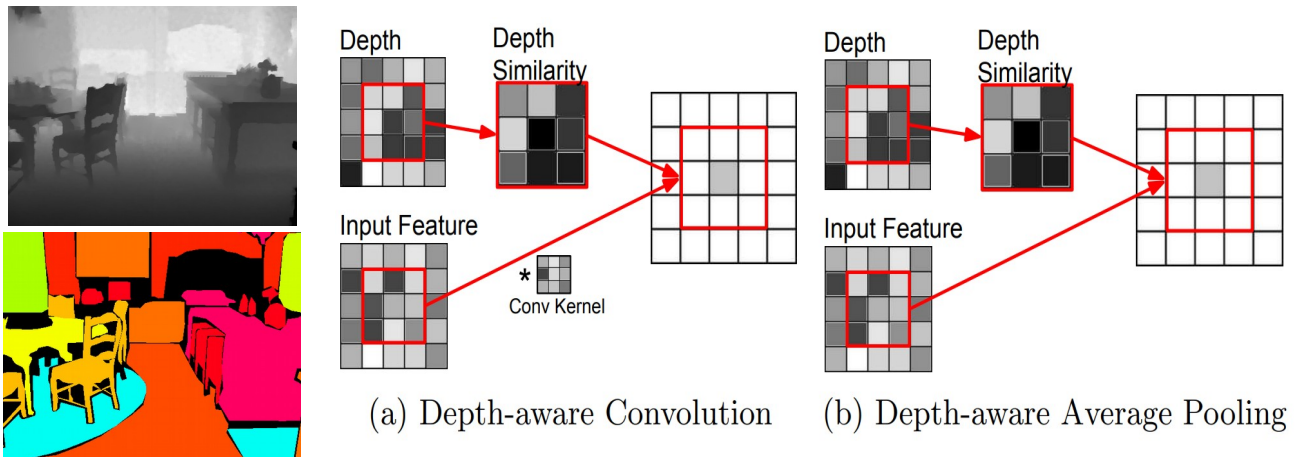


Master Thesis

Image Segmentation of ToF Depth Images Using a Combination of Depth Encodings

Semantic Segmentation is a heavily explored field in deep learning but it is mostly limited to RGB and RGB-D images, ignoring the often arising situations where only depth images are available. In this thesis we want to explore methods for DL based semantic segmentation of time-of-flight depth images using a combination of approaches. A fusion approach combining different outputs from a time-of-flight depth camera efficiently with other encodings of depth images will be developed and validated on different depth image datasets in addition to comparison with other state-of-the-art approaches.



Tasks

- State-of-the-art review on deep learning approaches for semantic segmentation on RGB-D and depth images.
- Familiarize yourself with generation of ToF depth image, amplitude image, surface normals, and HHA encoding.
- Integrate all of the above inputs in a network for image segmentation finding best ways to incorporate each of the available inputs.
- Compare developed approach against the state-of-the-art methods, perform ablation studies and submit paper to a Computer Vision conference.

Requirements

- 3D Computer Vision
- Deep Learning (TensorFlow, PyTorch, Keras)

References

- Liang-Chieh Chen, George Papandreou, Iasonas Kokkinos, Kevin Murphy, and Alan L Yuille. Deeplab: Semantic image segmentation with deep convolutional nets, atrous convolution, and fully connected crfs. *IEEE transactions on pattern analysis and machine intelligence*
- Weiyue Wang and Ulrich Neumann. Depth-aware cnn for rgb-d segmentation. In *Proceedings of the European Conference on Computer Vision (ECCV)*, pages 135–150, 2018.