

Survey Of Air Pollution Using IOT

K. Preethi, Assistant Professor, Department of CSE , University college of Engineering Pattukkottai, Rajamadam, India

R. Tamilarasan, Assistant Professor, Department of Chemistry, University college of Engineering Pattukkottai, Rajamadam, India

kalai.preethi@gmail.com, 9790263717

rrtamilk@yahoo.co.in, 75027991191

ABSTRACT

The level of pollution is increasing swiftly due to factors like industries, urbanization, increasing inresident, automobile use which can affect human health. IOT Based Air Pollution Monitoring System is used to security system of Air Quality over a web server using Internet. It will raise an alarm when the air quality goes down beyond a sure level, means when there are sufficient amount of injurious gases present in the air like CO₂, smoke, alcohol, benzene, NH₃ and NO_x. It will reveal the air trait in PPM on the LCD and as well as on screen so that air pollution can be survey very easily. The system uses MQ135 and MQ6 sensor for observing Air Quality as it detects most harmful gases and can measure their amount flawlessly.

Keywords: Air Pollution, MQ135 Sensor, IOT, Arduino Uno.

1. INTRODUCTION

Air pollution is the tremendous problem of every society, whether it is developed or developing. Health problems have been flourishing at faster rate exclusively in metropolitan areas of developing region where industrialization and thriving number of vehicles leads to release of lot of gaseous toxic waste. Harmful effects of pollution include mild hypersensitive reactions such as inflammation of the throat, eyes and nose as well as some serious problems like bronchitis, heart diseases, pneumonia, lung and bother asthma. According to a evaluate due to air pollution 50,000 to 100,000 immature deaths per year occur in the U.S. alone.

IOT Based monitoring and detecting of air pollution using web control system the Air quality over a web server using Internet and will trigger an alarm when the air quality goes

down beyond a certain threshold level, means when there are sufficient amount of harmful gases present in the air like CO₂, smoke, alcohol, benzene, NH₃, LPG and NO_x.

It will show the air quality in PPM as well as on webpage so that it can monitor it very easily. 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.

2. LITERATURE REVIEW

The weaknesses of the typical monitoring equipment are their large size, heavy weight and curious expensiveness. These lead to sparse deployment of the monitoring stations. In order to be effective, the locations of the monitoring stations need careful placement because the air pollution situation in urban areas is highly related to human activities (e.g. construction activities) and location-dependent (e.g., the traffic choke-points have much worse air quality than average). IOT Based Air Pollution Monitoring System monitors the Air Quality over a webserver using internet and will give rise to an alarm when the air quality goes down beyond a certain level, means when there are amount of harmful gases present in the air like CO₂, smoke, alcohol, benzene, NH₃, NO_x and LPG. The system will display the air quality in PPM on the LCD and as well as on web page so that it can be survey very easily. Temperature and Humidity is observe and monitored in the system.

LPG gas is identify using MQ6 sensor and MQ135 sensor is used for monitoring Air condition as it detects most destructive gases and can measure their amount meticulously. In this IOT project, it can auditor the pollution level from anywhere using your computer or mobile. This system can be equipped anyplace and can also make some device when pollution goes after some level, like we can send alert SMS to the user

3. REQUIREMENTS

3.1 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 LM 35

12) Humidity sensor SY-H5220

3.2 SOFTWARE REQUIREMENT

1) Arduino 1.6.13 Software

2) Embedded C Language

4. BLOCK DIAGRAM AND WORKING

4.1 WORKING

Proposed Air Pollution Monitoring System is established on the block diagram as shown in Fig.1. The data of air is identified by MQ135 gas sensor and MQ6 LPG gas sensor. The MQ135 sensors can sense nitrogen trihydride, nitrogen oxides, alcohol, Benzene, smoke, Carbon dioxide. So it is forceful gas sensed for our Air pollution Monitoring system. When it will be linked to Arduino then it will sense all gases, and it will give the Pollution level in PPM (parts per million). MQ135 gas sensor will permit the output in form of voltage levels and we have to discipline it into PPM. So for translate the output in PPM, we have used a study for MQ135 gas sensor and MQ6 sensor.

