Department of AI and DS/AI and ML

Saveetha Engineering college, Chennai

_____

Project Title : Gas-Alcohol Monitoring Using Arduino

Student's first and last name with roll number

Ms. Sowmiya N, 212221230106

Ms. Aashima Nazreen S, 212221240002

Ms. Anitha P, 212221240004

Ms. Vaishnavi M, 212221240058

Ms. Evangelin S, 212221230025

_____

Department of AI and DS/AI and ML

Saveetha Engineering College , Chennai

December 21, 2022

Declaration

This report has been prepared on the basis of my own work. Where other published and
unpublished source materials have been used, these have been acknowledged.

Word Count: 1707

Student Name:

- Sowmiya N - 212221230106
- Aashima Nazreen S - 212221240002
- Anitha P - 212221240004
- Vaishnavi M - 212221240058
- Evangelin S - 212221240025

Date of Submission: 15/12/2022

Signature:

Table of Contents

Abstract:

The purpose of this project is to design a flammable gas – CO – and alcohol detecting hardware using Arduino UNO and MQ9, MQ3 sensors. The aim of this project is to detect the presence of such CO, Methane gases in the environment or to check the alcohol concentration in a drunk person.

Project Specification

- **Controller used:**
  Arduino UNO

- **Software used:**
  Arduino IDE 2.0

- **Hardware used :**
  MQ9 sensor, MQ3 sensor, Active Buzzer, Jumper wires.

Chapter 1: **Introduction**

The project focusses on designing a hardware to detect flammable gas concentration and alcohol concentration. This involves the usage of Arduino UNO connected with MQ9 and MQ3 sensors and a buzzer. The MQ9 sensor is responsible for detecting Carbon Monoxide, Methane, Propane, and any other flammable gases, and the MQ3 sensor is used to detect Alcohol, Benzine, CH4, Hexane, LPG and also for gas leakage detection.

Chapter 2: **COMPONENTS**

2.1 ARDUINO

The Arduino UNO is a standard board of Arduino. Here UNO means 'one' in Italian. It was named as UNO to label the first release of Arduino Software. It was also the first USB board released by Arduino. It is considered as the powerful board used in various projects. Arduino.cc developed the Arduino UNO board.

The technical specifications of the Arduino UNO are listed below:

- There are 20 Input/Output pins present on the Arduino UNO board. These 20 pis include 6 PWM pins, 6 analog pins, and 8 digital I/O pins.
- The PWM pins are Pulse Width Modulation capable pins.
- The crystal oscillator present in Arduino UNO comes with a frequency of 16MHz.
- It also has a Arduino integrated WiFi module. Such Arduino UNO board is based on the Integrated WiFi ESP8266 Module and ATmega328P microcontroller.
- The input voltage of the UNO board varies from 7V to 20V.
- Arduino UNO automatically draws power from the external power supply. It can also draw power from the USB.

2.2 MQ9 SENSOR

MQ-9 gas sensor using gas-sensitive materials with lower conductivity in clean air tin oxide (SnO2). MQ-9 Module can be used to sense Carbon Monoxide and Methane Gas. High and low-temperature cryogenic loop detection mode to detect carbon monoxide sensor conductivity increases with the increase in the concentration of carbon monoxide gas in the air, high-temperature detection of combustible gases methane, propane and cryogenic cleaning adsorption of stray gas.

MQ-9 high sensitivity to carbon monoxide, methane, liquefied gas sensor, this sensor can detect a variety of carbon monoxide and the flammable gas is suitable for a variety of applications.

Features:

- Have better sensitivity to Carbon Monoxide, Methane, and LPG Gas.
- High-quality dual-panel design, with power indicator and TTL signal output instructions.
- DO switching signal (TTL) output and AO analog signal output.
- TTL output valid signal is low.
- Analog output voltage: the higher concentration, the higher voltage.

