TECHNISCHE UNIVERSITÄT
CHEMNITZ

Assignment of Tasks

-

Image-based Photogrammetric Reconstruction of Geometrically Simple Objects for Mixed Reality Visualization

---

Faculty
Computer Science

Professorship
Computer Graphics and Visualization

Type of Assignment
Bachelor Thesis

Release Date
November 17, 2020

Student **Xiangyu Tong**

Tutors and Examiners Prof. Dr. Guido Brunnett

Tom Uhlmann M.Sc.

Title: *Image-based Photogrammetric Reconstruction of Geometrically Simple Objects for Mixed Reality Visualization*

Preliminaries and Objectives:

Mixed reality application becoming increasingly popular. Due to the ubiquitous availability of augmented reality (AR) devices such as smart phones and tablets, everyone can use them easily. Content creation can be a hard task and not easily be performed by a novice user, since 3D object modeling or 3D scanning is required. Photogrammetry is one approach to create 3D models of real world objects by creating several images from different perspectives and then computing the 3D surface of the object. High quality models can be produced by this approach only with sophisticated and expensive setups under laboratory conditions. Instead, this project will focus on creating high quality 3D models of geometrically simple objects by simple means and visualize them with an AR capable device.

The project involves, but is not limited, to the following tasks:

- Building a system to create point clouds using photogrammetric reconstruction.
- Generating triangle meshes from the point clouds.
- Improving the quality of the reconstructed meshes with respect to their geometric simplicity.
- Visualizing the reconstructed meshes with an AR capable device, e.g. a smart phone.
- Evaluation of the system regarding quality and ease of use.