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SRM INSTITUTE OF SCIENCE AND TECHNOLOGY
FACULTY OF ENGINEERING AND TECHNOLOGY
DEPARTMENT OF ELECTRICAL AND ELECTRONICS
18EES101J

ARDUINO FLAME SENSOR

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INTRODUCTION

Flame Sensors, Smoke Sensors, Fire Alarms etc. are part of a safety equipment that help us in keeping our homes, offices and stores safe from fire accidents.

Almost all modern houses, apartments, malls, cinema halls, theatres, office buildings and shops are equipped with such safety equipment and it is mandatory in some regions to fire safety devices.

Commercial fire safety devices are advanced with a lot of complex circuitry. If you want to implement a DIY Fire or Flame detection application, then this project might be helpful.

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COMPONENTS

1. An arduino and its adapter
2. Few jumper Wires
3. A fire sensor
4. A breadboard
5. A buzzer
6. A lighter

There are 3 pins on the digital sound sensor. They are :

1. **GND**-Ground pin
2. **VCC**-positive power pin
3. **DO**-digital output pin

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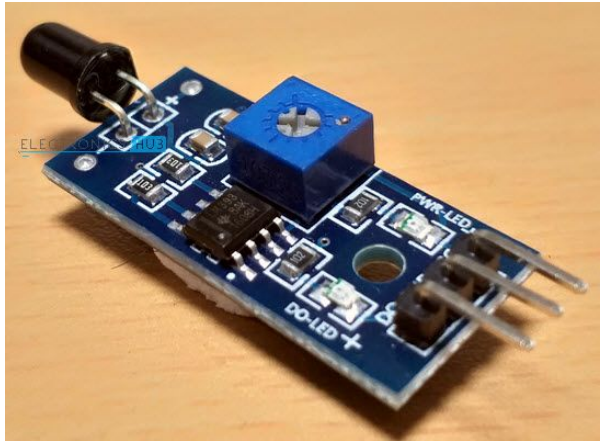
A Note on Flame Sensor

A Flame Sensor is a device that can be used to detect presence of a fire source or any other bright light sources. There are several ways to implement a Flame Sensor but the module used in this project is an Infrared Radiation Sensitive Sensor.

The following image shows an Infrared type Flame Sensor.



This particular flame sensor is based on YG1006 NPN Photo Transistor. The black object at the front of the module is this Photo Transistor.

The YG1006 PhotoTransistor looks like a black LED but it is a three terminal NPN Transistor, where the long lead is the Emitter and the shorter one is the collector (there is no base terminal as the light it detects will enable the flow of current).

This photo transistor is coated with black epoxy, making it sensitive to Infrared radiations and this particular Photo Transistor (YG1006) is sensitive to Infrared Radiation in the wavelength range of 760 nm to 1100 nm.

Using this particular type of Flame Sensor, you can detect Infrared Light up to a distance of 100 cm within its 60 degrees of detection angle.

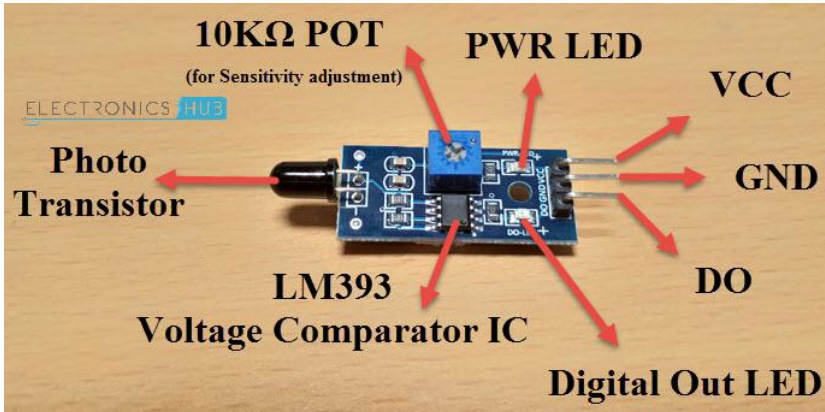
There are two types of implementations of Flame Sensors using YG1006 Photo Transistor: one is with both Analog Output and Digital Output while the other is with only the Digital Output.

Both these implementations require same components but the difference is that one module (the one with the Analog Output) provides the Sensor output as Analog Output.

The Flame Sensor that I am using in this project has only Digital Output.

Components of Flame Sensor Module

The following image shows all the components of a typical Flame Sensor Module.



