Storylining Suspense: An Authoring Environment for Structuring Non-Linear Interactive Narratives

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ABSTRACT

We describe an approach to a new authoring method for interactive storytelling. After positioning digital storytelling in a theoretical context to literature, we consider the author's view of the tools to be used and introduce a coherent environment that does not restrict the creative process and lets the author feel comfortable, leading him to create well-narrated, interactive non-linear stories. We describe the implementation of the story engine authoring module, which is followed by a project description.

Keywords

authoring, interactive storytelling and narration, human computer interaction, computer games

1. INTRODUCTION

Throughout the last few years, Narrative Intelligence required a great deal of effort to create well-narrated, interactive and non-linear stories. The main goal of research in this area is the combination of interactive structures found in computer games and the immersiveness of Hollywood feature films. The Centre for Computer Graphics in Darmstadt introduced the Storyengine, which is based on the morphologic functions by Vladimir Propp. This Storyengine is part of a storytelling system that narrates such interactive, non-linear stories.

In contrast to alternative actual solutions, the Storyengine gives human authors access to provide their own stories for narration. Nonetheless, in reality, just a small minority have the possibility to write interactive stories for the Storyengine. This is due to the fact that the needed data for such stories is still too complex.

This paper describes the implementation of an authoring platform, which enables authors to write interactive stories for the Storyengine without having to deal with technical details. This authoring tool is based on a theoretical concept, considering the main aspects of authoring for non-linear storytelling.

At first, digital storytelling is put into a theoretical context to literature. Then, the paper takes a look at the results of interactivity on the author and on the story itself. The process of authoring non-linear stories is analysed and a practical model is proposed.

Based on these theoretical propositions, a concept for an authoring tool for the Storyengine is introduced and the technical implementation is described. Throughout the technical conception, usability was the focal point of consideration. This paper shows the main aspects of usability and evaluates the final program within the AR project *Geist*. Finally, it gives a conclusion of our work and a notion of our future plans.

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2. RELATED WORK

Examples of basic tools for creating a linear story for television films or movies are *Dramatica* [Phi02] and *Page 2 Stage* [Pag01]. These tools are designated to writers of dramatic fiction, providing a structured theory of drama and an approved model of authoring for the user.

By answering its questions about characters, plots and development, Dramatica guides the author to create a believable, well-argued and dramaturgically correct story. Unfortunately, it is only useful for creating linear, non-interactive narrations.

Page 2 Stage is similar: It is a screenwriting software designed for people writing screenplays, scripts, and plays. It provides numerous features screenwriters need that are not found in standard word processors. However, as with Dramatica, it only helps authors writing and organizing the scenes for linear stories.

There are some authoring environments for creating non-linear presentations: *TotallyHip LiveStage 3.0 Professional* [Tot01], *Mediaforge 4.1* [Cle01], *Matchware Mediator 6.0 Pro* [Mat01], *Scala Infochannel Designer* [Sca01], *Toolbook II Assistant* [Cli01], and *Macromedia Authorware 6* [Mac01]. They help the authors with different metaphors while creating their presentations; branching and variations are possible in a limited way. Again, these systems do not assist the author seeking a non-linear dramaturgy or narration.

Chris Crawford has developed the story environment *Erasmatron* [Craw99]. By using verbs as the basic action components, it seeks to balance character-based and plot-based approaches. Crawford does not believe in story generation through algorithms - neither do we. So, he creates a set of useful words the engine can work with. Unfortunately, complexity hinders authors from creating stories.

3. THEORETICAL CONTEXT TO LITERATURE

Digital Storytelling is a successor of the literary genre of computer literature, see Lorenz [Lor92], and stems therefore from the automated generation of stories. But we see Digital Storytelling as an interactive telling of pre-authored stories - therefore, it seems reasonable to define Digital Storytelling as it pertains to several literary categories and genres (subcategories).

