IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429
Volume 6, Issue 3, February 2026
Impact Factor: 8.2

Implementation and Research Paper on IoT Based Water Quality Monitoring System with Real Time Dashboard

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Abstract: *Water quality monitoring is essential for ensuring safe drinking water, industrial usage, and environmental protection. Conventional laboratory-based monitoring techniques are time-consuming, costly, and unsuitable for continuous real-time observation. This research presents the design and implementation of an IoT-based Water Quality Monitoring System capable of measuring critical parameters such as pH, turbidity, total dissolved solids (TDS), and temperature. The proposed system uses an ESP32 microcontroller integrated with calibrated sensors and communicates data to a backend server and web-based dashboard for visualization and analysis. The system architecture supports reliable data acquisition, real-time monitoring, alert generation, and historical analysis. Experimental evaluation demonstrates high accuracy, low latency, and cost-effectiveness, making the system suitable for urban, rural, and industrial deployments. The proposed solution offers scalability, enhanced data accessibility, and timely detection of water contamination.*

Keywords: IoT, Water Quality Monitoring, ESP32, pH Sensor, Turbidity, TDS, Real-Time Dashboard.

DOI: 10.48175/IJARSCT-31361