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WATER QUALITY MONITROING USING IOT PLATFORM

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ABSTRACT:

A major concern for eco-friendly globalization is water contamination. It is essential to check the water quality in real-time to provide a safe supply of drinking water. In this work, we outline the steps needed to create an affordable system that can monitor water quality in real-time using the internet of things (IoT).To determine the water's physical and chemical properties, the system employs a number of sensors. Water parameters may be monitored with a flow sensor, including temperature, pH, and turbidity. The core controller is able to process the sensor readings. As a central controller, the Arduino model might be used. Lastly, the data collected by the sensors may be accessed online using a WI-FI network.

Keywords: Wifi, PH sensor, Flow sensor, turbidity sensor, cloud.

I INTRODUCTION

To put it simply, water is essential for all forms of life on Earth. The most fundamental need for human health is access to potable water for cooking, drinking, and other household use. Many human health issues and disruptions to ecological balance would result from our failure to preserve water quality. Innovative approaches to monitoring water quality in real time are necessary. Here, we present an Internet of Things (IoT)-based system for monitoring water quality in real time. Our setup includes a number of sensors, a Wi-Fi module, and a microcontroller. Even with smaller tanks, this solution is compact and straightforward to install. Due to factors such as increasing population, decreasing water supplies, and the effects of climate change, real-time water quality monitoring is becoming more difficult. Consequently, more effective methods of real-time monitoring of water quality indicators are required[1]. Various indicators of water quality Hydrogen ion concentration is measured by pH.

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Whether the water is acidic or alkaline is shown by it. Water with a pH of 7 is considered pure; acidic water has a pH below 7 while alkaline water has a pH beyond 7. There is a pH range of 0 to 14. It should be between 6.5 and 8.5 pH for drinking purposes. The turbidity of water is a measure of the amount of invisible particles suspended in it. Diarrhea and colla are more likely in waters with increased turbidity. As the turbidity drops, it indicates that the water is clear. The water's temperature is detected via a temperature sensor. The flow of water may be measured by using a flow sensor. Collecting water samples from various sites by hand is one of the most conventional ways to keep tabs on water quality.

II LITERATURE SURVEY

Nikhil Kediahas has presented a work based on "Water Quality Monitoring for Rural Areas-A Sensor Cloud Based Economical Project." This paper was presented in the First International Conference on Next Generation Computing Technologies (NGCT-2015) held at Dehradun, India. This paper discusses the various water quality monitoring methods adopted in real time environments, sensors used in those models, the controlling processors, governments role in implementing such models in villages and also the available dissemination procedures. Cloud domain used to store the data obtained from sensors is also discussed in detail [1].

Michal Lom et. al. have presented a paper that speaks about "Industry 4.0 as a Part of Smart Cities". The emphasis of governments all over the world towards building smart cities and the related concepts of Industry 4.0 are clearly discussed in this work. It is the prime responsibility of a government to provide a safe environment and quality life to their citizens and this has been the sole reason behind the evolution of Smart City concepts. Internet of Services (IoS), and Internet of Energy (IoE), which form the basis of Industry 4.0 framework are introduced in a broad manner in this work that stresses upon using the natural resources in a sustainable manner [2].

Jayati B and Jignesh P have presented a paper entitled "Real Time Water Quality Monitoring System" that describes a novel water quality monitoring system based on the concepts of IoT. Various parameters that define the quality of water such as conductivity, turbidity and temperature are measured using suitable sensors.

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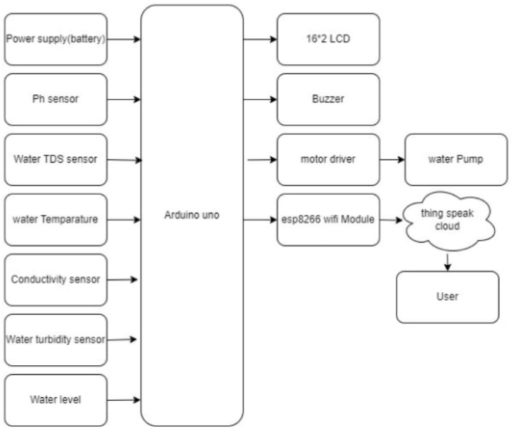
These values are then processed using a microcontroller. Raspberry pi and Zigbee protocol are used in this work to process and transfer the data to the IoT platform. Cloud computing concepts are used to store the data and use them for the future modifications [3].

