

ABSTRACT

The Internet of Things (IoT) is a concept that connects various devices, both hardware and software, to the internet to enable communication and automation. An IoT system has three main components: sensors, gateways, and the cloud. Hydroponics is a method of growing plants without soil, using water and nutrient solutions, such as lettuce.

This research develops an IoT-based system for monitoring and automating hydroponic systems. The system uses a microcontroller connected to a server and a monitoring website, and is equipped with pH, TDS, and water temperature sensors. Key system features include monitoring pH levels and nutrient concentrations, as well as automated pH and TDS correction using a peristaltic pump that delivers a balancing solution.

Test results showed that the average water temperature was 25.15 °C, the nutrient solution concentration was 730 ppm, and the average pH value was 6.5. For data communication, the system recorded an average transmission speed of 540 bps, a delay of 0.210 seconds, and no packet loss. All data can be accessed through the Node-RED dashboard in real-time via Web-Monitoring.

Keyword: *Automated, Hydroponic, IoT, Monitoring, Node-RED.*