Rubber hand illusion in mixed reality environment

Interactive Systems

Payel Bandyopadhyay
University of Helsinki
Department of Computer Science
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Introduction

Fig. 1 Milgram’s reality–virtuality continuum [1]
Related work

- Traditional rubber hand illusion
- Oculus rift
Fig. 2: Traditional rubber hand illusion. Participant (face has been covered only in the figure not in reality) can view only his right hand and the rubber hand. Participant’s left hand is kept out of sight from participant’s view point. The illusion is that the participant feels the touch of the viewed brush (and not of the hidden brush), as if, the rubber hand is his own left hand.
Oculus rift

Fig 3.: A Oculus Rift [2].
Related lecture topics

- Designing Interactive Systems
- Prototyping
- Audio interaction
- Usability Evaluation
System description

- OS - Windows (version 7 or 8)
- Virtual Environment device - Oculus Rift
- Software - Unity 4 (Version 4.2.2f1)
- Oculus Rift Unity Integration SDK
Fig 4: A higher level architecture of the application of this project.
Fig. 5: A screenshot of the main menu of the application.
Fig. 6: A screenshot of the demo of the virtual environment of the application using Oculus Rift.
Fig. 7: A screenshot of the classroom of the virtual environment of the application using Oculus Rift.
Fig. 8: A screenshot of the classroom scene without the Oculus Rift integration.
Fig. 9: Internal flow diagram of the Female and Male hand scene of the application.
Fig. 10: A screenshot of the female hand with the brush moving over it in the virtual environment of the application.
Fig. 11: A screenshot of the male hand with the stabbed knife and blood splatter in the virtual environment of the application.
Usability testing

Fig. 12: A screenshot of the video recording done in the user study of the application.
Fig. 13: Results from the questionnaires. The image shows the frequency of every mark for each statement. The reader should note that there was 1 question (number 8 - refer to Appendix) that was not answered by any of the users.
Future work

- limited time and resources
- only the Unity part of the application was developed
- implement the augmented hand
  - psychological or neurological sensors mapped to the hand that can turn the hand into an informative visualization
References
