VISVESVARAYA TECHNOLOGICAL UNIVERSITY
JNANASANGAMA, BELGAVI – 590018.

MINI PROJECT REPORT ON

"ARDUINO BASED FIRE DETECTION AND CONTROL SYSTEM"

Submitted in partial fulfilment of the requirement for the award of the degree

BACHELOR OF ENGINEERING

IN

ELECTRICAL AND ELECTRONICS ENGINEERING

Submitted by

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SAPTHAGIRI COLLEGE OF ENGINEERING

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SAPTHAGIRI COLLEGE OF ENGINEERING

CERTIFICATE

Certified that the mini project entitled **"ARDUINO BASED FIRE DETECTION AND CONTROL SYSTEM"** is carried out by **AKSHATHA B (1SG20EE002), HARSHITH MK (1SG20EE011), NITEESH(1SG20EE021) ,YASHASWINI S (1SG20EE038),** bonafide student of **Sapthagiri College of Engineering** in partial fulfilment for the award of **Bachelor of Engineering** in department of **Electrical and Electronics Engineering** of Visvesvaraya Technological University, Belagavi during the academic year **2022-2023**. It is certified that all corrections/suggestions indicated in the Internal Assessment have been incorporated in the report deposited. The mini project report has been approved as it satisfies the academic requirements in respect of mini project prescribed for the Bachelor of Engineering Degree.

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2.	

ABSTRACT

The fire alarm and controlling method present in this paper includes the use of various electrical and electronics instruments and water sprinkling system. Fire is considered as the most dangerous hazard at Residential Area, Commercial Area, industries etc. It is very dangerous and can affect human life and cause a mass destruction of properties that's why we require high security and control to avoid this mass destruction. That's why to protect from the danger caused by fire, preventive measures are to install an automatic fire alarm detector at endangered locations, hence the Arduino fire alarm detection and control system was proposed. It is capable of automatically detecting smoke or fire in a given environment, sound an alarm, switch off MCB switch of the building and also spray water to reduce the intensity of fire. The system uses a LM35 sensor, MQ2 sensor, a 5V buzzer, 230V DC (Direct Current) motor, a GSM (Global System Mobile) Module sim800l to send SMS (Short Message Service), GPS (Global Positioning System) Module Neo 6, an LCD screen 16X2, Relay and Arduino UNO Atmega328p Fire Alarm and controlling system is a system that sense the fire from respective sensors and activates Buzzer. Fire Alarm System and controlling is the important to sense fire in the proper time and take safety measures to avoid many hazards to humans or property. Fire Alarm System, smoke and temperature Sensors are a part of the entire systems which help in detecting the fire and take necessary actions to avoid damage. in the market there are many fire alarms available, but they are expensive and having complicated design and system, but in our system we have designed in simple form and it includes the water sprinkling also. The primary purpose of this fire alarm and controlling system is to give an immediate warning of fire so that respective person of that building can be informed and immediate action can be taken so that prevent fire effect and hazards caused by it as soon as possible.

ACKNOWLEDGEMENT

Firstly, we are very grateful to the management of our esteemed institution "**SAPTHAGIRI COLLEGE OF ENGINEERING**" for providing us an opportunity to pursue our degree course.

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We would like to thank **Dr.REKHA S N** Prof.& H.O.D. of Electrical and Electronics Engineering Department and **Mrs.ASHWINI C** Assistant Professor, Electrical and Electronics Engineering Department for providing us an opportunity and for their invaluable support. We would also like to take this opportunity to express our gratitude for the support and guidance extended to us by the faculty members of the Electrical and Electronics Engineering Department.

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CHAPTER NO 1

1.INTRODUCTION

Ever since human being started building structures by using of wood rather than stone, fire has become the part of the total process.

In actual case, there are many examples of fire outbreaks which causes a huge destruction for example in Indians capital New Delhi where 27 peoples have to lose their life and more than 12 peoples got heavily injured as well as in Lucknow city more than 12 fire incidents happen not as large a fire as the one in Chicago the year before or the fire that was ravage San Francisco just over three decades later Firefighting calls for capabilities in combating, extinguishing, and stopping hearthplace, working and retaining hearthplace branch device and quarters, and vast education in acting firefighting activities. Nowadays, many industries and residentials have installed related fire safety and control arrangements such as fire alarm, fire extinguisher, water sprinkling supply system. But in actual practice these all-fire alarm and controlling systems they are not that much capable enough to take necessary action when fire is started that's why to protect life.

The new way to avoid all the losses is to respond to emergency situations as quickly as possible. So, at that point comes the need of upgraded fire detection systems. This project therefore look for to design an Arduino Fire Alarm and Controlling systems that will monitor the presence of significant quantity of temperature and smoke and activate alarms and along with that switch off the mains of the building, send an SMS to respective send an SMS alert and location and extinguish the fire as a safety measure to contain the situation.

1.1 OBJECTIVE

- The main purpose of this project is to design and implement an automatic fire and smoke detection and prevention system that can be produced at a low cost with effective and competitive usage. This System is designed to be more users friendly and easy to operate at any level.

  - The project is also been designed to be further working vision using minimum hardware at the lower level of processing. Our objective is to design a fire and smoke detection and prevention system that would fulfill the following:

  - To indicate the room in which fire erupted.
  - To indicate the location where the fire is occurred.
  - To sound the alarm if fire occurs. e fire is becurred.
  - To run the emergency exit servo motor and control the fire by supplying water to the remote area by motor pump motor

1.2 PROBLEM STATEMENT

Fire detect system is crucial in every building as it can prevent any mishaps and can save lives. The system can sense heat and gas thus alarming people via buzzer, automated announcements, or alarming lights. It is faster than having to scream to alarm people of a fire or a gas leak. Basically, heat sensor will sense any temperature above the normal room temperature. The Arduino will be used as micro-controller to control the whole system. Once the temperature rise is detected, the signal will be sent to the buzzer or led to alarm people. The people will be alarmed, and everyone will be able to evacuate safely**.**

Safety is a crucial consideration in the design of residential and commercial buildings in order to safeguard against loss of life and damage to property.

