

IOT BASED AIR DEFILEMENT OBSERVING SYSTEM

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Abstract : A smart city enables the effective utilization of resources and better quality of services to the citizens. To provide services such as air quality management, weather monitoring and automation of homes and buildings in a smart city, the basic parameters are Carbon Mono Oxide, Carbon di- oxide and the level of traffic. This paper presents a customized design of an Internet of Things (IoT) enabled environment monitoring system to monitor Carbon Mono Oxide, Carbon di-oxide and the level of the temperature. In this system, data will be sent from the transmitter node to the receiver node. The data received at the receiver node is monitored in Personal Computer (PC) through an IOT . The Internet of Things is a network of physical objects that consists of sensors, software and electronics which have the ability to communicate with each other as well as with users. It is rapidly evolving due to the convergence of information and communication technologies and the internet. One of the applications of Internet of Things (IoT) in the urban context is the smart city that promises to improve the quality and performance of urban services[1]. According to the world health organization (WHO), nine out of ten people breathe air with high levels of pollutants [2]. The services for which quality can be enhanced in a smart city are monitoring the strength of buildings, waste management, air quality management, weather monitoring, noise monitoring, energy consumption management and automation buildings. Among all the health risks air pollution is currently 3rd major cause of death in India. In south Asian child's the average life span has being shortened by two and a half years due to air pollution [3].

Keywords - Automatic monitor, pollution, Quality, Gas monitor

1. INTRODUCTION

Air pollution is the biggest problem of every country. Health problems have been growing at faster rate especially in urban areas of developing countries where industrialization and growing number of vehicles leads to release of lot of gaseous pollutants. IOT Based Air Pollution Monitoring System monitors the Air quality over a web server using Internet .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, CO, and LPG[1]. The system will show temperature and humidity. The system can be installed anywhere.

2. LITERATURE REVIEW

"Air Quality Monitoring System based on Microcontroller" in this reference paper, the authors find the pollutants using IoT. Sensors used were UVI-01 for ultraviolet radiation, BMP085 for pressure and temperature, LDR light dependent resistor , TGS 2600 for general air quality, MICS- 2710 for NO₂, MICS-5525 for CO. Proposed system monitors all the results and the data is sent to cloud. Action will be taken according to the generated report[16].

"Development of IoT based Vehicular Pollution Monitoring System "in this reference paper , the authors main focus is on measuring air pollution caused by vehicles on the city roads using IoT. The measured air quality status is reported to the concerned agencies, vehicle owner and traffic department. The proposed system guaranties low cost sensors that give good results in controlling the air pollution [5].

"Implementation of an evaluation system to measure air quality on public transport routes using the Internet of Things" in this reference paper for the evaluation system, the authors use sensors namely MQ135, MQ4, MQ9 to transmit data to the cloud through IoT. To check the variation of pollutants, the proposed system can obtain the levels of vehicle discharge and can take tests in real time or at some other time interval[9].

"An IoT Based Low Cost Air Pollution Monitoring System "in this reference paper , the authors use sensor with Wi-Fi modules. The proposed system measures concentration of gases and the collected data was provided to base station that is raspberry pi. A mean stack was prepared to show data on website. The mentioned method lets us to reduce cost infrastructure for data collection and dissemination to stakeholders. Sensors MQ7 for Carbon Monoxide (CO), and MQ135 for NH₃, CO₂ were used[10].

"IOT-Based Air Pollution Monitoring and Forecasting System" in this reference paper, the authors use low cost sensors that assures accuracy, and makes monitoring area more systematic. The field data gathered by front-end sensor network in accordance with neural network performs the real time analysis of the collected data and provides real and effective solution[11].

“Monitoring Pollution: Applying IOT to Create a Smart Environment “in this reference paper, the authors use sensors for detection of pollutants in air. The data collected by IoT system is sent to the concerned authority. There the analysis of given data is done and it is compared against a threshold value. If the measured value is greater than threshold value it will trigger an alarm, hence it will take suitable actions to warn surroundings[12].

“A study on monitoring of air quality and modeling of pollution control”In paper, the authors choose a specific area (Agra) and make extensive study about NAAQS standards, USEPA standards, EUPAQ standards, WHO standards on fine PM(particulate matter) and various other aspects like causes, effects, control of air pollution through consciousness[1].

“A Study of Air Pollution Smart Sensors LPWAN Via NB-IoT for Thailand Smart Cities 4.0”in this reference paper, the authors develops the smart sensors that consist of noise level(dB), particular matter(PM10) sensor, carbon dioxide and ozone. The results illustrates air quality index via Narrowband Internet of Things (NB-IoT) which inform people about real time air quality[13].

