Time Series: project

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Instructions

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This continuous assessment will contribute 35% towards the final mark for this module. You are required to submit your proposed dataset and a brief description of the project to Moodle before 23:55 on 23rd April. The Python files and report showing findings must be submitted through Moodle before 23:55 on 30th April. This is a joint project with Data Architecture. You will be using the same dataset for both. For Time Series Analysis, you are required to source a dataset suitable for time series analysis. The dataset should be cleaned and formatted appropriately. Use time series analysis techniques to visualise the data, perform a diagnostic analysis and carry out informed predictions. Note that there may be a short interview on your report in the days following submission. This can be done via Zoom if required.

Your report should include the following sections (you can add other sections if you like):

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1 Outline

1. Data description: This should include a brief discussion of the data and variables of interest, and details of any data cleaning done.

2. Descriptive statistics and data visualisations: Exploratory analysis of the dataset.

3. Research questions and methods: Discuss potential research questions that can be answered using this data based on the exploratory analysis. Also discuss the Resampling and Interpolation methods that will be used. You should include references where appropriate.

4. Results: This section should include time series analysis that helps answer the research questions identified. This can include modelling, model testing, and prediction. Explain your choice of models, discuss whether they are appropriate, and interpret your results.

5. Conclusions: Discuss the main findings of your analysis.
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6. Marking Scheme (35% of the Module)
   (a) Report Marks (40 marks). The report components as follows:
      - Data description: 10%
      - Visualisations and descriptive statistics: 10%
      - Research questions and methods: 10%
      - Learning/Analysis/results: 50%
      - Conclusions: 10%
      - Report structure and clarity: 10%

   (b) Code (35 marks)
      - Resampling (upsampling and down sampling (any or both)) and Interpolation Techniques
      - Visualization
      - Sliding Window With Multiple Steps (Shift(1), Shift(2) and Shift (3))
      - Transform Methods (Square root Transform, Log Transform Log, Transform with constant and Box Cox Transform)
      - smoothing methods
      - Any Machine learning Algorithm

   (c) Interview (15 marks) (Last week of Semester (Preferably))

7. Others
   (a) Each student must submit one executable notebooks with the file names
   (b) firstname_Time_Series.ipynb (Convert them into PDF).
   (c) You will use the datasets as indicated in subsequent questions.
   (d) You have to create separate code cells andor text cells for different questions.
   (e) Interview questions will be based on overall Time Series concepts used and covered in this CA.

Please share your code (Python colab notebook). Please download your colab file and convert it into PDF and upload in the moodle. Instructions to convert the colab file into pdf. `https://stackoverflow.com/questions/52588552/google-co-laboratory-notebook-pdf-download` Choose any appropriate method according to you.

Please justified each step with data set. Please reflect your learning from above exercise (200 words).

Please submit this Assignment as per deadline. Plagiarism is strictly forbidden. Late submissions and plagiarism will be dealt with as per institute policy.

2 Plagiarism

PLEASE PAY SPECIAL ATTENTION TO THE ISSUE OF PLAGIARISM. The DkIT policies are available at `https://www.dkit.ie/system/files/academic_integrity_policy_and_procedures.pdf` in summary, all work submitted by learners for assessment purposes, or for written or oral publication, must be their own work. Where this is informed by the work of others, the source must be properly referenced using the accepted norms and formats of the appropriate academic discipline.

3 Late Submission

The policy for late submission is available at the link below. Any legitimate late submission must be accompanied by explanation and supporting documentation as per the policy. `https://www.dkit.ie/system/files/continuous_assessment_procedures_document_v4.pdf`