Lecture Notes in Computer Science 2733

Edited by G. Goos, J. Hartmanis, and J. van Leeuwen

Springer
Berlin
Heidelberg
New York
Hong Kong
London
Milan
Paris
Tokyo

Andreas Butz Antonio Krüger
Patrick Olivier (Eds.)

Smart Graphics

Third International Symposium on Smart Graphics, SG 2003
Heidelberg, Germany, July 2-4, 2003
Proceedings

Springer

Series Editors

Gerhard Goos, Karlsruhe University, Germany
Juris Hartmanis, Cornell University, NY, USA
Jan van Leeuwen, Utrecht University, The Netherlands

Volume Editors

Andreas Butz
Antonio Krüger
Universität des Saarlandes
FR 6.2 Informatik, Postfach 15 11 50
66041 Saarbrücken, Germany
E-mail: {butz/krueger}@cs.uni-sb.de

Patrick Olivier
Lexicle, Innovation Centre
York Science Park, York, YO10 5DG, UK
E-mail: patrick.olivier@lexicle.com

Cataloging-in-Publication Data applied for

A catalog record for this book is available from the Library of Congress

Bibliographic information published by Die Deutsche Bibliothek
Die Deutsche Bibliothek lists this publication in the Deutsche Nationalbibliografie; detailed bibliographic data is available in the Internet at <http://dnb.ddb.de>.

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

ISSN 0302-9743
ISBN 3-540-40557-7 Springer-Verlag 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-Verlag. Violations are liable for prosecution under the German Copyright Law.

Springer-Verlag Berlin Heidelberg New York
a member of BertelsmannSpringer Science+Business Media GmbH

http://www.springer.de

© Springer-Verlag Berlin Heidelberg 2003
Printed in Germany

Typesetting: Camera-ready by author, data conversion by DA-TeX Gerd Blumenstein
Printed on acid-free paper SPIN 10929100 06/3142 5 4 3 2 1 0

Preface

The International Symposium on Smart Graphics 2003 was held on July 2–4, 2003 in Heidelberg, Germany. It was the fourth event in a series that started in 1999 as an AAAI Spring Symposium. In response to the overwhelming success of the 1999 symposium, its organizers decided to turn it into a self-contained event in 2000. 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. The 2003 symposium was supported by the Klaus Tschira Foundation and moved to the European Media Lab in Heidelberg, thus underlining 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 psychology, and fine art. Each of these disciplines contributes to what we mean by the term "Smart Graphics": the intelligent process of creating expressive and esthetic graphical presentations. 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, 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.

Since the beginning, there have been discussions as to what qualifies as smart graphics and what doesn't. Although the term is intuitively clear to most, there are different interpretations along the outer boundaries of the field. Instead of giving an explicit definition, we decided to have invited papers from researchers to represent certain aspects of the field, and asked these authors to spread word in their respective communities. The result was a large number of submissions with hardly any out of topic, out of which a high quality program with clear focal points could be assembled.

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, the Klaus Tschira Foundation and the European Media Lab for providing space and time for hosting the event, and Springer-Verlag for publishing the proceedings in their Lecture Notes in Computer Science series.

May 2003

Andreas Butz
Antonio Krüger
Patrick Olivier

Organization

Organizing Committee

Conference Chairs:	Andreas Butz (Saarland University, Germany)
	Antonio Krüger (Saarland University, Germany)
	Patrick Olivier (Lexicle Limited, UK)
	Michelle Zhou (IBM T.J. Watson Research Center, USA)
Local Organization:	Robert Porzel (European Media Lab, Germany)
	Rainer Malaka (European Media Lab, Germany)

Program Committee

Maneesh Agrawala (Microsoft Research)
Elisabeth Andre (University of Augsburg)
Brian Fisher (University of British Columbia)
Steven Feiner (Columbia University, New York)
Knut Hartmann (University of Magdeburg)
Takeo Igarashi (University of Tokyo)
W. Bradford Paley (Digital Image Design)
Bernhard Preim (University of Magdeburg)
Thomas Rist (DFKI Saarbrücken)
Stefan Schlechtweg (University of Magdeburg)
Massimo Zancanaro (ITC-irst Trento)

Secondary Reviewers

George Popescu, IBM
Michelle Kim, IBM
Holly Rushmeier, IBM
Pengyu Hong, Harvard University

Sponsoring Institutions

The Third International Symposium on Smart Graphics was organized in cooperation with the European Association for Computer Graphics. It was hosted at the European Media Lab by the Klaus Tschira Foundation. Additional support was provided by Corel Corporation.

