SN Lab Project

Project Title : Air and Noise Pollution Monitoring System

Student Name :

1. Hemant Yadav
2. Rohan Deshmukh
3. Kamlesh Verma

Abstract :

Now a days in metropolitan cities air and noise pollution becomes serious issues. due to high decibels and toxic gases present in the environment which directly effect on human's health and thus needs a special attention. Therefore, it has now become necessary to control the pollution (air and noise)to ensure healthy livelihood and better future. To overcome with these issues, Here we implement the system. Where it detects the harmful gases and noise present in the environment. The embedded sensors in the system help to detect major air polluting gases such as CO2, SO2 and CO and level of sound pollution. The Air and noise Pollution Monitoring device can be accessed by the authorities and the common people belonging to the area. The device will be installed through a mobile application which will show the live updates of the pollution level of the area. It could be controlled in time to reduce the pollution which may affect the environment. This system works on the methods of IOT which is a rising technology based on the fusion of electronics and computer science. The concept of IOT helps to access data from remote locations.

Introduction :

In this era of modernization, technologies are advancing rapidly. Every day we realize some new technology coming in market to simplify our lives more than ever. Back in time checking the pollution in a particular area was a very tedious task which was not very efficient also. With the increasing pollution and advancing technology various new methods were introduced to keep an eye on the rapid increase in pollution more efficiently. Internet of things is one of the latest works that has been done in this path. The increment in use of internet and the interaction of human with machine gave rise to IOT. It allows exchange of information among various devices like fridge, washing machine, automobiles, watches etc. This exchange of information takes place with the help numerous sensors. The account for the success of IOT is its efficiency and makes it a feasible technology at low cost. Air and noise pollution are two main constituents that have the most adverse effect on humans as well as the entire earth. Therefore it is very important to check and control it. Traditional methods involves manual work in which data loggers used to visit the site to collect the data, analyse it and perform comparisons to provide the output which was very lengthy and time consuming besides being inefficient. The pollution monitoring system involves use of sensors (MQ135 and sound sensor FC04) which measures the noise pollution concentration and level of harmful gases like CO and SO2 which mainly pollutes the air. Comparisons are

done automatically using previously stored data in database and output is stored on cloud to make it accessible from remote areas. This paper involves description of the system that presents its output with the help of an android application which the user can download in their mobile phones and access it whenever they want. It can be used for notifying the authorities.

Requirement :

- MQ135 Gas sensor
- Arduino Uno
- Wi-Fi module ESP8266
- 16X2 LCD
- Breadboard
- 10K potentiometer
- 1K ohm resistors
- 220 ohm resistor
- Buzzer

Literature Survey :

Uncooled low noise frontend of the receiver system for ground-based monitoring of stratospheric ozone and carbon monoxide

P.M. Forkman ; V.M. Shulga ; V.I. Piddiachii ; A.M. Korolev ; V.V. Myshenko ; A.V. Myshenko

The Fifth International Kharkov Symposium on Physics and Engineering of Microwaves, Millimeter, and Submillimeter Waves (IEEE Cat. No.04EX828)

The motive of making a smart city can be fulfilled by using technology, thus making the life better and also enhancing the quality of services, therefore meeting every individual's needs. With modern technology in fields of information and communication, it has become easy to interact with the authorized people of city to tell them where about of the area or city, how well the city is developing and how to make it possible to achieve a better life quality. In this system, an application was created to make one more step in the fulfillment of the goal. An area is analyzed for evaluating how much pollution is affecting the area. The components of gases and their amounts are calculated and checked. If the amount is higher than normal then the officials are reported about it. After that the people are made to clear the area and taken to a safe place. The combined network architecture and the interconnecting mechanisms for the accurate estimation of parameters by sensors are being explained and delivery of data through internet is presented. Some of the research work made for monitoring the pollution parameters in a particular location in order to make the environment safe and that area smart. Different

methods were used in the past and are described in this section. First is Smart Environment Monitoring using Wireless sensor networks in which the main focus was on the developing an environment free of pollution by making it smart. Wireless sensors are fitted all over the city and in public transports. By monitoring all the sensor networks, all the environmental happenings can be gathered as a streaming database to analyse the environmental position.

Architecture :

This system is made to fulfil the purpose and need of the society to monitor and check the live air quality and noise pollution in an area through IOT. The system uses air sensors to check the presence of harmful and hazardous gases/ compounds [such as Methane, propane, Butane, alcohol, noxious gases, carbon monoxide etc.] in the air and also uses the noise sensor to keep measuring noise level in the surroundings. MQ135 is the air sensors which are used to collect air pollutants and a noise sensor module mic is used to capture sound. These sensors interact with microprocessor which processes this data and then transmit it over the mobile application. To send the data over remote location WIFI module is also installed. And whenever the noise pollution is detected, a buzzer immediately beeps and when there is a air pollution an buzzer starts beeps for three times. With this system not only the authorities but also the localized people can check the transmitted data through their mobile phone and that too without spending single rupee and the people can act against it on their level and try to bring the pollution level under control. This system would contribute as a part in the building of a healthy society.

