SIMATS ENGINEERING

Saveetha Institute of Medical and Technical Sciences

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Engineer to Excel

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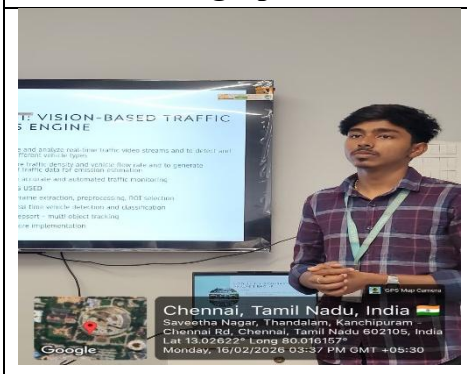
Course Code: DSA0216 **Slot:** B

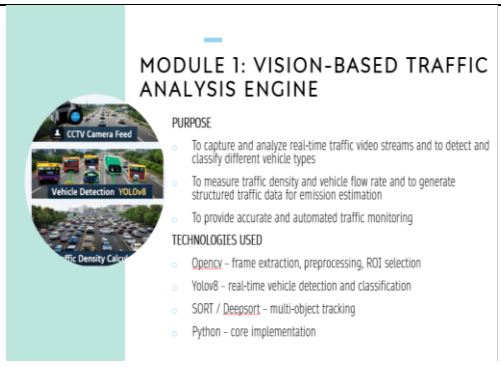
Course Name: Computer Vision with Open CV For Modern AI

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

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

Module Photographs:





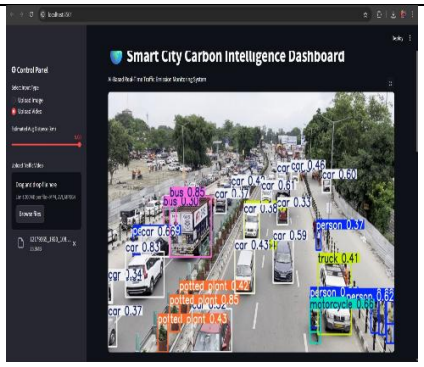


Fig 1:Photo **Fig 2: module 1** **Fig 3: Output**

Project Description:

Smart dashboarding and intelligent traffic monitoring systems play a crucial role in smart city carbon footprint estimation by enabling computer vision models and analytical frameworks to learn meaningful patterns from large-scale urban traffic video data. In this module, vision-based traffic datasets are captured, processed, and structured using image processing and object detection techniques to support accurate vehicle analysis and emission estimation. This approach allows analytical systems to reuse historical traffic knowledge while adapting to city-specific mobility patterns and congestion dynamics.

The dataset includes attributes such as vehicle density, traffic flow rate, vehicle type classification, average vehicle speed, lane occupancy levels, time-based congestion patterns, and estimated emission factors. Data preprocessing techniques such as frame extraction, noise removal, background subtraction, normalization, and object detection refinement are applied to improve detection quality and analytical consistency. This strategy enhances system reliability and reduces noise, occlusion errors, and inconsistencies commonly present in real-world traffic surveillance data.

As a result, systematic vision-based traffic analysis provides a robust and scalable foundation for smart carbon footprint estimation and interactive environmental dashboards, enabling accurate interpretation of urban traffic emission patterns and informed decision-making for sustainable smart city management.

Student Signature **Guide Signature**