**AFRICAN MASTER'S IN MACHINE INTELLIGENCE**

**AIMS-Senegal, Mbour, Senegal**

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# 1 Visualizations 2-frame tracks

**Category based linking:** First I used the matching score function that links two objects if they belong to the same category. The result is as shown below, it's not good because there could be different objects with the same category in the consecutive frames of the video. This only works if we have no same category objects in the consecutive frames.


(a) Frame-0 (b) Frame-1

Figure 1: Object tracking linking objects with the same category

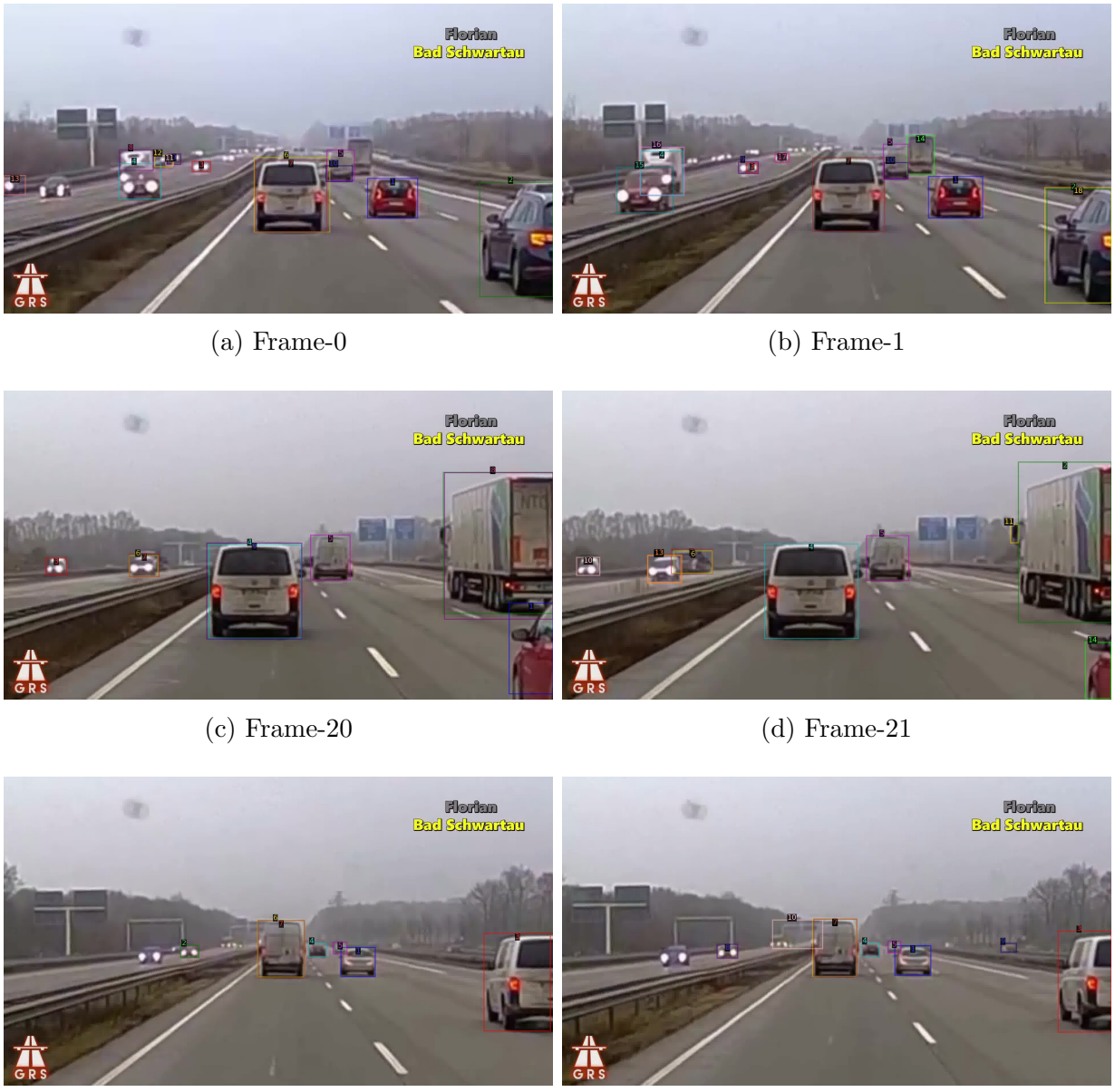
**Category and iou based linking:** Here I used both category and iou. i.e objects will be linked if the have same category and the their boxes iou is high. This is better than better than the category based linking because it also considers the objects position in the frame.


(a) Frame-0 (b) Frame-1

Figure 2: Object tracking linking objects with the same category and with high iou

**Linear sum assignment:** Above I used argmax function to get the highest matching object. However the problem here is multiple objects in one frame can be linked with one object in the other frame. For eexample

in fig 2 car labeled 3 has linked with two other objects in the next frame. To solve this I used linear sum assignment algorithm instead of argmax. The linear sum assignmnet maps objects one to one efficiently. The result shown in the following frames.




(a) Frame-0 (b) Frame-1

(c) Frame-20 (d) Frame-21

(e) Frame-39 (f) Frame-40

Figure 3: Object tracking using the linear sum assignment for matching score instead of arg max

## 2 Visualizations of 10-frame tracks

Here is tracking of objects for ten frames. Objects are being tracked from one frame to another. This is visualized by putting 20 different color boxes and a number label. Note objects 0&20, 1&21, 2&42... have same box colors but they can be identified by their number label.

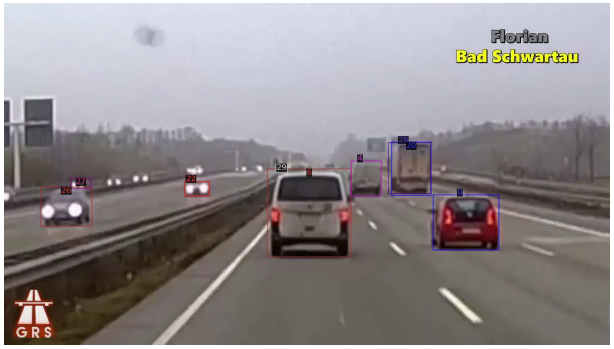

(a) Frame-0


(b) Frame-1


(a) Frame-2

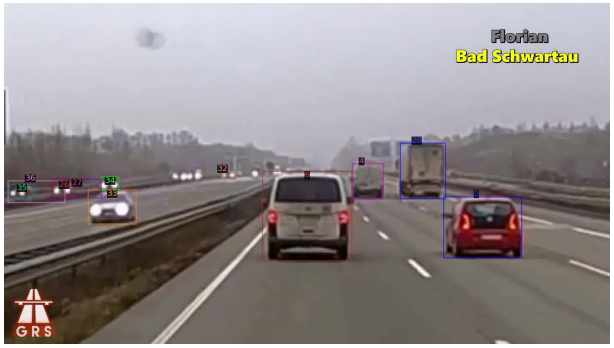

(b) Frame-3


(c) Frame-4




(d) Frame-5


(a) Frame-6




(b) Frame-7


(a) Frame-8 (b) Frame-9

Figure 7: Object tracking using the linear sum assignment for matching score instead of arg max

Here is the link for this implementation in google colab. click here
Here is the link for video visualization obect tracking of the frames click here