Project Design Phase - I
Proposed Solution

Date	24 September 2022
Team ID	PNT2022T{…}
Project Name	Project - Trip Based Modeling of Fuel Consumption in Modern Fleet Vehicles Using Machine Learning
Maximum Marks	2 Marks

Proposed Solution Template:

Project team shall fill the following information in proposed solution template.

S. No.	Parameter	Description
1.	Problem Statement (Problem to be solved)	Ability to model and predict the fuel consumption is vital in enhancing fuel economy of vehicles and preventing fraudulent activities in fleet management. Fuel consumption of a vehicle depends on several internal & external factors However, not all these factors may be measured or available for the fuel consumption analysis.
2.	Idea / Solution description	To predict the fuel consumption of contemporary heavy-duty trucks using PEMS data, regression analysis employing Machine Learning techniques such Artificial Neural Network, Linear Regression, and Random Forest was carried out. The preprocessed dataset, which was specific to one car, had 672,658 rows of actual inputs for the models, including actual torque (Nm), vehicle speed (km/h), and engine speed (rpm).
3.	Novelty / Uniqueness	Determine the fuel consumption of the vehicle, combining these techniques with data helps to identify parameters that may cause anomalies, such as malfunctions due to wear and tear of the engine, improper maintenance, engine failure, exhaust after-treatment system, and external factors like climate, traffic, road conditions, etc.
4.	Social Impact / Customer Satisfaction	The performance measures MAE, RMSE, and R 2 indicate that accurate prediction can be obtained with the model. The data modeling can help to identify the trend in instantaneous fuel consumption and to calculate the total fuel consumed by the vehicle for each trip, which can further help in diagnosing vehicle performance in the case of abnormalities

5.	Business Model (Revenue Model)	Subscription & Advertising Model
6.	Scalability of the Solution	Models that are accurate, fast, and able to predict in real-time will enable the optimization of fuel consumption. The model can be fine-tuned easily to model more complex data from other vehicles with different makes and models that do not have the amount on-road data needed to train a network. This work can be extended to include other factors such as time, traffic information, road information, GPS data, etc. that affect fuel consumption, and to estimate vehicle exhaust emissions.