Implementasi Iot Untuk Penyiraman Otomatis Menggunakan Logika Fuzzy Mamdani Dan Pengaturan Pencahayaan Pada Tanaman Krisan

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ABSTRACT

This research aims to design and implement an IoT-based soil monitoring and automatic irrigation system using Mamdani fuzzy logic for chrysanthemum cultivation (Chrysanthemum morifolium). The system was developed to optimize plant care through real-time monitoring of environmental parameters (soil moisture, air temperature, air humidity, and light intensity) along with automated control of irrigation and lighting. The system employs a NodeMCU ESP8266 microcontroller integrated with DHT22 (temperature & humidity), YL-69 (soil moisture), and BH1750 (light intensity) sensors. The sensor data is transmitted to Firebase Realtime Database and displayed through a mobile application built with Nylo Framework. Mamdani fuzzy logic is implemented to determine irrigation duration based on three input variables: soil moisture, air temperature, and air humidity, with the output being watering time in seconds. Test results demonstrate the system operates with 99.43% accuracy (0.57% error margin).

Keywords: Mamdani fuzzy logic, automatic irrigation, IoT, NodeMCU ESP8266, DHT22, Firebase, Nylo Framework, chrysanthemum, smart greenhouse