# Lab 3: Building an Object Tracker

## Notebook URL:Link to Notebook

## Methodology:

1. **Model** :In this lab mask rcnn 101 & rcnn 50 models are experminted to detect objects in video frames .However mask rcnn 101 have better performance.
2. **Matching algorithm**:to track similar objects 2 methods were used, matching using intersection over union between boxes and euclidean distance , the other method that suggest matching according to category doesn't get a good result because the model is not accurate in classifying objects and also a class can have many instances the the frame that are not necessarily matched , and thus this method is discarded , and only iou and distance matching algorithms is performed.
3. **Visualization & color coding** is performed by storing colors for every object/box and then overwrite /add or remove their corresponding objects/boxes depending on the matching with the previous frame

## Results:

Those results are obtained when using iou method because it proved to have better performance than distance method .Generally the performance is not that perfect even in iou method , and that is because of the model misdetections because for example in some frames it identifies some objects as cars and in other frames it sees the same objects as buses so according the matching algorithm assign different color to the same object because it relies in the false detection of the model.the results are shown below

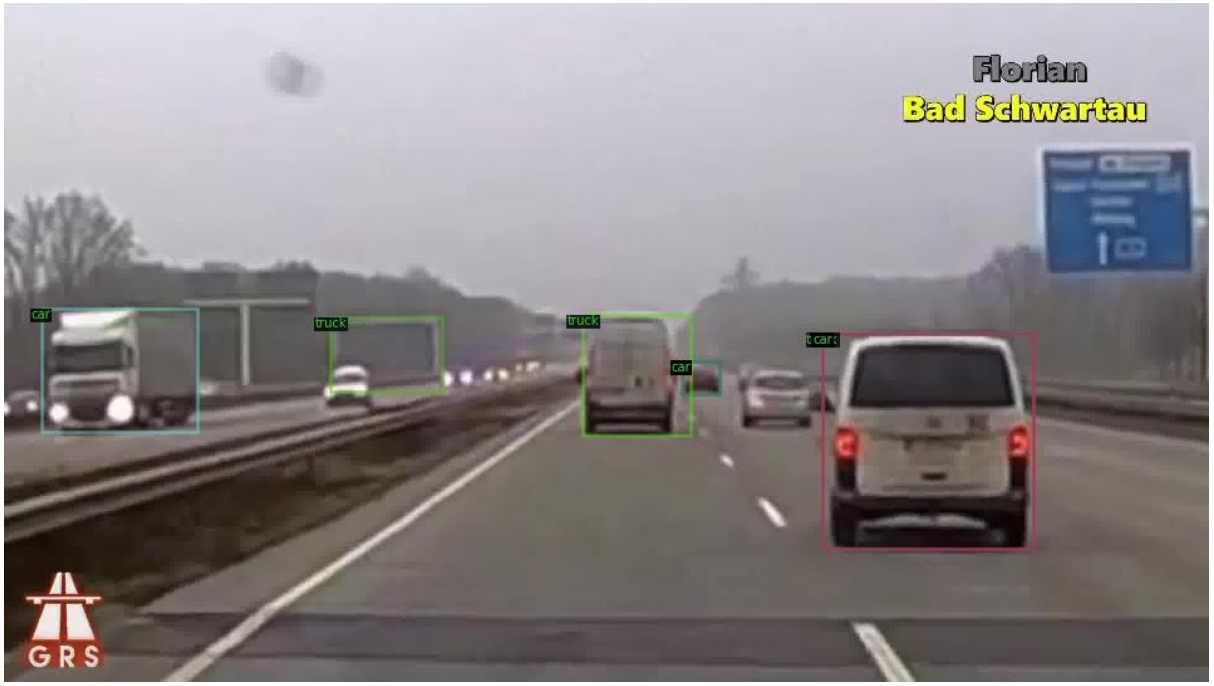
## Visualizations 2-frame tracks

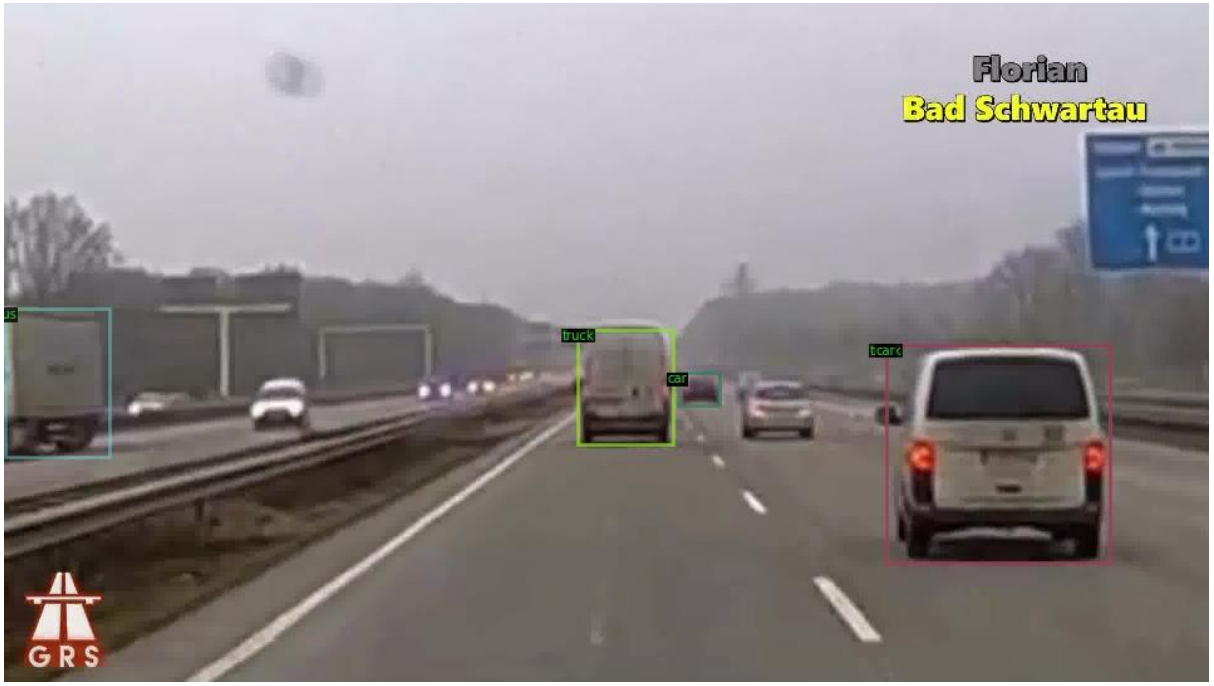
1. From start:


