VR-NaSty - VR Character Narrator with Story based Suspense Support

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ABSTRACT

We describe the VR-NaSty system as well as its evaluation and discuss some implications for the presentation of information. The VR-NaSty is a virtual narrator, which gets its content information enriched with meta information about a underlying story structure. It uses this information to calculate the expressiveness (or intensity) of its facial expression and its hand gestures. We designed the system to be adaptable to all kind of information presentation - management information systems, tale presentation for children or narration at an exhibition. We describe the evaluation of the system and therefore proof its usefulness. By interpreting the evaluation results we derivate implications for the use of gestures by virtual characters.

Keywords

Virtual Storytelling, Virtual Narrator, Virtual Characters, Suspense Schemata, Graphical-Interactive Systems, Human-Computer Interaction

1. INTRODUCTION

If one wants to narrate a story, one first have to have a story. It is a story if there has something happened to talk about. Heinrich Meyer [Mey72] told this in the book "The Art of Narration", and this was exactly the starting point of our research. While investigating in interactive storytelling for Management Information Systems, Education and Interactive Storys for children, we developed a story processing unit, the so called story engine (see [Bra03a], [Bra03b], a discussion of the literary aspects of the approach can be found in [Bra02]), based on the semiotic principles of story as they are told by V. Propp [Propp68], a Russian formalist of literary of the early 20th Century. His semiotics is based on morphologic functions, roles (dramatis personae) and dependencies between morphological functions, loops and moves. The story engine uses these principles, enhances them with so called polymorphic functions to generate an interactive adaptable story from a set of story fragments. The story engine is used in several projects, but soon we found that it is a difference between having a story and *narrating* the story, even if the story fragments are known and the story structure is well defined and interactive accessible by the user. We used scripts to control the virtual actor performed narration of story fragments [SB03], so called scenes. Therefore, most of the acting of the used virtual characters is predefined, they do not have a *knowledge* of the story structure, every expressiveness and acting has to be handmade by 3D Animators. To overcome this situation, we concentrated on the art of narration: the difference between narration and simply speaking a text loud while reading it.

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2. Related Work

Virtual storytelling systems are typically distinguished in character-based plot – and script based plot development, see [Theu03]. Closely related to our approach is the work of Silva et al [Sil01]. With the Papous project, they presented a virtual storyteller, whose hand gestures and facial expression are defined via tags by the author of the story. In opposite to this approach, we use meta information about suspense to calculate gestures and facial expressions by the system itself.

Another approach closely related to ours is the work of Szilas, see [Szi01] and [Szi03]. He defined several narrative criteria around the personal conflicts of the actors. Our approach concentrates on suspense as the major factor of narration, we find in personal conflicts one of the factors of suspense.

To get more into narrative details, we start with the principles of narration in the next paragraph.

3. The VR-NaSty

The Narrator

If one uses the classic epic form of narration as a start, she find that there is no mimetic presentation – the narrator is the central figure of the narration, the narrative presentation of the story is only shortly broken up by actor-like play presentations of the narrator himself. As the narrator is the only one to narrate the story to the audience, he tries to catch the audience and to narrate the story in an engaging way. The narrator is on the thin line between the reality of the story and the reality of the audience, he has to tell the story in a way that both realities can come together as one. The usage of words is not enough for this task, he has to adapt his whole expressiveness to the narration. This could imply the acting of short scenes, for example by using his head to look in several directions (e.g. looking left and right to simulate a discussion of two characters) or by adapting his voice to the several roles within a story. The narrator has to interpret the story and uses the most important elements of the story to raise suspense, therefore he increases the important aspects and decreases the minor important aspects that could hinder the immersion of the audience, this to take his audience into his story wonderland. These actions differ narration from simply speaking loud the text of a story.

The Variants of Suspense

As Laure-Ryan [LR01] says, stories do not tell information, they tell truth in a couple of actions. This concept takes a lot of time, just in case the audience is not capable to get an abstract truth (e.g. 'If you follow the words of your parents you will be happy, if not you will be punished'). The audience has to get this truth within a story (for example Grimm's *Hänsel and Gretel*) to catch the audience attention for the truth. Commonly, one uses suspense to get the truth to the audience. When examining tutorials and guidance to narration, we find that this assumption is true - suspense seems to be a major aspect of telling a story. We found three general aspects in suspense.

A typical constellation of raising suspense is to give a situation of danger or problems, with the hope to solve the problems, to the audience. The audience should ask their self how they would handle the situation or how they wish the hero of the story should handle the situation.

A second constellation of the raise of suspense is the riddle, for example, murder stories of Arthur Conan Doyle or Agatha Christie. The end of the story is predefined, the suspense raises by the stepwise investigation of circumstances and actions that lead to the murder (the riddle).

The third constellation of raising suspense is not dependant on the actions or the characters, but simply in the way the author handles a commonly known story genre in his own style (Examples are the books of Stephen King and the books of Richard Bachmann, both of the same author).

