A Project Report

on

FIRE ALARM SYSTEM

Submitted for the partial fulfillment of the requirement

for the award of the Degree of

PROJECT CREDIT

In

Internet of things

by

Aniket kumar & Jaya kumari

Under the Guidance of

Mr. Rochak Sharma

Designation and affiliating University/Organization

DIT UNIVERSITY, DEHRADUN, INDIA

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DECLARATION

This is to certify that the Project entitled **"FIRE ALARM SYSTEM"** in partial fulfillment of the requirement for the award of the **Degree of** PROJECT CREDIT in **INTERNET OF THINGS**, submitted to **DIT University, Dehradun, Uttarakhand, India,** is an authentic record of bonafide work carried out by me, under the guidance of **Mr. Rochak Sharma.**

The matter embodied in this Project/Thesis/Dissertation has not been submitted for the award of any other degree or diploma to any University/Institution.

Student Name & Signature:

Supervisor Name & Signature:

Head of Department
Signature

Controller of Examination
Signature

Date :

Place : Dehradun

DIT UNIVERSITY
IMAGINE ASPIRE ACHIEVE

CERTIFICATE

This is to certify that the Project entitled **"FIRE ALARM SYSTEM"** in partial fulfillment of the requirement for the award of the **Degree PROJECT CREDIT** in **INTERNET OF THINGS**, submitted to **DIT University, Dehradun, Uttarakhand, India,** is an authentic record of bonafide research work carried out by ANIKET KUMAR & JAYA KUMARI Roll No 170109030 & 170112015 under my supervision/ guidance.

Date: ***NAME AND SIGN OF SUPERVISOR***

Place: Dehradun

ACKNOWLEDGEMENT

The success and final outcome of this project required a lot of guidance and assistance from many people and I am extremely privileged to have got this all along the completion of my project. All that we have done is only due to such supervision and assistance and we would not forget to thank them.

We respect and thank Mr. Rochak Sharma, for providing me an opportunity to do the project work and giving us all support and guidance which made us complete the project duly. We are extremely thankful to him for providing such a nice support and guidance, although he had busy schedule managing the corporate affairs.

We would not forget to remember Dr. Vishal Bharti , HOD of CSE Department for their encouragement and more over for their timely support and guidance till the completion of our project work.

I am thankful to and fortunate enough to get constant encouragement, support and guidance from all Teaching staffs of CSE Department which helped us in successfully completing our project work.

Aniket Kumar & Jaya Kumari

PROJECT TOPIC

Design and Construction of Fire Alarm System using Arduino And Flame Sensor

Abstract:

Fire Alarm Circuit is a simple circuit that detects the fire and activates the Siren Sound or Buzzer. Fire Alarm Circuits are very important devices to detect fire in the right time and prevent any damage to people or property.

Fire Alarm Circuits are a part of the security systems which help in detecting or preventing damage. Installing Fire Alarm Systems in commercial buildings like offices, movie theatres, shopping malls and other public places is compulsory.

The main advantage of installing fire alarms is the early warning benefit. The fire alarms can be installed just about any where in a commercial building and best of all the fire safety measure is highly cost effective for smoke and fire protection.

Early warning is essential to effective fire safety because fires can occur anytime and any place. We highly recommend having fire alarms installed on every floor of your commercial business because a fire can ignite even when people are not within a room or section of the building**.**

You can be immediately alerted of a fire at your commercial building when your fire alarm system is connected to a remote monitoring station. This early warning signal is extremely important to life safety for the following reasons:

- Increases evacuation time for building occupants before a fire spreads out of control.
- Emergency medical help can be immediately sent out to those in need.
- Fire department personnel can help people exit the building safely.

Group Members:

Aniket Kumar 170109030

Jaya Kumari 170112015

TABLE OF CONTENT

TITLE **PAGE NO.**

CHAPTER ONE

1.1 PURPOSE :

Fire is one of the most dangerous events possible; somewhere in the world, one occurs every minute of every day. While fire can be our friend in some instances, it can be our worst enemy when it's uncontrolled and allowed to continue through a building. Fire is, of course, destructive, and the smoke from a fire creates a toxic, dangerous atmosphere. The rapid detection of a fire and its control can save several thousand lives, thousands of injuries, and millions of dollars in property loss each year.