2. Form middle:

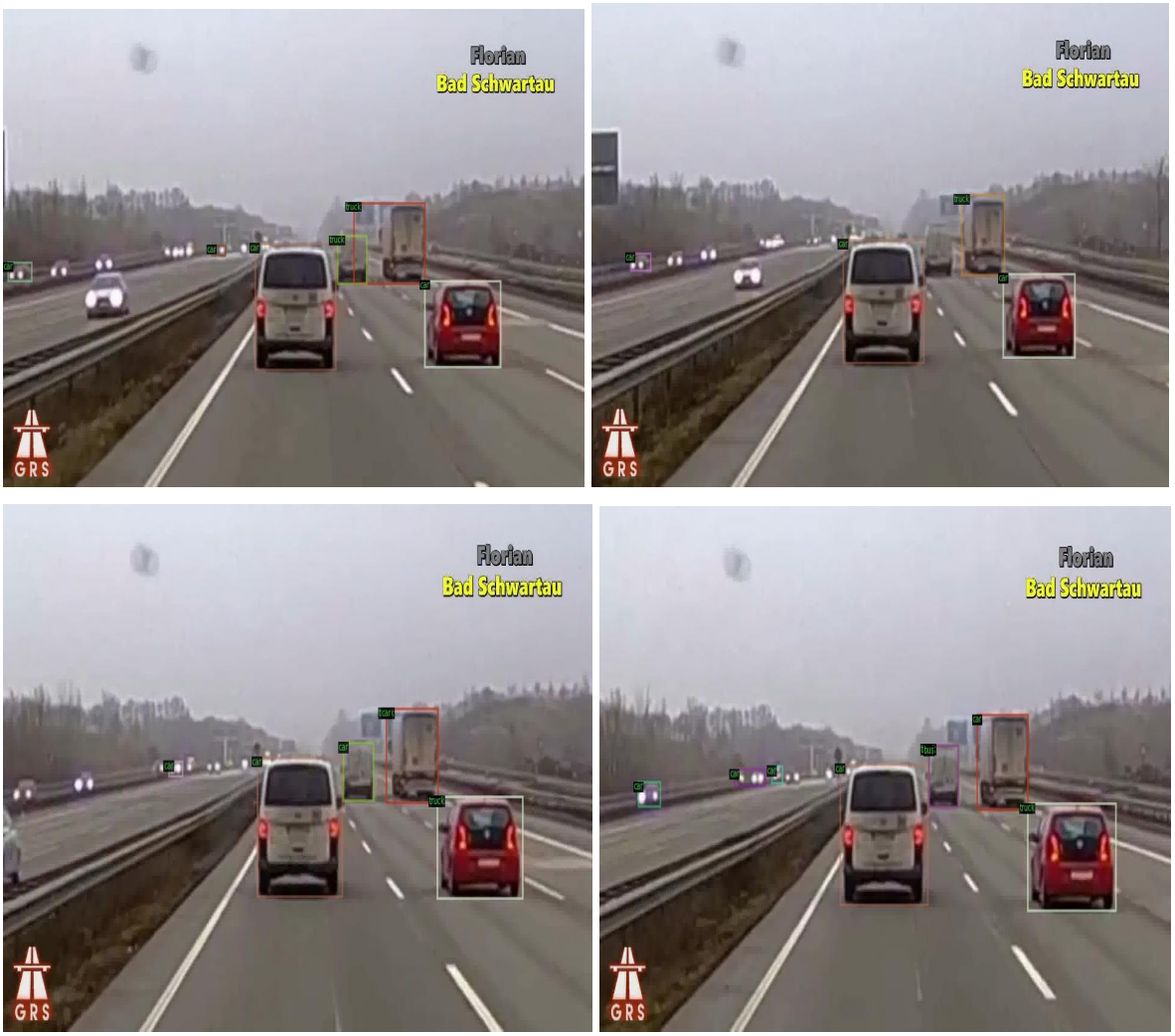


3. From end:


Florian
Bad Schwartau
car
truck
truck
car
GRS


Florian
Bad Schwartau
truck
car
GRS

## Visualizations of 10-frame tracks




## Observation & conclusion

Generally , the mask rcnn model is not perfect .However, using mask rcnn 101 improved the results to some extent. Moreover, iou intersection over union have acceptable performance more than euclidean distance .However additional improvements could be done maybe by thresholding the iou values or changing the model itself.