

# **REAL-TIME RIVER WATER QUALITY MONITORING SYSTEM**

## **ABSTRACT**

Nowadays water is the most valuable for all the human beings drinking water utilities faces challenges in real-time operation. These challenges occurred because of growing population, limited water resources, ageing infrastructure etc. Hence, there is a need of better methodologies for monitoring the water quality. To reduce the water related diseases and prevent water pollution, World health Organization (WHO) has also stated this crisis as "the largest mass poisoning of a population in history". The main goal of this paper to build a Sensor- based Real-Time water quality monitoring system.

## **INTRODUCTION**

Water is the primary need of all living beings and living without water is impossible. With the advancement of technology and industrialization, environmental pollutions have become a major concern. Water pollution is one of the most serious types of this environmental pollution. Our lives depend on the quality of water that we consume in different ways, from juices, which are produced by the industries. Any imbalance in the quality of water would severely affect the humans' health and at the same time, it would affect the ecological balance among all species. Water quality refers to the chemical, biological, radiological and biological parameters of the water .The essential parameters of the water quality vary based on the application of water. For example, for aquariums, it is necessary to maintain the temperature, pH level, dissolved

oxygen level, turbidity, and the level of the water in a certain normal range in order to ensure the safety of the fish inside the aquarium. For the industrial and household applications, however, some parameters of the water are more essential to be monitored frequently than the others, depending on the usage of the water.

## **KEYWORDS**

Arduino Mega 2560, pH sensor, Turbidity sensor, Temperature sensor, LCD display, Wi-Fi module.

## **LITERATURE REVIEW**

### **Wireless sensor network for river water quality monitoring in India [1]:**

This system is designed for monitoring the pH of water, which is one of the main parameters that affect the quality of water. The sensor node design consists mainly of a conditioning module, a processing module, a wireless communication module, and a power module. The sensed pH value will be wirelessly transmitted to the base station using Zigbee communication. This paper also proposes a novel technique for the design of a water quality sensor node.

### **The Real Time Monitoring of Water Quality in IoT Environment [2]:**

The traditional method of testing turbidity, PH, and temperature is to collect samples manually and then send them to a laboratory for analysis. However, it has been unable to meet the demands of water quality monitoring today. The system consists of a single-chip microcontroller, a data acquisition module, an information transmission module, a monitoring center, and other accessories.

Routinely monitored parameters of water quality are temperature, pH, turbidity, conductivity, dissolved oxygen (DO), chemical oxygen demand (COD), biochemical oxygen demand (BOD), ammonia nitrogen, nitrate, nitrite, phosphate, various metal ions and so on. The most common method to detect these parameters is to collect samples manually and then send them to laboratory for detecting and analyzing. This method wastes too much man power and material resource, and has the limitations of the samples collecting, long-time analysing, the aging of experiment equipment and other issues. Sensor is an ideal detecting device to solve these problems. It can convert no power information into electrical signals. It can easily transfer process, transform and control signals, and has many special advantages such as good selectivity, high sensitivity, fast response speed and so on.

### **IOT Based Water Quality Monitoring System [3]:**

Real-time monitoring of water quality is necessary to assure the provision of safe drinking water. A new solution based on IOT (Internet of Things)-based water quality monitoring has been suggested. In this research, we demonstrate the architecture of an IOT-based system for real-time water quality monitoring. There are some sensors in this system that can gauge many aspects of water quality, including temperature, conductivity, dissolved oxygen, pH, and turbidity. The microcontroller processes the sensor-measured values before transmitting them over the Zigbee protocol to the Raspberry Pi, which serves as the core controller. Finally, using cloud computing, sensor data can be seen on web applications.

## **EXISTING SYSTEM**

Existing system has a mechanism, which are semi-automated, or manually controlled devices, which are to be handled by a person responsible for monitoring the water quality. There is need to have human intervention in taking

various reading of the water parameters. The instruments or tools are used by either putting/inserting a water sensing part into water or seeing the result on small display device or by directly inserting a portable device in water and watching the output on the display. Central Water Commission (CWC) monitors water quality, by collecting samples from representative locations within the processing and distribution system. These samples are analysed at the well-equipped laboratories. At these laboratories, samples of raw water, filter water and treated water are taken for analysis, this analysis can be performed by human intervention which for specific period only. The disadvantage of this system is, water is not monitoring seamlessly, and it always needs a human intervention.

## **PROPOSED SYSTEM**

The main aim is to develop a system for continuous monitoring of river water quality at remote places using wireless sensor networks with low power consumption, low-cost and high detection accuracy. pH, conductivity, turbidity level, etc. are the limits that are analyzed to improve the water quality. Following are the aims of idea implementation

- (a) To measure water parameters such as pH, dissolved oxygen, turbidity, conductivity, etc. using available sensors at a remote place.
- (b) To assemble data from various sensor nodes and send it to the base station by the wireless channel.
- (c) To simulate and evaluate quality parameters for quality control.
- (d) To send SMS to an authorized person routinely when water quality detected does not match the preset standards, so that, necessary actions can be taken.

## **CONCLUSION AND FUTURE WORKS**

Real-time monitoring of water quality by using IoT will immensely help people to become conscious against using contaminated water as well as to stop polluting the water. The research is conducted focusing on monitoring river water quality in real-time. Due to the limitation of the budget, we only focus on measuring the quality of river water parameters. This project can be extended into an efficient water management system of a local area. Moreover, other parameters which was not the scope of this project such as total dissolved solid, chemical oxygen demand and dissolved oxygen can also be quantified. So the additional budget is required for further improvement of the overall system.

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