IOT and Arduino based Real-Time Noise and Air Pollution Monitoring and Alert System

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ABSTRACT

Air pollution and noise are a growing issue in modern times. It is important to maintain a high level of mood and keep it in control of a bright future and a healthy life for everyone. Here we are proposing an air quality and noise pollution monitoring system that allows us to monitor and evaluate living air quality and noise pollution in certain areas using IoT. The system uses various wind sensors to detect and detect the presence of harmful gases or compounds present in the air and constantly updates this data on a small controller. In addition, our system continues to measure audio intensity and reports this data to an online server via IoT. The sensors interact with the microcontroller that processes this data and transmitts it over the Internet. This allows the authorities to monitor and control air pollution in various areas and take action. In addition, the respected authorities can monitor noise pollution near schools, hospitals and non-wooded areas, and if the system detects air quality and noise issues notify authorities to take action to control the issue.

Keyword: - *Sound Level, Gas, IoT, Dirt, Sensor, Air Sensor, Sound Sensor, ESP8266 Wi-Fi Module, LED, Microcontroller.*

1. INTRODUCTION

People are surrounded by a variety of health concerns about rapidly growing noise and air pollution. Industries and urbanization are the main reasons for the increase in noise levels and air pollution in the environment. Misuse and uncontrolled use of energy and gas resources such as nitrogen and sulphur compounds. are some of the most important sources of air pollution. Traditionally, monitoring noise and air pollution was a very difficult and inaccurate task. However, with the rapid development of science and technology, a number of modern methods of pollution monitoring have been introduced. Internet of Things offers a wide range of new opportunities in this field. It allows the exchange of data between electronic and electronic devices and between the Internet and a person with the help of various sensors. IoTo is cheaper, more efficient and feasible, which makes it an effective domain.

According to research data, noise pollution and air pollution are two major causes of ill effects on human health and the environment. Data cutters used to visit individual sites to collect data on common comparisons and data analysis techniques. This process is time consuming and ineffective. In this paper, we have introduced a system that monitors and allows constant inspection of air quality and noise levels and to report to the relevant authorization if the level of pollution is above normal, so that what is needed is done. A series of sensors are distributed to detect noise levels

and to monitor the concentration of harmful gases such as Sulfur dioxide, carbon dioxide and other harmful gases that pollute the environment. The data captured on these IoT sensors is constantly updated on the microcontroller.

Outputs obtained from sensors are stored in a cloud compartment and are given remote access. It also allows us to compare custom-made algorithms with data from the previously stored cloud. The process described in this paper provides the process involved in building a prototype model for noise and air pollution control and to warn concerned council when the level incfrase beyond the maximum bearable level to take the necessary action as soon as possible and the situation can be prevented. .

The main purpose of this project is to assist today's society with the use of the Internet. IoT is simply a network of objects / connected devices connected to sensors, software, network connections and the necessary electrical hardware deices that allows it to collect and exchange data that enables them to respond.

2. LITERATURE SURVEY

In a paper submitted by Tanuja Borate, Meghalata Lipani, Madhuri Kale, Vaishnavi Pardeshi, Prof. Prashant Jawalkar named Automatic Air & Sound management system is an advanced move ahead in delivering a solution to the greatest risk. It has supported new technologies and successfully supported the concept of a healthy lifestyle. The system had features that allowed people to monitor the level of pollution using a mobile system. To use this, they use sensory devices in the area to collect data and analyze it. network. Then the data collected and the analyzed result would be provided to the remote user via Wi-Fi. Collected data could be a critical factor while considering the impact due to idle vehicles in on state on air quality. Carbon monoxide concentration data can be updated using mobile devices, such as PDAs, cell phone devices, and tablets to maintain air quality.

In another paper proposed by, K. Cornelius, N. Komal Kumari, Sagar Pradhaan, Priyesh Patel, N. Vinay, developed IoT technologies for monitoring and monitoring air pollution and noise levels. and its sound quality can be monitored, tested and controlled in real time with the help of this model. Real-time monitoring allows users to take timely action when displaying a warning sign on an LCD screen and updated in the cloud with the help of IoT to prevent any major threats. Their next proposed development was the possibility of quality testing. noise and noise pollution of a particular stadium using the GPS of the mobile user.

