

AIR POLLUTION MONITORING AND CONTROL USING GSM

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Abstract

Air quality monitoring provides raw measurement of gases and pollutant concentrations, which can then be analyzed and interpreted. Air pollution is a concern in many urban areas and be the major reason for respiratory problems among many people, monitoring the air quality may help many distress from respiratory problems and diseases, and thereafter informing engineering and policy decision makers to recover the quality of air. Major contributor's air causing respiratory problems are Fine particles produced by the burning of fossil fuel, noxious gases, Ground-level ozone g), Volatile organic compounds. A prototype for air pollution monitoring device has been developed to measure the concentration of CO₂ and gases, monitoring at a specified rate and communicating, to notify to any wireless device when the threshold of these gases is reached. Though the prototype can be extended across regions for high-fidelity emissions monitoring to explore the effects of environmental factors on intra-hour air quality.

Keyword: *Air quality; Air pollution; high- fidelity; wireless device;*

1. INTRODUCTION

Now- a -days the pollution level becoming high due to increasing in large number of vehicles. It is important to track the pollutant level in the urban areas. The air pollutants are particulate matter, Ground level ozone, Carbon dioxide, Sulphur oxide, Nitrogen oxide and Lead. To avoid the pollutants in the air, the vehicle is monitored and controlled using GSM module. The sensor plays the vital role; it senses the value above the threshold value. When the threshold value becomes high the motor stops and alarm starts. The level of the pollution is displays in the LCD ,a message send to the RTO and the service centre of the respective vehicle using GSM. The system is fully controlled by PIC microcontroller. It will benefit them as well as others by reducing pollution concentration in peak roadways so everybody can breathe cleanser air.

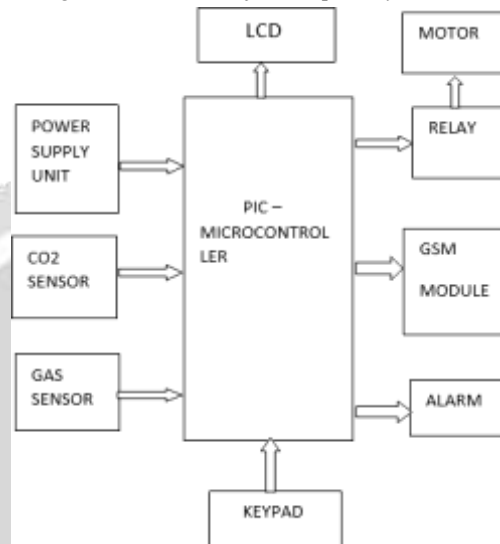
2. LITERATURE SURVEY

The effective solution for air polluting monitoring system using wireless sensor networks(WSN) on a real time basic namely real time wireless air pollution monitoring system. The discrete gas sensors for sensing concentration of gases like CO₂,NO₂,CO and O₂ are detected. These pre- calibrated gas sensors are then integrated with wireless sensor motor for field at the campus. Libelium WAMP motes are used a basic wireless communication module, which comprise of processing unit and the communicating unit. A light weight middleware and a web interface to view the live pollution data in the form of numbers and charts from the test beds was made any available on the internet. The cost was too high. It consumes lot of energy.[1] It is designed and developed to measure CO, CO₂ and the density of dust parameters based on a multilayer distributed model with Arduino platform, sensor and wireless connectivity. The data is collected in the computer and to send webpage to monitor air-pollution on real-time. The system is quite complex. Since they have used various types of software languages for various purposes .For example Java for computer system, C/C++ for

conversion of analog data to digital form[2]. To monitor the air quality using real-time air pollution monitoring and forecasting system. The system can be laid out in large number in monitoring area form monitoring sensor network, Besides the function of conventional air automatic monitoring system, it also exhibits the function of forecasting development tendency of air pollution within a sure time range by analyze the data obtained by front-end system according to neural network technology. It has relatively complex equipment technology, large bulk, unstable operation and high cost. [3]

3. PROPOSED SYSTEM

Figure 1: Flow Chart of the Proposed system



CO2 and gas sensor allows to sense the pollution level, it is used to detect the pollution level of the vehicle above the threshold range, and they are compact, low cost, and easy to use. The air quality capacity taken by the designed system was exact. The result was displayed on the designed hardware's display interface and to notify to RTO & service center using GSM module. The working of the proposed technique is illustrates as follows;

- LCD and GSM initialization
- Sensor value reading
- If the level of the Gas and CO2 value is above the threshold value, it displays the value in LCD.
- Then sends the message to the respective numbers using GSM module.

