

ABSTRACT

Inflation is an economic indicator that reflects price changes in general and fluctuates over time. Unstable and complex inflation patterns cause the forecasting process to be important to support economic decision-making. This study aims to analyze the dynamics of monthly inflation in Indonesia, evaluate the performance of the Prophet method in inflation forecasting, and examine the effectiveness of hyperparameter optimization using the Grid Search technique in improving the accuracy of the model. The data used is in the form of Indonesian monthly inflation data for the period January 2000 to December 2025 which is analyzed using the Prophet method with Grid Search-based hyperparameter optimization. The results of the analysis show that inflation data has a fluctuating pattern with a long-term trend that tends to decline and a weak to moderate seasonal pattern. Initial modeling using the default Prophet showed that the model was able to follow the general pattern of the data, but there were still differences in some forecasting periods. After hyperparameter optimization, the model produces a prediction pattern that is more stable and closer to the actual value, especially in the early forecast period of 2026. The effectiveness of optimization was shown through the decrease in the MAE and RMSE values on the test data from 0.302554 and 0.426800 in the default model to 0.235222 and 0.336581 in the optimization model. This decrease in error values indicates that the optimal combination of hyperparameters is able to improve the accuracy of the model in capturing trend and seasonal patterns more precisely. The results of this study show that the Prophet method can be used in inflation forecasting and hyperparameter optimization plays a role in producing more accurate and representative predictions of inflation dynamics.

Keywords: Indonesia's Monthly Inflation, Forecasting, Prophet, Hyperparameter Optimization, Grid Search