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ACM SIGCHI International Conference on
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ACE 2004

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ACE 2004 CONFERENCE - INDEX

FULL PAPER

SHORT PAPER

ACE 2004 CONFERENCE - INDEX

SHORT PAPER

POSTER

ACM SIGCHI International Conference on Advances in Computer Entertainment Technology ACE 2004

Welcome Notes

Ryohei Nakatsu
ATR MI&C
Kwansei Gakuin University

Welcome to Singapore and welcome to ACE2004. ACE is a pioneering international conference in the area of entertainment computing. As you know, entertainment has been taking very important parts in our life by refreshing us and activating our creativity. Recently by the advancement of computers and networks new types of entertainment have been emerging such as video games, entertainment robots, and network games. As these new games have a strong power to change our lives, it is good for people who work in this area to discuss various aspects of entertainment and to promote entertainment related researches. ACE brings together researchers, developers, and practitioners working in the area of entertainment computing. I hope that by attending this conference you would learn the most recent research trend in this area and would have chases to exchange opinions with other researchers.

Mark Billinghurst
HIT Lab NZ
University of Canterbury

In 2001 for the first time worldwide revenue generated from computer games was higher than that from films. Since that time computer entertainment has continued its dominance over more traditional media. Despite this, academic and industrial researchers have not had a forum in which to discuss computer-based entertainment. ACE 2004 was established to meet

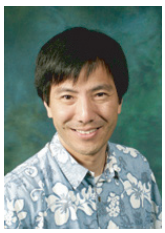
this need. For the first time there is a conference at which researchers can present referred papers on this important topic, meet others in the field and see leading edge computer entertainment technologies.

Computer Entertainment is an exciting topic that crosses over a large variety of different areas such as human computer interface design, computer music, graphics, software and hardware development, education, psychology and communication. In an era where researchers are becoming increasingly specialized it is refreshing to be able to participate in a truly multi-disciplinary field. Attendees at the conference should relish the opportunity to discover the links between their research interests and those from a range of different disciplines.

Although I am listed as one of the general chairs, the driving force behind this conference has been Adrian Cheok and the other members of the organizing and program committees. I would like to thank them on behalf of all the conference attendees for the outstanding work they put into organizing the event. I know that they have put in countless hours into getting the conference to this point.

Welcome to ACE 2004, I hope that you gain a lot from it and that together we can lay a strong foundation for a continuing conference series on computer entertainment.

Gino Yu
MIC
The Hong Kong Polytechnic University



Entertainment applications are becoming the main factor driving innovation in digital technology. As what we see and hear influence how we feel, think, and interact, entertainment applications can drive personal development and global transformation. I welcome all participants to this exciting event and hope our interactions will stimulate collaboration that fuels further innovation.

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Keynote Speech Notes

Takashi Totsuka
Content and Applications Lab
Sony Corporation

Why your mom does not appreciate your work?

When Marconi did the first transatlantic wireless communication, there was no need to explain the value. 50 years ago, if you had said to your mom that you were working on a television with color, she would have appreciated it and been proud of her son's hard work. But now, I believe many of you spend tougher time than at your Ph.D oral defence to explain your work to your girlfriend only to win vague smile by courtesy. You are working as hard, thinking as hard. Then what's wrong?

Most of the problems are now solved by software. Even radios are software defined. Thus, physical constraints have been dramatically removed from our problems and it becomes much easier to realize what you imagine. The problem domain is shifting quickly. In the past, it was about solving a problem (HOW part). Now, it's more and more about finding a valuable problem (WHAT part). We all knew it and we all also knew it's tough. One reason why it's tough is the system we have. Our scientific education, problem solving methodologies, even academic conferences are all tuned for the HOW part.

How can we increase our batting average of finding and defining a good problem? I think one fundamental key is to understand human. In my talk, I would like to discuss two approaches to understand human. These approaches could be the lighthouse for us to guide our research activities.

Ernest W. Adams
Freelance game designer, writer, and lecturer

The Future of Computer Entertainment, 2005-2050

As an entertainment medium, computer gaming is influenced by a number of forces which do not affect better-established media such as books, movies, and television. Interactive entertainment is experiencing technological advancement at a rate which far outstrips that of older media, and this will have a profound effect on the quality of the experiences we deliver. However, technological progress is only part of the story. Even more significant changes will come about as a result of economic growth in the Third World, shifting demographics in Western markets, closer cooperation with other media distributors, and changes to the data transmission infrastructure. This lecture delineates these trends, then examines how they are likely to affect the kinds of games that we play and how we play them.

