**During the lecture, you were given a case study. In this learning journal you are asked to upload your solution to the casestudy?**

1.  How would you suggest approaching this problem?

Answer:

The amount of load of electricity needed would depend on consumption that changes on factors like time of day, seasons, etc. This kind of data follows a seasonality pattern, the net load in the dataset is the amount of energy needed on an interval of 15 minutes. ARIMA can be used to predict cyclical data that follows a certain pattern. ARIMA stands for AutoRegressor Integrated with Moving Average. In this type of model, a moving average calculated based on values of netload in a certain consecutive window of values. Then regression is carried out on the window average to make predictions on future data. Neural Hierarchical Interpolation for Time Series (NHITS) an MLP-based model can also be used in time-series forecasting from the neuralforecast library.

2. Would machine learning be necessary, and if so which technique would be most effective for this case? Alternatively if machine learning is not required what other approaches will you consider?

Answer:

A stacked RNN (Recurrent Neural Network) model has been used in the previously mentioned NHITS model from the neural forecasts model to give promising results on time-series data, other techniques in machine learning like regression analysis could also be used to forecast on a continuous range of output data. If not for machine learning. Other than machine learning methods, we can use just the moving average and assign it to the next time entry.

3.  In addition to machine learning, are there other techniques that you would consider this use case?

Answer: Various statistical techniques like decomposition, autocorrection, and spectral analysis could be used for forecasting data based on previous data as a supplement to machine learning techniques.

4. If you decide to use machine learning what would be your strategies for developing the model? How would you validate the model, and what strategies would you employ to improve your performance?

Answer: Initially, the model could be less complex with fewer layers for RNN and if the model underfits we can increase the complexity of the model. Data can be divided into training, testing, and validation sets. And while training the validation loss could be used to check for overfitting. The data finally can be checked on the test set for checking the model on unseen data and then deploy the model to check on real-time data.

5. If the manager requires the solution to provide real-time scheduling , what would be your deployment strategy?

Answer: For the real-time scheduling of net load to be stored we can create a software solution which implements the model trained and generates the amount of net-load to be stored based on the predictions generated by model trained. The model could be implemented using Docker or any other containerisation solution and the predicted value could be manually set by the manager, or this process could be automated.

6. Could you provide a block diagram outlining your proposed solution, highlighting the key components?

Answer:

Diagram

Description automatically generated

