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ABSTRACT

This research develops an Internet of Things (IoT)-based system for real-time monitoring of soil pH quality, air quality, and wind speed to optimize horticultural crop management. The system is designed to address the lack of knowledge regarding optimal environmental conditions for plants. In its implementation, the system integrates various IoT devices, including a pH sensor, MQ-135 sensor, infrared sensor, and DMS module, which are connected to a mobile application called Pedas. The system testing is conducted in two main phases: IoT device testing and mobile application testing. The IoT device testing aims to ensure that each sensor functions properly and to compare sensor data with quality standards to verify accuracy. Some sensors have been calibrated using digital sensors as a reference to enhance data accuracy, which is then analyzed based on Quality of Service (QoS) measurements. Meanwhile, mobile application testing focuses on validating functionality, ensuring all features operate without errors, and displaying monitoring data accurately in accordance with sensor measurements. With this system, horticultural crop management is expected to be more effective and efficient through real-time environmental condition monitoring. Continuous monitoring enables farmers to obtain accurate information on soil pH levels, air quality, and wind speed, allowing them to take appropriate actions in crop care. Additionally, this system helps reduce the risk of crop failure due to suboptimal environmental conditions, as farmers can promptly implement corrective measures based on the obtained data.

Keywords: Internet of Things (IoT), real-time monitoring, environmental quality, horticulture, mobile application