Lecture Notes in Computer Science

9353

Commenced Publication in 1973
Founding and Former Series Editors:
Gerhard Goos, Juris Hartmanis, and Jan van Leeuwen

Editorial Board

David Hutchison

Lancaster University, Lancaster, 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 Zürich, Zürich, Switzerland

John C. Mitchell

Stanford University, Stanford, CA, USA

Moni Naor

Weizmann Institute of Science, Rehovot, Israel

C. Pandu Rangan

Indian Institute of Technology, Madras, India

Bernhard Steffen

TU Dortmund University, Dortmund, Germany

Demetri Terzopoulos

University of California, Los Angeles, CA, USA

Doug Tygar

University of California, Berkeley, CA, USA

Gerhard Weikum

Max Planck Institute for Informatics, Saarbrücken, Germany

More information about this series at http://www.springer.com/series/7409

Konstantinos Chorianopoulos · Monica Divitini Jannicke Baalsrud Hauge · Letizia Jaccheri Rainer Malaka (Eds.)

Entertainment Computing – ICEC 2015

14th International Conference, ICEC 2015 Trondheim, Norway, September 29 – October 2, 2015 Proceedings



Editors
Konstantinos Chorianopoulos
Ionian University
Corfu
Greece

Monica Divitini Norwegian University of Science and Technology Trondheim Norway

Jannicke Baalsrud Hauge Bremer Institut für Produktion und Logistik (BIBA) University of Bremen Bremen Germany

and

KTH Royal Institute of Technolgy Stockholm Sweden Letizia Jaccheri Norwegian University of Science and Technology Trondheim Norway

Rainer Malaka University of Bremen Bremen Germany

ISSN 0302-9743 ISSN 1611-3349 (electronic)
Lecture Notes in Computer Science
ISBN 978-3-319-24588-1 ISBN 978-3-319-24589-8 (eBook)
DOI 10.1007/978-3-319-24589-8

Library of Congress Control Number: 2015949473

LNCS Sublibrary: SL3 - Information Systems and Applications, incl. Internet/Web, and HCI

Springer Cham Heidelberg New York Dordrecht London

© IFIP International Federation for Information Processing 2015

This work is subject to copyright. All rights are reserved by the Publisher, whether the whole or part of the material is concerned, specifically the rights of translation, reprinting, reuse of illustrations, recitation, broadcasting, reproduction on microfilms or in any other physical way, and transmission or information storage and retrieval, electronic adaptation, computer software, or by similar or dissimilar methodology now known or hereafter developed.

The use of general descriptive names, registered names, trademarks, service marks, etc. in this publication does not imply, even in the absence of a specific statement, that such names are exempt from the relevant protective laws and regulations and therefore free for general use.

The publisher, the authors and the editors are safe to assume that the advice and information in this book are believed to be true and accurate at the date of publication. Neither the publisher nor the authors or the editors give a warranty, express or implied, with respect to the material contained herein or for any errors or omissions that may have been made.

Printed on acid-free paper

Springer International Publishing AG Switzerland is part of Springer Science+Business Media (www.springer.com)

Preface

We are proud to present the proceedings of the 14th International Conference on Entertainment Computing (ICEC 2015). After Brazil (2013) and Australia (2014), ICEC was back in Europe, for the first time in Norway.

The conference was hosted in Trondheim, from September 30 to October 2, by NTNU, The Norwegian University of Science and Technology. As a result of a university merge, starting with January 2016, NTNU will be the biggest university in Norway with circa 38,000 students. Thanks to NTNU, the research institute Sintef and an ecosystems of knowledge intensive companies, Trondheim is one of the main Nordic centers of innovation, research, and development.

Entertainment computing is a diverse field bringing together computer science, social and cultural sciences, psychology, art, design, and many other disciplines.

Therefore, entertainment computing is one focal point of exchange between these different disciplines. ICEC 2015 aimed at celebrating the multidisciplinary nature of the area, and this is well demonstrated in this edited book by the variety and scientific quality of this year's program.

