

ABSTRAK
SISTEM MONITORING DAN PREDIKSI KONSUMSI LISTRIK
MENGGUNAKAN METODE *LONG SHORT-TERM MEMORY* (LSTM)
BERBASIS *INTERNET OF THINGS* (IOT)

(Muhammad Rifqi Amir Putra 2025:77)

Perkembangan teknologi *Internet of Things* (IoT) memungkinkan pengukuran dan pemantauan konsumsi listrik dilakukan secara *real-time* dan efisien. Penelitian ini bertujuan untuk merancang dan membangun sistem monitoring dan kontrol konsumsi listrik berbasis IoT yang dilengkapi dengan fitur prediksi menggunakan algoritma *Long Short-Term Memory* (LSTM). Sistem ini menggunakan sensor PZEM-004T untuk mengukur parameter listrik seperti tegangan, arus, daya, dan energi, yang kemudian dikirimkan melalui protokol MQTT menggunakan mikrokontroler ESP32. Data konsumsi listrik ditampilkan pada aplikasi mobile dan disimpan di database Supabase. Selain fitur pemantauan, sistem juga menyediakan kontrol perangkat listrik melalui relay serta pengaturan waktu dan batas konsumsi yang dapat dikonfigurasi pengguna. Fitur prediksi konsumsi listrik dikembangkan untuk memberikan estimasi tagihan bulanan atau estimasi waktu habis token listrik berdasarkan data historis. Hasil implementasi menunjukkan bahwa sistem mampu melakukan monitoring dan kontrol secara *real-time*, serta memberikan visualisasi histori konsumsi dalam bentuk grafik yang informatif. Sistem ini diharapkan dapat membantu pengguna dalam mengelola konsumsi daya secara lebih bijak dan efisien.

Kata Kunci: *Internet of Things*, PZEM-004T, Konsumsi Listrik, LSTM, *Machine Learning*, Monitoring, Supabase, MQTT.

ABSTRACT

**ELECTRICITY CONSUMPTION MONITORING AND PREDICTION
SYSTEM USING LONG SHORT-TERM MEMORY (LSTM) METHOD
BASED ON INTERNET OF THINGS (IOT)**

(Muhammad Rifqi Amir Putra 2025:77)

The development of Internet of Things (IoT) technology enables real-time and efficient measurement and monitoring of electricity consumption. This study aims to design and develop an IoT-based electricity consumption monitoring and control system equipped with a prediction feature using the Long Short-Term Memory (LSTM) algorithm. The system uses the PZEM-004T sensor to measure electrical parameters such as voltage, current, power, and energy, which are then transmitted via the MQTT protocol using an ESP32 microcontroller. Electricity consumption data is displayed on a mobile application and stored in a Supabase database. In addition to monitoring features, the system also provides control over electrical devices through a relay, as well as user-configurable scheduling and consumption limit settings. The electricity consumption prediction feature is developed to provide estimated monthly bills or estimated time until prepaid electricity tokens run out, based on historical data. The implementation results show that the system is capable of performing real-time monitoring and control, as well as providing informative visualizations of consumption history in graphical form. This system is expected to help users manage their power consumption more wisely and efficiently.

Keywords: Internet of Things, PZEM-004T, Electricity Consumption, LSTM, Machine Learning, Monitoring, Supabase, MQTT.