Karlsruhe Institute of Technology

Institute for Automation and Applied Informatics (IAI)

Master‘s Thesis

Photogrammetry and machine learning for 3D reconstruction in VR applications

3D reconstructions are widely used across various fields to analyse and digitize small objects. A common approach is photogrammetry, where a 3D model is generated from images captured from multiple perspectives. In recent years, alternative machine learning methods—such as Neural Radiance Fields (NeRF)—have gained importance due to their efficiency and the high quality of the resulting models.

This master's thesis aims to convert multi-perspective images of small biological samples into high-quality 3D models. These models are intended to support remote scientific collaboration by allowing researchers to examine and interact with the objects, for example, through the use of VR headsets.

[1]

Tasks:

- Research the state of the art
- Development and optimisation of existing algorithms and code
- Comparison of different reconstruction algorithms
- Validation and evaluation

Education, experience and skills:

- High motivation and ability to work independently
- Experience with Python
- Thesis can be written in English or German

[1] https://www.techrxiv.org/users/813834/articles/1223980

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