Velocity Prediction for Passenger Vehicles

**Project Title**: Vehicle Velocity Prediction and Probability Estimation

**Project Overview**:

This project aims to develop a predictive model for estimating the velocity of a passenger vehicle in a specified time window based on its velocity in a previous window. The project will cover various types of vehicles, including electric, hybrid, internal combustion-based, and autonomous or semi-autonomous vehicles. The team will collect and analyze data from standard vehicle driving cycles and develop models to estimate not only future velocities but also the probability distributions of these velocities within specific windows.

**Key Deliverables**:

1. **Data Collection and Analysis**: Gather and analyze data from standard vehicle driving cycles to inform velocity predictions.
2. **Predictive Model Development**: Develop models to predict vehicle velocity in a specified window using prior velocity data, focusing on different vehicle types.
3. **Probability Estimation**: Create a methodology to estimate the probability that a vehicle will achieve certain velocities in a given time window.
4. **Performance Evaluation**: Test and compare various techniques to assess their accuracy and determine the trade-offs between model precision and the amount of training data required.
5. **Reporting and Visualization**: Provide a detailed report and visual illustrations of the model’s efficacy, including predictions, probability estimations, and data requirements.

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DataSets:

Standard Datasets needed: 10

Synthetic Datasets needed: 20

[Standard Dataset Collection:](https://www.epa.gov/vehicle-and-fuel-emissions-testing/dynamometer-drive-schedules#californiaEPA)

1. [Urban Dynamometer Driving Schedule (txt)](https://www.epa.gov/sites/default/files/2015-10/uddscol.txt)
2. [Federal Test Procedure (txt)](https://www.epa.gov/sites/default/files/2015-10/ftpcol.txt)
3. [Highway Fuel Economy Test (txt)](https://www.epa.gov/sites/default/files/2015-10/hwycol.txt)
4. [New York City Cycle (txt)](https://www.epa.gov/sites/default/files/2015-10/nycccol.txt)
5. [US06 Supplemental FTP Driving Schedule (txt)](https://www.epa.gov/sites/default/files/2015-10/us06col.txt)
6. [SC03 - a Supplemental FTP Driving Schedule (txt)](https://www.epa.gov/sites/default/files/2015-10/sc03col.txt)
7. [LA92 Heavy Duty Driving Schedule (txt)](https://www.epa.gov/sites/default/files/2021-01/la92col.txt)
8. [Japanese 10-15 Exhaust Emission & Fuel Economy Driving Schedule (txt)](https://www.epa.gov/sites/default/files/2015-10/j1015col.txt)
9. Worldwide Harmonized Light Vehicles Test Cycle (WLTC)
10. <https://github.com/dabo248/nedc/blob/master/csv/nedc.csv>