

Clarification of Approach Regarding Prompt Ambiguities

The following confused me a bit:

1. "Linear Regression" for Classification (Task 1):

- The prompt explicitly requested "linear regression" as one of the algs for the classification in Task 1. However, Linear Regression is designed for predicting continuous values, not discrete class labels.
- So I assumed the prompt likely intended **Logistic Regression**, which is the standard linear model appropriate for binary classification tasks.
- Thus, Logistic Regression was implemented in notebook_1.ipynb using Scikit-learn instead of Linear Regression.

2. Framework Discrepancy (PyTorch/Keras vs. Task 1 Algorithms):

- The prompt initially suggested building the model using "PyTorch or Keras", but Task 1 specifically listed classic machine learning algorithms (interpreted Logistic Regression, SVM, kNN) which are typically implemented using libraries like Scikit-learn.
- To satisfy both aspects of the prompt, I created two notebooks:
 - notebook_1.ipynb: Addresses the specific requirements of Task 1 by implementing Logistic Regression, SVM (with various kernels), and kNN using Scikit-learn.
 - notebook_2.ipynb: Addresses the "PyTorch/Keras" suggestion, I implementing a more advanced **Graph Neural Network (GNN)** approach using **PyTorch Geometric**. This method inherently utilizes the relationships (topology) between EEG channels, treating the data as a graph.

3. Feature Source for Importance Analysis (Task 2):

- Task 2 asked for the top 5 features using UFS, RFE, and PCA, but did not specify whether this analysis should apply to the original 320 features or the potentially smaller, engineered/selected set of features used for the Task 1 models.
- To provide a comprehensive analysis, I performed Task 2 on **both** feature sets within notebook_1.ipynb:
 - **Part A:** Analyzed the original 320 features.
 - **Part B:** Analyzed the final set of features that were actually used as input for the Task 1 models (after feature engineering and correlation filtering).

By adopting this two-notebook approach and interpreting the ambiguities as described, I tried to fulfill all explicit requirements of the prompt.