

Something eerie?

KARL-PETTER ÅKESSON, JAN HUMBLE

SICS - Swedish Institute of Computer Science AB

P.O. Box 1263

164 29 Kista

Sweden

kalle@sics.se, humble@sics.se,

+46 31 773 55 42

+46 8 751 72 30

Abstract: In this paper we describe an ongoing project that aims to create tools for computer based role-playing games that utilize the physical world as setting. Tools for creating and authoring as well as support for a game-master controlling the game will be developed. We briefly describe a first prototype and the results gathered from reviewing it.

Keywords: *Context awareness, role-playing, interactive environments, augmented reality, computer games*

Introduction

The efforts to create interactive environments have been ongoing within the research community since the early 90's and our work in the area is based on the experiences of creating collaborative virtual environments. We realized that not only the design of the virtual environment was important but also the physical one had equal importance [1]. The change to include design of the physical environments was specifically addressed in the KidStory [2] project that had the goal to create a story space for children's authoring and retelling of stories. Currently we address this in the ACCORD [3](Administering Connected Co-Operative Residential Domains) project and the eErie [4] (eerie Enhanced Reality Interactive Experience) project, the later described in this paper.

The eErie project

Games based on pervasive and ubiquitous computing are the subject of a new research area. The goal of eErie is to briefly explore a wide variety of related

issues and the results of such will generate new projects that study separate issues more in detail.

Quests and mysteries along with exploration of unknown and unfamiliar environments are the main themes for several top selling computer games such as Myst [6] and Monkey Island. This is also a fundamental part of role-playing board games and How-To-Host-A-Murder-Mystery role-playing games. We found it would be an interesting challenge to study how such games can be created utilizing the physical environment instead of a computer generated one. A common strategy to create an interesting and fascinating game-world is to introduce the element of unnatural phenomenon, either as some futuristic technology or medieval magic. We want to study how ubiquitous computing can be used to create an illusion of such phenomenon.

The potential in creating interactive environments was one of the results from KidStory [5] that we found most compelling and we wanted to expand our focus group to include adults as well. eErie will not only study how to build these environments but also what authoring tools are needed.

A shared physical environment invite people to collaborate, compared to an isolated computer based experience. Therefore we believe player collaboration will be a natural part of these kinds of games. A form of gaming that relies on player collaboration to a large extent as well as utilizing the physical environment is live action role-playing games (LARP)[7]. Even though the games we are interested in are much more task oriented we believe there is much we can learn from the LARP-world.

To summarize, the goals of eErie are to create and explore tools for enhancing reality with technology with the purpose of creating a collaborative experience to be explored together with others through role-playing. In this paper we describe the project more in detail, the ongoing work and related activities.

Related work

Research teams have been challenged by the task to create physical interactive story environments for several years and among the first was a series of immersive environments at New York University [9]. These were rooms designed to tell a story that would be experienced by visitors. The rooms had physical objects that were used as input to a program that controlled lights, sound, and

video. Later, the MIT KidsRoom [10] used projected images and camera tracking to let children explore an imaginary world they were immersed in. Justine Cassell and her group at the MIT Media Lab have demonstrated several different systems that both utilize conversational agents [11] and create authoring opportunities for children [12]. The main difference with the later compared to the earlier ones is that the story is not fixed. The system lets a child record its own voice while she is playing out a story on a mat. Previously recorded story material is played back when the child brings his or her toy over the different areas of the mat. The authoring capabilities of story environments have been directly addressed both by the StoryRooms [13] and the KidStory projects, the later emphasized on creating shared collaborative tools for children's storytelling. The eErie project will carry on the work from KidStory but not only restrict the user group to children but include adults as well to find any existing differences.

