AI Vehicle Detection Project Report

1. Project Overview

This project involves training a YOLOv8 computer vision model to detect and count five types of vehicles (Car, Rickshaw, Motorbike, Truck, and Van) in real-time traffic video.

2. Challenges & Mistakes Overcome

- Problem: Initial training with 640px images caused the i5 CPU to overheat and estimated 15+ hours of training.
- Solution: Reduced Image Size to 320px, which sped up training by 4x without sacrificing detection quality.
- Problem: Encountered '100+ errors' related to pathing and Python environments.
- Solution: Fixed by navigating to the correct project directory and standardizing the ultralytics environment.

3. Exact Model Performance

Class	Precision	Recall	mAP50 (Accuracy)
All Classes	0.968	0.922	0.972
Car	0.959	0.896	0.955
Rickshaw	0.981	0.910	0.979
Motorbike	0.973	0.978	0.992
Van (Lowest)	0.937	0.875	0.945

Final Inference Speed: 23.3ms per image (42 FPS)

4. Current Capabilities

The model successfully detects vehicles live through the webcam and provides a real-time count on the display. All results are saved in the 'runs/detect/predict' directory.