

ABSTRAK

IMPLEMENTASI SISTEM KLASIFIKASI KENYAMANAN RUANGAN MENGUNAKAN *FUZZY LOGIC MULTI-INPUT* BERBASIS IOT PADA *PLANT BASED AIR PURIFIER*

(2026: xiv + 75 Halaman + 27 Gambar + 23 Tabel + Daftar Pustaka + Lampiran)

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Kualitas udara dalam ruangan (Indoor Air Quality/IAQ) merupakan salah satu faktor yang memengaruhi kesehatan dan kenyamanan penghuni. Penelitian ini mengimplementasikan sistem klasifikasi kenyamanan ruangan menggunakan metode Fuzzy Logic Multi-Input berbasis Internet Of Things (IoT) pada Plant-Based Air Purifier. Sistem dibangun menggunakan mikrokontroler ESP32 yang terintegrasi dengan sensor DHT22, MH-Z19B, dan PMS7003 untuk mengukur suhu, konsentrasi karbon dioksida (CO₂), dan partikulat PM2.5. Data sensor diproses menggunakan metode Fuzzy Logic Multi-Input untuk mengklasifikasikan kondisi ruangan ke dalam tiga kategori, yaitu Ruang Sehat dan Nyaman, Ruang Sehat dan Cukup Nyaman, serta Ruang Kotor dan Tidak Nyaman. Hasil klasifikasi ditampilkan secara real-time pada TFT LCD, dan aplikasi Blynk, melalui jaringan WiFi. Hasil penelitian menunjukkan bahwa sistem berhasil melakukan monitoring dan klasifikasi kualitas udara secara real-time, serta penggunaan tanaman lidah mertua (*Sansevieria Trifasciata*) mampu meningkatkan kualitas udara dibandingkan kondisi tanpa tanaman. Selain itu, hasil pengujian menunjukkan bahwa sensor DHT22, MH-Z19B, dan PMS7003 memiliki tingkat akurasi yang baik sehingga sistem mampu bekerja secara andal sebagai sistem monitoring kualitas udara berbasis IoT.

Kata kunci: *Plant Based Air Purifier, Internet of Things, Fuzzy Logic Multi-Input, Indoor Air Quality, ESP32.*

ABSTRACT

IMPLEMENTATION OF AN IoT-BASED MULTI-INPUT FUZZY LOGIC ROOM COMFORT CLASSIFICATION SYSTEM ON A PLANT-BASED AIR PURIFIER

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Indoor Air Quality (IAQ) is one of the key factors affecting human health and comfort. This study implements an Internet of Things (IoT)-based room comfort classification system using the Multi-Input Fuzzy Logic method on a Plant-Based Air Purifier. The system is developed using an ESP32 microcontroller integrated with DHT22, MH-Z19B, and PMS7003 sensors to measure temperature, carbon dioxide (CO₂) concentration, and PM2.5 particulate matter. The sensor data are processed using the Multi-Input Fuzzy Logic method to classify room conditions into three categories: Healthy and Comfortable, Healthy and Moderately Comfortable, and Unhealthy and Uncomfortable. The classification results are displayed in real time on a TFT LCD and the Blynk application via a WiFi network. The results show that the proposed system successfully performs real-time indoor air quality monitoring and room comfort classification. Furthermore, the use of Sansevieria trifasciata as the plant medium improves indoor air quality compared to conditions without plants. In addition, the DHT22, MH-Z19B, and PMS7003 sensors demonstrate good measurement accuracy, indicating that the system is reliable for IoT-based indoor air quality monitoring.

Keywords: Plant-Based Air Purifier, Internet of Things, Multi-Input Fuzzy Logic, Indoor Air Quality, ESP32.