Literary Category

For the German language area, Goethe has defined three categories [Goe48]: Lyric, Epic and Dramatic. However, categorizing for Digital Storytelling is problematic. The existence of a storyteller indicates an Epic, but the mimic presentation tends to indicate Drama. This seems similar to the Novella genre of Epic and the Epic Theatre (Brecht) of Dramatic. So, it would appear adequate to define Digital Storytelling as an interactive mimic presentation of Novella.

Narrative Elements

Let's consider the general definition of narration; see Weber (Web98):

- Narration is a serial addressing of temporal specific circumstances.
- Narration does apply to the non actual.
- Narrators are outside the narration.
- Narration has two points of orientation – the me-here-now system of the narrator and the here-me-now system of the characters.
- Narration is addressing the audience.
- Narration is successive and non perfective.

The first and second criteria are limited for Digital Storytelling. Digital Storytelling is interactive and non-linear, thus temporal points and the sequence of story elements are not predefined. Additionally, Digital Storytelling does not apply to the non actual, but rather to the actual. As Wilder says: "On the stage is always now" [Web98, p24].

Dramatical Classification

Braak said that the key to the Dramatic is dialogue, if the dialogue raises suspense [Web98, p.117]. The actions within a Drama are aspiring to a peak level, therefore, a Drama is directional. Suspense emerges when the audience awaits the peak level. This is also true for Digital Storytelling: Only relevant and important actions are presented.

4. AUTOMATED NARRATION

The whole storytelling process can be divided into three parts, as shown in figure 1: Story creation, which has to be done by the author, storytelling, which is the Storytelling-Engine's task, and story receiving by the recipient [Sch02].

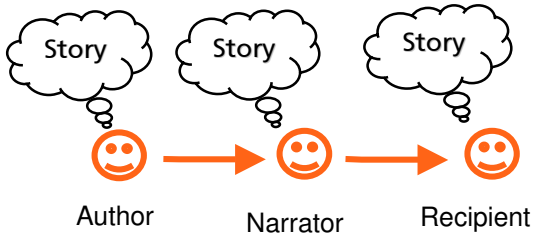

Figure 1: Storytelling process

Several applications for interactive storytelling (figure 2) have been developed or are currently in progress in the Department of Digital Storytelling at the Computer Graphics Centre in Darmstadt, Germany.

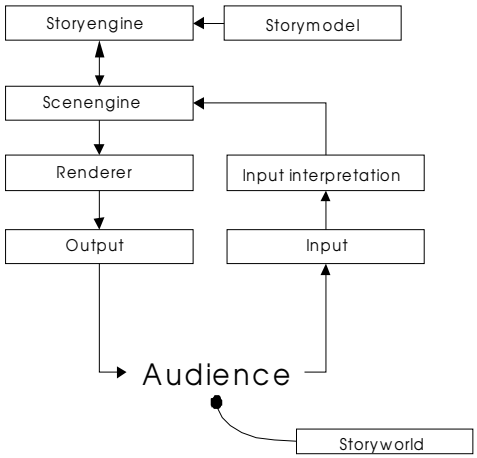

Figure 2: Storytelling Engine

The Story-Engine [Braun01] narrates interactive non-linear stories. Therefore, it needs a story model, which is implemented as a separate module. Currently, a model is being used based on the work of the Russian formalist Vladimir Propp [Propp58]. He defined a story as a set of morphological functions (figure 3) and showed how new storylines can be generated by the algorithmic processing of the semiotic structure.

The Scene-Engine maps the Propp-functions on real scenes using the scene model, which contains dramatic functions at the level of concrete actions and settings. It uses rules based on dramatic laws, which are modelled like single shots in films.

