Topic: Immersive Interactive room-scale Scanning

Start: 01.01.2021

End: 01.06.2021

Task description:

High-quality 3D scanning of room-scale scenes is still a challenging task nowadays. This project is going to improve the overall scanning quality with the help of VR techniques. By scanning immersively, users find themself in a familiar coordinate space, where working with 3d models seems more intuitive. At the same time, semantic information can easily be obtained with controllers and involved in the modeling process. This work will focus on the creation and manipulation of room-scale 3d models. An intuitive model generating pipeline shall be developed. It is interesting to segment and interact with the objects in virtual environments. Thus, the objects within the scanned room shall be interactive as further work.

Tasks:

* Literature research.
* Implementation of a basic user interface in VR.
* Create and manipulate point clouds with the help of 3d scanners and VR controllers.
* Align the point clouds.
* Recording, saving and loading of point clouds in the system.
* Create meshes with fusion algorithms, possibly by using an external tool.
* Manipulate the generated meshes with the help of VR controllers.
* Simplify the generated mesh with semantic information provided by controllers.
* Evaluation of the quality of the implemented immersive scanning scheme.
* Thesis writing.

Optional:

* Segmentation and Interactive operations of the scanned objects.
* Animate segmented meshes with the help of a immersive Rigging and Skinning system.
* Develop alignment algorithms for point clouds.