

A SYSTEM FOR MONITORING AIR AND SOUND POLLUTION USING ARDUINO CONTROLLER WITH IOT TECHNOLOGY

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Abstract

Air and sound pollution is growing issue these days. It is necessary to monitor air quality for a better future and healthy living for all. In this paper, 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 area through IoT. It uses air sensors to sense the harmful gases like NH₃, Benzene, smoke and CO₂. Also system keeps measuring sound level and reports it to the online server over IoT. The main aim of the paper is to monitor air pollution in different areas and we can keep a watch on noise pollution.

Keywords- Pollution, air quality, noise, sound level.

1. INTRODUCTION

An air pollution is a substance in the air that can have adverse effects on humans and eco system. The substance can be solid particles, liquid droplets, or gases. A pollutant can be of natural origin or man-made. Pollutants are classified as primary or secondary. Primary pollutants are usually produced from a volcanic eruption. Other examples include carbon monoxide gas from motor vehicle exhaust or sulphur dioxide released from factories. Secondary pollutants are not emitted directly. Rather, they form in the air when primary pollutants react or interact. Ground level ozone is a prominent example of secondary pollutants. Pollutant either emitted directly or formed from other primary pollutants.

In order to mitigate the impacts of air pollution on human health, global environment and worldwide economy, governments have put tremendous efforts air pollution monitoring. With detailed information of the air pollution situation, scientists, policy maker and planners are able to make informed decisions on managing and improving the living environment. Human needs demands different types of monitoring system these are depends on the type of data gathered by sensor devices. Initially the sensor devices are deployed in environment to detect the parameters noise, CO. The sensor devices are placed at different locations to collect the data to predict the behavior of particular area of interest. The main aim of this paper is to design and implementation of efficient monitoring system using IoT. In this paper we also present a trending results of collected and sensed data with respect to normal or specified ranges of particular parameters. A solution for monitoring the noise and air quality levels using embedded computing is proposed. The embedded system used to monitor the fluctuation of parameter like noise and air pollution level from normal levels.

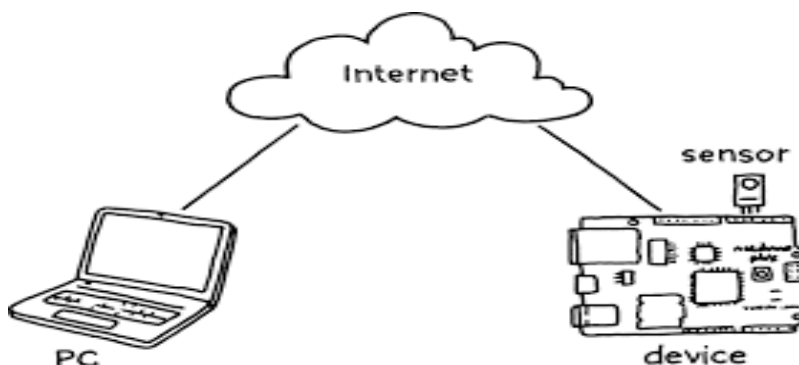


Fig 1. Internet Of Things

2. EXISTING SYSTEM

In today's world many pollution monitoring are designed by considering different environmental parameters. Existing system model is presented in figure 1 uses Zigbee based wireless sensor networks to monitor environmental conditions. The sensor nodes directly communicate with nodes deployed on the object of interest which avoided the use of complex routing algorithm but computation are very minimal. RFID is means of storing and retrieving data through electromagnetic transmission to an RF compatible integrated circuit. It consist of two main components: tags and readers. A tag has identification number and a memory that stores additional data such as manufacturer and product type.

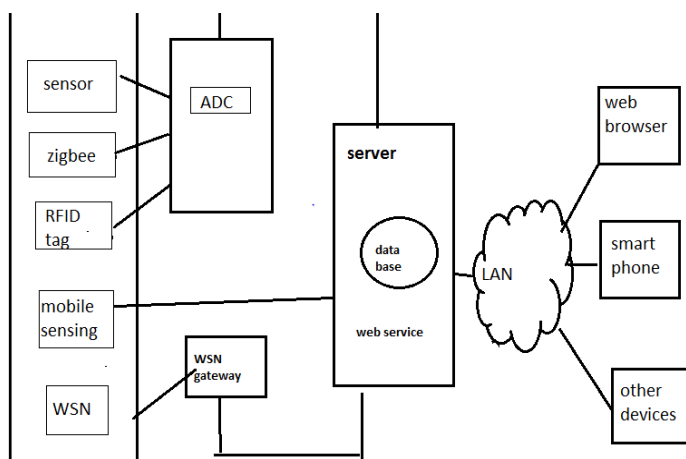


Fig .2. Existing system

The reader is able to read and /or write to tag via wireless transmission. Tags are attached or embedded into the object that are needed in identification and tracking. Mobile phones or smart phones that are enabled with sensors are used for impact on social including how mobile technology has to be used for environmental protecting sensing. A wireless sensor network consist of many inexpensive wireless sensor which are capable of collecting, storing, processing environmental information

communicating with neighbor nodes. The access method of WSN gateway node is convenient because the data can be received from a WSN via gateway at any time and any place. The internet that are connected through LAN and made available for users via smart phones, web browsers and other web browser devices to make the system more intelligent, adaptable and efficient.

