Indoor Scene Modelling and Graph Generation from Single Panorama

Computer Vision (CS6350)
TPA-1

1. Problem Statement

Infer 3D structure of an indoor scene from a single 2D panorama. Recover the spatial layout by finding floor, ceiling, walls. Recover shapes of typical indoor objects such as furniture. Depth information computed can be used to perform 3D reconstruction of the scene. The resultant 3D mesh can be used to generate scene graph.

2. Input

- 2D panorama images.

3. Output

- Depth map for the panoramic scene.
- 3D reconstruction of the panoramic scene.
- 3D Scene graph of panorama.
- Demo should run on an unknown indoor scene.

4. Dataset

- PanoContext (http://panocontext.cs.princeton.edu/)
- SUN360 (http://people.csail.mit.edu/jxiao/SUN360/main.html)

Note: You can choose any dataset based on your implementation or refer to the given datasets.
Hints for excellence: Points will be awarded for accurate reconstruction of scenes with cluttered objects and relationship graph.

5. References

- Iro Armeni, Zhi-Yang He, et al. 3D Scene Graph: A structure for uni ed semantics, 3D space, and camera, Proceedings of the ICCV19.

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- Zou, Chuhang, et al. LayoutNet: Reconstructing the 3D Room Layout from a Single RGB Image. Proceedings of the IEEE Conference on Computer Vision and Pattern Recognition. 2018.

- Yang, Hao, and Hui Zhang. E cient 3d room shape recovery from a single panorama. Pro-ceedings of the IEEE Conference on Computer Vision and Pattern Recognition. 2016.

- Zhang, Yinda, et al. Panocontext: A whole-room 3d context model for panoramic scene understanding. European Conference on Computer Vision. Springer, Cham, 2014.