Fire Alaram System Using Arduino Board

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Abstract- *This project presents a simple and efficient fire alarm system using Arduino. The system utilizes a flame sensor to detect fires and triggers an alarm when a fire is detected. The system consists of a flame sensor, Arduino board, buzzer, and LED indicators. When the flame sensor detects a fire, it sends a signal to the Arduino board, which then activates the buzzer and LED indicators to alert people in the vicinity. The system is designed to provide early warning in case of a fire, allowing people to evacuate the area and take necessary actions to prevent damage. This project demonstrates the potential of Arduino-based systems in fire safety applications.*

Keywords- Fire Alarm, Arduino Uno, IR Flame Sensor, Buzzer, Jumper wire, BreadBoard, Led

I. INTRODUCTION

Fire-related incidents continue to pose serious threats to life and property. An efficient and timely fire detection system can minimize damage and save lives. This paper introduces a fire alarm system based on Arduino microcontroller technology, providing a scalable, affordable, and customizable solution. The system is designed to monitor environmental parameters, detect fire presence using a flame sensor, and alert users via a buzzer and LED.

II. METHODOLOGY

To build a fire alarm system you'll need a Arduino UNO R4/R3 Board ,IR falme sensor ,jumper wire,buzzer, LED,Type C USB cable. The methodology involves hardware assembly ,software development for Arduino and securing a components correctly,and testing for functionality

Hardware Components related information:

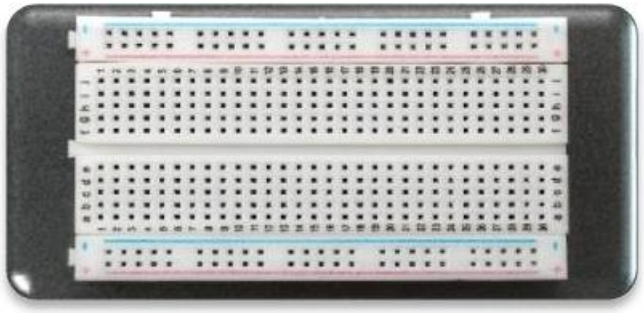
Arduino UNO- - Arduino uno is a popular microcontroller board used in fire alarm system due to its reliability, Flexibility,and cost-effect

IR Flame sensor- The IR flame sensor is a type of sensor used to detect flames or fires by sensing the infrared radiation emitted by the flame

Buzzer- A buzzer is a crucial component of a fire alarm system,providing an audible alert to ocuupants in the event of a fire.

Jumper Wires-jumper wires are used for making connections between items on your breadboard and your Arduino's header pins

BreadBoard-A BreadBroad is simply for prototyping or building circuits on



Led- led are commonly used in fire alarm system to provide a visual indication of a fire

IV. WORKING PRINCIPLE

The flame sensor detects infrared radiation emitted by flames and sends a signal to the Arduino. The Arduino continuously monitors the sensor's output.

If the sensor detects a fire, the Arduino processes the input and triggers the buzzer to alert the users. It uses C++ coding language.

V. RESULTS

The system successfully detects flame presence and triggers alerts. It is reliable under controlled test conditions, providing both auditory and visual warnings. While simple, the project is highly expandable—future iterations could include Wi-Fi/Bluetooth modules for remote alerting or data logging.

VI. CONCLUSION

The Arduino-based fire alarm system is a low-cost, efficient, and scalable solution for basic fire detection. Its open-source design and readily available components make it ideal for implementation in educational and small-scale safety applications. Integration with advanced systems like Raspberry Pi could further enhance functionality, including IoT-based alert systems.

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