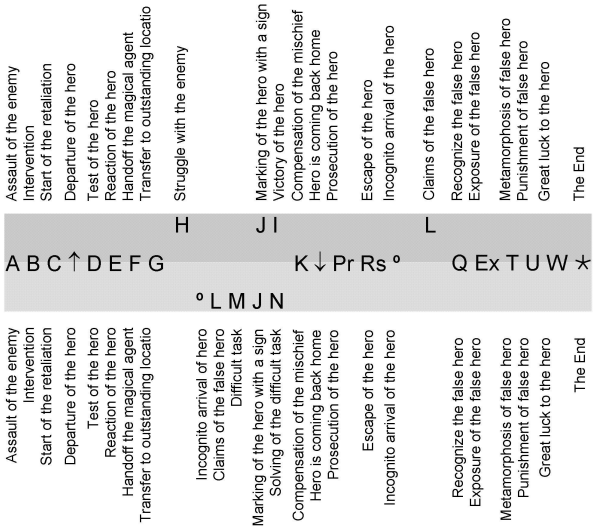

Figure 3: Morphologic functions

Thus, Digital Storytelling narrates variants of a story. These variants are affected by the authors' constraints and the user interaction.

5. AUTHORING

The author has the possibility to access the system on several levels of interaction design, story design, and dramaturgical design. First, he has to create the story. Second, he has to prepare the storyteller, in our case, the Storytelling-Engine. The more the storyteller knows about the story, the more he understands it and the better he can tell it.

The authoring environment accompanies him from brainstorming till the end of content creation and gives him the help he needs. Additionally, this environment supports the author in his view as far as is possible. It is similar to the well-known storywriter metaphors und pushes him smoothly in the direction of interactive non-linear storytelling.

As figure 4 shows, content creation can be split into three parts. Each of these parts is dependent on the previous part; each of them should be finished before the author proceeds to the next one. Within each of these parts, the author may go forwards and backwards through the elements.

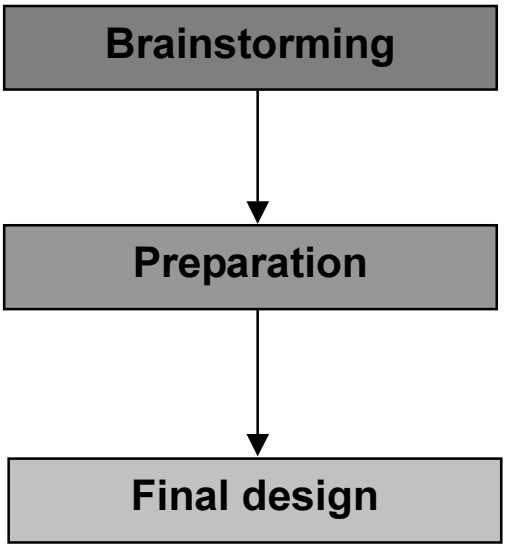

Figure 4: Content creation process

During the brainstorming process, the author creates the story basics; see figure 5.

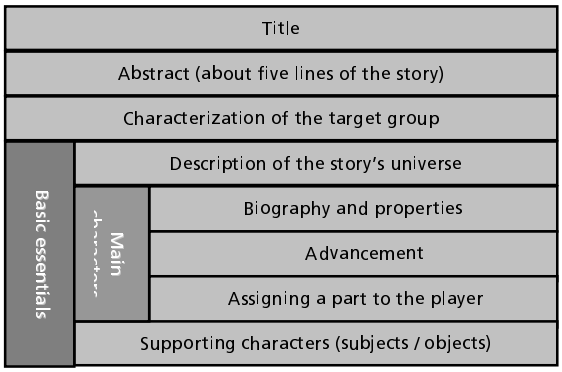

Figure 5: Story brainstorming process

After completing the brainstorming process, the story type and the manner of storytelling have to be specified. Figure 6 gives an overview.

The final design process starts at this point: All the work from now on will feed the modules of the Storytelling-Engine; see figure 7. Some tasks seem to be the same as in the brainstorming process, but this is the definite content, since all of this information runs directly into the user's presentation.