Mithila Barabde and Shruti Danve have proposed a work entitled "Real time water quality monitoring system". This work tries to replace the conventional lab tests with a novel method that measures the water quality parameters remotely. It employs a base station and a remote station, a number of sensors and a wireless communication link is used to connect all these nodes with the sensors. Data obtained from the sensors are visualized using MATLAB and compared with the standard values to provide continuous monitoring of the system [4].

Geetha S and Gauthami S have presented a paper entitled "Internet of Things enabled real time water quality monitoring system". This paper presents an excellent literature review of the works carried out in the field of water quality monitoring systems. It also provides a simple and cost effective solution for monitoring the water quality in flow pipes based on IoT. It also provides an alarm system to indicate the problems in the monitoring systems [5].

PROPOSED SYSTEM

The heart of our suggested system controller is an independently built Arduino microcontroller. The system may be operated without a PC, keyboard, or display after the code is uploaded to the microcontroller. Following the instructions programmed into the microcontroller, the system operates autonomously and without human intervention. The C programming language is used in the development of this system. Four sensors are used in this system to measure the vital water parameters. Previous studies have shown that pH, turbidity (cloudiness), temperature, conductivity, and total dissolved solids (TDS) are the most important water characteristics for the ordinary user to monitor.



WORKING METHODOLOGY

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Appropriate sensors are used to detect water parameters in real time. There is communication between the main controller and these sensors. For the central processing unit, they use the Aurdino Atmega 328. The Aurduino Atmega 328 is used to transform the analogue signals from the sensors into digital signals. An analog-to-digital converter (ADC) transforms these signals into a voltage range of zero to five volts. In order to make sense of the raw data, the core controller applies relevant equations to the various sensor signals it receives. Elements that users may see are integrated into the system according to their needs. The LCD is the visible component here. An LCD shows the data collected from each sensor. As a Wi-Fi module, the ESP8266 is used. A Wi-Fi transmitter and receiver make up the ESP8266 module. Measurements are sent and saved in the cloud using a state-of-the-art Wi-Fi technology.

Final Product to clarify:

A certain number of samples are examined in the proposed investigation from different water resources. A central processor called ATMEGA 328 controls a suitable model that has all the necessary sensors and connecting devices. The study primarily considers two water parameters: turbidity and pH. In order to get the values, two separate samples are first examined. There is a discussion of the measured values. After this is complete, the samples are treated with pollutants before the water quality metrics are tested once again. In this way, we can find out how pollutants affect water quality indicators. A tabulation of these findings is available. We may send the collected data to the IoT platform and store it in the cloud for further processing with the aid of the ESP8266 module.

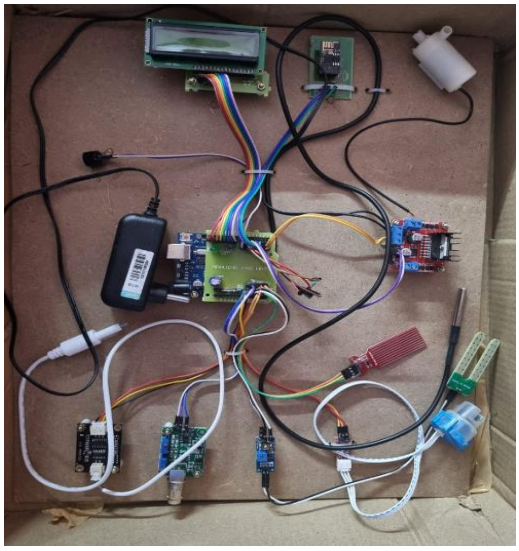

Fig.1. Hardware kit image.

CONCLUSION

This article proposes a straightforward method for monitoring water quality indicators. The water's turbidity and pH, among other factors, are constantly monitored by a number of sensors. The system's operational cost is minimal as it does not need any human involvement.

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Both the stability and the adaptability of the suggested system are very commendable. Adding more sensors and the necessary software packages allows the same system to assess other parameters linked to water quality. The sensor may now send the user online data thanks to the Internet of Things (IoT) that is integrated into this system. The changes in water quality metrics might be obtained by storing and processing this data. The suggested system has a lot of potential applications beyond only agricultural and pollution management, and it's also extendable.

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