**REVIEW OF RELATED MATERIALS**

**IoT based real-time water quality monitoring system in water treatment plants (WTPs)**

Water quality monitoring systems are developed to help humans overcome errors, and boost efficiency in workplace. This system leverages IoT-devices as the center of the water quality monitoring system. Through the use of IoT, the researchers developed an infrastructure capable of real-time monitoring of water quality and data visualization. The researchers want to study the approach and apply on the system. Additionally, the researchers want to address the gaps found in the study to develop a more sustainable water quality monitoring system.

In the study of (Forhad et al., 2024), real-time water quality monitoring system that leverages the use of IoT devices is developed. This device is mainly developed to remotely monitor the water quality of water treatment plants. The key parameters monitored by the device are pH, Dissolved Oxygen (DO), Total Dissolved Solids (TDS), and Temperature. The parameters are then transmitted to a centralized monitoring platform using wireless communication protocols such Wi-Fi, LoRa Wan, and Cellular Networks. The data transmitted are stored in a cloud server, SCADA, this system is capable of storing and visualizing data sent by the device. This enables early detection of any abnormalities in the water quality, which allows prompt corrective actions to prevent further damages. This study’s concept of water quality monitoring is relevant to our project, the use of IoT devices and use of Cloud Server are the main takeaways from this project. However, it did not explore renewable power source usage for sustainability, and portability of the monitoring device was not tackled, which are the gaps from this study that the researchers aim to address.

**Water quality monitoring system using IOT**

The use of MCUs and GPRS in water quality monitoring systems is an innovation that solved the problem in traditional water monitoring. This technology help solved problems with manual, costly, and labor-intensive water quality monitoring system. Leveraging IoT devices and a wireless communication protocol to process and transmit data gathered though the sensor nodes enable the device to monitor water quality in real-time. This approach is relevant as this will serve as the basis, along with the key gaps that the researchers want to address and develop.

The research by (Doni, 2018)utilized the power of IoT to develop a water quality monitoring system. This project revolves around the use of Microcontroller Units (MCU) and General Packet Radio Service (GPRS). Through the use of MCU, the data collected by the sensor nodes are processed and will be compared to a threshold. In an event where parameters went pass the threshold, there will be an indicator to indicate it. The data sent, through GPRS, are then stored in a cloud server for further use. This system focuses on measuring the pH, temperature and Turbidity (TDS) of a water body. The server module is responsible for storage and management of the data sent by the base station. This study utilized IoT devices and cloud server integration to allow real-time and remote monitoring of water quality parameters. Although this study has great purpose, it has its downsides, first it does not address renewable power source which is vital in remote deployment areas. Also, the system is not equipped with smart notifications that triggers when a threshold is met thus can’t alert humans. These gaps are what the researchers aims to address to improve the proposed water quality monitoring system.

**IoT based smart water quality monitoring system**

**Enhancing Coastal Management through the Design and Development of an In Situ Water Quality Monitoring System**

**IoT based real-time river water quality monitoring system**