BSc (Hons) Computer Science with Network Security

Group Assignment

"London Weather Analysis"

COHORTS: BCNS24AFT Batch 1 & 2

MODULE: Programming for Machine Learning

MODULE CODE: BCNS1209C

Submission Deadline: 16th February 2025

Instructions

Groups

- This is a **group** assignment and the allocation of team members needs to be finalised by the **31st January 2025**.
- Each group needs to have 5-6 team members.

Deliverables

- Each team will be required to submit a unique copy of the following.
    1. A fully commented jupyter notebook for the assignment.
    2. A comprehensive report which includes answers to questions asked in the assignment statement along with a description and justification for all tools, techniques and procedures used by the team. Any results obtained should also be clearly presented and discussed.
- Students may be requested to attend a short Question and Answers session regarding their work.

Submission and Deadline

- The jupyter notebook needs to be submitted in **ipynb** format and the report needs to be submitted as a secured **pdf** file.
- All reports and notebooks will be checked for plagiarism using Turnitin and late submissions will **not** be accepted.
- All deliverables need to be submitted on the relevant Google Classroom by **one** team member by **06:00 PM (18:00 hrs)** on the **16th February 2025**.
- **Note:** It is the students' responsibility to ensure that any submitted file has been successfully uploaded in the correct format and that they are free of errors.

Problem Statement

Climate Insights Ltd. is working to improve weather-related predictions and analysis in London, UK. The company aims to provide better insights for local businesses, especially those dependent on weather conditions. To achieve this, XYZ Climate Insights Ltd. has provided data captured in the "***London_Weather.csv***" dataset.

Using the provided dataset, you are required to complete the following tasks:

1. Load the "***London_Weather.csv***" dataset in a Python-compatible environment.
2. Identify any missing features in the dataset and suggest additions or comment on superfluous ones.
3. Analyze the dataset's dimensionality to determine its suitability for the study.
4. Perform exploratory data analysis and preprocess the data.
5. Present the results of **Task 4** using appropriate visualizations.
6. Determine the key variables that influence weather patterns in London.
7. Select an appropriate machine learning approach to model and predict outcomes based on the data. Justify your choice.
8. Identify a suitable performance metric for this problem and explain your reasoning.

Marking

The work submitted will be assessed on a total of **50 marks** as per the below breakdown:

Notebook structure and comments	5 Marks
Exploratory Data Analysis and Data Preparation	8 Marks
Data Visualisation	7 Marks
Dataset Inferences	5 Marks
Machine Learning Model Implementation	5 Marks
Report structure, formatting, and references	5 Marks
Results, Comments and Discussions	10 Marks
Conclusions	5 Marks