

# Vehicle Tracking Project Report

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Project: Vehicle Tracking and Counting using YOLO + ByteTrack

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## 1. Introduction

This project implements a vehicle tracking and counting system using YOLO object detection and ByteTrack for tracking. The system detects vehicles in a video, assigns unique IDs, and exports the results to both JSON and CSV formats.

Objective:

- Detect and classify vehicles (cars, trucks, etc.) in a video stream
- Track each vehicle with a unique ID
- Export tracking results for analysis
- Demonstrate the workflow in a video demo

## 2. Tools and Technologies Used

Python, YOLOv8, ByteTrack, OpenCV, CSV/JSON, GitHub, PowerShell/CMD

## 3. Project Setup

1. Clone the repository: `git clone https://github.com/Labelleerr/campushiring.git`
2. Create your folder and copy files:
  - vehicle\_count.csv
  - vehicle-counting-result.avi
  - export\_vehicle\_csv.py
  - export\_json.py
  - results.json
  - README.md
3. Activate Python env: `conda activate yolo-bytetrack`
4. Run scripts: `python export_vehicle_csv.py`, `python export_json.py`

## 4. Workflow

1. Detection: YOLO detects vehicles.
2. Tracking: ByteTrack assigns unique IDs.
3. Output: CSV and JSON generated.

## 5. Results

Video: vehicle-counting-result.avi

CSV example: frame, vehicle\_type, id, bbox

JSON contains frame-by-frame tracking.

## **6. Challenges Faced**

- Correct path to results.json
- Proper CSV export
- Handling missing video files

## **7. Future Enhancements**

- Real-time camera input
- Vehicle speed calculation
- Traffic monitoring alerts

## **8. Conclusion**

Successfully demonstrated vehicle detection, tracking, and counting using YOLO and ByteTrack.