Sensor is giving us value of 90 when there is no gas neighboring it and the air quality assure level is 350 PPM and it should not exceed 1000 PPM. When it will exceed the reduce of 1000 PPM, it will cause Headaches, sleepiness and idle, stuffy air. If it outstrip beyond 2000 PPM then it will provoke expanded heart rate and many different flu. When the value will be less than 1000 PPM, then the LCD and web page will display “Fresh Air”. When the value will increase from 1000 PPM, then the buzzer will start beeping and the LCD and web page will demonstration “Poor Air, Open Windows”.

And when it will raise 2000, the buzzer will preserve call a deliver and notify message on smartphone through GSM. The LCD and webpage will display “risk! Change to fresh Air”. It will consist of temperature and humidity so it will possibly display the current temperature and humidity of the air. For temperature we have used LM35 sensor and for humidity SY-HS-220. According to the model the 4 sensors work as input data, they transmit data for knowing which gas it is, What is the temperature and humidity. LCD and Buzzer are the output devices. LCD shows the data of the gases in ppm (parts per million) and Buzzer is used when ppm crosses above a threshold limit.

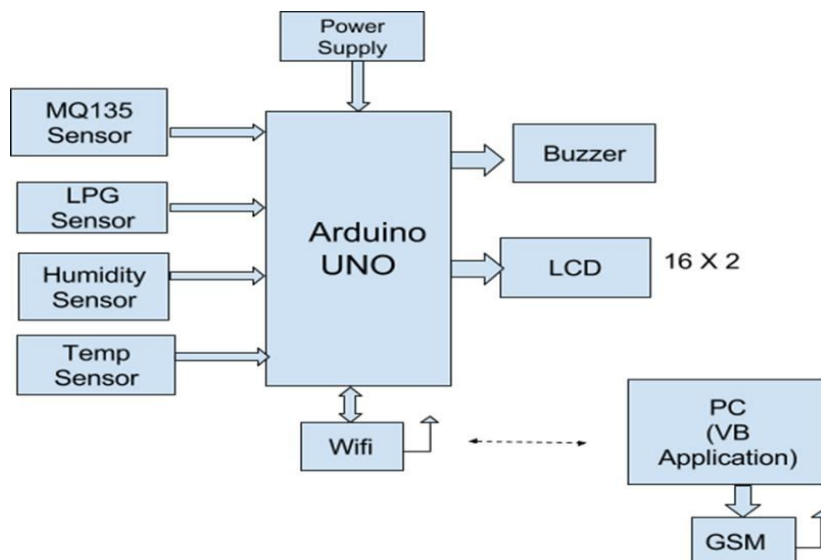


Fig. 1: Block Diagram

5. COMPONENTS

5.1. ARDUINO UNO

Arduino Uno is a microcontroller board based on the ATmega328P. It has 14 digital input/output pins, 6 analog inputs, a 16 MHz quartz crystal, a USB connection, power jack, an ICSP header and a reset button as shown in Fig 2.

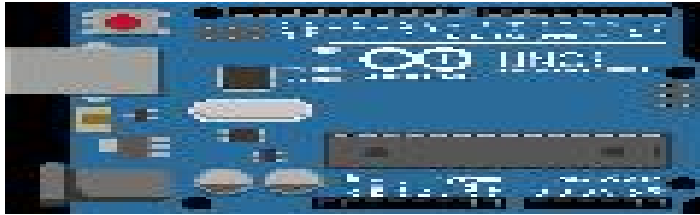


Fig. 2: Arduino UNO

5.2) MQ135 SENSOR

The MQ135 sensor can sense NH₃, NO_x, alcohol, Benzene, smoke, CO₂ and some alternate gases. It gives the result in form of voltage levels. Fig.3 shows the sensor MQ135.



