Studying of Machine Learning Models for Forecasting Macroeconomic Indicators

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***Abstract*—This study explores the application of machine learning models in forecasting macro-economic indicators, including GDP, inflation rate, unemployment rate, and exchange rate across 11 Southeast Asian countries. The models used include Linear Regression, ARIMA, Random Forest, XGBoost, LSTM, and SVM. We conducted a performance comparison of each model based on MAE, RMSE, and R^2 metrics to evaluate the accuracy of the forecasts. The experimental results indicate that Random Forest and XGBoost models excel in predicting nonlinear and complex indicators such as GDP and unemployment rate, while ARIMA and Linear Regression models perform better in time series with clear regular patterns, like inflation rate. The LSTM model shows inconsistent effective-ness, requiring large data volumes and complex optimization processes. SVM demonstrates potential in handling nonlinear data but requires careful tuning. This study concludes that using machine learning models presents significant potential for improving the accuracy of macroeconomic forecasting. However, model tuning and optimization are essential to match the characteristics of each type of economic indicator. Future research directions include developing hybrid models and integrating additional factors such as market sentiment, social and environmental indicators (ESG) to enhance forecasting outcomes.**

***Keyword*— machine learning, macroeconomic indicators**

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