GNANAMANI COLLEGE OF TECHNOLOGY

Department: BIO MEDICAL ENGINEERING

Year: THIRD YEAR

TOPIC – AIR QUALITY MONITORING

Team members

1.KALIDASS.P

2.KUMARAGURU.M

3.LAWRANCE.N

4.MAHESH.R

5.MANOJKUMAR.S

6.MARIARAJ.G

AIR QUALITY MONITORING

INTRODUCTION:

Air pollution has become a common phenomenon everywhere. Specially In the urban areas. Air pollution is a real-life problem. A lot of people get sick only due to air pollution. In the urban areas. The increased number of petrol and diesel vehicles and the presence of industrial areas on the outskirts of the major cities are the main causes of air pollution. The problem is seriously intensified in the metropolitan cities. Also, climate change is now apparent. Governments all around the world are taking every measure in their capacity. Many European countries have aimed to replace petrol and diesel vehicles with electric vehicles by 2030. Even Indian has aimed to do so by 2025. The use of coal for electricity generation is now going to be a thing of the past. It is now important to monitor air pollution in real time in most urban areas. The air pollution monitoring device developed in this project is based Arduino UNO.

CIRCUIT CONNECTION:

The air pollution monitoring device is built by assembling the following components. Arduino based real time air pollution monitoring IOT device circuit connections.

ARDUINO UNO:

Arduino UNO is one of the most popular prototyping boards. It is small in size and packet with rich features. The board comes with a built-in Arduino boot loader. In IOT device 9 pins of the board are utilized. There are six pins used to interface the character LCD. There are two points utilized to interface the ESP8266 wi-fi module and an analog input pin is used to connect with MQ-135 sensor.

16x2 CHARACTER LCD:

The 16x2 LCD display is used to monitor the sensor values read by the Arduino board the MQ-135. The circuit connections of the character LCD with the Arduino board are summarized in the following table.

ESP8266 WIFI MODULE:

The ESP8266 wi-fi module is used to connect with any available internet hotspot and transfer sensor data to thing speak platform via wi-fi. The module comes available in two models ESP-01 and ESP-12. ESP-12 has 16 pins available for interfacing while ESP-01 has only 8 pins available for use. The Arduino boards respectively into 10 or 11 configured to serial receiver and transmitter through software serial function.

MQ-135 SENSOR:

MQ-135 is a gas sensor which is used to measure the concentration of combustible gases. The sensor can detect the concentration of combustible gases in the range from 100 PPM to 1000 PPM.

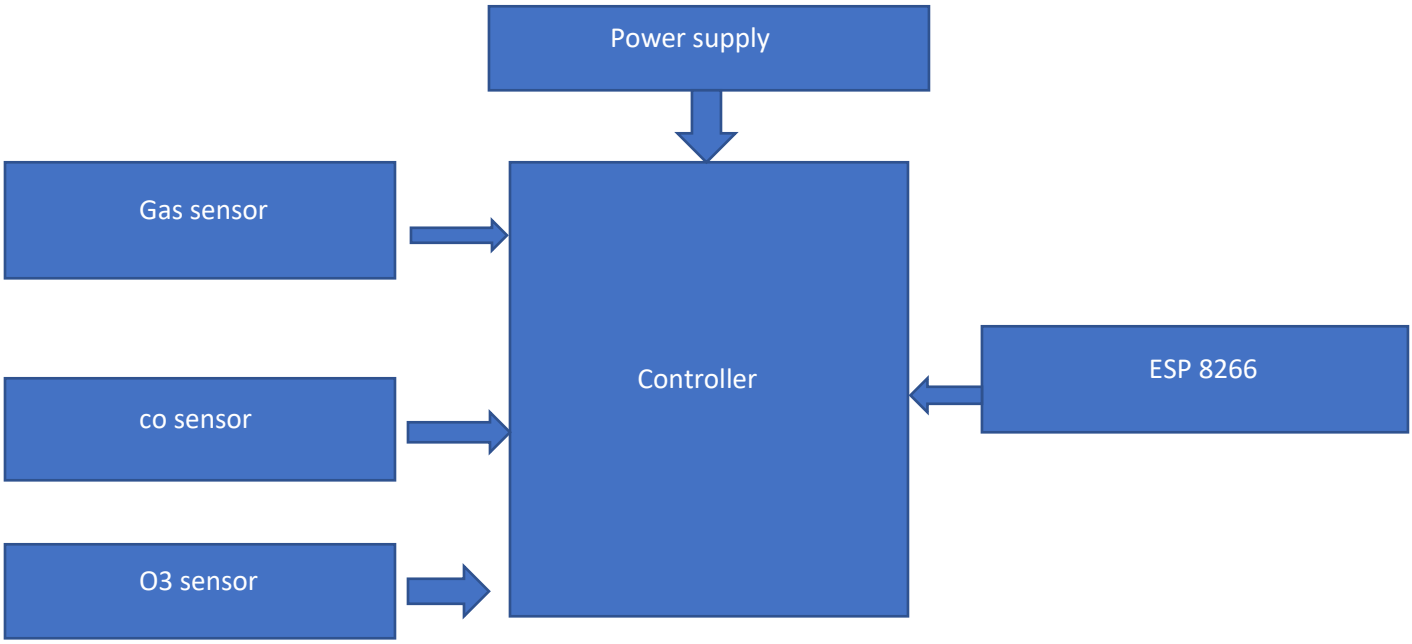
SENSITIVITY CURVE OF MQ-135 SENSOR:

From the sensitivity curve of the sensor, it can be seen that the resistance of the sensor decreases as the concentration of the target gas is increased in PPM while for clean air its resistance remains constant.

POWER SAPPLY;

The Arduino board and the WI-FI module require 3.3v while LCD and MQ-135 sensor need 5v DC for their operation. The Arduino can be powered by connecting it to a USB connection.

DESIGN OF THE SYSTEM:



CIRCUIT WORKING:

The device developed in this project can be installed near only wi-fi hotspot in a populated urban areas.

- AT
- AT+GMR
- AT+CWMODE=3
- AT+RST
- AT+CIPMUX=1

PROGRAMMING:

The program code is intended to be loaded on an Arduino UNO. This completes the Arduino sketch for Arduino based IOT air quality monitoring IOT project. The complete code from the code section.