



PROJECT REPORT
SMARTROOM WITH
FUZZY MAMDANI ALGORITHM

MARCELLO OKTAVIANUS GUNARTO
21.K1.0032

Faculty of Computer Science
Soegijapranata Catholic University
2025

ABSTRACT

(SMARTROOM WITH FUZZY MAMDANI ALGORITHM)

In this study, a Smartroom security system is developed by integrating Internet of Things (IoT) technology with three types of sensors: temperature sensor (DHT11), motion sensor (PIR), and distance sensor (HC-SR04). The system is designed to monitor room conditions in real time and provide automatic responses to potential threats. The temperature sensor detects abnormal heat changes that may indicate fire hazards. The motion sensor captures the presence of human activity within the room, while the distance sensor identifies approaching or suspicious objects based on proximity. All sensor data are processed by a control system using the Mamdani-type Fuzzy Logic Algorithm. This algorithm converts crisp input values into fuzzy sets, processes them through a rule base, and generates output indicating the threat level. Based on the threat level, the system can trigger an alarm and send a web-based notification to the user. The use of Fuzzy Mamdani enables the system to deal with uncertainty and variations in sensor input more effectively. Testing results show that the system is capable of detecting intrusion and environmental anomalies with high accuracy. The algorithm allows for adaptive decision-making, enabling the system to respond appropriately to different threat scenarios. This approach increases both safety and comfort for room occupants. The implementation is suitable for residential and office environments. Furthermore, the system architecture provides a foundation for future smart security applications. Overall, this research demonstrates the effectiveness of combining IoT-based sensing with fuzzy logic for intelligent room security systems.

Keyword: *algoritma_fuzzy, inferensi_Mamdani, input_multi-sensor, sistem_keamanan, alarm_cerd*