

INTISARI

PERBANDINGAN ALGORITMA *PARTICLE SWARM OPTIMIZATION* (PSO) PADA *FEEDFORWARD NEURAL NETWORK* (FFNN) DAN *RECURRENT NEURAL NETWORK* (RNN) DALAM PERAMALAN NILAI INDEKS LQ45

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Perkembangan pasar modal Indonesia mendorong kebutuhan akan metode peramalan harga saham yang akurat. Penelitian ini memfokuskan pada peramalan indeks LQ45 menggunakan jaringan saraf tiruan (JST), yaitu *feedforward neural network* (FFNN) dan *recurrent neural network* (RNN), dengan optimasi *hyperparameter* menggunakan algoritma *particle swarm optimization* (PSO). Data yang digunakan adalah harga penutupan indeks LQ45 periode 1 Januari 2022 hingga 28 Mei 2025. Pemodelan dilakukan melalui empat pendekatan, yaitu FFNN tanpa optimasi, RNN tanpa optimasi, FFNN dengan PSO, dan RNN dengan PSO. Evaluasi performa dilakukan menggunakan metrik RMSE, MAE, dan MAPE. Hasil penelitian menunjukkan bahwa model RNN yang dioptimasi dengan PSO (PSO-RNN) memberikan performa terbaik dengan nilai MSE sebesar 147,15, RMSE sebesar 12,13, MAE sebesar 8,78, dan MAPE sebesar 1,10%. Temuan ini menunjukkan bahwa kombinasi PSO dan RNN efektif dalam meningkatkan akurasi peramalan data *time series* indeks saham. Dengan demikian, model PSO-RNN dapat menjadi alat bantu yang potensial bagi investor dalam memprediksi pergerakan indeks LQ45 secara lebih akurat dan efisien.

Kata kunci: *Particle Swarm Optimization, Feedforward Neural Network, Recurrent Neural Network, Peramalan, Indeks LQ45, Jaringan Saraf Tiruan.*

ABSTRACT

COMPARISON OF PARTICLE SWARM OPTIMIZATION (PSO) ON FEEDFORWARD NEURAL NETWORK (FFNN) AND RECURRENT NEURAL NETWORK (RNN) IN FORECASTING LQ45 INDEX VALUES

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The development of Indonesia's capital market has increased the demand for accurate stock price forecasting methods. This study focuses on forecasting the LQ45 index using Artificial Neural Networks (ANN), specifically the Feedforward Neural Network (FFNN) and Recurrent Neural Network (RNN), with hyperparameter optimization using the Particle Swarm Optimization (PSO) algorithm. The data used consists of LQ45 index closing prices from January 1, 2022, to May 28, 2025. The modeling is carried out through four approaches: FFNN without optimization, RNN without optimization, FFNN with PSO, and RNN with PSO. Model performance is evaluated using RMSE, MAE, and MAPE metrics. The results show that the RNN model optimized with PSO (PSO-RNN) delivers the best performance, with an MSE of 147.15, RMSE of 12.13, MAE of 8.78, and MAPE of 1.10%. These findings indicate that the combination of PSO and RNN is effective in improving the accuracy of time series forecasting for stock index data. Therefore, the PSO-RNN model can serve as a potential tool for investors to more accurately and efficiently predict the movement of the LQ45 index.

Keywords: Particle Swarm Optimization, Feedforward Neural Network, Recurrent Neural Network, Forecasting, LQ45 Index, Artificial Neural Network.