# Automated Vehicle Detection and Counting System

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# Overview

# Introduction

- Detecting vehicles and collecting data from highway surveillance videos is crucial for smarter highway traffic management.
- By automating the process of vehicle detection, classification, number plate recognition 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 | Vehicle Number Plate Detection using YoloV8 and EasyOCR. | Sheetal S., Suhas H., Avinash M., Mrunal S., Amol K. 2023 14th IC-CCNT -2023 | In this research study, a project has been developed for license detection and recognition utilizing convolutional neural network (CNN) which is a deep learning method and easyocr. |
| 2 | Vehicle Detection and Counting using Deep Learning basedYOLO and Deep SORT Algorithm for Urban Traffic Management System. | Rahul Kejriwal, Ritika H J, Arpit Arora, Mohana 2022 First International Conference of ICEEICT -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 SORTalgorithm. |

| S. No | Title of the paper | Authors and Journal Details | Description |
|---|---|---|---|
| 3 | Automated License Plate Detection and Recognition using YOLOv8 and OCR With Tello Drone Camera. | Hanif Fakhrurroja, Dita Pramesti, Abdul Rofi Hidayatullah, Ahda Arif Fashihullisan 2023 International Conference on Computer, Control, Informatics and its Applications (IC3INA) -2023 | This paper proposes an Automated License Plate Recognition (ALPR) system using YOLOv8 and Optical Character Recognition (OCR). This system is developed with the Python programming language and uses the OpenCV library for image processing and Pytesseract library as an OCR engine. |

# Problem Statement

- The Automated Vehicle Detection and Counting System is to detect and classify vehicles on the road, accurately count the number of vehicles, and identify the number plates of vehicles traversing a given roadway.

# Proposed Method

- Object Detection: using Yolov8.

- Object Tracking: Implement object tracking algorithms (SORT - Simple Online and Realtime Tracking) to track vehicles across consecutive frames.

- License Plate Recognition: using EasyOCR to recognize the License Plate and to detect the characters from it.

- Vehicle Counting: Count the unique IDs assigned to tracked vehicles as they pass through the monitored area.

# Implementation

- Vehicle Detection and Counting Module
  - Functionality: Identifies vehicles and counts them.
- Claasification
  - Functionality: Classifies detected vehicles into categories (e.g., cars, trucks, motorcycles).Enhances understanding of the types of vehicles on the road.
- Object Tracking Module
  - Functionality: Tracks detected vehicles across frames to maintain continuity.
- License Plate Recognition Module
  - Functionality: detects the license plate numbers

# Result



Figure: Vehicle Counting and Classification

# Result



Figure: License Plate Recognition

# Future Scope

- Connect to public transit data for instant bus/train schedules, delays, and optimal routes.
- Spot abnormal behavior in traffic using machine learning.
- Facilitate efficient emergency response coordination.

# Conclusion

- Detected and classified the vehicles on the road, counted the number of vehicles and recognization of number plates traveling through a road.

# References

- Sheetal S, Suhas H, Avinash M, Mrunal S, Amol K, "Vehicle Number Plate Detection using YoloV8 and EasyOCR", Published in: 2023 14th International Conference on Computing Communication and Networking Technologies (ICCCNT)

- Rahul Kejriwal, Ritika H J, Arpit Arora, Mohana, "Vehicle Detection and Counting using Deep Learning basedYOLO and Deep SORT Algorithm for Urban Traffic Management System", Published in: 2022 First International Conference on Electrical, Electronics, Information and Communication Technologies (ICEEICT).

- Hanif Fakhrurroja, Dita Pramesti, Abdul Rofi Hidayatullah, Ahda Arif Fashihullisan , "Automated License Plate Detection and Recognition using YOLOv8 and OCR With Tello Drone Camera", Published in: 2023 International Conference on Computer, Control, Informatics and its Applications (IC3INA).

# Thank you