ABSTRACT

One of the promising instruments for investment today is gold. However, gold prices often experience high volatility, creating uncertainty for investors. This makes it essential to develop an accurate model to predict gold price movements. Predictive models can be built using various methods, such as machine learning or deep learning. However, deep learning algorithms are often considered too complex and require large amounts of data. Therefore, this study focuses on machine learning (ML) algorithms. Some ML algorithms that can be used for prediction include linear regression, logistic regression, and Markov Chain Regression. Although these algorithms can be used for prediction, they have limitations in handling non-linear and continuous data. Hence, this study selects Support Vector Regression (SVR) due to its ability to handle both non-linear and continuous data through the use of kernel functions. The objective of this study is to develop and evaluate the performance of the SVR algorithm in predicting gold prices. In practice, SVR has many hyperparameters that affect the algorithm's performance and accuracy in making predictions. Therefore, this study also implements the GridSearchCV optimization algorithm to find the best combination of hyperparameters for SVR, thereby improving the algorithm's accuracy in making predictions. The parameters that were optimized include epsilon, gamma, and cost. The SVR method is applied both without optimization and with hyperparameter optimization using GridSearchCV. Evaluation is carried out by measuring the metrics of Mean Squared Error (MSE), Mean Absolute Percentage Error (MAPE), and R-squared (R^2). The results of the study indicate that the SVR model with optimization shows better performance compared to SVR without optimization. Specifically, the evaluation metrics improved with an increase in R^2 by 40%, a decrease in MSE by 51.042, and a reduction in MAPE by 0.0121. The optimal parameters C, epsilon, and gamma were found to be C = 100, epsilon = 0.1, and gamma = 0.01. The results demonstrate that the SVR-GridSearchCV model has proven to enhance performance and accuracy in making predictions compared to the model without optimization. This study underscores the importance of hyperparameter optimization in improving the performance of gold price prediction models. In conclusion, the use of optimization techniques such as GridSearchCV is highly recommended in model development to achieve more accurate and reliable results.

Keywords : Support Vector Regression (SVR), Gold Price Prediction, *Hyperparameter* Optimization, *GridsearchCV*