Lehrstuhl für Medientechnik
Fakultät für Elektrotechnik und Informationstechnik
Technische Universität München

Masterarbeit

Generalizable Neural Rendering for Indoor Scene Analysis

Neural rendering refers to the set of generative deep learning methods that enables the extraction and manipulation of scene properties such as semantic information, geometry and illumination [1]. The field being relatively new, most of the methods revolve around the idea of representing the scene properties implicitly by neural networks. Recent works utilize differential rendering to backproject color values from posed images [2]. This idea is further extended by the work titled Neural Radiance Field (NeRF) by also predicting the density [3]. Nevertheless, very low convergence rate and requirement of many structured camera viewpoints hinders the way to real-life applications.

In this Master's level research project, the student will investigate how to utilize prior information about scenes. This information will be utilized for generalizable neural rendering methods. This will enable large-scale scene analysis from sparse camera view points.

[1] Tewari, Ayush, et al. "State of the art on neural rendering."

[2] Niemeyer, Michael, et al. "Differentiable volumetric rendering: Learning implicit 3d representations without 3d supervision."

[3] Mildenhall, Ben, et al. "Nerf: Representing scenes as neural radiance fields for view synthesis."

Voraussetzungen

- Experience in Python
- Experience in machine learning, data processing and scientific computing frameworks such as: NumPy, SciPy, Tensorflow, Pytorch, Matplotlib, Pandas
- Experience in multiview geometry

Nice to have

- Experience with neural rendering frameworks

Kontakt

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Betreuer

Cem Eteke