

SMART FIRE DETECTION

Overview

The objective of the Smart Fire Detection System project is to design and implement an advanced fire detection system using sensors, microcontrollers, and wireless communication. The system aims to quickly and accurately detect fire hazards by monitoring smoke, temperature, and gas levels through sensors. Upon detecting abnormal conditions, the sensors send signals to the microcontroller, which processes the data and triggers alarms or notifications. The system can also send real-time alerts to users and emergency services via mobile applications, ensuring faster responses. The goal is to enhance safety, minimize property damage, reduce false alarms, and ensure timely intervention in fire emergencies.

Components Required to build a Smart Fire Detection

CH32V003x Board (VSD Squadron Mini RISCv Board)

- IR Sensor
- LED
- buzzer
- Jumper Cables

Circuit Connection for a Smart Fire Detection

The Fire Detection System consists of the following components connected to the VSD microcontroller:

1. IR Sensor:

- The IR sensor has three main pins: VCC, GND, and OUT.
- **VCC** is connected to the 5V pin of the microcontroller.
- **GND** is connected to the GND pin of the microcontroller.
- **OUT** is connected to a GPIO input pin of the microcontroller (PA0) to detect fire.
- The sensor outputs LOW when fire is detected, and HIGH otherwise.

2. LED Indicator:

- The LED is connected to a GPIO output pin (PC13) of the microcontroller.
- The anode (+) of the LED is connected to the GPIO pin, and the cathode (-) is connected to GND.
- When fire is detected, the microcontroller outputs HIGH on this pin, turning the LED ON.

3. Buzzer:

- The buzzer is connected to another GPIO output pin (PB1) of the microcontroller.
- The positive terminal of the buzzer is connected to the GPIO pin, and the negative terminal is connected to GND.
- When fire is detected, the microcontroller outputs HIGH on this pin, activating the buzzer.

Working Principle:

1. Fire Detection:

- The IR sensor detects infrared radiation emitted by flames.
- When fire is detected, the sensor outputs a LOW signal.

2. Microcontroller Response:

- Upon receiving a LOW signal from the IR sensor, the microcontroller sets the LED and buzzer pins to HIGH.
- This turns ON both the LED and buzzer, providing a visual and audible alert.

3. No Fire Condition:

- If no fire is detected, the IR sensor outputs HIGH.
- The microcontroller keeps both the LED and buzzer pins LOW, turning them OFF.

Pinout Diagram for an Fire detection

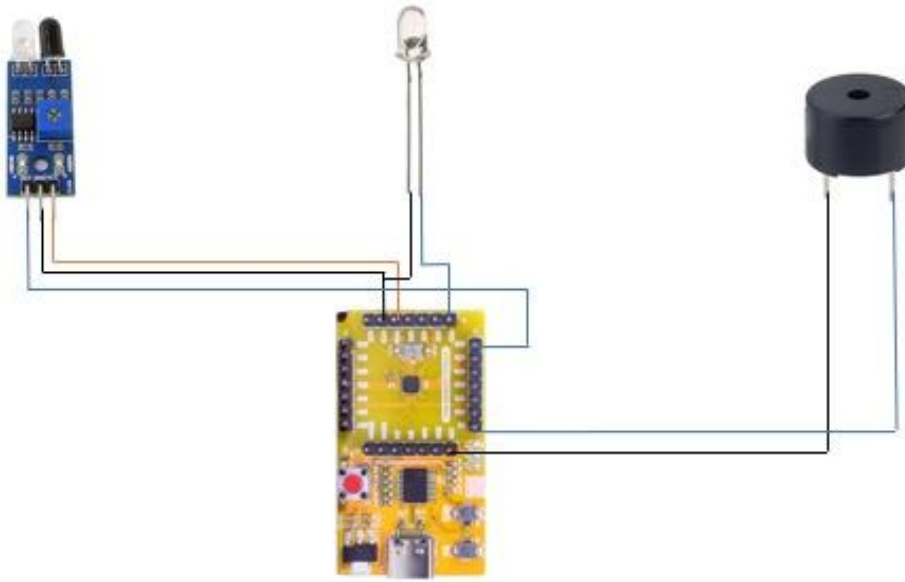


Table for Pin connection:

LED	CH32V003x
Anode	PD6
Cathod	GND

Buzzer	CH32V003x
Positive	PD1
Negative	GND

IR Sensor	CH32V003x
VCC	3.3V
GND	GND
Out	PD5

