

ABSTRAK

DESAIN PENGUKUR PARAMETER LINGKUNGAN BERBASIS IOT (*INTERNET OF THINGS*) MENGGUNAKAN MIKROKONTROLER WEMOS D1 R2 UNTUK GUDANG PENYIMPANAN PABRIK GULA

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Gula menjadi bahan pokok utama dalam kehidupan sehari-hari, dalam proses penyimpanan suhu dan kelembapan gudang penyimpanan gula berpengaruh terhadap kualitas gula yang menyebabkan gula menggumpal atau mencair. Proses pengecekan suhu dan kelembapan gudang biasanya dilakukan secara berkala yang bertujuan untuk memastikan suhu tetap dalam keadaan stabil. Maka untuk memudahkan pengecekan tersebut diperlukannya alat monitoring ruang yang berbasis *Internet of Things* (IoT). Tujuan penelitian ini yaitu menghasilkan alat monitoring berbasis IoT menggunakan Wemos D1 R2 dengan aplikasi Blynk untuk gudang penyimpanan pabrik gula serta mendapatkan nilai respon sistem dan akurasi pengiriman data dari sensor yang digunakan.

Penelitian ini dilakukan pada bulan Februari - April 2022 di Laboratorium Daya Alat dan Mesin Pertanian (LDAMP), Jurusan Teknik Pertanian, Fakultas Pertanian, Universitas Lampung. Parameter pengujian pada penelitian ini yaitu pengujian stabilitas, reliabilitas, respon sistem dan akurasi pengiriman data. Pengambilan data dilakukan selama tujuh hari pada ruangan dengan jarak antar ruang 50-100 meter. Alat monitoring ruang telah berhasil dibuat dengan komponen utama Wemos D1 R2, sensor DHT22, sensor MQ-135 dan sensor api. Komponen dimasukkan kedalam kotak plastik hitam berukuran 15 cm x 9,5 cm x 5 cm.

Hasil pengujian dengan menggunakan taraf 5% menunjukkan bahwa alat 1 sampai 5 memiliki reliabilitas sangat tinggi, berdasarkan hasil pengujian nilai Cronbach Alpha pembacaan suhu sebesar 0,9992 dan untuk pembacaan kelembapan serta nilai CO₂ sebesar 1. Berdasarkan pengujian akurasi pengiriman data untuk alat 1 sampai 5 nilai sangat baik yaitu nilainya mendekati nol. Didapatkan bahwa RMSE suhu alat 1 sebesar 0,0006, RMSE kelembapan yaitu 0 dan RMSE CO₂

yaitu 0,0092. Untuk alat 2 RMSE suhu sebesar 0, RMSE kelembapan 0 dan RMSE nilai CO₂ sebesar 0,0092. Alat 3 RMSE suhu sebesar 0, RMSE kelembapan sebesar 0,0061 dan RMSE nilai CO₂ sebesar 0,0092. Alat 4 RMSE suhu sebesar 0, RMSE kelembapan 0,0092 dan RMSE nilai CO₂ sebesar 0,0030. Alat 5 RMSE suhu sebesar 0, RMSE kelembapan 0,0061 dan untuk RMSE nilai CO₂ sebesar 0,0030.

Kata kunci : IoT, suhu, kelembapan, nilai CO₂, RMSE

ABSTRACT

DESIGN OF ENVIRONMENTAL PARAMETER MEASUREMENT BASED ON IOT (INTERNET OF THINGS) USING WEMOS D1 R2 MICROCONTROLLER FOR SUGAR FACTORY STORAGE WAREHOUSE

BY

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Sugar is the main staple in everyday life, in the process of storing the temperature and humidity of the sugar storage warehouse affect the quality of sugar which causes sugar to clot or melt. The process of checking the temperature and humidity of the warehouse is usually carried out periodically to ensure that the temperature remains in a stable state. So to facilitate this checking, a room monitoring tool based on the Internet of Things (IoT) is needed. The purpose of this study is to produce an IoT-based monitoring tool using Wemos D1 R2 with the Blynk application for a fiber sugar factory storage warehouse to get system response values and data transmission accuracy from the sensors used.

This research was conducted in February 2022 - April 2022 at the Laboratory of Agricultural Machinery and Equipment Power (LDAMP), Agricultural Engineering Department, Faculty of Agriculture, University of Lampung. The test parameters in this research are stability, reliability, system response and data transmission accuracy. Data collection was carried out for seven days in a room with a distance between spaces of 50-100 meters. The room monitoring tool has been successfully made with the main components of the Wemos D1 R2, the DHT22 sensor, the MQ-135 sensor and the fire sensor. The components are put in a black plastic box measuring 15 cm x 9.5 cm x 5 cm.

The test results using the 5% level show that the reliability of tools 1 to 5 is very high, based on the test results, the Cronbach Alpha value for temperature reading is 0.9992 and for humidity readings and CO₂ values are 1. In addition, based on testing the accuracy of data transmission for tools 1 to 5 the value is very good, namely the value is close to zero. It was found that the RMSE of temperature for tool 1 was 0.0006, RMSE of humidity was 0 and RMSE of CO₂ was 0.0092. For tool 2 RMSE temperature is 0, RMSE humidity is 0 and RMSE CO₂ value is

0.0092. Tool 3 RMSE for temperature is 0, RMSE for humidity is 0.0061 and RMSE for CO₂ is 0.0092. Tool 4 RMSE temperature is 0, RMSE humidity is 0.0092 and RMSE is CO₂ value is 0.0030. Tool 5 RMSE for temperature is 0, RMSE for humidity is 0.0061 and for RMSE the value of CO₂ is 0.0030.

Key words : IoT, temperature, humidity, value of CO₂, RMSE