Semi-Automatic Film-Direction Technique In Internet-Based Interactive Entertainment

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Abstract

Interactive entertainment permits users to participate actively. In this paper, we consider the importance of cinematic presentation in internet-based interactive entertainment. We propose that a tool for the artistic and technical representation of presentation-layer demands of interactive entertainment already exists: a system called DirectorNotation. This system can provide the ability for the creation of artistically significant, adaptive, context sensitive, interactive, actionable multimedia content. In the work that has been presented so far on DirectorNotation, the applications that are considered target the professional film director in his filming activities to produce better results, or consider the “Artificial Intelligence” possibilities of exploiting a knowledge model of film directing. In this paper, we aim to create a connection to the domain of interactive entertainment, showing that this application area can achieve highly promising improvements by exploiting the suggested technology combination.

Key-words: Interactive entertainment, interactive storytelling, DirectorNotation

1. Introduction

Nowadays, interactive entertainment is demanded more and more and with as many ways as possible. The aim of interactive entertainment is to permit to the user to participate actively or/and change the flow of a show, a game story or even of a film or a TV series that is created using people advice. Today, users don’t make do with only watching a story or show or playing a computer game with amazing 3D graphics, but with a predefined story. They want to participate and follow a story that its continuation is created in real-time according to their choices, intentions and preferences.

In order the creative user interaction to be achieved, it is necessary for the content that will be adapted to have been created with a tool, easy in use, that permits authors to describe a flexible scenario for a scene, a dynamic situation, a character behaviour, interesting camera motion and inter-character relations and adaptive camera settings, lighting, etc. Some of these aspects involve customizing the story itself. Other aspects are related to the presentation of the story.

In this paper, we make the suggestion that DirectorNotation can be a useful tool for precisely the latter aspect given above, i.e. the presentation layer of interactive entertainment. Especially in a multi-user, fast-paced internet-based interactive story experience, the presentation capabilities need to be highly sophisticated – dynamic and adaptive and aesthetically well formed. DirectorNotation is a symbolic language that describes the conceptual content of a film/video creation [1][2][3][15]. It describes actors’ movements, camerawork and lighting, allowing extremely expressiveness. It is as music notes that provide a
language for the writing of music or as choreography for the writing of a dance. It is an abstract language, that is, it describes the conception and not every detail of the desired creation.

However, DirectorNotation is being developed with a strong focus on achieving “traditional” applications. It is mainly intended for use by a professional film director preparing a movie. Interactive entertainment is not considered as an application area. In this paper, we propose that the ability to describe the film creation process in such a formal language would also offer a very good way to prepare the presentation of content that is to be adapted in real time to end-user interactions.

In the next sections, we present related work, briefly introducing interactive entertainment and DirectorNotation we show the importance of the possible contribution of DirectorNotation if used in interactive entertainment, and finally we give some conclusions.

2. Related work

2.1. Introduction

Some kinds of interactive entertainment are the interactive storytelling and the interactive television. In case of interactive television, for instance, it is permitted the audience to change the flow of a show by the ability of voting.

In case of interactive storytelling, there is a predefined story, a specific plot concerning facts and occurrences and only the telling of the story is done interactively. Player plays the role of the protagonist in a dramatically rich environment. Interactive storytelling takes advantage of the Artificial Intelligent and integrates real-time artificial intelligent techniques into graphic environments.

The first published interactive storytelling software is Façade [16], where the player coaches a couple that has a relationship breakdown.

Storytron [17] is an interactive storytelling website where each “storyworld” is a universe of dramatic possibilities. The player, playing the role of the story's Protagonist, can shape into different stories.

StoryMash [18] is another interactive storytelling website where users can create short-stories, novels or screenplays and they can publish them. Each published creation can be continued by the initial author or other users, and so, many versions of an initial story can be created.

INSCAPE [19] is a project that aims to provide tools for authoring non-linear interactive stories from idea to implementation. The authors write an interactive story idea, sketch images, and make storyboards, and the tools produce the interactive story. Ability of playing back and testing the interactive story is provided, so as to see if the desired result is achieved. It is hard to judge the success and capabilities of INSCAPE, as it is a project that is still running. However, it seems likely that in focusing on the amateur user, although this is an important application, it will not, however, offer the best capabilities possible for professional, expert storytellers. We should stress the distinction here: the best interactive storytelling will usually be created by very capable authors, like the best books are written by excellent authors and the best films are made by excellent directors; but we still don’t expect these authors to be technology experts, and thus easy authoring tools are needed even for professional authors, not just for the amateurs. But the professional tools must have very great expressive ability at the artistic level.

