Iot Based Air and Sound Pollution Monitoring System

Rajat Sankhe
Department of ECE
Atharva College of Engineering,
Mumbai, Maharashtra, India.

Pravin Shirodkar
Department of ECE
Atharva College of Engineering,
Mumbai, Maharashtra, India.

Avinash Nangare
Department of ECE
Atharva College of Engineering,
Mumbai, Maharashtra, India.

Abhishek Yadav
Department of ECE
Atharva College of Engineering,
Mumbai, Maharashtra, India.

Prof. Gauri Salunkhe
Department of ECE
Atharva College of Engineering,
Mumbai, Maharashtra, India.

***Abstract*: 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 a 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.**

I. 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 a 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.

II. BLOCK DIAGRAM:

monitoring the movements of wildlife and their habitats. Development of resource constrained devices connected to the Internet also means that other applications such as tsunami or earthquake early warning systems can also be used by emergency services to provide effective aid. The analysis will be carried out for pollution due to changes in parameters because of,

1. Climate (Rain, Temperature, Environment, Dust) change.
2. Population.
3. 3.Industrial wastage.

Proposed System:

The goal of building a smart city is to improve*1T 1T* quality of life*1T 1T* by using technology to Improve the *1T 1T* efficiency*1T 1T* of services and meet residents needs. Information and Communication Technology allows city officials to interact directly with the public to tell what is happening in the city, how the city is evolving, and how to enable a better quality of life.*1T*A Smart City is one with at least one initiative addressing one or more of the following six characteristics: Smart Governance, Smart People, Smart Living, Smart Mobility, Smart Economy and Smart Environment. We are going to develop an app that is going to bear a hand in this campaign .Consider an area that is being surveyed for estimating how much the area is affected by pollution. The constituents of air along with its proportion are calculated and if it is higher than normal then the officials are intimated about it. Then the people are evacuated to a safe place.

Implementation and Result Analysis:

1. Any Smart Phone.
2. Sensors.
3. Cloud / Big Data.
4. Internet of Things.
5. Internet connection is also required.
6. Any Locality.

The first group ofdevices areconstrained devices which have limitedresources and features and hence rely on other devices to perform some processes. The external devices are smart gateways which possess a threat to expose the functionality to the clients. The second group of devices are unconstrained devices which have enough features and resources that are necessary to run processes. Even if the unconstrained devices lackthe necessary feature to perform a particular process, theyhave middleware components that provide the functionalities directly to the client via a platform or third party cloud service. The next layer or the middle layer in the architecture of the Internet of Things is the software layer, which supports an open source platform. The task of this layer is to provide a mechanism to define and setup the functionalities of the hardware like sensors, actuators, process handling etc. and also organize them I order to build the services (either simple or complex). The software level also has the task of implementing necessary protocols, connectivity drivers and communication standards. The final layer in the architecture Internet of Things is the user layer.

This layer consists of clients which make use of the services provided by the software layer. The clients can be smart phones, TV's, laptops, smart machines, home appliances etc. The hardware circuitry comprises of a Micro controller that acts as a core component.
Supply is given by a DC power supply. For sensing the pollutants or the carbon particles in the air, a carbon sensor is employed. The carbon sensor detects the level of pollutants in air and gives the output in form of analog signal. Since, a microcontroller take s input in the digital form so ADC is used that converts the analog output of the sensor in the digital form and gives it as a input to the micro controller. These values are continuously being shown on the LCD. A switchpad is used forentering the critical value. If the value of pollutants in air exceeds the critical Valueentered then the buzzer beeps and also a notification is sent to the webpage on Smart phone by the micro controller through the GPRS module. The IoT enables communication between the GPRS and the internet. The information is continuously being updated on the webpage that can be accessed globally. A notificationis also received on the webpage when the level of pollutants rises above critical value. Smartphone receives the signal from modem which it forward to server to the internet. Server analysis the data received from the smartphone. It concludes the output from the data received and sends the output over the internet.

III. INTERNET OF THINGS:

In the past decade, human life changed because of the internet. The internet of things has been heralded as one of the major development to be realized through out the internet portfolio of technologies. The Internet of Things (IOT) is concerned with inter connecting communicating objects that are installed at different locations that are possibly distant from each other. Internetof Things represents a concept in which, network deviceshaveabilityto collect and sense data the world, and then share that data across the internetwhere that datacan be utilized and processed for various purposes. The internet of things describes a vision whereobjects becomepart ofinternet: whereevery objectis uniquely identified and access to the network. IOT communication is quite different from the traditional human to human communication, bringing a large challenge to existing telecommunication and infrastructure. Further more, IOT provides immediate information regarding access to physical objects with high efficiency. The concept of Internet of Things is very much helpful to achieve real time monitoring of sensor data. Internet of Things (IOT)is akind of network technology, whichis based on information sensing equip ments such as RFID, infrared sensors, GPS, laser scanners, Sensors and soon, can make anything join the Internet to exchange infor mation, according to the protocol, which gives intelligent identification, location and tracking, monitoring and manage ment. Cloud computing provides the access of application sasutilities, overthe internet. Cloud computing is a large scale processing unit which processes in run time and it is also a very low cost technology based on the IP. The application area of IOT includes building and home automation, smart city project, smart manufacturing various products, wearables , health care systems and devices, automotive etc.

