Immersed Labor: Gamifying Daily Chores using Virtual Reality

Project IGR205

Supervisor

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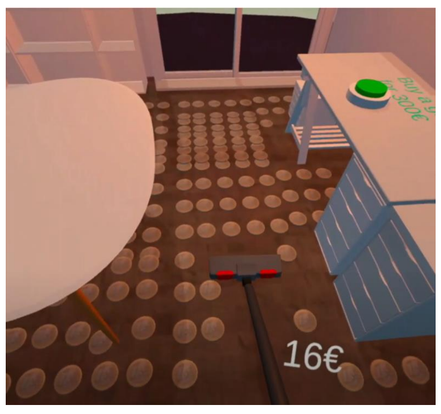


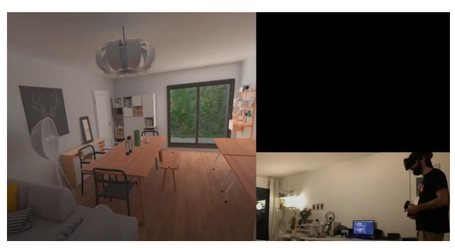
Description

Virtual reality technology is able to immerse a user inside a completely artificial environment and allow the user to perform any actions and activities he/she desires. The actions performed in the physical world to interact with the virtual environment (e.g., gestures and motion) are often only a byproduct and have no particular meaning. However, using an aligned world (physical world and virtual world) could allow the immersed user to perform a virtual enjoyable action (e.g., fighting space invaders on the floor) while the same action corresponds to a physical chore that is performed by the user without being aware of it (e.g., hoovering the floor). To enable such an experience two steps have to be fulfilled: **1)** The physical and the virtual world has to be aligned to a certain degree (it is not necessary to have a perfect alignment but the essential obstacles in the environment need to be visualized) [1]. **2)** A game have to be designed that is using a physical motion that corresponds to a virtual action [2].

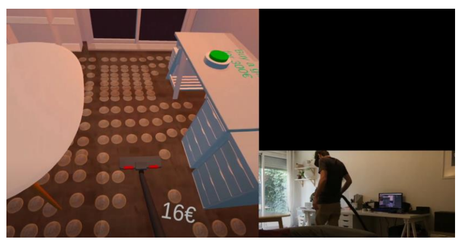
Goal

The goal of this project is to design and implement a virtual environment in which the user is playing a game through actions that correspond to a chore in the real world. Students will have to learn the skills necessary to implement a virtually aligned environment and follow a creative process to design and implement a simple game application in VR. In a first step, each student will receive one Oculus Quest and will have to follow Unity 3D tutorials to learn how to program and deploy a first VR application. In a second step, the students will together implement an application that is able to align the virtual and physical world and spawn simple geometry (e.g., cubes and circles) that can be used to approximate the user's individual environment. In a last step, each student will implement a short individual game that leverages the aligned world to mask a physical chore (e.g., cleaning the room, hoovering, wiping surfaces, watering the plants). Each group is expected to meet once a week with their supervisor and discuss their ideas and the direction of the project. Each student will get an Oculus Quest to be able to develop individually.

Examples/Sources:



[1]
https://www.youtube.com/watch?v=wgH6H8jsD7Y



[2]
https://www.youtube.com/watch?v=ipC-rHJn9W8

Prerequisite

- Object Oriented Programming (e.g. Java, C++, C#)
- Basic understanding of Computer Graphics
- Basic understanding of Human-Computer Interaction (HCI) Methods
- (optional) First experiences working with 3D Game Engines (e.g. Unity3D, UnrealEngine)

Acquired skills

- Being able to apply a research driven design process for HCI projects.
- Being able to develop VR applications in Unity3D
- Being able to use the Oculus Rift SDK
- Understanding the spatial paradigm behind Augmented and Virtual Reality
- Outstanding projects will have the option to contributing to a scientific publication at a top tier HCI Conference (e.g. ACM CHI, ACM UIST)

[1] Ivan Poupyrev, Mark Billinghurst, Suzanne Weghorst, and Tadao Ichikawa. 1996. The go-go interaction technique: non-linear mapping for direct manipulation in VR. In Proceedings of the 9th annual ACM symposium on User interface software and technology (UIST '96). Association for Computing Machinery, New York, NY, USA, 79–80. DOI:https://doi.org/10.1145/237091.237102

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