**Project Report: Gas Detection System using Arduino and MQ-2 Sensor**

1. Introduction:

The Gas Detection System presented in this project employs an Arduino microcontroller in conjunction with the MQ-2 gas sensor to monitor the concentration of various gases in the surrounding environment. The system includes LED indicators that offer visual feedback based on the gas concentration detected by the sensor.

2. Components Used:

- Arduino Board

- MQ-2 Gas Sensor

- LED addon board

- Arduino Kit

3. Wiring Instructions:

Connect the components as follows:

- MQ-2 Sensor:

- VCC to Arduino 5V

- GND to Arduino GND

- AOUT to Arduino A3

- DOUT (optional) not used in this project

- LEDs:

- LED 1: Connect to Arduino pin 2

- LED 2: Connect to Arduino pin 3

- LED 3: Connect to Arduino pin 4

- LED 4: Connect to Arduino pin 5

4. Working Principle:`

The MQ-2 gas sensor provides an analog voltage output that varies based on the concentration of gases such as methane, propane, carbon monoxide, and others. The Arduino reads this analog value from pin A3, maps it to a range of 0-100 using the `map` function, and activates the LEDs based on specific threshold values.

- LED 1: Turns on when gas concentration is 25 or above

- LED 2: Turns on when gas concentration is 50 or above

- LED 3: Turns on when gas concentration is 75 or above

- LED 4: Turns on when gas concentration is 100

**5. Arduino Code:**

// Include necessary libraries

const int sensorPin = A3;

const int led1Pin = 2;

const int led2Pin = 3;

const int led3Pin = 4;

const int led4Pin = 5;

void setup() {

pinMode(led1Pin, OUTPUT);

pinMode(led2Pin, OUTPUT);

pinMode(led3Pin, OUTPUT);

pinMode(led4Pin, OUTPUT);

}

void loop() {

// Read analog sensor value

int sensorValue = analogRead(sensorPin);

// Map the sensor value to a range of 0-100

int mappedValue = map(sensorValue, 0, 1023, 0, 100);

// Turn on LEDs based on threshold values

digitalWrite(led1Pin, mappedValue >= 25);

digitalWrite(led2Pin, mappedValue >= 50);

digitalWrite(led3Pin, mappedValue >= 75);

digitalWrite(led4Pin, mappedValue == 100);

}

**6. Conclusion:**

The Gas Detection System utilizing the MQ-2 sensor and Arduino offers a versatile solution for monitoring various gases. This project can be extended for applications such as gas leakage detection in homes or industrial environments. Ensure proper calibration of the MQ-2 sensor for accurate and reliable results.