

Forecasting 24-Hour Ahead Electricity Load Using Time Series Models

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Abstract : Forecasting electricity load is important for various purposes like planning, operation, and control. Forecasts can save operating and maintenance costs, increase the reliability of power supply and delivery systems, and correct decisions for future development. This paper compares various time series methods to forecast 24 hours ahead of electricity load. The methods considered are the Holt-Winters smoothing, SARIMA Modeling, LSTM Network, Fbprophet, and Tensorflow probability. The performance of each method is evaluated by using the forecasting accuracy criteria, namely, the mean absolute error and root mean square error. The National Renewable Energy Laboratory (NREL) residential energy consumption data is used to train the models. The results of this study show that the SARIMA model is superior to the others for 24 hours ahead forecasts. Furthermore, a Bagging technique is used to make the predictions more robust. The obtained results show that by Bagging multiple time-series forecasts, we can improve the robustness of the models for 24 hours ahead of electricity load forecasting.

Keywords : bagging, Fbprophet, Holt-Winters, LSTM, load forecast, SARIMA, TensorFlow probability, time series

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