AIR POLLUTION MONITPORING SYSTEM WITH IOT

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Abstract:- *we are creating an IOT Based Air Pollution Monitoring System in which we will monitor the Air Quality over a web page using WI-Fi module and internet and will trigger an alarm when the air quality decreases beyond a certain level, i.e., when there are sufficient amount of dangerous gases are present in the air like CO2, CO, smoke, CH4, benzene. It will show the air quality in PPM and in the percentage on the LCD and as well as on webpage in PPM so that we can monitor it very easily and it is possible to graphical presentation on webpage*

Key Words: Air Quality Monitoring Systems (AQMS), IOT(Internet of Things*)*, Air pollution, Atmega 328 controller, Air Quality Sensors

1. INTRODUCTION

Here to create an IOT Based Air Pollution Monitoring System in which we will monitor the Air quality over a webpage using internet and will trigger an alarm when the air quality decreases beyond a certain level, means when there are sufficient amount of hurtful gases are pr.esent in the air like CO2, Co,Methene and dust particles. It will show the air quality in PPM as well as in percentage on the LCD and on webpage so that we can monitor it very easily. Also we can display graphical representation. We have built the methane gas detector using MQ4 sensor and we have used MQ135 sensor which is used for the best choice for monitoring Air Quality as it can detects most hurtful gases and can measure their amount accurately. We use pm2.5 sensors for the dust particles. In this IOT project, you can monitor the pollution level from anywhere using internet or by using mobile application. We can install this system anywhere and can also trigger alarm when pollution goes beyond some level.

1.1 Purpose of this project

We proposal an air pollution monitoring system that allows us to monitor and check live air quality in an area through IOT System uses air sensors to sense presence of dangerous gases/particles in the air and constantly transmit this data. Air pollution occurs when dangerous substances including particulates and molecules are introduced into atmosphere. It may cause diseases, allergies or death in humans; it may also cause to animals, food & crops, and may cost the natural or built environment. Human activity and natural processes can both generate air pollution. This project allows authorities to monitor air pollution in different areas and act against it

2. EXISTING SYSTEM.

The commercial meters available in the market are Fluke CO-220 carbon monoxide meter for CO, Amprobe CO2 meter for CO2, For bix Semicon LPG gas leakage sensor alarm for LPG leakage detection. The researchers in this field have proposed various air quality monitoring systems based on WSN, GSM and GIS. But each technology has limited uses according to the intended function

3. PROPOSED SYSTEM

We are creating an IOT Based Air Pollution Monitoring System in which we will monitor the Air Quality over a web page using WI-Fi module and internet and will trigger an alarm when the air quality decreases beyond a certain level, i.e., when there are sufficient amount of dangerous gases are present in the air like CO2, CO, smoke, CH4, benzene. It will show the air quality in PPM and in the percentage on the LCD and as well as on webpage in PPM so that we can monitor it very easily and it is possible to graphical presentation on webpage

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4. REQUIREMENTS

4.1 Hardware Requirement:-

- ATMEGA 328 controller
- MQ135 Air Quality sensor
- MQ 4 gas sensor
- PM 2.5 dust sensor
- HMT 11 temperature sensor
- Wi-Fi module ESP8266
- 16X2 LCD
- 10K potentiometer
- 1K ohm resistors
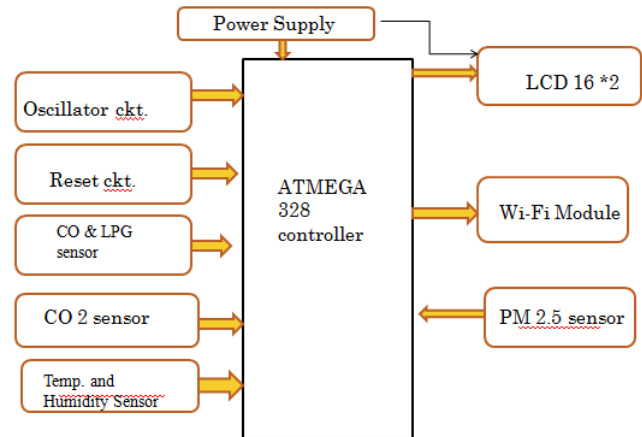- 220 ohm resistor
- Buzzer

4.2 Software Requirement
- embeded c language

5. PROJECT DESCRIPTION:

MQ135 sensor can sense CO2 and some other gases, so it is perfect gas sensor for our Air Quality Monitoring System. When we will connect it to Atmega 328 then it will sense the gases, and we will get the Pollution level in PPM (parts per million). MQ135 gas sensor gives the output in form of voltage levels then we convert it into PPM. So for converting the output in PPM, here we have used a library for MQ135 sensor, Sensor was giving us value of 0 when there was no gas near it and the safe level of air quality is >2000 PPM and it should not exceed 5000 PPM. When it exceeds the limit of 2000 PPM, then the buzzer will start beeping and the LCD and webpage will display "Alert! Air Quality improper".