3. PREVIOUS WORK

Some of research works carried out for monitoring the pollution parameters in particular area for making the environment smart in that area, different techniques and methods were used past discussed in this section .Smart environment monitoring using wireless sensor networks- in this work they are mainly focus on the making the city environment smart, by deploying wireless sensor network in all over the city and moving public transportation systems buses and cars.This research work adopts the concept of “internet of things” WSN and IoT –Based smart homes and their extension of smart building-this works mainly aims to design and develop reliable, efficient, flexible, economical real time and realistic wellness sensor networks for smart homes.

4. PROPOSED SYSTEM

The proposed embedded device for monitoring noise and air levels in atmosphere to make the environment intelligent or interactive with object. The proposed model is adaptable and distributive in nature to monitor the environmental parameters. The architecture is developed for noise and air pollution monitoring. Smart sensor network are the emerging field of research which combines many challenges of computer science, wireless communication and electronics.

Block Diagram

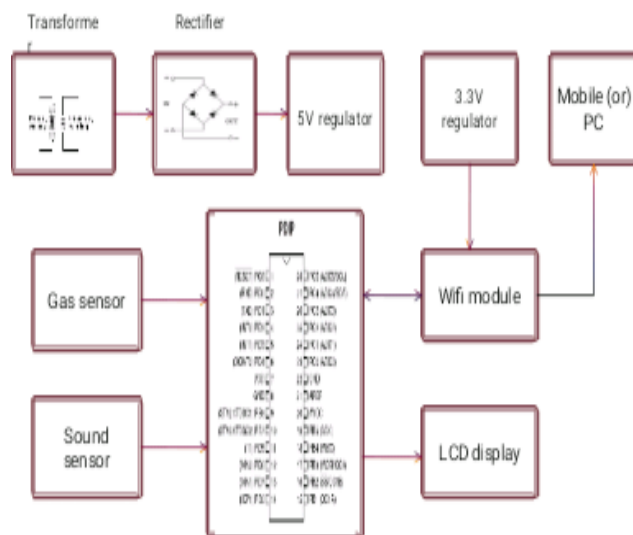


Fig 3.Block Diagram of Proposed System

In this project a solution for monitoring air and sound pollution level in industrial environment or particular area of interest using wireless embedded computing system is proposed. The solution includes the technology internet of things(IoT) which is outcome of merged field of computer science and electronics. Here sensing devices are connected to the embedded computing system to monitor the fluctuation of parameters like noise an air pollution levels from their normal levels. This model is adaptable and distributive for any environment that needs continuous monitoring, controlling and behavior analysis. The end users can browse the data using mobile phones, PCs etc.

5. RESULT AND ANALYSIS

After sensing the data from different sensor devices which are placed in particular area of interest and constantly transmit the data to microcontroller .The harmful gases will be detected using this system. Also keeps measuring the sound level an reports it to the online server over IoT. The sensor interact with which processes this data and transmit it over internet. This allows users to monitor the air and noise pollution in different areas. This model further expanded to monitor the developing cities and industrial zones for pollution monitoring. To protect the public health from pollution, this provides efficient, low cost solution for continuous monitoring environment.

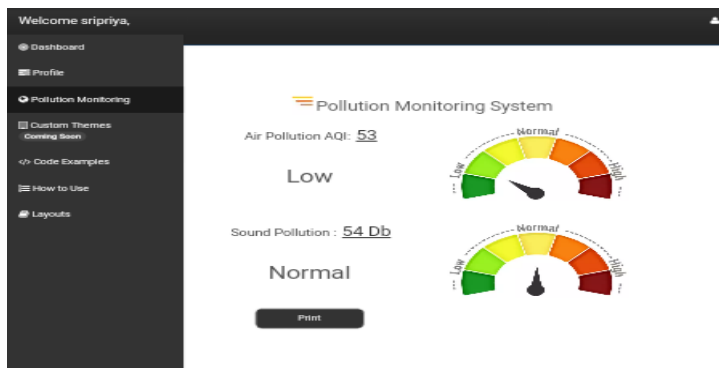


Fig 4 Displayed Output For Pollution Monitoring

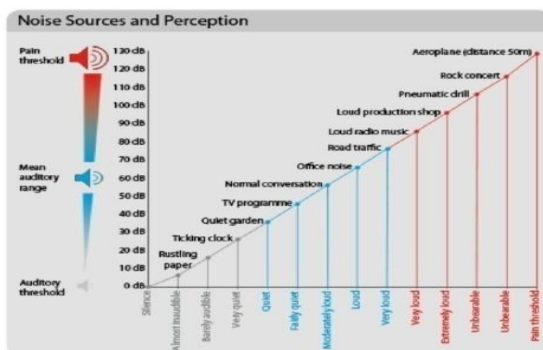


Fig 5. Graph For Noise Pollution

CONCLUSION

By keeping the embedded devices for monitoring enables self protection to environment. To implement this need to deploy the sensor devices in the environment for collecting data and analysis. By deploying sensor devices in the environment, we can bring the environment into real life. It can interact with other objects to the network. Then the collected data and analysis results will be available to the end user through the Wi-Fi.

The smart way to monitor the environment and an efficient, low cost embedded system is presented with different models in this paper. In the proposed architecture function of different modules were discussed. The noise and air pollution monitoring system with Internet of Things concept experimentally tested for monitoring two parameters. This data will be helpful for future analysis and it can be easily shared to other end users. This model can be further expanded to monitor the developing cities and industrial zones for pollution monitoring .To protect the public health from pollution, This model provides an efficient and low cost solution for continuous monitoring of environment.

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