

An Efficient Tracking System for Air and Sound Pollution Using IOT

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Abstract— Air pollution, due to some losses is increasing day by day affects the environment and causes biodegradation. This may be due to rapid economic growth and urbanization. Some directly affect people's health and cause population degradation. In order for the future to be good and healthy for everyone, it is very important to control and control the air quality and sound level. To overcome this problem, we create a model by creating a noise problem and the presence of pollution in the environment can be detected. The model recognizes the presence of pollutants and compounds in the air using a wind and sound sensor, respectively, and continues to connect this information to the microcontroller. More pollution like testing issues started to cause problems for people. Toxic substances in the air can be hazardous to human health and require special precautions. The model continuously measures the noise and calculates them online via the IoT to the host. Thanks to the use of the Internet, audit data can be retrieved from remote locations without easy access. The nature of this monitoring model depends on the information structure of the organization or the cooperation between decentralized sensor and data conversion units.

Index terms— MQ135 sensor, sound sensor module and ATmega328P Arduino microcontroller

I. INTRODUCTION

Air and sound pollution is a growing issue these days. It is necessary to monitor the air and sound pollution levels to ensure a healthy and safe environment. With the rapid increase in infrastructure and industrial plants, environmental issues have greatly influenced the need of smart monitoring systems. Due to its low cost, high efficiency and versatility, Internet of Things (IoT) has become very popular now these days. Internet of Things (IoT) allows interaction between devices and humans. It forms a communication medium from human to machine. Previously, data collectors had to travel long distances to the various locations to collect data after which the analysis was done. This was lengthy and time consuming. But now,

sensors and microcontrollers connected to the internet can make environmental parameter monitoring more flexible, accurate and less time consuming. When environment merges with sensors and devices to self-protect and self-monitor it forms a smart environment. Embedded intelligence makes the environment interact with objects. In this model, we are using a ATmega328P microcontroller, which will have gas sensors and noise sensors connected to it, to monitor the fluctuating environmental parameters.

The main objective of IOT Air & Sound Monitoring System is that the 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 an area through IOT. System uses air sensors to sense presence of harmful gases/compounds in the air and constantly transmit this data. Also, system keeps measuring sound level and reports it. This allows authorities to monitor air pollution in different areas and act 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. Receiving warnings on your phone or wearable device when IoT networks detect some physical danger is detected nearby. Self-parking automobiles.

II. LITERATURE SURVEY

1. A System For Monitoring Air And Sound Pollution Using Arduino Controller With Iot Technology
Proposed:

Ezhilarasi et al have proposed a monitoring technique using a Zigbee wireless sensor network to monitor various environmental parameters. It uses RFID means to store and retrieve data through

electromagnetic transmission to an RF integrated circuit. The WSN gateway method is used to conveniently collect the data at any time and place.

2.IOT Based Air and Noise Pollution Monitoring in Urban and Rural Areas, Important Zones like Schools and Hospitals in Real Time

Proposed:

Mahantesh BDalawai et al. in their paper have used a GPRS/GSM module and a web server to efficiently monitor various pollution levels. In module smoke sensor and noise sensor will upload the data to server or cloud at every instant of time so that pollution level can be monitored using internet.

3.IOT based Air and Sound Pollution Monitoring System

Proposed:

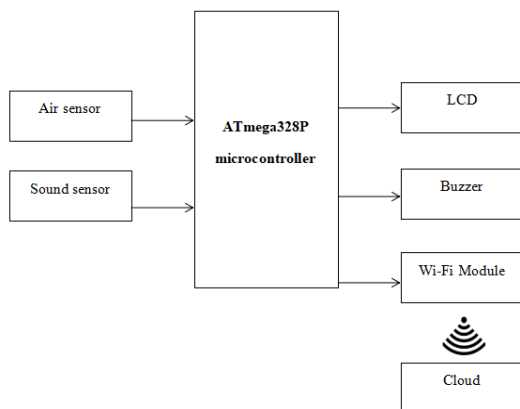
Arushi Singh et al. have proposed a system which uses air and sound sensors to monitor data constantly and then transmit the data. A raspberry pi module interacts with sensors and processes data thereby transmitting it to application.

4.A Smart Environmental Monitoring System Using Internet of Things

Proposed:

Dr. A Sumithra et al. have proposed the concept of a smart city. Technology and communication is the basis of this smart city. Various sensors and modules have also been used to monitor the various environmental parameters. This system uses air and sound sensors to monitor the data and then upload the data on cloud server as digital data. The cloud storage managers analyze the data and notify accordingly.

