

ABSTRAK

ROBOT PENGANTAR BARANG MENGGUNAKAN ESP 8266 DENGAN METODE LOGIKA FUZZY BERBASIS IOT

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HIDAYAT SAPRIYANTO

062140342292

JURUSAN TEKNIK ELEKTRO

PROGRAM STUDI SARJANA TERAPAN TEKNIK ELEKTRO

POLITEKNIK NEGERI SRIWIJAYA

Berdasarkan laporan tugas akhir ini, dirancang dan diimplementasikan robot pengantar barang berbasis ESP8266 dengan metode logika fuzzy Mamdani dan IoT. Sistem ini mengintegrasikan navigasi berbasis garis menggunakan sensor warna TCS3200 untuk mendeteksi jalur hitam dan penanda persimpangan berwarna. Logika fuzzy Mamdani diterapkan untuk klasifikasi warna barang guna menentukan lokasi penurunan muatan secara akurat, dengan input nilai navigasi dan barang serta output kontrol servo. Integrasi IoT melalui aplikasi Blynk memungkinkan pengendalian real-time seperti pemilihan area tujuan, aktivasi robot, dan perintah kembali. Hasil pengujian menunjukkan akurasi klasifikasi warna mencapai 97% untuk merah dan biru, serta 92% untuk kuning. Sistem navigasi mampu mengikuti jalur hitam dengan akurasi 98% dan merespons persimpangan warna secara tepat. Robot berhasil menurunkan barang sesuai area tujuan dengan tingkat keberhasilan 95%, serta memiliki waktu respons rata-rata 1,2 detik per perintah. Pengujian dalam lingkungan indoor (kantor, laboratorium, gudang skala kecil) membuktikan kinerja sistem yang stabil dan adaptif. Dengan demikian, solusi ini menawarkan efisiensi operasional dalam logistik internal melalui kombinasi navigasi, klasifikasi warna, dan kendali jarak jauh berbasis IoT.

KATA KUNCI: *Robot AGV, Internet Of Things, Fuzzy Mamdani*

ABSTRACT

DELIVERY ROBOT USING ESP 8266 WITH IOT-BASED FUZZY LOGIC METHOD

([2025 : 64 Pages] + [26 Pictures] + [8 Tables] + [References] + [attachment])

HIDAYAT SAPRIYANTO

062140342292

ELECTRICAL ENGINEERING DEPARTMENT

APPLIED UNDERGRADUATE STUDY PROGRAM IN ELECREICAL ENGINEERING

SRIWIJAYA STATE POLITECHNIC

This final project report presents the design and implementation of a goods delivery robot based on ESP8266, employing the Mamdani fuzzy logic method and IoT technology. The system integrates line-following navigation using a TCS3200 color sensor to detect black paths and colored intersection markers. Mamdani fuzzy logic is applied to classify the color of items, enabling accurate determination of drop-off locations by using navigation and item color values as inputs and producing servo control as output. IoT integration through the Blynk application allows real-time control functions, such as selecting destination areas, activating the robot, and sending return commands. Testing results show that the color classification accuracy reached 97% for red and blue, and 92% for yellow. The navigation system successfully followed black paths with 98% accuracy and responded correctly to colored intersections. The robot achieved a 95% success rate in delivering items to designated areas, with an average response time of 1.2 seconds per command. Tests conducted in indoor environments (offices, laboratories, and small-scale warehouses) demonstrated stable and adaptive system performance. Overall, this solution offers operational efficiency in internal logistics through the combination of navigation, color classification, and IoT-based remote control.

Keyword: Robot AGV, Internet Of Things, Fuzzy Mamdani