2.3 MQ3 SENSOR

MQ-3 module is suitable for detecting Alcohol, Benzine, CH4, Hexane, LPG, CO. Sensitive material of MQ-3 gas sensor is SnO2, which with lower conductivity in clean air. When the target alcohol gas exist, the sensor's conductivity is more higher along with the gas concentration rising. MQ-3 gas sensor has high sensitity to Alcohol, and has good resistance to disturb of gasoline, smoke and vapor.

This sensor provides an analog resistive output based on alcohol concentration. When the alcohol gas exist, the sensor's conductivity gets higher along with the gas concentration rising.

Features:

- Sensor Type - Semiconductor
- Easy SIP header interface
- Compatible with most of the microcontrollers
- Good sensitivity to alcohol gas
- Fast response and High sensitivity

2.4 ACTIVE BUZZER MODULE

An Active Buzzer Alarm Module for Arduino is an audio signaling device, which may be mechanical, electromechanical, or piezoelectric. Just like what you are viewing now, it is 3.3V-5V DC Electronic Part Active Buzzer Module. Using top quality material, it is durable in use.

An active buzzer rings out as long as it is electrified. Compared with a passive buzzer, it is a bit expensive but easier to control. Typical uses of buzzers include alarm devices, timers, and confirmation of user input such as a mouse click or keystroke.

Features:

- An active buzzer with a concussion internal source- so long as it will be called an energized
- Program easy to control- SCM can let a high-low sound- while passive buzzer did not.
- Transistor drive module uses 8550
- With fixed bolt hole- easy installation- 2.6mm aperture.
- Operating voltage 3.3V-5V

Chapter 3: **PIN CONFIGURATION**

3.1 MQ9 SENSOR

Pin Name	Description
VCC	This pin powers the module, typically the operating voltage is +5V
GND	Used to connect the module to system ground
Digital Out (DO)	You can also use this sensor to get digital output from this pin, by setting a threshold value using the potentiometer
Analog Out (AO)	This pin outputs 0-5V analog voltage based on the intensity of the gas

3.2 MQ3 SENSOR

Pin Name	Description
VCC	This pin powers the module, typically the operating voltage is +5V
GND	Used to connect the module to system ground
Digital Out (DO)	You can also use this sensor to get digital output from this pin, by setting a threshold value using the potentiometer
Analog Out (AO)	This pin outputs 0-5V analog voltage based on the intensity of the gas

3.3 ARDUINO UNO
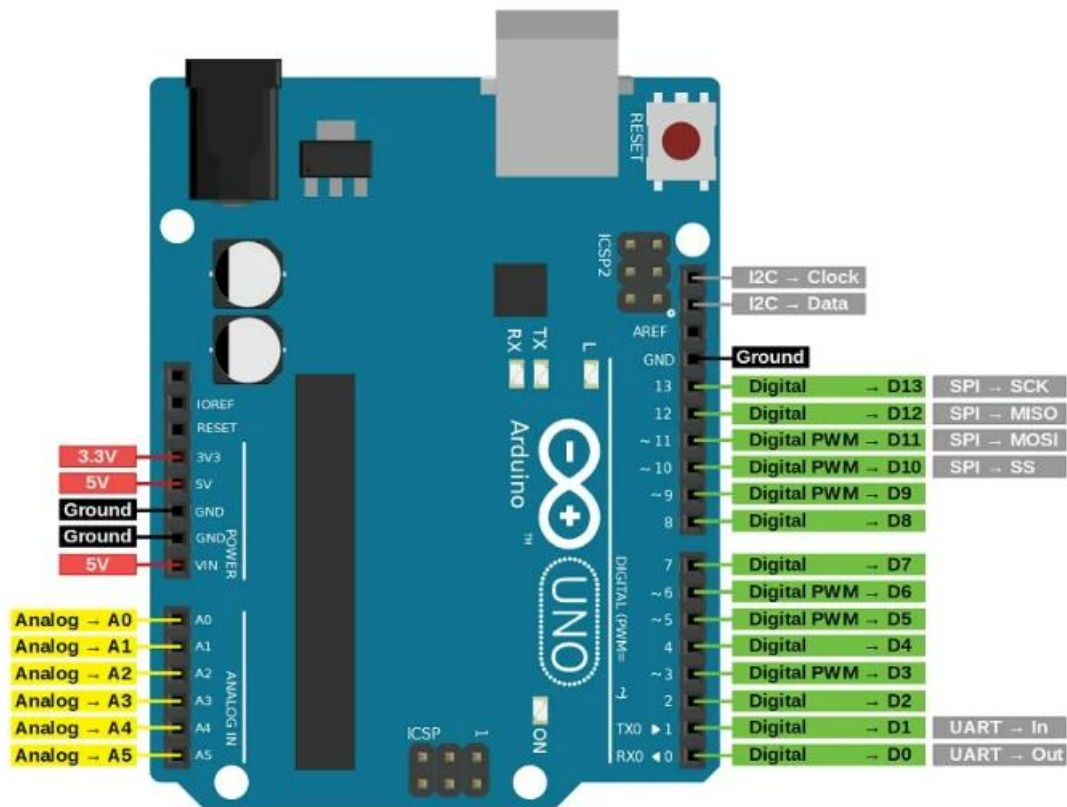
Vin: This is the input voltage pin of the Arduino board used to provide input supply from an external power source.

