ABSTRAK

RANCANG BANGUN PENYIRAM TANAMAN BERBASIS INTERNET OF THINGS (IOT) UNTUK MENINGKATKAN EFISIENSI PADA TANAMAN SAWI HIJAU

(2025: xix + 59 Halaman + 38 Gambar + 12 Tabel + Lampiran)

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Laporan Akhir ini bertujuan untuk merancang dan membangun sistem penyiram tanaman otomatis berbasis Internet of Things (IoT) untuk meningkatkan efisiensi penyiraman pada tanaman sawi hijau (*Brassica rapa var. parachinensis*). Sistem dirancang menggunakan mikrokontroler NodeMCU ESP32 yang terintegrasi dengan sensor kelembapan tanah kapasitif dan sensor suhu udara DHT11. Panel surya monokristalin dimanfaatkan sebagai sumber energi utama yang disimpan dalam aki dan diatur oleh solar charge controller. Data sensor diolah dan dikirim secara real-time melalui aplikasi Blynk IoT, memungkinkan pemantauan dan pengendalian pompa penyiram serta kipas pendingin secara jarak jauh. Pengujian alat menunjukkan bahwa sistem mampu mengaktifkan pompa otomatis saat kelembapan tanah <50% dan menonaktifkannya saat >70%, serta kipas pendingin aktif saat suhu kotak panel >40°C. Hasil penelitian ini diharapkan dapat membantu petani sawi hijau dalam menghemat air, waktu, serta meningkatkan produktivitas tanaman secara berkelanjutan melalui penerapan teknologi IoT.

Kata kunci: IoT, ESP32, sawi hijau, penyiraman otomatis, sensor kelembapan tanah, Blynk IoT.

ABSTRACT

DESIGN OF AN INTERNET OF THINGS (IOT)-BASED PLANT SPRINKLER TO INCREASE EFFICIENCY IN GREEN MUSTARD PLANTS

(2025: xix + 59 pages + 38 images + 12 tables + appendices)

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This Final Report aims to design and build an Internet of Things (IoT)-based automatic plant watering system to improve watering efficiency in green mustard plants (Brassica rapa var. parachinensis). The system is designed using NodeMCU ESP32 microcontroller integrated with capacitive Soil Moisture sensor and DHT11 air temperature sensor. Monocrystalline solar panels are utilized as the main energy source stored in batteries and regulated by a solar charge controller. Sensor data is processed and sent in real-time through the Blynk IoT application, enabling remote monitoring and control of sprinkler pumps and cooling fans. Testing of the device shows that the system is able to activate the pump automatically when the Soil Moisture is <50% and deactivate it when it is >70%, and the cooling fan activates when the panel box temperature is >40°C. The results of this research are expected to help mustard green farmers save water, time, and increase plant productivity in a sustainable manner through the application of IoT technology.

Keywords: IoT, ESP32, mustard greens, automatic watering, Soil Moisture sensor, Blynk IoT.