

Master's thesis or other student works at the group of Human Factors Engineering, Chair of Consumer Behavior (D-HEST)

Real-time collaboration in AR-assisted medical training

We have built an augmented reality (AR) simulator for training microsurgical interventions at the example of ophthalmic surgery (Figure 1). It uses a Microsoft HoloLens to display a 3D hologram of a human eye and an ideal path along of which a microsurgical instrument is to be moved.

Until now, the training units consist of predefined paths with varying difficulty levels. A trainee can use the simulator to exercise his micromanipulation skills and get direct feedback of his performance. We would like to extend the existing setup so that two users can simultaneously work with the simulator (e.g. an expert teaches the trainee in the simulator).

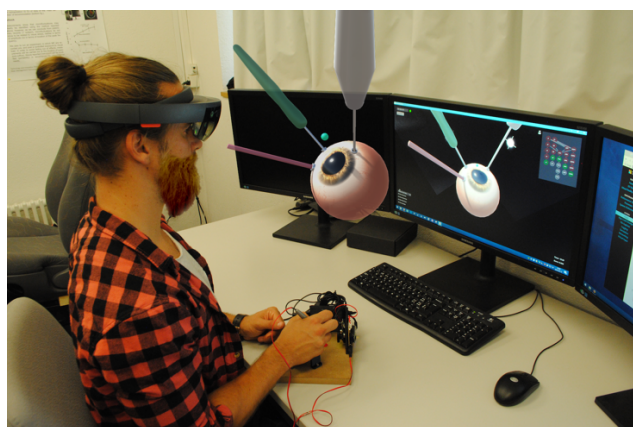


Figure 1. Visualization of the AR simulation. The user manipulates using the microsurgical handle while observing a 3D holographic representation of the human eye and the instrument position through the Microsoft HoloLens headset.

Tasks

Your task is to extend the current implementation and link two tracking systems to create a real-time collaborative space inside the simulation. You will work with customized hardware and state-of-the-art augmented and virtual reality equipment. We therefore ask you to bring the following qualifications:

- Extensive experience in object-oriented programming with .NET / C#
- Experience in developing software with Unity3D
- Basic knowledge of image processing
- Familiar with AR and VR technology

Other than that we hope that you are motivated and interested in the field of AR and VR collaboration.

Support and contacts

The Human Factors Engineering group can provide broad interdisciplinary technical and scientific support and has a solid experience in the many disciplines required to run the project. For further information please contact Sandro Ropelato (rosandro@ethz.ch) or Marino Menozzi (mmenozzi@ethz.ch, 044 632 39 81). Earliest start date is 1st July 2019.