

# Vehicle Cut-In Detection

## Dataset Used

- IDD temporal dataset
- After dataset our task is to get Annotated image

## Training

- YOLOv8 is used for training our dataset
- After training we get our best.pt model which detects the vehicle

## Testing

- The model is then tested with the images and videos and get good results

## Object Tracking

- we used SORT method and the by default YOLOv8 tracking method for tracking each vehicles uniquely
- it provides each vehicles unique id

## Velocity Calculation

- Velocity is calculated by using the concept of the time to frame concept
- we considered two imaginary lines and find the time to cross that line for each vehicles and find velocity using formula  $\text{distance}/\text{time}$  and the distance varies with camera used and we need to fix the real-distance ratio with the camera one while considering fps.

## Time To Collision

- After getting the velocity we need to find the distance between the our car and the other vehicles. we get that using the boundary box results given by our model. And finally we need to calculate the real-distance ratio from the frame distance which depends with camera used.
- Similarly , we also need relative velocity ie,  $\text{velocity2} - \text{velocity1}$ .
- Finally TTC is given by  $\text{distance} / \text{relative\_velocity}$

## Warning

- After getting TTC we need to warn if the TTC is less than 5-7s.

## Code Explanation Link

[https://drive.google.com/file/d/1hsKE7QM\\_RN9RVO8ZoNgjFyknU\\_gnYe52/view?usp=sharing](https://drive.google.com/file/d/1hsKE7QM_RN9RVO8ZoNgjFyknU_gnYe52/view?usp=sharing)