MQ2 sensor can sense CO and LPG gases, When we will connect it to Atmega 328 then it will sense the gases, and we will get the Pollution level in PPM (parts per million). MQ2 gas sensor gives the output in form of voltage levels then we convert it into PPM. So for converting the output in PPM, here we have used a library for MQ2 sensor, Sensor was giving us value of 0 when there was no gas near it and the safe level of air quality is for the Co <200 PPM and for the LPG gases <50000ppm ..When Co exceeds the limit of >200 PPM & LPG exceed the limit of >50000 PPM, then the buzzer will start beeping and the LCD and webpage will display "Alert! High Co detected " & "Alert! High LPG detected " respectively

Figure 1: Block diagram of AIR POLLUTION MONITORING SYSTEM WITH IOT

Sr. no	Sensor name	Gas Detected	Starting value	Warning at point	Highest value
1	MQ 2	CO	0 PPM	<200 PPM	2500 PPM
2	MQ 2	LPG	0 PPM	< 50000 PPM	70000 PPM
3	MQ135	Co2	0 PPM	<2000 PPM	5000 PPM
4	HMT 11	Temp& Humidity	0	-	-
5	PM 2.5	Dust Particles	0 ugm/m^3	-	-

Table-1: Table for Gas Sensor

6. Result Analysis:

This shows the final output scenario of the project. The working of the project is shown in this chapter.
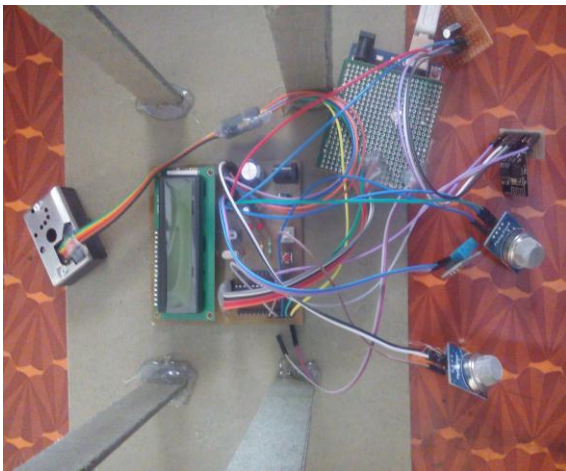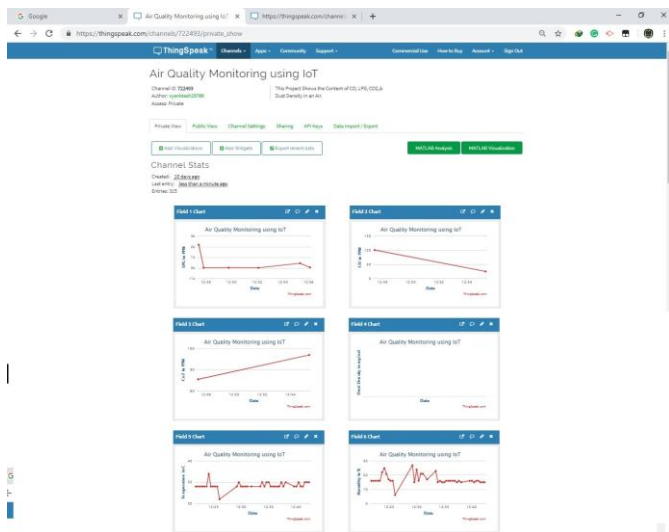
Figure 2: OVERVIEW OF MODULE

Fig -3: **VALUES OF ALL MODULES THOROUGH IOT SERVER**

7. ADVANTAGES

1. Detection of harmful gases is very easy.
2. Cost efficient.
3. Less complex circuit.
4. It is based on IOT of things, so remotely access is possible.

8. APPLICATIONS

1. Detection of pollution level in environment.
2. It can be used by Government authorities or any sectors who are checking pollution level periodically.
3. Pollution created by industries can be monitored periodically.

9. CONCLUSION

This paper introduces a IOT based air quality monitoring system using IOT central server and gases sensors. This system is very Beneficial as compared to the existing air quality monitoring systems.Also using this system it is possible to give access for no. of users. This project is also used for pollution monitoring purpose.

REFERENCES

1. K.A. Delin, and S.P. Jackson, "The Sensor Web: A New Instrument Concept," SPIE Symposium on
   Integrated Optics, San Jose, CA. Jan 2003.
2. Lwaimi, A., "Case study: Monitoring of air quality in king Faisal University using a microcontroller and WSN", Procedia Computer Science, volume
3. https://en.wikipedia.org/wiki/ESP8266
4. www.instructables.com/id/ESP8266-Wi-fi-module-explain-and-connection/
5. https://www.olimex.com/Products/Components/Sensors/...MQ135/.../SNS-MQ135.pdf
6. https://en.wikipedia.org/wiki/Internet_of_things