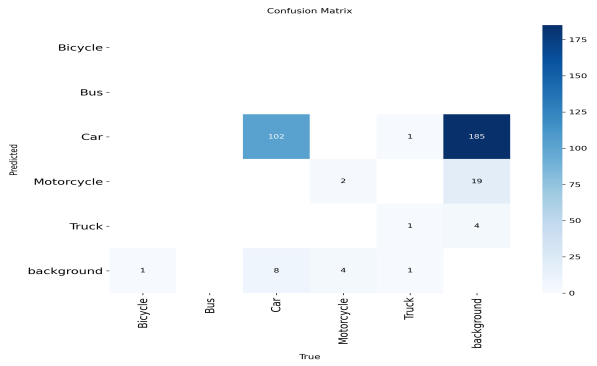
project report: Fine-tuning YOLOv8 for detecting vihecles

■■■■ ■■■■■: 1. 100 pictures with Label Studio labeling (5 classes: Car, Bicycle, Bus, Truck, Motorcycle). 2. split: 70% train (70 image), 20% val (20 image), 10% test (10 image). 3. Fine-tune YOLOv8n/s/m with 50 epochs, batch=8, imgsz=640 (CPU). 4. results: mAP@0.5 Val best 0.256 (m), Test 0.212. Car best class (mAP=0.422). 5. WandB: https://wandb.ai/[tajmiri-iman-engineer]/yolo-vehicle-detection (charts mAP/loss).

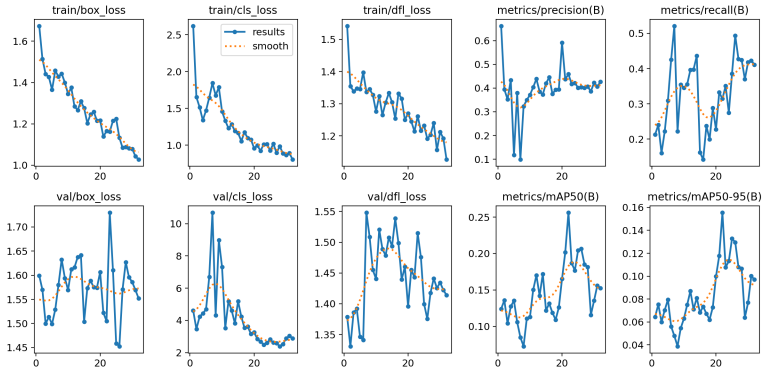
mAP@0.5 (Val)	Precision (Val)	Recall (Val)	mAP@0.5 (Test)
0.1156450545493476	0.6118472520601508	0.1772727272727272	0.1368671473324096
0.1612680738226332	0.6923276936161034	0.2176433105654057	0.2254183269441142
0.256114453154077	0.458351887179195	0.3143939393939394	0.2120257401067488

accuracy & error: - Precision: mid 0.58 (low false positive). - Recall: mid 0.24 . - mAP@0.5: n=0.12, s=0.16, m=0.26 (Val). - best model: yolov8m (25M params, 78 GFLOPs).

Confusion Matrix



Training Curves



Inference Output