Overall, we received more than 100 unique submissions, from 31 countries, demonstrating the global interest for this research area and for ICEC 2015. Out of the total submissions, after a rigorous peer-review and meta-review process, we accepted 26 full papers and six short papers. To complement the oral presentations, the ICEC 2015 program also included six demos and 16 posters. Moreover, the main conference program was complemented by five workshops and two tutorials focusing on special topics of interest. In summary, ICEC 2015 offered an exciting program that provided an excellent overview of the state of the art in entertainment computing and an occasion for bringing research forward and creating new networks.

We are very proud of the final selection of papers, which would not have been possible without the effort and support of our excellent Program Committee, including 53 top researchers from 23 countries. We would like to thank all members of the Program Committee and all additional external reviewers for their work and commitment.

We thank our keynote speakers Florian "Floyd" Mueller, Yvonne Rogers, Alf Inge Wang, and Axel Tidemann.

Finally, this event would not have been possible without the help of all the great people who assisted us at NTNU, including our technical staff and student volunteers. We would like to specifically thank NTNU Videre for support with local organization and registration, the technical and administrative group at the Department of Computer and Information Science for the technical support before and during the conference, Tore R. Jørgensen for his support with the

VI Preface

conference organization, and Francesco Gianni for his aid in the editing process of the proceedings. We also thank our sponsors and supporting organizations.

July 2015

Konstantinos Chorianopoulos Monica Divitini Jannicke Baalsrud Hauge Letizia Jaccheri Rainer Malaka

Organization

General Chair

Letizia Jaccheri Norwegian University of Science

and Technology (NTNU), Norway

General Co-chair

Konstantinos Chorianopoulos Ionian University, Greece

Program Co-chairs

Monica Divitini Norwegian University of Science

and Technology (NTNU), Norway

Rainer Malaka University of Bremen, Germany

Local Chair

Sobah Abbas Petersen Sintef, Norway

Industry and Sponsor Chair

Andrew Perkis Norwegian University of Science

and Technology (NTNU), Norway

Web and Publicity Chair

Alf Inge Wang Norwegian University of Science

and Technology (NTNU), Norway

Doctoral Consortium Chair

Helmut Hlavacs University of Vienna, Austria

Workshop Chair

Jannicke Baalsrud Hauge BIBA, University of Bremen, Germany;

Kungliga Tekniska Högskolan, Sweden

Grand Challenge Co-chairs

Aisling Kelliher Carnegie Mellon University, USA Andrew Perkis Norwegian University of Science

and Technology (NTNU), Norway

Conference Advisory Committee

Matthias Rauterberg Eindhoven University of Technology,

The Netherlands

Sydney Fels The University of British Columbia, Canada

Hyun Seung Yang KAIST, Republic of Korea

Program Committee

Nikos Avouris University of Patras, Greece

Sander Bakkes University of Amsterdam, The Netherlands Christoph Bartneck University of Canterbury, New Zealand

Rafael Bidarra Delft University of Technology,

The Netherlands

Staffan Björk Chalmers University of Technology

and University of Gothenburg, Sweden

Pedro González Calero Complutense University of Madrid, Spain

Luis Carriço University of Lisbon, Portugal Marc Cavazza University of Teesside, UK

Luca Chittaro HCI Lab, University of Udine, Italy

Sung-Bae Cho Yonsei University, Korea Paolo Ciancarini University of Bologna; Italy

Esteban Clua Universidade Federal Fluminense, Brazil Kendra Cooper The University of Texas at Dallas, USA Nuno N. Correia Goldsmiths, University of London, UK Frank Dignum Utrecht University, The Netherland

Ines Di Loreto University of Troyes, France Jerome Dupire CEDRIC/CNAM, France

Owen Noel Newton Fernando NTU (Nanyang Technological University),

Singapore

Chris Geiger University of Applied Sciences Düsseldorf,

Germany

David Geerts KU Leuven, Belgium Kathrin Maria Gerling University of Lincoln, UK

Michail Giannakos NTNU, Norway

Nicholas Graham Queen's University, Canada

Marc Herrlich TZI, University of Bremen, Germany

Junichi Hoshino
University of Tsukuba, Japan
Kristine Jørgensen
University of Bergen, Norway
Börje Karlsson
Microsoft Research Asia, China
Evangelos Karapanos
University of Madeira, Portugal
Kwansei Gakuin University, Japan
Antonio J. Fernández Leiva
Universidad de Málaga, Spain