Suspenseful Narration of Stories

The approach discussed in this work uses the danger- or problems situation to catch the audience's attention for the truth of the presented information. The suspense is raising in relation to the problems occurring to the hero and the way he is solving the problems. The Virtual Narrator has to understand exactly the ongoing actions and situations of the story, this to increase or decrease the aspects of the story. We use three concepts to understand the ongoing actions in a story.

The first one is based on the morphology of the story we use. We identify the aspects of the actions in the story and indicate suspense points for several morphological functions and the concatenation of these functions. For example, the *fight of the hero* against his opponent is one of the most suspenseful functions of a story. The *win of the hero* is also suspenseful, but not as suspenseful as the fight itself. Therefore we use annotations called the *Suspense Progression*.

The second concept uses the conflict potential between the several roles of a story. The situation, where a conflict initialises, rises, escalates and is solved are aspects of a story that are enlighten by a narrator, they are more substantial for the story than the actions that are used to keep the believability of the story on track. We call this annotations the *Narrative Conflict*.

The third concept takes into account the relevance of a function for the ongoing story. For example, if the audience did not get the birds eating the bread of Hänsel and Gretel, they do not know why the kids are lost in the deep, dark forest. The narrator should use this accentuation to raise expectations of the audience. The annotation is the *Narrative Relevance*.

These three concepts are used to give the virtual narrator an understanding of the story. With this

understanding, it can adapt its expressiveness to the story, therefore its speech, gaze, head movement and gestures.

Especially the gestures are of great value to give the audience a hint on the suspense of the ongoing story (compare to paragraph Evaluation and Results).

Development

The system contains of three general parts:

- The story part, given as the story model, the story content and the story engine.
- The behaviour part, given as the behaviour manager (coupled with behaviour rules) and the gesture manager (coupled with gesture meta data).
- The virtual character with a text to speech system and synchronised lip movement, facial expressions and hand gestures, like shown in figure 1.

The information (the content) is stored in a Story Content DB as scenes. These scenes are selected by the Story Engine, get enriched with suspense annotations and transferred to the Behaviour Manager. There, the suspense information is calculated to an expressiveness value within the interval [0..1] and used to control the Virtual Character. Details of the implementation are described in [BrRi03].

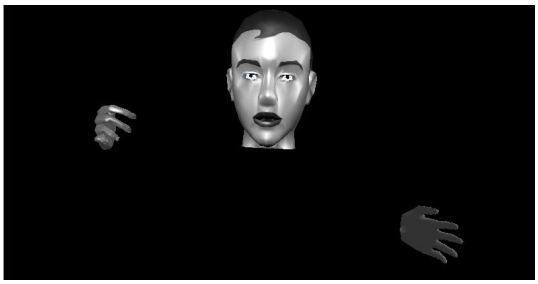

Figure 1: Hand gestures for the story part 'struggle with the enemy'

4. Evaluation and Results

The evaluation of the VR-NaSty System was done with the following questions in mind:

Is the VR-NaSty able to substitute a human narrator?

We reduced this question to the following:

Are the gesture and facial expressions of the VR-NaSty adequate to the narrating situations?

Evaluation test configuration

To answer the question we had to choose a story to be told by the virtual narrator – this time, we used the story of Jorinde and Joringel, see [Gri03] for details of the story. The story in short words:

Jorinde and Joringel pass by a castle with a witch in it. The witch bewitches Jorinde and puts her into a cage. Somehow Joringel has to overcome the situation. After a while, he finds a magical flower that helps him to free Jorinde and to kill the witch. They live happily ever after.

The structure of the story is a slightly reduced scheme of the Propp-story structure, therefore easy to adapt to the story engine.

We prepared two tests.

The first test (Test 1) presented the whole Jorinde and Joringel story, this to get a rating of the narrative quality of the VR-NaSty system.

The second test (Test 2) presented two scenes of the story in five different emotion and suspense states of the VR-NaSty, this to verify the calculated expressiveness of the VR-NaSty in relation to the expressiveness the audience would like to see within the scene.

Then we invited 14 persons to the evaluation and split them in two groups:

Group A got the first test (Test 1) without any emotional facial expression and with randomly selected gestures.

Group B got the first test (Test 1) with system-calculated facial expression and gestures.

The groups got the same content of the story, as well as the same voice of the virtual character. Also, we reduced the visual presentation to a generic face and hands to limit the variables of the evaluation.

The second test (Test 2) was the same to both groups.

The VR-NaSty itself was presented on a simple PC with speakers and the common interaction possibilities of keyboard and mouse. The evaluation audience had to rate the system with a so called think aloud test – the test persons tell their impression while being exposed to the test, their impressions were written down by a test coordinator, they also were able to do notes by their self, see figure 2. The evaluation was done in an office, two test persons were able to do the tests at one time.

Evaluation test results

For the first test, Test 1, we got the following results:

Group A described the presentation of the system as monotonous.

