Project proposal submission

- The problem we will be investigating is the position estimation of cones inside of a map. The cones are used to layout the borders of a path that an autonomous car will have to navigate.
- We will need a large dataset of labeled cones to train the detection network, we will partially collect it ourselves and then exploit existing free datasets.
- The hardware we will use will likely be two cameras in a stereo setup.
- We will exploit an existing SLAM algorithm to get the pose and orientation of the car and map of the surroundings of the car. We will then use deep neural a network to detect cones inside of the images from the cameras and use either a geometric approach, thanks to the fact that we know in advance the exact geometry of the cones, or a depth-map, given by the stereo setup, to project the cones onto the map.
- What we want to achieve is not only a position estimation of the cones in the current frame, relative to the car. Our aim is a mapping of the cones positions in a global and persistent map that gets updated at each iteration.
- The expected results is a precise, accurate and complete mapping of the cones positions in real time.
- To asses the quality of the result we will also compare our solution to the one that is currently used in our car which uses cameras and lidar fusion.