# 3D Point Cloud VR viewer

University of Zurich[UZH]

## Introduction

Many human-computer interaction techniques using input devices like keyboards and mouses have been developed and matured over time. For example, software tools use well-known methods for scrolling, zooming, panning, and selecting with a mouse in 2D environments in identical ways. In comparison, the input devices in Virtual Reality (VR) environments are new.

Figure 1: HTC Vive.

Figure 2: HTC Vive interaction.

Tracking the head and two hand-held controllers, each with six degrees of freedom, provides a considerable input space. Creative interaction techniques should be devised, tested, and improved iteratively to exploit the potential of the input devices in VR.

## Assignment

For this project, the task is to develop a VR viewer for 3D scenes represented by point clouds obtained from scanners and implement walk-through navigation interactively in this environment with the VR input devices. This project will be running on HTC Vive.

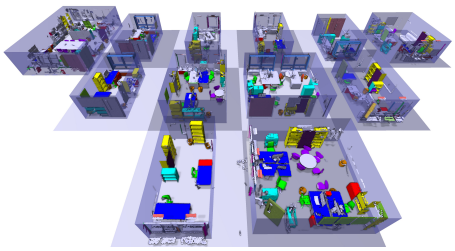

Figure 3: UZH IfI dataset.

## Requirements

Interest and willingness to learn about computer graphics and human-computer interaction. This project requires C++ programming experience and prior knowledge of OpenGL.

## Work Load

- 30% Theory
- 50% Implementation
- 20% Test

## Project Type

This project can be defined for the requirements of a Bachelor, Master thesis, or Master project. The goals and tasks will be adjusted accordingly.

## Supervision

- Prof. Dr. Renato Pajarola
- Luciano A. Romero Calla (assistant)

## Contact

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## References


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[2] Claudio Mura, Gregory Wyss, and Renato Pajarola. Robust normal estimation in unstructured 3D point clouds by selective normal space exploration. *The Visual Computer*, 34(6-8):961–971, June 2018.

[3] Alexandre Boulch and Renaud Marlet. Deep learning for robust normal estimation in unstructured point clouds. In *Proceedings Eurographics Symposium on Geometry Processing*, 2016.

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