Group B gave a lot of positive critics to the presentation of the system. As a little drawback, the notes of the users are mostly related to single scenes and not to the presentation over all.

For the second test, Test 2, we got the following results:

Regarding to the facial expressions, 60 % of the users voted the same expressiveness as calculated by the system for the first scene, 75 % of the users of the second scene.

Regarding the hand gestures of the first scene, 60 % of the users voted for a gesture intensity that was 0.2 degrees below the expressiveness proposed by the system. About 55% of the users of the second scene voted for a gesture intensity that was equal to the expressiveness proposed by the system.

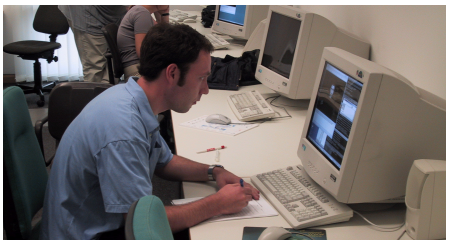

Figure 2: Evaluation of VR-NaSty

Interpretation of the evaluation results

The result of Test 1 shows an advancement of the presentation when using the VR-NaSty as a suspense controlled virtual narrator. The audience seem to have more fun with the story when getting it with expressive gestures that combine well with the current suspense level of the story.

Test 2 showed, that the system need to be advanced in relation to the expressiveness values that are the basis to calculate the hand gestures intensity. There is a need for more empirical data about the intensity of hand gestures while telling a story.

Both test showed: Every gesture, done by the VR-NaSty, was interpreted as a reference to a story element. This caused some oddities, for example, VR-NaSty showed both hands held up with the inside up while talking about Jorinde – most of the male test persons made clear statements about body aspects of Jorinde, but the gesture was not at all meant to show aspects of her body. Therefore we guess that a system that uses gestures always need a possibility to re-adjust gestures in special situations.

5. Conclusion

The so called VR-NaSty, a Virtual Character narrator with story based suspense support, offers new possibilities of telling information to all kind of people. If for management, for education or for children – the VR-NaSty can produce a presentation of an narrative expressiveness that keeps the information in the minds of the audience. He uses expressive facial expression as well as hand gestures that indicate the suspense level of story fragments. The evaluation of the system showed good results, people enjoy the presentations and felt an advancement of the information presentation.

6. REFERENCES

[Bra02] Braun, N. Automated Narration, the Path to Interactive Storytelling, Workshop on Narrative and Interactive Learning Environments, Edinburgh, Scotland, 2002.

[Bra03a] Braun, N. Storytelling in Collaborative Augmented Reality Environments, Proceedings of the WSCG, Plzen, Czech, 2003.

[Bra03b] Braun, N. Storytelling and Conversation to Improve the Fun Factor in Software Applications, in: Mark A. Blythe, Andrew F. Monk, Kees Overbeeke, and Peter C. Wright (ed.): Funology, From Usability to Enjoyment , Chapter 19, Kluwer Academic Publishers, Dordrecht, ISBN 1-4020-1252-7, 2003.

[BrRi03] Braun, N. and T. Rieger Expressiveness Generation for Virtual Characters, based on the Principles of Suspense Progression and Narrative Conflict, International Workshop on Mobile Computing, IMC 2003, Rostock, Germany, 2003

[Gri03] Gebrüder Grimm Jorinde and Joringel, provided by Rick Walton's Online Library, http://www.rickwalton.com/ , 2003.

[LR01] Laure-Ryan, M. Narrative as Virtual Reality, John Hopkins University Press, 2001.

[Mey72] Meyer, H. Die Kunst des Erzählens (The Art of Narration), Francke Verlag, Bern, 1972.

[Propp68] Propp, V. Morphology of the folktale, University of Texas Press, 2nd edition, 1968.

[SB03] Schneider, O. and N. Braun Content Presentation in Augmented Spaces by the Narration of Interactive Scenes, in First Research Workshop on Augmented Virtual Reality AVIR03, University of Geneva, Switzerland, 2003.

[Sil01] Silva, A., Vala, M. and A. Paiva Papous: The Virtual Storyteller, Proc. Of Intelligent Virtual Agents, Third International Workshop, IVA 2001, Madrid, Spain, 2001.

[Szi01] Szilas, N. A New Approach to Interactive Drama: From Intelligent Characters to an Intelligent Virtual Narrator, in: Proc. Of the 2001 Spring Spymposium on AI and Interactive Entertainment, Stanford, USA, 2001.

[Szi03] Szilas, N. Idtension: a narrative engine for Interactive Drama, , in Goebel, Braun, Spierling, Dechau Diener (eds.): Technologies for Interactive Storytelling and Entertainement, Computer Graphic edition Band 9, 2003.

[Theu03] Theune, M., Faas, S. Nijholt, A. and D. Heylen The Virtual Storyteller: Story Creation by Intelligent Agents, in Goebel, Braun, Spierling, Dechau, Diener (eds.): Technologies for Interactive Storytelling and Entertainement, Computer Graphic edition Band 9, 2003.