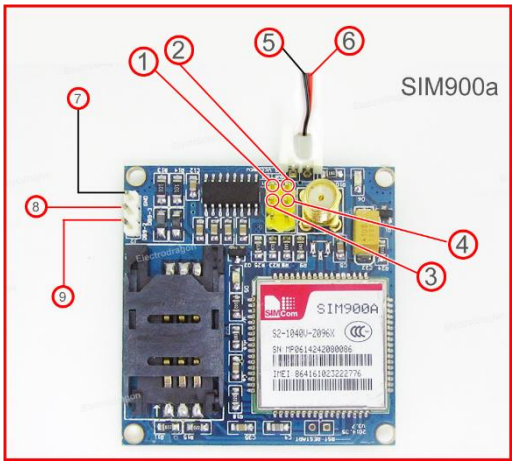

Figure 7:GSM Module

The white connector labelled with 4.7 – 5V, this is where we connect the external 5volt regulated power supply. It has a total of 9 male headers. The three male headers on the right side are not connected.

- Pin number 1 is the VCC which can be connected with the Arduino's 5volts. In my case as I will power up this module using the external power supply so I will leave this pin unconnected.
- Pin number 2 is the ground, which will be connected with the Arduino's ground.
- Pin number 3 is the 5v TXD,
- Pin number 4 is the 5v RXD,
- Pin number 5 is the 3.3v TXD, and
- Pin number 6 is the 3.3v RXD.

As Arduino is based on the 5v controller board so we will be using the 5v TXD and 5v RXD pins of the GSM Sim900A module.

- **PCF8574 (I2C Module for LCD):**

The PCF8574 is a silicon CMOS circuit. It provides general purpose remote I/O expansion for most microcontroller families via the two-line bidirectional bus (I2C). Along with its purely I2C interface, PCF8574 modules feature an "INT" pin that outputs a signal based on input changes. We are interfacing this with LCD to make connections of our circuit simpler and effective.

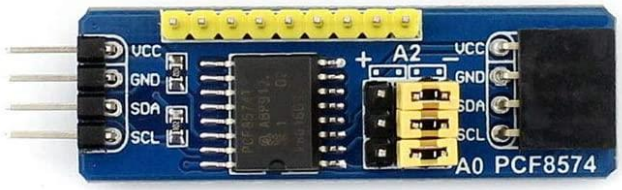

Figure 8:PCF8547 IC

- **LCD Display Module:**

An LCD is an electronic display module that uses liquid crystal to produce a visible image. We have used a 16x2 LCD Display module. The 16×2 LCD display is a very basic module commonly used in DIYs and circuits. The 16×2 translates a display 16 characters per line in 2 such lines. In this LCD each character is displayed in a 5×7-pixel matrix. We are using the LCD to show the current status of the project while demonstration.

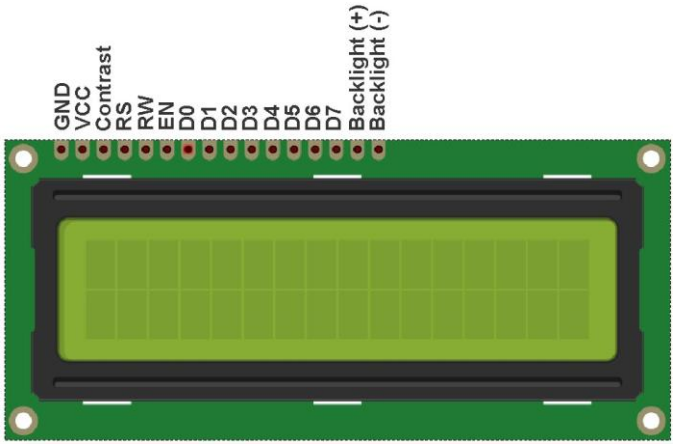

Figure 9:16x2 LCD Display Module

- **12v Power Supply:**

A 12V Power supply is essential to run the whole setup in order to obtain proper outcome.

Figure 10:12V Power supply

1.5.3: Circuit Diagram:

All the components are connected in the following manner inside proteus design suite as depicted in Figure 13.