The existing fire alarm system in market nowadays is too complex in terms of its design and structure. Since the system is too complex, it needs regular maintenance to be carried out to make sure the system operates well. Meanwhile, when the maintenance is being done to the existing system, it could raise the cost of the system.

CHAPTER NO 2

2.LITERATURE REVIEW

- **W. H. Dong** propose that the protection of garment workers' minimal rights and safety has suddenly become a hot issue. The employees of clothing manufacturers face several labyrinths and one of them is certainly broken out of fire. the investors lose interest and the industry's prominence becomes toneless.in this work, we have proposed a fire detecting system that can locate the damaged area multiple Arduino, connected with a number of sensors and camera, have been controlled using regulator. To prevent any false alarms, we have included a validation of the fire suspicions systems. the method would deliver an automated SMS and the location of Arduino. An administration may validate or deny the claim, and if the situation is confirmed as a fire breach, the systems would generate an alarm and an automatic response would be sent. the next fire department has been enlisted.
- **M. S. Bin** Propose that Fire alarm is a real-time monitoring device which detects fire smoke and records photos via a camera in a room if a fire arises. Regulator and Arduino Uno are the embedded systems for developing the fire alarm system. The system's primary feature is the ability to transmit an alarm remotely if a fire is detected. The technology will send a message to the phone through gsm module when the presence of fir is detected. To report the occurrence to the Firefighter via Short Message service, the system needs user confirmation (SMS). This approach has the advantage of reducing the risk of the Firefighter receiving erroneous alerts**.**
- **Fairness in Wireless Sensor Networks (WSNs):** In a study by Chakraborty et al. (2018), an Arduino-based WSN architecture is presented, which ensures fair data transmission and energy management among sensor nodes. The authors employ a fairness index to achieve balanced data gathering, enhancing the network's performance and lifespan..
- **Energy-Aware Fairness in Smart Homes:** To address fairness issues in smart home energy management, Wu et al. (2019) propose an Arduino-based system that intelligently allocates energy resources among household devices. Their study demonstrates the effectiveness of the control system in optimizing energy utilization while considering user preferences and fairness constrain

CHAPTER NO 3

3.METHODOLOGY AND BLOCK DIAGRAM

- Interfacing GSM Module to Arduino Uno Board: There are two ways of connecting GSM module to Arduino. In any case, the communication between Arduino and GSM module is serial. So it is expected to use serial pins of Arduino (Rx and Tx).
- Considering this method, the Tx pin of GSM module is connected to Rx pin of Arduino and Rx pin of GSM module to Tx pin of Arduino. Now the ground pin of the Arduino is connected to ground pin of GSM module. So that's all the connections required to allow communication between the Arduino and the GSM module and the wiring is over.
- Now one can load different programs to communicate with GSM module and make it work. The problem with this connection is that, while programming, Arduino uses serial ports to load program from the Arduino IDE.
- If these pins are used in wiring, the program will not be loaded successfully to Arduino. So you have to disconnect wiring in Rx and Tx each time you burn the program to Arduino.
- Once the program is loaded successfully, you can reconnect these pins and have the system working. To avoid difficulty, it is preferable to use an alternate method in which two digital pins of Arduino are used for serial communication.
- Two PWM enabled pins of Arduino need to be selected for this method.
- o I choose pins 9 and 10 (which are PWM enabled pins). This method is made possible with the Software Serial Library of Arduino. Software Serial is a library of Arduino which enables serial data communication through other digital pins of Arduino. The library replicates hardware functions and handles the task of serial communication.

BLOCK DIAGRAM

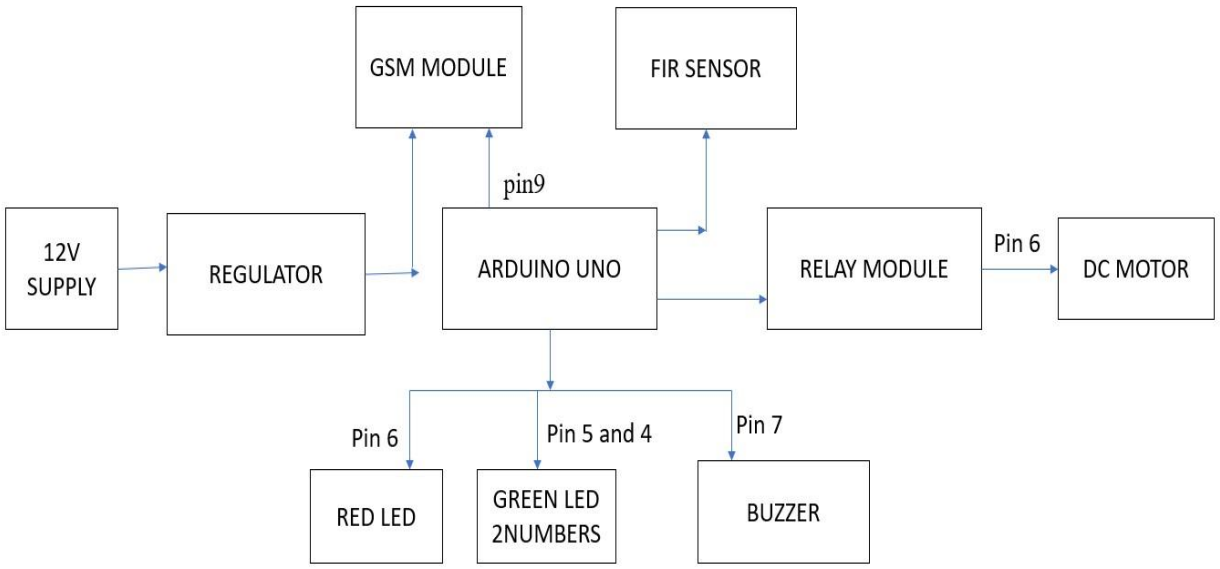

Fig No 3: BLOCK DIAGRAM

- The temperature at the start of the system is always felt by sensor. An increase in temperature occurs whenever a fire breaks out, even a little one. In this case, sensor can immediately identify the value of the temperature.
- On the Arduino UNO microcontroller will inform When the temperatures reaches 40 degrees Celsius or more, the GSM module sends a caution signal to the client. The temperatures limit activated by sensor in the program may be changed by the user upon request.
- With references to the temperatures spectrum, the sensor detects any environmental warmth (-55°C to +150°C) it can count. Temperature in Malaysia may reach up to about 38°C during hot weather.
- Therefore, according to the weather conditions, the temperature limit to be detected is 40o C certainly convenient.

