Technical Approach

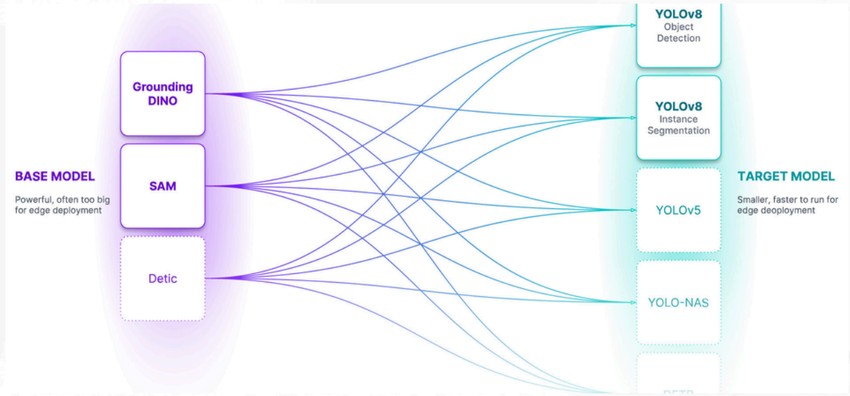
1.vehicle detection :

Used Autodistill method which encludes base model such as grounding dino and SAM which helps in automatically labelling of dataset and detection of vehicle.

YOLO v8 is used for training of dataset of images.

2.Distance and TTC calculation : :

Calculate distance between two points on Earth (**Haversine formula**).
Calculate 3D distance including altitude.
Calculate Time to Collision (TTC).
Set a threshold distance in meters for collision warning.
Calculate distance and time difference.
Calculate relative speed and TTC.
Check for warnings.



Issues faced

1.Due to lack of GPU support , i am unable to process these large number of images , that’s why i am able to train only 100 images from the **IDD multimodel d0** dataset.

2.Finding the correct way to compare the dataset and find distance between vehicles.

3.How to take latitude , longitude and altitude in account and find a formula to locate the coordinates and find the distance.

4.Calculation of Time of collision is hard since we have to go through every coordinate and find the TTC.

Results

1.Complete YOLOv8 Vehicle detection model.

2.ML model for distance estimation and TTC calculation.