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Matthias Rauterberg (Ed.)

# Entertainment Computing – ICEC 2004

Third International Conference
Eindhoven, The Netherlands, September 1-3, 2004
Proceedings

Springer

Volume Editor

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# Preface

The advancement of information and communication technologies (ICT) has enabled broad use of ICT and facilitated the use of ICT in the private and personal domain. ICT-related industries are directing their business targets to home applications. Among these applications, entertainment will differentiate ICT applications in the private and personal market from the office. Comprehensive research and development on ICT applications for entertainment will be different for the promotion of ICT use in the home and other places for leisure. So far engineering research and development on entertainment has never been really established in the academic communities. On the other hand entertainment-related industries such as the video and computer game industries have been growing rapidly in the last 10 years, and today the entertainment computing business outperforms the turnover of the movie industry. Entertainment robots are drawing the attention of young people. The event called RoboCup has been increasing the number of participants year by year. Entertainment technologies cover a broad range of products and services: movies, music, TV (including upcoming interactive TV), VCR, VoD (including music on demand), computer games, game consoles, video arcades, gambling machines, the Internet (e.g., chat rooms, board and card games, MUD), intelligent toys, edutainment, simulations, sport, theme parks, virtual reality, and upcoming service robots.

The field of entertainment computing focuses on users' growing use of entertainment technologies at work, in school and at home, and the impact of this technology on their behavior. Nearly every working and living place has computers, and over two-thirds of children in industrialized countries have computers in their homes as well. All of us would probably agree that adults and children need to become competent users to be prepared for life and work in the future. Especially children's increasing use of entertainment technologies brings with it both the risk of possible harm and the promise of enriched learning, well-being and positive development.

Between now and the near future, digital technologies will become more powerful and affordable for all users and at every level, in digital networks and in product offerings. An increasing number of people will be able to compile, program, edit, create and share content; as a result, they will gain more control and become more immersed in media experiences. But more than technical challenges, the social implications on human behavior will be of most importance. We need a media ecology movement to heighten consciousness to fight the waste and pollution that the media produces. It is indeed a question of the mental environment for our children and future generations. The questions we must ask ourselves are: Do we give them a world that is challenging, stimulating, inspiring, and really entertaining? Do we encourage their intelligence, creativity and curiosity?

To address and hopefully answer these questions and to advance this newly born area of entertainment technologies it is important to build a good relationship between academia and industry, and to set up a task force group. This was the main motivation that in August 2000 prompted the International Federation for Information Processing (IFIP) General Assembly to approve the setting up of the Entertainment Computing

Specialist Group (SG16) under the auspices of IFIP and the Committee for Cooperation with Industry (CCI).

First of all, the major efforts of SG16 activities were directed toward demonstrating that the subject could be mature enough to attract the broad interest of the ICT community. For this purpose a technical event, the 1st International Workshop on Entertainment Computing (IWEC), was planned, and IWEC Steering Committee members were appointed (Bruce Blumberg from MIT Media Lab, USA; Marc Cavazza from the University of Teesside, UK; Jaap van den Herik from the Universiteit Maastricht, Netherlands; Tak Kamae from Laboratories of Image Science and Technology, Japan; Donald Marinelli from Carnegie Mellon University, USA; Ryohei Nakatsu from ATR, Japan; Matthias Rauterberg from the Technische Universiteit Eindhoven, Netherlands; and Demetri Terzopoulos from the University of Toronto, Canada).

The first important opportunity came when IFIP TC13 on “Human-Computer Interaction" kindly offered a time slot for a first international panel on entertainment computing at the prestigious INTERACT 2001 conference in Tokyo (Japan) in July 2001. The IWEC Steering Committee decided to accept this kind offer to increase the presence of SG16 and IWEC. At the panel many participants showed interests in entertainment computing.

In the next year, 2002, the first international workshop on entertainment computing (IWEC) was launched. IWEC 2002 was successfully held at Makuhari (Japan) on May 14–17, 2002. IWEC 2002 attracted over 100 participants and over 60 papers were published in the proceedings by Kluwer (edited by Ryohei Nakatsu and Junichi Hoshino). At IWEC 2002 were many high-quality papers and several interesting technical demonstrations. In other words, evidence that entertainment computing was already an important technical area. At IWEC 2002 we had an extended SG16 meeting, and it was agreed unanimously that the formation of a new technical committee (TC) on entertainment computing should be proposed formally to IFIP at the General Assembly at Montreal in 2002.