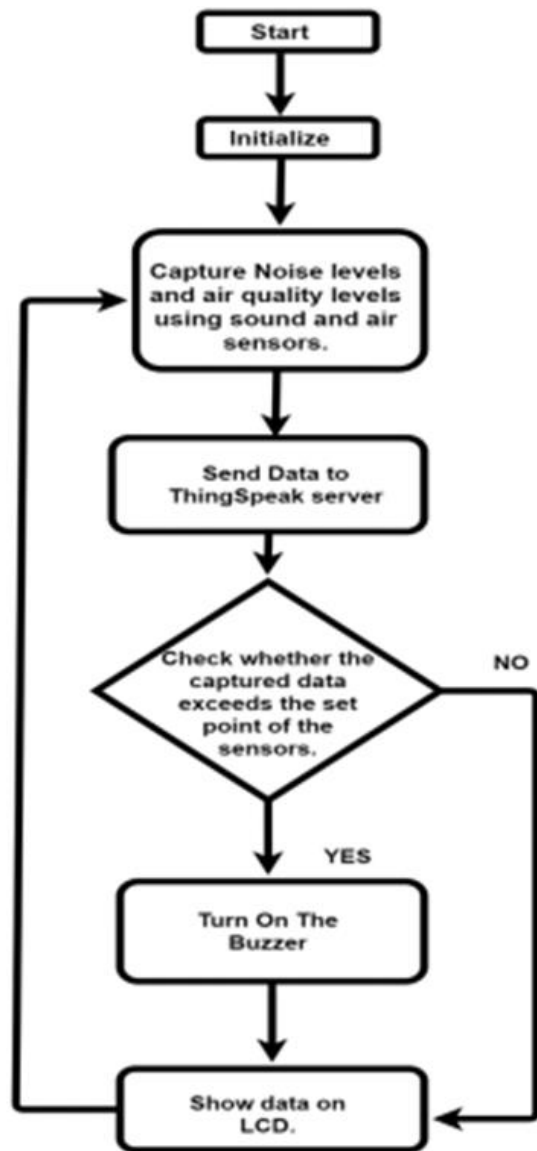
III.BLOCK DIAGRAM



The block diagram consist of Arduino Uno, Air Sensor, Sound sensor, LCD, Buzzer, Wi-Fi module

In this system, IoT technology is used for monitoring and checking the level of air and sound pollution. We measure several harmful gases and high-intensity noise that can lead to radiation of the atmosphere and the harmful gases and their noise intensity can be monitored, controlled and checked in real-time using this model. Real-time monitoring enables us to take timely actions that display warning on the LCD screen and also gets uploaded on the cloud using IoT to prevent any major mishap.

IV.FLOWCHART

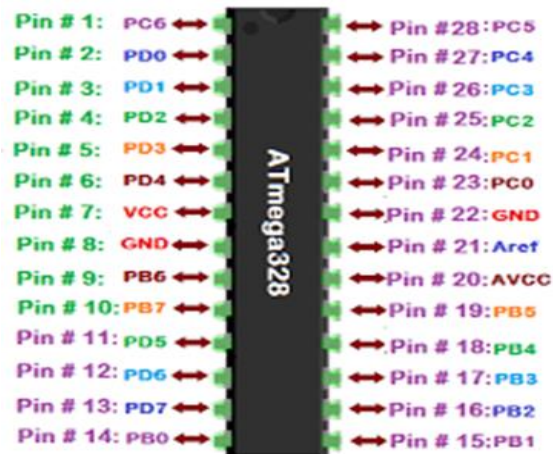


As the flow chart shows the function of the An effective air and sound pollution monitoring system using IOT. The system will get live stream values

video of gas and sound sensors. The captures noise and air levels are sent to the thingspeak server and then checks whether the captured data exceeds the set point of sensors. If the values is exceeded then buzzer will turn on and displays the data on the LCD display, if the value is less than the set point then the remains same and displays the data on the LCD display. Then after it again captures the noise and air levels and the process goes on again.

V. HARDWARE COMPONENTS

ATmega328P Arduino Microcontroller



The Arduino Uno is a microcontroller board based on the ATmega328 (datasheet). It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz ceramic resonator, a USB connection, a power jack, an ICSP header, and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started.

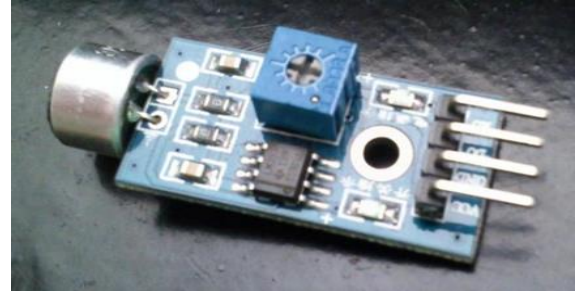
MQ-135 Gas Sensor User Manual



MQ-135 gas sensor applies SnO₂ which has a lower conductivity in the clear air as a gas-sensing material. In an atmosphere where there may be polluting gas, the conductivity of the gas sensor raises along with the

concentration of the polluting gas increases. MQ-135 performs a good detection to smoke and other harmful gas, especially sensitive to ammonia, sulfide and benzene steam. Its ability to detect various harmful gas and lower cost make MQ-135 an ideal choice of different applications of gas detection.