5V: This pin of the Arduino board is used as a regulated power supply voltage and it is used to give supply to the board as well as onboard components.

3.3V: This pin of the board is used to provide a supply of 3.3V which is generated from a voltage regulator on the board

GND: This pin of the board is used to ground the Arduino board.

Reset: This pin of the board is used to reset the microcontroller. It is used to Resets the microcontroller.

Analog Pins: The pins A0 to A5 are used as an analog input and it is in the range of 0-5V.

Digital Pins: The pins 0 to 13 are used as a digital input or output for the Arduino board.

Serial Pins: These pins are also known as a UART pin. It is used for communication between the Arduino board and a computer or other devices. The transmitter pin number 1 and receiver pin number 0 is used to transmit and receive the data resp.

External Interrupt Pins: This pin of the Arduino board is used to produce the External interrupt and it is done by pin numbers 2 and 3.

PWM Pins: This pins of the board is used to convert the digital signal into an analog by varying the width of the Pulse. The pin numbers 3,5,6,9,10 and 11 are used as a PWM pin.

SPI Pins: This is the Serial Peripheral Interface pin, it is used to maintain SPI communication with the help of the SPI library. SPI pins include:

SS: Pin number 10 is used as a Slave Select

MOSI: Pin number 11 is used as a Master Out Slave In

MISO: Pin number 12 is used as a Master In Slave Out

SCK: Pin number 13 is used as a Serial Clock

LED Pin: The board has an inbuilt LED using digital pin-13. The LED glows only when the digital pin becomes high.

AREF Pin: This is an analog reference pin of the Arduino board. It is used to provide a reference voltage from an external power supply.
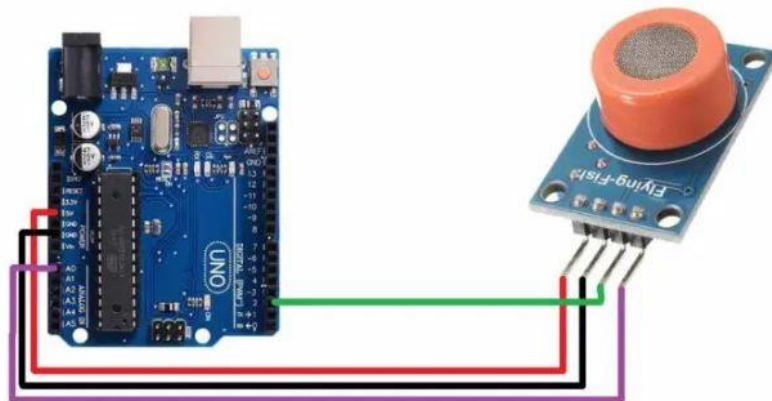
Chapter 4:   **CONNECTIONS**

