UNDERGRADUATE THESIS

AN IOT-BASED INDOOR ENVIRONMENTAL CONTROL SYSTEM FOR DROSERA SESSILIFOLIA USING THE FUZZY TYPE-2 METHOD

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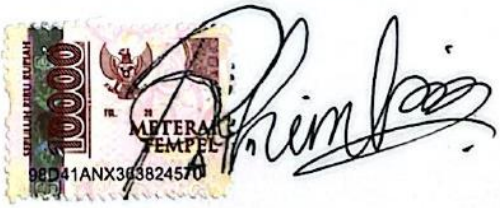

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ABSTRACT

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Drosera Sessilifolia requires a stable growing environment, particularly concerning air temperature, light intensity, and water level. This study aims to implement an Internet of Things (IoT) system utilizing the Type-2 Fuzzy Logic method with an ESP32 microcontroller to automatically monitor and control these parameters. Data obtained from the DS18B20 temperature sensor, LDR, and water level sensor are processed using the IT2FL method to control various actuators (a heater, Peltier cooler, LED lights, water pump, and fan). The system's status can be monitored in real-time via the Blynk platform.. The system proved capable of adapting to two different environmental conditions (indoor and terrace) by successfully maintaining the temperature within the optimal range of 26.5°C to 29.9°C, and stabilizing the water level between 0.6 and 1.4. Furthermore, the system automatically responded to low-light conditions (sensor ADC values of 2800 - 3774) by activating the LED lights. The implementation of the Type-2 Fuzzy Logic method also proved effective in tolerating sensor reading uncertainties, thereby preventing abrupt on-off transitions (switching) of the actuators. Overall, this system serves as an efficient and reliable solution to support the indoor cultivation of Drosera Sessilifolia.

Keywords: Drosera Sessilifolia, Internet of Things, Interval Type-2 Fuzzy Logic, ESP32, Environmental Monitoring, Carnivorous Plants

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Author,

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