**Project 2 Overview Document**

# Python Programming (CSEG1021)

## Project Title

Car Evaluation

## Objective

To develop a machine learning model that predicts the condition of a car based technical data, such as its maintenance, price and features. The project leverages a dataset from the UCI Machine Learning Repository and includes steps from data cleaning to model deployment via a web interface.

## Tools & Libraries Used

- Python 3.13.3
- Pandas, Numpy
- Matplotlib, Seaborn
- Scikit-learn
- Flask
- Joblib

## Steps Involved

1. Problem & Dataset Selection:
   - Chosen dataset: Car Evaluation UCI Dataset from UCI Repository.

2. Data Cleaning and Transformation:

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- Addressed missing values.

- Created a label encoder for the column names

- Separated its features from its target

3. Exploratory Data Analysis (EDA):

- Visualized data distribution and correlations.

- Used histograms, heatmaps, pair plots, etc.

4. Model Building:

- Applied classification models (Random Forest Classifier)

- Evaluated performance using metrics like accuracy, Decision Tree Model, confusion matrix etc.

5. Model Export:

- Saved the trained model using joblib for later use.

6. Web Application Development:

- Created a user-friendly interface using Flask.

- Added CSS styling to make it look more appealing.

- Users can input car features and get the result in accountable, unaccountable, good, very good.

7. Integration and Deployment:

- Integrated the model with the web app for real-time predictions.

8. Submission:

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- Uploaded source code and documentation to GitHub.

- Recorded a demo video showcasing the app and its features.

## Outcome

Built a machine learning-based web application that predicts a car's condition based on its features and specifications given by the user as inputs.

## Links

- GitHub Repository: https://github.com/DimpleRogha/CarEvaluation.git

- Demo Video: https://drive.google.com/file/d/1y7Ohgl9IijyzZJIZjHUfR1S74NFYkCW9/view?usp=drive_link