Virtual Reality in Tiny Spaces

Summary: In this bachelor project, you will develop and implement a system that allows running **large virtual worlds in very small physical spaces**. You will implement these in Unity, supported by the Havoc physics engine. You will present your code to our project partner Havoc and co-author a scientific publication to be submitted to a top-tier conference.

Project description: The most immersive approach to experiencing virtual reality is to **walk**, so that the tracking volume maps 1:1 to physical space and all recent consumer VR systems, such as the Oculus Quest, provide all the hardware required to implement real-walking.

However, surprisingly, only 0.3% of the experiences shared on *Steam* actually build on real-walking. All other experiences instead rely on **instant teleportation**, as that works with the small tracking volumes home users tend to actually have. The main drawback of instant teleportation is that it has to continuously prevent users from bumping into the edge of the tracking volume and thus, unfortunately, every time this so-called *chaperone box* pops up, it breaks the immersion.

In this bachelor project, your objective is to figure out how real-walking can be brought to users' homes—despite their limited tracking volumes. We will give you a few ideas as a starting point (impossible spaces, tools that extend into the space outside the tracking volume, physics that extend past the tracking volume, haptic machinery…) but we expect you to actively read up on the topic and come up with, and implement, test, and publish your own ideas.

Technology: To allow for a wide deployment of your idea, we will run most development on Unity and Quest. Publish your resulting experiences on Quest.

Project Partner: You will be supported by our partner Havoc.

Furthermore, co-author a scientific publication to be submitted to a top-tier conference.

Questions?

martin.taraz@hpi.de and baudisch@hpi.de