

# **A Time-Series Forecasting Performance Comparison for Neural Networks with State Space and ARIMA Models**

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## **Abstract**

This research focuses on the development of an automated forecasting procedure that implement State Space (SS), Auto Regressive Integrated Moving Average (ARIMA), and Neural Networks (NN) to identify the best forecasting strategy for time series with numerous patterns. The proposed approach is applied on multiple time series exhibiting different series patterns from the M4 competition. Based on our study, the performance of ARIMA models showed superior results when compared to the ETS performance for seasonal data. In addition, NN and ARIMA showed a higher performance for cyclical and non-stationary data. NN performance was competitive in all types of data patterns. ARIMA stepwise selection procedure proved to be the most accurate in general for all the series. This delimited development is part of a comprehensive application that will encompass a dashboard tool designed to automatize forecasting procedures of different types of time series presented in the industry

## **Keywords**

Forecasting, State Space, ARIMA, Neural Networks.