CHAPTER NO 4

4.COMPONENTS DESCRIPTION

4.1 ARDUINO UNO:

The Arduino Uno is an opensource microcontroller board based on the Microchip ATmega328P microcontroller (MCU) and developed by Arduino.cc and initially released in 2010. The microcontroller board is equipped with sets of digital and analog input or output (I/O) pins that may be interfaced to various expansion board (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 uno (Integrated Development Environment), via a type B USB cable. It can be powered by a USB cable or a barrel connector that accepts voltages between 7 and 20 volts, such as a rectangular 9-volt battery. It has the same microcontroller as the Arduino Nano board, and the same headers as the Leonardo board. The hardware reference design is distributed under a Creative Commons Attribution Share-Alike 2.5 license and is available on the Arduino website. Layout and production files for some versions of the hardware are also available.

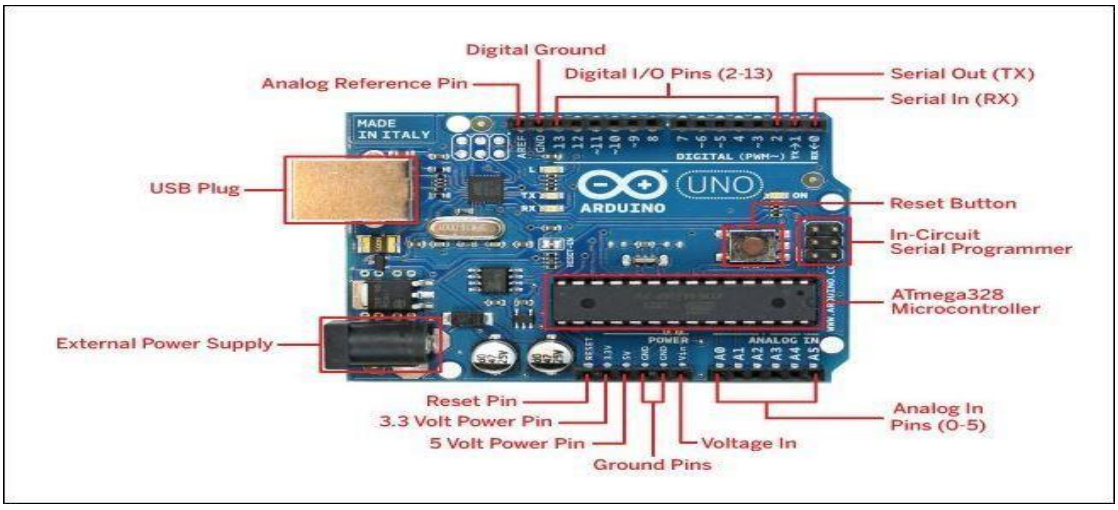

Fig 3.1 ARDUINO UNO

4.2 FLAME SENSOR

A flame-sensor is mainly used to detect & react to the occurrence of a flame/fire. Flame sensors are used in fire alarms, fire detection, drying systems, firefighting robot, industrial heating, hydrogen stations, domestic heating systems, industrial gas turbines, gas-powered cooking devices, etc.

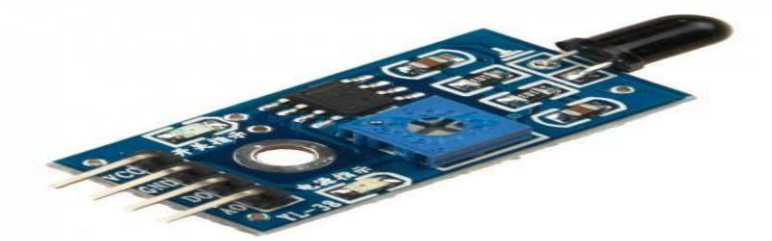

Fig 3.2 FLAME SESNSOR

4.3 BUZZER

A buzzer or beeper is an audio signaling device, which may be mechanical,electromechanical**,** or piezoelectric .Typical uses of buzzers and beepers include alarm devices, timers, train and confirmation of user input such as a mouse click or keystroke.

Piezoelectric buzzers, or piezo buzzers, as they are sometimes called, were invented by Japanese manufacturers and fitted into a wide array of products during the 1970s to 1980s. This advancement mainly came about because of cooperative efforts by Japanese manufacturing companies. In 1951, they established the Barium Application Research Committee, which allowed the companies to be "competitively cooperative" and bring about several piezoelectric innovations and inventions.

Fig 3.3 BUZZER

4.4 LED

A light-emitting diode (LED) is a semiconductor device that emits light when current flows through it. Electrons in the semiconductor recombine with electron holes, releasing energy in the form of photons. The color of the light (corresponding to the energy of the photons) is determined by the energy required for electrons to cross the band gap of the semiconductor. White light is obtained by using multiple semiconductors or a layer of lightemitting phosphor on the semiconductor device.

Fig 3.4 LED

4.5 GSM MODULE

A GSM module is a device that allows electronic devices to communicate with each other over the GSM network. GSM is a standard for digital cellular communications, which means that it provides a platform for mobile devices to communicate with each other wirelessly. The GSM module is a specialized device that enables a device to send and receive data over the GSM network.

A GSM module works by connecting to the GSM network through a SIM card. The SIM card provides the module with a unique identification number, which is used to identify the device on the network. The GSM module then communicates with the network using a set of protocols, which allows it to send and receive data.

