

## ABSTRAK

Peternakan ayam broiler memerlukan pengelolaan lingkungan kandang yang baik untuk menjaga kesehatan dan meningkatkan produktivitas ternak. Parameter lingkungan seperti suhu, kelembaban, dan kadar gas amonia merupakan faktor penting yang harus dipantau secara *real-time* karena kondisi yang tidak sesuai dapat menyebabkan stres, gangguan pernapasan, serta menurunkan produktivitas ayam broiler.

Penelitian ini bertujuan untuk merancang dan mengimplementasikan sistem monitoring dan pengendalian suhu, kelembaban, dan gas amonia berbasis *Internet of Things (IoT)* pada lingkungan peternakan ayam broiler. Sistem ini dikembangkan menggunakan Arduino Uno sebagai pengirim data dan ESP32 sebagai penerima data sekaligus *gateway* IoT. Sensor DHT22 digunakan untuk mengukur suhu dan kelembaban, sedangkan sensor DFRobot NH<sub>3</sub> digunakan untuk mendeteksi kadar gas amonia. Komunikasi data antara pengirim dan penerima data menggunakan modul LoRa SX1278, sementara pemantauan jarak jauh dilakukan melalui aplikasi Blynk berbasis internet. Sistem ini juga dilengkapi *Solid State Relay (SSR)* untuk mengendalikan kipas blower secara otomatis berdasarkan nilai ambang batas yang telah ditentukan.

Hasil pengujian menunjukkan bahwa sensor DHT22 mampu membaca suhu dan kelembaban dengan baik, sensor DFRobot NH<sub>3</sub> mampu mendeteksi perubahan kadar gas amonia, serta komunikasi LoRa SX1278 berhasil mengirimkan data dengan tingkat keberhasilan tinggi pada jarak tertentu. Selain itu, *dashboard* monitoring mampu menampilkan data secara *real-time*, dan sistem pengendalian otomatis dapat bekerja sesuai dengan kondisi lingkungan kandang. Dengan demikian, sistem yang dirancang dapat membantu peternak dalam melakukan monitoring dan pengendalian lingkungan kandang ayam broiler secara efektif, efisien, dan *real-time*.

**Kata kunci:** *Internet of Things (IoT)*, suhu dan kelembaban, gas amonia, mikrokontroler, LoRa SX1278.

## ABSTRACT

*Broiler chicken farming requires proper environmental management to maintain animal health and improve productivity. Environmental parameters such as temperature, humidity, and ammonia gas concentration are important factors that must be monitored in real-time, as inappropriate conditions can cause stress, respiratory disorders, and reduced productivity in broiler chickens.*

*This study aims to design and implement an Internet of Things (IoT)-based monitoring and control system for temperature, humidity, and ammonia gas levels in broiler farming environments. The system was developed using an Arduino Uno as the data transmitter and an ESP32 as the data receiver and IoT gateway. The DHT22 sensor is used to measure temperature and humidity, while the DFRobot NH<sub>3</sub> sensor is used to detect ammonia gas concentration. Data communication between the transmitter and receiver is carried out using the LoRa SX1278 module, while remote monitoring is performed through the Blynk application via the internet. The system is also equipped with a Solid State Relay (SSR) to automatically control the blower fan based on predetermined threshold values.*

*The test results show that the DHT22 sensor can accurately read temperature and humidity, the DFRobot NH<sub>3</sub> sensor can detect changes in ammonia gas concentration, and the LoRa SX1278 communication successfully transmits data with a high success rate at a certain distance. In addition, the monitoring dashboard is able to display real-time data, and the automatic control system operates according to the environmental conditions of the poultry house. Therefore, the developed system can assist farmers in monitoring and controlling the broiler house environment effectively, efficiently, and in real-time.*

**Keywords:** *Internet of Things (IoT), temperature and humidity, ammonia gas, Microcontroller, LoRa SX1278.*