



VRSketchIn++: Extended Exploration of the Design Space of Pen and Tablet Interaction for 3D Sketching in Virtual Reality

Open Bachelor/Master Thesis

Background

Sketching in virtual reality (VR) enhances perception and understanding of 3D volumes, but is currently a challenging task, as spatial input devices (e.g., tracked controllers) do not provide any scaffolding or constraints for mid-air interaction. I presented VRSketchIn, a VR sketching application using a pen and a tablet as input devices, combining unconstrained 3D mid-air with constrained 2D surface-based sketching.

Research Goal

The aim of this thesis is to extend VRSketchIn and explore the design space further. The following research topics are possible:

- Improve the existing interaction metaphors based on the previous study findings and evaluate them further (e.g., mental load, frequent metaphor switch, ...).
- Investigate a selected interaction metaphor group in detail, define use cases, and perform an evaluation.
- Extend VRSketchIn for Constructive Solid Geometry (CSG) and develop appropriate interaction metaphors.

The application will be implemented with Unity, an HTC Vive Pro, and OptiTrack. A user-centered design process shall be conducted as well as a usability study. Based on bachelor/master level the scope is adapted.

Tobias Drey
Institute of Media Informatics
Room: O27 / 336

tobias.drey@uni-ulm.de



Initial Related Work

T. Drey, J. Gugenheimer, J. Karlbauer, M. Milo and E. Rukzio, "VRSketchIn: Exploring the Design Space of Pen and Tablet Interaction for 3D Sketching in Virtual Reality" , *Accepted to Proc. of CHI 2020 (SIGCHI Conference on Human Factors in Computing Systems)* , Apr. 2020.

Surale, H. B., Gupta, A., Hancock, M., & Vogel, D. (2019, May). TabletInVR: Exploring the Design Space for Using a Multi-Touch Tablet in Virtual Reality. In *Proceedings of the 2019 CHI Conference on Human Factors in Computing Systems* (pp. 1-13).

Arora, R., Habib Kazi, R., Grossman, T., Fitzmaurice, G., & Singh, K. (2018, April). Symbiosissketch: Combining 2d & 3d sketching for designing detailed 3d objects in situ. In *Proceedings of the 2018 CHI Conference on Human Factors in Computing Systems* (pp. 1-15).