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IOT BASED POLLOUTION MONITORING SYSTEM

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Abstract:
Due to excessive decibel levels and lethal chemicals that are naturally occurring in the environment, air and pollution in major cities are now daily important issues that require specific care. Hence, in order to ensure a healthy way of life and a better future, it is currently important to limit pollution (both air and noise). In this study, a good implementation of the internet of things is used to monitor environmental factors such as air pollution and noise pollution. Because of the high decibel sand harmful gases present in the earth that directly affect human well-being and as a demand for an unusual level of concern, air and pollution problems now occur every day in metropolitan areas. In this way, it has finally come to light. In this work, a powerful application of the internet of things is used for perceiving air quality conditions including noise and pollution. This essay illustrates an applied design for a flexible, flexible, and cost-effective method of evaluating the air and sound quality of a chosen website. This frame work suggests a noise and air quality-related perceptual framework that enables us to monitor and assess real-time sound and air quality in a specific area using IoT. Framework makes use of air sensors to measure the distance of dangerous gas mixtures that are visible all around and frequently relay this information.

Keywords– InternetofThings(IoT), Sensors, Arduino, Monitoring System.

I. INTRODUCTION

These days, air and sound pollution is a major problem. For a better future and everyone's health, it is essential to monitor and manage air quality. Here, we suggest an IOT-based air quality and sound pollution monitoring system that enables real- time monitoring and analysis of both in specific locations. The system continuously transmits data to the microcontroller using air sensors to detect the presence of dangerous gases and compounds in the air. The technology also continuously measures sound level and transmits that information via IOT to an online server. The sensors communicate with the microcontroller, which then analyses and send the data via the internet. This enables officials to keep an eye on local air quality.

Air pollution has grown so prevalent that nearly everyone accepts the fact that it is increasing exponentially and continuously due to rapid growth in industrialization and vehicles. Air pollutants such as ground–level ozone, nitrogen dioxide, and Sulphur dioxide are harmful for nature.

Chemical pollutants, including suspended particulate matter, carbon monoxide, oxides of nitrogen, oxides of Sulphur, lead aerosol, volatile organic compounds are harmful for health.

Present innovations in technology mainly focus on controlling and monitoring of different activities. These are increasingly emerging to reach the human needs. Most of this technology is focused on efficient monitoring and controlling different activities. An efficient environmental monitoring system is required to monitor and assess the conditions in case of exceeding the prescribed level of parameters (e.g., noise, CO and radiation levels).

When the objects like environment equipped with sensor devices, microcontroller and various software applications becomes a self-protecting and self-monitoring environment and it is also called as smart environment.

In such environment when some event occurs the alarm or LED alerts automatically. The effects due to the environmental changes on animals, plants and human beings can be monitored and controlled by smart environmental monitoring system. By using embedded intelligence into the environment makes the environment interactive with other objectives, this is one of the application that smart environment targets.

II. LITERATURESERVEY

In many places across the world, urban air pollution is a significant issue. The Air Q platform is a clever and economical way to measure air quality. The Air Q device offers real-time and location-specific air quality data and is inexpensive and portable [1].

The design and construction of a portable sensory system for air pollution monitoring that can measure temperature, humidity, and particle matter (PM) are the main topics of this paper [2].

We have designed an air quality and sound contamination surveillance system that enables us to monitor and check real-time air peculiarity as well as sound contamination in a specific area using the most recent IoT technology. It is crucial to examine the air quality and sound level and put them under control for a good future and a full life for everyone [3].

Dust particle density in the air, humidity, light intensity, and sound level are a few factors that change when there is pollution. Wireless sensor networks (WSNs) are a technology that can be used to create an integrated pollution monitoring system. These networks connect various sensors, such as dust sensors, to devices that were designed to support smart cities [4].

In especially for those who are exposed for a long period of time, chronic diseases like asthma and mental health disorders like anxiety may be brought on by human exposure to environmental hazards like air pollution and high sound levels. In this article, we introduce the "MLMS- EMGN4.0" gadget, which may be worn around the wrist and measures a number of physical and chemical environmental factors, as well as motion tracking [5].

Table No.1

Paper No.	Methodology	Technology	Experimentation Platform	Pros and Cons
[1]	Implementation of IoT, sound sensors,ESP8266microcontrollers	IoT, ESP8266, sound sensors, Express PCB	Laboratory and Deploymenting Urban Area	**Pros:** Real-time monitoring, RemoteAccessibilty. **Cons:** Initial setup costs, potentialtechnical challenges during deployment.
[2]	Deploy pollution sensors strategically, transmit data to a central server, analyze and visualize data	Utilize IoT devices for sensor deployment, wirless communication protocols	Arduino for sensor nodes, cloud platforms	**Pros**: Data visualization, Early warning system. **Cons**: Maintenance challenges, Security concerns.
[3]	Development of sophisticated algorithms for sensor-based air quality	Advanced Sensor Algorithms, Microcontrollers	Testing and Controlled Environments	Pros:Improved accuracy ,optimized patterns. **Cons**:Algorithm complexity, potential false positives or negatives
[4]	User friendly platform for programming anduploading codetoArduinomircocontrollers	Arduino IDE	Integrated Development Enirvonment	**Pros**: open Source, Cross-platform compatibility **Cons**: Limited code editing, Single thread compilation.
[5]	Evaluation of different IoT platforms to monitoring system	Multiple IoT Platforms(e.g. Thing Speak)	Simulated Environment and Comparative Analysis	**Pros**:Informedplatformselection,improvedsysteminteroperability. **Cons:**Platformspecificlearningcurves,potentialcompatibilityissues

III. Aim of the Project:

Pollution is increasing because of the release of toxic gases by industries, vehicle emissions and increased concentration of harmful gases and particulate matter in the atmosphere.