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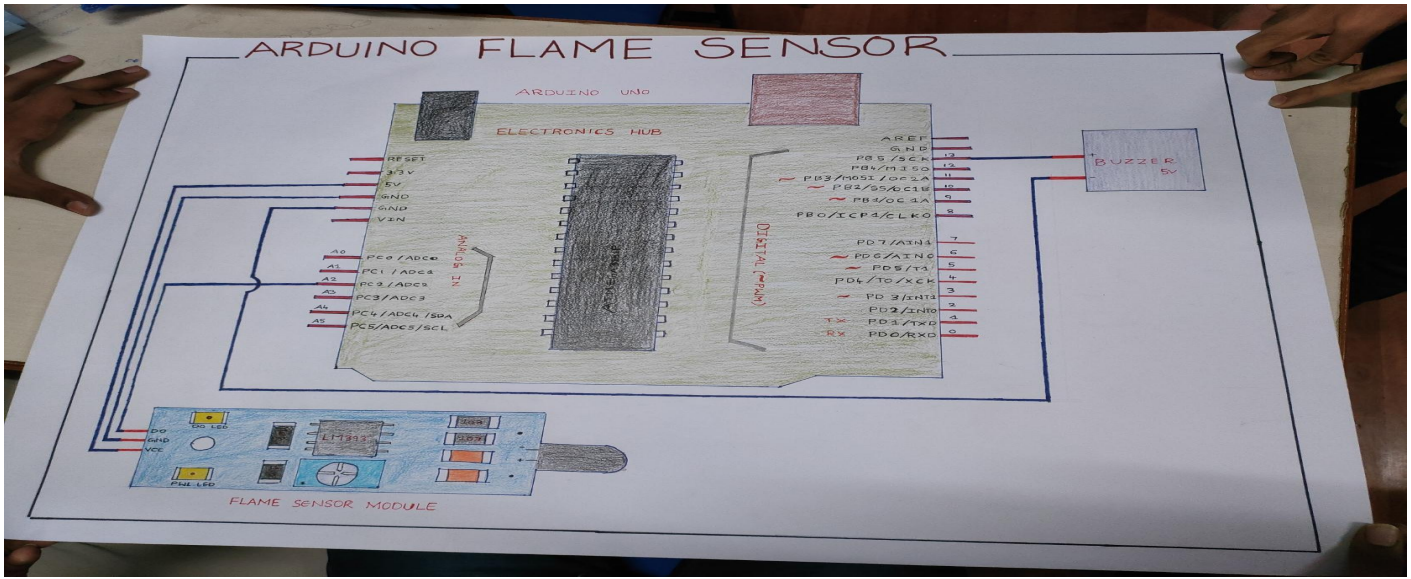
Circuit Diagram of Flame Sensor Module & Connections

If you want to know a little bit more about the Flame Sensor Module, then analyzing its circuit will probably help you. The following image shows the circuit diagram of a Flame Sensor.



There are two legs on a LED. The longer leg is positive and the shorter leg is negative. A buzzer has similar legs. The steps to setup hardware are listed below:

- Connect **"VCC" pin of the sensor** to 5V pin on the arduino.
- Connect **"GND" ground pin** to GND pin on the arduino.
- Connect **longer LED leg** to pin 13 on the arduino. If you want to use anyother pin on the arduino, you need to use a 220 ohm resistor.
- Connect **shorter LED leg** to GND pin on the arduino.
- FIx buzzer on the breadboard.
- Connect **longer buzzer leg** to pin 11(or any other pin) on the arduino.
- Connect **shorter buzzer leg** to GND pin on the arduino.

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Working

Make the necessary connections and upload the code to Arduino UNO. To test the functionality of the flame sensor, place a fired lighter or a match stick in front of the sensor.

Under normal conditions, the output from the Flame Sensor is HIGH. When the sensor detects any fire, its output becomes LOW.

Arduino detects this LOW signal on its input pin and activates the Buzzer.

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Applications

Flame Sensors are very important devices in detecting fire and they can be used in a variety of applications/areas like:

- Car or Automobile
- Fire Fighting Robots
- Garage Safety Equipment
- Warehouses

Code

The code of the Arduino Flame Sensor is very simple and is shown below.

```
const int flamepin=A2; //flamepin and buzpin are not changed throughout the process
const int buzpin=11;
const int threshold=200;// sets threshold value for flame sensor
int flamesensvalue=0; // initialize flame sensor reading
void setup() {
Serial.begin(9600);
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
tone(buzpin,100);//turns on buzzer
delay(1000); //stops program for 1 second
}
else{
noTone(buzpin);// don't turn on buzzer
}
}
```

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ARDUINO APPLICATION IS USED TO UPLOAD THE CODE INTO ARDUINO

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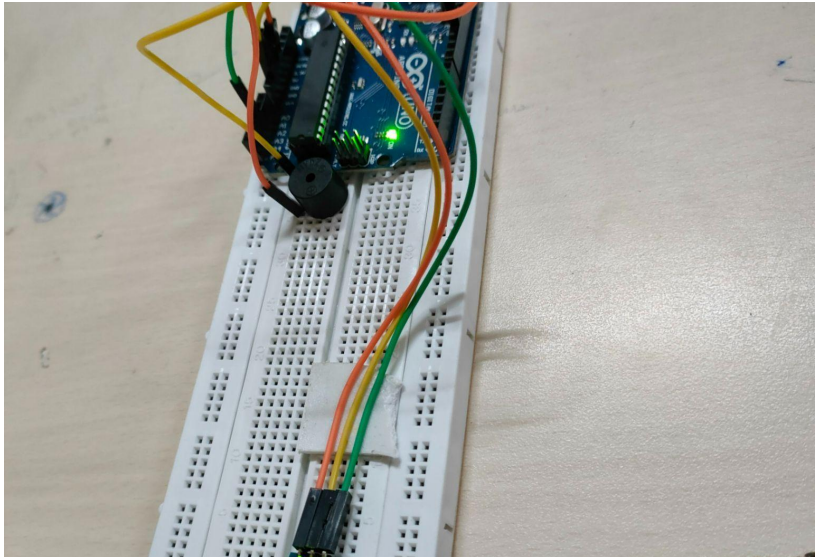

THANK YOU