IoT Based Air Pollution Monitoring System

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Abstract— The degree of contamination is expanding quickly because of variables like ventures, urbanization, expanding in populace, vehicle use which can influence human wellbeing. IOT Based Air Pollution Monitoring System is utilized to screen the Air Quality over a web worker utilizing Internet. It will trigger an alert when the air quality goes down past a specific level, implies when there are adequate measure of hurtful gases present noticeable all around like CO_2, smoke, liquor, benzene, NH3 and NOx. It will show the air quality in PPM on the LCD and just as on page with the goal that air contamination can be observed without any problem. The framework utilizes MQ135 and MQ6 sensor for checking Air Quality as it recognizes most destructive gases and can gauge their sum precisely.

Keywords: IoT, Air Quality

I. INTRODUCTION

Air contamination is the most serious issue of each country, regardless of whether it is created or creating. Medical issues have been developing at quicker rate particularly in urban zones of creating nations where industrialization and developing number of vehicles prompts arrival of parcel of vaporous toxins. Unsafe impacts of contamination incorporate gentle unfavorably susceptible responses, for example, bothering of the throat, eyes and nose just as some major issues like bronchitis, heart infections, pneumonia, lung and irritated asthma. As indicated by a study, because of air contamination 50,000 to 100,000 unexpected losses for each year happen in the U.S. alone. Though in EU number ranges to 300,000 and more than 3,000,000 around the world. IOT Based Air Pollution Monitoring System screens the Air quality over a web worker utilizing Internet and will trigger a caution when the air quality goes down past a specific limit level, implies when there are adequate measure of destructive gases present noticeable all around like CO_2, smoke, liquor, benzene, NH3, LPG and NOx. It will show the air quality in PPM on the LCD and just as on website page with the goal that it can screen it without any problem. LPG sensor is included this framework which is utilized generally in houses. The framework will show temperature and stickiness. The framework can be introduced anyplace however for the most part in enterprises and houses where gases are for the most part to be found and gives an alarm message when the framework crosses edge limit.

II. LITERATURE SURVEY

The downsides of the traditional checking instruments are their enormous size, overwhelming weight and unprecedented cost. These lead to scanty organization of the checking stations. So as to be successful, the areas of the checking stations need cautious position on the grounds that the air contamination circumstance in urban territories is profoundly identified with human exercises (for example development exercises) and area subordinate (e.g., the traffic gag focuses have a lot of more terrible air quality than normal)

IOT Based Air Pollution Monitoring System screens the Air Quality over a webserver utilizing web and will trigger an alert when the air quality goes down past a specific level, implies when there are measure of hurtful gases present noticeable all around like CO_2, smoke, liquor, benzene, NH3, NOx and LPG.

The framework will show the air quality in PPM on the LCD and just as on site page with the goal that it tends to be observed without any problem. Temperature and Humidity is distinguished and checked in the framework.

LPG gas is distinguished utilizing MQ6 sensor and MQ135 sensor is utilized for observing Air Quality as it recognizes most hurtful gases and can quantify their sum precisely. In this IOT venture, it can screen the contamination level from anyplace utilizing your PC or portable. This framework can be introduced anyplace and can likewise trigger some gadget when contamination goes past some level, similar to we can send ready SMS to the client.

III. REQUIREMENTS

A. Hardware Requirement:-

MQ135 Gas senso
Arduino Uno
Wi-Fi module ESP8266
16x2 LCD
Breadboard
10K potentiometer
1K ohm resistors
220 ohm resistor
Buzzer
MQ 6 LPG gas sensor
Temperature sensor LM35
Humidity sensor SY-H5220

B. Software Requirement:-

Visual Studio 2017.
Arduino 1.6.13 Software
Embedded C Language
Express PCB.

IV. BLOCK DIAGRAM AND WORKING

A. Working:-

System is based on the block diagram as shown in Fig.1. The data of air is recognized by MQ135 gas sensor and MQ6 LPG gas sensor. The MQ135 sensor can sense NH3, NOx, alcohol, Benzene, smoke, CO_2. So it is dynamic gas sensored for our Air pollution Proposed Air Pollution Monitoring Monitoring system. When it will be connected to Arduino then it will sense all gases, and it will give the Pollution level in PPM (parts per million). MQ135 gas

sensor will give the output in form of voltage levels and we have to convert it into PPM. So for converting the output in PPM, we have used a library for MQ135 gas sensor and MQ6 sensor.Sensor is giving us value of 90 when there is no gas near it and the air quality safe level is 350 PPM and it should not exceed 1000 PPM. When it will exceed the limit of 1000 PPM, it will cause Headaches, sleepiness and stagnant, stuffy air. If it exceeds beyond 2000 PPM then it will cause increased heart rate and many different diseases. When the value will be less than 1000 PPM, then the LCD and webpage will display "Fresh Air". When the value will increase from 1000 PPM, then the buzzer will start beeping and the LCD and webpage will display "Poor Air, Open Windows". And when it will increase 2000, the buzzer will keep beeping and give an alert message on smartphone through GSM. The LCD and webpage will display "Danger! Move to fresh Air". It will contain temperature and humidity so it will possibly show 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 works 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.
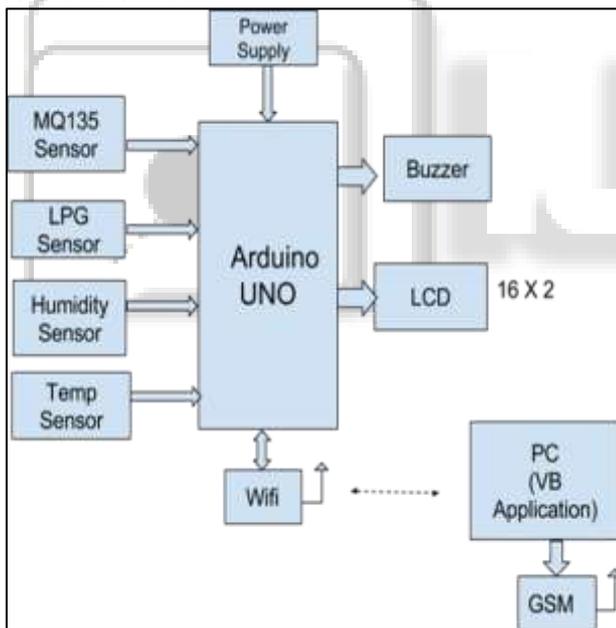
Fig. 1: Block Diagram

