

DECC Workshop

Lorentz Centre, Leiden

Report on the first day: Entertainment & Gaming

(Day 1, 10-04-2006)

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Day 1 of the workshop consisted of two parts: talks in which some selected participants presented their vision of the future of gaming by looking at some important developments in nowadays gaming and entertainment. During the second part of the day three subgroups discussed the following topics:

- The Structure of Games
- Virtually There
- Entertainment and Society/Social behavior

1 Talks during the first day

The following talks were held during the Entertainment & Gaming Day,

- Introduction to this Roadmap Workshop (Matthias Rauterberg, University of Eindhoven)
- Game Research for Training and Entertainment: Proposals and Projects (Anton Nijholt, HMI (Human Media Interaction), University of Twente)
- Applied Research in Video Games (Jeffrey Goldstein, Utrecht University)
- Learning and Adaptation of Game AI (Pieter Spronck, University of Maastricht)
- On-line gaming is not about gaming it is about socializing (Jurriaan Van Rijswijk, Dutch Broadband Foundation (NBL))
- When the Storyteller is a Computer (Mariet Theune, HMI (Human Media Interaction), University of Twente)
- “Play” - Games, musical instruments, video and architecture (Bert Bongers, Eindhoven University of Technology, Vrije Universiteit Amsterdam)

During and after the talks there were extensive discussions causing the lectures part to take most of the day, rather than just the morning session. Abstracts of the talks and biographies of the speakers can be found in Appendix 1 and 2, respectively.

2 Discussions during the first day

During the first day three topics were identified that required further discussion. Three subgroups were formed. There is no formal record of the discussions, but below the main issues for each group are collected.

2.1 The Structure of Games

- **Human-like non-player characters.** We need more realistic non-player characters. These should be “more realistic” in the sense that they should display human-like behaviour (rather than have realistic looks). One aspect of this is that

they should be capable of reacting realistically to everything the human player does, even if it is irrelevant for the progress of the game. This requires that non-players are somehow aware of the role they play in the game and the behaviour that is expected from them in that role. Another aspect is that non-player characters should have human-like communication skills. The player should be able to converse with them in natural language (possibly typed but preferably spoken). One way to accumulate knowledge about appropriate character behaviour / communication would be to first let human players take on the character's role and store their actions in a database, from which non-player character behaviour can be learned automatically.

- **Adaptive gameplay.** Computer games should be able to adapt automatically -- *during* gameplay -- to the skill level of the user.
- **Bringing a story to the game.** In current multi-player on-line role-playing games (MMORPGs), new storylines, challenges and characters have to be introduced to the game on a regular basis, to keep the players interested. It would be good if we could somehow (partially) automate this task by making it the responsibility of a drama manager agent, which monitors the game and makes changes when necessary. For this purpose, drama management techniques from research on interactive storytelling should be explored. User-friendly authoring tools are needed to make it possible for players without programming skills to write new storylines, develop new levels/characters etc. for their favourite game. Current authoring tools are not very accessible and make high demands on the users' programming skills.
- **Evaluation.** Work on human-like characters, adaptive game play and drama management should be tested with real users in a real MMORPG (using a local version of a commercial game). This will allow for objective measurements on scoring and efficiency. However, improving subjective experience of a game seems even more important. This leads to the question how entertainment value can be measured.

2.2 Virtual There

- **The Paradigm.** Gaming is the next paradigm for social interaction – today's art is being influenced by the gaming paradigm. Even when art is being influenced by the gaming paradigm, artistic research as forerunner for the development applications for gaming is very interesting.
- **The Space.** When developing game applications it is important to have an integral approach to the spaces of social interaction (urban space + games). The integral approach to gaming in the urban reality can help to establish game research as a research and development area.
- **The Societal Effects.** Gaming supports the development of social skills. Gaming supports "digital literacy".
- **The Embodiment.** Mobile technology is a very important area of research and development because it is a direct "embodiment" of the "virtual".

