Air Quality Monitoring System Based on Sensor

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ABSTRACT: The atmosphere is a complex natural gaseous system that is essential to support life on a planet earth. But the pollution level around the developing and the developed countries is gradually increasing day by day due to various factors industries, automation and the most important factor is destroying the trees for the developing the infrastructure and the vehicles .So it is necessary to understand and detect the problem. Air pollution is significant risk factor to for number of pollution related diseases and health conditions. It also caused loss of biodiversity, changes in hydrological system. Thus To understand the quality of the air and by sensing the type of the dust particles we developed this application for the common people so they can get the proper information about the air quality. This application will provide the exact information about the pollution condition and works on that pollution condition for further processing

KEYWORDS: -Dust Particles, Aurduino mini pro, DHT11, ESP8266, Dust Sensor, Android.

I. INTRODUCTION

The air pollution level around the developing and developed countries is increasing due to various factors like industries, automation, and the most important factor is destroying the trees for the developing the infrastructure and the vehicles .So it is necessary to understand and detect the problem. Air pollution has raised great concern over the past few decades due to the increasing expansion of the industries. Some of the chemical pollutants in the air can increase the occurrence of the disease such as lung cancer and many more. The human health effects of the poor air quality is reaching, but principally affect the body's respiratory system, and other system also get affected. The common person doesn't get the idea about the air and dust in the environment. Therefore To understand the quality of the air and by sensing the type of the dust particles we developed this application for the common people so they can get the proper information about the air quality. This application will provide the exact information about the pollution condition and works on that pollution condition for further processing.

The main aim of our project is to understand and sense the dust particle over the particular region and loading it on the cloud. So that the developmental measures can be applied globally on it. The sensor will understand the quality of the air by sensing the dust particles. Since the hazard gases are spread over the very large scale region and causing huge irreparable damage and that's why there is growing the damage for the air pollution monitoring. This project is a sub module of an ongoing international project which will be installing over the 1000 units of the system all across the globe to identify the problem and collect the data. The project module contains two parts which are segmented into hardware and software. Aurduino mini pro and ESP8266 together is capable enough to take an analog input from the dust sensor and upload on the cloud via Wi-Fi device. The android application can be easily made and graphs can be made by the Json parsing in android studio. By using this application the updates will be always

available for all over people in the world. And the government also will get the complete information about the condition of the pollution in their particular place and they can take correct decision for the common public.

The project contains two parts which are segmented into hardware and software. The ESP12 is microcontroller is a microcontroller based Wi-Fi module which is capable enough to take the analog input from the dust sensor and upload on the cloud via Wi-Fi device. In the place of ESP12 we can use an Arduino pro mini and ESP8266 together for the same task. The difference is only the cost. Now the fan is present there so as to pass in the air and give it to the sensor. Make sure that while controlling the fan from the controlling device. Arduino and ESP8266 it should be controlled via a transistor. It must be same for operating. Now when the controlling device collects the sensor data, it will upload on the cloud. The database will be phpmyadmin for the prototype. For large amount of data, big data like (hadoop) can be used. The data will be handled by the php scripts. For interchanging, pearl, ruby and python can be used for interfacing. The android app can be made easily and the graphs can be made by Json parsing in Android Studio.

