

ABSTRACT

COMPARISON OF PSO AND DE ALGORITHM PERFORMANCE IN LSTM MODEL PARAMETER OPTIMIZATION FOR PT ASTRA INTERNATIONAL TBK STOCK PRICE PREDICTION

By

Laksmi Dyah Nurlita

21110023

Stocks are one of the most important in financial markets and the most popular in society. Predicting stock price movements is a complex challenge to research, but crucial for investors and companies. PT Astra International Tbk is one of the major companies in Indonesia according to Fortune Indonesia 100. The company was chosen as the object of research because of its dynamic stock price fluctuations. The Long Short-Term Memory (LSTM) model has been widely used to handle time series data such as stock prices, due to its ability to capture long-term relationships. However, the performance of the LSTM model is highly dependent on the selection of optimal hyperparameters. This study aims to optimize LSTM hyperparameters, namely the number of units, dropout, and batch size using two metaheuristic algorithms, namely Particle Swarm Optimization (PSO) and Differential Evolution (DE). Optimization is done by comparing the MSE and R2 evaluation matrices. From this research, it was found that PSO produces better prediction accuracy with MSE of 0.000345 and R2 of 0.975, compared to DE with MSE of 0.000349 and R2 0.974. The best hyperparameters obtained are the number of units of 64, dropout 0.088, and batch size 76. The best PSO model is used to predict stock prices 50 days ahead, with close to actual prices. Tests were also conducted on other stock data which showed that the performance of the model depends on the similarity of the historical data. This research also proves that the combination of LSTM with PSO optimization can provide accurate stock prediction results.

Keywords: DE, LSTM, Optimization, Stock Prediction, PSO