

ABSTRACT

This research presents the development of an Internet of Things (IoT)-based monitoring dashboard for hydroponic systems, enabling both real-time and historical tracking of environmental parameters such as TDS, pH, water level, and actuator status. The system is built on the ESP32 microcontroller, which collects data from various sensors and transmits it to Firebase Realtime Database for live visualization and MySQL for long-term storage. A user-friendly web interface developed with Chart.js displays data interactively. Additionally, an automated notification feature is triggered when sensor readings exceed predefined thresholds. Testing results indicate that the dashboard effectively supports accurate, responsive monitoring and facilitates data-driven decision-making in hydroponic cultivation.

Keywords: Internet of Things, hydroponics, web dashboard, ESP32, Firebase, MySQL, environmental monitoring