II. LITURATURE SURVEY

[1]Nihal Kulratna and B. H. Sudantha presented environmental air pollution monitoring system in 2008. The system based on the IEEE 1451 standard. In this paper STIM smart transducer interface module was developed which consist of microcontroller and group of various sensors like CO2, O3, NO2, CO. This also used personal computer PC for graphical representation. STIM connected to the PC via transducer independent interface which uses IEEE 1451 standard. [2] In the year of 2010 A. R. Ali-Ali, Imran Zualkernan and fadi Aloul mobile GPRS sensor for the pollution monitoring. This included data acquisition unit, GPRS module and pollution server. In this DAQ unit, GPRS and GPS were connected to the microcontroller via RS-232 Interface and finally gathered data were sending to the pollution server. [3] Raja Vara Prasad et al. In 2011 proposed a real time wireless pollution monitoring. This system was based on the multihop data aggregation algorithm. Calibrated gas sensors were interfaced to wireless sensor motes, in that Libelium WASP mote was used which consist of processing unit and communication unit. All gas sensors were connected to sensor board on rotational basis. The collected data were sending to base station. Multihop data aggregation algorithm was used to increase a monitoring range. [4] Jen-Hao Liu et al. introduced micro-scale air quality monitoring system for urban areas in 2012. This system monitors the concentration of carbon monoxide co caused by heavy vehicles emission. Sensor nodes were deployed in highly populated areas. System was integrated with the GSM for data transmission. Gateway collected the data from all sensor nodes and sends to control centre by GSM network.

III. RELATED WORK

The present existing system has multiple drawbacks which we want to overcome through the current project. The following are the factors represent the current system. Most of the sensor which controls the data in India is government base. Where there is a dedicated building or infrastructure and through that tower, the data is collected. So there are many places in India which still don't have access to these sensor data.

There are currently lots of sensor modules or the device which gets imported in India from other countries. Basically these sensors are very much costly because they are imported from other countries. Also the technical issues are very hard to solve which again makes it hard to purchase. Satellite is used with the combination of on ground sensors that collect the data and manually get uploaded on the cloud. The procedure is tedious and long which makes the overall process very much long. There are vehicles which monitor the air quality on the run. This type of vehicle travel around other cities and then collect the dataof the specific places. These vehicles are excellent in monitoring the weather conditions but they may be very expensive.

IV. PROPOSED SYSTEM

The proposed system uses very cheap sensor module but extremely powerful. The modules will be around 80% less than current present module in the market will make it accessible for the mid average families. In this generation every person is working on the internet or they uses multiple application with internet so this will be easily affordable by the users and they can easily handle this application. The sensor will detect the air quality and upload it

on the cloud for everyone. So the person regardless of having the device or not can see the accurate data of the air quality in the user home, which will help realize the problem and take necessary measures to deal with the problem. Right now in the current system we are using an arduino mini pro with esp8266 Wi-Fi module, which will be connected to a dust sensor. This system will be connected to a cloud where the data will be uploaded. There will be an android app and web app which will be accessible in the smart phones and computers through which the user can see the data of not only their environment but also others to. The ESP12E is the microcontroller based Wi-Fi module which is capable of taking analog input from the dust sensor and upload it on the cloud, here we are using Arduino mini pro and ESP8266 together for the same task.The devices which are currently available in the market are very much costly due to import duties on it. To deal with it we have used low cost hardware and simplified the process to cut the cost, which makes more affordable thus user.Innow days every person is working on the internet or they uses multiple application with the internet so this will be easily affordable by the user and they can easily understand the working of the application.