Fig. 3: MQ135

5.3) WIFI MODULE (ESP8266)

The ESP8266 is a low-price Wi-Fi chip with full TCP/IP stack and MCU (microcontroller unit) proficiency. It runs on 3.3V and provides our system connection to Wi-Fi or internet. Fig.4 shows Wi-Fi Module (ESP8266).



Fig. 4: WIFI Module

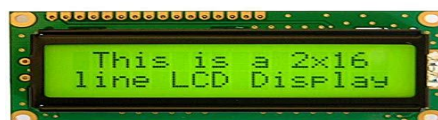
5.4) BUZZER

A Buzzer or beeper is an audio signaling device. Whenever the air pollution goes above the threshold level the Buzzer starts beeping indicating Danger. Fig.5 shows Buzzer.



Fig. 6: Buzzer

5.5) LCD (LIQUID CRYSTAL DISPLAY)



ig. 6: LCD

This is a basic (16x2) 16 character by 2 line display .Black text on Green environment. It is used to illustrate the Air and Humidity in PPM. Fig. 6 shows LCD (16x2).

5.6) GSM MODULE

Global System for Mobile communication is used to found connection between a computer and a GSM system. It is an architecture used for mobile communication. Fig. 7 shows GSM Module.



Fig. 7: GSM Module

5.7) LPG SENSOR

MQ-6 sensor is a transparent-to-use liquefied petroleum gas (LPG) sensor, relevant for sensing LPG (composed of mostly propane and butane) concentrations in the air. The MQ-6 can recognize gas concentrations in whatever place from 200 to 10000ppm. Fig.7 shows LPG sensor (MQ6).



Fig.8.LPG Sensor

5.8) TEMPERATURE SENSOR

The LM 35 is fidelity unified-circuit temperature sensor, whose output voltage is nearly proportional to the Celsius (Centigrade) temperature. It can be used with personal power supplies, or with plus and minus supplies. Fig.9 shows LM 35 sensor for Temperature

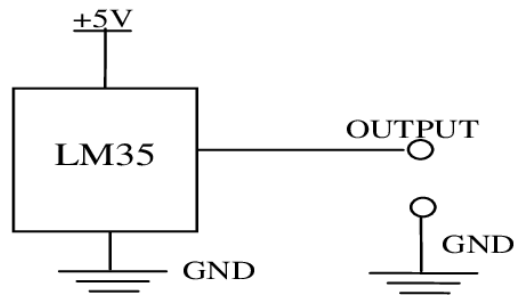


Fig.9. Temperature Sensor

5.9) HYGROMETER SENSOR

The hygrometer sensor is of causative type, hold on chip signal conditioner. However, it is mounted on the PCB, which also consists of other stages employed to make sensor rather smarter. The PCB subsists of CMOS timers to vibration the sensor to provide output voltage. Fig10 shows SYHS-220 sensor for Humidity.



Fig. 10: S Y-HS -220 (Humidity)

5.10 APPLICATIONS

- 1) Industrial perimeter monitoring
- 2) Indoor air quality monitoring
- 3) Site selection for reference monitoring stations.
- 4) Making data available to users.

5.11. ADVANTAGES

- 1) Easy maintenance of installation
- 2) Easily Updates On mobile phone directly
- 3) Accurate Pollution monitoring
- 4) Remote location monitoring

6. CONCLUSION

The system to oversee the air of ambience using Arduino embedded controller, IOT Technology is proposed to increase quality of air. With the use of IOT technology upgrade the process of monitoring numerous aspects of surrounding such as air quality monitoring issue proposed in this paper. Here, using the MQ135 and MQ6 gas sensor deliver the sense of distinct type of critical gas and Arduino is the soul of this project. Which control the unified process. Wi-Fi module associate the all process to internet and LCD is used for the optical Output.