V. COMPONENTS

A. Arduino UNO:-

Arduino Uno is a microcontroller board dependent on the ATmega328P It has 14 advanced info/yield pins 6 simple data sources, a 16 MHz quartz precious stone, a USB Connection, power jack, an ICSP header and a reset button as appeared in Fig. 1.

Fig. 1: Arduino UNO

B. MQ135 sensor:-

The MQ135 sensor can detect NH3, NOx, liquor, Benzene, smoke, CO2 and some other gases. It gives the yield in type of voltage levels.

Fig. 2: MQ135

C. WIFI Module (ESP8266 node mcu):-

The ESP8266 is an ease Wi-Fi chip with full TCP/IP stack and MCU (microcontroller unit) capability. It runs on 3.3V and gives our system access to Wi-Fi or web. Fig.3 shows Wi-Fi Module (ESP8266).

Fig. 3: Wifi Module

D. Buzzer:-

A Buzzer or beeper is a sound flagging gadget. At whatever point the air contamination goes over the edge level the Buzzer begins blaring showing Danger. Fig.4 shows Buzzer.
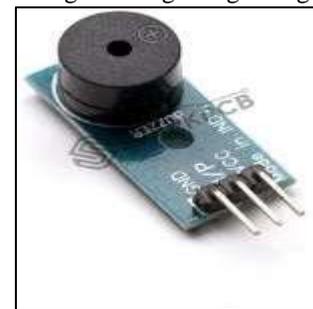
Fig. 4: Buzzer

E. LCD (Liquid Crystal Display):-

This is a fundamental (16x2) 16 character by 2 line show. Dark content on Green foundation.

It is utilized to show the Air and Humidity in PPM. Fig. 5 shows LCD (16x2).

Fig. 5: LCD

F. *LPG Sensor:-*

MQ-6 sensor is a simple to-use dissolved oil gas (LPG) sensor, sensible for recognizing LPG (made out of by and large propane and butane) centers observable all around The MQ-6 can perceive gas concentrates some place in the scope of 200 to 10000ppm. Fig.6 shows LPG sensor (MQ6).

Fig. 6: MQ6

G. *Temperature Sensor:-*

The LM35 is exactness coordinated circuit temperature sensor, whose yield voltage is straightly corresponding to the Celsius (Centigrade) temperature. It tends to be utilized with single force supplies, or with in addition to and short supplies. Fig.7 shows LM35 sensor for Temperature.

Fig. 7: LM35 (Temperature)

H. *Humidity Sensor:-*

The mugginess sensor is of capacitive sort, including on chip signal conditioner.However, it is mounted on the PCB, which likewise comprises of different stages utilized to make sensor rather smarter.The PCB comprises of CMOS clocks to beat the sensor to give yield voltage. Fig.8 shows SY-HS-220 sensor for Humidity.

Fig. 8: Y-HS-220 (Humidity)

VI. APPLICATIONS

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

VII. ADVANTAGES

5) Easy to Install
6) Updates On mobile phone directly
7) Accurate Pollution monitoring
8) Remote location monitoring

VIII. FUTURE SCOPE

The created air quality checking and perception framework precisely estimated the grouping of poisons carbon monoxide, carbon dioxide, smoke and residue in environment. The sensor has been incorporated with IoT system which has effectively been utilized to gauge and screen the contaminations continuously. This framework survives the issue of contamination observing, wellbeing monitoring, livelihood estimation, maintainability appraisals and estimation related fields. The information's are consequently put away in the information base; this data can be utilized by the specialists to take brief activities. It likewise helps the typical individuals to think about the measure of contaminations in their general vicinity also, to take control measures. This is a powerful framework which is exceptionally valuable in ventures due to the expanding contamination because of increment in enterprises. This framework is client cordial and cost of the item is moderate. This framework is checking just five boundaries and henceforth can be extended by considering more boundaries that cause the contamination particularly by the ventures. Numerous toxins don't have sensors that sense them if accessible they are pricey and consequently assembling sensors for various boundaries may be a future and testing task. The created framework devours a lot of intensity, so we can utilize sun oriented force as an outside wellspring of vitality in future and it will improve the dependability of the framework

IX. CONCLUSION

The framework to screen the demeanor of condition utilizing Arduino microcontroller, IOT Technology is proposed to improve nature of air. With the utilization of IOT innovation improves the way toward observing different parts of condition, for example, air quality checking issue proposed in this paper. Here, utilizing the MQ135 and MQ6 gas sensor gives the feeling of various kind of risky gas and arduino is the core of this task. Which control the whole procedure. Wi-Fi module interfaces the entire procedure to web and LCD is utilized for the visual Output.

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