Semester/Master project: Implementation of a Virtual Reality Application to Evaluate a Break in Presence.

Main Objective:
Design an application in Virtual Reality (VR) according to a protocol already established to evaluate a Break in Presence.

Background:
Slater et al (Slater and Steed 2000) have introduced the concept of the “Breaks in Presence” (BIP) to denote a break of the feeling to “being there” leading to a poor VR. Different ways have been proposed to evaluate this Presence, but they are all subjective measurements. Thus, we are looking for new methods to get objective measures.

(Burns and Brooks 2006) have implemented a way to avoid any penetration of a virtual hand inside a virtual object in a VR environment and preserving this sense of presence thanks to a distortion of the user movement. Indeed, the hand when colliding an object, will stay tangent to the virtual object.

Project Idea:
The idea of this project is to analyze the user behavior when a system fails to avoid interpenetrations. Indeed, we want to let the user going through the virtual object. This interpenetration would normally elicit a BIP. In this project we want to measure such a BIP in an objective way. In fact, (Padrao, et al. 2016) have managed to use EEG signal to get an objective measurement of a Break in Embodiment (BIE) which is another important aspect for an optimal VR experiment. Here we want to verify whether the same measurement can be used to evaluate a BIP.

First, you have to take charge of the protocol already established and adjust it if needed with your assistant. Then, an application in VR will have to be implemented according to such a protocol. Finally, some pilots will have to be conducted to test the application.
For a Master project, on top of the pilots you will have to conduct a user study to assess the presence.

**Goal:**
- Implement an Application in VR for an experiment (record data).
- Adjust the protocol according to the feedback from the pilots.
- Master project: Assess the presence through a user study.
- Provide a Notice to run the experiment

**Requirements:**
- Unity (scripting in C#/DLL in C++)
- 3D geometry and quaternions (Vectors, cross products, rotations)
- Matlab/R (statistical tool).

**Information, materials and resource:**
*Unity3D game engine: http://unity3d.com/learn*
*The Protocol established.*

**References**


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