SUSTAINABLE MOBILITY TRACKER: CAR METRICS CALCULATOR

A PROJECT REPORT

Submitted by

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Under the Guidance of

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Certified that 18CSP109L / I8CSP111L project report titled "SUSTAINABLE MOBILITY TRACKER: CAR METRICS CALCULATOR" is the bonafide work of SAMANYU B RAO [RegNo:RA2011003011063] and SMIT VICHARE [RegNo:RA2011003011089] who carried out the project work under my supervision. Certified further, that to the best of my knowledge the work reported here in does not form part of any other thesis or dissertation on the basis of which a degree or award was conferred on an earlier occasion for this or any other candidate.

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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 (CO_2) 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 CO_2 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, CO_2 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