Antonio J. Fernández Leiva Universidad de Málaga, Spain Universidade de Aveiro, Portugal

Tim Marsh Queensland College of Art, Griffith University,

Australia

Maic Masuch University of Duisburg-Essen, Germany
Irene Mavrommati Hellenic Open University, Greece
Simon McCullum Gjøvik University College, Norway
Zlatogor Minchev Bulgarian Academy of Sciences, Bulgaria

Lennart Nacke University of Ontario, Canada

Ryohei Nakatsu National University of Singapore, Singapore Anton Nijholt University of Twente, The Netherlands

Valentina Nisi University of Madeira, Portugal

Manuel Oliveira SINTEF, Norway

Arttu Perttula Tampere University of Technology, Finland Johanna Pirker, Graz University of Technology, Austria Yusuf Pisan University of Technology, Sydney, Australia

Mike Preuss TU Dortmund, Germany

Matthias Rauterberg Eindhoven University of Technology,

The Netherlands
Teresa Romão DI/FCT/UNL, Portugal

Walt Scacchi University of California, Irvine, USA

Hyun Seung Yang KAIST, Korea

Nikitas Sgouros University of Piraeus, Greece Flavio Soares Correa da Silva University of São Paulo, Brazil Elpida Tzafestas University of Athens, Greece

Guenter Wallner University of Applied Arts, Vienna, Austria

Additional Reviewers

Aida Azadegan Mariela Nogueira-Collazo
Augusto Baffa Katharina Emmerich
Francesco Bellotti Laura Giarre'
Fernando Birra Zuzanna Hofman
David B. Carvalho Raul Lara-Cabrera

X Organization

Theodore Lim Edirlei Soares De Lima

Stefan Liszio Simone Mora Malte Paskuda Mark Rice

Johann Riedel

Andre Rodrigues Ralf Schmidt

Alexandre Ribeiro Júnior Silva

Ioana Stanescu Luis Valente Gabriel Zachmann

Supporting Organizations and Sponsors

 ${\bf International\ International\ Federation\ for\ Information\ Processing\ (IFIP)}$

The Research Council of Norway (NFR)

Trondheim Municipality

NTNU - Norwegian University of Science and Technology

Brainstorm

SINTEF

Adressavisen

Kahoot

NxtMedia

Interaction Design Foundation

ERCIM

JoinGame

Contents

Full Papers

A Mobile Game Controller Adapted to the Gameplay and User's Behavior Using Machine Learning	3
A Participatory Approach for Game Design to Support the Learning and Communication of Autistic Children	17
A Real Time Lighting Technique for Procedurally Generated 2D Isometric Game Terrains	32
Adaptive Automated Storytelling Based on Audience Response	45
ADITHO – A Serious Game for Training and Evaluating Medical Ethics Skills	59
A Battle of Wit: Applying Computational Humour to Game Design Dormann Claire	72
Advanced Dynamic Scripting for Fighting Game AI	86
Applied Games – In Search of a New Definition	100
Classification of Player Roles in the Team-Based Multi-player Game Dota 2 Christoph Eggert, Marc Herrlich, Jan Smeddinck, and Rainer Malaka	112
Design-Based Learning in Classrooms Using Playful Digital Toolkits K.J. Scheltenaar, J.E.C. van der Poel, and M.M. Bekker	126
Embedding and Implementation of Quantum Computational Concepts in Digital Narratives	140

