ABSTRACT

The stock market has become one of the most popular investment instruments in the digital era. From early 2020 to the end of 2024, META's stock price exhibited sharp fluctuations, including a significant decline in 2022 due to global economic uncertainty and shifts in business strategy, followed by a strong recovery in 2023 and 2024 driven by the growth of the technology sector and the adoption of artificial intelligence. *Long Short-Term Memory* (LSTM), a variant of the *Recurrent Neural Network* (RNN), is capable of addressing the vanishing gradient problem and retaining long-term information through its complex *gate* mechanisms. This study aims to predict META's daily closing stock prices using an LSTM model based on historical data from January 2, 2020, to December 31, 2024. The model was developed through *hyperparameter* optimization, including LSTM units, *dense layer*s, *timesteps*, *batch size*, *learning rate*, and *dropout rate*. The model's performance was evaluated using Mean *Absolute Percentage Error* (MAPE). The results show that the best model was achieved with the following *hyperparameter* combination: training and testing data ratio of 80%:20%, 128 LSTM units, 1 *dense layer*s, 5 *timesteps*, *batch size* 16, *learning rate* 0.001, and *dropout rate* 0.1, resulting in a MAPE of 1.496%.

Keywords: Stock, NVDA, Prediction, *Long Short-Term Memory*, Reccurrent Neural Network, *Hyperparameter*