

SUSTAINABLE MOBILITY TRACKER: CAR METRICS CALCULATOR

A PROJECT REPORT

Submitted by

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BONAFIDE CERTIFICATE

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ABSTRACT

This report presents a web application designed to predict vehicle fuel consumption and facilitate model comparisons for various car makes and models. The application leverages machine learning models to provide accurate predictions and offers a user-friendly interface for comparing the specifications of different vehicles.

The web application, built using Flask, offers two primary functionalities: fuel consumption prediction and vehicle model comparison. Four trained machine learning models (linear regression, ridge regression, lasso regression, and elastic net regression) are employed to predict carbon dioxide (CO₂) emissions based on user-provided vehicle features, such as engine size and number of cylinders. The application selects the best-fitting model and displays the closest prediction to the actual CO₂ emissions, accompanied by an error percentage. This feature is particularly useful for individuals and organizations looking to make informed decisions about vehicle choices and their environmental impact. The second major functionality of the web application enables users to compare the specifications of different vehicle models. Users can select car makes and models, and the application retrieves detailed specifications from a provided CSV file. The report includes a robust description of how the application extracts and presents vehicle specifications, which can aid consumers, car enthusiasts, and industry professionals in comparing various vehicle attributes, such as fuel consumption, CO₂ emissions, engine size, cylinders, vehicle class, and transmission.

The application incorporates responsive web design and data visualization, making it accessible and user-friendly on various devices. Users can interact with the application through a simple, intuitive user interface, enhancing the overall user experience.

This report details the technical aspects of the web application, including the integration of machine learning models, data extraction and presentation of vehicle specifications, and the use of the Flask framework for web development. It also highlights the significance of the application for users seeking accurate fuel consumption predictions and vehicle model comparisons.

In summary, the "Sustainable Mobility Tracker: Car Metrics Calculator" offers valuable tools for users interested in making informed vehicle choices and exploring the specifications of different car models. Its user-friendly design and machine learning capabilities make it a valuable resource in the automotive industry and beyond.

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LIST OF SYMBOLS AND ABBREVIATIONS

ReLU	Rectified Linear Unit
GAN	Generative Adversarial Network
CNN	Convolutional Neural Network
XAI	Explainable Artificial Intelligence
AI	Artificial Intelligence
ML	Machine Learning
MRI	Magnetic Resonance Imaging
CT	Computed Topography
CO₂	Carbon Dioxide
MSE	Mean Squared Error
RMSE	Root Mean Squared Error