
Acoustic Step Feedback System for Walking in Virtual Environments

Keywords: Virtual Reality, Game Engine, Accelerometer, Stepsensor

Research Area

We have a mobile Virtual Reality (VR) System which allows a user to visit a virtual environment by real walking. A user wears a head mounted display and a camera system tracks the user's head motion. Using the feedback from the tracking system and a notebook mounted on a backpack, the virtual environment can be updated in real time.

In order to further improve the system, we would like to use additional hardware sensors. These sensors should be used to detect steps. For instance, accelerometers might be attached to the user's feet and the sensor information should be used to provide an acoustic feedback that fits to the virtual environment in order to enhance immersion.



Tasks

The goal of this thesis is to design a hardware and software solution which enables the existing VR simulator to provide an acoustic feedback of the user's steps.

This thesis involves the evaluation of hardware for retrieving sensor data (e.g. accelerometers and gyroscopes), data analysis and a small user study to evaluate and tune the system.

Software should be developed that interprets the data and forwards it to the Unity3D game engine. Finally a small demonstration scene should be developed in Unity. In the demonstration scene, a user walking on different surfaces should hear different step sounds depending on the surface.

Skills

- Autonomous working
- Good programming skills
- Background in statistics and data analysis
- Some machine learning knowledge can be helpful
- Interest in working with hardware

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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