ABSTRAK

Toko Loa Kim Jong menghadapi permasalahan pengelolaan stok yang tidak efisien karena keputusan pengadaan barang dilakukan secara subjektif tanpa memanfaatkan data historis penjualan. Penelitian ini membangun sistem prediksi penjualan berbasis website menggunakan model ARIMA dan LSTM yang dibandingkan secara berdampingan tanpa mekanisme *ensemble*. Data mencakup 31.880 transaksi dari 345 produk periode Mei 2020 hingga Maret 2025 yang diagregasi menjadi data bulanan per produk. Sebanyak 166 produk layak dimodelkan menggunakan kedua algoritma. ARIMA menggunakan seluruh data training per produk melalui *grid search* berbasis AIC, sedangkan LSTM dilatih per klaster menggunakan 11 fitur hasil rekayasa dan normalisasi *MinMaxScaler*. Kedua model dievaluasi secara *rolling* pada 12 bulan data pengujian menggunakan MAE dan RMSE pada level agregat total pendapatan toko, serta *Precision@10* pada level produk individual. Hasil menunjukkan LSTM (MAE Rp1.327.530; RMSE Rp1.587.740) mengungguli ARIMA (MAE Rp2.467.639; RMSE Rp2.950.435) sebesar 46,2% pada level total pendapatan toko, sedangkan ARIMA lebih unggul dalam mengidentifikasi produk terlaris (*Precision@10* 0,342 dibandingkan 0,267). Seluruh 20 skenario *Black Box Testing* berhasil dijalankan dan *User Acceptance Testing* memperoleh tingkat penerimaan 86,67% (Sangat Baik).

Kata kunci: Prediksi Penjualan, ARIMA, LSTM, Time Series, Website, Manajemen Stok.

ABSTRACT

Loa Kim Jong Store faces inefficient inventory management due to subjective procurement decisions made without utilizing historical sales data. This study develops a web-based sales forecasting system using ARIMA and LSTM models compared side-by-side without an ensemble mechanism. The dataset consists of 31,880 transactions from 345 products collected between May 2020 and March 2025 and aggregated into monthly product-level data. A total of 166 eligible products were modeled using both algorithms. ARIMA was trained using all available training data per product through AIC-based grid search, while LSTM was trained per cluster using 11 engineered features and MinMaxScaler normalization. Both models were evaluated using rolling validation over 12 testing months with MAE and RMSE at the aggregate store revenue level, and Precision@10 at the individual product level. Results show LSTM (MAE IDR 1,327,530; RMSE IDR 1,587,740) outperformed ARIMA (MAE IDR 2,467,639; RMSE IDR 2,950,435) by 46.2% at the total store revenue level, while ARIMA achieved better performance in identifying top-selling products (Precision@10 of 0.342 compared to 0.267). All 20 Black Box Testing scenarios passed, and User Acceptance Testing achieved an acceptance rate of 86,67% (Very Good).

Keywords: Sales Forecasting, ARIMA, LSTM, Time Series, Website, Inventory Management