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EDITORIAL

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Guest editorial

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In this issue, we have selected the first four papers from a research workshop held in Hannover in December 2005. These papers demonstrate the work done in HAPTEX, a recent research project funded by the Sixth Framework Programme of the European Union, and coordinated by MIRALab at the University of Geneva. HAPTEX is an acronym for HAPtic sensing of virtual TEXtiles and its objective is to develop a VR system that enables the user to perceive, touch and manipulate virtual textiles.

The first paper "A vibrotactile approach to tactile rendering" describes a rendering strategy based on vibrations that play an important role in the tactile exploration of fine surfaces. To produce appropriate excitation patterns, the authors use an array of vibrating contactor pins. Similar to the colour model in computer graphics, the authors simulate arbitrary vibrations as a superposition of only two sine waves. Each sine wave is intended for the excitation of a specific population of mechanoreceptors.

Degradation of the visual system can lead to a dramatic reduction of mobility by limiting the person to his/her sense of touch and hearing. The second paper of this special issue "Wearable system for mobility improvement of visually impaired people" presents the development of an obstacle detection system for visually impaired people. The user is alerted to obstacles in close range while traveling in their environment. The system proposed detects an obstacle that surrounds the user by use of a multisonar system and by sending appropriate vibrotactile feedback. The system aims at increasing the mobility of visually impaired people by offering new sensing abilities.

Haptics on 3D deformable models is a challenge because of the inevitable and expensive 3D deformation computation. The third paper "Interactive deformable geometry maps" proposes a new technique that extends the conventional rigid geometry images approach. The approach not only flattens the geometry, but also helps to accomplish deformation in an effective and efficient manner. This makes it suitable for haptics computing, as it performs the deformation on the geometry map itself, thereby avoiding expensive 3D deformation computation. The authors have demonstrated construction of the deformable geometry map representation and its application utilizing practical methods for interactive surgery simulation and interactive textile simulation.

In haptic applications, real-time cloth simulation entails many computational challenges, as it involves simulations at a high frame rate for obtaining a satisfactory tactile experience. In the fourth paper "From measured physical parameters to the haptic feeling of fabric" a real-time cloth simulation system is presented that offers a compromise between a realistic physically-based simulation of fabrics and a haptic application with high requirements in terms of computation speed. Emphasis has been given on architecture and algorithmic choices for obtaining the best compromise in the context of haptic applications. A first implementation using a haptic device demonstrates the features of the proposed system and leads to the development of new approaches for haptic rendering using the proposed approach.

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HAPTEX'05 Special Issue Guest Editor