Others have also used the physical world around us as a gaming environment, such as the Pirates game project [14] where the relative physical location determined where in the game world the user was. In the game, players travel between different islands with their ships represented by a PDA (Personal Digital Assistant). The islands are different locations in the physical room and when the ship, the player with his or her PDA, has moved to an island the player can take advantage of what is located there. Though in Pirates the physical location was merely used to navigate a virtual world we shall use the physical environment as where the game takes place, similar to Bot-Fighters [15] that uses mobile phone positioning in a combat game. While moving around in a city the players receive SMS messages on their mobile phones about who is in the vicinity and their attack status. By replying to these messages one can select to retaliate or run away to flee from the attacker. RV Border Guards [16] is another example that uses the physical surrounding as the game world. It is an augmented reality game that uses HMD (Head-Mounted Displays) to overlay game graphics onto the room. Augmented reality in general deals with the issues of superimposing computer graphics on the world around the spectator. Within our project we do not confine to graphics but rather use a diversity of media along with the strands of ubiquitous computing to integrate the computing power in the actual physical space. Geo-caching [17], a web-based treasure hunt utilizing GPS positioning, uses the physical world extensively. The geo-caching web site includes a long list of

treasures that players have hidden at different challenging locations. Hints and riddles are provided together with GPS position data and a short description of the treasure leading the hunter to it. With the tools we foresee it will be possible to create this kind of game but also add a storyline as well.

The eErie project is also related to context-aware computing that deals with the issues of how to make computers more aware of their surrounding. For such we will employ and evaluate results such as indoor-positioning systems and use of sensor, etc in the tools we create, e.g. to detect movement of game artefacts.

First experience

The project started early 2001 with a discussion on how different technologies, such as positioning, object and player identification, game control and messaging, can be used. By using a specific technology in a smaller scenario we will be able to gather an understanding of appropriate usage. A fundamental component of stories and computer games is the division into story segments. The main story is divided into several minor scenarios and the combination of these gives a richer and more complex story. We shall adapt the same technique for the enhanced environments.

During the spring, a first single-player scenario was constructed and we let a number of users (10 to 15) experience it, not a formal study. They ranged in background from computer science researchers to average computer users, all with at least some basic computer knowledge. Before starting to explore the environment the player was given a device and a short background description that informed him or her what the device might do. When the user entered the first of two rooms a soft but strange voice was heard from the device.

– Hello, my name is Sebastian. Can you help me?

Sebastian, a ghost, could only be heard through the device. If the user complied with Sebastian's request, he would ask the player to pickup a certain book from a shelf in the room. As a ghost he is unable move physical objects and therefore needs help to bring the book into the other room. When the player had fulfilled Sebastian's request and placed the book where he wanted, he told them his gratitude. This ended the very simple scenario.

Each run through took 1-2 minutes and the users were not interviewed, but provided some positive feedback from the experience, mostly commenting on the innovative aspects.

The device was an iPAQ PDA with a Wireless LAN and an audio headset connected to it. All sound files for Sebastian's voice were stored on the PDA and were activated by a control panel on a PC. A game-master had two video cameras monitoring the two rooms and activated the different actions by entering the events into the game engine through the control panel. The scenario above used the technology to mediate an unnatural phenomenon but this is not necessarily the case. For instance the PDA above could have acted as a communication device for an undercover organization. We believe it is important for the technology to be an integrated part of the fictional environment and from a story perspective be as invisible as possible, i.e. the technology used should be an integrated part of the story. The PDA in the scenario above is presented as a device constructed by a bizarre researcher and not as a simple PDA. He claims it is possible to contact the spiritual world with the device. The unconvinced player can ignore to use the device making it more difficult to complete the quest.

Further work

Role-playing is used today for both education and entertainment. Role-playing a conflict in a company can be an effective way to learn how to handle such situations at a later time [18]. Several of the most popular online games today are massive multiplayer role-playing games [19], MMRPGs, such as Asheron's Call and EverQuest. Among the first was Ultima Online that still 3 years after its release in 1997 had over 100.000 registered players [20].