The GSM network is a digital cellular network that uses a set of protocols to enable communication between devices. The network is divided into cells, which are each serviced by a base station. The base station communicates with the devices in its cell, and the cells are interconnected to form a network.

Fig 3.5 GSM MODULE

4.6 BREAD BOARD

A breadboard, solderless breadboard, or protoboard is a construction base used to build semi-permanent prototypes of electronic circuits. Unlike a stripboard, breadboards do not require soldering or destruction of tracks and are hence reusable. For this reason, breadboards are also popular with students and in technological education.

Compared to more permanent circuit connection methods, modern breadboards have high parasitic capacitance, relatively high resistance, and less reliable connections, which are subject to jostle and physical degradation. Signaling is limited to about 10 MHz, and not everything works properly even well below that frequency.

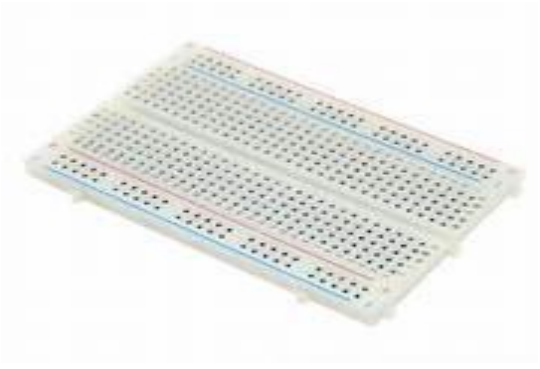

Fig 3.6 BREAD BOARD

4.7 JUMPERS

A jump wire (also known as jumper, jumper wire, DuPont wire) is an electrical wire, or group of them in a cable, with a connector or pin at each end (or sometimes without them – simply "tinned"), which is normally used to interconnect the components of a breadboard or other prototype or test circuit, internally or with other equipment or components, without soldering. Individual jump wires are fitted by inserting their "end connectors" into the slots provided in a breadboard, the header connector of a circuit board, or a piece of test equipment.

Fig 3.7 JUMPERS

4.8 RELAY MODULE

Relay modules are simply circuit boards that house one or more relays. They come in a variety of shapes and sizes, but are most commonly rectangular with 2, 4, or 8 relays mounted on them, sometimes even up to 16 relays. Relay modules contain other components than the relay unit. These include indicator LEDs, protection diodes, transistors, resistors, and other parts.

Fig 3.8 RELAY MODULE

4.9 REGULATOR

Voltage regulators perform the same function in large-scale power-distribution systems as they do in motor vehicles and other machines; they minimize variations in voltage in order to protect the equipment using the electricity. In power-distribution systems the regulators are either in the substations or on the feeder lines themselves. Two types of regulators are used: step regulators, in which switches regulate the current supply, and induction regulators, in which an induction motor supplies a secondary, continually adjusted voltage to even out current variations in the feeder line.

Fig 3.9 REGULATOR

CHAPTER NO 5

5.ANALYSIS AND IMPLEMENTATION

5.1 CIRCUIT DIAGRAM AND DESCRIPTION

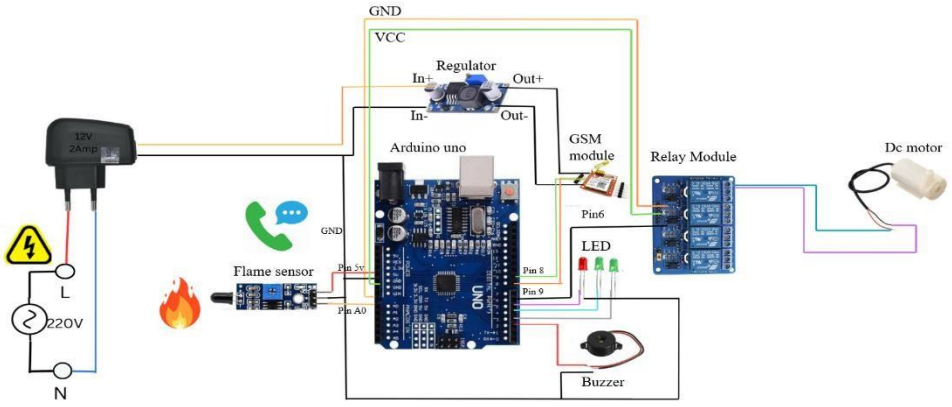

Fig 5.1 CIRCUIT DIAGRAM

DESCRIPTION

The system includes two main parts: hardware and software. A stand-alone embedded system based on an Arduino, a GSM mobile with GSM Modem (SIM800L), a relay module, and current sensors make up the hardware architecture. The software comprises of Arduino UNO programming. The GSM modem provides the communication media between the home owner(consumer) and the system by means of SMS. The SMS consists of AT commands to be performed. The format of this message is predetermined. The SMS message is delivered to the residential customer in format of a text message with a predetermined structure. The Arduino will decode and execute the commands supplied by the GSM module. The system will start the commands and switch the appliances/equipment (ON/OFF) as per instructions.