GONÇALO MARQUES AND RUI PITARMA paper, in which they proposed the design of a wireless sensor network to monitor noise pollution in the area. They built the sensor node using the Teensy 3.2 an omnidirectional POW-1644P-B-R microphone and data is transmitted using the Xbee module with the Zigbee protocol. The design gate uses the Raspberry Pi 3 and contains an XBee module for data communication. They used four modules within 14 days of field work and testing to validate the proposed method with the best results of real-time audio-level data collection. The data acquisition system used the Raspberry Pi, audio codec, and mobile connection to the data connection. The system used two microphones with different sensors. Power is provided with the help of a solar-powered battery to charge. The hardware system used ethernet to power the system. The proposed route was confirmed and tested.

NoiseSpy was founded by E. Kanjo uses a microphone embedded in a cell device to determine the level of disturbance in terms of noise in the surroundings. Another device to monitor noise and air pollution was proposed by Chaithanya, Shruthi and Raste. But this system failed to detect level level units when the system was used to collect data. Another air and noise pollution monitoring program called Zagreb was launched in late 2017, which used a wearable sensor to measure air pollution and a mobile application for noise detection. But the proposed model did not work well on all devices, its accuracy has changed for mobile phones of different types. The good thing about this program is that it was a zero correction system. .

A paper by Meruyeert Nuragazy, Arkady Zaslavsky, Prem Prakash Jayraman, Sylvain Kuler, Karan Mitra and Shaguna in which they developed a CAVisAP system for visualizing air pollution. The system provided sensitive observation of the three components of air, namely nitrogen dioxide , and particlulate matter. In addition to this, the system provided maps of personal pollution. The system was examined for a set of different profiles of user profiles with different levels of pollution. The test highlights the importance of considering the user profile, as the same level of impurity level in air proves to be very dangerous for one person/group/area, while the other feels less discomfort. In addition, CAVisAP seeks to lay out a new way of visualizing air pollution data taking into account the color impairment of users. This is very important, as misinterpretation of air pollution can lead to chronic health problems. As a future activity, the user experience test can be designed to identify the most useful demonstration methods

available in CAVisAP. In addition, the system can be upgraded with a combination of routes based on air pollution between two or more locations. In addition, contextual recognition ways can be used for air pollution forecasts.

Palghat Yaswanth Sai proposed paper using embedded tools in an environment that allows for environmental protection. To use this, sensory devices are used locally for data collection.By using local sensors, it can interact with other objects to gather information about the surroundings. Then the data from the sensors and its analytics results will be provided to the user via Wi-Fi. In the proposed activities of the structures of the various modules were discussed. The Internet of Things (IoT) sensible air pollution monitoring system has been tested for the use of two parameters. This data would be useful for future analysis and will be readily shared with other end users. The model could be extended for monitoring developing cities and industrial areas. To protect human health from effects of air and sound pollution, the proposed model provides an effective and inexpensive way for constant environmental monitoring.

Nagaraja Pandian proposed Automatic irrigation system to detect moisture content in soil. The ever-growing need for food resuted in the development of food production technologies. In India, the economy and a lot of households are heavily dependent on agriculture and the weather isotropic, however, it seems we are not ready to use agricultural resources. The continuous increase in groundwater abstraction reduces the level of groundwater because most of the land is not fertile for production.

Poonam Paletal proposes IoT-Based Air Pollution Control Program using Arduino. Pollution levels have grown rapidly over time due to a lot of factors including population growth, increased automobile use, industrial development, and urban growth leading to dangerous effects on man's health by directly affecting the lives of people exposed to high levels of hazardous substances. gases such as Carbon dioxide, smoke, and ammonia are increasing in the atmosphere. The air quality rating scale will be in PPM on LCD and web page.