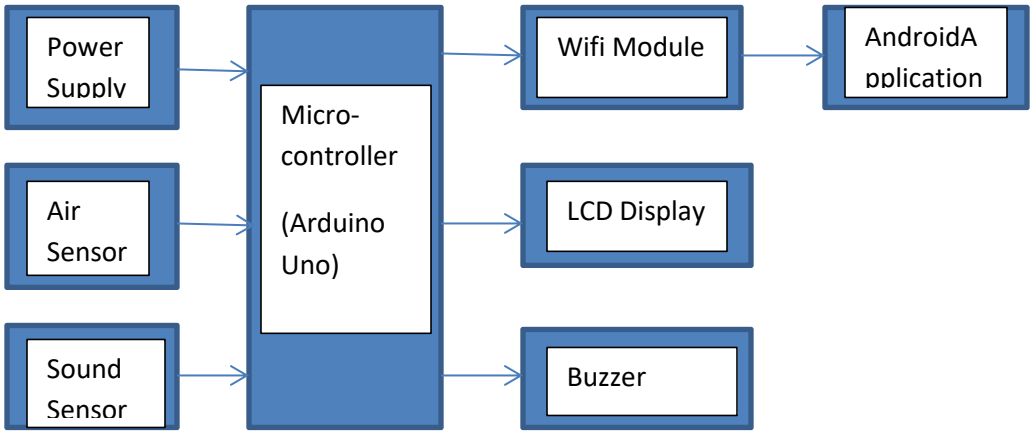

Fig. Block Diagram

Working Explanation :

The MQ135 sensor can sense NH3, NOx, alcohol, Benzene, smoke, CO2 and some other gases, so it is perfect gas sensor for our Air quality monitoring project. When we will connect it to Arduino then it will

sense the gases, and we will get the Pollution level in PPM (parts per million). MQ135 gas sensor gives the output in form of voltage levels and we need to convert it into PPM. So for converting the output in PPM, here we have used a library for MQ135 sensor, it is explained in detail in “Code Explanation” section below.

Sensor was giving us value of 90 when there was no gas near it and the safe level of air quality is 350 PPM and it should not exceed 1000 PPM. When it exceeds the limit of 1000 PPM, then it starts cause Headaches, sleepiness and stagnant, stale, stuffy air and if exceeds beyond 2000 PPM then it can cause increased heart rate and many other diseases.

When the value will be less than 1000 PPM, then the LCD and webpage will display “Fresh Air”. Whenever the value will increase 1000 PPM, then the buzzer will start beeping and the LCD and webpage will display “Poor Air, Open Windows”. If it will increase 2000 then the buzzer will keep beeping and the LCD and webpage will display “Danger! Move to fresh Air”.

Conclusion :

This IOT based air and noise pollution monitoring device is a great step towards a healthy livelihood. With the help of this device not only the municipal authorities but even the common people can participate in the process of controlling pollution and ensure safe environment. This automatic device, once installed is capable of continuously tracking the pollution level and analyse the detected information. The most highlighting feature of this device is that the output is represented in digital as well as analog format with the help of a simple mobile application which is usable on all android devices like smart phones, tablets, PDA's etc. The device itself is very eco-friendly and does not harm the environment in any way. Moreover, it is based on one of the modern technology and also inexpensive as compared to other technologies developed so far and can be installed anywhere.

Reference :

https://nevonprojects.com/iot-air-sound-pollution-monitoring-system/

https://www.irjet.net/archives/V5/i3/IRJET-V5I3849.pdf

https://www.irjet.net/archives/V5/i10/IRJET-V5I10316.pdf

https://www.ijser.org/researchpaper/Sound-and-Air-Pollution-Monitoring-System.pdf

http://ieeexplore.ieee.org/abstract/document/8301660/

https://www.scribd.com/document/360845699/Air-and-Sound-Pollution-Monitoring-System-using-IoT

https://circuitdigest.com/microcontroller-projects/iot-air-pollution-monitoring-using-arduino

https://www.ijareeie.com/upload/2017/march/49_IOT.pdf

https://www.researchgate.net/publication/319122626_IOT_BASED_AIR_AND_NOISE_POLLUTION_MONITORING_SYSTEM

https://www.googleadservices.com/pagead/aclk?sa=L&ai=DChcSEwj0spGXtbrgAhXYIysKHbqrAYsYABAAGgJzZg&ohost=www.google.com&cid=CAASE-Ro-OZmyPSBHtePdW7F8A82BmY&sig=AOD64_2GeEaSR0FtafghsIHHRxXXg5tPLA&q=&ved=2ahUKEwijxYqXtbrgAhXCuo8KHUagDh0Q0Qx6BAgLEAE&adurl=