Project Proposal
Visual Recognition

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Abstract

Our goal is pixel wise depth prediction from a single image. There have been lots of recent works and some use CNNs which constitutes the state of the art.

1 Main Idea

To obtain a feature rich accurate depth map we have to pool a number of important cues which help in depth estimation.(Some of these cues are: Segmentation information, Edge and Corner info and Viewpoint Information).

Also rather than trying to obtain an accurate depth map in one shot, we are inclined towards an algorithm which keeps improving the generated depth map in multiple iterations making it feature rich and correcting erroneous pixels in each iteration.

Our main Idea is using/generating Hierarchical Segmentation stepwise to improve the predicted depth map at each step.

1.1 Literature Survey

- http://www.cv-foundation.org/openaccess/content_cvpr_2015/papers/Liu_Deep_Convolutional_Neural_2015_CVPR_paper.pdf
  Deep Convolutional Neural Fields for Depth Estimation from a Single Image, CVPR'15

- http://www.cv-foundation.org/openaccess/content_cvpr_2015/papers/Wang_Towards_Unified_Depth_2015_CVPR_paper.pdf
  Towards Unified Depth and Semantic Prediction from a Single Image, CVPR'15

- https://arxiv.org/abs/1505.05641
  Render for CNN: Viewpoint Estimation in Images Using CNNs Trained with Rendered 3D Model Views

2 Stages Proposed

- Understand the above top two papers in detail. Run their code for different images and try to explicitly define their shortcomings.

- Formulate the problem for Hierarchical Image Segmentation. The formulation should be such that it is able to aid depth prediction.

- Design our own pipeline taking help from the realizations from the above steps. Novel approach is possible here(we can use Viewpoint Prediction techniques along with Hierarchical Image Segmentation).

- Run and improve the above designed Pipeline.