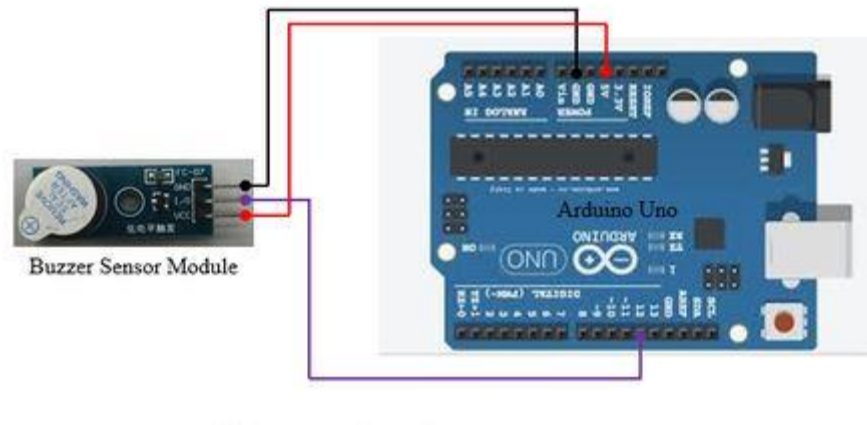**4.1 CONNECTION OF MQ9 SENSOR WITH ARDUINO**
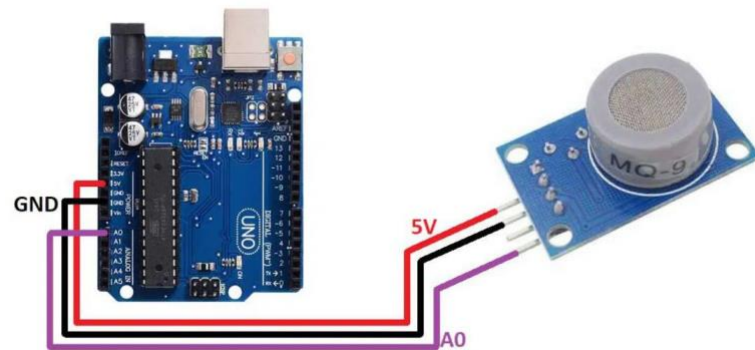
- Connect the VCC pin of the sensor to the 5V pin of the Arduino UNO.
- Connect the GND pin of the sensor to the GND pin of the Arduino UNO.
- The next pin is the digital output pin. From the pin we get the digital data HIGH/LOW
- The fourth analog output pin of the sensor is attached to the analog input of the Arduino UNO.

4.2 CONNECTION OF MQ3 SENSOR WITH ARDUINO

- Connect the VCC pin of the sensor to the 5v pin of the Arduino UNO.
- Connect the GND pin of the sensor to the GND pin of the Arduino UNO.
- Connect the A0 pin of the sensor to the A0 pin of the Arduino UNO.
- Connect the D0 pin of the sensor to the D2 pin of the Arduino UNO.

4.3 CONNECTION OF BUZZER WITH ARDUINO

Buzzer Sensor Module

- Connect the VCC pin of the buzzer to the 5V pin of the Arduino UNO.
- Connect the I/O pin of the buzzer to the 12th pin of the Arduino UNO.
- Connect the GND pin of the buzzer to the GND pin of the Arduino UNO.