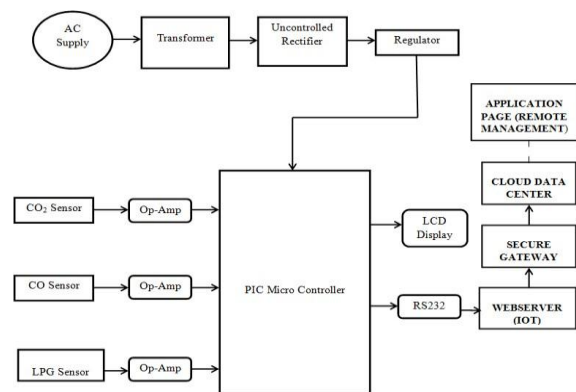
“IoT based air pollution monitoring and control system”in this reference paper, the authors main focus is on automobile pollution. Their work gives us a real time solution through a sensor deduced hardware module fixed at certain locations that monitors pollution and take measures to reduce the traffic in densely polluted areas. The algorithm predicts the air quality and the proposed system transmits the calculated information for traffic control purpose and through mobile application[14].

“Air pollution monitoring and prediction using IoT” in this reference paper, the authors use IoT based air pollution monitoring and prediction system for analysis and forecasting of air quality by using air sensors to communicate data microcontroller .For prediction, Long Short Term(LSTM) implemented[15].

3. HARDWARE AND SOFTWARE USED

- PIC16F877A
- RS 232, LCD
- CO2 Sensor
- CO Sensor
- LPG Sensor
- Op-Amp
- Transformer
- Rectifier
- Regulator
- Wifi Module

BLOCK DIAGRAM



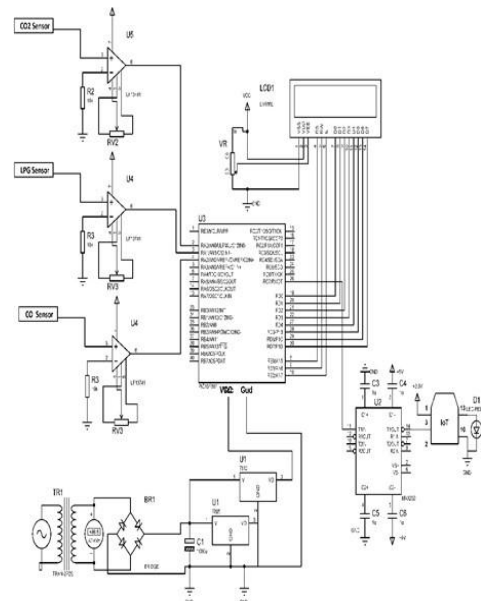
Working principle

In this method using IoT data’s will be stored in cloud and then it will be developed in a web server to monitor the air pollution content wherever needed and also it can be accessed for the remote management[17] .

LCD is used to display the air pollution level.CO2 sensor used to monitor the air quality and chemicals present[18] .CO is a tasteless, colourless gas which comes out from co2 in complete combustion of co2 materials hence CO sensor is used. LPG sensor used to identify leakage of gas substances in air.

3.1 CIRCUIT DIAGRAM

A circuit architecture diagram would be used to show the relationship between different components.



ADVANTAGES OF THE SYSTEM

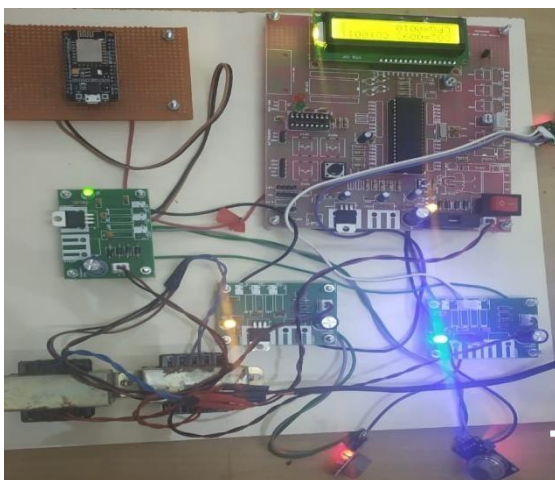
- Monitoring of Data will be an easy task. Sensors can detect the harmful gases.
- Easy to Install.
- Updates On mobile phone directly.
- Accurate Pollution monitoring. Remote location monitoring.

APPLICATIONS

- Smart home
- Smart farming
- Smart grids
- Traffic Areas
- Smart City
- Industrial perimeter monitoring
- Indoor air quality monitoring
- Site selection for reference monitoring stations
- Making data available to users.

4. OUTPUT

In output, the three sensors Co sensor, Co2 sensor and LPG sensor are used to observe amount of harmful gases present in the air. These sensors observes levels of gases like carbon monoxide, carbon dioxide, chemical substances in ppm and display the various levels of gases present in the air or area around us in LCD.



5. CONCLUSION

The paper presented an IOT based Air Defilement Observing System for Smart Cities. A few sensors constantly monitor the Temperature, Humidity, Carbon Monoxide, Smoke, LPG levels in the atmosphere.

The Air Pollution Monitoring System is implemented and tested in real-life working condition. In future by changing the sensors health will be monitored in human beings by detecting viruses present in shopping malls , human body etc...

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