



HAPTEX'06 – Advanced Haptics Workshop at IST2006

09:00-09:05 **Opening of the workshop**

Introduction to part 1 – HAPTEX and other EU projects

Nadia Magnenat-Thalmann, MIRALab - University of Geneva (Geneva, CH)

09:05-09:15 **The HAPTEX Project.: Goals and Challenges**

Nadia Magnenat-Thalmann, MIRALab - University of Geneva (Geneva, CH)

HAPTEX - "HAPtic sensing of virtual TEXTiles" - is a research project on multimodal perception of textiles in virtual environments. Its main goal is to develop a Virtual Reality System (including both software and hardware) for visuo-haptic interaction with virtual textiles.

The HAPTEX System will display a realistic 3D representation of the simulated virtual textile animated in real time. Users of the system will be able to "feel" the displayed virtual textile through a novel haptic/tactile interface.

HAPTEX investigates the limits and constraints of haptic/tactile perception and analyzes how to proceed from the measurements of deformable objects such as textiles to their simulation in Virtual Reality from the haptic, tactile and visual point of view. The project has many direct applications for the textile industry, but the main impact will be the significant advancement of multimodal interaction tools, techniques and know-how.

09:15-09:30 **Human Perception and Tactile Discrimination**

Ian Summers, University of Exeter (Exeter, U.K.)

This presentation looks at tactile perception in virtual environments. Stimulators arrays can be used to produce tactile stimulation which is spatially distributed on the skin. This can provide information about virtual objects, for example, information about contact area, edges, corners and surface texture. Designs for tactile stimulators are discussed and a possible scheme for tactile rendering is presented.

09:30-09:45 **Haptic Rendering of Fabrics**

Franz-Erich Wolter, University of Hanover (Hanover, D)

09:45-10:00 **The EU Intuition Project**

Jérôme Perret, Haption (Paris, F)

"INTUITION is a Network Of Excellence focused on virtual reality and virtual environments applications for future workspaces. It is funded by the European Union, and operates under the 6th Framework of the European Commission (IST). The members of the network are research laboratories, universities, technology providers and end-users. The 58 partners participate to 11 Working Groups, addressing specific scientific and technological areas of virtual reality, virtual environments, and their applications.

The main objective of the Working Group dedicated to Haptic Interaction is to promote and federate the activity of the major European actors in Haptics. The Working Group is conscious of its strategic role, in a moment when haptic research and development (devices, software, etc) is mostly led by non-European countries (US, Canada and Japan). The Haptic Interaction Working Group contributes to the emergence of an appropriate critical mass in Europe to face the challenges of haptic technology. For this purpose, the WG develops various types of action in order to: (1) Federate, (2) Organize, (3) Integrate, and (4) Spread the activity of its members."

10:00-10:15 **The EU Touch And Design Project**

Umberto Cugini, Politecnico di Milano (Milano, I)

10:15-10:30 **Questions and Answers**

10:30-11:00 Coffee Break

11:00-11:05 **Introduction to part 2 – Advanced Haptics**
Nadia Magnenat-Thalmann, MIRALab - University of Geneva (Geneva, CH)

11:05-11:25 **Haptic interfaces and the EU ENACTIVE Network of Excellence**
Carlo Alberto Avizzano, PERCRO - Scuola Superiore Sant'Anna (Pisa, I)

ENACTIVE Network of Excellence has the objective to connect European researchers for the development, spreading and standardization of innovative interfaces and interaction paradigms that could substitute and integrate interaction with information mediated by symbolic/iconic systems (language/images) with media based on Enactive Knowledge. Enactive knowledge is not simply a multisensory mediated one, but knowledge stored in the form of motor responses and acquired by the act of "doing". It is a form of cognition inherently tied to actions, as in the handcrafters way of knowing; it is an intuitive non-symbolic form of learning.

Europe currently has the multidisciplinary expertise that is needed to the study and development of enactive interfaces but this knowledge is still dispersed in multiple independent laboratories. Nonetheless these innovative interfaces present a wide potential of application in all the fields related to the Human-Computer Interaction and could permit to overcome limitation of current symbolic based information and interaction systems introducing a new interaction paradigm shift.

11:25-11:45 **Issues on Haptic Interfaces**
Moustapha Hafez, CEA - Commissariat à l'Energie Atomique (Paris, F)

Tactile interfaces are used to communicate information through the sense of touch, which is an area of growing interests from the research community. Potential applications include virtual training for surgeons, remotely touching materials via internet, automotive industry, active interfaces for blind persons, and sensory substitution devices. The presentation gives an overview of different Haptic and tactile interfaces developed at CEA LIST. A Vibrotactile interface named VITAL is based on micro linear electromagnetic actuators fabricated using standard PCB technology. The interface has been used to create a novel tactile language and to explore images such as diagrams for visually impaired. The results and future work will be discussed. Another portable interface; the VIFLEX was developed to assist blind person in indoor and outdoor navigation. Finally, a haptic interface that simulates the real touch of a piano key will be presented. The technology used in this interface is the magnetorheological fluid which allows a real time control of the force throughout the stroke.

11:45-12:05 **Telerobotics and Haptics**
Carsten Preusche, Institute of Robotics and Mechatronics, DLR - German Aerospace Center (Oberpfaffenhofen, D)

In telerobotic systems haptics play an important part from the very beginning in the early fifties. Even in exploration tasks, which are mainly perceived by 3D visual feedback, haptics provide additional information about the material or the surfaces of a remote scene. Manipulating the distant environment requires feedback of interaction forces, though the remote robot has to react on them.

For telerobotic systems the ultimate goal is transparency, meaning the human operator cannot distinguish between operating in a local or a distant environment. For the haptic modality this implies research in two main fields: robotic hardware, both handcontroller and tele-robots, and bilateral control with time-delay.

With the evolving technology in these research areas telerobotic systems can now be found in a variety of different application fields, e.g. Microassembly, Medicine or Space.

12:05-12:30 **Panel chaired by Nadia Magnenat-Thalmann**
with the collaboration of Carlo Alberto Avizzano, Umberto Cugini, Moustapha Hafez, Jérôme Perret, Carsten Preusche



HAPTEX'06 Workshop at IST2006

This workshop addresses challenges, problems and solutions when dealing with haptic simulation of deformable objects in virtual environments. Haptic simulation means reproducing the sense of touch when interacting with virtual objects, and is a truly multidisciplinary task involving the cooperation of mechanical engineers, neurophysiologists, physicists, and computer scientists. Thus, the workshop will take into account the different views of the involved actors.

Our example -the haptic perception of virtual textiles- will show how one single show case can involve and interest several different communities, ranging from fashion to virtual reality.

We will deal with the principles of haptic applications, discuss state-of-the-art techniques and see which approaches of existing knowledge can be generalized and applied for simulating other deformable objects. The concluding discussion will concern the future of haptics and how this emerging technology will affect our everyday life.

HAPTEX Website:

<http://haptex.miralab.unige.ch> >> Dissemination >> Events

HAPTEX Newsletter:

http://haptex.miralab.unige.ch/public/HAPTEXNews_Jul-Sep2006.pdf

Workshop Details at IST2006:

http://europa.eu.int/information_society/istevent/2006/cf/network-detail.cfm?id=538
