IoT based Air Pollution Monitoring System

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Introduction:

In most of the developed and developing countries, the air pollution and airborne particulate matter (PM) such as PM10, PM2.5 and PM1 has increased rapidly in the last few decades[1]. PM Concentration and increase in air pollutants has not only degraded the air quality but also has brought many health hazards problems by inhaling these small particulates. Therefore it is necessary to have a portable and cost-effective solution for monitoring the air pollutants, air quality index along with its PM Concentration at certain atmospheric condition

According to a survey, due to air pollution 50,000 to 100,000 premature deaths per year occur in the U.S. alone. Whereas in EU number reaches to 300,000 and over 3,000,000 worldwide [2].

IOT Based Air Pollution Observing System screens the Air quality over a web server utilizing Internet and will trigger an alert at the point when the air quality goes down past a certain limit level.

Block Diagram[3]:
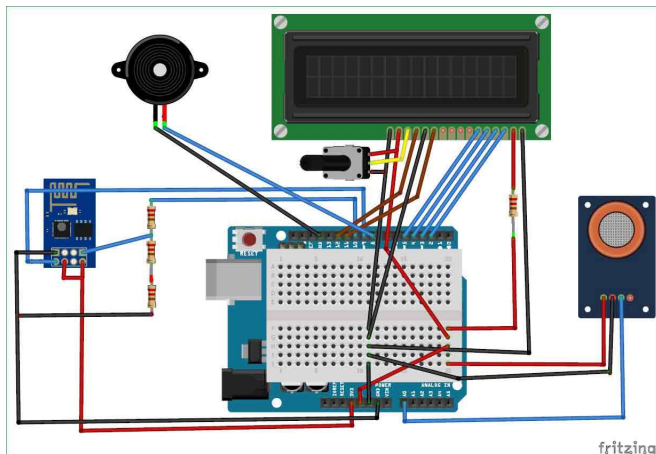
Hardware Requirement:

1) MQ135 Gas sensor

 2) Arduino Uno

3) Wi-Fi module ESP8266

 4) 16x2 LCD

5) Breadboard

 6) 10K potentiometer

7) 1K ohm resistors

8) 220 ohm resistor

9) Buzzer

10) MQ 6 LPG gas sensor

11) Temperature sensor LM35

12) Humidity sensor SY-H5220

Software Requirement:

1) Arduino 1.6.13 Software

2) Embedded C Language

Addition and Updation:

Updates can be done using a sensor network and by using the present values in air quality index and historical values of air quality index the pollution level can be predicted.

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Application[2]:

The system can be installed anywhere but mostly in industries and houses where gases are mostly to be found and gives an alert message when the system crosses threshold limit.

The system will show temperature and humidity.

The system will show the air quality in PPM on the LCD and as well as on webpage so that it can be monitored very easily.

Advantages[2]:

Sensors are easily available.

Detecting a wide range gases like CO2, CO etc.

Simple, compact and easily handle.

Continous update of change in percentage of quality

Challenges:

To be compelling, the areas of the checking stations need cautious position in light of the fact that the air contamination circumstance in metropolitan regions is profoundly identified with human exercises

Another issue is the large size of components.

Conclusion:

The implementation of cloud based IoT system for air quality monitoring in which the sensors are used to calculate CO, PM2.5 and PM10, O3, SO2 and NOx pollution level with environmental condition like temperature and humidity.

References:

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2. https://www.ijser.org/researchpaper/IOT-Based-Air-Pollution-Monitoring-System.pdf
3. https://circuitdigest.com/microcontroller-projects/iot-air-pollution-monitoring-using-arduino