ABSTRACT

Nickel prices on the London Metal Exchange (LME) are currently experiencing significant fluctuations, driven by a surge in demand from the electric vehicle sector and supply uncertainties. This situation poses a challenge to the Indonesian economy, as the LME price serves as the primary benchmark in determining the domestic Mineral Benchmark Price (HMA). These fluctuations cause the data characteristics to be non-stationary and non-linear, requiring a forecasting method that is adaptive to trend changes and capable of capturing long-term dependencies. This study implements the Long Short-Term Memory (LSTM) model, which excels in processing time series data through gate mechanisms capable of adaptively updating information, capturing non-linear patterns, and addressing long-term dependencies. To obtain the best forecasting accuracy, the Bayesian Optimization method is used to efficiently determine the optimal hyperparameter combinations. The results show that the LSTM model with Bayesian Optimization effectively captures historical price movement patterns. This is proven by a Mean Absolute Percentage Error (MAPE) value of 0,92%. This performance proves the effectiveness of LSTM in forecasting nickel price trends for the next five business days as a risk mitigation measure for industry players and the government.

Keywords*:* Nickel Price, London Metal Exchange (LME), Long Short-Term Memory (LSTM), Bayesian Optimization, Hyperparameter, Mean Absolute Percentage Error (MAPE)