5.2 PROGRAMMING

```
#include <EEPROM h>
#include <Software Serial. h> //Create software serial object to communicate with SIM800L
Software Serial GSM (2, 3); //SIM800L Tx & Rx is connected to Arduino #8 & #9

char phone no [] = "+919380039521"; //change +92 with country code and 3378655465 with
phone number to SMS



#define sensor Pin A0 // choose the input pin (for Fire sensor)

#define buzzer 7 // choose the pin for the Buzzer
#define led_ M 9 // choose the pin for the Green LED Message active indication
#define led C 4// choose the pin for the Green LED Call Active indication
#define led S 5 // choose the pin for the Red LED Fire detection indication

int motor = 6;

int read_ value; // variable for reading the sensor pin status

int SMS_ Status, call_ Status;
int flag=0; int var_1=0,
var_2=0;
char input_ string [15]; // Will hold the incoming character from the GSM shield

void setup () {// put your setup code here, to run once

Serial. Begin (9600); //Begin serial communication with Arduino and Arduino IDE (Serial
Monitor)
GSM. Begin (9600); //Begin serial communication with Arduino and SIM800L

Digital Write (motor, HIGH);

Pin Mode (sensor Pin, INPUT); // declare sensor as input

Pin Mode (buzzer, OUTPUT); // declare Buzzer as output
Pin Mode (led_ M, OUTPUT); // declare Green LED as output
Pin Mode (led_ C, OUTPUT); // declare Green LED as output
Pin Mode (led_ S, OUTPUT); // declare Red LED as output
Pin Mode (motor, OUTPUT);

 Serial. Print ln ("Initializing....");
  Init Module ("AT", "OK", 1000);
  Init Module ("ATE1", "OK", 1000);
  Init Module ("AT+CPIN?", "READY", 1000);
```

```
  Init Module ("AT+CMGF=1", "OK", 1000);
  Init Module ("AT+CNMI=2,2,0,0,0", "OK", 1000);
  Serial. Print ln ("Initialized Successfully");

  Send SMS (phone_ no, "Start GSM Fire Alert System");


SMS_ Status = EEPROM. read(1); call_
Status = EEPROM. read(2);
}

void loop () {
read SMS ();

read_ value = digital Read (sensor Pin); // Digital input value

if(read_ value==1) {//check if the Fire variable is High   digital
Write (buzzer, LOW); // Turn LED off.
Digital Write (led_ S, LOW); // Turn LED off.
Digital Write (motor, HIGH);
Delay (2000);


flag=0;
}
Else {//check if the Fire variable is Low Digital
Write (buzzer, HIGH); // Turn LED on.
Digital Write (led_ S, HIGH); // Turn LED on.
Digital Write (motor, LOW); if(flag==0)
{flag=1;
 if (SMS_ Status==1) {send SMS (phone_ no, "Fire is Detected Alert....!!!");}
delay (1000);
 if (call_ Status==1) {call Up (phone_ no);}
}
Delay (1000);
}

  if (var_1 == 1) {      if (! (STRNCMP (input_ string, "SMS on", 6)))
{SMS_ Status=1;
  EEPROM. write(1, SMS_ Status);
  Send SMS (phone_ no, "Message is Active");
  }
else if (! (STRNCMP (input_ string, "SMS off", 7))) {SMS_ Status=0;
  EEPROM. write (1, SMS_ Status);
  Send SMS (phone_ no, "Message is Deactivate");
  }
```

```
else if (! (STRNCMP (input_ string, "call on", 7))) {call_ Status=1;
  EEPROM. write(2, call_ Status);
  Send SMS (phone_ no, "Call is Active");
  }
else if (! (STRNCMP (input_ string, "call off", 8))) {call_ Status=0;
  EEPROM. Write (2, call_ Status);
  Send SMS (phone_ no, "Call is Deactivate");
  }

   var_1     =     0;
var_2 = 0;
  }

Digital Write (led_ M, SMS_ Status); //LED On SMS Active, LED Off SMS Deactivate
Digital Write (led_ C, call_ Status); //LED On Call Active, LED Off Call Deactivate

}

void send SMS (char *number, char *msg) {
GSM. print("AT+CMGS=\""); GSM. print(number); GSM. Print ln("\"\r\n"); //AT+CMGS=”
Mobile Number” <ENTER> - Assigning recipient’s mobile number
Delay (500);
GSM. Print ln (msg); // Message contents
Delay (500);
GSM. write (byte (26)); // Ctrl+ Z   send message command (26 in decimal). Delay
(5000);
}

void call Up (char *number) {
GSM. Print ("ATD + "); GSM. print(number); GSM. Print ln(";"); //Call to the specific
number, ends with semi-colon, replace X with mobile number Delay (1000); // wait for 1
seconds...
}


void read SMS () {   while (GSM. Available ()>0) {     //----
----- PIN HERE -------//     if (GSM. Find ("/")) // <<< '/786'
where786 is 3digit PIN.
     //--------- PIN HERE -------//
    {
     Delay (1000);
     while (GSM. available())
     {
      char   input_   char   =   GSM.   read();
input_ string[var_2++] = input_ char;
      if (input_ char == '/')
```

```
{          var_1 =
1;          return;
      }
    }
  }
} }
void int Module (String CMD, char *res, int t) {
 while (1) {
   Serial. Print ln (CMD);
   GSM. Print ln (CMD);     Delay
(100);     while (GSM. Available
() > 0) {       if (GSM. Find (res))
{         Serial. Print ln(res);
delay(t);         return;
    } else {
      Serial. Print ln("Error");
    }     }
delay(t);
 }
}
```

