Design And Implementation of Real Time Web Based Geographic Polution Monitoring System

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***Abstract*— Air monitoring is important concept to check whether the surrounding air is suitable to breath by the human being or not. Because of increasing the traffic the rate of carbon concentration present in the air increases. Which result in the fresh air gets polluted. Today each human being wants to live in the healthy atmosphere, they want to check whether the particular area where they have to go is more or less polluted and according to this pollution level information they may choose their route appropriately. Now a day's mobile are available to everyone if it may possible to check the pollution level of each area, it may help them to choose the alternate healthy route. Various technologies are used previously for monitoring the pollution level but accuracy in the reading of pollution level compromises.**

Keywords- Air quality, microcontroller, real time monitoring, WSN.

I. INTRODUCTION

The main purpose of pollution monitoring is not only to provide the collected data to the end user it may also help the planners, policy makers and scientist to take the decision on pollution level and make the effort to improve the environment. There are various resources of pollution that make the air unbreathable. With the development of automotive industry and communication technology our daily live are largely infected and people tend to spend many time to the vehicle. And it may see that the next generation transportation system is more powerful. The main issues of this are to increasing the traffic and air pollution which may affect the human health. With the rapid development in the transportation system it may seen that the clean air get polluted rapidly. Modern technology is a combination of many techniques such as wireless communication, cloud computing, internet of thing etc... .It consist the many no. of level which is useful to provide several types of services on the real time basis.

Fig 1. Represent the three level of architecture. The first level is a device level which consist a no of device to get communicate with each other. Second level is a communication level where the all devices communicate with the other devices wirelessly and in the last level to get the service from each level by using a cloud computing? With this development wireless sensor.

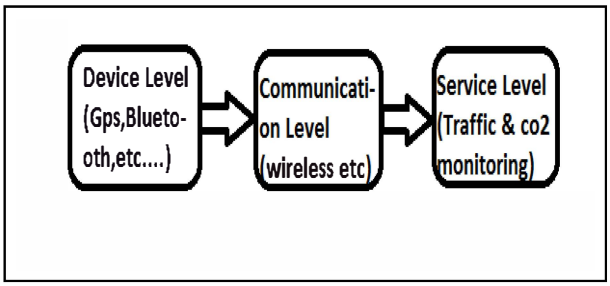

Fig 1.Three Level Architecture

network play the important role to provide the information of any location.

WSN consist a number of stations. Each station collects the information of pollution level in their nearest locations where the sensors are deployed. Monitoring station contains the number of unit. Such as processing unit, sensing unit, power unit, communication unit. And each unit must be operate independently i.e. processing unit must process the information that are collected from the sensor. Sensing unit that produce the signal which may change in the physical condition such as humidity, pressure or temperature. Power that consume by each station must be low. Communication unit responsible to transfer the information from each unit to the world i.e. collected information store on the server from where this information get distribute to the internet and can easily access by the each individual user.

II. LITERATURE REVIEW

Air monitoring is a social as well as public experiment where the each user wants to know how much the environmental changes affect their daily life cycle. Teco envboard is an environmental sensing platform that carries a number of sensor such as temperature sensor, carbon dioxide sensor, humidity sensor etc.. To provide the information about the indoor as well as outdoor of the air quality [1].
Pimi air box is the other device which help to find the indoor air quality it detect the temperature as well as the matter concentration present in the air.[2]

978-1-4673-6524-6/15/$ 31.00

Wearable device getting more popularity it monitor the personal inhalation information dosage of the air pollution. The individual activity such as driving, jogging, cycling has impact their dosage and develop the application to provide them personalized information.[3]

Distributed infrastructure consist a wireless sensor network and grid computing technology for air pollution monitoring as well as mining. Two layer architecture and peer to peer e-science grid architecture and distributed data mining algorithm are used to collect the data and tiny operating system used to examine the operation and performance of the wireless sensor network.[4]

To monitor the air quality in the city of Mongolia result shows that the dust concentration is more than its standard level it shows 50% of air pollution caused by the soil,30% by the raw coal burning,12% by the vehicle and 3% by the wood burning. From this result soil and dust is the main reason of pollution in the city of magnolia.PM 10 and PM2.5 techniques can be used to monitor and control the measurement for air pollution monitoring.[5]

monitoring stations are used to monitor the air quality these stations are largely deployed the sensor that collect the pollution information are send it to the these stations and back end platform controlled by the lab view program through which data can be stored in the database .the system deployed to the main road in the city to monitor the carbon concentration caused by the vehicle emission the main advantage of wireless sensor network is that it is easy to set up, inexpensive and provide the real time data.[6]

The daily activity in the cities around the world which is responsible to emit the 62% of the carbon emission. The relation between the pollution emission and traffic is a one of the most relevant problem faced by the future city. Crowed face the health related problem due to the low air quality in the cities. Due to this , there is a need of effective air quality monitoring programs that complement the current available system and traditional network to perform well in the case of any change in the physical parameter.[7] UrVAMM is the another revolutionary technology used to monitor the environment. it is a new open concept of the smart cities.

