**Vehicle Classification**

*Files Legend:*

1. vehicle\_classification.py - main python file for vehicle detection and classification
2. video1\_final.mp4 - 10 seconds video taken from my mobile phone camera
3. video1\_output\_detections.mp4 - output video with bounding boxes and classified class labels
4. ADAS\_assignment\_vehicle\_classification.ipynb - all preparation and training code

*Workflow:*

The ‘vehicle\_classification.py’ file contains the main code that takes in the input video file named ‘video1\_final.mp4’, runs inference using the trained YOLO weights, draws the bounding boxes on the video frames and saves the final video.

I’ve used the pre-trained Pytorch implementation of the YOLO v7 tiny model and re-trained the model on the provided vehicle classification dataset. The ‘ADAS\_assignment\_vehicle\_classification.ipynb’ file consists of the code for loading the model, making changes to the configurations and training the model on the vehicle classification dataset. I trained the model for 50 epochs, reaching an mAP of 0.65 before running out of GPU. However, the model’s performance could be further improved by fixing the class imbalance issue in the dataset and by training for more epochs.

The ‘video1\_output\_detections.mp4’ contains the video with bounding boxes, class name and confidence score.