Development of Vision Based 3D Interaction Techniques

Personal Space Technologies

Personal Space Technologies (PS-tech) is a high-tech spin off company from the Center for Mathematics and Computer Science in Amsterdam, based on expertise in the field of Virtual Reality (VR). PS-tech focuses on making this VR technology, consisting of 3D visualization and 3D interaction technology, available to the medical market. This has resulted in the development of 3D workstations for the visualization and analysis of complex volumetric medical data sets, such as MRI, CT and Ultrasound data. Supported by intuitive 3D interaction technology, these 3D workstations facilitate faster and more accurate data analysis.

Project Description

Originally developed for the medical world, PS-tech has developed the Digital Heritage Presenter (DHP). The DHP shows digitized museum artifacts in 3D and allows users to interact with the objects in the same way as with the original: holding it, rotating it, and looking at specific details. Learning about the object becomes fun and the attention span of a user for a simple piece is enhanced.

The 3D interaction in the DHP is enabled by a marker-based optical tracking system. Objects are equipped with reflective markers, which can be efficiently located by the tracking system. By determining the configuration of markers, objects can be recognized and the 3D position and orientation of each object can be determined.

The main focus of this research is to develop novel vision-based 3D interaction techniques for the DHP. The goal is to remove the need for markers for specific types of interaction. A system that could serve as a basis for the development of such interaction techniques could be the Microsoft Kinect. The raw output of this system is, next to a normal color image, a depth image. This information could be combined for advanced vision based tracking and interaction techniques.

Your Competencies

The work will be practical and requires knowledge of C/C++. Furthermore, some background in 3D computer graphics and expertise in image analysis and computer vision is required. The work will be practical and requires the following skills:

- Microsoft Windows operating system.
- C/C++ experience.
- Interest in computer vision and image analysis.
- Good communication skills.
Contact Information

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