Finally, at a more technical level, about interactive storytelling, it has proposed the Hierarchical Task Network (HTN) planning [4][6][7][8]. In this case, the basic actions of a story are determined. But for each action many alternatives (secondary actions) are given until the initial basic action can be achieved. The actions have a hierarchy where the basic actions are found at the top and the secondary actions that obtain a basic action are sub-branches of this basic action. User may interact whenever during story, moving objects or making secondary actions to fail. When a secondary action fails, then another secondary action of the sub-branch is realized. The same process is realized until the basic action to be achieved.
Another proposed planning method for interactive entertainment is Heuristic Search Planning (HSP) [8]. This planning provides handling of long-distance dependencies and it supports more variable and complex situations than HTN.

Although, there have been done many attempts for interactive storytelling, these are, until now, linear or primitive or just text-based (e.g. Storytron). It is permitted to user to deal with story, but there is no visual expressiveness. The camera also is not expressive, but simply follows user movement in the virtual world. For instance, the Façade, that was reported, uses a first-person view. StoryMash, INSCAPE and HTN planning method lacks the ability of introducing user’s intention and expressiveness.

Furthermore, computer games despite of the very good graphics that provide, they are low-level artistic. New games must be created that will provide a creative content and that will permit players to be interactive at the level of the story. Interactive character-based storytelling can introduce better narrative content into games.

The “classical” arts provide a predetermined artistic creation. Interactive artistic creation is still immature and there are no mature tools to aid this creation.

2.2. **DirectorNotation** exploitation

DirectorNotation is a symbolic and abstract language that describes the conceptual content of a film/video creation and offers great expressiveness. It describes the conception and not every detail of the desired creation. Many details of body language do not be specified at the Director’s level, so as, in case of film, to allow actors to have interpretative freedom. Similarly, as far as the storytelling is concerned, user is not interested in such details, but he only cares about the result of desired interaction.

User can be interactive to a creation giving directions (where the actor or avatar to move, what to say, etc) by DirectorNotation description. Actors see the symbols and they execute them in real-time. Correspondingly, in case of computer games or animation demands, avatars “follow” the instructions given by DirectorNotation input.

Apart from the basic movements and relations of characters, additional abilities can be allowed. For instance, it can be provided an emotion symbol that determines the avatar emotion (e.g. angry, happy, etc) and by which is specified the avatar face expression according to the current emotion. Also, it can be permitted to specify phrases that the user wants the avatar (or actor) to say.

3. **Architecture**

In this section, we propose an architecture for authoring interactive storytelling. We use existing technologies as components. The purpose is to demonstrate that the integration of existing tools that have so far not been used together can offer valuable new functionality.

StoryTron provides a text-based interaction with the player. The only visual part in StoryTron as it stands today is the display of the faces of the characters that the player is interacting with [9]. The language that is used for interaction is Deikto [9][11].

The first expansion that we have considered is that cinematic presentation could easily be achieved by following the existing work on automatic expressive cinematography, e.g. [20][21][22][23]. Cinematography could be expressed in a language such as DCCL [12]. Technically this is a tractable solution, as these tools are designed for full automation of cinematic presentation, and in our scenario manual scripting is also possible for more difficult situations. The real problem is that using these tools requires strong programming skills, while an interactive storytelling system such as StoryTron is designed for a non-computer-expert user, e.g. a typical author or screenwriter. Thus, technically interesting cinematography can be integrated with text-based interactive storytelling, but an appropriate user interface must also be found.

As a solution to the challenge identified above, we propose that using DirectorNotation, it is able to be provided, additionally, the graphical presentation of the story, at an artistic level by an author who is not a
computer programmer. DirectorNotation thus fills the gap and offers to the authors important capabilities, hiding the technical level. Authors will notate the intended story presentation by DirectorNotation and a DirectorNotation compiler will translate the notation to a final animation expressed in appropriate technical form, e.g. DCCL.

