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IOT BASED AIR AND SOUND POLLUTION MONITORING SYSTEM

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ABSTRACT:

The pollution of air and sound is increasing abruptly. To bring it under control its monitoring is majorly recommended. To overcome this issue, we are introducing a system through which the level of sound and the existence of the harmful gases in the surroundings can be detected. The growing pollution at such an alarming rate has started creating trouble for the living beings, may it be high decibels or toxic gases present in the environment leaves a harmful effect on human's health and thus needs a special attention. This device is also capable of detecting the fire in its area and notify the same to the fire brigade authorities so that they could take necessary actions accordingly, and also the mobile applications will be installed in the fire brigades itself so that if a fire is taking place nearby, it could be controlled in time to reduce loss of people and property. This system works on the methods of IOT which is a rising technology based on the fusion of electronics and computer science. 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 concept of IOT helps to access data from remote locations and save it in database so that we don't need to actually be present in that area.

Keywords: IOT, Gas, Air pollution, with cloud resistance.

1. INTRODUCTION

Air and sound pollution is a growing issue these days. It is necessary to monitor air quality and keep it under control for a better future and healthy living for all. Here we propose an air quality as well as sound pollution monitoring system that allows us to monitor and check live air quality as well as sound pollution in particular areas through IOT. System uses air sensors to sense presence of harmful gases/compounds in the air and constantly transmit this data to microcontroller. Also system keeps

measuring sound level and reports it to the online server over IOT. The sensors interact with microcontroller which processes this data and transmits it over internet. This allows authorities to monitor air pollution in different areas and take action against it. Also authorities can keep a watch on the noise pollution near schools, hospitals and no honking areas, and if system detects air quality and noise issues it alerts authorities so they can take measures to control the issue. Some future consumer applications envisioned for IoT sound like science fiction, but some of the more practical and

realistic sounding possibilities for the technology include: Receiving warnings on your phone or wearable device when IoT networks detect some physical danger is detected nearby. Self-parking automobiles. Automatic ordering of groceries and other home. Automatic tracking of exercise habits and other day-to-day personal activity including goal tracking and regular progress reports. Network Devices and the Internet of Things All kinds of ordinary household gadgets can be modified to working an IoT system. Wi-Fi network adapters, motion sensors, cameras, microphones and other instrumentation can be embedded in these devices to enable them for work in the Internet of Things. Home automation systems already implement primitive versions of this concept for things like light bulbs, plus other devices like wireless scales and wireless blood pressure monitors that each represent early examples of IoT gadgets.

2. LITERATURE SURVEY

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 the whereabouts 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 is being explained and delivery of data through internet is presented.[1] 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 [4]. First is Smart Environment Monitoring using Wireless sensor networks[5] 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 analyze the environmental position. The monitoring data gathered from stationary nodes installed in the city to the mobile nodes placed on public transports is given by this technique. Second is Toward a Green campus with the internet of things. It is an implementation of idea to save energy through adequate management of computer machines and air conditioner. It is based on the theory of internet of things [7]. Third is WSN- and IOT based Smart Homes and their extension to Smart Buildings [7]. This work is based on the use

of reliable, efficient, real-time and economical sensor networks for making smart homes. In this, the sensor nodes are fitted into the different areas of home. These nodes produce data of the movement done in the home or any usage of an object. Further, these homes are extended to smart buildings [4].

3. RELATED STUDY

In recent years, IoT has gained a lot of importance in the field of science, The Internet of things (IoT) is the network of vehicles, home appliances, and other items which have electronics embedded within, there are software, sensors which help in connectivity which enables these things to connect, collect and exchange data. The word "Internet of Things" is consisted of two main parts; Internet the backbone of connectivity, and "Things" meaning devices . According to analyst firm Gartner and as shown in figure 1.1, there will be 8.4 billion connected things in 2017, setting the stage for 20.4 billion Internet of Things (IoT) devices to be deployed by 2020[5]. The purpose of this project is to identify the harm caused by the air and sound pollution to the environment. Pollution in simple words can be explained by, the presence of an foreign object in the environment which has harmful effect, we as a society have to ensure that all the pollution levels are maintained to the minimum, both first and second tier cities in Indian perform extremely poorly in cases of Air and Noise pollution India tops the world in pollution related deaths, accounting to 2.5 million

deaths of the total 9 million worldwide. This project helps in detecting the major gases in air and the decibel levels in the surrounding environment. Our project will be a boon to the society as our project will be making sure that every individual will be able to keep a track of the pollution from our app. It is the need of the hour to monitor air quality and keep it under control for a better future and healthy living for all. 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.

4. PROPOSED SYSTEM

The air and noise pollution monitoring system consists of ARM7 microcontroller [5] and sensors. Microcontroller is also known as the mind of the device. Initially, the microcontroller is provided with a 5V supply. Sensors provide the data to the microcontroller that is displayed on the LCD display continuously, LCD Display is connected to the microcontroller board and if the air pollution exceeds the set limit (defined by the programmer) then the output

is shown in the analog form i.e. if the air pollution is raised it will be displayed on the output pane, Buzzer simultaneously buzz and similarly when the sound pollution exceeds the set limit (90dB in this case) the buzzer will be displayed as output on the output panel. Now the data which is retrieved from air and sound sensor will be provided to the WiFi module which is connected to the 3.3 V pin on the microcontroller board. This WiFi module (nRF24L01 module) will then provide this data to the android application accessible to all the android phone users and accordingly the local people can take actions on their part.

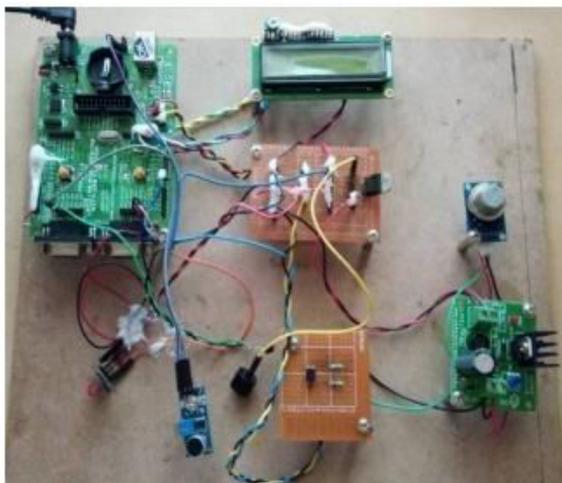


Fig.4.1. Proposed hardware model.

The air and sound pollution monitoring system monitors air and noise pollution using a mobile application. It shows the digital value of air and sound pollution and user can analyse it with a graph. It becomes very easy for us to rectify the levels and air and noise pollution around and plan for a healthy living and surrounding. The figures that are included in our paper shows the way

the system works and how the output is obtained from the input after processing.



Fig.4.2. Output results.

5. CONCLUSION

This IOT based air and sound 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.

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