2.3 Entertainment and Society/Social behavior

- **Investigating the long term influences of entertainment on society.** Much research is done on short-term effects of entertainment on behavior. However, phenomena such as “virtual laws” in MMORPGs, skill transfer between the virtual world and the real-world, social contacts established in the virtual world (and the way of establishing contact), are dynamic processes defined over long periods of time. We need to focus on the long-term influence of entertainment on society and personal/collective behavior. Such long-term focus is also needed to characterize to what extent digital entertainment affects cognitive/motor/social skills.
- **Towards a digital entertainment ontology.** Digital entertainment consists of a vast collection of technologies, content and human participants. Many relations exist between these elements, such as *first person shooters increase player visual perception*. If DECC wants to investigate in a systematic way the different digital entertainment types, effects on cognition /emotion /behavior, fundamentals of entertainment value, associated risks, possible social changes, etc..., a digital entertainment ontology seems needed.
- **Entertainment and environmental perception.** Entertainment can be used to influence cognitive, affective and behavioral states. This is relevant to long-term space flight. First, can entertainment be used to influence time perception in a controlled way (related to the concept of *flow*)? Second, can entertainment (e.g., via a *personified avatar* metaphor) be used to influence the perception of (the size of) a human’s personal space (e.g., enlarge perception of size compared to actual size). Third, what is the role of the inverse of entertainment, *boredom*? Research at Stanford University showed that scheduled periods of “doing nothing” can increase students’ performance on cognitive tasks.
- **Play as person-world interaction metaphor.** Children play to learn. Can digital entertainment also teach useful skills in an entertaining and playful way to adults? [Review research literature to establish which specific skills can be acquired through entertainment media.] What are the limits of entertainment-based /VR training? An example of the *play as person-world interaction metaphor* related to long term space flight could be the “space-ship-as gaming interface”. To limit boredom during, e.g., a Mars mission, when internet and real-time communication is no longer feasible, the mission becomes a game, with the space-ship as interface. Normal (real) maintenance and control tasks are embedded into a game “shell” and additional game tasks are added by that shell. Unexpected events that cannot interfere with the actual safety can be simulated and astronauts have to solve these. Such events can be training-related. Astronauts’ responses can be monitored and sent back to earth. An interesting leveled architecture arises, astronauts are on a serious mission (real-world), they perceive the “game-enriched” mission as serious (perceived world), but the interface is still a game (virtual world).
- **Health and mental health. Role of games for pain management.** Relation between games and control over personal space.

3 Conclusions

The general feeling after the first day was that it had been a very interesting and fruitful day. There was also the feeling that more time was needed to discuss the issues that were brought up by the various speakers. And certainly there is more time needed to elaborate the notes that were taken during talks and discussions into a full-fledged roadmap. Most participants seemed to be eager to continue the discussions and the emerging collaboration. Hence, some kind of a sequel to this meeting is expected.

Appendix 1

Abstracts of the talks of the first day

- **Game Research for Training and Entertainment: Proposals and Projects (Anton Nijholt, HMI (Human Media Interaction), University of Twente)**
Abstract: This is a short presentation in which we discuss a few recent research projects and some possibilities for project proposals in the near future, both in the Netherlands and in Europe. We will in particular look at the recently approved GATE project and, if time permits, some of our own work.
- **Applied Research in Video Games (Jeffrey Goldstein, Utrecht University)**
Abstract: Three uses of video games are described: 1. Video games as assessment and as measures of performance. 2. Video games as training and practice in cognitive and perceptual skills, biological and physiological functioning, and cooperation and teamwork. 3. Video games as entertainment. Selected studies are described for each domain. The purpose is to suggest the many possible roles for video games in the context of the space program.
- **Learning and Adaptation of Game AI (Pieter Spronck, University of Maastricht)**
Abstract: Modern computer games are among the most challenging environments to build effective AI for. It is no surprise that the state-of-the-art for game AI does not achieve the same sense of realism as the state-of-the-art in computer sound and graphics. Currently, game developers still program all game AI manually. As they cannot foresee everything the human player will do, and are unable to get a solid grasp on all emergent properties of game worlds, the game AI they produce usually is predictable, uncreative, and prone to make fundamental mistakes. Adaptive techniques are needed to enhance game AI in such a way, that it can cope with the challenges posed by modern game worlds. While such techniques are as yet not used by game developers, they hold the key to the future of game AI that is able to deal with the ever-increasing complexity of games.
- **On-line gaming is not about gaming it is about socializing (Jurriaan Van Rijswijk, Dutch Broadband Foundation (NBL))**
Abstract: In this presentation I will give a overview of the social aspects of on-line gaming. For a large group of people, the virtual world becomes part of their life and with that part of the 'real' life. Actually there is no distinction between virtual and real life. Topics and examples are both entertainment gaming and serious gaming.
- **When the Storyteller is a Computer (Mariet Theune, HMI (Human Media Interaction), University of Twente)**
Abstract: People create and tell stories for many different purposes: to provide entertainment or to share valuable lessons, to make sense of unstructured information and make it easier to remember, to pass on cultural heritage and form social bonds, and combinations of all of these. These days, the art of storytelling

is no longer reserved for humans only. Digital Storytelling, which I define as the automatic creation of stories by computers (with varying degrees of human involvement) is a growing research field, and the power of Digital Storytelling for entertainment, education and many other applications is starting to be widely recognized. In this talk I will describe some existing and potential applications of digital storytelling, and discuss some of the (many) problems that are still unsolved. I will illustrate this with examples from international research on storytelling, as well as our own work on storytelling at the University of Twente.

