Project Report: Fire Alarm System using Arduino and Flame Sensor

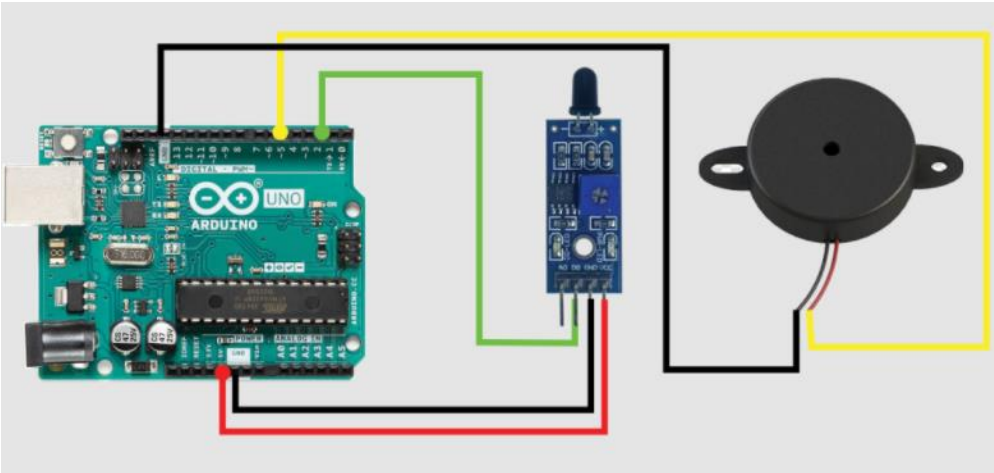
1. Introduction

A fire alarm system is designed to detect the presence of fire or smoke in an area and alert occupants to evacuate or take necessary precautions. The system utilizes a flame sensor to detect fire and activates a buzzer to raise an alarm, ensuring prompt action during emergencies.

2. Components Used

- **Arduino Uno**
- **Flame sensor module**
- **Buzzer**
- **Jumper wires**
- **Breadboard**
- **Power supply**

3. Circuit Diagram



4. Codes

```
// Define the flame sensor pin
const int flameSensorPin = 4;
// Define the buzzer pin
const int buzzerPin = 8;

void setup() {
  // Initialize Serial communication
  Serial.begin(9600);
  pinMode(flameSensorPin,INPUT);
  // Set the buzzer pin as an output
  pinMode(buzzerPin, OUTPUT);
}

void loop() {
  // Read the value from the flame sensor
  int sensorValue = digitalRead(flameSensorPin);

  // Print the sensor value to Serial monitor
  Serial.print("Flame sensor value: ");
  Serial.println(sensorValue);

  // Check if the sensor value crosses a certain threshold
  if (sensorValue == 0 ) { // You may need to adjust this threshold value
based on your sensor and environment
    // If flame is detected, trigger the alarm
    digitalWrite(buzzerPin, HIGH);
    Serial.println("Fire detected! Alarm activated!");
    delay(1000); // Delay for alarm sound
    digitalWrite(buzzerPin, LOW);
    delay(750);
  } else {
    // If no flame is detected, turn off the alarm
    digitalWrite(buzzerPin, LOW);
  }

  delay(500); // Adjust the delay as needed for your application
}
```

5. Result

The fire alarm system successfully detects the presence of fire using the flame sensor and triggers the buzzer to raise an alarm, alerting individuals in case of a fire emergency.

6. Advantages and Disadvantages

Advantages

- **Swift detection of fire or smoke for timely action.**
- **Low-cost solution for basic fire detection needs.**
- **Simple setup and implementation for immediate use.**

Disadvantages

- **Limited range of detection based on the sensor's sensitivity.**
- **Potential false alarms due to environmental factors like dust or sudden light changes.**

7. Future Scope and Applications

Future Scope

- **Integration with IoT for remote monitoring and alerts.**
- **Incorporation of additional sensors for enhanced fire detection accuracy.**
- **Development of a more comprehensive fire safety system for commercial or industrial applications.**

Applications

- **Home safety to alert occupants in case of a fire outbreak.**
- **Small office or shop setups for basic fire detection and warning.**
- **Temporary installations in events or construction sites to ensure fire safety measures.**
