A short report on Deep Learning for Table Interest Point Detection

Introduction -

In the recent past, Deep learning has been successfully applied to object recognition with state of the art results. SegNet[1] approaches to solve the problem of 2D image segmentation via deep learning. It formulates a encoder-decoder network to predict segmentation by using both fine and coarse scale information.

In this short project, I attempt to find interest points or corner points of the tables in the scene. Availabilty of semantic information such as interest points can help mobile robots navigate in a better way.

Problem Statement -

Given an image of a lab scene, the task is to find interest points or corner points of the tables in the scene.

Approach –

I first obtain a good quality segmentation of the image using SegNet. Using vanishing points detection algorithm[2], and cues from segmentation, I find vanishing lines which are part of a table. I find relevent intersection points of these lines to obtain interest points of the table.

Methodology -

- I train SegNet on my own dataset comprising of 88 images augmented to 222 images by horizontal and vertical flipping.
- I test this network on current image to obtain predicted segmentation mask.
- I use the code provided by the authors of [2] to obtain the vanishing lines and horizon line of the scene.
- I only take those lines which have some part of the table in it.
- I find relevant intersection points e.i. those which lie below the vanishing horizon, to obtain the table interest points.
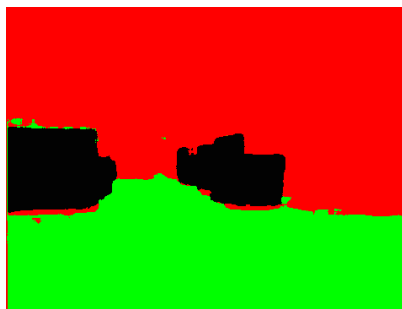
Results -

I present qualitative results in the following images.

a)
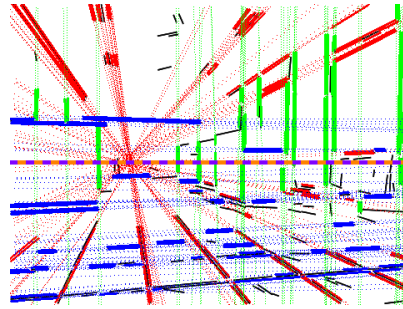
b)

c)

d)

Fig1 : a) Original image of lab scene. b) Result of vanishing point detection algorithm c) Segmentation Mask predicted by SegNet Simple. d) Relevant interest points of tables, encircled.

References -

1. Alex Kendall, Vijay Badrinarayanan and Roberto Cipolla "Bayesian SegNet: Model Uncertainty in Deep Convolutional Encoder-Decoder Architectures for Scene Understanding."arXiv preprint arXiv:1511.02680, 2015.
2. "Vanishing Point Detection in Urban Scenes Using Point Alignments" Jose Lezama, Gregory Randall, Jean-Michel Morel and Rafael Grompone von Gioi.