

Automated Vehicle Detection and Counting System

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Overview

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Introduction

- Detecting vehicles and collecting data from highway surveillance videos is crucial for smarter highway traffic management.
- By automating the process of vehicle detection and counting, it contributes to enhanced traffic management, road safety, and informed urban planning.

Literature Survey

S. No	Title of the paper	Authors and Journal Details	Description
1	Surface traffic monitoring using OpenCV for various weather conditions through enhanced spatial correlation method.	Dipak Ghosh, Soumokanti Bera, Pushan Kumar Datta - 2022	The core of this working model is to enhance vehicle detection and counting module which is implemented by analysing consecutive frames of video using frame differencing technique.
2	Vehicle Detection and Counting using Deep Learning based YOLO and Deep SORT Algorithm for Urban Traffic Management System.	Rahul Kejriwal, Ritika H J, Arpit Arora, Mohana -2022	Vehicle counting is performed in two steps: the captured video is sent to YOLO to detect, count and classify the vehicles. Multi vehicular tracking is adopted using Deep SORT algorithm.

S. No	Title of the paper	Authors and Journal Details	Description
3	Vehicle Counting, Classification and Detection using OpenCV.	Chandru V, Muthukumar G, Ajay S, S. Arulkumar -2023	In this paper it utilizes OpenCV YOLOv3 for vehicle detection and counting of vehicles from still images that can detect, classify and count numerous vehicles from CCTV footage.

Problem Statement

- The Automated Vehicle Detection and Counting System focuses on to detect and classify the vehicles on the road and count the number of vehicles traveling through a road.
- It also enables continuous monitoring of vehicles through Object Tracking.

Proposed Method

- Object Detection: Utilize state-of-the-art object detection models such as opencv or YOLO (You Only Look Once) to identify vehicles in each frame.
- Object Tracking: Implement object tracking algorithms (SORT - Simple Online and Realtime Tracking) to track vehicles across consecutive frames.
- Vehicle Classification: Using machine learning and computer vision techniques, we can distinguish between various vehicle types, such as cars, trucks, and motorcycles.
- Vehicle Counting: Count the unique IDs assigned to tracked vehicles as they pass through the monitored area.

Modules and Functionalities of modules

- Vehicle Detection Module
 - Functionality: Identifies vehicles within the captured data.
- Object Tracking Module
 - Functionality: Tracks detected vehicles across frames to maintain continuity.
- Vehicle Classification Module
 - Functionality: classifying vehicles into different categories such as cars, trucks, buses, and motorcycles.
- Vehicle Counting Module
 - Functionality: Counts vehicles accurately based on tracking data.

References

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- Da Li, Bodong Liang, Weigang Zhang, "Real-time moving vehicle detection, tracking, and counting system implemented with OpenCV", Published in: 2014 4th IEEE International Conference on Information Science and Technology.

Thank you