

Eduard Gröller:

Visualization with Knowledge and Style

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Abstract

Utilizing knowledge and information derived from the visualization process or from data analysis helps in generating more effective visualizations. The inclusion of knowledge and employing abstractions on various levels, generates expressive visualizations and allows user-centric interaction metaphors. The talk will cover several examples of knowledge-assisted visualizations: Importance-driven focus of attention is a concept for automatically focusing on interesting features within a volumetric data set. The user selects a focus, i.e., object of interest, from a set of pre-defined features. The system automatically determines the most expressive view on this feature. Smooth viewpoint changes are controlled by changes in the importance distribution among features in the volume. We will explain style transfer functions which allow to combine a multitude of different shading styles in a single rendering. In the case of multiple volumetric attributes and multiple visual styles the specification of a multi-dimensional transfer function becomes challenging and non-intuitive. We describe semantic layers as a methodology for the specification of a mapping from several volumetric attributes to multiple illustrative visual styles. Semantic layers enable an expert user to specify the mapping in the natural language of her/his domain. LiveSync utilizes deformed viewing spheres for knowledge-based navigation. It is a concept to synchronize 2D slice views and 3D volumetric views of medical data sets.

Further information on the research projects discussed in the talk is available at <http://www.cg.tuwien.ac.at/research/vis/>

Short Biography

Eduard Gröller (<http://www.cg.tuwien.ac.at/staff/EduardGroeller.html>) is professor at the Institute of Computer Graphics and Algorithms (ICGA), Vienna University of Technology. In 1993 he received his PhD from the same university. His research interests include computer graphics, flow visualization, volume visualization,

medical visualization, and information visualization. He is heading the visualization group at ICGA. The group performs basic and applied research projects in the area of scientific visualization (<http://www.cg.tuwien.ac.at/research/vis/>).

Dr. Gröller has given lecture series on scientific visualization at various other universities (Tübingen, Graz, Praha, Bahia Blanca, Magdeburg, Bergen). He is a scientific proponent and member of the Scientific Review Committee of the VRVis Kplus center of excellence (<http://www.vrvis.at/>) The center performs applied research in virtual reality and visualization.

Dr. Gröller is adjunct professor of computer science at the University of Bergen, Norway (since 2005). He co-authored more than 150 scientific publications and acted as a reviewer for numerous conferences and journals in the field. He also has served and serves on various program and paper committees. Examples include Computers&Graphics, IEEE Transactions on Visualization and Graphics, EuroVis, IEEE Visualization conference, Eurographics conference. He has been paper co-chair of Volume Graphics 2005, IEEE Visualization 2005 and 2006, and Eurographics 2006. He is chief editor of the Journal Computer Graphics Forum (<http://www.eg.org/EG/Publications/CGF>), (since 2008).

Dr. Gröller is head of the working group on computer graphics of the Austrian Computer Society and member of IEEE Computer Society, ACM (Association of Computing Machinery), GI (Gesellschaft für Informatik), OCG (Austrian Computer Society).