



IEEE VR 2007 tutorial

Title: “Integration of Haptics in Virtual Environments: a Perception-Based Approach”

Abstract :

The design of virtual environments using haptic interfaces is more often driven by the availability of technology than by the necessity to solve real users' issues. There is a need today for a clear change of perspective, and it is time to search how to design virtual environments that match properly the human haptic perception. For instance, haptic hardware could be restricted to stimulate the part of the haptic channel which provides the best contribution to the final percept in the VE. Furthermore, we could take advantage of interesting properties of human perception such as haptic illusions, cross-modal transfer, synesthesia, etc. In addition, having a deeper understanding of the characteristics of the human haptic system, as well as of the human perceptual processes would help us to define more effective guidelines for developing and evaluating virtual environments and applications using haptic devices.

Therefore, this tutorial will provide the audience with recent physiological and psychological findings in the field of haptic and multimodal perception and rendering. It will give methodological guidelines for the design of virtual environments that match the characteristics of the human haptic sense. We will illustrate our approach with successful applications and systems, which benefited from information stemming from human perception.

Envisioned topics of the tutorial include:

- Recent results in the field of human haptics and multimodal perception
- Design of virtual environments and haptic interfaces based on human haptic perception
- Software simplifications related to haptic perception, i.e., perception-based haptic rendering
- Use of visual feedback and cross-modal transfer to provide haptic sensations in VE
- Exploitation of haptic illusions and pseudo-haptic feedback

The tutorial is supported by the INTUITION European Network of Excellence (IST-NMP-1-507248-2) and by the INTUITION Working Group on Haptic Interaction. The tutorial is endorsed by the IEEE RAS/CS Technical Committee on Haptics.

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