

## ABSTRACT

Stock price forecasting is an important strategy in capital market analysis to anticipate price movements and support data-driven investment decision-making. This study aims to develop a stock price prediction model for PT Astra International Tbk (ASII) using Support Vector Regression (SVR) optimized with Grey Wolf Optimizer (GWO). This research uses ASII stock because it is classified as a blue-chip issuer in the automotive sector with large market capitalization, high liquidity, and significant volatility. SVR is applied as the method due to its ability to handle non-linear patterns through the Radial Basis Function (RBF) kernel, although its performance heavily depends on selecting optimal hyperparameters such as the regularization parameter ( $C$ ), tolerance error margin ( $\epsilon$ ), and kernel parameter ( $\gamma$ ). GWO is used as a hyperparameter optimization algorithm due to its ability to explore the solution space adaptively through mechanisms that mimic the leadership hierarchy and hunting strategies of grey wolves. The data used consists of ASII daily closing prices from January 2021 to August 2025, totaling 1121 observations divided into training data (90%) and testing data (10%). The optimization process was conducted with a population size of 50 wolves over 300 iterations to find the best hyperparameter combination. The results show that the SVR-GWO model achieves a MAPE of 1.4% with optimal parameter combination  $C = 99.687421$ ,  $\epsilon = 0.269928$ ,  $\gamma = 12.227993$ , while the default SVR model produces a MAPE of 12.83%. The optimization using GWO proved capable of producing a more optimal combination of SVR parameters compared to the default parameters, making SVR-GWO an effective approach for forecasting ASII stock prices.

**Keywords:** Stock price forecasting, Astra International, Support Vector Regression, Grey Wolf Optimizer, Mean Absolute Percentage Error