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Environmental Parameters Monitoring and Device Controlling Using IoT

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ABSTRACT

Environmental pollution is a critical global issue that can have severe health and social consequences, and it is the responsibility of humans to address this challenge. The rapid evolution of technology offers solutions for predicting and displaying environmental parameters to reduce or eliminate pollution. The combination of Wi-Fi sensor networks (WSNs) and the internet of things (IoT) can enable the creation of efficient and managed environment. This paper proposes an embedded and standalone system that can display, maintain, and monitor environmental data while calculating energy consumption in specific settings. The information is accessible through an internet application with fundamental control capabilities. The system utilizes an embedded controlled sensor network technology, which is an effective solution for implementing environmental solutions. Despite several attempts by researchers to develop embedded controlled sensor networks, current systems are bulky, expensive, and challenging to maintain. In contrast, the proposed system is cost-effective and managed by user-friendly embedded systems. It employs an Arduino-based microcontroller and wireless sensors to control various devices and display environmental data using Wi-Fi technologies. This proposed system highlights the potential of technology in addressing environmental challenges by enabling efficient monitoring and management of environmental parameters. Its ability to control environmental pollution can promote sustainable development by enhancing environmental quality.

Keywords : Embedded Systems, Arduino Controller, IoT, Wifi , Sensors

I. INTRODUCTION

Human and natural surroundings are inseparably bonded together. A healthier surrounding makes a better residing. Although, the causes contributing to environmental pollutants are innumerable. The principal belongings of pollution embody enterprise and home combustion, inner combustion engines,

industrial waste, commercial enterprise merchandise, chemical use in agriculture, sanatorium, and circle of relatives sewage in keeping with records from Hellenic Statistical Authority (ELSTAT), the quantity of waste generated, starting from 33 three million thousand, in 2004, to 69.7 million plenty, in 2014. It is extended instances, about 109%, in a decade.

II. Proposed System

In the suggested paradigm, sensor nodes in the IOT are regularly used to monitor climatic changes. The Internet of Things (IoT) is a modern paradigm for communication in which objects are outfitted with microcontrollers, transceivers, and the appropriate protocol stack to enable communication between them and with the user. This study develops a wireless environmental monitoring system prototype that will upload data from a variety of sensors to a database. With the help of this programme, we may view or measure environmental factors in real time from any location. The three primary components of this system are the sensor nodes, wireless communication, and web server. This study describes a system for measuring harmful gases in surrounding areas, such as industrial areas, using a variety of sensor nodes. The Arduino microcontroller has all the sensors connected, and it continuously transmits to the control section the sensorstate.The ESP 8266 Wi-Fi module uploads the data. On the internet, the data is updated. On LCD, sensors' values are presented. If the sensor exceeds its threshold value requiring immediate human rescue, a buzzeris utilised to make noise. This project's device is based on the Arduino UNO. Using an ESP8266 Wi-Fi module, the Arduino board communicates with the Thing Speak platform. Popular IOT platform The Thing Speak is simple to use and programme. Additionally, the sensor data is shown on a character LCD that is integrated into the monitoring IOT device. The Arduino Sketch is in charge of controlling data collection and transmissionover the Wi-Fi module to the Thing Speak server. The written, compiled, and loaded Arduino sketch.

