MIET

Title: Predictive Model for Carbon Emission Detector

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Problem Statement

Every time we start the engine, CO_2 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 Most of the existing methods are outdated, manual, or just too generic to be useful.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_2 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_2 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_2 impact estimation easy, accessible, and actionable — for everyone from car makers to policymakers.

Model Evaluation and Results

Features Used:

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

Target Variable:

CO_2 Emissions (g/km)

Model	R^2 Score	RMSE
Linear Regression	0.8942	19.5
Random Forest	0.9974	3.01
XGBoost	0.9971	3.21

Model Evaluation Metrics Results

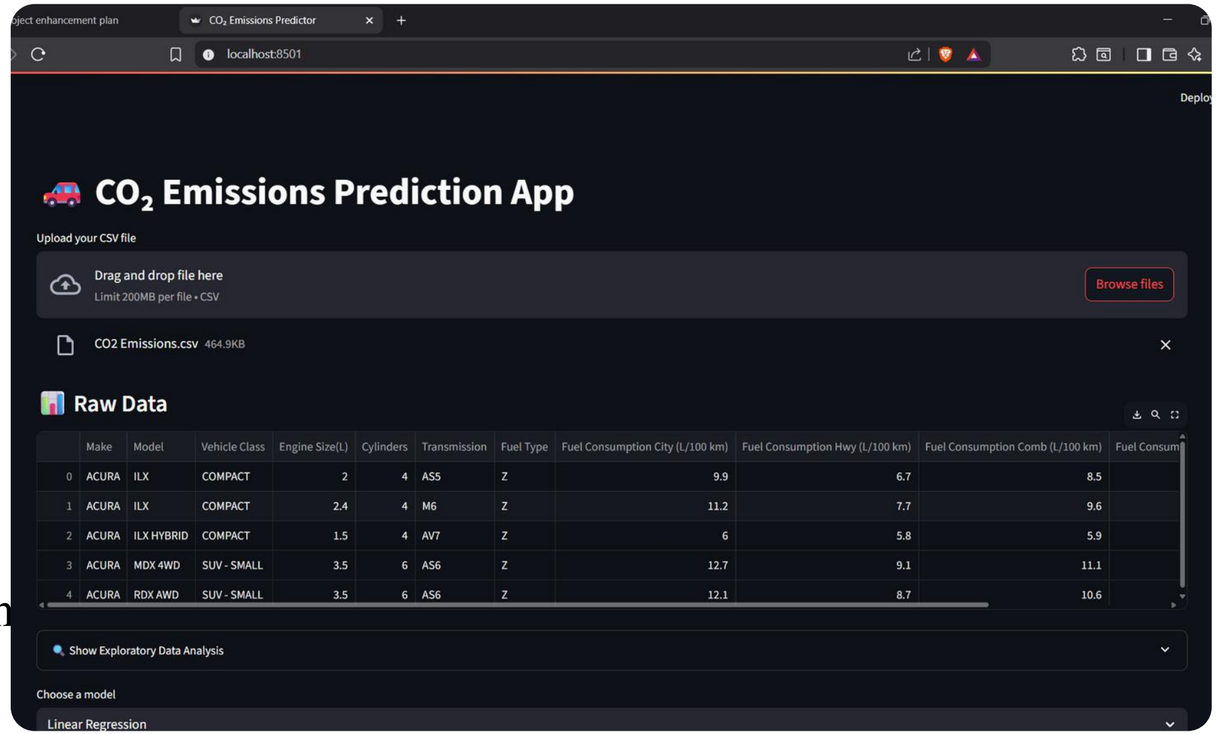
Streamlit Web App & Real-World Impact

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 environm 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