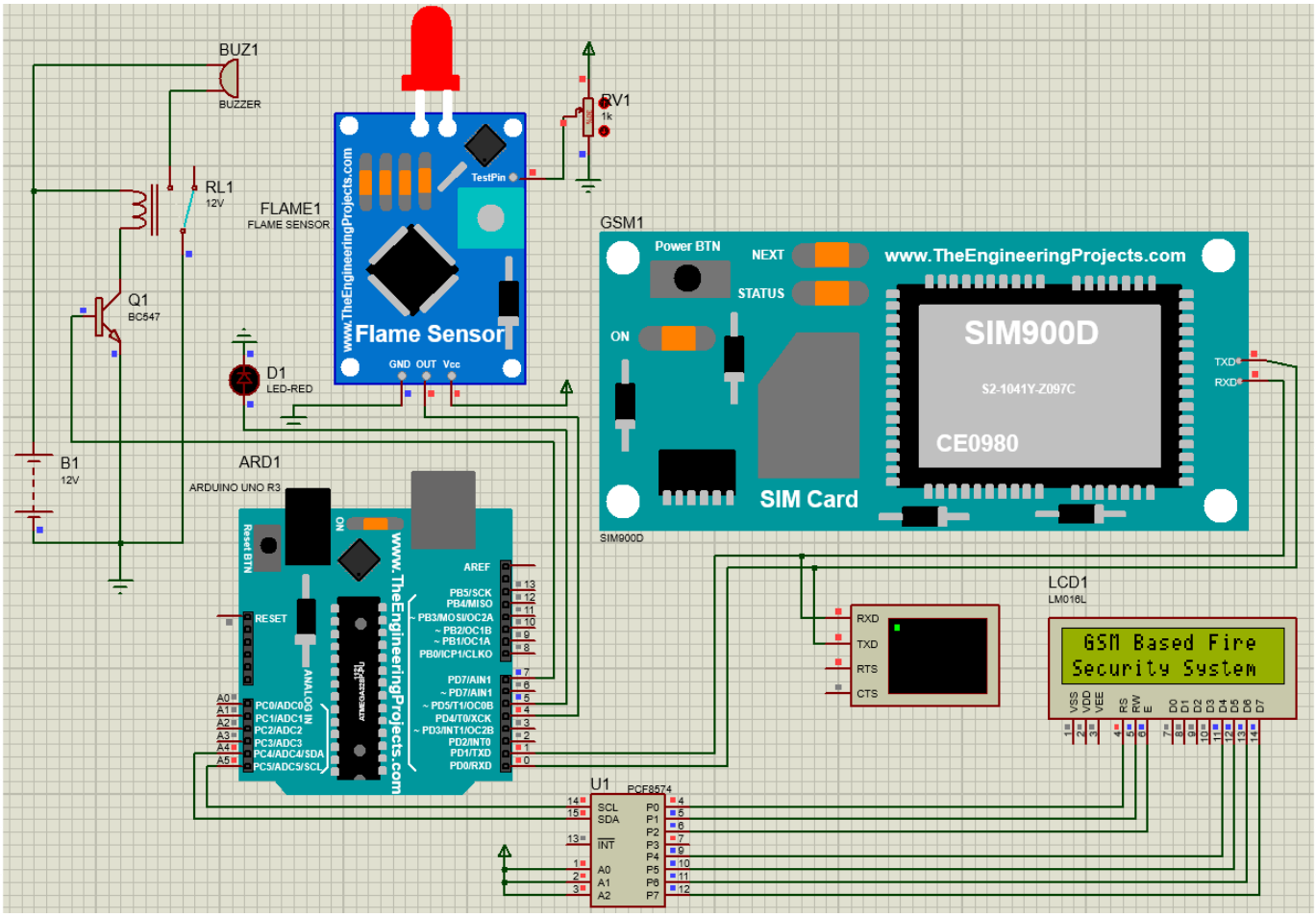

Figure 11:Circuit Diagram

1.6. Working:

When we run the simulation, first we get a message displayed in the LCD saying “GSM Based Fire Security System”. Then the virtual terminal pops up displaying the status of flame sensor as 1(When no flame is detected), 0 (When Flame is detected), based on which we will get an SMS type message shown through Virtual Terminal. So, whenever the Flame sensor detects a Flame within a range of Approximately 3 feet, the output pin (DO) connected to pin No 5 of Arduino UNO will give 0V(LOW), and if the is no fire the output pin will be 5V(HIGH). At the same moment a message is sent to LCD through PCF8574 I2C Module and displays “Fire Detected, Stay Safe”. At the same moment a message is received by the GSM module from Arduino UNO, accordingly a SMS is sent to the Respective User “Fire Alert” (This process is Displayed through Virtual Terminal in simulation). Along with these at the exact moment of detection of fire the Buzzer and the Red LED turns ON through the Relay module which in turn is connected to a BC547 transistor, which in combination acts as a switch.

1.7. Results and Discussions:

The following Fig 14 and Fig 15 depicts the results obtained when we run the simulation:

Case 1: When no flame is detected (Pot is Low), Relay is in off condition as a result Buzzer and Red LED is in OFF Condition. And LCD Displays “FIRE NOT DETECTED” and in Virtual terminal we can observe 1(Flame not detected).

