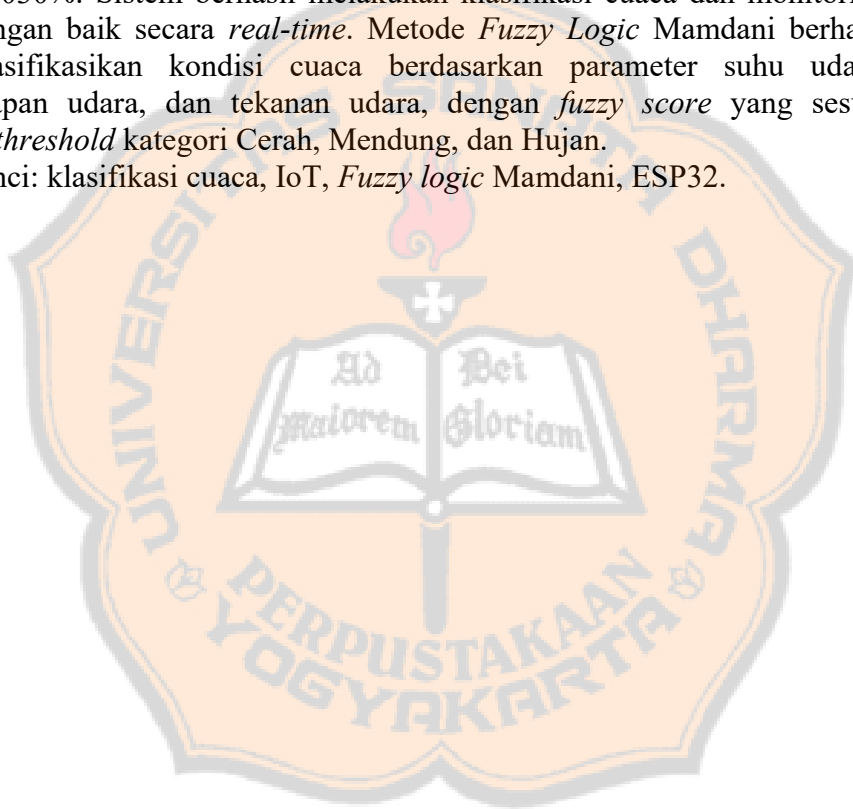


INTISARI

Penelitian ini bertujuan merancang dan membangun sistem klasifikasi cuaca berbasis *Internet of Things* (IoT) menggunakan metode *Fuzzy logic Mamdani*. Sistem menggunakan sensor DHT11 untuk membaca suhu dan kelembapan udara serta sensor BME280 untuk membaca tekanan udara, dengan mikrokontroler ESP32 DevKit V1 sebagai pusat pemrosesan data. Data sensor diolah menggunakan 27 *rule fuzzy* untuk menghasilkan klasifikasi cuaca berupa cerah, berawan, dan hujan, kemudian ditampilkan secara *real-time* pada platform IoT Blynk. Hasil pengujian menunjukkan rata-rata galat sensor suhu sebesar 2,08%, kelembapan 1,50%, dan tekanan udara 0,030%. Sistem berhasil melakukan klasifikasi cuaca dan monitoring data dengan baik secara *real-time*. Metode *Fuzzy Logic Mamdani* berhasil mengklasifikasikan kondisi cuaca berdasarkan parameter suhu udara, kelembapan udara, dan tekanan udara, dengan *fuzzy score* yang sesuai dengan *threshold* kategori Cerah, Mendung, dan Hujan.

Kata kunci: klasifikasi cuaca, IoT, *Fuzzy logic Mamdani*, ESP32.



ABSTRACT

This study aims to design and develop an Internet of Things (IoT)-based weather classification system using the Mamdani *Fuzzy logic* method. The system utilizes a DHT11 sensor to measure temperature and humidity and a BME280 sensor to measure air pressure, with an ESP32 DevKit V1 microcontroller serving as the data processing unit. Sensor data is processed using 27 fuzzy rules to classify weather conditions specifically sunny, cloudy, and rainy and the results are displayed in real-time on the Blynk IoT platform. Testing results indicate average sensor errors of 2.08% for temperature, 1.50% for humidity, and 0.030% for air pressure. The system successfully performs weather classification and real-time data monitoring. The Mamdani Fuzzy Logic method was successfully implemented to classify weather conditions based on air temperature, relative humidity, and atmospheric pressure. The results showed average fuzzy scores of 22.4 for the Clear category, 59.2 for the Cloudy category, and 80.1 for the Rainy category, indicating that the fuzzy scores were proportionally distributed according to the predefined classification thresholds.

Keywords: weather classification, IoT, Mamdani Fuzzy Logic, ESP32.

