ABSTRACT

We present a first version of a 3D power wheel chair (PWC) simulator to be used to assess whether a person is able to drive a real PWC. The project is in its very early stage but might lead to a comprehensive virtual assessment suite in the future.

Categories and Subject Descriptors
H.1.2 [Information Systems]: User/Machine Systems – Human factors; J.3 [Computer Applications]: Life and Medical Sciences – Health

General Terms
Human Factors

Keywords
Occupational therapy, Physiotherapy, Mobility, Health and IT

THE DEMONSTRATION

It is a very long and expensive process to determine whether a person is suitable and eligible for a power wheel chair. Aspects to be assessed include: physical/motor ability to move a joystick, spatial navigation, fatigue, and mental ability. To minimise the assessment and training costs we want develop a power wheel chair simulator which should be better than products on the market which focus on visual realism instead of correct (enough) physical simulation.

After an initial requirements analysis (related work, technical possibilities, talking to physiotherapists) we developed a first simulator version as part of a summer student project (second author). This is demoed here.

A rather abstract interior of a residential home serves as the geometric basis. The task is to navigate through all rooms with as few collisions with the environment as possible. This is not an easy task and shows that driving a power wheelchair is a complex task and should be assessed in simulation and not only in reality (imagine all the bumps in the walls! ;)

The path and all collisions are logged in a time-stamped manner at 10 HZ for later analysis. This is going to determine whether the person might be suitable for a power wheelchair. The analysis part is not implemented yet.

Currently a Masters student (third author) is working on the project investigating the influence of peripheral vision and stereoscopic display on navigation and driving performance. It is planned to develop the project into a full power wheelchair assessment system at a later stage.

The second author is presenting the system on a standard computer with a joystick connected to it. We show a monoscopic as well as a stereoscopic (shutter glasses) version of it. The audience is encouraged to try the system and to give feedback.