

Final Project Assignment

Objective

The goal of this final project is to apply your knowledge of machine learning techniques to a semi-supervised multi-class classification problem using the automobile dataset (link below). You will have to properly preprocess the data, clean it, build ML models, evaluate their performance, and draw meaningful conclusions from your analysis.

Project Description

You are required to:

1. Perform exploratory data analysis (EDA) to understand the dataset.
2. Preprocess the data
3. Train at least three different approaches suitable for the given task.
4. Evaluate the models using appropriate metrics.
5. Perform hyperparameter tuning for at least one of the models.
6. Compare and analyze the results across the different models.
7. Summarize your findings and discuss the implications of your analysis.

Deliverables

Your submission must include:

- a. A report (in PDF format) containing: **(For mini-project failures only)**
 - Introduction: A brief overview of the dataset and the problem.
 - Methodology: Description of the steps you followed, including EDA, preprocessing, model training, and evaluation.
 - Results: Tables, graphs, and detailed analysis of the results.
 - Conclusion: Key takeaways, limitations and how to potentially overcome them.
- b. Python (well-documented) used for your analysis.
- c. A README file with instructions on how to run your code.

Evaluation Criteria

Your project will be evaluated based on the following criteria:

- Clarity and organization of the report (**For mini-project failures only**)
- Depth and rigor of the analysis
- Correctness and efficiency of the code
- Creativity in solving the problem and presenting the results
- Quality of visualizations and interpretation of the results
- **Project defense during the regular practical classes i.e., between December 9th-13th)**

Timeline

- Final Submission: Due by **Monday, 9th December, 2024 at 08:00 AM.**

Resources

- Automobile Dataset Repository: https://sci2s.ugr.es/keel/dataset_smja.php?cod=1459
- Scikit-learn documentation: <https://scikit-learn.org/stable/>
- Matplotlib documentation for visualization: <https://matplotlib.org/stable/>

Happy Coding!