

A Project Proposal on

## **Prediction of CO<sub>2</sub> Emission from Vehicles**

### **Team Members:**

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### **Introduction:**

Carbon dioxide (CO<sub>2</sub>) emissions from vehicles are a major contributor to climate change. Governments and organizations around the world are working to reduce emissions by promoting the use of cleaner vehicles. One way to encourage the adoption of cleaner vehicles is by providing consumers with information on the environmental impact of their vehicle choices. This project aims to develop a machine learning-based system that can predict the CO<sub>2</sub> emissions of vehicles based on their features. The system will be trained on a dataset of vehicle features such as number of cylinders, transmission type, fuel type and fuel consumption in city, highway and combined scenarios. The goal of the project is to develop a system that can accurately predict CO<sub>2</sub> emissions for new vehicles, helping consumers make more informed decisions about their vehicle choices. The system can also be used by policymakers and manufacturers to assess the environmental impact of several types of vehicles and make informed decisions about future vehicle development. The developed system will help reduce CO<sub>2</sub> emissions from vehicles and mitigate the effects of climate change.

### **Objectives:**

- Develop a machine learning-based system that can predict the CO<sub>2</sub> emissions of vehicles based on their features.
- Identify the most prominent features that influence the CO<sub>2</sub> emissions of vehicles.
- Assist consumers in making more informed decisions about their vehicle choices.
- Assist policymakers and manufacturers in developing more environmentally friendly vehicles.

### **Data Collection:**

Collected the Vehicle Emissions Dataset by Debajyoti Podder available on Kaggle at <https://www.kaggle.com/datasets/debajyotipodder/co2-emission-by-vehicles> whose raw data was obtained via the following Canada Government link <https://open.canada.ca/data/en/dataset/98f1a129-f628-4ce4-b24d-6f16bf24dd64#wb-auto-6>

The dataset contains information about 7385 vehicles with the following fields:

- *Make*: Company of the vehicle
- *Model*: Car Model
- *Vehicle Class*: Class of vehicle depending on their utility, capacity and weight
- *Engine Size(L)*: Size of engine used in Litre
- *Cylinders*: Number of cylinders Transmission Transmission type with number of gears
- *Fuel Type*: Type of Fuel used
- *Fuel Consumption City (L/100 km)*: Fuel consumption in city roads (L/100 km)
- *Fuel Consumption Hwy (L/100 km)*: Fuel consumption in highways (L/100 km)
- *Fuel Consumption Comb (L/100 km)*: The combined fuel consumption (55% city, 45% highway) is shown in L/100 km
- *Fuel Consumption Comb (mpg)*: The combined fuel consumption in both city and highway is shown in mile per gallon(mpg)
- *CO2 Emissions(g/km)*: The tailpipe emissions of carbon dioxide (in grams per kilometre) for combined city and highway driving

The potential features for this research problem are:

- Make
- Model
- Vehicle class
- Transmission Type
- Engine Size
- Number of Cylinders
- Fuel Type
- Fuel consumption in city, highway and combined scenarios

The target variable for this research problem is the CO2 Emissions (g/km) of the vehicle. The nature of the target variable is continuous, as it represents a numerical value that can take on any value within a range of possible values.