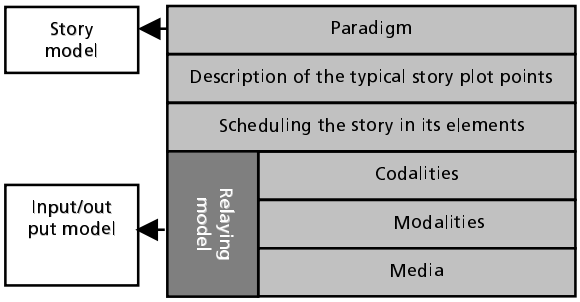

Figure 6: Story preparation process

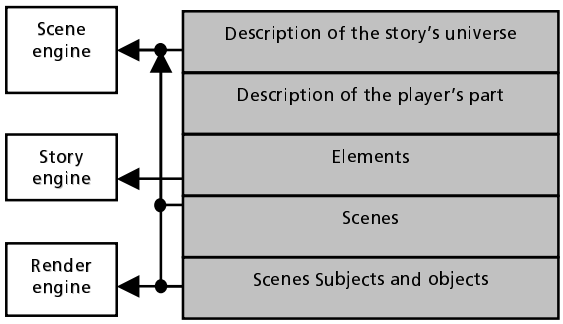

Figure 7: Final design process

6. AUTHORING THE STORY ENGINE

The user group of this environment will consist of professional authors. Hence, we have specified and developed this environment hand in hand with authors while they created some content for our projects. We have focused our work to build a framework for an integrated authoring environment and to realize a first authoring module for story structure, because this is one of the main problems of authoring interactive non-linear stories.

Authors are always working on many parts simultaneously. To provide this user group a constant view of several things, we have divided the environment into four working views, which can be replaced by one big view, and one fixed help view.

Authors have to work in a very complex way, thus for usability aspects, the user interface should be as simple as possible. We decided to use the same outfit and buttons to give authors the feeling of familiarity right away. Figure 8 gives an impression of the whole application.

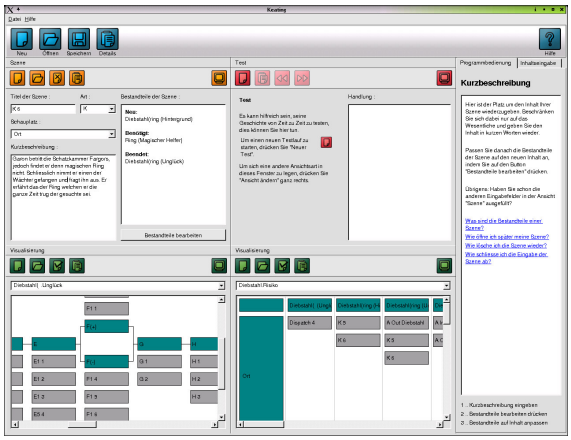

Figure 8: Storytelling authoring environment

On the right side, there is a permanent double feature context sensitive help section. It delegates the author through the content creation process by telling him step by step *what* to do next and *how* this can be realized.

There are several ways for the author to look onto or into the story and to organize it. These ways are *inquiry material*, *ideas and notices*, *scene*, *visualisation* and *test*.

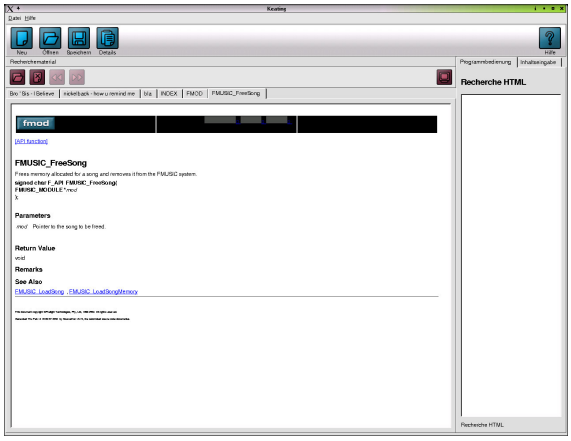

Figure 9: Inquiry view

Inquiry Material

This section is for collecting all the material the author has found by inquiring. Lots of different sources are handled: Pictures like *JPEG*, *GIF* and *PNG*, audio sources like *MP3* and *Wave*, simple *text*s and *HTML* –pages; see figure 9.