Based on the success of IWEC 2002, SG16 organized the next International Conference on Entertainment Computing (ICEC 2003), that was held during May 8–10, 2003 at the Entertainment Technology Center at Carnegie Mellon University, Pittsburgh (USA). ICEC 2003 was also successful with more than 100 attendees, 20 highly select papers, several prestigious keynote talks, and invited panels. All the papers for ICEC 2003 were accepted by ACM for inclusion in their ACM online digital library.

To complete the first around-the-world cycle “Japan–USA–Europe", the 3rd International Conference on Entertainment (ICEC 2004) was held in Europe at the Technische Universiteit Eindhoven during September 1–3, 2004. This conference attracted 27 full papers. Around 150 attendees from academia and industry participated in this successful conference. In several parallel sessions full papers, short papers, posters, system demonstrations and exhibitions from industry were presented. The program included three well-received keynote talks, three specially invited topic talks, and an outstanding super-chess contest organized by Jaap van den Herik.

For more information about ICEC 2004 have a look at the homepage on the Internet: http://www.icec.id.tue.nl/

For making ICEC 2004 such an outstanding event, we have to thank the following people who volunteered in the organization: Jaap van den Herik and Anton Nijholt as co-chairs, Jacques Terken as review chair, Ben Salem as treasurer and chair of the organizing committee, as well as all members of the different committees, in particular the long list of distinguished experts from all over the world in the scientific and industrial program committee, the several sponsors, all cooperating societies, and last but not least all researchers who submitted and presented their outstanding research results at ICEC 2004, documented in this book. We gratefully acknowledge their contributions, effort and valuable input.

Eindhoven, June 28, 2004 Matthias Rauterberg

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ERCIM: European Research Consortium for Informatics and Mathematics
IOP-MMI: Innovation-Oriented Research Program Human-Machine Interaction

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Usability Professionals' Association

# IFIP SG16

A new Technical Committee (TC) on Entertainment Computing was proposed to IFIP (approval pending) in the following way:

## TC Title

Entertainment Computing

### Aims

To encourage computer applications for entertainment and to enhance computer utilization in the home, the technical committee will pursue the following aims:

- to enhance algorithmic research on board and card games
- to promote new types of entertainment using information technologies
- to encourage hardware technology research and development to facilitate implementing entertainment systems, and
- to encourage non-traditional human interface technologies for entertainment.

### Scope

1. Algorithms and strategies for board and card games (algorithms of board and card games; strategy controls for board and card games; level setups for game and card games).
2. Novel entertainment using ICT (network-based entertainment; mobile entertainment; location-based entertainment; mixed reality entertainment).
3. Audio (music informatics for entertainment; 3D audio for entertainment; sound effects for entertainment).
4. Entertainment human interface technologies (haptic and non-traditional human interface technologies; mixed reality human interface technologies for entertainment).
5. Entertainment robots (ICT-based toys; pet robots; mental commit robots; emotion models and rendering technologies for robots).
6. Entertainment systems (design of entertainment systems; entertainment design toolkits; authoring systems).
7. Theoretical aspects of entertainment (sociology, psychology and physiology for entertainment; legal aspects of entertainment).
8. Video game and animation technologies (video game hardware and software technologies; video game design toolkits; motion capture and motion design; interactive story telling; digital actors and emotion models).
9. Interactive TV and movies (multiple-view synthesis; free viewpoint TV; authoring technologies).
10. Edutainment (entertainment technologies for children's education; open environment entertainment robots for education).

*Members:* As first members of this TC, Ryohei Nakatsu is named as chair (contact: nakatsu@ksc.kwansei.ac.jp), Matthias Rauterberg as vice-chair, and Claudio Pinhanez as secretary.

*TC Activities:* The 3rd International Conference on Entertainment Computing (ICEC) was organized. The next ICEC will be held in 2005 in Japan. SG16 became a sponsor of the international 10th Advances in Computer Games Conference (ACG-10), that was held in November 2003 at Graz, Austria. Two panel sessions were organized: (1) at the IFIP TC13 INTERACT conference in 2001 (Japan), and (2) at the IFIP World Computer Congress in 2002 (Canada). An additional Topical Day "Virtual Realities and New Entertainment" was held at the IFIP World Computer Congress in August 2004 (France).

*TC Publications:* Ryohei Nakatsu and Junichi Hoshino (2003, eds.). Entertainment Computing, Kluwer Academic Publishers. Matthias Rauterberg (2004, ed.). ICEC 2004, Entertainment Computing, Lecture Notes in Computing Science, Vol. 3166, Springer-Verlag.

