

IOT-BASED HYDROPONIC LETTUCE MONITORING AND MAINTENANCE SYSTEM

Taupik Miftah Fauji

Computer Engineering Study Program, Faculty of Science and Technology,

University of Technology Yogyakarta

Jl. North Ringroad Jombor, Sleman, Yogyakarta

E-mail: taufikmiftahf86@gmail.com

ABSTRACT

The application of Internet of Things (IoT) technology in modern agricultural systems plays a crucial role in increasing the efficiency of monitoring and maintaining hydroponic plants. Lettuce is a horticultural commodity widely cultivated hydroponically, but its maintenance requires regular monitoring of environmental parameters. This research aims to design and implement an IoT-based hydroponic lettuce monitoring and maintenance system using an ESP32 microcontroller. The developed system is equipped with a water pH sensor, a DHT22 temperature sensor, an LDR light sensor, and a water level sensor to monitor plant environmental conditions. Sensor data is processed by the ESP32 and sent in real time to the Blynk app, allowing users to monitor remotely via mobile devices. The system is also equipped with an automatic control mechanism to maintain the nutrient solution pH and water level within predetermined limits. The designed system is capable of stable operation in monitoring plant environmental conditions and executing automatic control functions as designed. This system can assist users in maintaining optimal growth conditions for hydroponic lettuce plants and reduce the need for manual monitoring.

Keywords: Automation, ESP32, hydroponics, Internet of Things (IoT), monitoring system