L. Rama Devi proposed method for Monitoring Soil Moisture level Using IoT. Here, the soil moisture sensors measure water content in the soil according to their volume. Since the precise volumetric measurement of the soil moisture gravity requires subtraction, drying, and sample measurement, the ground moisture sensors indirectly measure the volume of water by using various other soil parameters, such as resistance, dielectric constant, as a representative of soil moisture content.

Lalit Mohan Joshi has proposed a system that monitors air and noise pollution levels in an industrial area using a wifi-based computer system. Technologies such as the Internet of Things (IoT) are embedded in a solution that is an integrated field of computer science and electronics. In order to monitor the variability of parameters such as noise and air pollution levels from their normal levels, sensory devices are connected to a computer-assisted computer system. Regular monitoring, control and behavioral analysis of this model, has been adapted and spread across any area of infrastructure. The operating principle of the proposed model is tested using a demo, which includes the UNO board, sensors and MATLAB with an AVR hardware support package. In parameters such as noise, carbon monoxide and radiation levels, the system is tested with respect to standard ethical standards that provide vigilance over pollution control to make the environment smarter and more environmentally friendly. The main goal of Air Quality Planning and Standards is to maintain air quality.

Anand Vetta, Arjun Khurana, Nihar Sharma, Muthamil Selavan developed a project using the IoT based Air and Sound Pollution Monitoring system using the Grove Sound Sensor, MQ135, ESP8266 Wi-Fi module and the board Arduino Uno. The proposed system provides Air and Sound quality of the input area, to the relevant authorities. It eliminates the need for any manual measurement attempt and provides data remotely. It will assist in better planning for authorities in reducing pollution.

Arusi Singh, Divya Pathak, Prachi Pandit, Shruthi Patil, Prof. Preeti. C. Golar suggested that the Internet of Things would be able to more clearly and freely integrate many different storage systems, while providing open access to selected sub-data sets to improve a wide range of digital services. In this paper, the typical IoT architecture is built and that is why it is a very complicated job, basically due to the huge range of devices and services that might be implicated in with the system.The main focus of the paper is on the urban IoT system which, while STIL is a broader division, is reflected in their specific programming domain. In fact, Urban IoT is planned to back the vision of Smart City, whose aim is to exploit the most advanced communication technologies to support value-added services to the city and its citizens. Apart frome these, the paper also proposed and discussed the technical solutions

and best system guidelines adopted for the Padova Smart City project, a testament to the IoT island concept in the city of Padova, Italy. The purpose of this paper is to discuss the general reference framework for urban IoT design. Explain some aspects of urban IoT, as well as services that may facilitate the approval of urban IoT by local governments.

3. CONCLUSION

A system to monitor various environmental parameters using Arduino microcontroller, WSN and GSM Technology is proposed to improve air quality. Through the use of technologies such as WSN and GSM it develops a way to monitor various environmental factors such as the issue of air quality monitoring proposed within this paper. to take the necessary steps. It is estimated that this process will be well received in the market as it can be a central system for all monitoring activity. Thanks to the intelligent monitoring of the environment and the efficient, low-cost embedded system presented by the various models within this paper. In the proposed architectural work of various modules were discussed. The system for monitoring the noise pollution of the Internet and the concept of the Internet of Things has been tested with the help of two parameters. This model is often extended to look at developing cities and industrial areas to monitor pollution. In order to monitor the human health in pollution, this model provides an competent as well as cost-effective solution for constant environmental monitoring. The flexibility of the sensor nodes that are to be integrated with different type of sensor were tested and utilized in this operation.

The air and noise monitoring system overpowers the problem of pollution in the all kins of areas. It encourages new technologies and successfully upholds the concept of a healthy lifestyle. The system allow users to monitor the quantity of pollution in their surrounding on their cell phones using this system. Therefore, it is considered more reliable and efficient for the officials and citizens to monitor the environment. Allowing citizens to participate in the process adds value to it. As citizens are now equally aware and want to know where they are, this IoT concept is beneficial to public welfare. It is also implemented using the latest technology.

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