V. ARCHITECTURE DIAGRAM
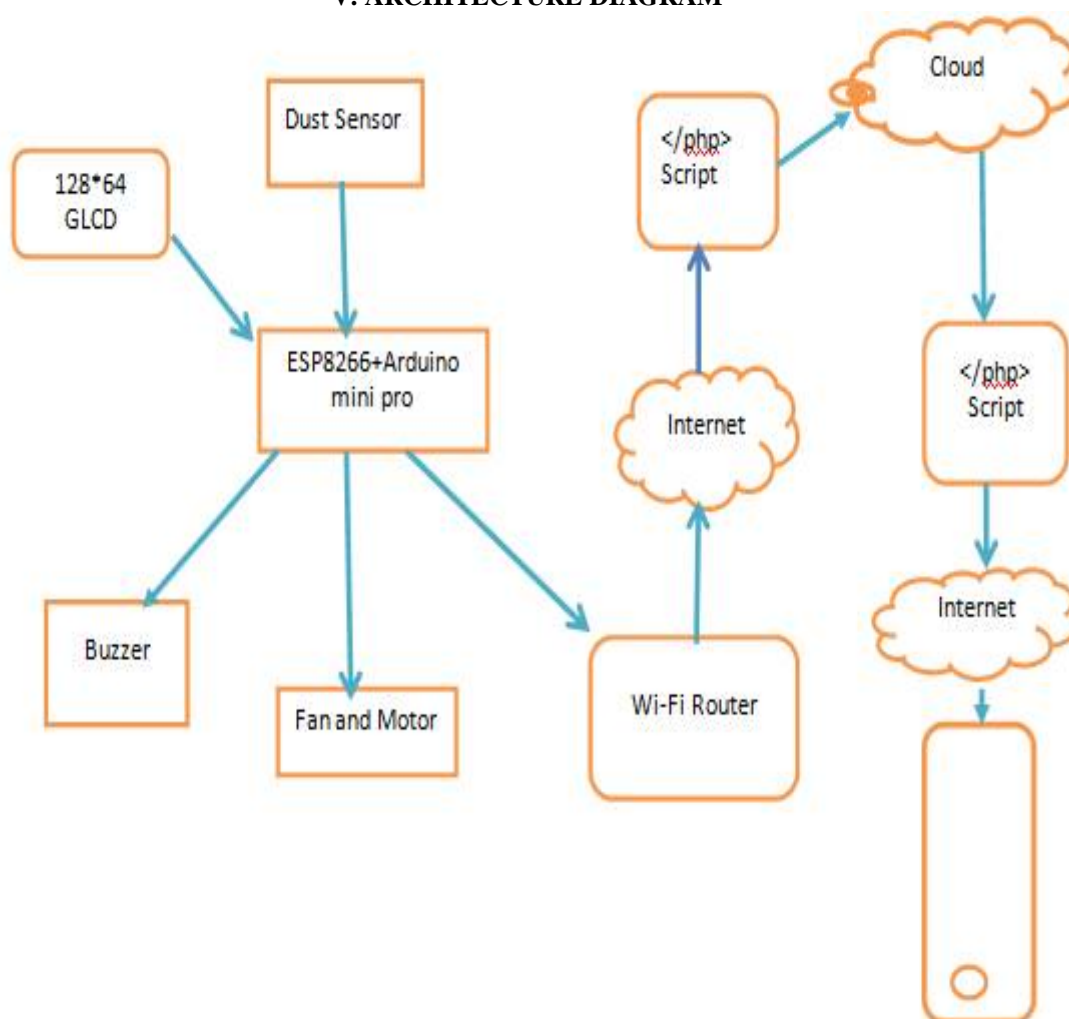
VI. MODULES
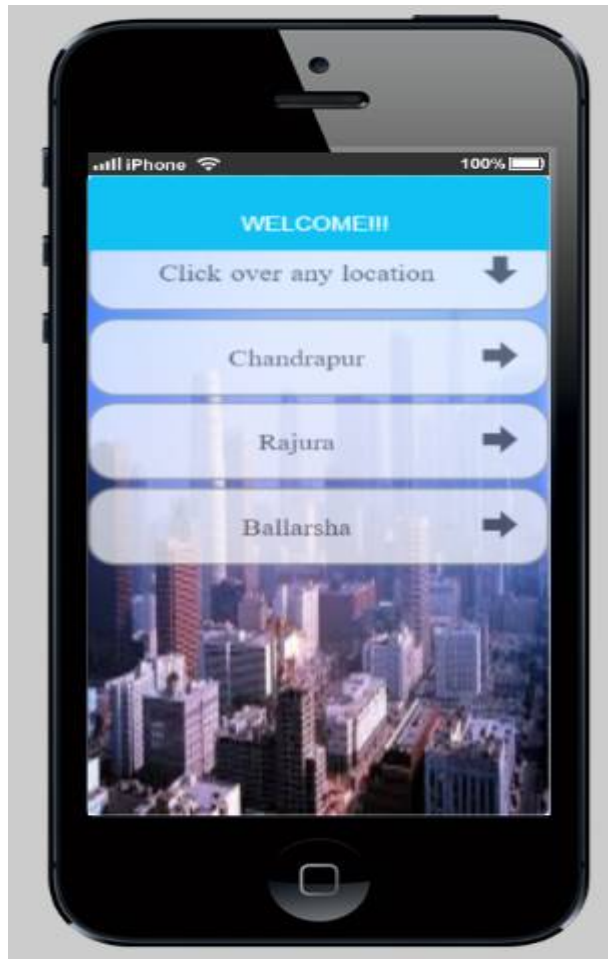
This is our very first module name as Location in which the user has to select any location from the given to check there air quality. If user wants to check the temperature, humidity and dust of any particular location firstly the user has to click on the location then the user will go on the next module.