Thereafter, we describe the architecture that we propose. We will use the example of StoryTron, where a man, called Knifer, threatens the player with a knife to give him his bicycle.

The architecture is displayed in Figure 1. There is the initial part of a story. The author continues the story with various versions giving options to players to interact in the story (e.g. when player is threatened by the Knifer, he can accept or reject the treat or take an initiative). The route of the story is determined by the choices of the player.

![Figure 1. The architecture of our proposal for authoring storytelling](image)

The author determines the various versions of the story route by Deikto. Additionally, the author will determine the graphical presentation of the story by DirectorNotation, the environment specification and the character emotion specification.

With DirectorNotation, he will specify the characters that will take part in the scene (e.g. Knifer, player), the actions of these characters (e.g. Knifer moves towards player), the characters orientation (e.g. Knifer looks towards player) and the camera (e.g. short shot to the Knifer so as be emphasized the baleful Knifer and get more frightening atmosphere) and lighting settings (e.g. dark so as to make the environment more frightening).

With environment specification he will determine the scene (e.g. a remote park at night, a remote road) and the objects that will be appeared (e.g. knife, bicycle).

With character emotion specification, he will show the emotions of the participated characters (e.g. rough and angry face for the Knifer, and afraid or fearless face for the player according to his choice – acceptance or rejection of threat). For the character emotion specification it will be used the FaceGen which creates and adjusts faces.

When the author finishes with DirectorNotation, the DirectorNotation will be translated to an animation by DirectorNotation compiler. That is, the compiler takes as input the notation of author and gives as output the
adaptive animation script. This compiler uses existed technologies for character motion, for camera settings and for lighting settings. For camera settings it is used the DCCL [12] and for lighting simple low-level lights can be determined as in a typical animation/rendering engine, but more sophisticated tools can also be used, e.g. the expressive lighting engine [13] is worth integrating into this architecture (partially, of course, because its input is changed from sensors on human actors to input from the DirectorNotation compiler). The resulting animation will concern only the characters and their movements and the camerawork and lighting.

A complete animation will be provided when author specifies all the necessary data, that is Deikto, DirectorNotation, Environment specification and character emotion specification. So, the complete animation will be as the animation that is provided by DirectorNotation, but moreover it will be displayed the environment, the characters emotion and the choices that are given to player for interaction by Deikto.

In Figure 1, is also displayed the role of author and player. The author creates an initial story and specifies the continuation of this story by Deikto and its equivalent graphical presentation by DirectorNotation, environment specification and character emotion specification. The player sees the complete animation and is asked by Deikto to interact to the story. He decides and responds by Deikto and with this way the story is continued. New choices are presented to the player and by his decisions the story progresses and so on.

In Figure 2, it is displayed a user interface so as author can determine the necessary data for the story and its presentation without knowing any technology. There are lists that determine for each scene the characters, the environment, the objects, the camerawork, the lighting settings, the frame that characters will be located to the scene and the emotion, the motion and the orientation of the characters. For instance in motion list we can see some of the actions symbols of DirectorNotation. Also, it can be determined possible speech of the characters. Finally, there are buttons for animation, suggestions, determination of new timestamp or new scene, save, help and search. In the screen, we show the user choices. X-axis indicates the time. In this figure, we can see a simple example where until now user decides that there are two characters, the one is located at the down left part of the screen whereas the second one at the center down part of the screen. The second character is talking and so the camera placement is external by left with long view [12]. At the next timestamp, the first character is talking and so the camera placement is external by right with long view.

4. Conclusions

Concluding, an artistic representation of desired creations in interactive entertainment is very important and gives to the users a much more immersive experience. There are technologies that can provide such presentations but are created for engineers and so artists have a difficulty to use them. In this paper we describe an architecture that integrates text-interactive based storytelling tools with technical
presentation tools for delivering interesting cinematography. DirectorNotation is then used to bridge the gap identified, solving the difficulty for the author. It offers a representation in conceptual level and not a technical specification. This system can improve interactive entertainment by providing additional capabilities, as demonstrated by the integrated architecture described. Further work can be done so as to be provided to the authors a tool that can easily describe the graphical presentation of stories and sceneries that are created real-time and an equivalent animation to be achieved.

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