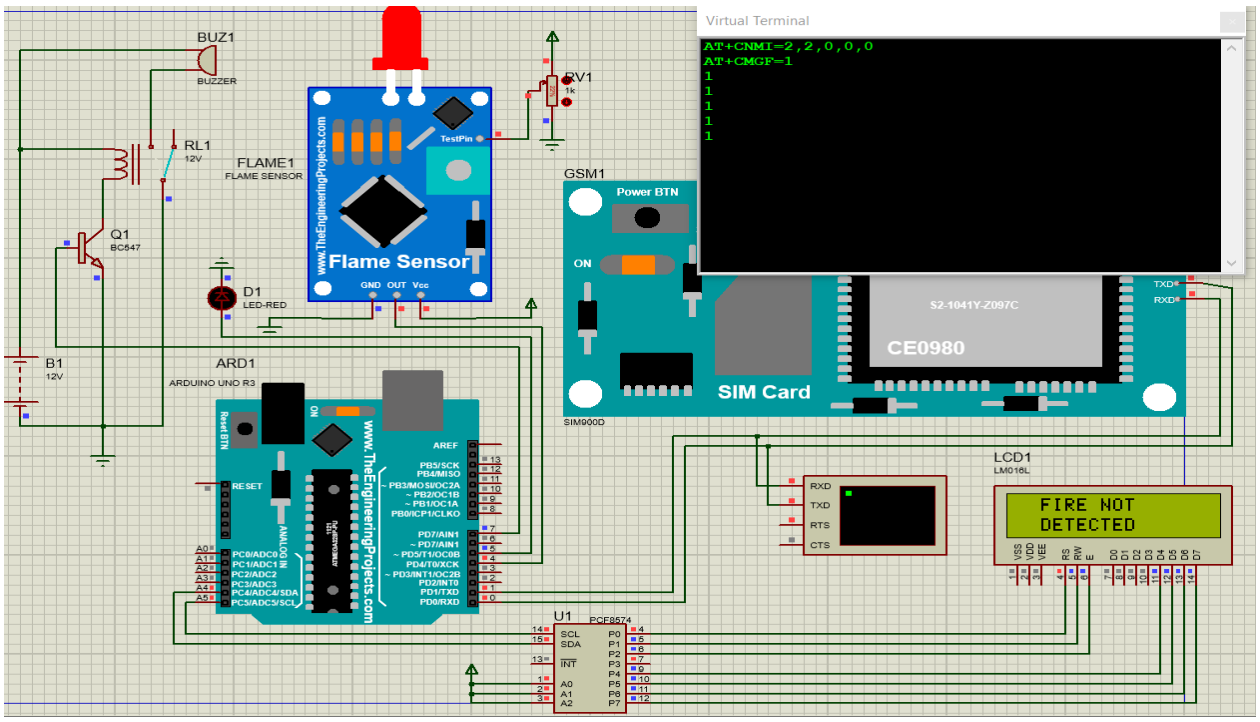

Figure 12:Fire Not Detected Result

Case 2: When flame is detected (Pot is High), Relay is in on condition as a result Buzzer and Red LED is in ON Condition. And LCD Displays “FIRE DETECTED, BE SAFE” and in Virtual terminal we can observe 0 “Fire Alert, Attention Required” (Flame detected and SMS Sent to No: 91-7795033521).

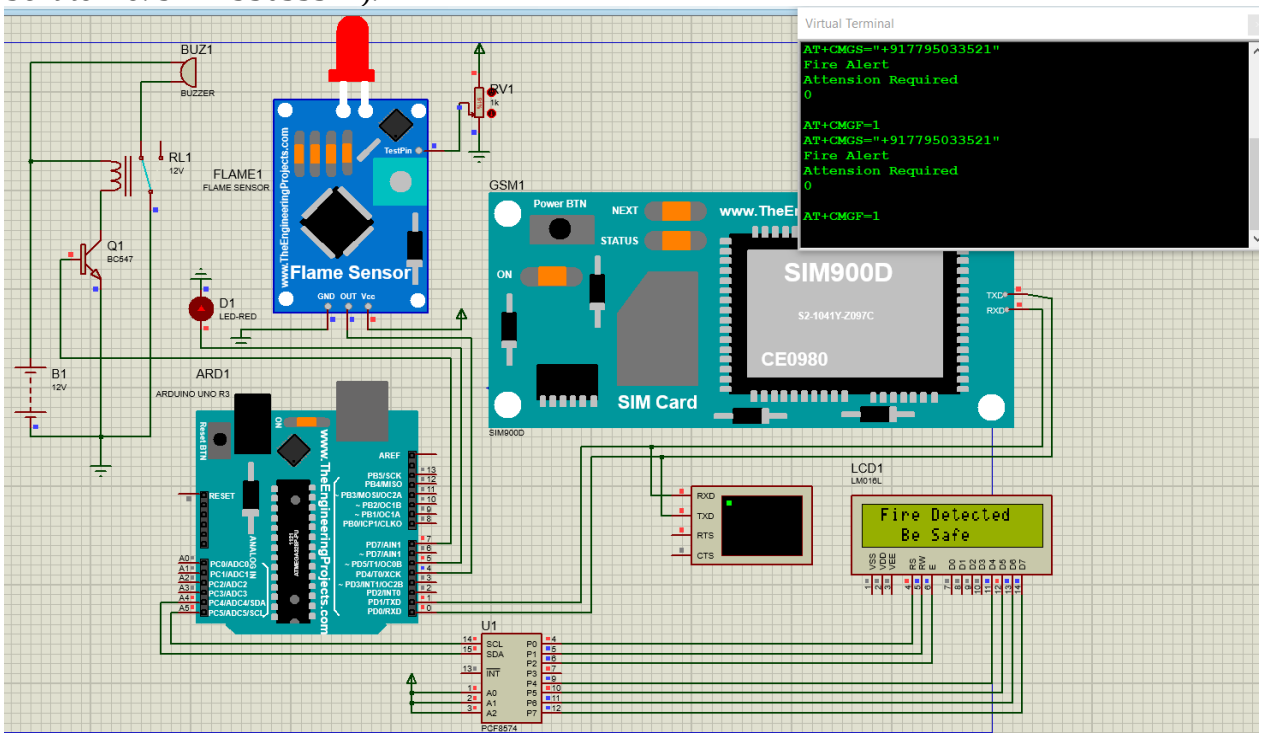

Figure 13:Fire Detected Result

1.8. Advantages

- Simple Implimentation
- Sensitivity
- Speed of response
- Reliability

1.9. Disadvantages

- False alarm
- High Cost
- High Maintenance
- Blinded to thick smoke

1.10. Applications

- Industrial and non-industrial building
- Institutional building
- Apartments
- Hotels and Hospitals
- Mall and multi storied complexes
- Office and control rooms
- Electric vehicles