Ideas and Notices

This is the right place to collect all the author's ideas. To give him better support, the ideas can be organised into

- background
- content of the story
- structure of the story
- characters
- content of a scene
- details

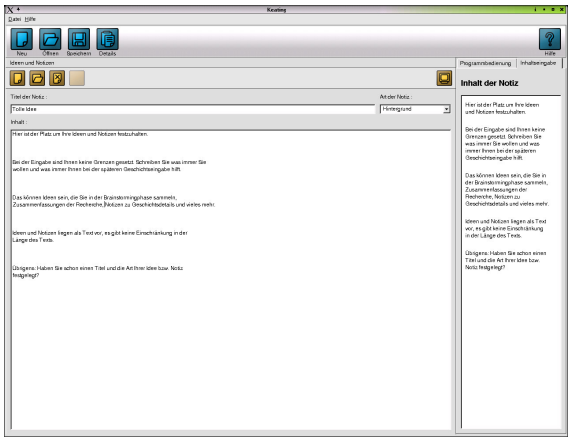

Figure 10: View for ideas and notices

Later on, we will use this structured information to offer the author better support in content creating itself.

Scene

Here, the author can write down a brief summary of the scene and – more important – the context information for the story engine with the Propp story-model. This includes:

- Title
- Propp function
- Stage (location)
- Scene-properties like:
  - Misfortune
  - Risk
  - Actor
  - Magic helper
  - Sign
  - Background

These scene-properties are essential pieces of information for structuring the story. This is why the author can create a complex non-linear interactive story without revealing the branches in mind. The story engine will create these branches out of this context information - which is much easier for humans to handle - on the fly during the storytelling process (runtime), .

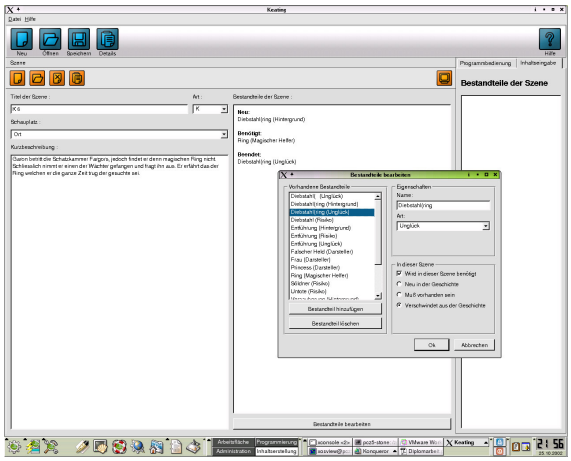

Figure 11: Scene view

Visualisation

The authoring environment offers a lot of possibilities for the visualisation of the story, its content, its structure and the context information. First, the user can choose how he wants the needed information to be presented (figure 12):

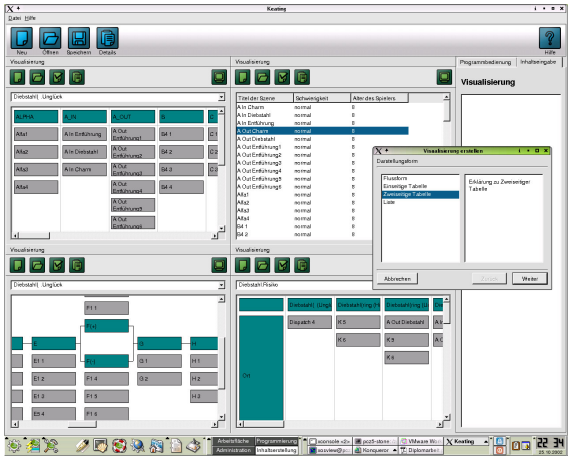

Figure 12: 4 different visualizations

- List
- One-dimensional table
- Two-dimensional table
- Story-flow

Then, the author can choose what information should be presented. Then he can qualify the amount of information. Last, but not least, he can assign the elements colours to enhance recognition and can switch on the context-automation.

We have seen first-hand that these visualisations provide an extremely well-working and massive support for the author. At first, the authors are a bit overwhelmed because of the amount of features, but after playing around with the possibilities, they find they could not work without them.