When the user selects the location, on the next module the user has to choose the temperature or humidity or dust at a time. If the user wants to check the temperature then the user must click on the temperature button and the user get a result in the graphical form.

VII. RESULT ANALYSIS

This experiment were conducted to obtain the air quality such as temperature, humidity and dust particle and also to understand the characteristics of the sensors. The sensors node has been tested in real time environment and the data received wirelessly in the remote monitor as well as in android application. The response of the result will present in some seconds of time. The result of this experiment is represented in the graph given below. To get the intimation whenever the gas concentration exceeds some threshold level alarm mode is used. Here the alarm mode is the blink LED. In this mode the user can set the constant threshold level for the sensor from remote monitor.

This figure shows the final result of our project which is in the form of graph of temperature, humidity and dust respectively. The same result will be shown on the monitor hence the application is hybrid type software application.

VIII. CONCLUSION

To live a healthier life and for the welfare of every common people we developed this application. So the common people can also know the about the air quality around us in the environment. This application will provide the exact information about the pollution condition in the environment and will upload on the cloud for the further processing by sensing the type of dust particles, temperature and humidity also. Therefore

REFERENCES

1.   WHO, Global Environment Change, World Health Organization, Geneva, Switzerland, 2005.
2.   U. Poschl, Atmospheric aerosols: Composition, transformation, climate and heakth effects, J. Atmospheric Chem. Sci, vol.44, pp.7520-7540, Nov.2005.
3.   N. Kularatna and B. H. Sudantha, An Environmental Air Pollution Monitoring System Based on the IEEE 1451 Standard for Low Cost Requirements, IEEE Sensors J., vol.8 no.4, pp.415428, Apr.2008.
4.   D. D. Lee and D. S. Lee, Environmental gas sensors, IEEE Sensors J., vol.1, no.3, pp.242-251, Oct.2001.
5.   Y. J. Jung, Y. K. Lee, D. G. Lee, K. H. Ryu, and S. Nittel, Air pollution monitoring system based on geosensor network, in proc. IEEE int. Geoscience Remote Sensing Symp., vol.3, pp.1370-1373.s
6.   M. Gao, F. Zhang, and J. Tian, Environmental monitoring system with wireless mesh network based on embedded system, in Proc. 5th IEEE Inc. Symp.EmbededComput, 2008, pp. 174-179.
7.   F. Gil-Castineira, F. J. Gonzalez-Castano, R. J. Duro, and F. Lopez-Pena, Urban Pollution Monitoring though Opportunistic Mobile Sensor Network Based on Public Transport, in Proc. IEEE CIMSA 08, 2008, pp.70-74.
8.   A. Y. S. Lam and V. O. K. Li, Chemical reaction optimization: A tutorial,Memtic Computing, vol. 14, no.1, pp. 3-17, Mar. 2012.
9.   Citybus Limited and New World First Bus Services Limited, Route List, Available: http//www.nwstbus.com.hk/routes/routesearch.aspx, access date: Nov. 17th, 2011.
10. Code Project, AI-Simple Genetic Algorithm (GA) to solve a card problem [Online]. Available: http://www.codeproject.com/KB/receipes/Genetic Algorithm.aspx