

ABSTRAK

MUHAMMAD SEPTI. Perbandingan Metode *Long Short-Term Memory* (LSTM) Dan *Bidirectional Long Short-Term Memory* (Bi-LSTM) Dalam Memprediksi Penutupan Harga Saham. Dibimbing oleh TEKAD MATULATAN dan FERI IRAWAN.

Pergerakan harga saham bersifat fluktuatif dan non-linear, sehingga memerlukan model yang mampu menangkap pola deret waktu secara efektif. Penelitian ini bertujuan untuk membandingkan kinerja dua arsitektur deep learning, yaitu Long Short-Term Memory (LSTM) dan Bidirectional Long Short-Term Memory (Bi-LSTM), dalam memprediksi harga penutupan (*closing price*) saham perbankan yaitu BBKA, BBRI, dan BMRI. Data historis harian diperoleh dari Yahoo Finance periode 1 Januari 2019 hingga 30 Desember 2024. Data mengalami preprocessing berupa normalisasi Min-Max, pembentukan *sliding window*, dan pembagian data secara kronologis 70% *training*, 15% *validation*, 15% *testing*. Hyperparameter tuning dilakukan menggunakan *Grid Search* untuk mendapatkan konfigurasi terbaik pada masing-masing model. Evaluasi model menggunakan metrik RMSE, MAE, dan MAPE. Hasil penelitian menunjukkan bahwa LSTM memberikan performa lebih baik pada saham BBRI (MAPE 1,85%) dan BMRI (MAPE 1,57%), sedangkan Bi-LSTM unggul pada saham BBKA (MAPE 1,57%). Secara keseluruhan, LSTM lebih efisien secara komputasi dan stabil pada sebagian besar kasus. Penelitian ini membuktikan bahwa kedua model mampu memprediksi harga saham dengan akurasi tinggi (MAPE < 2%), namun pemilihan model yang optimal bergantung pada karakteristik masing-masing saham.

Kata kunci: LSTM, Bi-LSTM, prediksi harga saham, time series, deep learning, BBKA, BBRI, BMRI.

ABSTRACT

Muhammad Septi. Comparison of Long Short-Term Memory (LSTM) and Bidirectional Long Short-Term Memory (Bi-LSTM) Methods in Predicting Stock Closing Prices. Supervised by TEKAD MATULATAN and FERI IRAWAN

Stock price movements are highly fluctuating and non-linear, requiring models capable of effectively capturing time series patterns. This study aims to compare the performance of two deep learning architectures, namely Long Short-Term Memory (LSTM) and Bidirectional Long Short-Term Memory (Bi-LSTM), in predicting the closing price of banking stocks: BBKA, BBRI, and BMRI. Daily historical data was obtained from Yahoo Finance for the period from January 1, 2019, to December 30, 2024. The data underwent preprocessing through Min-Max normalization, sliding window transformation, and chronological data splitting (70% training, 15% validation, and 15% testing). Hyperparameter tuning was performed using Grid Search to obtain the optimal configuration for each model. Model evaluation was conducted using RMSE, MAE, and MAPE metrics. The results show that LSTM performed better on BBRI (MAPE 1.85%) and BMRI (MAPE 1.57%), while Bi-LSTM outperformed on BBKA (MAPE 1.57%). Overall, LSTM demonstrated superior computational efficiency and greater stability in most cases. This study proves that both models are capable of predicting stock prices with high accuracy (MAPE < 2%). However, the optimal model selection depends on the specific characteristics of each stock.

Keywords: LSTM, Bi-LSTM, stock price prediction, time series, deep learning, BBKA, BBRI, BMRI