

ABSTRAKS

RANCANG BANGUN PROTOTYPE PEMANTAUAN KUALITAS UDARA BERBASIS *INTERNET OF THINGS* PADA KANDANG AYAM PETELUR

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Kualitas udara kandang ayam petelur merupakan faktor kritis yang mempengaruhi kesehatan dan produktivitas ternak. Penelitian ini merancang dan membangun prototype sistem pemantauan kualitas udara berbasis Internet of Things (IoT) pada kandang ayam petelur menggunakan sensor DHT22 untuk mengukur suhu dan kelembapan, serta sensor MQ-137 untuk mendeteksi kadar gas amonia (NH_3). Mikrokontroler NodeMCU ESP32 digunakan sebagai pusat pengolahan data yang terhubung ke aplikasi Blynk melalui jaringan Wi-Fi untuk pemantauan secara real-time. Sistem dilengkapi dengan aktuator berupa kipas, lampu, buzzer, dan LED indikator yang bekerja secara otomatis berdasarkan kondisi lingkungan. Hasil pengujian menunjukkan sensor DHT22 memiliki tingkat akurasi suhu sebesar 99,20% dan kelembapan sebesar 96,98% dibandingkan hygrometer referensi. Sensor MQ-137 mampu mendeteksi kadar gas amonia dari 0–0,9 ppm pada udara bersih hingga 24,1 ppm pada media kotoran ayam, dengan rata-rata selisih 12,14 ppm. Sistem berhasil menampilkan data secara real-time melalui LCD dan aplikasi Blynk, sehingga dapat membantu peternak memantau kondisi kandang dan mengambil keputusan secara cepat guna meningkatkan produktivitas ayam petelur.

Kata kunci: IoT, kualitas udara, kandang ayam petelur, DHT22, MQ-137, ESP32, Blynk

ABSTRACT

DESIGN AND CONSTRUCTION OF AN INTERNET OF THINGS-BASED AIR QUALITY MONITORING PROTOTYPE FOR LAYING HEN COOPS

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Air quality in laying hen coops is a critical factor affecting the health and productivity of livestock. This study designs and builds an Internet of Things (IoT)-based air quality monitoring prototype for laying hen coops using a DHT22 sensor to measure temperature and humidity, and an MQ-137 sensor to detect ammonia gas (NH₃) concentration. The NodeMCU ESP32 microcontroller serves as the central data processing unit connected to the Blynk application via Wi-Fi for real-time monitoring. The system is equipped with actuators including fans, lights, a buzzer, and LED indicators that operate automatically based on environmental conditions. Test results show that the DHT22 sensor achieves a temperature accuracy of 99.20% and humidity accuracy of 96.98% compared to a reference hygrometer. The MQ-137 sensor successfully detects ammonia concentrations ranging from 0–0.9 ppm in clean air up to 24.1 ppm in chicken manure media, with an average difference of 12.14 ppm. The system successfully displays data in real-time via an LCD and the Blynk application, enabling farmers to monitor coop conditions and make timely decisions to improve laying hen productivity.

Keywords: IoT, air quality, laying hen coop, DHT22, MQ-137, ESP32, Blynk