1.11. Conclusion

Fire accident claims the lives of innocent people around the world every single day. A small amount of fire is able to damage a huge part of a society. This report presents the design and implementation of a cost-effective and reliable automated GSM based fire alarm system. Using this GSM based forest fire detection and prevention system, temperature and smoke concentration of the forest area under surveillance can be easily obtained. Fire detectors use various sensor, generally a smoke sensor and temperature and humidity sensor. The sensor input data is connected with Arduino controller. LCD display, Buzzer and GSM module also is connected with Arduino for output result. Buzzer is to notify for fire alarm and LCD is to display the fire detection status. GSM module can be informed to specific user to know or prevent their home, office or building. This system can also be applied in residential places, offices and hotels. With this system safety is assured. There should be a minimum of two or three smoke and detectors in your home. Always have a smoke and detector and fire alarm system in your home for your own safety. The advantages of the system can help in early reaction, saving lives and property. The system is simple and efficient since it involves less components; algorithm used can be easily implemented and the Flame sensor regularly keeps providing the readings for monitoring purpose.

1.12. References:

- Muheden, Karwan, Ebubekir Erdem, and Sercan Vançin. "Design and implementation ofthe mobile fire alarm system using wireless sensor networks." 2016 IEEE 17th International Symposium on Computational Intelligence and Informatics (CINTI). IEEE, 2016
- Mohamed Hefeeda and Majid Bagheri, “Wireless Sensor Networks for Early Detection of Forest Fires”, 2007 IEEE.

Part-2: Hardware Implementation:

2.1. Introduction:

Fire alarm systems are very common nowadays and commonly installed in Banks, shops, offices, home etc. They detect the fire and trigger a loud alarm to aware everybody. But what if nobody is there to hear that alarm, like in night time or when nobody is at home. So, to inform the authority about any fire incident today we are building a IoT based Fire Alarm system which not only trigger an alarm but also sends an Email alert, Blynk Notification, Text message through Telegram Bot to concern persons**.** This method can also be used to inform fire department automatically in case of fire. Here we will use Infrared Flame Sensor to detect the fire and MQ-2 Gas sensor to detect Smoke arising due to fire. The **ESP8266** NodeMCU will trigger the alarm and send email with the help of Blynk server, Text message in telegram bot and we also receive a Blynk notification.

2.2 Problem Statement:

An IOT based Fire/Smoke alarm system is designed using NodeMCU and Multiple Sensors. NodeMCU Microcontroller is main control chip, which links the sensors output to our mobile devises. By adopting Flame detector (Based on IR) for sensing the fire and MQ-2 Smoke sensor for sensing Smoke we have proposed a circuit which is capable of alerting both in nearby environment (Through Buzzer and RED light) and remote as well.

2.3 Objective:

The main Objective of our mini-project is to build a IOT Based Fire Alarm System that will detect the unwanted presence of fire by monitoring environmental changes associated with combustion using NodeMCU WIFI Module Alert system, it uses Flame Sensor for sensing Fire, MQ-2 Smoke Sensor for sensing Smoke arised due to fire and also provided with a buzzer to alert the surrounding environment. The objectives of the work are:

1. To interface NodeMCU with MQ-2 Smoke sensor, Flame Sensor, Buzzer and LEDs.
2. To send an email Notification through Blynk Server.
3. To send an Blynk app Notification.
4. To send a Telegram Notification through Telegram Bot.

Figure 14:Email Notification

Figure 17: Telegram Notification

Figure 18: Blynk Notification

2.4. Selection Of Software:

2.4.1. Arduino IDE:

The Arduino Integrated Development Environment - or Arduino Software (IDE) – is an opensource software which contains a text editor for writing code, a message area, a text console, a toolbar with buttons for common functions and a series of menus. It connects to the Arduino and Genuino hardware to upload programs and communicate with them. The Arduino Integrated Development Environment - the piece of software we use to program our NodeMCU - is written in C. The IDE translates and compiles our sketches into code that NodeMCU can understand. Once our code is compiled it's then uploaded to the board's memory. The main code, also known as a sketch, created on the IDE platform will ultimately generate a Hex File which is then transferred and uploaded in the controller on the board. The IDE environment mainly contains two basic parts: Editor and Compiler where former is used for writing the required code and later is used for compiling and uploading the code into the given NodeMCU WIFI Module.

Figure 19: Arduino IDE

2.5. Methodology:

2.5.1: Block Diagram:

The Block Diagram of Fire Alarm system is as follows:

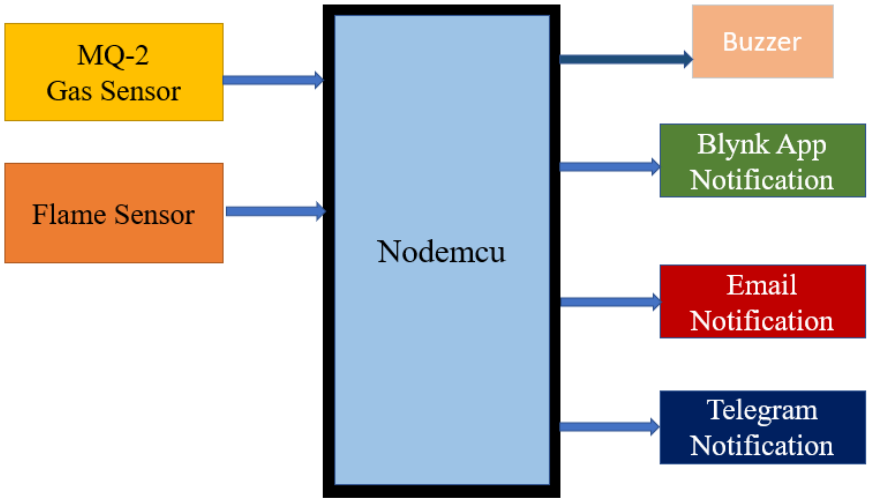

Figure 20: Hardware implementation Block Diagram

According to the block diagram shown in figure 16, as soon as the fire /smoke is detected by the flam sensor the information is sent to Nodemcu microcontroller which then processes the

information and notifies the user through Buzzer, by sending Blynk app notification, Email Notification and Telegram Bot Notification.

2.5.2. Components Required in Detail:

- **NodeMCU ESP8266:**

- ESP8266 NodeMCU is an open source IoT platform.
- It includes firmware which runs on the low-cost Wi-Fi enabled ESP8266 Wi-Fi SoC from Espressif Systems, and hardware which is based on the ESP-12 module.
- It has GPIO, SPI, I2C, ADC, PWM AND UART pins for communication and controlling other peripherals attached to it.
- On board NodeMCU has CP2102 IC which provides USB to TTL functionality.
- In this IoT Fire Alarm, we are using two GPIO pin to get the digital data from the flame sensor and gas sensor.

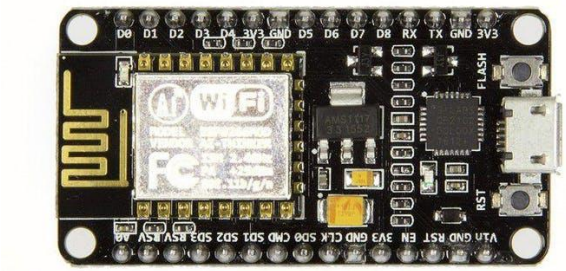

Figure 21: NodeMCU

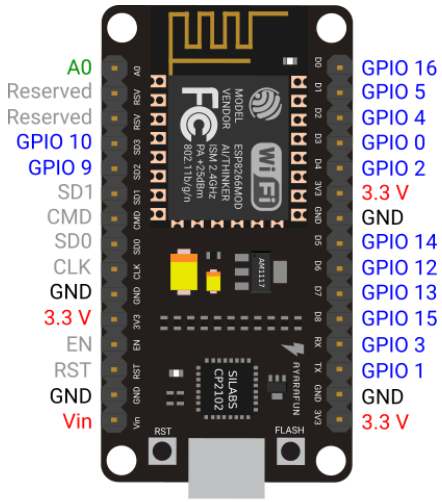

Figure 22: NodeMCU Pinout

- **Buzzer:**

The buzzer which we are using is a 5v buzzer which is connected to the relay. It has a total of two pins. The + (long) pin is connected with one of the NodeMCU GPIO pins while the – (short) pin is connected with the ground terminal.

Figure 23: Buzzer

- **IR Flame Sensor:**

Figure 24: IR Flame Sensor

This is the Flame Sensor Module which is also known as the Infrared IR Fire Sensor Detector. This Flame Sensor is extremely sensitive to IR wavelengths between 760-1100nm light. This flame sensor is ideal for short-range fire detection and can be used to monitor projects or as a safety, precaution to cut devices OFF / ON or to turn ON buzzers or Send SMS. It can be used in hundreds of projects. We have found that this Flame Sensor is mostly accurate up to about 3 feet.

When fire burns it emits a small amount of Infra-red light, this light will be received by the Photodiode (IR receiver) on the sensor module. Then we use an Op-Amp to check for a change in voltage across the IR Receiver, so that if a fire is detected the output pin (DO) will give 0V(LOW), and if the is no fire the output pin will be 5V(HIGH). It can detect infrared light with a wavelength ranging from 700nm to 1000nm and its detection angle is about 60°.

From Figure 5, On the right, we have a black IR LED sensor. The Flame Sensor Module has a total of 4 male headers on the left side which are clearly labelled as

1. A0 which is the Analog output pin of the Flame Sensor
2. G this is the ground pin and it should be connected with the ground pin of the power supply or the Arduino board.
3. + pin is the input supply pin and this is where we connect 3.3v from the NodeMCU Board.
4. D0 is the digital output signal pin which can be connected with any i/o pin of the NodeMCU board. This Flame sensor module is also provided with a Potentiometer which can be used for adjusting the Fire Flame detection sensitivity.

The Flame sensor module is also provided with two LEDs L1 and L2. One LED is turned ON when you power up the Flame Sensor module while the other LED only lights up when it detects the flame. This IR Flame Sensor module is based on the LM393 low offset voltage dual comparator.

- **LED's:**
  A green Led and a red LED is also made involved in the project such that when there is no smoke/flame detected then Green Led is in ON state and Red Led is OFF state,

but when smoke/Flame is detected, the Red Led Is in ON state, whereas Green LED is in OFF state.

- **MQ-2 Smoke Sensor:**

This sensor can detect various gases including Methane, Butane and LPG. We are using a MQ2 gas sensor module in this project for better interface.