III. PROPOSED WORK

Fig 2. Represent the system architecture. In order to find out the pollution level of each & every square it requires to place the sensor on every square. Collection of nearest sensor creates a sensor node. Each sensor sense the level of pollution and all collected data are uploaded to the main server of the monitoring station. Microcontroller is used to fetch the data from the sensor node. Because of

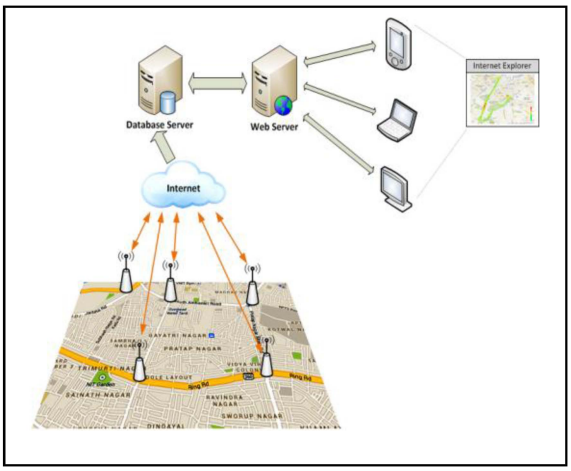

Fig 2. System Architecture

data from the every node are giving the analog reading which is not easily readable by the human being. Microcontroller Ic is used to fetch the data. This ic is used to fetch the pollution data from the sensor which is located on each square. Microcontroller is another name of computer which consist a number of input and output. Sensor that allow the microcontroller to determine the present of harmful gas present in the atmosphere. It uses the analog to digital conversion port of microcontroller because whatever the output of sensor is analog in nature which generates the different gas level value.

Microcontroller passes these collected data to the computer by using URL port and then uploaded all the collected data to the cloud dataset. The cloud consist a past and recent history of pollution level so it can be viewed as the current and future use. All the uploaded data are manage in the database management system over the centralize warehouse. Where the huge collection of pollution data are systematically manage along with the area code and time stamp. so it can be better analyze from which area and on what time the rate of pollution will be more and user can search the pollution record as per their requirement whether it may be current record or the previous record. System can provide the live data on the map by using the Google mapping API with this interfacing user can easily find out the pollution level of particular area lively. Colorful representation of pollution level may get more attractive. The different colors are used to represent the low or more pollution rate in each square.

Different port of the microcontroller are use to transfer the information collected by the sensor.CO2 sensor that collect the concentration of carbon present in the atmosphere. the collected signal are analog in nature i.e. the signal vary continuously with the time. but the microcontroller understand only the digital language therefore it uses the ADC port of microcontroller that convert the analog signal to the digital format which is

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understand by the microcontroller. Then it processes the information and provides the result to the output end.

Praposed System Consist The Following Phases-

Microcontroller based pollution level sensing system:

It will use a analog gas sensor which will generate the different gas level values then microcontroller will convert it in to digital format.

Uploading the pollution level reading :

Use Once the data fetched by microcontroller it will be then passed to computer system using some convertor and system will then upload this data to the cloud dataset so that this data can be viewed or analyzed later on for future use or current use.

Managing The Dataset:

All the uploaded data will be managed in DBMS format over the centralized data ware house. In this module system will provide user to search the record as per requirement it may be current record or the last transaction record.

Google mapping API for Monitoring:

As the system has facility to view the data live on the map so this phase will use the Google mapping API and develop a live map view in order to show the different pollution level in defined color as a graphical representation.

- System will use Atmega16 microcontroller for data collection and data transfer on different ADC, I/O and UART port.
- Almost all sensor used in system will be analog sensor so system will use ADC port from Atmega16 Microcontroller.
- As all the values received by Microcontroller will be in ASCII format system need a serial communication port from transferring data to computer system.

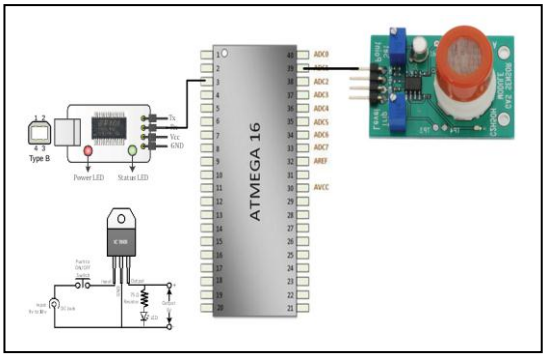

Fig 3. System Requirement

Hence, the system will use UART port for serial data transmission as it is to the computer for further uploading Interfacing with the module of sensor is done through a 4-pin SIP header and requires two input and output pins from the host microcontroller.

The module of sensor is mainly require to provide a means of comparing alcohol sources and being able to set an alarm limit when the source cross the threshold level.

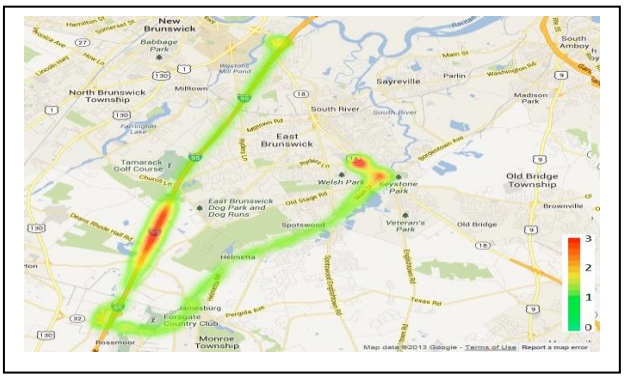

Fig 4. System Monitoring

Fig 4. Below represent the monitoring of the entire system. Monitoring is the most important part of this entire system it represent the level of pollution according to the user requirement. For monitoring it will use the Google map to show the air quality on real time basis. Different colors are used to show the air quality is less or more polluted.

IV. CONCLUSION

The system monitors the air quality with the help of sensor. It is based on the smart sensor micro converter equipped with the network capable application processor that downloads the pollutants level to a personal computer for further processing. The system provides the alarm message depending on the detected pollution types. A high resolution surveillance web-camera will be use to monitor the air quality via the internet.

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BIOGRAPHY

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