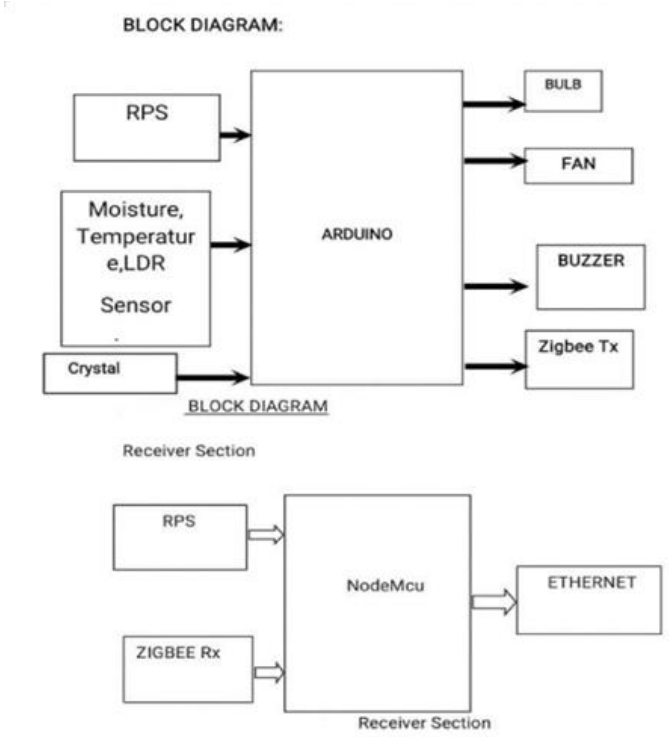
III. Literature Review

DSNs were more of a vision when they were first proposed more than 20 years ago than a fully developed technology. The state-of-the-art in sensors, computers, and communication networks significantly limited the early DSN researchers' ability to conduct their research.[1] The design and implementation of a wireless sensor network-based real-time water quality monitoring system for drinking water have been detailed in the work suggested.[2]

The creation of affordable sensor networks has been made possible by recent developments in wireless communications and electronics. There are many applications for the sensor networks (e.g. health, military, home).[3] There are various technical problems that researchers are currently overcoming for various application areas. This article summarises the current state of the art for sensor networks and discusses solutions in thecontext of the relevant protocol stack layer components. The article's goal is to pique new interest and developments in this area by highlighting the unresolved research difficulties as well.[4]

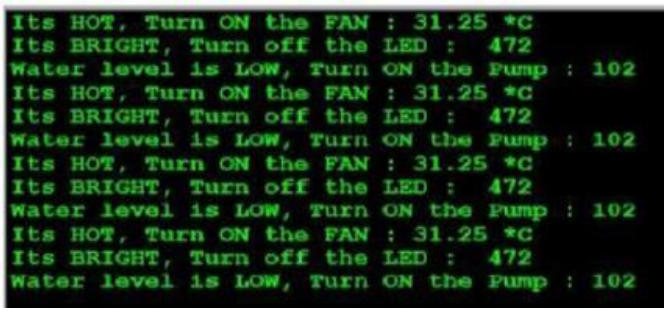
In an overview of Wireless Sensor Networks, the survey was presented. The survey covered wireless sensor networks' generations, architecture, routing, and storage management. This study also describes the characteristics and application areas of WSNs.[5] The sensor networks still face numerous difficulties and limitations, such as restricted bandwidth and node lifetime in the network. The report also outlines potential research areas and highlights research challenges in WSN.[6]

Block diagram



IV. Results and Discussion

It shows both the monitored results and controlling signals along with the measures of temperature, brightness and water level. Shown in below figure.



V. Conclusion

The lifetime of wireless sensor network for an environmental monitoring has been presented, allowing them to operate as autonomous measurement system for long period of time. The energy consumption of the system has been addressed and methods to reduce the energy consumption have been identified. WSNs are traditionally considered key enablers for Packet delivery ratio has been increased, while transmitting the data using WSN. This paper deal, all phases of the practical development from scratch of a full custom WSN platform for a environment monitoring IOT application. All aspects of the wireless platforms are considered: reusability and flexibility, platform structure, optimization of the sensor node and gateway node, error recovery in communication and node operation, high availability of service, application server reliability and interface with IOT.

VI. Future Scope

The vehicle shall be equipped with GSM technology to allow for remote ignition control, allowing the user to start and stop the vehicle remotely. The vehicle shall be equipped with GPS technology for real-time vehicle tracking and location monitoring, providing the user with up-to-date information on the vehicle's location and movements.

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Author's Contribution

Snehith and Akhilesh have conceived the idea, Akhilesh and Akhila developed the theory and information related to the project. Akhila encouraged Akhilesh and Snehith to investigate about the sensors. while both Akhila and Snehith studied about the working of the Arduino. Akhilesh and Akhila learnt about thelibraries and software used in the project and

Snehith took the lead in authorizing . All authors discussed the results and contributed to the final manuscript. Mrs.A.Praveena, also provided valuable guidance with her expertise.

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