Smart Traffic Management System

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Abstract

The Smart Traffic Management System (STMS) leverages advanced computer vision and machine learning techniques to address daily traffic challenges such as congestion, traffic violations, and pedestrian safety. By implementing real-time vehicle detection, crosswalk monitoring, license plate recognition, and traffic signal color detection, the system provides comprehensive traffic analysis and control. Utilizing deep learning models like YOLO for vehicles, pedestrian detection and OCR for license plate recognition, STMS facilitates dynamic traffic signal control, automated violation detection, and congestion prediction. The system aims to enhance road safety, reduce travel time, and optimize traffic flow in urban areas, thereby contributing to sustainable urban mobility solutions.

Method

Data Gathering

Datasets were chosen from Roboflow, a platform famous for computer vision datasets containing annotated images. https://roboflow.com/

Model Selection

The main model we used was state-of-the-art YOLO by Ultralytics, which handles computer vision tasks perfectly. Various versions were tested and v8 was selected.

Features Construction:

There were total 4 features. All explained in detail

Vehicles Detection:

Assessments and Measures

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Results

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Outcome 1

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Outcome 2

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Discussion

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