Specifications:

- Operating Voltage is +5V.
- Can be used to Measure or detect LPG, Alcohol, Propane, Hydrogen, CO and even methane.
- Analog output voltage: 0V to 5V
- Digital Output Voltage: 0V or 5V (TTL Logic).
- Preheat duration 20 seconds.
- Can be used as a Digital or analog sensor.
- The Sensitivity of Digital pin can be varied using the potentiometer.

Figure 25:MQ-2 Smoke Sensor

2.5.3: CIRCUIT DIAGRAM:

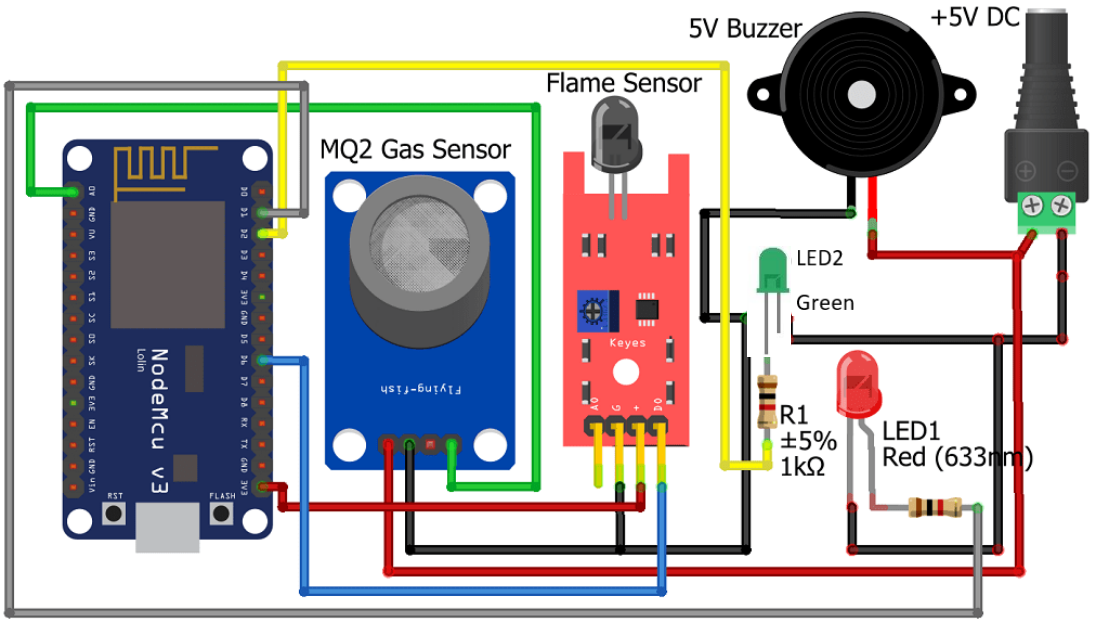

Figure 26:Fritzing Circuit

2.5.4: Hardware Implemented Image:

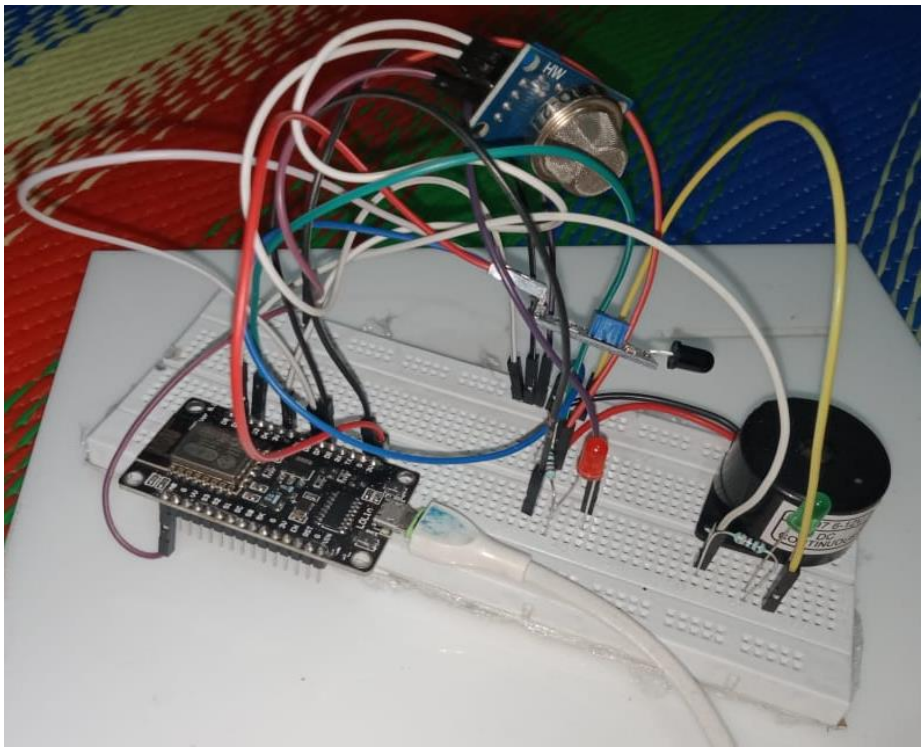

Figure 27: Hardware Implemented Circuit

2.6 Working:

First the Green LED will be in ON condition indicating that there is no fire/smoke in the surrounding environment. Later if the Flame sensor detects fire flame/Smoke sensor detects smoke, then suddenly the red LED and the buzzer turns ON and green LED turn OFF. And within a fraction of seconds an email is sent to concerned person in authority saying “Fire Detected”/ “Smoke Detected”, along with that a blynk app notification is sent “Fire Detected”/ “Smoke Detected” to another person who might be near by the place. Still if no action is taken within a minute a message through a telegram bot “IOT Based Fire Alarm System” saying “Fire Detected” to concerned personal for better action.