5.3 FLOW CHART

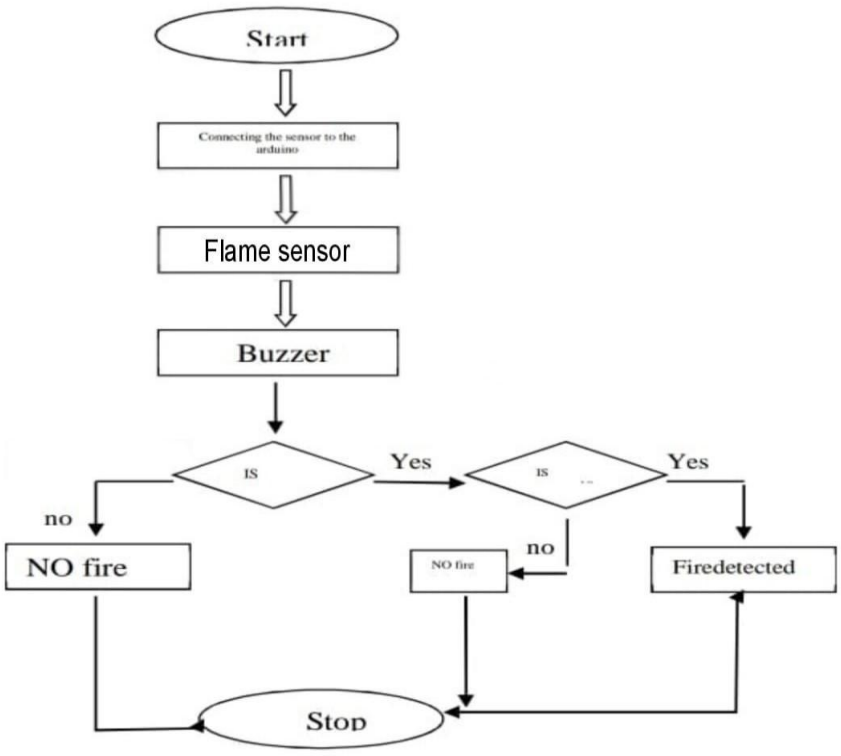

Fig 5.2 FLOW CHART

5.4 PROJECT DESIGN

STEP 1: CONTROLLING VOLTAGE

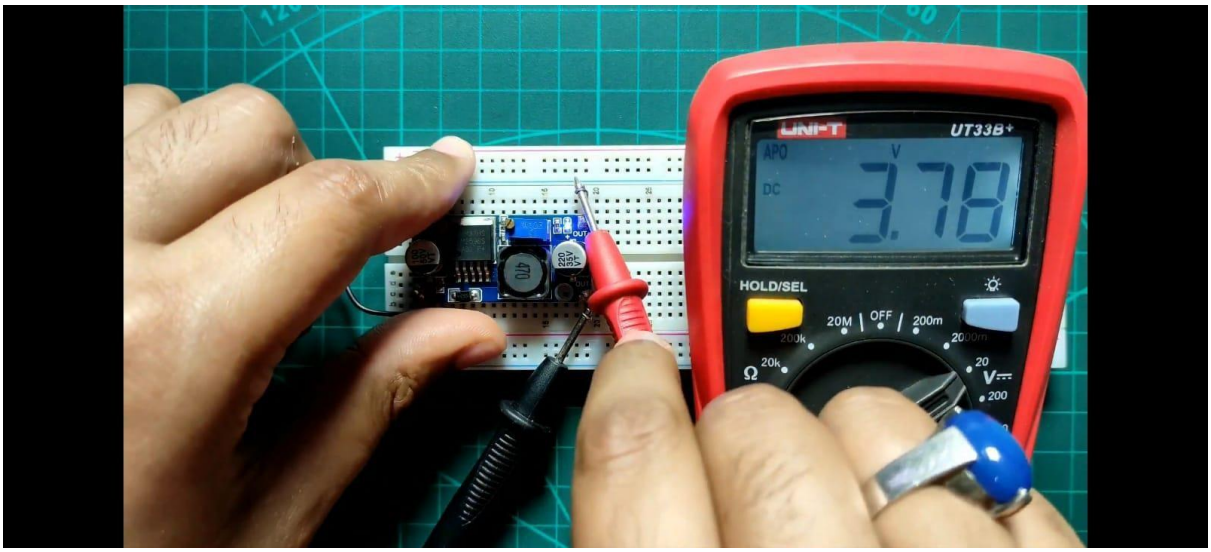

Fig 5.3 CONTROLLING VOLTAGE

STEP 2: SOLDERING THE GSM

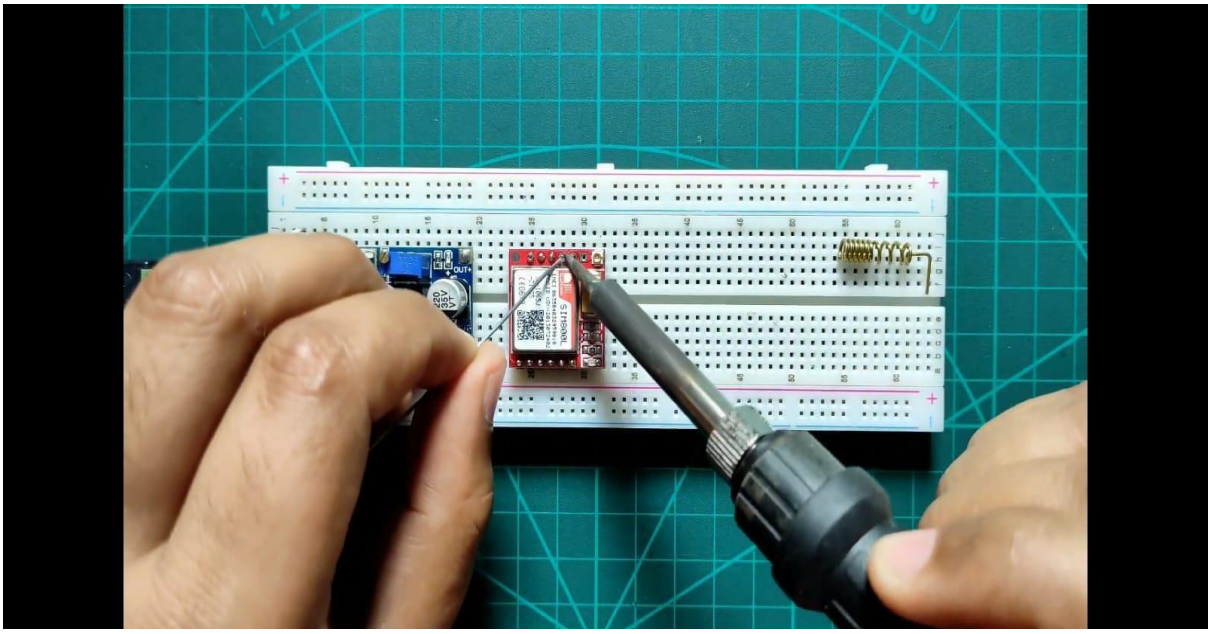

Fig 5.4 SOLDERING THE GSM

STEP 3: CIRCUIT WITH LEDS AND GSM MODULE

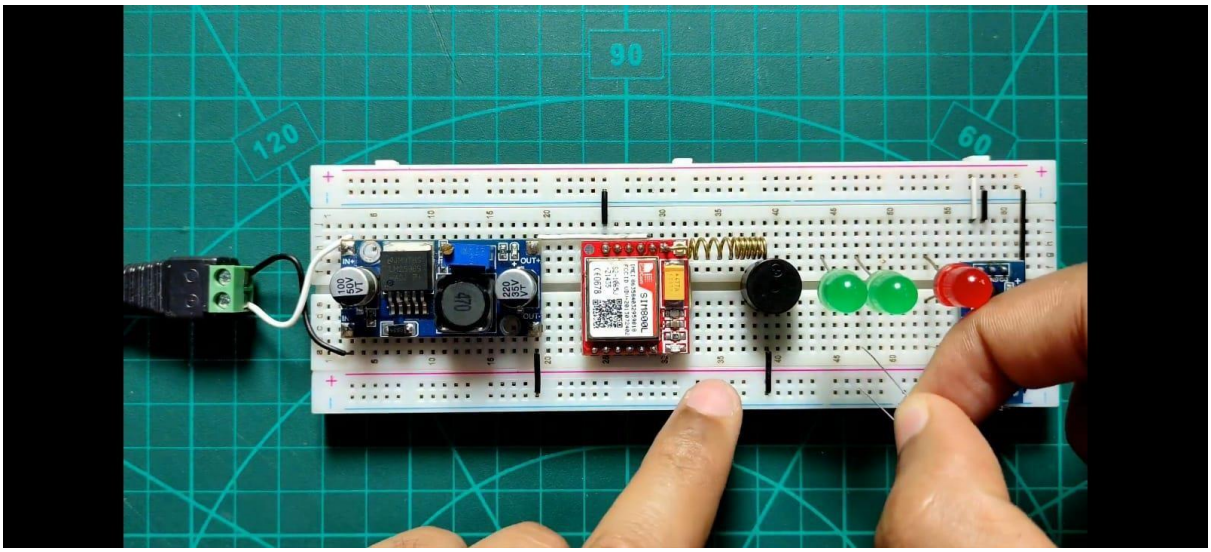

Fig 5.5 CIRCUIT WITH LEDS AND GSM MODULE

STEP 4: FIXING ARDUINO

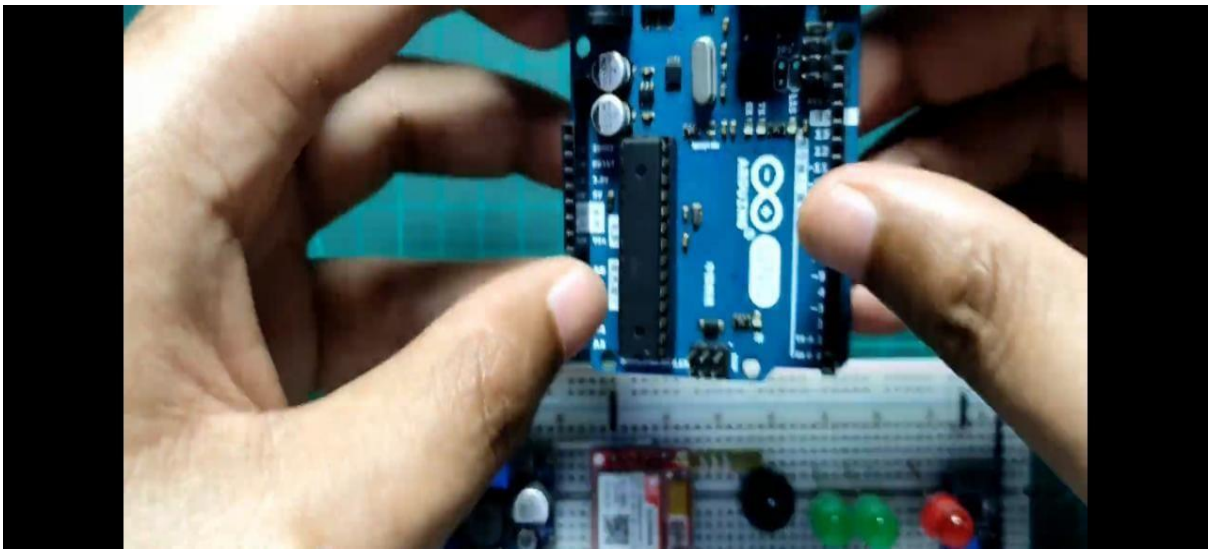

Fig 5.6: FIXING ARDUINO

FIINAL VIEW OF PROJECT

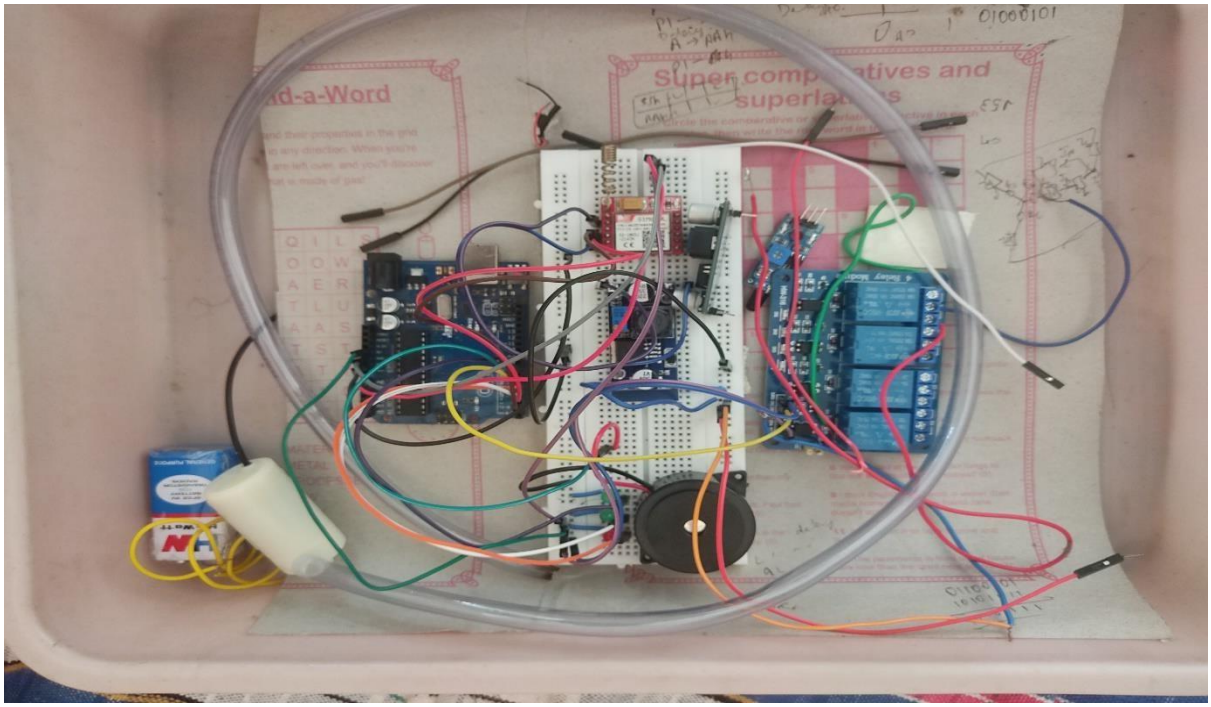

Fig 5.7 FINAL CIRCUIT

5.5 APPLICATIONS

- Industrial and nonindustrial buildings
- Institutional buildings
- Apartments
- Hotels and hospital
- All industries
- Mall and multi storied complexes
- Office and control rooms
- Elective vehicles [battery, motors]

5.6 BENIFITS

- Accurate and Real-Time Monitoring: Arduino microcontrollers can collect data from various sensors in real-time, providing accurate information about the fair conditions.
- Cost-Effective Solution: Arduino boards and sensors are relatively inexpensive compared to other industrial automation systems.
- Energy Efficiency: Arduino microcontrollers are designed to be energy-efficient. By using low-power sensors and optimizing control strategies, the system can minimize energy consumption while maintaining fairness.
- Easy Integration and Scalability: Arduino microcontrollers are compatible with a wide range of sensors and actuators, facilitating easy integration into existing systems or the ability to scale up the system as needed.

5.7 LIMITATIONS

- False Alarms: Fire detection systems can be susceptible to false alarms, triggered by factors such as cooking smoke, steam, dust, or malfunctioning sensors. False alarms can lead to complacency among occupants and emergency responders, reducing the system's credibility and response effectiveness.
- Limited Coverage: Fire detection systems are typically installed in specific areas or zones within a building. If a fire starts outside these areas, or in concealed spaces such as walls or ceilings, the detection system may not be able to detect it in a timely manner.

CHAPTER NO 6

6. FUTURE SCOPE

