MASTER THESIS Utilizing Hydra for Real-Time Reconstruction of Environments in Extended Reality
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Experiencing an environment being rendered in real-time in XR

POPULAR SCIENTIFIC SUMMARY **Edward Sjöblom, Hannes Rydén Sonesson**

Imagine you are at home in your apartment. You put on your VR headset and your apartment is immediately turned into a spaceship cruising around in outer space. The furniture in the apartment is altered into realistic science fiction objects. This may soon be a reality with a technique that has been explored during the thesis "Utilizing Hydra for Real-Time Reconstruction of Environments in Extended Reality".

During the thesis a technique for scanning an environment, processing the data and rendering the environment in real-time was explored. It was concluded that the rendering in real-time works well and that users enjoyed the experience of being present in XR in an environment that is being rendered in real-time. However, there are still many improvements that may be implemented in the future.

The development of the prototype was performed in an iterative manner, where three iterations were executed. The final prototype consisted of two virtual environments. The first virtual environment consisted of rendered furniture according to a virtual representation of the environment provided by Hydra. The second scene consisted of the same room definitions, but was empty of furniture. As Hydra ran, the furniture was rendered in real-time and users could experience it in XR.

From the user tests performed during the thesis, it was concluded that most users thought that being present in the virtual environment in XR as it was being rendered in real-time was a cool and interesting experience. However, feedback regarding the reconstruction process indicated a need for smoother rendering animations and a need for improving the accuracy of the rendered objects.

The societal benefit of real-time tracking and rendering of objects may be its potential to enhance training and simulation experiences in industries that can benefit from realistic virtual environments reconstructed from real environments. The technology also has the potential to facilitate remote collaboration by creating immersive virtual meeting spaces. This can benefit individuals who are unable to meet physically, leading to more inclusive and interactive collaboration experiences.