LM393 sensor module



The sound sensor module provides an easy way to detect sound and is generally used for detecting sound intensity. This module can be used for security, switch, and monitoring applications. Its accuracy can be easily adjusted for the convenience of usage. It uses a microphone which supplies the input to an amplifier, peak detector and buffer. When the sensor detects a sound, it processes an output signal voltage which is sent to a microcontroller then performs necessary processing.

VI. WORKING

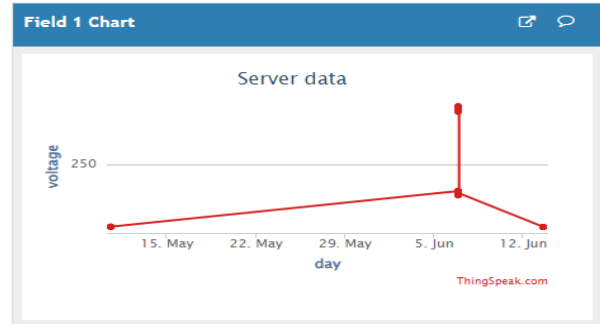
Here we propose an air quality as well as sound pollution monitoring system that allows us to monitor and check live air quality as well as sound pollution in an area through IOT. System uses air sensors to sense presence of harmful gases/compounds in the air and constantly transmit this data. Also, system keeps measuring sound level and reports it. This allows authorities to monitor air pollution in different areas and act against it. Also, authorities can keep a watch on the noise pollution near schools, hospitals and no honking areas. Network Devices and the Internet of Things All kinds of ordinary household gadgets can be modified to work in 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. The MQ135 sensor can sense NH₃, NO_x, 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”.

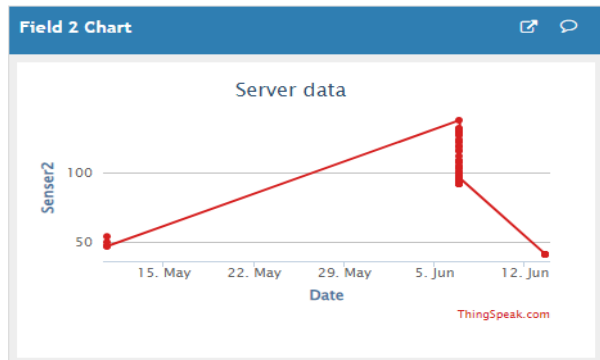
VII. ADVANTAGES

- **Effective Air Monitoring**
In closed spaces, the advanced sensor devices get installed in the desired areas, which work automatically. They instantly detect the presence of particulate matter or air pollutants in the air and trigger notifications on smartphones at once.
- **Toxic Gas Detection**
The IoT-powered air quality monitoring system is well-equipped with advanced sensor devices and gateway connectivity that is functioned to detect the presence of toxic gases within the premises.
- **Human Health**
closed or open premises, human health gets affected by the increase in air pollutants or particulate matter. Thus, installing an air quality monitoring system helps monitor the presence of pollutants, resulting in better environmental conditions for humans to reside.
- **An effective sound monitoring**
This noise pollution monitoring system is a machine to machine communication system so data to be recorded will have great accuracy. Also devices are wirelessly connected so automation and controlling of it becomes an easy task for a person.

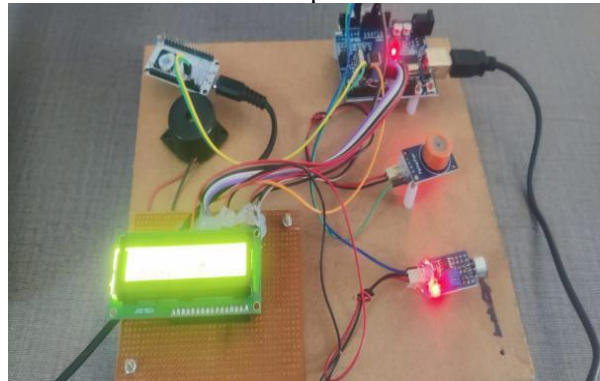
VIII. RESULTS



Flowchart 1 output window



Flowchart 2 output window



KIT photo

IX. FUTURESCOPE

Many possible solutions have been highlighted in this paper, as to how we can monitor air and sound pollution levels along with humidity and temperature using Internet of Things. Our proposed model gives us real-time data so that we can analyze environmental parameters. We would like to implement the concept of machine learning soon so that we can forecast the possible environmental data. It gives an estimate of the upcoming weather conditions and creates awareness amongst the public.

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