

Commenced Publication in 1973

Founding and Former Series Editors:

Gerhard Goos, Juris Hartmanis, and Jan van Leeuwen

Editorial Board

David Hutchison

Lancaster University, UK

Takeo Kanade

Carnegie Mellon University, Pittsburgh, PA, USA

Josef Kittler

University of Surrey, Guildford, UK

Jon M. Kleinberg

Cornell University, Ithaca, NY, USA

Friedemann Mattern

ETH Zurich, Switzerland

John C. Mitchell

Stanford University, CA, USA

Moni Naor

Weizmann Institute of Science, Rehovot, Israel

Oscar Nierstrasz

University of Bern, Switzerland

C. Pandu Rangan

Indian Institute of Technology, Madras, India

Bernhard Steffen

University of Dortmund, Germany

Madhu Sudan

Massachusetts Institute of Technology, MA, USA

Demetri Terzopoulos

New York University, NY, USA

Doug Tygar

University of California, Berkeley, CA, USA

Moshe Y. Vardi

Rice University, Houston, TX, USA

Gerhard Weikum

Max-Planck Institute of Computer Science, Saarbruecken, Germany

Andreas Butz Brian Fisher
Antonio Krüger Patrick Olivier (Eds.)

Smart Graphics

5th International Symposium, SG 2005
Frauenwörth Cloister, Germany, August 22-24, 2005
Proceedings

Volume Editors

Andreas Butz
Ludwig-Maximilians-Universität München
Institut für Informatik, LFE Medieninformatik
Amalienstrasse 17, 80333 München, Germany
E-mail: butz@ifi.lmu.de

Brian Fisher
Simon Fraser University at Surrey
13450 102 Ave, Surrey BC V3T 5X3, Canada

Antonio Krüger
Westfälische Wilhelms-Universität
Institute for Geoinformatics
Robert-Koch-Str. 26-28, 48149 Münster, Germany
E-mail: antonio.krueger@gmail.com

Patrick Olivier
University of Newcastle upon Tyne
Informatics Research Institute
Newcastle upon Tyne NE1 7RU, UK
E-mail: p.l.olivier@ncl.ac.uk

Library of Congress Control Number: 2005930515

CR Subject Classification (1998): I.3, I.2.10, I.2, I.4, I.5, H.5, I.7

ISSN 0302-9743
ISBN-10 3-540-28179-7 Springer Berlin Heidelberg New York
ISBN-13 978-3-540-28179-5 Springer Berlin Heidelberg New York

This work is subject to copyright. All rights are reserved, whether the whole or part of the material is concerned, specifically the rights of translation, reprinting, re-use of illustrations, recitation, broadcasting, reproduction on microfilms or in any other way, and storage in data banks. Duplication of this publication or parts thereof is permitted only under the provisions of the German Copyright Law of September 9, 1965, in its current version, and permission for use must always be obtained from Springer. Violations are liable to prosecution under the German Copyright Law.

Springer is a part of Springer Science+Business Media
springeronline.com

© Springer-Verlag Berlin Heidelberg 2005
Printed in Germany

Typesetting: Camera-ready by author, data conversion by Scientific Publishing Services, Chennai, India
Printed on acid-free paper SPIN: 11536482 06/3142 5 4 3 2 1 0

Preface

The International Symposium on Smart Graphics 2005 was held from August 22–24, 2005 in the cloister Frauenwörth on the island of Frauenchiemsee, Germany. It was the sixth event in a series which originally started in 2000 as a AAAI Spring Symposium.

In response to the overwhelming success of the 2000 symposium, its organizers decided to turn it into a self-contained event. With the support of IBM, the first two International Symposia on Smart Graphics were held at the T.J. Watson Research Center in Hawthorne, NY in 2001 and 2002. The 2003 symposium moved to the European Media Lab in Heidelberg to underline the international character of the Smart Graphics enterprise and its community.

The core idea behind these symposia is to bring together researchers and practitioners from the field of computer graphics, artificial intelligence, cognitive science, graphic design and the fine arts. Each of these disciplines contributes to what we mean by the term “Smart Graphics”: the intelligent process of creating effective, expressive and esthetic graphical presentation. Many Smart Graphics symposia emphasize a particular aspect of the field in the call for papers. In 2005 our focus was on “Visual Analytics”—the art and science of analytical reasoning facilitated by interactive visual interfaces.

While artists and designers have been creating communicative graphics for centuries, artificial intelligence focuses on automating this process by means of the computer. While computer graphics provides the tools for creating graphical presentations in the first place, the cognitive sciences contribute the rules and models of perception necessary for the design of effective graphics. The exchange of ideas between these four disciplines has led to many exciting and fruitful discussions, and the Smart Graphics symposia draw their liveliness from a spirit of open minds and the willingness to learn from and share with other disciplines.

We would like to thank all authors for the effort that went into their submissions, the program committee for their work in selecting and ordering contributions for the final program, and of course the participants who transformed Frauenchiemsee for three days in August into Smart Graphics Island 2005.