EmotionBike: A Study of Provoking Emotions in Cycling Exergames Larissa Müller, Sebastian Zagaria, Arne Bernin, Abbes Amira, Naeem Ramzan, Christos Grecos, and Florian Vogt	155
Evaluating the Impact of Highly Immersive Technologies and Natural Interaction on Player Engagement and Flow Experience in Games Raffaello Brondi, Leila Alem, Giovanni Avveduto, Claudia Faita, Marcello Carrozzino, Franco Tecchia, and Massimo Bergamasco	169
Evolutionary Changes of Pokemon Game: A Case Study with Focus On Catching Pokemon	182
Game-Based Interactive Campaign Using Motion-Sensing Technology Alf Inge Wang, Mari Hansen Asplem, Mia Aasbakken, and Letizia Jaccheri	195
Gamification and Family Housework Applications	209
IdleWars: An Evaluation of a Pervasive Game to Promote Sustainable Behaviour in the Workplace	224
Interactive Digital Gameplay Can Lower Stress Hormone Levels in Home Alone Dogs — A Case for Animal Welfare Informatics	238
KINJIRO: Animatronics for Children's Reading Aloud Training Hisanao Nakadai, Lee Seung Hee, Muneo Kitajima, and Junichi Hoshino	252
Rogue-Like Games as a Playground for Artificial Intelligence – Evolutionary Approach	261
Software Architectures and the Creative Processes in Game Development	272
Storytelling Variants: The Case of Little Red Riding Hood Edirlei Soares de Lima, Antonio L. Furtado, and Bruno Feijó	286
Tags You Don't Forget: Gamified Tagging of Personal Images Nina Runge, Dirk Wenig, Danny Zitzmann, and Rainer Malaka	301

Contents	XIII
The Design Process Continues: Attending Experiential Values up to Version 1.0	315
Three Apps for Shooting Sports: The Design, Development, and Deployment	329
Jouni Saarni, Tomi "bgt" Suovuo, and Jouni Smed Yasmine's Adventures: An Interactive Urban Experience Exploring the Sociocultural Potential of Digital Entertainment	343
Short Papers	
Asterodrome: Force-of-Gravity Simulations in an Interactive Media Theater	359
Exploring the Importance of "Making" in an Educational Game Design	368
Simple Games – Complex Emotions: Automated Affect Detection Using Physiological Signals	375
Studying an Author-Oriented Approach to Procedural Content Generation through Participatory Design	383
The Role of Embarrassment to Shape Public Interactions	391
Towards Smart City Learning: Contextualizing Geometry Learning with a Van Hiele Inspired Location-Aware Game	399

Posters

Reflections on Prototyping	409
A Role-Switching Mechanic for Reflective Decision-Making Game	417
Adaptation to TV Delays Based on the User Behaviour towards a Cheating-Free Second Screen Entertainment	424
Exploring Deep Content in Physical Rehabilitation Games	433
Games, from Engaging to Understanding: A Perspective from a Museum of Computing Machinery	439
Interactive Painterly Rendering for Mobile Devices	445
Lessons from Practicing an Adapted Model Driven Approach in Game Development	451
Measuring Latency in Virtual Reality Systems	457
MindSpace: A Cognitive Behavioral Therapy Game for Treating Anxiety Disorders in Children	463
Noise Modeler: An Interactive Editor and Library for Procedural Terrains via Continuous Generation and Compilation of GPU Shaders Johan K. Helsing and Anne C. Elster	469
Serious Games: Is Your User Playing or Hunting?	475
Space for Seriousness? Player Behavior and Motivation in Quiz Apps	482

XVI Contents

Workshops and Tutorials

Workshop: AI and Creativity in Entertainment	553
Creating Video Content for Oculus Rift: Scriptwriting for 360°- Interactive Video Productions	556
Game Mechanics Supporting Pervasive Learning and Experience in Games, Serious Games, and Interactive & Social Media J.M. Baalsrud Hauge, T. Lim, S. Louchart, I.A. Stanescu, M. Ma, and T. Marsh	560
Making as a Pathway to Foster Joyful Engagement and Creativity in Learning	566
Playful Experiences and Game Concepts for Multi-screen Environments	571
Quantum and Entertainment Computing	575
Tutorial: Service-Oriented Architecture (SOA) Development for Serious Games	578
Author Index	581