- **“Play” - Games, musical instruments, video and architecture (Bert Bongers, Eindhoven University of Technology, Vrije Universiteit Amsterdam)**

Abstract: Entertainment is often about playing. One can play a musical instrument, physical or computer games, DJ's play records, VJ's perform with video. Playing can involve the architectural space or the natural environment. In this presentation I will briefly show a number of projects, mostly from my own practice of the design of interfaces which enable people to play and perform.

Appendix 2

Biographies of the speakers of the first day

- **Matthias Rauterberg** is fulltime professor for 'Human Communication Technology' first at IPO, Center for User System Interaction Research, and later at the Department of Industrial Design of the Technical University Eindhoven (TU/e). He is the Dutch representative and vice-chair of the IFIP SG16 on 'Entertainment Computing'. He is also the chair of the IFIP WG16.3 on 'Entertainment Theory'. He holds an appointment as visiting professor at the Kwansai Gakuin University (Japan). He is also a nominated member of the 'Cream of Science' in the Netherlands (the 200 top-level Dutch researchers) and listed among the 10 top-level TU/e scientists. His recent research is in the area of entertainment computing, human-computer interaction, cognitive systems, and design science.
- **Anton Nijholt** is full professor of computer science at the University of Twente, Enschede, the Netherlands. He is heading the HMI (Human Media Interaction) research group of the University of Twente. The group consists of about forty staff and research members, including some eighteen Ph.D. students working on multimodal interaction, multi-media presentation and multimedia information extraction and retrieval. Research results (papers and demonstrations) have been presented at conferences and workshops on Computer Human Interaction and on Entertainment Computing.
- **Jeffrey Goldstein** has been with the Department of Social & Organizational Psychology at Utrecht University since 1991. Among his 16 books are *The Psychology of Humor; Sports, Games, and Play; Toys, Games, and Media; Why We Watch: The Attractions of Violent Entertainment*. He is co-editor with Joost Raessens of *The Handbook of Computer Game Studies* (2005, MIT Press). Goldstein is a fellow of the American Psychological Association and the American Psychological Society. He serves on commissions for the Netherlands Institute for the Classification of Audiovisual Media (www.kijkwijzer.nl), and PEGI, the European video games rating board (www.pegi.info).
- **Pieter Spronck** studied Computer Science at the Delft University of Technology and graduated cum laude in 1996. Since 1987 he has been working as a software engineer, knowledge engineer, researcher, and project leader. Since April 2001 he is affiliated to the Computer Science Department of the Universiteit Maastricht. He received his Ph.D. in 2005, with a thesis titled "Adaptive Game AI". He has published about 50 articles in international journals, books, and proceedings. His research interests include evolutionary systems, adaptive control, computer game AI, multi-agent systems and knowledge technology. Currently his research focus is on the investigation of machine learning for commercial game AI.
- **Jurriaan van Rijswijk** M.Sc. The first game consultant in the Netherlands. Started with programming Pong on his Sinclair ZX81 spectrum mounted to a black and white TV he focused during his study at the University on climatologically models and Geographic Information Systems. At his first job he let people literally play with business and process models. The first 'real' game he was involved developing was for the second World Water Forum organized by

the UN. For more than ten years gaming is Jurriaan's main professional focus. He knows what's going on in the mass consumer on-line gaming market. And he builds bridges as game consultant towards social impact gaming or serious gaming, among other things for the Dutch Broadband Foundation (NBL). He is co-founder of Game Entertainment Europe (the first pan-European publisher of Massive Multiplayers) and shareholder in WZZRD, a European chain of game café's.

- **Mariet Theune** is responsible for the research on virtual storytelling in the Human Media Interaction group of the University of Twente. She coordinates the work of a rather large group of students and staff members contributing to this research area. This research has led to several presentations in well known storytelling workshops and others. Presently she supervises a Ph.D. on storytelling. Her research, funded by NWO, also includes research on natural language and gesture generation.
- **Bert Bongers** (1964) is researcher and lecturer (assistant professor in HCI) at the VU Amsterdam, leader of the educational domain of Entertainment at the Industrial Design department of the TU Eindhoven, and free lance developer of electronic musical instruments, live video performances, and interactive architecture. He has a background in both engineering and the human sciences, and has written his PhD thesis on "Interactivation", describing his approach to the design of interactive environments as an electronic ecology or *e*-ecology of people, technology, and the relationship with the artistic domains. He has lectured and published about his work at conferences, in academic journals, and wrote a small book about the *e*-ecology.

Appendix 3

Email addresses of the participants of the first day

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