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Online Ambient Monitoring System

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Abstract: *Air pollution affects our day to day activities and quality of life. It poses a threat to the ecosystem and the quality of life on the planet. The dire need to monitor air quality is very glaring, owing to increased industrial activities over the past years. People need to know the extent to which their activities affect air quality. This project proposes an air pollution monitoring system. The system was developed using the Arduino microcontroller. The air pollution monitoring system was designed to monitor and analyze air quality in real-time and log data to a remote server, keeping the data updated over the internet. Air quality measurements were taken based on the Parts per Million (PPM) metrics and analyzed using Microsoft Excel. The air quality measurements taken by the designed system was accurate. The result was displayed on the designed hardware's display interface and could be accessed via the cloud on any smart mobile device.*

Keywords: AVR Microcontroller, Sensor

I. Introduction

Nowadays people are very concerned about the environment because of the rapid changes in the environment which will harm to human health. Hence it is necessary to monitor environment where the people spend more time like at home, office, industry, any working area in real time and long term manner. Using internet of things we can control system as well as we can access system remotely using IoT . It first takes information with help of different sensors and transfer sensors values on Internet directly, from which can be accessed at anytime and anywhere.

The project represents the environmental and ambient parameter monitoring using low-power wireless sensors connected to the Internet, which send their measurements to a central server. The data from all over the world, can be remotely visualized from every device connected to the Internet. IoT enables to be connected to virtually unlimited devices over the internet. It thus has a great potential of communicating and interacting with them. The resulted solution provides the possibility of logging measurements from locations all over the world and of visualizing and analyzing the gathered data from any device connected to the Internet. It overcomes the problem of system integration and interoperability, providing a well-defined architecture that simplifies the transmission of data from sensors with different measurement capabilities and increases supervisory efficiency. The main objective of this system is to provide environmental parameters at remote location using internet.

II. Literature Review

Air quality monitoring system (AQMS) which is based on the IEEE/ISO/IEC 21451 standard concentrations of CO, CO2, SO2 and NO2, were measured using elector-chemical and infrared sensors and the results are saved in the data server . A comparative study on smart sensors, objects, devices and things in internet of things. The differences and similarities between the smart objects, smart things in IoT are presented in the tabular form .The Web of Things is a concept that uses web standards and architecture as a framework for IoT applications. Web of things and CoAP protocol is used to collect data from the sensors .An embedded system is used to sense and collect data from the sensors, results are stored in the MySQL database whenever the relevant information is required .The semiconductor sensor was used to monitor the ozone concentration that was installed near the photocopy machine. When the pollution exceeds the predefined threshold value the warning is generated .An environmental parameter with amperometry sensors and gas sensors (infrared) using the pic18f87k22 microcontroller. Sensor nodes are setup in the different areas

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for real time monitoring of environment and the results are displayed on the city map .A business intelligence engine (APA) is proposed. The system is designed to aware the public about the quality of air being affected by different factors like pollutants, toxic gases etc. Analysis of air pollution from different perspective like meteorological data, pollutants and traffic data using APA is done. The system helps the people to realize their activities impact on deteriorating air quality .A system for monitoring the environmental parameters, model and manipulating microclimate of urban areas is presented. The system is implemented for the adaption of efficient urban infrastructure after analysis of urban micro-climate .The framework for monitoring the city environment is provided. Low cost raspberry pi is used for implanting the system. Parameters like carbon monoxide, carbon dioxide, temperature and pressure are measured but no emphasis is given on particulate matter which left the environment monitoring incomplete .A system for measurement and acquisition of data of water and air quality parameters and results are shown on IBM WATSON IOT platform. The system is battery powered with solar panel based charger unit .Collected air quality data from different cities of south Africa. Machine learning technique was applied to the data and prediction models were generated for ground level ozone. The acquired information about air pollution in surroundings is then stored on central on-line repository system periodically. It uses a wireless GSM modem connection for transferring data to a central computer. Also, the application can share the data publicly by displaying it on a dedicated website .A wireless sensor network to monitor air pollution levels of various pollutants due to environmental changes. A wireless network is comprising of large number of sensor nodes. This system proposes a method which mainly focuses on longer sustain time period of sensor network by effectively managing the energy in sensor network, effectively processing of collected information and less overhead in transferring information between various sensor nodes .In order to comply with requirements of oil and gas industry, an air quality monitoring system was proposed based on ZigBee wireless sensing technology. It uses ZigBee wireless network to send results to the monitoring centre so that, if some abnormal situations happen, a quick warning will be generated to remind staff .How road traffic is responsible to the pollution and its effects on the environment is proposed. The monitoring period was chosen to cover a period of street closures and hence attempt to isolate some of the traffic related pollutants. Traffic flow information was available for the area, from which traffic emission data was used to test an integrated model for street canyon pollution.

III. System Concept

A systematic monitoring network in support of a successful implementation plan to reduce regional air pollution exposure must represent most of the population, and cover a diverse range of topography, meteorology, emissions, and air quality in the region. If possible, multiple pollutants and precursors need to be monitored at the same locations at the same time. The primary purpose of a systematic air quality monitoring network is to distinguish between areas where pollutant levels violate an ambient air quality standard and areas where they do not. In other words, strategies, technologies, and regulations need to be developed to achieve the necessary reduction in pollution.

