

ABSTRAK

REKHA CLARHISTA AMELIA. Analisis Perbandingan Model *Univariate* dan *Multivariate* pada Prediksi Harga Emas Menggunakan *Gated Recurrent Unit*. Dibimbing oleh MARTALELI BETTIZA dan FORTIA MAGFIRA.

Emas merupakan salah satu instrumen investasi yang banyak diminati sehingga prediksi harga emas menjadi penting untuk mendukung pengambilan keputusan investasi. Perkembangan metode *deep learning* memungkinkan prediksi harga emas dilakukan dengan tingkat akurasi yang lebih baik. Penelitian ini bertujuan untuk membandingkan kinerja model *Gated Recurrent Unit* (GRU) dengan pendekatan *univariate* dan *multivariate* dalam memprediksi harga harian emas dunia. Dataset yang digunakan berasal dari *Investing.com* periode 1 Januari 2020 hingga 7 April 2026 sebanyak 1.410 data harian. Pendekatan *univariate* menggunakan variabel harga terakhir, sedangkan pendekatan *multivariate* menggunakan variabel pembuka, tertinggi, terendah dan terakhir. Data diproses menggunakan *min-max scaling*, *sliding window* berukuran 30, *grid search* untuk optimasi *hyperparameter*, serta *early stopping* untuk mencegah *overfitting*. Evaluasi model dilakukan menggunakan RMSE, MAE, dan MAPE. Hasil penelitian menunjukkan bahwa model GRU *univariate* menghasilkan performa yang lebih baik dengan nilai RMSE 88,8273, MAE 57,2301, dan MAPE 1,28%, sedangkan model GRU *multivariate* memperoleh RMSE 166,5775, MAE 133,5645, dan MAPE 2,92%. Hasil tersebut menunjukkan bahwa model GRU *univariate* lebih efektif dalam memprediksi harga harian emas pada *dataset* yang digunakan.

Kata kunci: emas, *gated recurrent unit*, *multivariate*, prediksi harga, *univariate*.

ABSTRACT

REKHA CLARHISTA AMELIA. Comparative Analysis of Univariate and Multivariate Models for Gold Price Prediction Using Gated Recurrent Unit. Supervised by MARTALELI BETTIZA and FORTIA MAGFIRA.

Gold is one of the most popular investment instruments, making gold price prediction important for supporting investment decision-making. Advances in deep learning methods have enabled more accurate gold price forecasting. This study aims to compare the performance of Gated Recurrent Unit (GRU) models using univariate and multivariate approaches in predicting daily global gold prices. The dataset was obtained from Investing.com, covering the period from January 1, 2020, to April 7, 2026, consisting of 1,410 daily records. The univariate approach used only the closing price variable, while the multivariate approach utilized open, high, low, and close price variables. The data were processed using Min-Max Scaling, a sliding window of 30, Grid Search for hyperparameter optimization, and Early Stopping to prevent overfitting. Model performance was evaluated using Root Mean Square Error (RMSE), Mean Absolute Error (MAE), and Mean Absolute Percentage Error (MAPE). The results show that the univariate GRU model outperformed the multivariate GRU model, achieving an RMSE of 88.8273, MAE of 57.2301, and MAPE of 1.28%, whereas the multivariate GRU model obtained an RMSE of 166.5775, MAE of 133.5645, and MAPE of 2.92%. These findings indicate that the univariate GRU model is more effective for predicting daily gold prices using the dataset employed in this study.

Keywords: gated recurrent unit, gold, gold price prediction, multivariate, univariate.