IV. MICRO CONTROLLER(ATMEGA8):

The Atmel ® ATmega8A is a lower CMOS 8-bit microcontroller based on the AVR® enhanced RISC architecture. By executing powerful instructions in a single clock cycle , the ATmega8Aachieves throughputs close to 1MIPS perMHz. This empowerssystem designer to optimizethe device for power consumption versusprocessing speed. Features • High-performance, Low-power Atmel AVR 8- bit Microcontroller • Advanced RISC Architecture – 130 Powerful Instructions - Most Single-clock Cycle Execution – 32 x 8 Genera l Purpose Working Registers – Fully Static Operation – Up to 16MIPSThroughput at 16MHz – On-chip 2-cycle Multiplier • High Endurance Non-volatile Memory segments – 8KByt es of In- System Self-programmable Flashprogram memory–512 Bytes EEPROM –1KbyteInternal SRAM – Write/Erase Cycles: 10,000 Flash/100,000 EEPROM – Dataretention: 20 years at 85°C/100 years at25°C(1)– OptionalBoot Code Section with Independent Lock Bits • In-System Programming by On-chip Boot Program • True Read-While-Write Operation – ProgrammingLock for SoftwareSecurity• AtmelQTouch® library support – Capacitivetouch buttons,sliders and wheels – Atmel QTouchand QMatrixacquisition – Up to 64 sense channels.

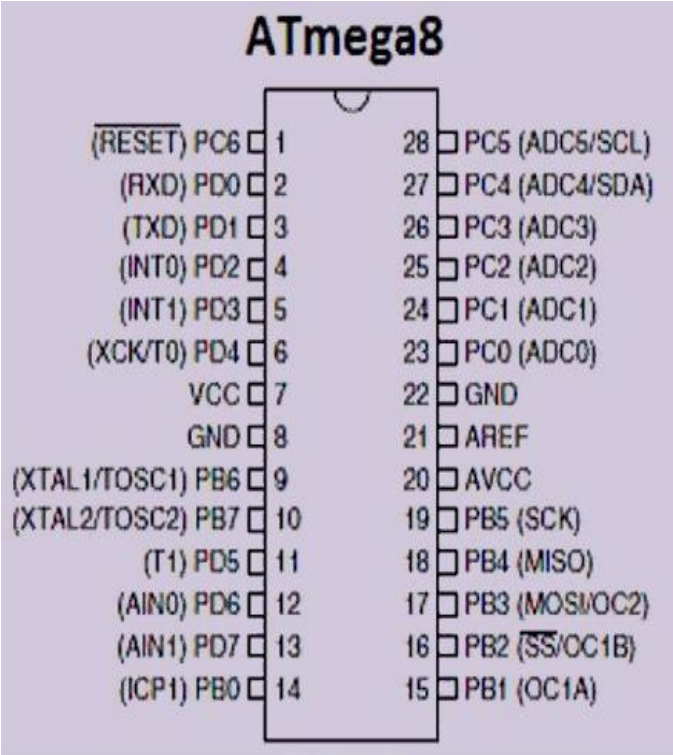

Figure.2

V. MQ-7 GAS SENSORE:

FEATURES * High sensitivity to carbon monoxide * Stableand long life APPLICATION. They are used in gas detecting equipment for carbon monoxide (CO) in family and industry or car. SPECIFICATIONS A. Standard work condition Symbol Parameter name Technical condition Remark Vc circuit voltage 5V±0.1 Ac or Dc VH (H) Heating voltage (high) 5V±0.1 Ac or Dc VH (L) Heating voltage (low) 1.4V±0.1 Ac or DcRLLoadresistanceCan adjust RHHeating resistance 33Ω±5% Roomtemperature TH (H) Heating time (high) 60±1 seconds TH (L) Heatingtime (low) 90±1 seconds PHHeating consumption About 350mW b. Environment conditions SymbolParameters Technical conditionsRemarkTao Usingtemperature -20-50Tas Storage temperature-20-50 Advice usingscopeRHRelative humidity Less than 95%RH℃℃O2O xygen concentration 21% (stand℃℃ condition)the oxygen concentration can affect the sensitivity characteristic Minimum value is over 2% Sensitivity characteristic symbol Parameters Technical parameters Remark Rs Surface resistance Of sensitive body 2-20k In 100ppm Carbon Monoxide a (300/100ppm) Concentrations lope rate Less than 0.5 Rs (300ppm)/ Rs (100ppm) Standard working Temperature - 20±2 relative humidity 65%±5%RL:10KΩ±5% condition Vc:5V±0.1V VH:5V±0.1V VH:1.4V±0.1V℃ Preheat℃ time No less than 48 hours Detect in grange: 20ppm-2000 ppm carbon monoxide.

Figure.3

VI. ADVANTAGES

It is Easy to use. Portable. It has High sensitivity. 4.Fast connectivity due to use of internet.

VII. CONCLUSION

The designof the air and sound quality monitoring Network basically involves determining the number of stations and their locations, with a view of the objectives, costs and available resources. To assist an industrialist, an expert system should be developed to fix the exact number and distribution of monitoring locations of a sensor. The expert system must contain some guidance to energy efficient continuous air and sound pollution monitoring sensornetwork.

VII. REFERENCES

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