Forecasting Electricity Demand in Sri Lanka by Using Weather Patterns Through a Machine Learning Approach

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Sri Lanka's electricity demand is growing day by day. Planning to increase the electricity supply to meet future demand is a very difficult task. Therefore, it is important to know the future demand for uninterrupted power supply. Many past studies have considered the correlation between weather factors and electricity demand to predict accurate demand value. Therefore, the objective of this study is to forecast the monthly electricity demand in Sri Lanka, considering the influence of weather patterns. Rainfall, humidity, and temperature weather parameters are considered along with historical monthly demand data. The most important weather variables are identified based on correlation with electricity demand data. Several techniques have been used to forecast electricity demand during the last decade. But the problem is that those studies did not focus on past weather data along with electricity demand data. Most studies focused only on historical electricity demand data. This study fills that gap. In this study, Vector Auto Regression (VAR) and Long Short-Term Memory (LSTM) models were applied to forecast monthly electricity demand regionally in Sri Lanka. Among them, the VAR model yielded a lower value for Root Mean Square, Mean Square Error, Mean Absolute Error, and Mean Absolute Percentage Error. Based on that, the VAR model has been selected as the best-fit model for monthly electricity demand forecasting using weather variables.

Keywords: Electricity Demand, Forecasting, Weather Patterns