ABSTRAK

Penelitian ini bertujuan mengatasi ketidak-efisienan dalam penggunaan energi listrik di rumah tangga dan apartemen dengan mengembangkan sistem smart building berbasis Internet of Things (IoT). Sistem ini menggunakan sensor suhu, LDR, dan arus, serta relay dan ESP32 sebagai microcontroller.

Melalui koneksi IoT, sistem mengumpulkan data real-time terkait penggunaan daya, arus, suhu, dan pencahayaan ruangan. Implementasi sistem ini, yang terintegrasi dengan aplikasi Telegram, memberikan kemampuan kontrol dan pemantauan real-time untuk suhu, pencahayaan, dan manajemen energi. Sensor seperti DHT11, PIR, dan LDR digunakan untuk mengumpulkan data yang dianalisis oleh logika fuzzy untuk pengambilan keputusan cerdas.

Hasil pengujian menunjukkan kematangan sistem dalam mendeteksi kondisi lingkungan, dan efisiensi penggunaan daya meningkat sekitar 80%, meskipun ada sedikit delay dalam kontrol non-aktifasi penggunaan berlebihan.

Kata kunci : *Internet of Things (IoT)*, Logika Fuzzy, Real-rime, Sensor Suhu(DHT11), Sensor Arus, Sensor Cahaya(LDR), Sensor PIR.

ABSTRACT

This research aims to address inefficiencies in household and apartment electricity usage by developing an Internet of Things (IoT)-based smart building system. The system utilizes temperature, LDR, and current sensors, along with a relay and ESP32 as the microcontroller.

Through IoT connectivity, the system collects real-time data related to power usage, current, temperature, and room lighting. The implementation of this system, integrated with the Telegram application, provides real-time control and monitoring capabilities for temperature, lighting, and energy management. Sensors such as DHT11, PIR, and LDR are employed to gather data, which is analyzed by the fuzzy system for intelligent decision-making.

Testing results demonstrate the system's maturity in detecting environmental conditions, with power usage efficiency increasing by approximately 80%, despite a slight delay in the deactivation control of excessive usage.

Keywords: Internet of Things (IoT), Fuzzy Logic, Real-time, Temperature Sensor (DHT11), Current Sensor, Light Sensor (LDR), PIR Sensor.

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