"Gheorghe Asachi" Technical University of Iasi, Romania

SMART WATER QUALITY MONITORING USING IoT FOR METROPOLITAN CITY LAKES

Poornima Jayaraman[1]*, Kothalam Krishnan Nagarajan[2], Pachaivannan Partheeban[3]

[1]Department of Electronics and Communication Engineering, Chennai Institute of Technology, Chennai, India
[2]Department of Electrical and Electronics Engineering, Sri Sivasubramaniya Nadar College of Engineering, Chennai, India
[3]Department of Civil Engineering, Chennai Institute of Technology, Chennai, India

Abstract

Worldwide, water quality is a significant issue that societies face because of industrial and economic growth due to population explosion. Therefore, in order to safeguard society, research on water quality concerns is urgently needed. The primary objective of this research is to design, develop, and implement a smart water quality monitoring system that can monitor the surface water quality of selected lakes based on their flood and water contamination levels. The water quality monitoring system integrates high-precision sensors such as TDS, pH, turbidity, and temperature sensors. In addition to a GPS module providing position data, these sensors are coupled to an ESP32 microcontroller, a central unit for collecting and sending sensor data. The developed IoT system was kept in a floating device so that each probe was in contact with the water surface to monitor the parameters. Real-time water quality data was collected in the Chennai metropolitan region, Tamil Nadu, India, for three supply and ten non-supply lakes during pre-monsoon and post-monsoon. The water quality index was calculated using real-time water quality values, and the classification of each lake was categorized. Chembarambakkam, Puzhal, and Solavaram lakes demonstrated water quality index values of 49.28, 50.23, and 50.9, which denote good quality in supply lakes, and Velachery Lake, with 39.39 in a non-supply lake. The results of this study show that the lake water quality index values vary depending on demand and floods. The availability of drinking water, urban life support, and public health are all areas where this study will have a significant positive social impact. This IoT system makes data collecting and analysis more effective, accurate, and real-time. Furthermore, this system offers a reliable and scalable framework for managing and monitoring urban water quality, especially in places with challenging connectivity and environmental issues.

Key words: internet of things, lake water, water quality index, water quality monitoring, wireless sensor networks

* Author to whom all correspondence should be addressed: e-mail: poornimaj@citchennai.net