

Abstrak

Kejahatan pencurian di wilayah padat penduduk seperti Jakarta Timur mendorong kebutuhan sistem keamanan rumah yang responsif dan mudah diakses. Penelitian ini merancang dan mengembangkan sistem keamanan rumah berbasis *Internet of Things* (IoT) dengan penerapan algoritma Fuzzy Logic Mamdani, serta pemantauan secara real-time melalui aplikasi *Android*. Sistem ini mengintegrasikan sensor *Passive Infrared* (PIR) untuk deteksi gerakan, sensor magnetik untuk status pintu, kamera Raspberry Pi untuk pengawasan visual, serta buzzer sebagai alarm. Proses klasifikasi status keamanan ("Aman", "Waspada", "Bahaya") dilakukan melalui metode *fuzzy logic* berbasis input intensitas gerakan, kondisi pintu, dan waktu. Data dikirim ke aplikasi *Android* menggunakan protokol MQTT, sementara video dipantau melalui RTSP. Aplikasi *Android* dibangun dengan arsitektur MVVM dan Jetpack Compose, menyediakan fitur notifikasi, *livestream*, kontrol alarm, dan pengaturan jaringan. Berdasarkan hasil pengujian *blackbox* dan simulasi pada miniatur rumah, sistem mampu bekerja secara efektif dalam mendeteksi dan merespons ancaman keamanan. Sistem ini diharapkan dapat menjadi solusi praktis dan terjangkau dalam meningkatkan keamanan rumah di lingkungan masyarakat.

Kata kunci: Sistem Keamanan Rumah, Fuzzy Logic Mamdani, MQTT, RTSP, Android.

Abstract

The high rate of burglary in densely populated areas such as East Jakarta drives the need for a responsive and easily accessible home security system. This study designs and develops a home security system based on the Internet of Things (IoT) with the implementation of the Mamdani Fuzzy Logic algorithm and real-time monitoring through an Android application. The system integrates a Passive Infrared (PIR) sensor for motion detection, a magnetic sensor for door status, a Raspberry Pi camera for visual surveillance, and a buzzer as an alarm. Security status classification ("Safe", "Alert", "Danger") is determined using fuzzy logic based on motion intensity, door condition, and time. Data is sent to the Android application via the MQTT protocol, while video monitoring is conducted using RTSP. The Android application is built using the MVVM architecture and Jetpack Compose, featuring notifications, livestreaming, alarm control, and network configuration. Based on blackbox testing and simulations using a miniature house, the system effectively detects and responds to security threats. This system is expected to provide a practical and affordable solution to enhance home security within communities.

Keywords: Home Security System, Mamdani Fuzzy Logic, MQTT, RTSP, Android.