The field of fire detection has advanced to where fire detectors and alarm devices have combined to become life-safety systems. The purpose of an automatic fire-alarm system is to detect an occurrence, alert the control panel and proper authorities, and notify the occupants to take action.

1.2 OBJECTIVE :

Objective of this project is to achieve an automated state where whenever there is any fire in the particular range , the sensor will detect that and send the signal to buzzer to buzz an alarm with the help of arduino.

1.3 MOTIVATION :

The primary motivation to introduce a business fire alarm system is obviously to keep fires from occurring. Per year losses occurs due to fire either it be in form of live or money either it be home or offices. With a fire alarm system, you'll have the capacity to stop the fire from spreading in your building or work place or anywhere else.

1.4 DEFINITION AND OVERVIEW OF COMPONENTS :

Components Required:

1. Arduino Uno
2. Flame sensor
3. LED
4. Buzzer
5. Jumper wires

Some overview about Flame Sensor :

A **flame detector** is a sensor designed to detect and respond to the presence of a flame or fire. Responses to a detected flame depend on the installation, but can include sounding an alarm, deactivating a fuel line (such as a propane or a natural gas line), and activating a fire suppression system.

There are different types of flame detection methods. Some of them are: Ultraviolet detector, near IR array detector, infrared (IR) detector, Infrared thermal cameras, UV/IR detector etc.

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 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).

In this project we are using an **IR based flame sensor**. It is based on the YG1006 sensor which is a high speed and high sensitive NPN silicon phototransistor. It can detect infrared light with a wavelength ranging from 700nm to 1000nm and its detection angle is about 60°. Flame sensor module consists of a photodiode (IR receiver), resistor, capacitor, potentiometer, and LM393 comparator in an integrated circuit. The sensitivity can be adjusted by varying the on board potentiometer. Working voltage is between 3.3v and 5v DC, with a digital output. Logic high on the output indicates presence of flame or fire. Logic low on output indicates absence of flame or fire.

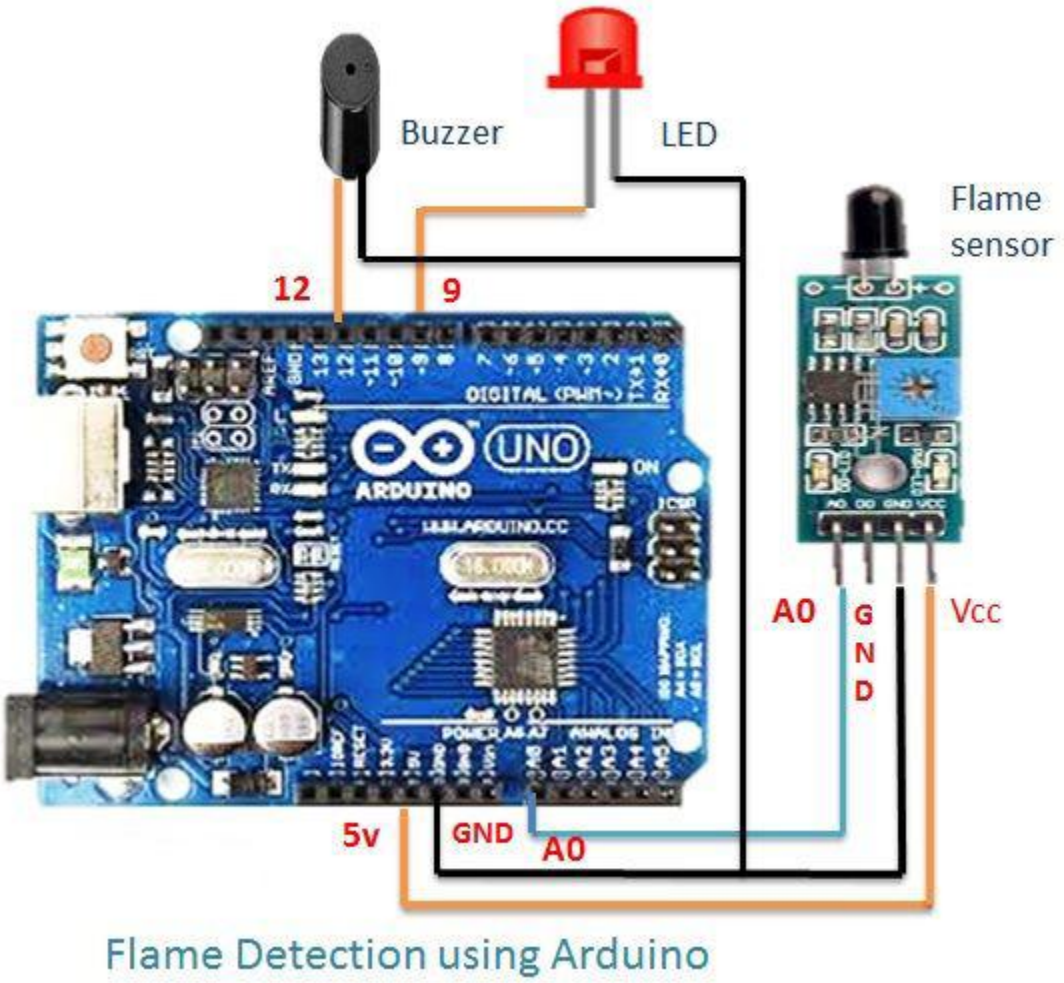
Working of flame sensor with arduino :