During the autumn we will concentrate the work on supporting the role-playing section of eErie. A sub-project will be carried out together with a company that uses role-playing in the management courses they sell. We will explore the kind of support that is needed and implement it. We foresee that support for a game-master, also called facilitator, guiding players and controlling the game space will be most important. By using for instance separate audio channels for each player the game-master can directly give personal instructions to each player without interfering or interrupting and will thus change the way the traditional game-

master works. Giving the game-master the tools to monitor player position either through video surveillance or player positioning would ease supervising the game. Our research focus for this project is not the study of how a game engine should be designed. We will emphasize more on the role of the game-master and explore how he or she can change or manipulate the storyline to create a more intriguing story. We will explore the use of intelligent underlying systems (such as Prolog) in the aid of the game-master. We will evaluate how it may automate the game engine and allow the game-master more freedom to concentrate on tasks at hand. A game master's decision could be dynamically inserted onto the game play and subsequently apply to future scenarios of the same kind reducing repeated monotonous actions.

A game-master could improvise a complete game scenario building the knowledge database in the process. The database could in turn be used to replay the game with minor intervention from the game master, or stand as a base for a more complex and substantial complete scenario. Also, multiple game-masters should be able to add to the database in a non-obtrusive manner. The introduction of multiple game-masters on the same game scenario adds issues of coherence if a game state is to be saved and maintained. We shall thus consider differences between keeping track of a game state and a free game play.

Regarding specific technologies we have identified the need of different kinds of positioning data, the granularity of the precision varies depending on the event. For instance, in the scenario described earlier it is necessary to determine if the player has entered the room and if the book has left its place in the shelf. A precision of a few meters is enough to position the player in the room but not acceptable for the purpose of the book. The ideal solution would be a highly accurate positioning system with wide area coverage both working indoors and outdoors, but we are not aware of such a system and therefore a combination of different available techniques have to be used. When developing the scenario described earlier we considered using a combination of door sensors to detect if and when the person entered the room and RFID tags to detect if the book was placed on the table or removed from the still. With the door sensors it was not possible to differentiate if someone left or entered the room and people tended to place the book on different locations at times in the still and at times on the table. The use of video made the system much more flexible and robust as the observer

decided when the prerequisites for an event were fulfilled. For instance, if the user placed the book on the chair instead of the table, Sebastian could still thank them for the help. We will further explore how different positioning and identification techniques can be used to address these problems and how the game-master can dynamically change the game engine.

Due to the un-obtrusive nature of sound we consider it to be the most important media for creating the environments envisioned and therefore streaming of individual as well as multicast sound is necessary. Combining this with the possibility to swiftly change and combine a large set of filters and effects could give the game-master the possibility to act as several non-player characters more or less simultaneously.

Discussion

A common strategy to create an interesting and fascinating world in role-playing games and in most computer games is to introduce the element of unnatural phenomenon, either as some futuristic technology or medieval magic. With carefully designed technology we believe a working illusion can be created for some of these. A source of inspiration for this is Arthur C. Clarke's third law, which states, "Any sufficiently advanced technology is indistinguishable from magic"[21]. This is generally interpreted as a statement of advanced technology as being as incomprehensible as magic. But one can also interpret as the possibility to create magic with sufficiently advanced technology. For instance one could quite easily create a divine voice, speaking to every one at the same time, or give someone the ability to hear much better.

During the last decade and a half the computer game industry has become one of the major entertainment producers and has a yearly turnover of several billion US dollars. Until the ubiquity of the Internet, computer games engaged only one or a few players simultaneously but with the increased availability of the Internet multiplayer games started to appear. MUDs (Multi-User Dungeons) were among of the first and today most of the games released have some kind of multiplayer option. Massive multiplayer games have entered the market and are engaging several thousands of players each day. How and if the predicted explosion of ubiquitous computers will change the computer gaming world is not obvious. The project described in this paper might be one among several first indications to a

change in future gaming. Though this change has not only implications on the gaming as such but as well as the use of public space as these games will use it extensively.

Conclusion

In this paper we have described an ongoing project that explores how ubiquitous computers and sensors can be used to create an enhanced reality for a gaming experience. We specifically aim these games at the role-playing genre and therefore will concentrate the work at player interaction and game-master support. The goal is to create a set of tools for authors of these games to be able to create an enhanced gaming environment in an easy manner. Other tools will support the game-master during the actual event to create a thrilling experience.

A first demonstration of a minor scenario has been carried out and was well received by a number of players. The need for flexible positioning and identification was identified. Next the project will address the issues of aiding the game-master.

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