Technology
Arts Sciences
TH Köln

Project Order

Interaction Lab

written by

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Interactive Systems in SS 2017

Supervisor:
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Institute for Media- and Phototechnology

Project Order of Interaction Lab

Project Manager: Vera Brockmeyer

Problem Analysis:

The demand of Virtual Reality (VR) devices and application increases heavily since the first consumer devices like *HTC Vive* and *Oculus Rift* are released during last years. But the development of the first Head-Mounted-Display is dated in 1966 by Sutherland and Goertz.

One main difficulty of the current development of VR-applications is the lack of standardisation of the Software Development Kit (SDK) and interfaces. The most acknowledged suppliers *HTC* and *Oculus* do not work together or force a standard for VR application development. Thus, all applications are system related and incompatible with other devices. Accordingly, each device offers different opportunities of interaction methods. These methods could be divided in the acknowledged categories Selecting, Grabbing, Manipulating, Movement and indirect controlling via widgets, gestures and voice input. Several suppliers offer currently different devices for interaction. And with focus on the grabbing and positioning methods, the most common are the *Oculus*-HMD, *HTC Vive*-HMD, *HTC Vive*-Controller, data hand-shoes and motion capturing systems for hand-tracking like the *LeapMotion*-Controller.

Currently, there is no opportunity to test and compare various interaction methods and devices or new developments in a single VR environment. This circumstance claims a virtual laboratory, where different interaction methods could be compared, demonstrated or tested in virtual test scenes. Thus, user friendly interaction methods which are not tiring and do not destroy the immersion could be improved by researcher. Another aspect of those methods is the increasing usability of VR applications and potential consumer will prefer devises with their implementation. Therefore, the profit of VR device suppliers will be squeezed.

Objective and Requirements:

A virtual interface laboratory is required for the development of an environment to test and compare interaction methods and to develop new ones. A further aspect of the laboratory is the use for teaching purposes or to give students a tool for the technical realisation of interaction studies in virtual (or augmented) reality environments. Thus, one task is to develop sophisticated test scenes for testing the interaction methods. These scenes should implement test exercises in different difficulty levels and represent typical and well-known environments as a shop, for example.

Solution Concept

The Agent provides a concept of an interaction laboratory for grabbing and positioning interactions in close or far range. It includes two test scenes, where the first is a practise room, in which the users could get familiar with all proposed interaction

methods. Whereas, the second scene is designed as a supermarket. This environment is chosen because it offers various possibilities of exercises under changing difficulties like grabbing small mushrooms, catching distantly placed tins or putting goods into boxes or shelves. The exercises are offered in form of a shopping list that tells them what goods have to be grabbed and repositioned. For example, they have to grab citrons, a bottle of milk and drop off empty plastic bottles at the recycle station. (sollen wir das nicht allgemeiner fassen? hat jmd. gecheckt ob es schon eine fertige Recycling Station gibt? Reicht es nicht die Einkaufskorbgröße zu variieren oder ähnliches)

All rooms are implemented in Unity and the VR components are controlled by the same framework. Further, the *HTC Vive*-HMD and the corresponding controllers are used to run the interactions, imaging and orientation in the environment. It is planned to realise minimally six interaction methods of grabbing and positioning. Additional, the complete framework should be compatible with new test scenes and other interaction categories. (steht im Lastenheft als evtl. Erweiterung)

Services

The agent is engaged to deliver a scientific project documentation in English language. Each project member is called upon to write an own chapter about his contribution. This documentation should be offered in form of a PDF file and two times in printed form.

A final project presentation is required as well in September or October. This presentation includes a 30 minutes talk, a live demonstration of the final result and a following discussion.

Furthermore is the delivery of all resulting data files like the program code, content and artwork required. This data has to be copied on a USB-Stick or in a cloud folder with appropriate access rights.

At least, a brief project profile is inquired which includes a short description, two or more significant images and an optional video.

Budget:

Material	Kosten in EUR
HTV Vive, 2 light houses and 2 Vive Controller	899
Unity IDE	0
Steam	0
Visual Studio IDE	0
Computer for HTV Vive	ca. 700
notebooks for each team member	0 (private computer)
Github Repository	0
Redbooth Webapplication	0
Google Drive Folder (Memory Space in Cloud)	0
Gesamt	1599

Boundary Conditions:

The first Prototype has to be presented on 01.06.2017 at 10:35 by the project manager. Furthermore, are periodic meetings with the principal required and those have to be arranged via email during the lecture period of SS 2017. Unfortunately, are the room facilities only available at official business hours of the TH Cologne Building.

Appointments and Milestones

Bitte checken ob Termine passen mit dem was wir heute besprochen haben

Research Phase	31.03.2017 - 23.04.2017
First Prototype	31.05.2017
Second Prototype	11.06.2017
Test Phase	12.06.-18.06.2017
Third Prototype	25.06.2017
Documentation Phase	26.06.2017-15.07.2017
Final Release	15.07.2017

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Date and Signature of Principal

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Date and Signature of Agent