CZECH REPUBLIC Brno

Masaryk University Brno

Human Computer Interaction Laboratory
Masaryk University Brno
Botanicka 68a
CZ-615 00 Brno, Czech Republic
☏ +420-5-4151 2351
🖷 +420-5-4121 2568
✉ sochor@fi.muni.cz
🌍 www.fi.muni.cz/usr/sochor/HCILAB.html

Core Competence

Non-immersive Virtual Reality, Haptic Vizualization, Collision Detection Methods, Object-oriented Graphics and HCI Architectures, Manipulation in Virtual Environments, Haptics Applied in Molecular Research Based on Computational Chemistry.

Head of the Institute
Jiri Sochor

History

Faculty of Informatics was established in 1994 as the very new institute of Masaryk University. Teachers and research staff recruited from math & informatics departments as well as from other universities and industry. Since the beginning computer graphics was the part of all study programmes. In 1996 visiting professor Karel Zikan (Boeing and Sun consultant) inspired the foundation of HCI Laboratory. He helped a lot both with "start-up" special equipment donated from several U.S. firms and also introducing the latest research problems in collision detection using BVH approach. The first PHANToM haptic device was definitely the beginning of haptics story and the unescapeable trap for everyone who just touched force feedback devices. In the following years laboratory obtained substantial financial support from Ministry of Education and several grant fundings.

Rooms and Locations

HCI Laboratory is located in the fourth floor in the building of Faculty of Informatics. Lab room plus 3 offices occupy approximately 60 square meters.

Staff

2 Professors: Jiri Sochor, Ivo Serba
2 Research assistants: Tomas Staudek, Petr Tobola
6 PhD students: Jiri Bracek, Jan Flasar, Ales Krenek, Pavel Kolcarek, Radek Oslejsek, Ludek Pokluda
1 Technician: Petr Hromek
1 Secretary: Helena Dvorackova
8-12 Undergraduate students

Financing

Labour costs and overhead expenses are financed by the Czech government from 6-year long term project MSM 143300003 (Ministry of Education). The special equipment and SW licences are paid from research projects funded by National Research Agency of Czech Republic.

Current Structure and Important Partners

HCI Laboratory is one of five research labs at the Faculty of Informatics. The most important partners inside institute are Natural Language Processing Laboratory, and Speech Recognition and

Synthesis Laboratory. Research in haptic visualization of molecules is coordinated with National Centre for Biomolecular Research (prof.Koca) located at Faculty of Science, Masaryk University Brno.

Current Research

HCI Laboratory has been established to carry out broad research of human-computer interfaces, especially of its recently most popular aspect, virtual reality systems. The research issues of this complex project conceptually decompose into three areas: its mathematical and algorithmic part, its system issues, and its application part. Algorithmically, team memebrs develop a suite of powerful mathematical routines and data structures for fast visualization, real-time collision detection (with degree of separation and depth of penetration), position and orientation data filtering, interpolation and extrapolation of rotations, and for several auxiliary problems. On the system level, multiple computer processors are tied together with diverse and imperfect peripheral devices, and with a human being into one working system. The principles as well as integrated tasks are tested in three core applications: general manipulation methods in VE, molecular force field visualization, and haptic visualization of 2D and 3D objects for visually impaired people.

Important Recent Project Participations

- "Human Computer Interaction Techniques" - project GACR 201/98/K041, Czech Republic
- "HCI, dialog systems and assistive technologies" - project MSM143300003, Czech Republic

Future of the Lab

HCI Laboratory will participate in international projects. Research results of collision methods in dynamic VE will be integrated into modular open architecture. This architecture will be the framework for experiments as well as the base for applications. Speech synthesis will be included into haptic-based assistive applications to allow comprehensible presentation of shadowed world to blind people. Cooperation with Computer Graphics Group in Prague is planned to explore the possibilities of high speed communication channels for distant collaboration in VE.