Vision: immersive locomotion interface for an AAA game

Daniel Apken
Digital Media
University of Bremen
dapken@tzi.de

Smitha Basavalingaiah
Digital Media
University of Bremen
niyudaks@tzi.de

Darya Davydenkova
Digital Media
University of Bremen
daryad@tzi.de

Nicole Hurek
Digital Media
University of Bremen
nicoleh@tzi.de

Yasser Maslout
Digital Media
University of Bremen
yasser@tzi.de

Fariba Mostajeran
Digital Media
University of Bremen
frbmst@tzi.de

Peter Szmidt
Digital Media
University of Bremen
piotr@tzi.de

ABSTRACT
In this paper we want to present our master project's vision of an immersive locomotion interface for a AAA game. This vision is based on our previous research[1] and reflects the reasons for our decision.

Author Keywords
Locomotion, video gaming, full body interaction, virtual-reality-simulation, immersive game experience

General Terms
Locomotion; game idea.

INTRODUCTION
There is a vast variety of possibilities on how to navigate an avatar through virtual space. Our aim is to develop a locomotion interface for a AAA game and to give the user a most immersive experience during playing this game as possible. For our vision, we researched how natural locomotion interfaces can be and how complex, user friendly or costly they are. We found a few important papers and ideas in the area of locomotion which suit our own vision for a full body interaction technique. During our research we looked into separate locomotion fields (walking, jumping, swimming, flying, riding, climbing) to find the best approach for each one. Also, we want to include as many locomotion types as possible in our future work.

RELATED WORK RESULTS
Our related work results show that sphere, cave and Omni-directional treadmills are very expensive and too hard to build during a master project. Also we found out that the sphere's and treadmill's temporal directness is too low for our aim. The riding locomotion with hydraulic feedback([6],[10]) would give a user an immersive experience of riding but it is also difficult to build during the time we have. There are approaches to virtual swimming and flying which seem to convey a realistic feeling which require a high technical effort. However, we are still interested in those, especially the swimming apparatus by Fels et. al. ([2],[3]). Interesting approaches to walking on the spot with a high temporal directness[12] and simulating real walking[9] inspire our vision. An accelerometer based approach[8] shows a good jumping and walking implementation, but also shows that the directness of gait transitions is very important.

RELATED WORK RESULTS
Technological Vision
At first we set up a minimum goal for our future project. We found out, that our priority is to get a one to one mapping of the users gestures for walking, jumping and shooting/aiming. We also decided to create an immersive AAA game. For the real feeling the player has to use a head mounted display (HMD) for looking around in the game.

We want to combine the different technological approaches which fit to our aim and give a natural experience. The setup would mainly be a walking on the spot gesture where the user walks on a board but is also held in place by the support of a hanging harness. The board should be made of slippery material that helps the user to slide their feet while...
walking in place. The harness should help the user maintain his balance and also keep him at the center of the platform. The idea might seem similar to what is already implemented in Wizdish[9], but the main difference is that we want to provide a more natural experience by allowing the user to smoothly slide with one foot (which would be equivalent to taking a step while walking) while lifting the other foot up to prepare for the next step. In our walking on spot implementation we would consider having a one to one mapping of full body gestures to the virtual-reality-simulation. One to one mapping is a priority in our implementation because it enhances the user experience greatly.

Figure 1. Prototype of low friction shoes

Game Idea
Because our projects aim is to give the user an immersive experience, we decided to use an already existing AAA game. Another reason for such a game is that we want to concentrate on the technology part to for the immersive experience. We decided to use the game Portal 2[12] for our approach, because the game offers many modification possibilities, a good story and engine. Another reason is the built in map editor which makes prototyping very easy. We also believe that a locomotion interface for Portal 2 would bring health benefits. Using this game and controlling it with walking, jumping, crawling or aiming would have a training effect and be fun at the same time. What we do not want to do is to force the user to do a sequence of training exercises, the training effect should come in a natural and not forced way. The ego-perspective also has the advantage of feeling to be in the game.

The gameplay we decided to create should include two player and be round based. The goal of the game would be to catch and to mark the game partner to end the round and get a point. The winner is who got the most points in a certain time or in a specific amount of rounds. The walking and running should provide a health benefit for the physical fitness, aiming should train the fine motor skills and adding portals in the right way should offer a logical training factor.

For modifying the game to our aim, we would use the map editor which is already included in Portal 2 and we could also export and tune them in an external editor (Valve Hammer Editor). Adding marking, scoring or the round system would be realized by using the Source SDK.

Figure 2. Map editor in Portal 2.
Figure 3. Map editor in Portal 2 with ingame tools.
Figure 4. Map prototype for the game idea.
CONCLUSION
In our discussion and during our research work, we found out, that we want to concentrate on the idea to create the immersive AAA game Portal 2, where the user is able to feel like in the game. To transmit the real feeling we decided to use a head mounted display, so the user can look around. The one to one mapping has the highest priority for walking and shooting / aiming. We define our minimum goal to optimize the real walking on spot and continue with some prototypes to test some methods for our future work. We propose to use an existing AAA game to implement our technical methods and to improve the control of the avatar with the whole body.

REFERENCES