GERMANY Magdeburg

Otto-von-Guericke - University of Magdeburg

Computer Graphics and Interactive Systems Laboratory at the Department of Simulation and Graphics (ISG)
Faculty of Computer Science
Otto-von-Guericke-University of Magdeburg
Universitätsplatz 2
D-39106 Magdeburg, Germany
☏ +49-391-67 18772
🖷 +49-391-67 11164
✉ office@isg.cs.uni-magdeburg.de
🌍 isgwww.cs.uni-magdeburg.de/graphik/

Core Competence

Non-photorealistic rendering, offline and real-time techniques human computer interaction, learning environments smart (knowledge-based) graphics rendering image-text coherence computer games non-visual interaction techniques, haptic rendering extraction of features from 3D polygonal shapes emphasis techniques and camera planning temporal influences on visualization

Head of the Institute
Thomas Strothotte

History

The research group was founded in 1993 by Thomas Strothotte. 13 Ph.D.'s and one „Habilitation“ have successfully completed their theses at the laboratory in the last five years. The department organizes the annual Simulation and Visualization conference, a collaboration mainly between the Simulation and Modeling Group and the Computer Graphics and Interactive Systems Laboratory. In 1996, the CGU was instrumental in establishing undergraduate (B.Sc.) and graduate degree programs (M.Sc.,Ph.D.) in Computational Visualistics.

Rooms and Locations

The lab occupies adequate lab space in its new location in the Ada Lovelace Building of the University's Faculty of Computer Science.

Financing

The CGU is funded primarily by the State of Saxony-Anhalt as well as by projects from external sources. Major contributors are the Deutsche Forschungsgemeinschaft (DFG) as well as various companies.

Staff

1 Professor: Thomas Strothotte
6 Assistant professors: Knut Hartmann, Maic Masuch, Klaus Sachs-Hombach (philosopher), Stefan Schlechtweg, Jörg Schirra, Jochen Schneider
10 Research assistants: Ralf Helbing, Wallace Chigona, Bert Freudenderg, Marcel Götze, Nick Halper, Tobias Isenberg, Roland Jesse, Henry König, Oscar Meruvia, Felix Ritter
2 External members: Steffi Beckhaus (Fraunhofer Institute for Media Communication, Sankt Augustin), Rainer Groh (HTW Dresden)
4 Technicians (shared with the other groups of the department): Heiko Dorwarth, Volkmar Hinz, Thomas Rosenburg, Petra Specht
2 Secretaries (shared with the other groups of the department): Petra Janka, Beate Traoré

Current Structure and Important Partners

The CGU is part of the Department of Simulation and Graphics which has four other research groups: Simulation and Modeling, Computational Geometry, Computer Vision, and Visualization. These groups share the primary responsibility for the undergraduate and

graduate degree programs in Computational Visualistics, in which about 600 students are currently enrolled.

Current Research

Non-photorealistic rendering: NPR as an alternative to photorealistic image generation is treated in all facets of the area. Algorithms have been devised, for example, to render line drawings and to incorporate various non-photorealistic and photorealistic styles in one image to enhance the communicative power of images. Special projects include the analysis of view-dependent particle distributions for placing stipples on the surface of polygonal meshes as well as real-time visibility preprocessing to improve interaction with large models. Computer games: As application of real-time NPR techniques, current research focuses on the integration of various different rendering styles in a game engine, evolving game engines into a versatile tool for real-time visualization. Techniques for action summaries, the automatic generation of summaries of interactive scenes are developed. For that, characteristics of players and exciting events that occur are detected so that the presentation style of the game can be influenced to augment the gaming experience. To do this a set of tools is provided that game developers can use to extract information from the game, design new rendering styles, and capture action with real-time camera techniques. Smart graphics: Knowledge-based coordination of different modalities (text, graphics) . Image-text coherence: Images as text, interactive labeling and figure captions. Haptic rendering of polygonal models using point-based interaction devices, non-visual interaction techniques: Research includes the design of an efficient collision detection, the development of rendering models for more complex surfaces and materials, and the study of the influence of material properties and behavior on human perception. Extraction of features from 3D polygonal shapes: Using skeletonization methods is a way to extract important features from polygonal shapes for, e.g., shape comparison and matching as well as shape compression. Human computer interaction, learning environments: Techniques are developed to enhance and to combine the interaction and the illustration of information spaces by means of 3D graphics. The main area of application are the active exploration of medical as well as mechanical information spaces. Highlighting techniques and camera planning: Emphasis is an important vehicle to communicate relevance and to guide user focus, especially in interactive computer graphics. In dynamic 3D systems that allow free navigation by the user, emphasis techniques must also consider visibility issues. In particular, camera planning can help both in establishing views that suit a certain communicative goal as well as providing a better 3D experience through guided camera motion. Temporal influences on visualization: Research concentrates on the visual representation of temporal data characteristics. This work is supported by extending the set of presentation variables by object motion as well as NPR techniques.

Important Recent Project Participations

- "Mobile Multimedia Training in Construction and Production" as part of the project Interactive Digitale Development- und Training Platform – IDEA-Sachsen-Anhalt; collaborative project with the Fraunhofer Institute for Factory Operation and Automation IFF Magdeburg (State of Sachsen-Anhalt)
- "Multimedia@LSA/Kaiserpfalz" (Deutsche Telekom AG); Exhibit at the exposition „Otto the Great" in the Museum of Cultural Heritage in Magdeburg. The exhibit was visited by over 150,000 people.
- "MoBIC" (EU project in the Technology Initiative for Disabled and Elderly People)

Important Recent Industrial Partners

Deutsche Telekom AG, Spinor GmbH, Munich (developers of the Shark 3D game engine), emergent media AG, Magdeburg

Future of the Lab

Having recently completed a book on „Non-Photorealistic Computer Graphics: Modeling, Rendering, and Animation" (Morgan Kaufman, San Francisco, 2002), our emphasis will now lie in using such techniques in connection with text-based systems, for example, for the illustration of texts, in computer games and in virtual communities.