GERMANY Ilmenau

Technical University of Ilmenau

Department of Computer Science & Automation
Computer Graphics Group
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Core Competence

Geometric Modeling for Conceptual Design, Virtual and Augmented Reality, Real-time Rendering, Physically-based Real-time Animation, Image Processing, Pattern Recognition

Head of the Institute
Beat Brüderlin

History

The computer graphics program at the TU Ilmenau was founded by Prof. Beat Brüderlin in 1996. Since then, the computer graphics group has shown continuous growth mainly due to successful conduction of industry-, EU- and German government-sponsored projects. Since 2001, the computer graphics group has participated in two of 15 national projects in the area of virtual and augmented reality, selected for funding by the German Federal Ministry of Education and Research (BMBF)

Rooms and Locations

The computer graphics group occupies around 200 square meters of office space including a special computing lab equipped with virtual reality hardware and a graphics cluster.

Staff

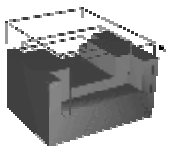
1 Professor: Beat Brüderlin
1 Lecturer: Karl-Heinz Franke
17 Research assistants: David Beier, Steffen Cersowsky, Ulf Döring, Markus Färber, Frank Gaßmann, Stephan Höfer, Eckhard Kaul, Dae Hyun Kim, Ronny Krüger, Carsten Lucht,Paul Michalik, Rico Nestler, Georg Notni, Michael Reeßing, Michael Reischl, Thomas Ullmann, Gerhard Wolf
1 Secretary: Karin Schilling
2 Technicians: Matthias Baag, Ilona Heinze

Financing

Basic staff (approx. 25% of personnel) and infrastructure is government-financed. Most other staff and equipment is funded through institutional research grants, as well as direct industry collaboration.

Current Structure and Important Partners

The computer graphics group is part of the Institute of Computer Engineering and Digital Media Technology at the Department of Computer Science and Automation. The group is organized in two working areas, one focusing on conceptual geometric modeling, collaborative design, and virtual and augmented reality, while the other focuses on color image processing, pattern recognition, and contactless measurement. Research partners include the Heinz Nixdorf Institute at Paderborn, Germany, the University of Paderborn, C-Lab at Paderborn, Technion at Haifa, Israel, Fraunhofer IPK and IMK, as well as industrial partners



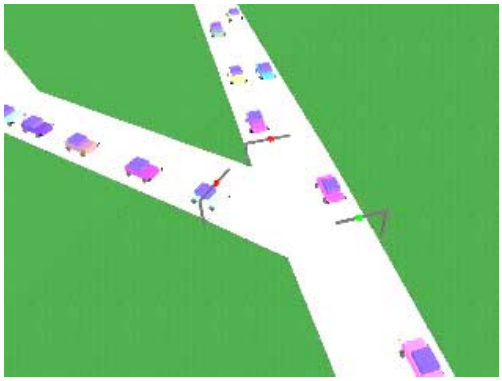
such as DaimlerChrysler Research at Berlin and Ulm, Germany.

Current Research

The research and teaching activities of the computer graphics group at TU Ilmenau include interactive computer graphics, geometric modeling, image processing, pattern recognition, real-time rendering, as well as virtual and augmented reality, real-time computer animation, multi-media, and multidisciplinary collaborative work using internet technology. We deloped COSMOS, an interactive conceptual modeling system, featuring hand-sketch input, interactive direct 3D manipulation under geometric constraints, and additional novel features. COSMOS is based on our own geometry kernel with robust set operations, a real-time constraint solver, and constraint-based free-form editing. The system serves as a test bed to demonstrate pioneering research in these areas. This modeling system is now being extended for immersive design use in virtual and augmented reality environments as well as in many other projects. In the field of virtual and augmented reality the group mainly works on human-machine interaction problems like making standard desktop applications available to VR environments, physically accurate simulation of hand interaction with data gloves, developing methods for visual and haptic augmentation of devices for multi-modal interaction. Another research direction is augmented reality, where we are focusing on object recognition in video streams.

Important Recent Project Participations

- Virtual Reality Interaction Toolbox "VRIB", BMBF-funded, www.vrib.de
- A Mobile Digital Assistant for Virtual and Augmented Reality Content
- "AR-PDA", BMBF-funded, www.ar-pda.de
- Declarative Geometric Modeling and Virtual Reality, industry-funded
- Internet-based Design and Realistic Representation "Konni"



- Image-guided Distortion Measurement for Control of a Weft Straightening Machine, EU-funded

Important Recent Industrial Partners

DaimlerChrysler, 3Dconnexion, Siemens, Unity AG, Miele, Jenoptik, Lunatic Interactive

The Future of the Lab

The computer graphics group intends to follow promising approaches in the fields of conceptual geometric modeling, collaborative design, as well as virtual and augmented reality. Furthermore, the

computer graphics group plans to extend the cooperation with industrial partners and research groups at the TU Ilmenau and outside, applying interactive design methods to interdisciplinary scientific problem solving. It is a formidable challenge to integrate currently existing specialized systems (designed for restricted problem domains) to solve complex multi-disciplinary problems.