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# Multivariate time series forecasting for electricity consumption using machine learning methods

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**Abstract**

Multivariate time-series forecasting plays a crucial role in many real-world applications. Recently, multiple works have tried to predict multivariate time series. In this paper, different aspects of electricity consumption within a household-based in Lahore real data have been used to make one-hour-ahead forecasts for overall usage. In this study, various Neural Networks (NNs) such as the Long Short-Term Memory (LSTM) network, Recurrent Neural Network (RNN) and the Gated Recurrent Unit (GRU) network are used with varying numbers of hidden layers to make multivariate time series analysis and predictions. This study aims to express a clear and precise method for multivariate time series. The models make predictions based on data sets and are trained on past data. Their performance is evaluated using root mean squared error. Their performance was compared, and results are given for the one-hour-ahead forecasts for electricity consumption using machine learning models. In the dynamic field of forecasting electricity use, the study further investigates the possible integration of real data to improve the prediction capacities of machine learning models using Python software. The results show that the RNN performs better than the other two models for the given data.

**Keywords:** Neural Networks, Long Short-Term Memory, Recurrent Neural Network, Gated Recurrent Unit, Multivariate Time Series, real data, electricity consumption.

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