

ABSTRACT

IMPLEMENTATION OF THE *HYBRID VECTOR AUTOREGRESSIVE INTEGRATED MOVING AVERAGE (VARIMA)-BIDIRECTIONAL LONG SHORT-TERM MEMORY (BiLSTM)* MODEL FOR FORECASTING THE STOCK PRICES OF PT BANK NEGARA INDONESIA, TBK AND PT BANK RAKYAT INDONESIA, TBK

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Stock price forecasting plays an important role in supporting investment decisions in the capital market, especially in large bank stocks such as PT. Bank Negara Indonesia and PT. Bank Rakyat Indonesia which often experience fluctuations. Therefore, a precise analysis is needed using the *hybrid Vector Autoregressive Integrated Moving Average (VARIMA)–Bidirectional Long Short-Term Memory (BiLSTM)* model to forecast the stock prices of the two banks. The combination of the two produces a *hybrid* model that is able to capture linear and *non*-linear patterns simultaneously. There are three approaches used, namely VARIMA, *hybrid* VARIMA–E_BiLSTM, and *hybrid* VARIMA–EP_BiLSTM. The analysis in this study uses daily stock price data from January 2017 to November 2024 as many as 1962 data with a scheme division of 80% for training and 20% for testing. The results of the analysis show that the *hybrid* VARIMA–EP_BiLSTM model is better able to follow the actual data pattern than other models. Based on the Kolmogorov–Smirnov (KS) test, this model shows a good agreement between the forecasting results and the actual data. Thus, the *hybrid* VARIMA–EP_BiLSTM model has the most optimal performance in forecasting the stock prices of PT. Bank Negara Indonesia Tbk and PT. Bank Rakyat Indonesia Tbk.

Keywords: Fluctuation, Prediction, Forecasting, VARIMA, BiLSTM, *Hybrid* Model, Stock Price.

ABSTRAK

IMPLEMENTASI MODEL *HYBRID VECTOR AUTOREGRESSIVE INTEGRATED MOVING AVERAGE (VARIMA)-BIDIRECTIONAL LONG SHORT-TERM MEMORY (BiLSTM)* PADA PERAMALAN HARGA SAHAM PT. BANK NEGARA INDONESIA, TBK DAN PT. BANK RAKYAT INDONESIA, TBK

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Peramalan harga saham berperan penting dalam mendukung keputusan investasi di pasar modal terutama pada saham bank besar seperti PT. Bank Negara Indonesia dan PT. Bank Rakyat Indonesia yang sering mengalami fluktuasi. Oleh karena itu, dibutuhkan analisis yang tepat dengan menggunakan model *hybrid Vector Autoregressive Integrated Moving Average (VARIMA)-Bidirectional Long Short-Term Memory (BiLSTM)* untuk meramalkan harga saham kedua bank tersebut. Kombinasi keduanya menghasilkan model *hybrid* yang mampu menangkap pola linier dan *non*-linier secara bersamaan. Terdapat tiga pendekatan yang digunakan yaitu VARIMA, *hybrid* VARIMA-E_BiLSTM, dan *hybrid* VARIMA-EP_BiLSTM. Analisis pada penelitian ini menggunakan data harga saham harian dari Januari 2017 hingga November 2024 sebanyak 1962 data dengan pembagian skema sebesar 80% untuk pelatihan dan 20% untuk pengujian. Hasil analisis menunjukkan bahwa model *hybrid* VARIMA-EP_BiLSTM lebih mampu mengikuti pola data aktual dibandingkan model lainnya. Berdasarkan uji *Kolmogorov-Smirnov* (KS), model ini menunjukkan kesesuaian antara hasil peramalan dan data aktual. Dengan demikian, model *hybrid* VARIMA-EP_BiLSTM memiliki kinerja paling optimal dalam meramalkan harga saham PT. Bank Negara Indonesia Tbk dan PT. Bank Rakyat Indonesia Tbk.

Kata-kata kunci: Fluktuasi, Prediksi, Peramalan, VARIMA, BiLSTM, *Hybrid* model, harga saham.