一、The task is to predict future energy use in a household based on weather conditions by building an advanced regression model.

1. Download the dataset

2.Read the paper before you start working on the task - you may find the information useful.

3. Construct a code in Python Jupyter notebook or R Notebook/Markdown. Python is preferred.

4. Analyse and visualise the data (word limit: 200 words).

• Identify data dependencies that might be useful for this task and visualise those dependencies using suitable techniques and charts.

• Use this analysis to select suitable prediction models for experimentation and justify your selection.

• Include the charts and diagrams together with the code, e.g., in Jupyter Notebook.

• Pre-process data: apply suitable processing techniques such as scaling, conversion and imputation of missing values.

5. Based on your analysis:

• Implement and train at least two prediction model(s).

You can use the paper and the paper code. If you use the code from the paper , clearly identify which part of the code is used and where, and how it has been adapted to your task. You can also use common Python and R libraries. Do not use any other code except the code from the seminar, workshopand the abovementioned paper.

• Use suitable training/testing methodology, such as data training/test split or cross-validation and justify your decision (write up to 100 words).

• Use suitable model performance metrics and justify your selection (write up to 200 words).

6. Test the models and print/include results for all models using machine learning methodology.

7. Compare the results from all candidate models, choose the best model, justify your choice and discuss the results (word limit: 200 words).

• Show the results of all models in the form of suitable charts and tables.

• Select the best performing model, show the final results for this model and justify you selection.

8. Reflect on what you have learned by completing this (word limit: 200 words)

二、The task is to predict future energy use in a householdtbased on weather conditions by building time series forecasting models.

Note: The ultimate prediction objective is the same as in task 1, however, the prediction methods you are expected to use are different.

You need to write Python or R code to predict energy use and analyse the impact of different factors

based on your model.

1. Download the dataset

2.Read the paper before you start working on the task - you may find the information useful.

3. Construct a code in Python Jupyter notebook or R Notebook/Markdown. Python is preferred.

4. Analyse and visualise the data (word limit: 200 words).

Use suitable time series analysis techniques learned in materials.

· Discuss your findings and how can they be used to select a time series forecasting model.

· Compare this analysis with the one from your analysis in task 1 and comment on any similarities. Consider whether the time series analysis techniques have given you more insights, and comment on what are those insights were.

· Include the(charts and diagrams together with the code,,e.g.in Jupyter Notebook.

Note: Use the pre-processed data from your task 1.

5.Based on your analysis:

● Use at least two time series forecasting methods(naive method, seasonal naive method, ARMA, RNN,LSTM)and justify your methods selection.

● You can use the paper mentioned below and the paper code.

If you use the code from the paper, clearly identify which part of the code is used aind where, and how it has been adapted to your task. You can also use common Python and R libraries.

· Do not use any other code except the code from the seminar, workshop and the abovementioned paper.

· Use training/testing methodology suitablefor time series and suitable model performance metrics.

6. Test the models using the same performance metrics as you selected in task 1,and show the results for all models.

7. Compare the results from all candidate models, choose the best model, justify your choice and discuss the results (word limit: 200 words).

· Show the results of all models in the form of suitable charts and tables.

· Select the best-performing model, show the final results for this model and justify your selection.

· Compare the forecasting results obtained in this task with the results you have obtained in

task 1. Make sure that the results are comparable in terms of metrics and methodology of testing. Use conversion or adjustments if needed.

8. Reflect on what you have learned by completing this task (word limit: 200 words).