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Preface

These are the proceedings of the 9th International Conference on Advances in Computer Entertainment (ACE 2012). ACE has become the leading scientific forum for dissemination of cutting-edge research results in the area of entertainment computing. Interactive entertainment is one of the most vibrant areas of interest in modern society and is amongst the fastest growing industries in the world. ACE 2012 brought together leading researchers and practitioners from academia and industry to present their innovative work and discuss all aspects and challenges of interactive entertainment technology, in an exciting, cultural, and stimulating environment.

ACE is by nature a multidisciplinary conference, therefore attracting people from across a wide spectrum of interests and disciplines including computer science, design, arts, sociology, anthropology, psychology, and marketing. The main goal of ACE is to stimulate discussion in the development of new and compelling entertainment computing and interactive art concepts and applications. At ACE conferences participants are encouraged to present work they believe will shape the future, going beyond the established paradigms, and focusing on all areas related to interactive entertainment.

This was the 9th ACE conference, and the first time that such an entertainment computing conference was held in the emerging world. The theme of ACE 2012 was "Entertaining the Whole World," and Kathmandu in Nepal ("The Roof of the World,") was chosen as the venue. In line with the theme, ACE 2012 emphasized the use of easily available technology. Technology for entertainment design is becoming cheap or even extremely cheap. Designing interactive entertainment with commercial off-the-shelf technology (cheap sensors, Kinect, Arduino, etc.) is becoming regular business. How can we use this development to invent yet more new ways of harnessing the entertainment power of creating? Can we convert consumers of entertainment into creators of entertainment, where the process of creating is perhaps as important as the resulting product? Young people in emerging markets can become creators as well as consumers of digital entertainment. They can distribute their work through apps and the Internet, and through media creativity benefit their country and economy. We wish to strike up discussions and initiate projects that will benefit the emerging world through digital entertainment.

In order to emphasize the theme of the conference some special tracks and events were organized. One of them was the Art and Culture track, with papers, games and other forms of entertainment, and interactive works of art showcasing the diversity of art and culture found in today's digital artifacts. This diversity can also be found in the tracks on Creative Showcases and Demonstrations and the Poster and Late-Breaking Results tracks. All the presentations from the regular sessions and those of these tracks can be found in these

proceedings. We received about 140 submissions in the various categories (papers, posters, demonstrations, workshops, panels). From the regular paper submissions, ten papers were accepted for long presentations (about 14%), and 20 for short presentations (about 27%). Many poster papers and papers accompanying demonstrations could be accepted. There are agreements with some journals to have special issues devoted to some subthemes of ACE 2012 and containing a selection of the best papers from ACE 2012.

ACE 2012 had several satellite workshops. There were regular workshops on entertainment research and technology, but new for ACE and particularly important for the theme of the conference were the Entertainment Kids Workshops. The underlying idea of these workshops is that entertainment can empower children and young people in developing countries and communities with creative thinking and new media technologies. We hope to nurture and inspire young children to create new value propositions that will benefit their individual selves, communities, and countries. We want to view young children in developing countries as creative innovators and ambassadors of new technologies, rather than passive end-user consumers. And this last point in particular was addressed successfully in many of the proposals for Kids Entertainment Workshops that the organizers received. Several of these workshops could be organized, aiming at children aged between 4 and 12 as participants. Among the issues that were explored individually or in small groups we can find participatory design, using gaming platforms for body movement design, tangible interfaces and storytelling.

During plenary sessions of the conference two panels were organized. One panel was devoted to the results of the Kids Entertainment Workshops. The other panel was titled: Where Buddhism Encounters Entertainment Computing.

At ACE 2012, as in all previous ACE conferences, prizes were awarded for the best papers and best demonstrations. The top three in each category were awarded Gold, Silver, and Bronze prizes. For the first time, in 2012, there was a special "Diamond Best Award" for the best academic work in any category. This was co-awarded together with Springer, with a book prize sponsored by Springer.

ACE attendees brought books for donation in the fields of digital media, computer science, electronics, and related areas. These books were presented to a high school in Nepal during ACE. It is hoped that this will be a positive push that will allow some smart Nepalese kids to have a jump start in creativity. Although it is a small contribution to Nepal, we hope it will inspire a few young people to become creative media designers or interest them to become computer scientists or engineers, and perhaps start a new game or Internet service. We hope to create a "geek" culture.

ACE 2012 was organized in Kathmandu, Nepal. We think that there is a perfect match between the theme of the conference ("Entertaining the Whole World") and the location ("The Roof of the World") with its political and economic problems. Nepal is a developing country. It is a rich country when you look at people, nature, and ambitions. It is a poor country when you look at characteristics that play a role in comparisons between countries when measuring the economic situation and

economic developments. Obviously, ACE 2012 does not pretend to make immediate changes. But maybe the participants of ACE 2012 will learn from the theme, how it relates to a local situation, and how advanced research and advanced technology can be adapted to the affordable design and implementation of interesting entertainment applications. And, obviously, we hope the people that attended and experienced demonstrations learned that advanced research and technology can be used in creative and not necessarily expensive ways.