August 2005

Andreas Butz
Brian Fisher
Antonio Krüger
Patrick Olivier

Organization

Organization Committee

Andreas Butz (University of Munich, Germany)
Brian Fisher (University of British Columbia, Canada)
Antonio Krueger (University of Münster, Germany)
Patrick Olivier (University of Newcastle Upon Tyne, UK)

Program Committee

Elisabeth Andre (University of Augsburg)
Marc Cavazza (Teeside University)
Marc Christie (University of Nantes)
Sarah Diamond (Banff Centre)
Steven Feiner (Columbia University)
Sid Fels (University of British Columbia)
Knut Hartmann (University of Magdeburg)
Rainer Malaka (European Media Lab)
Karol Myszkowski (Max-Planck-Institute Saarbrücken)
Shigeru Owada (University of Tokyo)
W. Bradford Paley (Digital Image Design)
Bernhard Preim (University of Magdeburg)
Thomas Rist (University of Applied Sciences, Augsburg)
Stefan Schlechtweg (University of Magdeburg)
Thomas Strothotte (University of Magdeburg)
Lucia Terrenghi (University of Munich)
Sha Xinwei (Georgia Institute of Technology)
Massimo Zancanaro (ITC-irst Trento)
Michelle Zhou (IBM T.J. Watson Research Center)

Secondary Reviewers

Alexander Belyaev (Max-Planck-Institute Saarbrücken)
Angela Brennecke (University of Magdeburg)
Tobias Isenberg (University of Calgary)
Grzegorz Krawczyk (Max-Planck-Institute Saarbrücken)

Supporting Institutions

The Smart Graphics Symposium 2005 was held in cooperation with Eurographics, AAAI and ACM Siggraph.

Table of Contents

Synthetic Characters and Virtual Worlds

Engaging in a Conversation with Synthetic Characters Along the Virtuality Continuum <i>Elisabeth André, Klaus Dorf Müller-Ulhaas, Matthias Rehm</i>	1
Visualizing Emotion in Musical Performance Using a Virtual Character <i>Robyn Taylor, Pierre Boulanger, Daniel Torres</i>	13
Knowledge in the Loop: Semantics Representation for Multimodal Simulative Environments <i>Marc Erich Latoschik, Peter Biermann, Ipke Wachsmuth</i>	25
Virtual Camera Planning: A Survey <i>Marc Christie, Rumesch Machap, Jean-Marie Normand, Patrick Olivier, Jonathan Pickering</i>	40

Generating Visual Displays

Graphical Data Displays and Database Queries: Helping Users Select the Right Display for the Task <i>Beate Grawemeyer, Richard Cox</i>	53
Visualization Tree, Multiple Linked Analytical Decisions <i>José F. Rodrigues Jr., Agma J.M. Traina, Caetano Traina Jr.</i>	65
Structure Determines Assignment Strategies in Diagrammatic Production Scheduling <i>Rossano Barone, Peter C.-H. Cheng</i>	77
Generation of Glyphs for Conveying Complex Information, with Application to Protein Representations <i>Greg D. Pintilie, Brigitte Tuekam, Christopher W.V. Hogue</i>	90
Negotiating Gestalt: Artistic Expression by Coalition Formation Between Agents <i>Kaye Mason, Jörg Denzinger, Sheelagh Carpendale</i>	103

Text and Graphics

Metrics for Functional and Aesthetic Label Layouts
*Knut Hartmann, Timo Götzelmann, Kamran Ali,
Thomas Strothotte* 115

A Smart Algorithm for Column Chart Labeling
Sebastian Müller, Arno Schödl..... 127

3D Interaction and Modeling

Usability Comparison of Mouse-Based Interaction Techniques for
Predictable 3d Rotation
Ragnar Bade, Felix Ritter, Bernhard Preim 138

Multi-level Interaction in Parametric Design
Robert Aish, Robert Woodbury 151

Intuitive Shape Modeling by Shading Design
Bertrand Kerautret, Xavier Granier, Achille Braquelaire 163

Automatic Cross-Sectioning Based on Topological Volume
Skeletonization
*Yuki Mori, Shigeo Takahashi, Takeo Igarashi, Yuriko Takeshima,
Issei Fujishiro* 175

Novel Interaction Paradigms

Interface Currents: Supporting Fluent Collaboration on Tabletop
Displays
Uta Hinrichs, Sheelagh Carpendale, Stacey D. Scott, Eric Pattison ... 185

Design of Affordances for Direct Manipulation of Digital Information
in Ubiquitous Computing Scenarios
Lucia Terrenghi 198

2D Drawing System with Seamless Mode Transition
Yoshihito Ohki, Yasushi Yamaguchi 206

Poster Presentations and Demos

Tentative Results in Focus-Based Medical Volume Visualization
Timo Ropinski, Frank Steinicke, Klaus Hinrichs 218

3d Visualisation in Spatial Data Infrastructures <i>Torsten Heinen, Martin May, Benno Schmidt</i>	222
From Artefact Representation to Information Visualisation: Genesis of Informative Modelling <i>Iwona Dudek, Jean-Yves Blaise</i>	230
Computer-Assisted Artistic Pattern Drawing <i>Hun Im, Jong Weon Lee</i>	237
VR-Mirror: A Virtual Reality System for Mental Practice in Post-Stroke Rehabilitation <i>Jose A. Lozano, Javier Montesa, Mari C. Juan, Mariano Alcañiz, Beatriz Rey, Jose Gil, Jose M. Martinez, Andrea Gaggioli, Francesca Morganti</i>	241
Picturing Causality – The Serendipitous Semiotics of Causal Graphs <i>Eric Neufeld, Sonje Kristtorn</i>	252
Xface: Open Source Toolkit for Creating 3D Faces of an Embodied Conversational Agent <i>Koray Balci</i>	263
Interactive Augmentation of 3D Statistics Visualizations <i>Peter Bergdahl</i>	267
Author Index	269