Evaluation of the Effects of Avatar and Environment on Body Temperature in Virtual Reality

Thema:
: Evaluation of the Effects of Avatar and Environment on Body Temperature in Virtual Reality

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Hintergrund

Virtual Reality (VR) allows embodying the user in any avatar and enables to translate users' movements into a simulated environment. This opens the possibility to fully immerse users in a virtual setting.

While not consistent, other forms of embodiment or perceived limb ownership, such as the Rubber Hand Illusion [1], have already shown that it can have an effect on the surface skin temperature of the affected person [2, 3]. Using the capabilities of VR, this effect can be examined across the whole body.

Other work already showed that the user's perceived temperature can be manipulated by placing them in a setting with specific ambient lighting or audio [4, 5]. While these studies have confirmed effects on the perceived temperature, Lauderdale could not find any effects on the actual body temperature when placing the user in a snowy virtual environment [6]. Llobera et al. found that full body ownership in VR has a smaller effect on temperature sensitivity than single limb ownership [7].

However, the effects on perceived and actual body temperature when putting the user in an avatar

that is affected by various statuses related to temperature (e.g. being on fire, covered in ice), and the interaction between avatar and environment, are not yet explored.

Zielsetzung der Arbeit

The aim of this thesis is implementing different VR settings for cold and warm temperatures in the form of a small video game. The settings include different environments as well as avatars. These conditions can be mixed and matched, to find out whether avatar or environment (or a specific combination of both) affect users' body temperature. The experiment will be carried out as a lab study, where each participant is exposed to every condition. Immersion will be measured using a standardized questionnaire, and body temperature will be measured at multiple body locations.

Konkrete Aufgaben

- Finding and incorporating related work
- Designing the virtual environment and avatars / finding fitting assets
- Implementing the game
    - Different thermal conditions (cold/warm)
    - Neutral conditions for time between study
    - Game elements to make participants look at their hands and surroundings
    - In-VR questionnaire using LeapMotion's hand controls
- Designing the study
- Conducting and evaluating the study

Erwartete Vorkenntnisse

- Developing games for VR
- Empirical study design

Weiterführende Quellen

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