4. METHODS AND MATERIALS

PIC16F877A

PIC Microcontroller (PIC16F877A) is one of the most renowned microcontroller which consist of two 8 bits and one 16 bit timer. Flash memory is used in the recently developer microcontroller so that the data can be retained even when the power is switched off. The PIC 16F877A devices have a 13 bit program counter capable of addressing 8k*14 words of flash program memory.

LCD

Liquid crystal display be flat Panel display or other electronic visual display that uses the light-modulating property of liquid crystal. LCD panel typically use thinly coated metallic conductive pathway on glass substrate, to form cell circuitry. It is used to indicate the Air and Humidity in PPM

RELAY

Relay is a electrically operated switch, when current flowing through the coil of the relay, it creates a magnetic field which attracts the lever and changes the switch contacts. Relay consist of three pins, they are common, normally close and normally open. CO2 SENSOR

In this project, MG-811 CO₂ gas sensor is used to sense the level of carbon dioxide present in air .It operates at 6V voltage and 200mA current. This sensor is chosen for its wide selecting scope, fast response time, high sensitivity and long stability.

GAS SENSOR

In this project, MQ-135 gas sensor is used to monitor the air pollution and to determine air quality index, it operates at 5V voltage and 40mA current. The sensor can also sense isobutene, propane. It works with a simple device circuit. This sensor is chosen for high sensitivity, fast response time, stable and long life. GSM module stands for Global System for Mobile Communications, It is used to send SMS, make and receive calls, do other GSM operations by controlling it through simple AT commands from micro controller and computers. SIM800 module is used for all its operations, it provides serial TTL interface for easy and direct interface to microcontroller.



Figure 2: Gas sensor

5. HARDWARE OUTPUT

In this project, the CO₂ and gas sensor indicates the pollution level. Here the 12 volt powers supply. It supplies 5V to enable the pins of motors drivers and LCD. The MQ-135 Gas sensor used to sense the gases such as Ammonia, Nitrogen, Sulphide, Aromatic Compounds and Smoke, The MG-811 CO₂ gas sensor sense the level of carbon dioxide. Both sensor display the value on LCD and then it is connected to the relay which acts as a switching device used to turn off the motor when air reaches a threshold value. Which finally, connects our microcontroller and to GSM module. It is used to send notification to the high authorities and the service centre of the vehicle through mobile communication, it can be controlled through AT commands from microcontroller and computers. SIM800 module is used for all of its operations, it provides serial TTL interface for direct interface to microcontroller.



Figure 2: Gas sensor

REFERENCES

- [1] Abdullah Kadri, Elias Yaacoub, Mohammed Mushtaha, and Adnan Abu-Dayya "Wireless Sensor Network for Real- Time Air Pollution Monitoring" IEEE Forum on Strategic Technology -2013.
- [2] Elias Yaacoub, Abdullah Kadri, Mohammad Mushtaha, And Adman,Abu-Dayya," Air Quality Monitoring

and Analysis in Qatar Using a Wireless Sensor Network Deployment” 2013; 2(4):596- 601.

[3] Kloeden C.N., Ponte G & McLaren, A.J. “Travelling speed and the risk of crash involvement on rural roads”. Report CR 204. Australian Transport Safety Bureau ATSB, Civic Square, ACT, 2001

[4] Kohashi.Y, Ishikawa.N and Nakajima.M, “Automatic Recognition of Road signs and Traffic signs”, Proceedings 1st ITS Symposium 2002; pp.321- 326.

6. CONCLUSION

An air pollution monitoring system was designed, implemented and tested. The system utilizes city vehicles to collect pollutant gases such as CO₂, Nitrogen oxide, SO₂ and other harmful gases. The pollution data from various sensor arrays is transmitted to a central server that makes this data available on internet through Google Maps Interface. This data shows the pollutant level and their conformance to local Air Quality Standards.

7. FUTURE ENCHANCEMENTS

In future every vehicle will have its own PUC system which benefits both owners as well as pollution control departments. A simple assembly in vehicle itself will help to bring down the CO₂ gas content.

Authors Biography (Mandatory)



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