Immersive Virtual Reality Games for Persuasion

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Abstract. Virtual reality (VR) can create stunning and memorable experiences and has been used in many different areas such as entertainment and simulation. Immersion states a key factor in this context. Fusing immersive virtual environments with persuasive technology (PT) in a game setting paves the way for creating interactive platforms aiming at user-oriented behavioral change. This work outlines important aspects for designing an immersive VR game platform for persuasion. Our future research aims at investigating how and to which extent recent advances in intelligent user interfaces (IUIs) can benefit immersion and persuasion. In particular, this includes how interactions with a persuasive VR game platform are influenced by contextual or individual conditions and how associated designs can be adapted to target audiences in specific, like medical or educational contexts.

Keywords: Virtual reality; persuasive technology; serious games; intelligent user interfaces.

1 Introduction

Recent advances in head-mounted display technology with integrated eye tracking [1] and mountable vision sensors [2] render virtual and mixed reality promising platforms for creating new interactive environments and visualizations in various fields ranging from pure entertainment over assisting technology in medical environments [5] to industrial simulation. While persuasive technology is focused on the design, development and evaluation of interactive computing systems aimed at changing users' attitudes or behaviors without coercion or deception, leveraging the "addictiveness" of video games for this purpose seems natural: players are encouraged to achieve a certain goal while following a set of rules and receiving system feedback under voluntary participation [4]. The goal of persuasive games can hence be identified as a behavioral change, which might be hard to achieve but seems eased in a gameful setting where individual abilities, motivation and trigger models are accounted for. When entering the VR realm, immersion, i.e. the feeling of perceiving a physical presence in a non-physical simulated environment, can be identified as a critical factor in persuasive systems since it largely

[1] http://www.smivision.com/en.html
[2] http://ovrvision.com/entop/

determines their credibility. In this respect, graphics, physics, sound, controls and personalized system feedback by means of an artificial intelligence component have to match a user's expectations. Since persuasive VR games constitute a part of human computer interaction (HCI) and incorporate intelligent automated capabilities for improving performance or usability in critical ways, several scientific challenges arise in the context of intelligent user interface design [6], which are described and contextualized in the following.

2 Position Statement and Research Plans

Immersive VR has been successfully used for persuasion in terms of aversive feedback for simulated risk experiences [1]. Moreover, design priciples for persuasive games have been formulated [3] and aligned with general PT strategies [2] in the context of gameful smoke cessation. Based on these results, we aim to address the following IUI-related research questions in the context of current projects [3]:

1. How are interactions with a persuasive VR game platform influenced by contextual or individual conditions?
2. How can immersive VR games for persuasion be designed from the perspective of modern IUIs incorporating collaborative multimodality [6]?

Aiming at task-related training and assessment games in medical and educational contexts, we opt for VR as technology channel in combination with new multimodal sensory input and output methods. Our technical infrastructure consists of an Oculus Rift DK2 with SMI's eye tracking HMD upgrade in combination with an attached vision sensory for immersive hand tracking as well as implementations realized in the Unity game engine [4]. In this respect, dedicated plug-ins allow for a seamless integration of multimodal multisensor frameworks to incorporate real-time monitoring and evaluation of user-specific input. This information can then be used to generate personlized system triggers aimed at increasing individual abilities and for providing users with a continous self-monitoring and customized feedback. Concerning the tracking of gaze data, planned user studies will benefit from a very robust tracking functionality, which even works uncalibrated for a wide range of users whenever an easy and on-the-fly in-game calibration functionality exists.

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