Progress Update: Motion Segmentation

19/01/2022

Introduction

Dataset

As discussed in last week's meeting there seems to be some dataset imbalance between the train/val dataset and the test dataset. In order find out what the problem is we have tried to utilize the confusion matrix and are trying to find the ratio of static to dynamic images.

Confusion Matrix on Tensorboard

We have written a function for the confusion matrix and could now track this on Tensorboard. However, the remote (*atcremers9*) which we have been training on previously is unavailable to us suddenly. This was the only machine with 4+ GB of VRAM. With our current U-Net, which takes ∼9 GB on the GPU, we can no longer train. Therefore, we will need to come up with a more compact representation first.

Dynamic-Static Vehicles Ratio

General steps to find this:

1. Use *tracklets* data from KITTI to obtain the number of objects in each image
2. Use pre-trained detector on the motion segmentation masks to obtain the number of dynamic vehicles
3. Use: $static = total - dynamic$ to obtain the number of static vehicles per frame
4. find the dynamic:static ratio for each frames and take an average all frames

At this point in time we have not yet found the count of dynamic vehicles from step 2. However once we have this steps 3 and 4 are very straight forward.

Metric changes

AIoU will provide be very low (in some cases zero) if the ground truth is completely static because the intersection value of gt and pred will be zero. We switched to a metric to average the AIoU with a focus on dynamic pixels and with a focus on static pixels.

CARLA

Automatic data set collection to iterate over all maps and save the RGB images and semantic segmentation images together with poses uses Python's threading library. Separate script to obtain the motion segmentation ground truth afterwards. Working on including it in the main data collection. Besides the data collection script we

Next Steps

Roadrunner

1. Use Roadrunner to edit ParkedVehicles; use existing vehicles in Town_XX_opt map and place them throughout the map
2. Use Roadrunner UE4 Plugin to directly use new map in Carla
3. Run data collection, with various setups for number of spawned vehicles, pedestrians, weather conditions

Unsupervised network

1. Unsupervised extension → how to proceed with supervised to make it unsupervised?

References