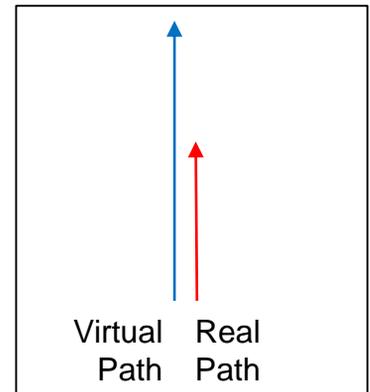


Velocity Gains for Real Walking In Virtual Environments

Keywords: Virtual Reality, Redirected Walking, Perception

Overview

Studies have shown that real walking is the most natural navigation method for in large virtual environments. This means that a user wearing a head-mounted display can walk in the real world and his movement is tracked and translated to the virtual world he can see. However, the space in the real world is usually limited, either by the room size or by the area covered by the tracking system. One approach to overcome this limitation is the so-called „Redirected Walking“. Here, the mapping from the user’s real movements to the virtual ones is manipulated, allowing the user to experience an virtual environment that is larger than the real available space. For example, a person can be guided on an arc while he believes to be walking on a straight line or a user can be tricked into turning 180° in the real world while only turning 90° in the virtual world.



With a positive gain, the user moves faster and a longer distance in the virtual environment

Tasks

In the current implementation the user is only redirected using rotations with so-called curvature and rotational gains. The walking distance however is not changed. In this thesis you will implement a new redirection technique called “Velocity Gain” in the existing redirection framework. This redirection techniques scales the user’s velocity with a certain gain causing him or her to walk faster or slower in the virtual world than he or she actually is in the real world.

In a second part you will conduct a user experiment to determine what values can be used as gains, before the mismatch becomes noticeable or disturbing.

The redirection framework is written in C++ while the Unity3D game engine used for the experiment uses C#.

Work packages

- Get familiar with the state of the art of real walking in virtual environments
- Implement the Velocity Gain redirection technique
- Conduct a user experiment to determine possible values for the velocity gain

Skills

- Experience with C++ or other object oriented programming languages
- Interest in Virtual Reality

Results

The results of this thesis have to be summarized in a written report and will be presented to the ICVR group in a 20 min talk.

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