## Working Groups (WG) Under TC 'Entertainment Computing'

### WG16.1 Digital Storytelling

*Scope:* Storytelling is one of the core technologies of entertainment. Especially with the advancement of information and communication technologies (ICT), new types of entertainment called video games have been developed where interactive story development is the key that makes those games really entertaining. At the same time, however, the difference between interactive storytelling and conventional storytelling has not been well studied. Also, as the development of interactive storytelling needs a lot of time and human power, it is crucial to develop technologies for automatic or semiautomatic story development. The objective of this working group is to study and discuss these issues.

*Members:* As a first member of this WG16.1, Marc Cavazza is named as chair (contact: m.o.cavazza@tees.ac.uk).

*WG16.1 Activities:* Already there are several conferences/workshops on digital storytelling. To establish a link between IFIP and these conferences/workshops is the first activity of WG16.1.

### WG16.2 Entertainment Robots

*Scope:* Robots are becoming one of the most appealing forms of entertainment. New entertainment robots and/or pet robots are becoming popular. Also, from the theoretical point of view, compared with computer graphics based characters/animations, the robot is an interesting research object as it has a physical entity. Taking these issues into consideration, it was decided at the SG16 annual meeting that a new working group on entertainment robots is to be established.

*Members:* As a first member of WG16.2, Hitoshi Matsubara is named as chair (contact: matsubar@fun.ac.jp).

*WG16.2 Activities:* As a first activity of this working group, WG16.2 organized a national workshop on entertainment computing, Entertainment Computing 2003, held during Jan. 13–15 at Osaka (Japan). It attracted more than 120 attendees and 30 papers.

*WG16.2 publications:* The proceedings were published by IPSJ (Information Processing Society of Japan) as a special issue on “Entertainment Computing," IPSJ Symposium Series, No.1, 2003.

**WG16.3 Theoretical Basis of Entertainment**

*Scope:* Although there are huge entertainment industries already, such as video games, toys, robots, etc., little academic interest has been paid to such questions as what is the core of the entertainment, what are the technologies that could create new entertainment, and how can the core technologies of entertainment be applied to other areas such as education, learning and so on. The main objective of this WG is to study these issues.

*Members:* As a first member of WG16.3, Matthias Rauterberg is named as chair (contact: g.w.m.rauterberg@tue.nl).

Anyone who is qualified and interested in active participation in one of the working groups is kindly invited to contact one of the WG chairs.

# Editor's Note

ICEC 2004 attracted 62 full-paper submissions, 40 short-paper submissions, 8 poster submissions and 4 demo submissions, in total 114 submissions.

Based on a thorough review and selection process done by 93 international experts from academia and industry as members of the program committee, a high-quality program was compiled. The international program committee consisted of experts from all over the world: 3 from Australia, 3 from Austria, 3 from Canada, 1 from China, 1 from Croatia, 2 from Denmark, 1 from Finland, 6 from France, 15 from Germany, 2 from Greece, 2 from Ireland, 2 from Italy, 8 from Japan, 1 from Korea, 16 from the Netherlands, 1 from New Zealand, 1 from the Philippines, 1 from Singapore, 1 from South Africa, 3 from Sweden, 1 from Switzerland, 7 from the United Kingdom, and 12 from the United States.

The final decision was made by review and conference chairs based on feedback from at least two reviewers available online via the conference management tool. As a result, 27 full papers were directly accepted as submitted, and for the acceptable remaining 21 submissions their status was changed: 9 were accepted as short papers, and 12 as posters; 14 full-paper submissions were definitively rejected; 19 short papers were directly accepted as submitted, and for 10 others their status was changed, to 8 posters and 2 demo papers, for final acceptance; 11 short-paper submissions were definitively rejected; 3 poster paper submissions were accepted and 5 rejected; 3 demo paper submissions were accepted and 1 rejected.

Finally 27 full papers, 27 short papers, 18 poster papers, 3 demo papers, and in addition 3 keynote papers plus 3 specially invited topic papers were compiled and are presented in this book. All these papers could be allocated to one of the following topics: (1) advanced interaction design; (2) art, design and media; (3) augmented, virtual and mixed reality; (4) computer games; (5) human factors of games; (6) intelligent games; (7) mobile entertainment; (8) sound and music; and (9) visual media engineering. Papers per topic are ordered as follows: full papers, short papers, demo papers, and poster papers.

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