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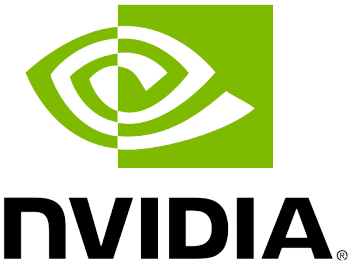

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Invited Talk

Generalized Barycentric Coordinates

Kai Hormann - Università della Svizzera italiana

Abstract

1827, August Ferdinand Möbius published his seminal work on the 'barycentric calcul' which provides a novel approach to analytic geometry. One key element in his work is the idea of barycentric coordinates which allow to write any point inside a triangle as a unique convex combination of the triangle's vertices. These triangular barycentric coordinates are linear and possess the Lagrange property, and are therefore commonly used to linearly interpolate values given at the vertices of a triangle. Möbius also noticed that this construction extends nicely to linear interpolation of data given at the vertices of a d-dimensional simplex, and by giving up positivity of the coordinates, we can even extrapolate the data to every point in d dimensions.

While barycentric coordinates are unique for simplices, they can be generalized in several ways to arbitrary polygons and polytopes in higher dimensions, and over the past few years, a number of recipes for such generalized barycentric coordinates have been developed. As they are usually given in closed form and can be evaluated efficiently, they have many useful applications, e.g. in computer graphics, computer aided geometric design, and image processing.

Biographical Sketch

Kai Hormann is a full professor in the Faculty of Informatics at the Università della Svizzera italiana (USI) in Lugano. He received a Ph.D. in computer science from the University of Erlangen in 2002 and spent two years as a postdoctoral research fellow at Caltech in Pasadena and the CNR in Pisa, before joining Clausthal University of Technology as an assistant professor in 2004. During the winter term 2007/2008 he visited Freie Universität Berlin as a BMS substitute professor and came to Lugano as an associate professor in 2009.

His research interests are focussed on the mathematical foundations of geometry processing algorithms as well as their applications in computer graphics and related fields. In particular, he is working on generalized barycentric coordinates, subdivision of curves and surfaces, barycentric rational interpolation, and dynamic geometry processing.

Invited Talk

Visual Data Exploration

Eduard Gröller - TU Wien

Abstract

Visualization and Visual Computing use computer-supported, interactive, visual representations of (abstract) data to amplify cognition. In recent years data complexity and variability has increased considerably. This is due to new data sources as well as the availability of uncertainty, error and tolerance information. Instead of individual objects entire sets, collections, and ensembles are visually investigated. This raises the need for effective visual reformations, sparse interactions, and comparative visualization approaches. Visual data science and computational sciences provide vast amounts of digital variations of a phenomenon which can be explored through superposition, juxtaposition and explicit difference encoding. A few examples of visual data exploration coming from various areas of visualization, i.e., scientific visualization, information visualization and visual analytics, will be treated in more detail. Analysis techniques which combine visualization and simulation to assist decision making under uncertainty will be discussed. Given the amplified data variability, visual data exploration is likely to gain in importance in the future. Research challenges and directions are sketched at the end of the talk.

Biographical Sketch

Eduard Gröller is professor at TU Wien, Austria, and adjunct professor of computer science at the University of Bergen, Norway. His research interests include computer graphics, visualization and visual computing. He co-authored more than 250 scientific publications and acted as a co-chair, IPC member, and reviewer for numerous conferences and journals in the field. He became a fellow of the Eurographics association in 2009. Dr. Gröller has been Co-Chief Editor of the Computer Graphics Forum journal (2008-2011) and chair of the EuroVis 2012 conference. He is the recipient of the Eurographics 2015 Outstanding Technical Contributions Award.

Invited Talk

VR & AR: from research to the search for content and markets

Robert Hoffmeister - Milkroom Studios GmbH

Abstract

Virtual Reality and Augmented Realty are the buzz words you hear in just about every company and marketing agency these days. The hardware is (mostly) here, but what about the content? I will attempt to shine some light and would like to open a discussion on the (entertainment) uses or AV and VR. (Warning: This session will contain no Algorithms or Formulars)

Biographical Sketch

Robert Hoffmeister has been living on the edge between creativity and technology since the early nineties. He worked at Lucasfilm/Industial Light and Magic for about a decade as lead artist and set supervisor, filming e.g. exploding hand crafted Miniatures for Transformers 2, 3 and many more, before he moved to Disney as Visual Effects Supervisor and Stereo 3D Director. In 2014 he co-founded Milkroom Studios GmbH, a international Studio focused on the converging fields of Visual Effects and gaming. His Company is currently working on several VR titles for Project Tango, mobile and desktop VR. His feature film credits include: Ironman 2 & 3, The Seventh Son, Rango, Spiderwick Chronicles, Lemony Snicket, Transformers 1-3, Star Trek, Pirates of the Caribbean 2-4, StarWars EP 2,3 and many more.