Gas Leakage Detection System

Gas leaks can be extremely dangerous, posing serious health and safety risks in both residential and industrial settings. To address this critical issue, we've developed a comprehensive gas leakage detection system using the highly sensitive MQ-2 gas sensor. This system is designed to quickly identify the presence of combustible gases like LPG and methane, triggering immediate alerts to ensure the safety of occupants and mitigate potential disasters.

Overview of the MQ-2 Gas Sensor

1 High Sensitivity

The MQ-2 sensor can detect a wide range of flammable gases, including LPG, propane, methane, hydrogen, and smoke, with a high degree of precision.

2 Wide Detection Range

The sensor can measure gas concentrations from 300 to 10,000 ppm, making it suitable for both residential and industrial applications.

3 Fast Response Time

The MQ-2 sensor can rapidly detect the presence of gas, typically within 10 seconds, allowing for quick emergency response.

Arduino Microcontroller Integration

Analog Input

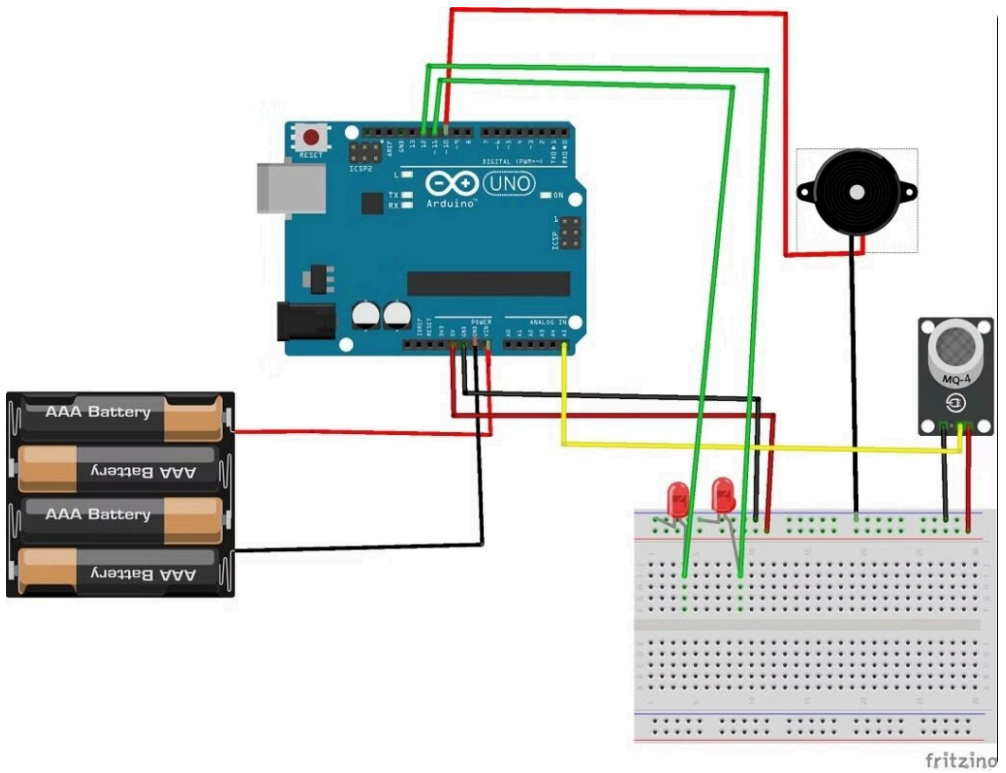
The MQ-2 sensor provides an analog output signal that can be directly connected to the analog input pin of an Arduino microcontroller.

Digital I/O

The Arduino can be programmed to monitor the sensor's output and trigger digital outputs, such as a buzzer or LED, to alert users of a gas leak.

Serial Communication

The Arduino can also be used to transmit sensor data to a central monitoring system or a mobile application for remote tracking and notifications.



Simulation & Arduino code

```
const int gasSensorPin = A0;
const int buzzerPin = 8;
const int ledPin = 9;
const int gasThreshold = 300;

void setup() {
  pinMode(gasSensorPin, INPUT);
  pinMode(buzzerPin, OUTPUT);
  pinMode(ledPin, OUTPUT);
  Serial.begin(9600);
}

void loop() {
  int gasLevel = analogRead(gasSensorPin);
  Serial.print("Gas Level: ");
  Serial.println(gasLevel);

  if (gasLevel > gasThreshold) {
    digitalWrite(buzzerPin, HIGH);
    digitalWrite(ledPin, HIGH);
    Serial.println("Gas leak detected! Warning alert
triggered.");
  } else {
    digitalWrite(buzzerPin, LOW);
    digitalWrite(ledPin, LOW);
  }

  delay(500);
}
```

Threshold-based Alert Triggering

1

Gas Concentration Monitoring

The Arduino continuously monitors the analog output of the MQ-2 sensor, which corresponds to the detected gas concentration.

2

Threshold Comparison

The system compares the measured gas concentration to a pre-set threshold value, which can be adjusted based on the specific application and safety requirements.

3

Alert Activation

When the gas concentration exceeds the threshold, the Arduino triggers the buzzer and LED to immediately alert users of the gas leak, allowing for prompt action and evacuation if necessary.

Project Model