

IOT SYSTEM DESIGN FOR THRESHOLD-BASED AUTOMATIC MONITORING AND WATERING OF CHILI PLANTS IN URBAN RESIDENTIALS

FURQAN BAHRULSAHLAN

*Computer Engineering Study Program, Faculty of Science and
Technology,*

*University of Technology Yogyakarta
Jl. Ringroad Utara Jombor Sleman Yogyakarta
E-mail : furqan.bahrulsahlan@gmail.com*

ABSTRACT

Agriculture in urban areas faces significant challenges due to limited land and lack of efficient resource management, especially in plant watering activities. Chili pepper plants as a high-value commodity have high sensitivity to fluctuations in temperature, soil moisture, and acidity levels. The purpose of this study is to design an automatic monitoring and watering system based on the Internet of Things (IoT) using the threshold method as an innovative solution in urban residential environments. The research was conducted by conducting tests by designing a system using an ESP32 microcontroller integrated with a soil moisture sensor, a Dht22 sensor, a soil pH sensor, and using actuators such as relays and DC water pumps. This system is equipped with watering at the bottom (roots) and at the top (leaves). This system is equipped with four watering modes, namely threshold, semi-automatic, manual, and scheduling. Data from sensor readings are sent in real-time to the Arduino Cloud and recorded to Google Sheets for remote monitoring. The system also provides a user interface for setting the watering duration and volume based on plant needs. Test results show that the watering system functions well, and the test results from the sensors used obtained relatively small average error values, such as 0.34 for the pH sensor, 21.3 ml for the R385 water pump, 18 ml for the SL3500 water pump, and 0.69°C for the dht22 temperature and 5.09% for the humidity. This system can assist in monitoring and watering chili plants, thereby increasing efficiency in watering cayenne pepper plants.

Keywords: Internet of Things, NodeMCU ESP32, Cayenne Pepper Plants, Threshold