

PENGEMBANGAN SISTEM MONITORING CUACA *REAL-TIME* BERBASIS RASPBERRY PI DAN IOT DI PERKEBUNAN DURIAN

Oleh

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ABSTRAK

Penelitian ini bertujuan mengembangkan dan menguji sistem monitoring cuaca real-time berbasis Raspberry Pi dan *Internet of Things (IoT)* yang diterapkan di area perkebunan. Sistem ini memantau suhu dan kelembaban udara menggunakan sensor DHT22, kelembaban tanah menggunakan sensor soil moisture, serta curah hujan menggunakan sensor *tipping bucket rain gauge*. Data sensor diproses oleh Raspberry Pi, ditampilkan melalui LCD, dan dikirimkan secara real-time ke platform IoT menggunakan protokol MQTT. Hasil pengujian menunjukkan bahwa sensor DHT22 memiliki selisih pengukuran kelembaban udara antara 0,1% hingga -7,4% terhadap alat ukur acuan, sensor *soil moisture* memiliki selisih 0,3% hingga 1,5%, dan sensor rain gauge mampu mencatat curah hujan secara otomatis dan konsisten. Secara keseluruhan, sistem bekerja dengan baik dan layak digunakan sebagai solusi pemantauan cuaca untuk mendukung pertanian presisi.

Kata-kata kunci: IoT, Raspberry Pi, monitoring cuaca, DHT22, *soil moisture*, *rain gauge*

Development of a Real-Time Weather Monitoring System Based on Raspberry Pi and Internet of Things (IoT) for Plantation Durian Areas.

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ABSTRACT

This study aims to develop and evaluate a real-time weather monitoring system based on Raspberry Pi and Internet of Things (IoT) for plantation areas. The system monitors air temperature and humidity using a DHT22 sensor, soil moisture using a soil moisture sensor, and rainfall using a tipping bucket rain gauge. Sensor data are processed by the Raspberry Pi, displayed on an LCD, and transmitted in real time to an IoT platform using the MQTT protocol. The experimental results show that the DHT22 sensor has a humidity measurement deviation ranging from 0.1% to -7.4%, the soil moisture sensor shows a deviation between 0.3% and 1.5%, and the rain gauge is able to record rainfall automatically and consistently. Overall, the developed system operates properly and is suitable as a weather monitoring solution to support precision agriculture.

Keywords: IoT, Raspberry Pi, weather monitoring, DHT22, soil moisture, rain gauge