

Based on the performance metrics, the ARIMA model generalizes better than the LSTM model for this stock price forecasting task. ARIMA achieves a lower average RMSE (1.61 vs. 2.78) and lower average MAPE (5.59% vs. 9.10%) compared to LSTM, indicating that its predictions are, on average, closer to the actual values and exhibit smaller relative errors. Additionally, ARIMA shows slightly lower variability (standard deviation) in both RMSE and MAPE, suggesting more stable performance across different test periods.

One key reason for this result is that ARIMA is well-suited for time series with strong linear and short-term autocorrelations, which is often the case for daily stock closing prices over moderate horizons. In contrast, LSTM models, while powerful for capturing nonlinear patterns and long-term dependencies, require more data, careful hyperparameter tuning, and regularization to avoid overfitting. If the dataset is noisy or not sufficiently large, LSTM models can fit training patterns too closely, leading to higher forecast errors on unseen data.

Therefore, in this comparison, ARIMA exhibits better generalization performance, likely because the underlying stock series are relatively linear and the available data better matches ARIMA's statistical assumptions than LSTM's data-hungry deep learning architecture.