Part of the conference was organized in a Kathmandu hotel that hopefully, when necessary, will have utilities for generating its own electricity. For part of the conference there was no guarantee that electricity would be available owing to electricity rationing and power interruptions. Participants were asked to be prepared for situations in which they would have to present their paper, their poster, and their demonstration without having the guarantee that electricity is available. Workshop proposers and participants, including the Kids Entertainment Workshops, were asked to prepare their workshops and presentations in such a way that they could be successful without having access to electricity or when being forced to shift their activities to non-scheduled periods. We think that the creativity needed to deal with such situations is also helpful to designing and applying advanced entertainment technology in developing countries.

As can be expected, the organization of ACE 2012 was a team effort and a large number of people worked very hard to organize ACE 2012. A list of committees and committee members appears on the next pages. These committees were successful, because a record number of potential contributions were submitted and reviewed. However, particular thanks should go to Adrian Cheok who, together with our Nepalese research colleagues, took the daring initiative to have ACE 2012 in Nepal. And particular thanks should also go to the local organizers in Kathmandu for their pioneering efforts to make ACE 2012 a success, not only for the visitors from abroad, but also for the Nepalese community, from children to students, researchers, and policy makers interested in new and advanced technology and its use in creative applications that can bring joy.

August 2012

Anton Nijholt
Teresa Romão
Dennis Reidsma

Welcome Messages from the General Chairs

It gives me immense pleasure and utmost pride to welcome you all to the ACE 2012 conference proceedings. As we all know, the ACE conference is a multidisciplinary meeting attracting people of varied interests and disciplines across the globe. I feel honored and privileged to have such a mega conference held in the capital of the pristine Himalayan country, Nepal. Moreover, I am very happy to be one of the Organizing Chairs of the conference, hosted for the first time in Nepal.

All ACE participants were encouraged to present work they believe will shape the future, going beyond the established paradigms, and focusing on all areas related to interactive entertainment. I am very sure that the conference will make a tremendous contribution toward the development of new and compelling entertainment computing and interactive art concepts and applications.

I am also confident that the Kathmandu conference will be a vital guideline for future entertainment markets.

I hope you enjoy the proceedings of this event.

Aashmi Rajya Lakshmi Rana

Every nation has its own pop culture which can be developed and empowered by digital technology. This pop culture can bring about a stronger change and effect developing countries and children. I hope we have a happy convergence of culture and technology for everyone on earth!

Ichiya Nakamura

Organization

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Keynote Talks

Keynote Talk: Spreading ICT in India: Connectivity, Content, Devices and Training for a Billion People

Kannan M. Moudgalya

This talk explains the Spoken Tutorial methodology that creates instructional material on ICT, suitable for self-learning. During the last year, about 100,000 students were provided free training on many open source software systems, in 1,000 colleges, through student and faculty volunteers. One may also access these tutorials from http://spoken-tutorial.org free of cost. Synchronous support can be provided through an ongoing teacher training program that allows up to 10,000 people to interact with experts with audio-video connectivity. We dub only the spoken part of these tutorials into the many languages of India to teach ICT to children weak in English, while keeping the employment potential intact. This method has the potential to also bridge the digital divide.

The Indian government is also establishing 1GBps connectivity in every one of the about 1,000 universities in India and their affiliated colleges. To realize the benefits of these ICT tools and techniques, one needs computers, which are unfortunately not affordable to most Indians. To provide this important link, this Mission has come up with the Aakash project. As a part of this project, for testing purposes, we have placed an order for 100,000 units of a 7" tablet, at a cost of INR 2,263 (about USD 40). We have been successful in porting to Aakash, C, C++, Python, PHP and Perl, and also Scilab, an open source alternative to Matlab. This device will also help access video content, e-books, and the Internet through wireless. Based on the feedback obtained through this pilot study, we will freeze the specifications and order several million units. Aakash will be demonstrated during this talk. A video that explains the current state of Aakash is available at http://media.sakshat.ac.in/Play/?ID=1. These projects are funded by the National Mission on Education through ICT.

The work reported in this talk has the potential to be of use to all children of the world in general, and to those in the developing world in particular.

Brief CV of Kannan M. Moudgalya

Kannan M. Moudgalya is a professor at IIT Bombay. He studied chemical engineering and electrical engineering at IIT Madras and at Rice University. He has been a visiting professor at the University of Alberta. He has written two textbooks: (1) *Digital Control*, published by John Wiley & Sons, Chichester and (2) *Optimization: Theory and Practice*, jointly with M. C. Joshi, published by Narosa, New Delhi.

