INTRODUCTION TO COMPUTER VISION: VISUAL PERCEPTION AND GENERATION		
Student's Name		Deadline
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LAB3: Report

Introduction: In this project, we implemented a pairwise object tracker for consecutive frames in a video. We used a pre-trained Faster R-CNN model on COCO dataset to detect objects in the frames. We then defined two matching score functions for matching predictions between consecutive frames based on object category and bounding box overlap.

1 Part B: Tracking Objects in Pairs of Frames

- Pairs of consecutive frames from the start, where the two predictions belong to the same object category.

Figure 1: Frame 1

Figure 2: Frame 2

- Pairs of consecutive frames from the middle, where the two predictions belong to the same object category.

Figure 3: Frame 19

Figure 4: Frame 20

- Pairs of consecutive frames from the end, where the two predictions belong to the same object category.
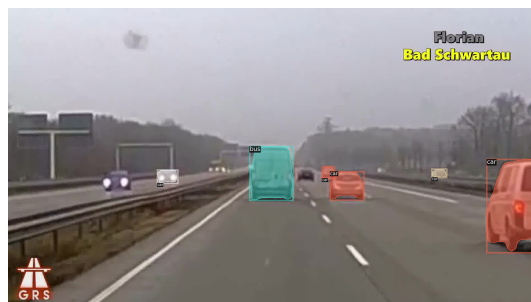

Figure 5: Frame 39

Figure 6: Frame 40

- Pairs of consecutive frames from the start, where the two predictions belong to the same object category AND if their bounding box overlap is high.

Figure 7: Frame 1

Figure 8: Frame 2

- Pairs of consecutive frames from the middle, where the two predictions belong to the same object category AND if their bounding box overlap is high.

Figure 9: Frame 19

Figure 10: Frame 20

- Pairs of consecutive frames from the end, where the two predictions belong to the same object category AND if their bounding box overlap is high.

Figure 11: Frame 39

Figure 12: Frame 40

Observation: We observed that the matching score function that considers both object category and bounding box overlap works better than only considering object category.

2   Part C: Tracking Objects in Videos.

We extended our tracker to perform pairwise links for a time horizon of 10 frames. We visualized examples of our 10-frame tracks by visualizing them on their corresponding frames, we made a video for that, follow this link to watch the video.

We observed that it produces some false positives and false negatives. We believe that this is due to the accumulation of errors over time.

To use our tracker on a new set of 10 images contained in a zip file, follow the steps described in our notebook:

Download the colab notebook from our Google drive: link.