ABSTRACT

Indonesia has significant potential in the non-oil and gas trade sector, contributing substantially to economic growth. Indonesia has significant potential in the non-oil and gas trade sector, contributing greatly to economic growth. However, fluctuations in exports and imports present complex challenges, particularly in time series forecasting. Complex data patterns and vanishing gradient issues in conventional models often hinder prediction accuracy. This study proposes a Bidirectional Gated Recurrent Unit (BiGRU) model optimized with the Nesterov-Accelerated Adaptive Moment Estimation (Nadam) algorithm to improve prediction accuracy and convergence efficiency. This method leverages BiGRU's ability to process sequential data bidirectionally and Nadam's advantages in stability and parameter update speed. The study utilizes monthly non-oil and gas trade data from January 1993 to October 2024, preprocessed using Min-Max Scaling and evaluated using RMSE. The best hyperparameter combination predicts export and import values for the next 12 months with high accuracy. The forecast results show a MAPE of 11.23% for exports and 7.21% for imports. Export accuracy decreased by 1.74%, while import accuracy increased to 92.79% based on testing data. This study supports more precise economic policy planning and contributes to developing deep learning-based predictive models for non-oil and gas economic analysis, aiding national policymaking.

Keywords: Non-oil and gas, Export, Import, Bidirectional Gated Recurrent Unit, Nadam, Time Series