BRNO UNIVERSITY OF TECHNOLOGY

Graphics and Video group: Graph@FIT

/ Department of Computer Graphics and Multimedia
/ Faculty of Information Technology / Brno University of Technology

RESEARCH GROUP CONTACT

Božetěchova 2, 612 66 Brno
http://www.fit.vutbr.cz/research/groups/graph/

HEAD Assoc. Prof. Pavel Zemčík
PHONE +420 541 141 217
E-MAIL zemcik@fit.vutbr.cz

HEAD Assoc. Prof. Adam Herout
PHONE +420 541 141 178
E-MAIL herout@fit.vutbr.cz

THEMATIC RESEARCH FOCUS

RESEARCH AREA

- General computer graphics algorithms
- Rendering
- Modern methods of interaction in three-dimensional space
- Image processing
- Signal processing
- Computer vision
- Feature extraction
- Machine leasing and applications

EXCELLENCE

Image processing and computer vision, object detection, realistic rendering, interaction, machine learning

MISSION

- To provide excellent education as well as research and development in the selected IT areas

DEVELOPED TECHNOLOGIES

CONTENT OF RESEARCH

- Computer graphics and image processing algorithms, algorithms of computer vision including their accelerated versions using embedded systems, DSP, FPGA, and GP-GPU
- Parallel rendering implementation of signal and image processing, vision, and graphics algorithms
- Novel methods of machine learning and their applications to the above algorithms

MAIN CAPABILITIES

Basic research:
Research and applications of algorithms, specifically video processing algorithms (scene detection, video in video search), object detection algorithms (AdaBoost/WaldBoost based), event and motion categorization.

Application research + protection forms:
The detection of faces and body parts in image or video and monitoring of motion, classification of motion, detection of key points, their evaluation and localization, 3D reconstruction, implementation of the above algorithms in mobile platforms, acceleration of the above algorithms

FIELDS OF RESEARCH RESULTS APPLICATION

- Electronics industry
- Telecommunications
- Software
- Computer hardware
- Internet
- IT Security

ALUMNI PROFILE

Graduates operate in the fields of computer graphics and multimedia, human-machine interfaces, image and sound processing and compression, application interfaces for computer graphics and multimedia, and also in other applied computer graphic disciplines, such as computer-aided design and geographic information systems.

NUMBER OF RESEARCH POSITIONS

SENIOR RESEARCH STAFF

JUNIOR RESEARCH POSITIONS (INCL. PH.D. STUDENTS)

25

KEY RESEARCH EQUIPMENT ↘

LIST OF DEVICES

Standard computer equipment, computing clusters, programmable hardware and DSP boards

BUDGET ↘

TOTAL (MIL. CZK/ MIL. EUR)

10 / 0.4

PART OF THE TOTAL BUDGET FROM PRIVATE RESOURCES (%)

2

PART OF THE TOTAL BUDGET FROM FOREIGN RESOURCES (%):

49

MAIN PROJECTS ↘

2011–2015: VideoTerror - Tools and Methods for Video and Image Processing for the Fight against Terrorism (project funded by the Ministry of Interior)

2011–2014: GenEx – System for support of evaluation of FISH (project financed by TAČR – Technology Agency of the Czech Republic)

2010–2013: SMECY – Smart Multicore Embedded Systems (funded by FP7-ARTEMIS, jointly EU and the Czech Republic)

2010–2013: RECOMP – Reduced Certification Costs for Trusted Multi-core Platforms (funded by FP7-ARTEMIS, jointly EU and the Czech Republic)

2006–2011: Centre of Computer Graphics (project financed by the Ministry of Education, Youth and Sports, Czech Republic, programme LC – Basic Research Centres)

ACHIEVEMENTS ↘

Journal papers examples:

» Hanák, I., Herout, A., Zemčík, P.: Acceleration of the Detail Driven Method for Hologram Generation, In: Optical Engineering, Vol. 2010, No. 12345, US, p. 21, ISSN 0091-3286

» Antikainen, J., Havel, J., Jošth, R., Herout, A., Zemčík, P., Hauta-Kasari, M.: Non-Negative Tensor Factorization Accelerated Using GPGPU, In: IEEE Transactions on Parallel and Distributed Systems (TPDS), Vol. 2011, No. 1111, US, p. 7, ISSN 1045-9219

» Pouli, T., Prazak M., Zemcık, P., Gutierrez, D., Reinhard, E.: Rendering fur directly into images, In: Computers and Graphics, Vol. 34, No. 5, 2010, Elmsford, NY, US, p. 612-620, ISSN 0097-8493

» Herout, A., Hradiš, M., Zemčík, P.: EnMS: Early non-Maxima Suppression, In: Pattern Analysis and Applications, Vol. 2011, No. 1111, DE, p. 10, ISSN 1433-7541

» Havel, J., Herout, A.: Yet Faster Ray-Triangle Intersection (Using SSE4), In: IEEE Transactions on Visualization and Computer Graphics, Vol. 2010, No. 3, US, p. 434-438, ISSN 1077-2626

Over 100 conference papers, 10 journal papers, and 3 book chapters in last 5 years, 3 registered utility models, industrial applications, etc.

MAIN COLLABORATING PARTNERS ↘

COLLABORATION WITH ACADEMIC PARTNERS

» Faculty of Informatics, Masaryk University (Brno, CZ)
» Most Czech academic institutions

COLLABORATION WITH COMPANIES

» Honeywell (Brno, CZ)
» Camea (Brno, CZ)
» UNIS (Brno, CZ)
» BALÓNY KUBÍČEK (Brno, CZ)
» Disk/Audiffex (Boskovice, CZ)

EXPECTATIONS ↘

REQUIREMENTS

Customers to licence the technology, customers for application development, collaboration bodies.

OFFERS

Research and development in the above areas, application development, expertise in the above areas.

04 / 2011