- The developed prototype in this work is made for a user to control the fire alarm system remotely.
- This helps the user if he/she is not in the building or even unaware of emergency condition. The use of this prototype will avoid the unpredictable situation or any critical situation from occurring in the residential areas without awareness of the resident.
- The use of coupled sensor of temperature sensor and smoke detector was found to be more appropriate than the use of only one of them. Though the prototype was able to extinguish the fire but the portability can be significantly improved by an efficient assimilation of the different modules.
- This system should also take care that each module of it can be easily replaced by a better sensor and equipment with updated technology.
- There is ongoing research and development in sensor technologies to improve the detection of fires. For instance, the integration of advanced sensors like optical sensors, infrared cameras, and multi-sensor arrays can enhance the system's ability to detect fires more accurately and quickly.
- Fire detection systems can leverage data analytics and predictive modeling techniques to identify patterns, trends, and potential fire hazards.
- Fire detection and control systems can be integrated with other building systems, such as HVAC (Heating, Ventilation, and Air Conditioning) systems, access control, and surveillance systems.

CHAPTER NO 7

7 .RESULT

GSM based fire alarm system works based on the GSM module where when the gas detector detect the fire in the surroundings then it sends the signal to the Arduino where it immediately sends the signal to both buzzer and the GSM module to make the owner alert that fire has been detected through the help of the GSM module the text alert message ‘Fire detected’ is sent to the multiple numbers which are added in the coding.

The fire alarm system works based on GSM module where GSM module sends a text message to the user’s number from the SIM Card that is inserted in to the module. The code run on the Arduino determines which number to send message, and how many times message needs to be sent, if the fire takes place the temperature of the surroundings start increasing as soon as temperature crosses a threshold value, the Arduino sends a signal to the GSM module to do its job. The GSM module sends the text message to the user number that “Fire is Detected”.