2.7 Results:

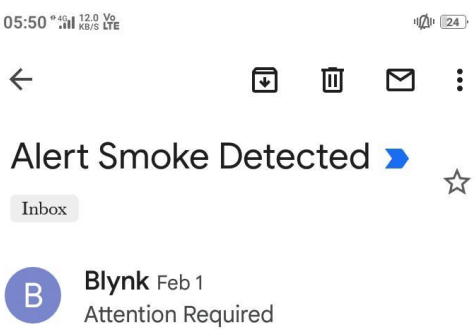

Figure 28: Smoke detected Email Notification

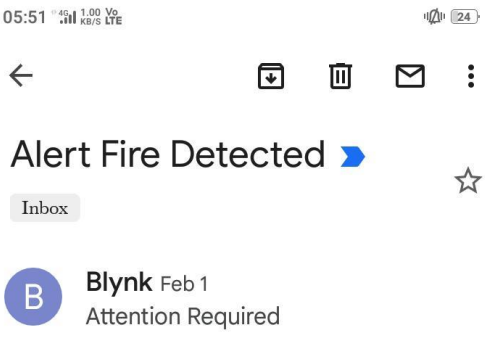

Figure 29: Fire detected Email Notification

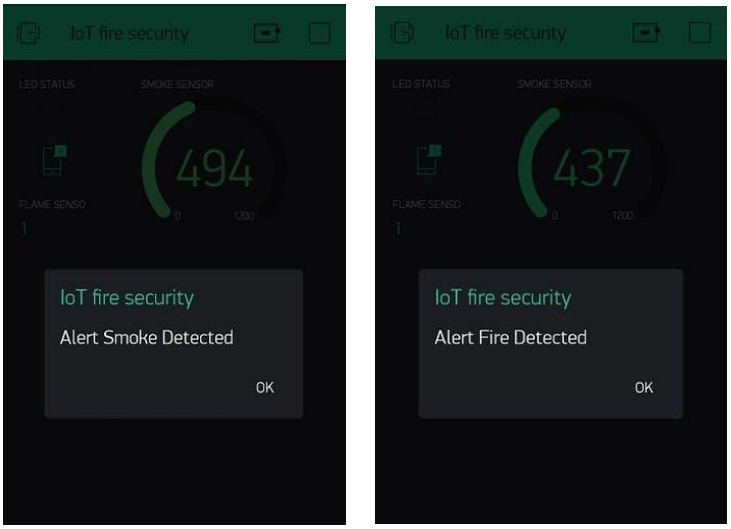

Figure 30: Fire and smoke detected Blynk app notification

Figure 31: Telegram Notification

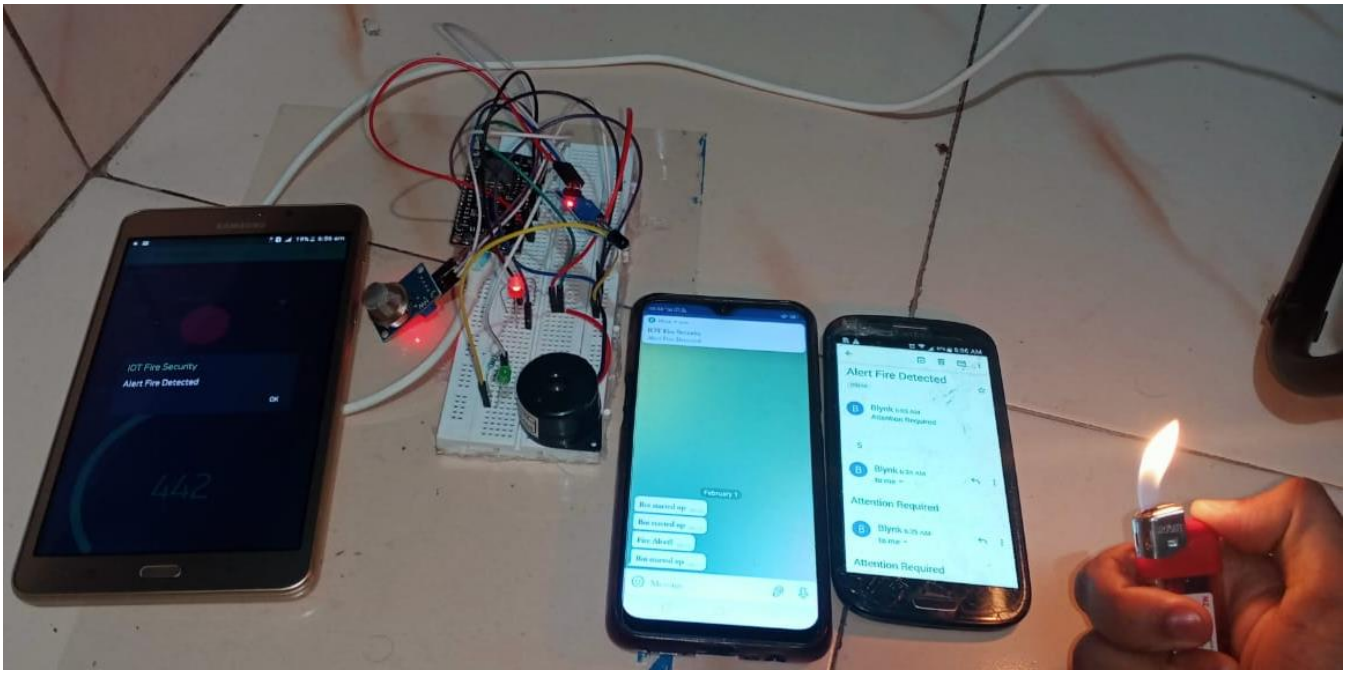

Figure 15:The entire Working Setup in case fire detected

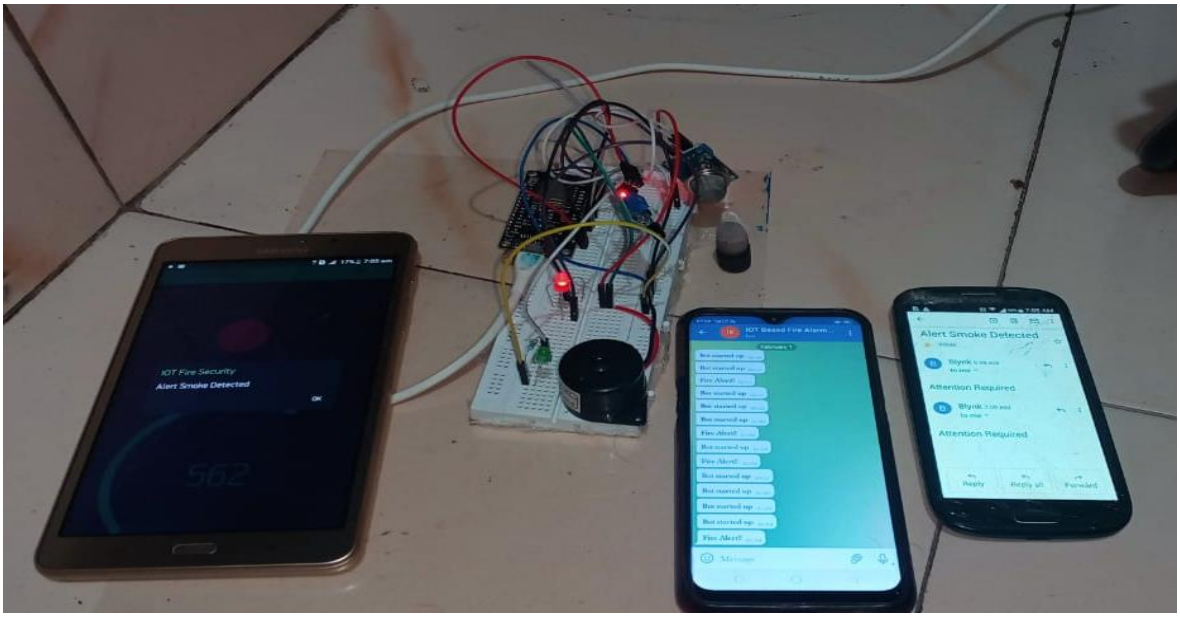

Figure 32: The entire Working Setup in case smoke detected (Dhoop stick is used to generate smoke)

- In order to generate a Fire, we have used a small lighter and to generate Smoke, we have used incense stinks/dhoop sticks.

2.8. ADVANTAGES:

- Simple Implementation
- Sensitivity
- Since its IOT Based system, it can connect to user in any part of the world.
- Speed of response
- Reliability
- Low cost compared to GSM Based alarm system and less bulky.

2.9. DISADVANTAGES

- False alarm
- Does not work under low internet connectivity and might become slow in those cases.

2.10. APPLICATIONS

- Industrial and non-industrial building
- Institutional building
- Apartments
- Hotels and Hospitals
- Mall and multi storied complexes
- Office and control rooms
- Electric vehicles

2.11. Concluision:

Fire accident claims the lives of innocent people around the world every single day. A small amount of fire is able to damage a huge part of a society. This system can also be applied in residential places, offices and hotels. With this system safety is assured. There should be a minimum of two or three smoke and detectors in your home. Always have a smoke and detector and fire alarm system in your home for your own safety. The advantages of the system can help in early reaction, saving lives and property. The system is simple and efficient since it involves less components; algorithm used can be easily implemented and the Flame sensor regularly keeps providing the readings for monitoring purpose.

This project will send an alert (Email Notification, Blynk Notification and Telegram Bot Notification) whenever it detects fire and smoke. It has also connected with a buzzer and an LED which will act as a audio and visual indication for alert.

2.12 References:

i. Kang, Do-Hun, Min-Sung Park, Hyoung-Sub Kim, Da-young Kim, Sang-Hui Kim, Hyeon-Ju Son, and Sang-Gon Lee. “Room temperature control and fire alarm/suppression IoT service using NodeMCU." In 2017 International Conference on Platform Technology and Service (PlatCon), pp. 1-5. IEEE, 2017.

ii. https://iotdesignpro.com/projects/iot-based-fire-alarm-project-using-esp8266