The level of pollution is increasing rapidly due to factors like industries, urbanization, increase in population, vehicle use which can affect human health. Particulate matter is one of the most important parameters having a significant contribution to the increase in pollution. This creates a need for measurement and analysis of real-time air quality monitoring so that appropriate decisions can be taken in a timely period.

This paper presents real-time standalone monitoring system. Internet of Things (IoT) is nowadays finding profound use in each and every sector, plays a key role in our monitoring system too.

IV. SYSTEM ARCHITECTUREBlock Diagram:

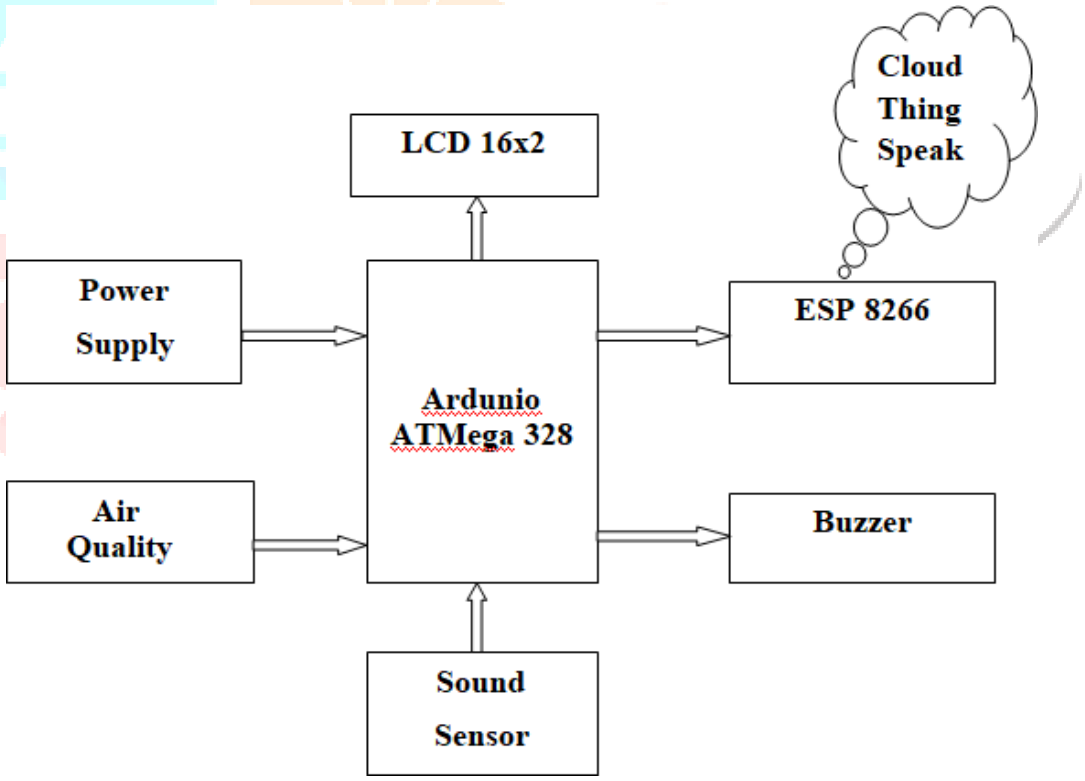

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Fig1:-BlockDiagram

This Diagram consists of IoT based Pollution Monitoring System are more than one. The sensors are connected to the microcontroller which is the heart of the project. Power Supply is the main source for the working of the project. ESP 8266 and Buzzer are connected alongside which is further connected to Ardunio ATMega 328.

Working:

First of all we will connect the **ESP8266 with the Arduino**. ESP8266 runs on 3.3V and if you will give it 5V from the Arduino then it won't work properly and it may get damage. Connect the VCC and the CH_PD to the 3.3V pin of Arduino. The RX pin of ESP8266 works on 3.3V and it will not communicate with the Arduino when we will connect it directly to the Arduino. So, we will have to make a voltage divider for it which will convert the 5V into 3.3V. This can be done by connecting three resistors in series like we did in the circuit. Connect the TX pin of the ESP8266 to the pin 10 of the Arduino and the RX pin of the esp8266 to the pin 9 of Arduino through the resistors.

ESP8266 Wi-Fi module gives your projects **access to Wi-Fi or internet**. It is a very cheap device and makes projects very powerful. It can communicate with any microcontroller and it is the most leading devices in the IOT platform. Then we will connect the **MQ135 sensor with the Arduino**. Connect the VCC and the ground pin of the sensor to the 5V and ground of the Arduino and the Analog pin of sensor to the A0 of the Arduino.

Connect a buzzer to the pin 8 of the Arduino which will start to beep when the condition becomes true.

V. Objective

a. To sense the parameters like air, sound and rainfall in order to constantly transmit the data.

b. To sense the Temperature and humidity conditions using sensor.

c. To design a system that also keeps measuring sound level and report it.

d. To display the message on display board though GSM.

e. To receive and transmit data effectively via GSM.

f. To eliminate the need of being physically present.

g. To detect the rainfall using the rain sensor and alert the authority.

VI. Future Scope

1. IOT based pollution monitoring system is promising. It involves advancement at such as real-time data analytics, integration with AI fro productivity analysis and expanding sensor network for comprehensive environmental monitoring.

2. Additionally, this system could contribute to smart cities initiatives, policy–making and public awareness by providing actionable insights into pollution trends.

VII. Conclusion

This study focuses in using IoT technology to determine the number of stations and their locations while taking objectives, costs, and available resources into consideration are the main components of the design of the air and sound quality monitoring network. An expert system should be created to fix the precise number and distribution of sensor monitoring locations in order to aid an industrialist.

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