Development of a Motion Capture System

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

The Personal Space Tracker (PST) is a near-field optical tracking system developed by PS-tech. The PST can be used to determine the 3D position and orientation (or pose) of arbitrary objects. The PST illuminates the environment with infrared light. Objects are equipped with retro-reflective markers that reflect incoming light back to the cameras. The properties of these markers in the camera images can be obtained efficiently. By using multiple cameras, the system can determine the 3D position of each marker.

Currently, the Personal Space Tracker is primarily intended for so called rigid body tracking. As the distance between markers remains constant for rigid bodies, this makes it possible to not only track devices, but also uniquely identify devices based on marker configuration.

Motion capturing however is a technique which is generally applied to non-rigid bodies, such as the human skeleton. A well-known application of this technique is the animation of CGI characters by capturing the movements of human actors using markers placed on the body. Other fields where motion capturing is used are sports, and medical applications.

The focus of this research is to extend our tracking system with marker based motion capture capabilities. The starting point for applicants would be the 3D positions of individual markers as returned by our current tracker. Challenges in creating a motion capture system would include: 'skeleton' mapping on the raw 3D data, handling disappearing/reappearing markers, dealing with noisy data/outliers.

Your Competencies

The work will be practical and requires the following skills:
- Linux operating system.
- C/C++ experience.
- Interest in image analysis and computer vision.
- General knowledge of 3D computer graphics.
- Good communication skills.

**Contact Information**

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