3.1 Block Diagram

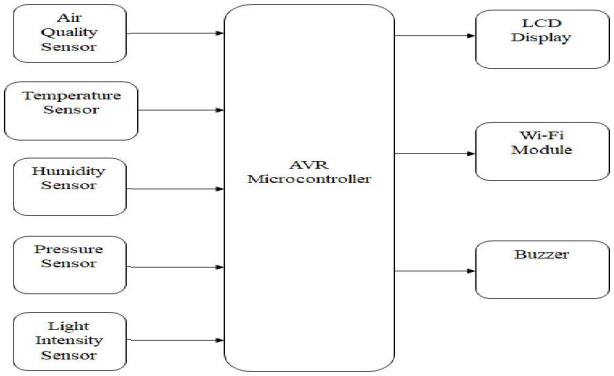


Figure 1: Block Diagram

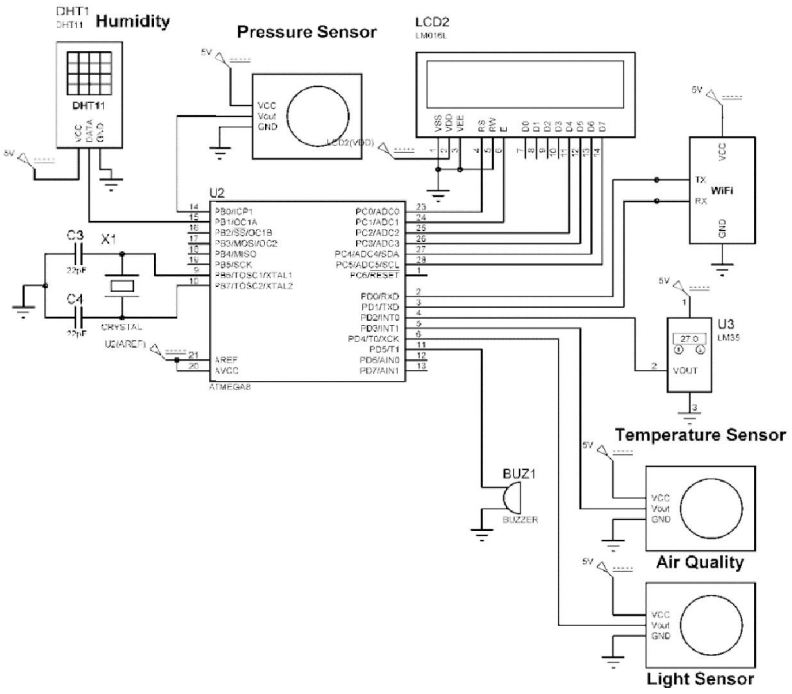
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3.2 Block Diagram Explanation

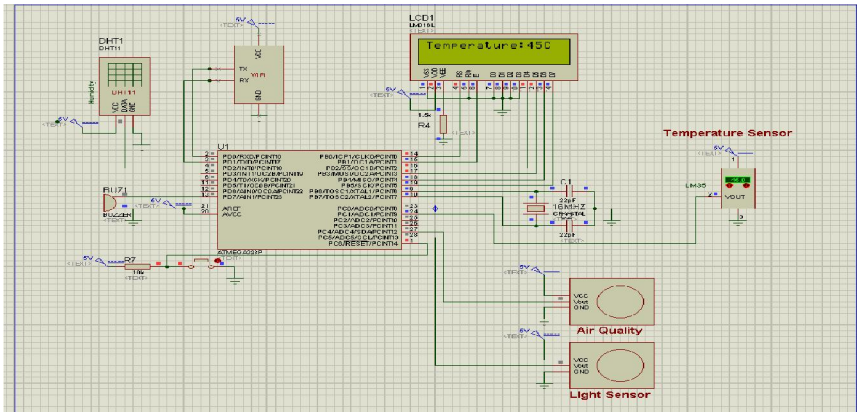
The proposed system is summarized using a block diagram as shown in Fig. The system consists of sensor networks, control and processing unit and a IOT Module. The base of the system is built up using an AVR Microcontroller board which provide control and processing with the help of ATmega328 microcontroller. The sensor networks consist of various sensors to sense key environmental parameters such as temperature, humidity, air pollution, sun light intensity and pressure.

The AVR Microcontroller directly communicates with the individual sensor and collects necessary data. Once data are available, it performs a series of processes and transfers the data to the server via a Wi-Fi module (ESP8266). The sensors that are configured and are used for monitoring real time data of the environment are BME280 (Temperature, Humidity and Pressure Sensor), MQ135 (gas sensor), BH1750 module (Light intensity sensor).

IV. Simulation Of Circuit Diagram



V. Result



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VI. CONCLUSION

Most Online Ambient monitoring systems are based on AVR microcontroller Atmega-328 (57%), followed by ESP8266 (29%). The results show that 53% of the systems use the Internet of Things, and WSN architectures represent 33%. Finally, 14% of the systems are designed using hybrid Internet of Things/WSN architectures. Wi-Fi communication technology is the most used for the Internet connection. Temperature, humidity, and light intensity sensors are incorporated by the majority for the methods for enhanced thermal and luminous comfort. On the one hand, the Air Quality Sensor and Pressure sensors are the most used for air quality assessment, but several solutions also provide all harmful gases in campus monitoring.

REFERENCES

[1] "Air quality Arduino based monitoring system " Abdullah J. Alabdullah'sBadr I Farhat , May 2019.
[2] "An Environmental Air Pollution Monitoring System Based on the IEEE 1451 Standard for Low Cost Requirements" Nihal Kularatna , BhSudantha , May 2008.
[3] "Air Quality Monitoring System Based on ISO/IEC/IEEE 21451 Standards ", Kgoputjo Simon Elvis Phala , Anuj Kumar , April 2016.
[4] "A Smart Air Pollution Monitoring System ", Kennedy Okokpujie , Etinosa Noma-Osaghae September 2018.
[5] "Air quality Monitoring Using IOT" Mr. Nitin V. Bansod, Prof. U. V. Hore April 2021 IJARSCT