Mini-Project-Readme-File

Title of the Project : AUTOMATED VEHICLE DETECTION AND COUNTING SYSTEM

Project Idea :

To develop a system that involves detecting, classifying, and counting vehicles, along with the added functionality of detecting number plates and sending the extracted data to the excel sheet for traffic management and analysis.

Modules included in our Project:

1. Data Collection and Preprocessing
2. Vehicle Detection
3. Vehicle Tracking and Counting
4. License Plate Recognition (LPR)
5. Data Integration and Analysis

Data Collection and Preprocessing :

Collects diverse datasets including images, videos, and annotated data for vehicle detection, counting, and license plate recognition. Cleans, preprocesses, and augments collected data for training and testing purposes. Gathers data from various sources ensuring diversity in lighting conditions, weather, and traffic densities. Resizes, cleans noise, and augments data for improved model training and robustness.

** Vehicle Detection** :

Identifies and localizes vehicles in images or video frames.Employs advanced object detection models (Yolov8) to detect vehicles and generate bounding box annotations.

** Vehicle Tracking and Counting** :

Tracks detected vehicles and counts their movement through specific zones or lanes. Utilizes object tracking algorithms to maintain continuity, enabling accurate vehicle counting.

** License Plate Recognition (LPR) ** :

Recognizes and extracts license plate information from vehicle images or videos. Applies Optical Character Recognition (OCR) algorithms to extract license plate text from identified regions.

** Data Integration and Analysis** :

Combine outputs from vehicle detection, counting, and license plate recognition for comprehensive data analysis. Analyse collected data to generate traffic reports, including vehicle counts, traffic flow analysis, and license plate information.

CONCLUSION :

The system's ability to extract multiple frames, accurately estimate backgrounds, account for shadows, and employ advanced frame subtraction sets it apart from conventional methods. Moreover, the incorporation of advanced license plate detection adds a layer of sophistication to the system, enabling comprehensive traffic estimation. The system's unique feature of sending detected number plates in an Excel sheet enhances its practicality for traffic management applications, facilitating seamless integration with other systems. This interoperability underscores its potential as a comprehensive solution for traffic monitoring and analysis. The integration of advanced object detection, tracking algorithms, and license plate recognition represents a substantial stride towards efficient transportation management.