Test

In this section, the author can test his story at each stage of the creation process. Additionally, he gets some “debug” information and can go back to previous steps (rewind). In this manner, he can see that if there are some dead ends, some scenes will simply not work, or whether he has just created a really good immersive narrative.

To test a story, theauthoring environment writes all the data onto the disk and starts the story engine as a process, which is connected to the authoring environment via IPC.

Implementation

All the content and structure information is stored in proprietary databases. We specify a DTD now, so we can specify in XML in the future. This DTD will be enhanced to meet all storytelling demands as descriptions of

- Scenes
  - Interaction
  - Content
- Story
  - Structure
  - Content
- Characters
- …

We do not want for the author to be forced to use any specific platform, so we have chosen C++ with Trolltech's Qt-Library. The first implementation has been done with Linux, but porting to another platform like Solaris, IRIX, MacOS X or even PDAs (and Windows, if somebody wants that…) will not be a big problem.

In the class overview (figure 13), you can see the separation of content and visualisation, as is normal nowadays. This model is very to use for extensions to future applications.

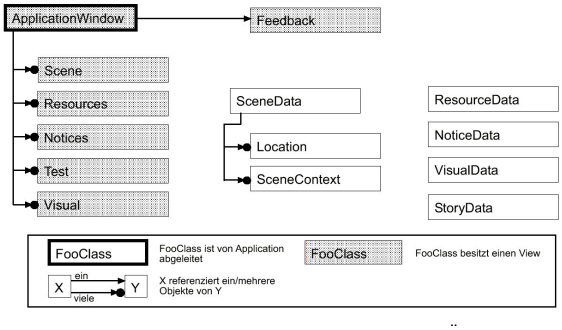

Figure 13: Class overview

7. APPLICATION

This authoring concept is being evaluated for the first time with the Geist project [Gei02]. The Geist system is a mobile computer game and arouses the user's interest in historical information by means of an interactive narration during a real city tour. Augmented reality technology shows the ghost characters and add-on objects, in addition to the substantial surrounding area. The project basically serves as an edutainment application for pupils of the age of 9-13. The prototype gives insights into the Thirty Years' War as it actually happened in Heidelberg, Germany.

Due to the complexity of the story, it would be difficult to realize with normal tools and presentation platforms. We could see that the story engine combined with this authoring environment is a great help for authors of interactive non-linear narratives.

Figure 14: Geist scenario

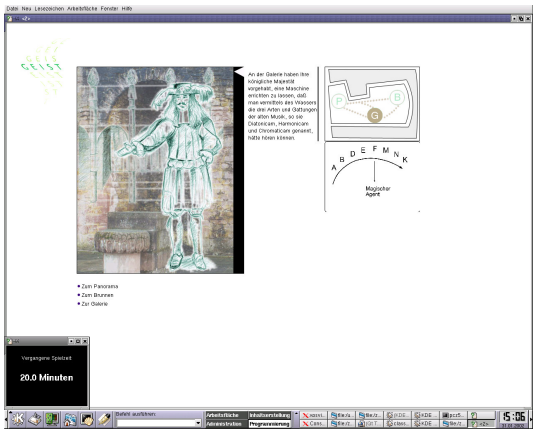

Figure 15: First visual Geist/storyengine prototype

8. CONCLUSION AND FUTURE WORK

Starting with traditional storytelling and positioning our view on interactive non-linear storytelling in a theoretical context to literature, we define story and narration from an interactive viewpoint. We describe an approach to an authoring environment for interactive storytelling. It is based on the author's view of story creation, which results in a slightly manipulated metaphor of the narration creation used for movies.

As a first module, a tool for authoring the story engine has been realised. This tool is verified by using it within the project Geist.

Future work will focus on the development of more authoring modules, e.g. for the story model, the relaying model and the scene engine. Later on, we need some more research work in interpretation and interweaving the results of the author's brainstorming to provide him with a better support for structure and suspense. In the end, we will redesign the environment as a storytelling application itself, so that the author will be guided through the content creation process via an interactive non-linear narrative about authoring an interactive non-linear story.

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