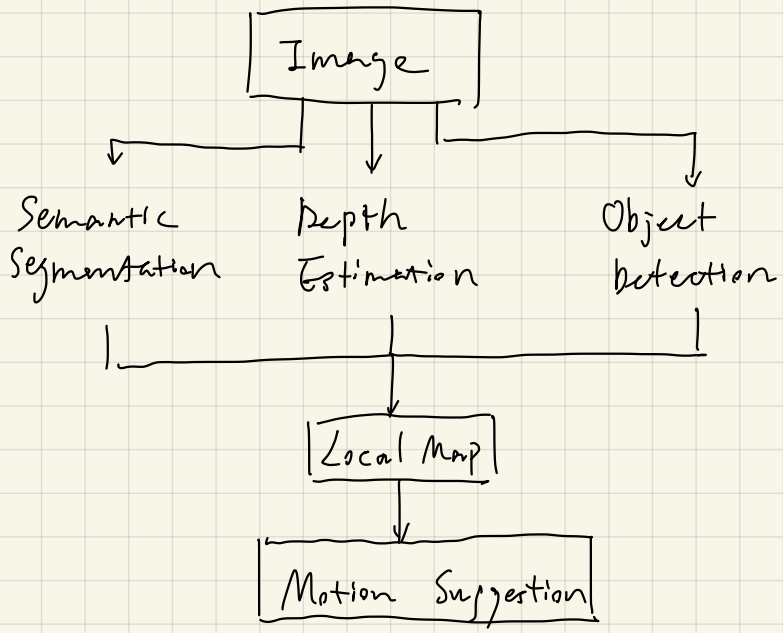
A Local Monocular Mapper for Self-Driving Cars

We propose a project that designs a visual system that is able to localize a vechicle in static scences and generate local maps useful for decision-making in the configuration space. The whole system runs on individual RGB images.



The segmentation and object detection modules act as supplements for inconsistencies and inaccuracies of depth estimation and enhance the granularity of the map.

The neat part is that if we use a 2 stage object detection or just use segmentation, all networks can share the same backbone feature extractor.

Job 0

Painfully do literature reviews and search for datasets.

Job 1

Reproduce U-Net / FCNN / ... for semantic segmentation

Job 2

Reproduce YOLO? / Faster RCNN / Mask RCNN / ...
for object detection

Job 3

Reproduce / Implement a depth estimation network

Job 4

Integrate them

Job 5

Implement the mapper

Job 6

Run it on video / simulator so it looks good on demo.

Things we won't be doing.

1. Global Mapping since we don't know the global static map.
2. Direct Motion Planning since we don't know the C-space.
3. SLAM since we acts on static images.
4. Guarantee the architecture will be the same after we are done with it since we can't predict the future.
5. Do this end-to-end, since we don't have such a dataset.