

Semantic 3D reconstruction using a label hierarchy

Goal: leverage semantic hierarchy in order to accelerate and reduce memory consumption of semantic 3D reconstruction

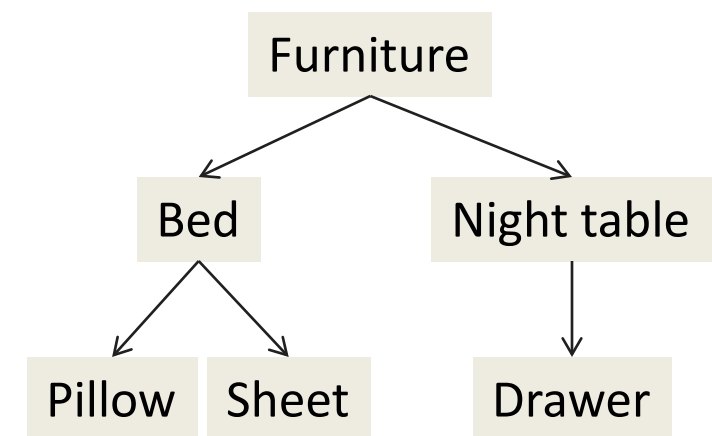
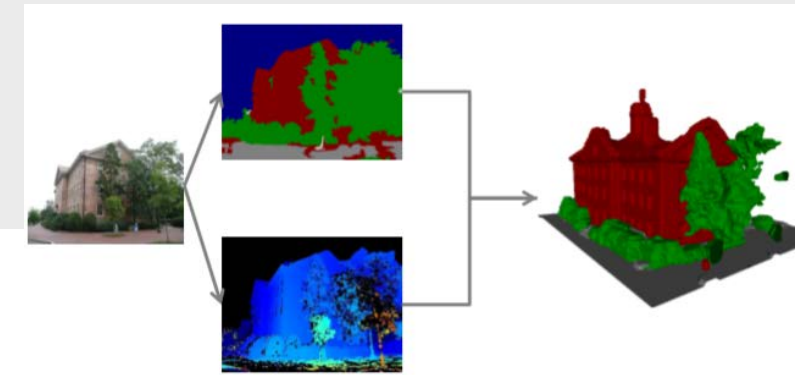
Description:

Semantic 3D reconstruction is the task of jointly inferring the 3D geometry and the semantic nature of objects in a scene from images. This can be formulated as a volumetric labeling problem as in [1]. However, [1] is limited in the number of labels that it can reconstruct. Solutions like [2] have been proposed to tackle this issue.

Exploiting the hierarchy that exist between labels in a coarse to fine way could improve the efficiency of [1]. For instance, *wall* is a coarse label, refined by *windows*, itself refined by *frames*... We propose to explore this idea in order to reduce the memory footprint and speed up the algorithm, leading to an increase in the number of labels one can reconstruct at the same time, and more efficiency.

[1] Häne et al, Joint 3D scene reconstruction and class segmentation, CVPR '13

[2] Cherabier et al, Multi-Label semantic 3D reconstruction using voxel blocks, 3DV '16



Requirements / Tools:

Required: C++, Linux

Recommended: Convex Optimization

Supervisors:

Ian Cherabier (ian.cherabier@inf.ethz.ch)

Martin Oswald (martin.oswald@inf.ethz.ch)