Thad E. Starner
GVU Center, College of Computing
Georgia Institute of Technology

Mobile Interaction Interfaces

Today more wearable computers are sold annually in the form of mobile phones and MP3 players than are desktop or laptop computers. Given current technology trends, body-worn devices will quickly approach the capabilities of today's desktop computers. For example, in four years users will be able to carry over one terabyte of data on their persons. However, while the technology is improving rapidly and becoming ubiquitous, mobile interfaces remain relatively undeveloped and prevent the delivery of more sophisticated services to the mobile user. We describe three mobile interaction thrusts at Georgia Tech: chording text entry, dual-purpose speech, and gesture interfaces, and we will relate these projects to potential entertainment scenarios.

While over 1 trillion wireless messages will be exchanged in 2004, text entry is still limited to a frustratingly slow 10-20 words per minute (wpm) on mobile phones. We will present an analysis of the Twiddler one-handed chording system which allows up to a 70 wpm average text entry on a mobile phone keypad. In addition, we will present evidence that this typing method

is surprisingly fast to learn for novices and can be performed "blind" (i.e. with no visual feedback) with little effect on typing speeds and accuracy. Such a rapid text entry system that can be used while interacting in the physical world enables a variety of applications, including mobile email, chat, location-based annotation systems, and real-time, real-space role playing games.

Mobile speech interfaces are inappropriate in many social situations. For example, when being introduced to a new colleague, telling one's computer "Computer: remember that I met Mark Billinghurst at ACE2004" while still in conversation is extremely disruptive. In addition, even these interfaces are not dependable due to high mobile speech recognition error rates. We present a series of "dual-purpose speech" projects where the user phrases his speech to follow socially appropriate scripts while simultaneously controlling a wearable computer interface. Such systems enable new forms of communication and cooperation between teams of colleagues and new interactions with on-body computers.

We will examine a series of projects that exploit gesture recognition for creating mobile interfaces. Telesign attempts to create a mobile American Sign Language to English translator. MINDWARPING allows a user to gesture to defend himself against opponents in an augmented reality game. BlinkI allows a user to communicate with his computer via eyeblinks; such a system could be used to control night vision goggles or an augmented reality gaming interface. Finally, Digitaler allows low-power gesture recognition for consumer electronic devices that will become too small for push-button interfaces (e.g., portable MP3 players the size of hearing aids).

Mark Billinghurst
HIT Lab NZ
University of Canterbury

Augmented Reality Entertainment: Back to the Real World

Humans have a natural need for play, and use many of their inventions for entertainment. Computers are no exception. From the days of the first interactive applications, computers have been used for game playing. As the interface has changed over the last several decades the computer games have become increasingly sophisticated. The children of the 1980s spent hours playing Pong with one bit graphics while the X-box generation of today play in nearly photorealistic three dimensional desktop virtual environments. Although there has been a quantum improvement in the graphics and computing power in today's computer entertainment it is questionable that they provide a quantum increase in fun. Clearly there are some key elements that the best games have that transcends the technology itself. For example the text based adventure game *R*ogue from the 1980s was just as addictive as

the modern graphical adventure game *D*iablo. Hughes et. al. [3] identify three elements of compelling entertainment applications; Imagination, Reality, and Virtuality. They suggest that the best way to creating an interactive experience is to create games that use both real and virtual world content to stimulate the player such that their imagination fills in the gaps and they become truly immersed. These three elements combine to create what they term *M*ixed Fantasy. Augmented Reality (AR) is an ideal technology for providing these elements. This is interface technology that enables virtual information to be overlaid on the real world. The first AR interface was developed in the 1960s and since that time the technology has proven valuable in many application areas such as medicine, archaeology and engineering. However there has been little research on AR entertainment. AR technology provides an intimate connection between the real and virtual world and so provides an ideal entertainment platform. For example the ARQuake application [6] allows people to shoot virtual enemies in the real world, while Human Pacman [2] brings the classic game of Pacman outdoors. Augmented Reality technology may be particularly valuable for enhancing face to face collaborative entertainment. When players sit around a table to play a board game they can easily see each other at the same time as the game pieces. In this case the game space is a subset of the communication space. However with screen based entertainment the players are focussed on the screen and away from each other. In co-located AR gaming the game space is once more encompassed in the communication space. For example, in the Shared Space application [5] players around a table try to match virtual objects that appear overlaid on real cards. People found the application easy to use and even total strangers played together. Similarly, the AR2 Hockey [4] application used AR technology to reproduce the classic game of air hockey. Once again, the AR interface was found to enhance natural face to face collaborative behaviours. AR techniques can also be used to provide entertainment experiences not possible with other methods. In the MagicBook interface [1] AR technology is used to smoothly transition a user from the real world to an immersive virtual experience. When a user looks at the real page of a real book through a handheld display they see virtual imagery popping out of the page. The virtual content appears attached to the real book pages, thus providing an Augmented Reality view. When the user finds a virtual scene they particularly like they can fly inside it and experience it as a fully immersive virtual environment. So, as can be seen, AR provides an ideal platform for entertainment experiences. Now is the time for the game developers to explore this technology, and in doing so produce entertainment experiences that break through the screen space and enhance interaction in the real world.

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