DISCUSSION

There have been few experiments to monitor the performance of the system. The experiments were conducted using heat in the vicinity of the sensor. Shows the ready mode state of the sensor (prepared to detect but not to detect a fire). Shows a fire and alarm message detected by the sensor on the LCD screen. When the fire has been removed, the condition is present. Reveals the user's SMS when the system notifies a fire alert. When a fire is detected, the LCD display simply indicates the sensor sensor's readiness to detect fire. Whenever the sensor senses a red, the LCD screen flashes "Fire alarm!" in time with the SMS delivered to the user through the GSM component. "Fire shut!" will appear on the LCD display when the blaze has being doused. Now you're safe.”

7.1 CONCLUSION

- This project has been made in order to help building owner to overcome the problem which is fire spreading whenever the owner is not in the building. The unpredictable situation or critical situation always occurs in the building or resident areas without the residents' notice.
- Based on the results obtained, the home alert system is doable and functional to the residents to protect their houses. In fact the system built is cheap in value compared to other existing alarm system in the market and easy to apply to the houses.
- The ability to detect heat or high temperature is undeniable because of the use of sensor in the system. This device can be applied in varied areas due to its flexibility and simplicity in handling; for instance in houses, hostels, hotel industries, factories, vehicle industries and many more areas which are related to the crowd, people or beneficial things.
- Users can simply apply the device in their interested area to protect the area from the existence of fire. Whenever the temperature reaches the limit (40o C), the device will instantly alert the users by sending a message via GSM.
- This will make the users become aware of the dangerous situation and can easily prevent it from happening by quick prevention (use fire extinguisher, call firemen etc.).

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