



**MIET**

**Title: Predictive Model for Carbon Emission Detector  
using Machine Learning and Stream lit Interface**

**Roll Numbers: 2022a6r016 2022a6r044 2022a6r052**

**Branch: CSE AI-ML**



**Model Institute of Engineering & Technology**

# Problem Statement

Every time we start the engine, CO<sub>2</sub> goes up into the atmosphere. And with more vehicles hitting the road every year, it's becoming a serious issue.

## The challenge?

We don't have smart tools that can predict emissions for any vehicle in real time. Most of the existing methods are outdated, manual, or just too generic to be useful.



# Project Objectives & Approach

## Our Objectives:

- Predict CO<sub>2</sub> emissions based on vehicle specifications.
- Compare the effectiveness of three ML models:
  - Linear Regression
  - Random Forest
  - XGBoost
- Deploy a user-friendly web app using Streamlit.

## Approach:

- Data preprocessing, model training, and evaluation using standard regression metrics.
- Interactive dashboard for real-time prediction and analysis.

# Solution

We built a machine learning model that predicts a vehicle's CO<sub>2</sub> emissions (g/km) based on its specifications — like engine size, fuel type, cylinders, and fuel consumption. And showcases it in a user friendly format using Streamlit web interfaces.

Our goal is to make CO<sub>2</sub> impact estimation easy, accessible, and actionable — for everyone from car makers to policymakers.



# Dataset Overview

**Data Source:** Real-world vehicle emission dataset.

## Features Used:

1. Engine Size (L)
2. Cylinders
3. Fuel Type
4. Fuel Consumption

## Target Variable:

CO<sub>2</sub> Emissions (g/km)

Model	R <sup>2</sup> Score	RMSE
Linear Regression	0.72	15.3
Random Forest	0.88	9.2
XGBoost	0.9	8.5

## Model Evaluation Metrics Results

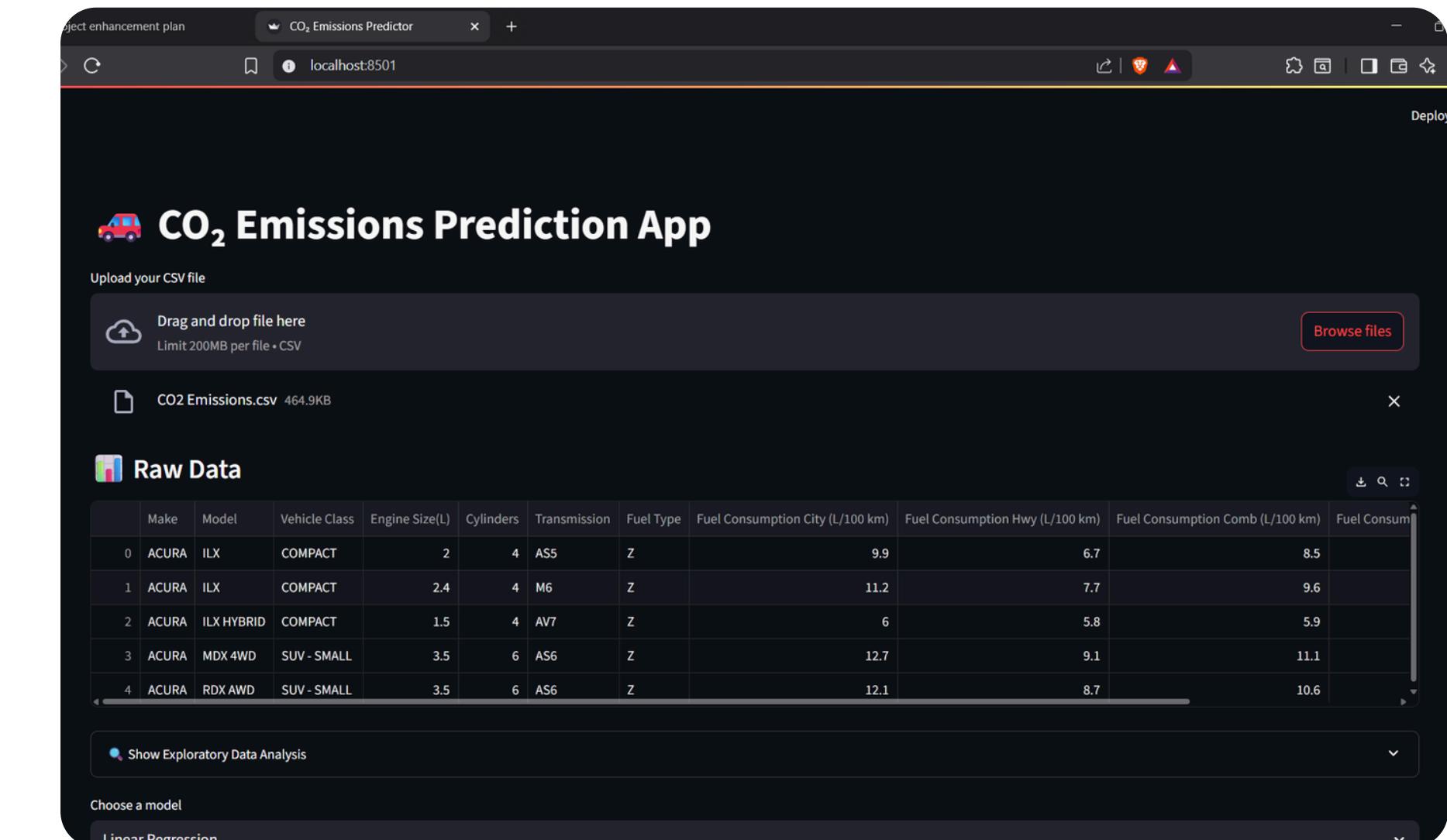
# Streamlit Web App & Real-World Impact

## App Features:

- Upload vehicle datasets.
- Choose a prediction model.
- Get real-time emission predictions.
- Visualize results and trends.

## Potential Applications:

- Government: Regulatory planning
- Industry: Eco-friendly vehicle design
- Consumers: Understand vehicle environmental impact



# Applications

## Automotive Industry

Design and evaluate low-emission vehicles

## Policy Making

Support development of environmental regulations

## Research and Academia

Analyze emission trends and vehicle impact

## Consumers

Compare environmental footprint before purchasing





Thank You