Arduino Uno is a open source microcontroller board based on ATmega328p microcontroller. It has 14 digital pins (out of which 6 pins can be used as PWM outputs), 6 analog inputs, on board voltage regulators etc. Arduino Uno has 32KB of flash memory, 2KB of SRAM and 1KB of EEPROM. It operates at the clock frequency of 16MHz. Arduino Uno supports Serial, I2C, SPI communication for communicating with other devices. The table below shows the technical specification of Arduino Uno.

The flame sensor detects the presence of fire or flame based on the Infrared (IR) wavelength emitted by the flame. It gives logic 1 as output if flame is detected, otherwise it gives logic 0 as output. Arduino Uno checks the logic level on the output pin of the sensor and performs further tasks such as activating the buzzer and LED.

CHAPTER TWO

2.1 Project diagram :



2.2 Project code :

```
const int ledpin=13; // ledpin,flamepin and buzpin are not changed throughout the process

const int flamepin=A2;

const int buzpin=11;

const int threshold=200;// sets threshold value for flame sensor

int flamesensvalue=0; // initialize flamesensor reading
```

```
void setup() {
Serial.begin(9600);
pinMode(ledpin,OUTPUT);
pinMode(flamepin,INPUT);
pinMode(buzpin,OUTPUT);
}
void loop() {
flamesensvalue=analogRead(flamepin); // reads analog data from flame sensor
if (flamesensvalue<=threshold) { // compares reading from flame sensor with the threshold value
digitalWrite(ledpin,HIGH); //turns on led and buzzer
tone(buzpin,100);
delay(1000); //stops program for 1 second
}
else{
digitalWrite(ledpin,LOW); //turns led off led and buzzer
noTone(buzpin);
}
}
```

CHAPTER THREE

3.1 USER INTERFACE :

Our user interface is a simple box made of paper which is light weighted and easy to use

3.2 HARDWARE INTERFACE :

Hardwares used are Arduino , buzzer , jumper wire , flame sensor and Led.

3.3 SOFTWARE INTERFACE :

Software used is arduino IDE.

CHAPTER FOUR

4.1 CONCLUSION :

We reached to the conclusion of making fire alarm system.

4.2 SCOPE FOR FUTURE WORK :

In future we can make advance fire security system which can have the potential to cover a long range like a whole office building or a whole house in order to prevent fire occurring .