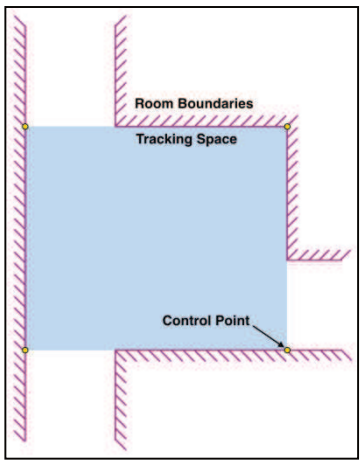
IWF
Institut für Werkzeugmaschinen und Fertigung
Institute of Machine Tools and Manufacturing

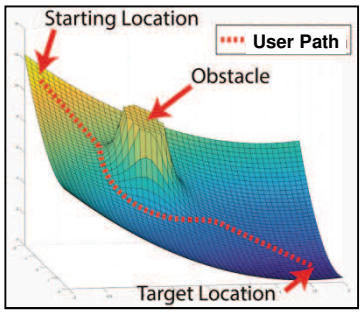
Artificial Potential Fields for Path Planning in Redirected Walking

Keywords: Virtual Reality, Redirected Walking, Artificial Potential Fields

Overview

Real Walking in Virtual Environments (ReWaVE) is a system currently in use at ICVR which allows unlimited free walking in a virtual environment. Using subtle visual manipulations of the user, so-called redirection techniques, a user can be steered to specific real locations, since the virtual and real walking trajectory are deviated to a certain extend. Since it is crucial for redirection algorithms to know, where a user can be steered to in the real tracking space, a complete model of the real environment is required. So far, corner points (i.e. control points) of a rectangular tracking space were manually entered into the system to describe the boundaries. Accordingly, the tracking space needed to be static and free of obstacles at all times.
In most recent applications, this model of the real environment has been adapted to be more flexible in terms of shape and obstacles within the tracking space by introducing artifical potential fields. Accordingly, not only the shape can now be arbitrary, but also multiple users and obstacles can simultaneously be present in a single tracking space.





Tasks

Your task is to research robotics and recent redirected walking applications that employ artifical potential fields. You further compare these approaches. You show advantages/disadvantages of different applications using artificial potential fields and propose ways of implementing these in a path planning approach for ReWaVE.
Finally, you present your findings to the ICVR lab and hand in a written report covering your study.

Workpackages

- Literature research on the state-of-the-art of artificial potential fields in robotics and redirected walking
- Evaluation and discussion of methodologies
- Proposal of future implementations
- Final presentation
- Written report

Results

The results of the study need to be summarised in a written report and will be presented to the ICVR in a presentation.

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