Table of Contents

Graphical Interaction

Illustrative Interfaces: Building Special-Purpose Interfaces with Art Techniques and Brain Science Findings 1
W. Bradford Paley

The Effect of Motion in Graphical User Interfaces 12
Paul U. Lee, Alexander Klippel, Heike Tappe

Pointing and Visual Feedback for Spatial Interaction in Large-Screen Display Environments 22
Barry A. Po, Brian D. Fisher, Kellogg S. Booth

Freeform User Interfaces for Graphical Computing 39
Takeo Igarashi

A Sketching Interface for Modeling the Internal Structures of 3D Shapes 49
Shigeru Owada, Frank Nielsen, Kazuo Nakazawa, Takeo Igarashi

Smart Sketch System for 3D Reconstruction Based Modeling 58
Ferran Naya, Julián Conesa, Manuel Contero, Pedro Company, Joaquim Jorge

Intregated System and Methodology for Supporting Textile and Tile Pattern Design 69
José María Gomis, Margarita Valor, Francisco Albert, Manuel Contero

Visualization Techniques

Smart 3d Visualizations in Clinical Applications 79
Bernhard Preim, Heinz-Otto Peitgen

Shadows with a Message 91
Wallace Chigona, Henry Sonnet, Felix Ritter, Thomas Strothotte

Dynamic Glyphs – Depicting Dynamics in Images of 3D Scenes 102
Marc Nienhaus, Jürgen Döllner

A New Approach to the Interactive Resolution of Configuration Problems in Virtual Environments 112
Carlos Calderon, Marc Cavazza, Daniel Diaz

Virtual Characters

Building Smart Embodied Virtual Characters 123
Thomas Rist, Elisabeth André

Let's Run for It!: Conspecific Emotional Flocking Triggered via Virtual Pheromones 131
Carlos Delgado-Mata, Jesus Ibanez, Ruth Aylett

A Perception and Selective Attention System for Synthetic Creatures 141
Daniel Torres, Pierre Boulanger

Intelligent Virtual Actors That Plan ... to Fail 151
Marc Cavazza, Fred Charles, Steven J. Mead

Extracting Emotion from Speech: Towards Emotional Speech-Driven Facial Animations 162
Olusola Olumide Aina, Knut Hartmann, Thomas Strothotte

Camera Planning

A Constraint-Based Approach to Camera Path Planning 172
Marc Christie, Eric Languénou

Declarative Camera Planning (Roles and Requirements) 182
Jonathan H. Pickering, Patrick Olivier

Automatic Video Composition 192
M. Zancanaro, C. Rocchi, O. Stock

Poster Presentations

Beyond Encoding: It Has Got to Move 202
Marius Hartmann

3D Graphics Adaptation System on the Basis of MPEG-21 DIA 206
Hae-Kwang Kim, Nam-Yeol Lee, Jin-Woong Kim

Analogical Representation and Graph Comprehension 212
Aidan Feeney, Lara Webber

Optimization Strategies for a Scalable Avatar 222
Uwe Berner

Physical Animation and Control of Simulated Creatures 231
Olivier Parisy, Christophe Schlick

A Contribution to the Theory and Practice of Cognitive Prostheses 241
Eric Neufeld, David Callele, David Mould, Sonje Kristtorn, Raymond Rabu

Exporting Vector Muscles for Facial Animation 251
The Duy Bui, Dirk Heylen, Mannes Poel, Anton Nijholt

Author Index 261