He has published a large number of papers in refereed international conferences and journals in the areas of mathematical modelling, control, and simulation. Kannan is now devoting his time to spreading education on a massive scale,

without quality dilution. He has been focusing on spoken tutorials, open source software systems, virtual labs and the low-cost tablet, Aakash. He has held the posts of Associate Dean (R&D), Head of Office Automation and Head of Distance Education, at IIT Bombay. He is a member of the Standing Committee of the National Mission on Education Through ICT, Government of India.

Keynote Talk: When Robots Do Wrong

David Levy

Before long, robots will be assisting us in many different aspects of our lives, becoming our partners in various practical and companionable ways and entertaining us. As robot and AI technologies advance, the proliferation of robots and their applications will take place in parallel with increases in their complexity. One of the disadvantages of those increases will be a burgeoning in the number of robot accidents and wrongdoings, resulting in enormous numbers of robot-based court cases throughout the developed world, many of them involving complex legal arguments based on technological evidence from expert witnesses.

Here we address the questions: What are the implications when something goes wrong? Who, or what, is responsible? Should responsibility be attributed to the robot itself, or to its manufacturer, designers or developers, or to its owner, or its operator . . .? And above all, how best should society deal with an ever-increasing number of robot accidents, their diverse causes and their negative consequences?

We discuss the concept of blaming the robots themselves for their accidents, based on three possible rationales for doing so: treating them as quasi-people, as quasi-animals, or simply as man-made products. And we examine how robots might be punished if society decides that they should take the blame for the accidents they cause.

We also consider the more likely approach of blaming homo sapiens, with the manifold complications that can affect the blame attribution process put forward as a powerful argument against society employing litigation as its primary response to robot accidents.

Robot vehicles are introduced as an example of a category of robot for which legal constraints already exist, namely, motoring laws, including the laws requiring cars and their drivers to be adequately insured. The idea of compulsory insurance, supported by a technologically driven system of enforcement, is extended from robot cars to robots in general as an alternative approach to litigation.

Brief CV of David Levy

David Levy graduated from St. Andrews University, Scotland, in 1967, and then taught practical classes in computer programming at Glasgow University for four years, before moving into the world of business and professional chess playing and writing. He wrote more than 30 books on chess, won the Scottish Championship, and he was awarded the International Master title by FIDE, the World Chess

Federation, in 1969. In 1968 David started a bet with four artificial intelligence professors that he would not lose a chess match against a computer program within ten years. He won that bet. Since 1977 David has been involved in the development of many chess playing and other programs for consumer electronic products. David's interest in artificial intelligence expanded beyond computer games into other areas of AI, including human–computer conversation, and in 1997 he led the team that won the Loebner Prize competition in New York. David won this prestigious prize again in 2009. His 50th book, *Love and Sex with Robots*, was published in November 2007, shortly after he was awarded a PhD by the University of Maastricht for his thesis entitled "Intimate Relationships with Artificial Partners." David is President of the International Computer Games Association, and CEO of the London-based company Intelligent Toys Ltd. His hobbies include classical music and playing poker.

Workshops and Panels at ACE 2012

Kids Workshops

- Dance It and Make My Sound with the Oriboo. Organizers: Elena Márquez Segura, Annika Waern, and Jin Moen
- Parapara Animation: Organizers: Daisuke Akatsuka, Brian Birtles, Hiroki Ito, Masami Ishiyama, and Satoko Takita Yamaguchi
- LuTrack: Bringing Tangible Interaction to Low-Computer-Literacy Children. Organizers: Javier Marco Rubio, Yoram Itzhak Chisik, Monchu Chen, Maria Clara Martins
- Playing with Blocks and Exploring Words and Sounds. Organizers: Cristina Sylla, Sérgio Gonçalves, Pedro Branco, Clara Coutinho, Valentina Nisi, and António Gomes
- Creative Design Workshop: Exploring Value Propositions with Urban Nepalese Children. Organizers: Alissa Antle and Allen Bevans

Regular Workshops

- Creating Pleasurable Interactive Brand Communications. Organizers: David Williams and Hiroaki Kawamura
- Mediated Yoga Experiences. Organizers: Monique Park, Mario Pinto, Monchu Chen, Valentina Nisi, and António Gomes

Panels

- Where Buddhism Encounters Entertainment Computing. Organizers: Daisuke Uriu, Naohito Okude, Masahiko Inami,Takafumi Taketomi, and Chihiro Sato
- Kids, Entertainment, Media Technologies and Developing Countries. Organizers: Yoram Chisik and Janak Bhimani

Partnership

ACE 2012 in Kathmandu, Nepal, was organized in partnership with EduPro:

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