Chapter 5: **WORKING**

5.1 SOURCE CODE

```
int sensorPin=A0;

#define MQ3pin 1


float sensorValue;  //variable to store sensor value

int sensorData;

void setup()

{

  Serial.begin(9600);

  pinMode(sensorPin,INPUT);

  Serial.println("MQ3 warming up!");

        delay(5000); // allow the MQ3 to warm up


 }

void loop()

{

  sensorData = analogRead(sensorPin);

sensorValue = analogRead(MQ3pin); // read analog input pin 0

        Serial.print("MQ3: ");

        Serial.println(sensorData);

  Serial.print("Mq:");

  Serial.println(sensorValue);

        delay(2000);

}
```
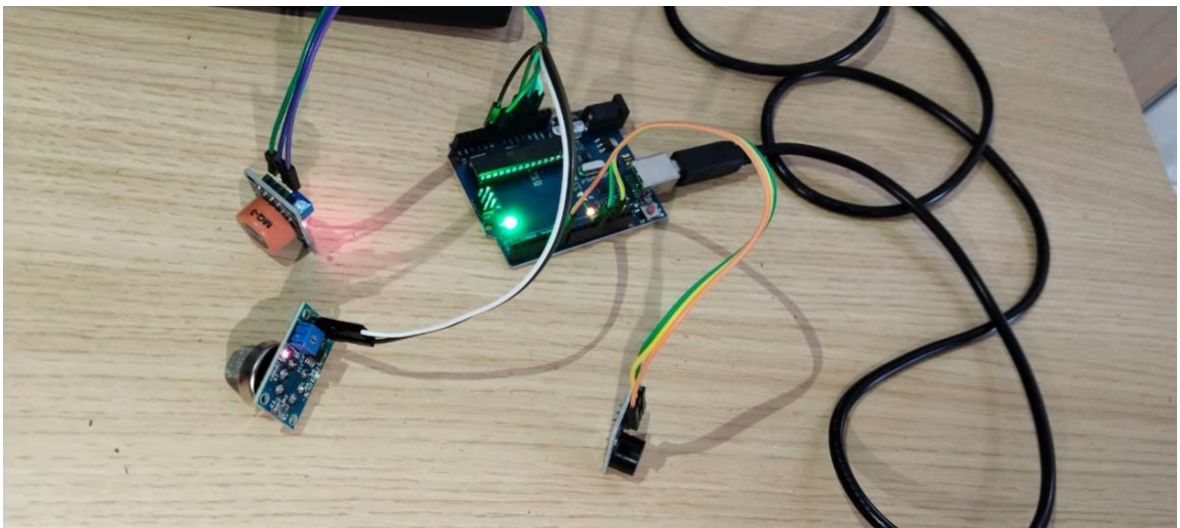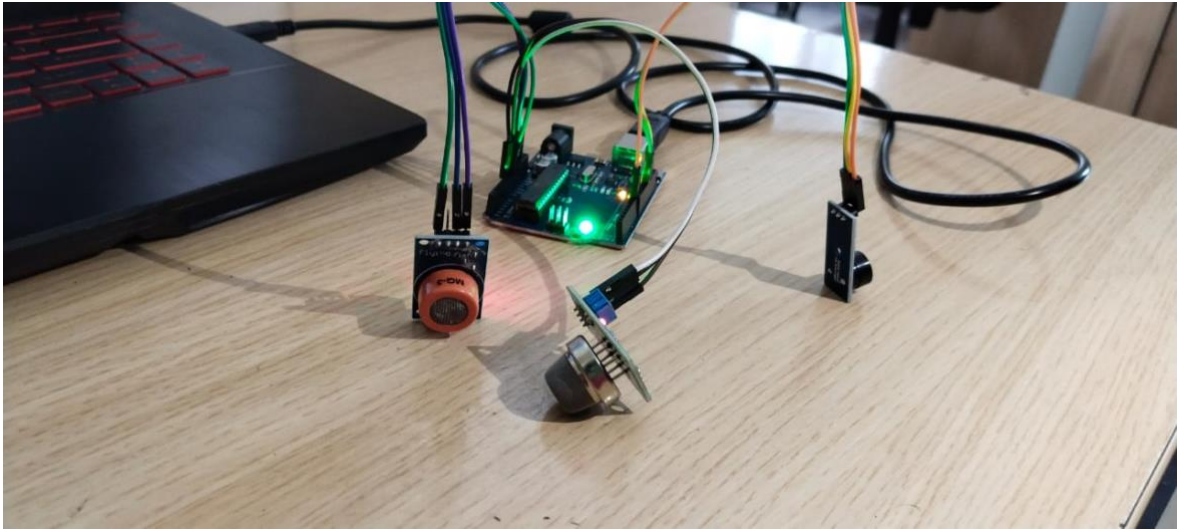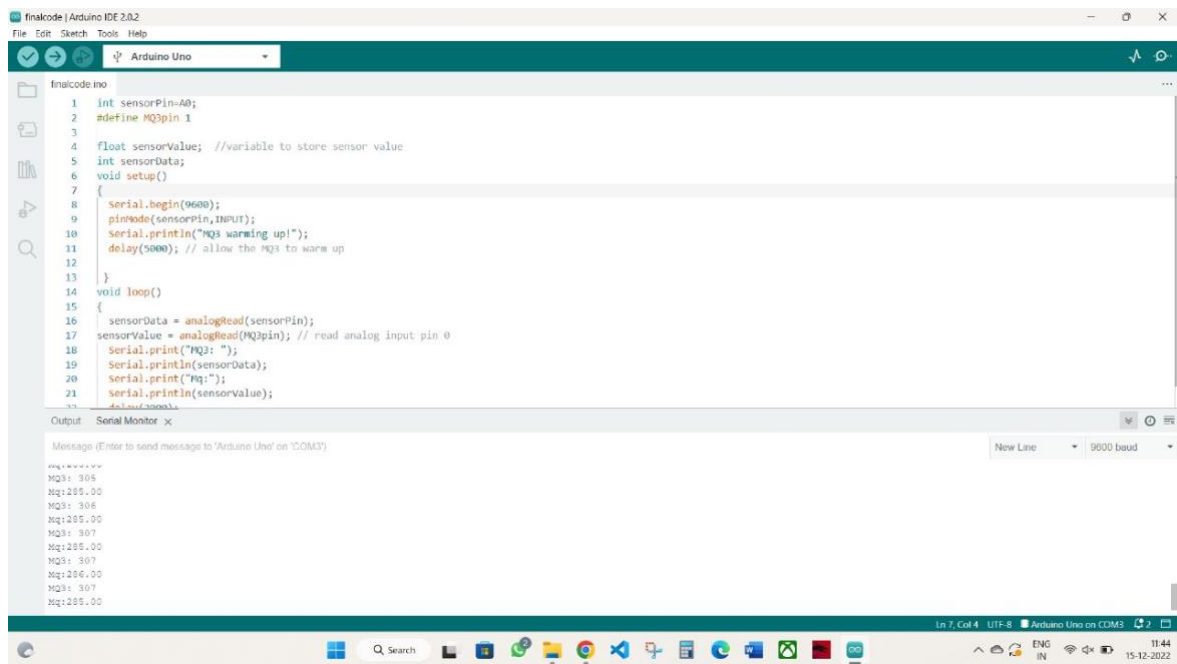
5.2 OUTPUT

Project Title

WORKING VIDEO

https://drive.google.com/file/d/1PsApb6w0Z2GlIJGh3t_xwMLgbhg4KjG7/view?usp=sharing

REFERENCES

https://lastminuteengineers.com/mq3-alcohol-sensor-arduino-tutorial/#:~:text=Let%20us%20connect%20the%20MQ3,following%20image%20shows%20the%20wiring.

https://components101.com/sensors/mq-3-alcohol-gas-sensor

https://www.flyrobo.in/mq-9-carbon-monoxide-andmethane-and-lpg-gas-sensor-module