SIMATS ENGINEERING

Saveetha Institute of Medical and Technical Sciences

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Engineer to Excel

Student Name: Loganath. M **Reg. No.:**192424399

Course Code: DSA0216 **Slot:** B

Course Name: Computer Vision With Open CV For Modern AI

Course Faculty: Dr. Senthilvadivu S & Dr. Kumaragurubaran T

Project Title: Vision-based carbon footprint estimator for smart cities

Module Photographs:

Fig 1:Photo

Fig 2: module 3

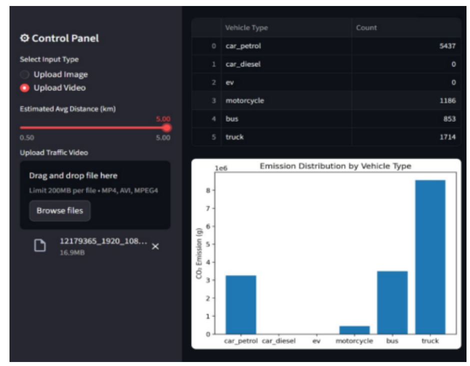

Fig 3: Output

Project Description:

Smart dashboarding and decision support systems play a crucial role in smart city environmental analytics by enabling models and visualization systems to learn meaningful patterns from large-scale urban monitoring data. In this module, vision-based carbon emission datasets are processed and structured using data management and preprocessing techniques to support accurate analysis and visualization. This approach allows analytical systems to reuse historical environmental data while adapting to city-specific emission patterns and sustainability trends.

The dataset includes attributes such as vehicle density, traffic flow, industrial activity levels, energy consumption indicators, regional environmental factors, and estimated emission values. Data preprocessing techniques such as data cleaning, normalization, aggregation, and transformation are applied to improve data quality and consistency. This strategy enhances reliability and reduces noise and inconsistencies present in real-world urban monitoring datasets. Feature engineering techniques are applied to extract meaningful indicators such as total estimated CO_2 emissions, average emission per zone, peak traffic emission levels, carbon intensity metrics, and regional environmental performance measures.

As a result, systematic vision-based carbon data management provides a robust and scalable foundation for smart environmental analytics and interactive dashboard visualization, enabling accurate interpretation of urban carbon patterns and informed decision-making for sustainable smart city development.

Student Signature **Guide Signature**