STORYWORLD CREATION:
AUTHORING FOR INTERACTIVE STORYTELLING

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ABSTRACT

Storytelling - humankind's universal choice for content transmission - is becoming of great importance in the field of computer graphics, as the human ability to keep track of information in the information society of the 21st century is dependent on the quality of the information providing systems. Basically, the first steps towards storytelling systems have been taken; everyone today has the possibility to step into enfolding 3D worlds and become immersed in extensive loads of data. However, there is still a great backlog on the human-like organization of the associated data. The reason for this is the absence of the basic authoring systems for interactive storytelling. This position paper presents an approach to new authoring methods for interactive storytelling. It considers the author's view of the tools to be used and introduces 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.

Keywords: authoring, non-linear story narration, human computer interaction, computer games.

1.   INTRODUCTION

Storytelling is the most universal form of human conversation. Regardless of whether there is something to narrate or to explain – humans do this by telling each other stories. Many years ago, there was only a small percentage of people with access to books – therefore, the storyteller often was a 'real' person telling news, stories, etc., interactive with his audience. When books became popular and the people were able to read, the storytelling job began to get more sophisticated. Since there is usually no possibility for the reader of a book to inquire about certain inexplicit topics of the story, artistic rules for telling a story through a book were developed over time. The same holds true when examining the movie or TV sector. Today, authors can make use of a whole new world of possibilities to tell their stories, ranging from direct worldwide access of content and 3D visualization of content to interactive possibilities for the audience – nearly everything is possible. The artistic rules to organize and narrate the stories, however, are not developed simultaneously – the process of structuring interactive storytelling is still in the beginning stages. Of course, today, there are people who are able to communicate immersive, brilliant interactive stories to their audience – but just as in the beginnings of book-writing and movie-making, their number is limited.

Within the business of creating and selling prosaic literature or movies, several innovations concerning the management, as well as the content creation, of a story evolved – new procedures, new jobs, new ways of thinking. The same is true for the non-linear story narration sector – new ways of thinking about an interactive story, its creation, and its presentation have to be created.

The demand for new ideas does not imply that we cannot learn from successful ideas gleaned from traditional storytelling. The movie sector shows how content can be created and told in a way that everybody understands. Most movies are realized

using a simple but absorbing working structure. Unfortunately, movies tell the story in a non-interactive and linear way. However, studying the applied methods should lead us in the right direction for content creation and telling – and has the advantage that authors are already familiar with this kinds of methods.

In Computer Games, we often find approaches to storytelling. Unfortunately, in the simulation of story worlds, as the one definitely successful genre, we cannot find interactive story narration. These types of games lack a dramatic narration of story: there is no focus on dramatic details, no shortcuts for (dramaturgical) non-relevant parts of the simulation, and the storytelling itself is somewhere hidden, implicit in the simulation model. Other games are definitely not interactive, in the sense that the outcome of the story is not interactively changeable by the user.

This paper proposes a structure for interactive story narration. It gives an overview of related work in this area, shows an approach to the authoring of non-linear stories, as well as to non-linear story telling, points out a possible implementation of the presented ideas to some basic applications, and concludes with some words on future work in the research area.

2. RELATED WORK

One of the basic tools for creating a linear story for television films or movies is Dramatica [Dram]. This tool is 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.

The authoring environment Director [Dir] is a tool for the creation of interactive presentations. Therefore, movie metaphors are used. It places the author into the role of a set director – it provides a timeline, in which the author can place characters and actions. Branching and variations are possible in a limited way. It does not consider typical narration characteristics like suspense, coherence and sense. Authorware [Authorw] uses a flow chart metaphor to model the content structure. Procedural structures are missing from the system; dramaturgy, suspense and narration are not considered. Authoring systems like Toolbook [Toolb] use a book metaphor for structuring content. These systems do not assist the author towards 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, Erasmatron's complexity prevents authors from creating stories.

3. APPROACH TO AUTHORING OF NON-LINEAR STORIES

First of all, we divide the whole process 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.
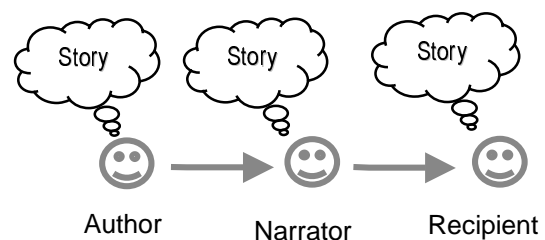- Story receiving by the recipient.

Figure 1: Storytelling process

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

The Conversation-Engine [Braun01a] is responsible for the basic conversation with the audience. It provides a conversation model, which is modelled on conversional aspects of human-human communication. A Story-Engine [Braun01b] 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]. The Scene-Engine executes 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. Characters are controlled by the Character-Engine [Iurgel00]. This engine ensures the coherence of the interactive narration in terms of the figures' traits and motivations. Possible parameters will be extroversion-introversion, neuroticism,
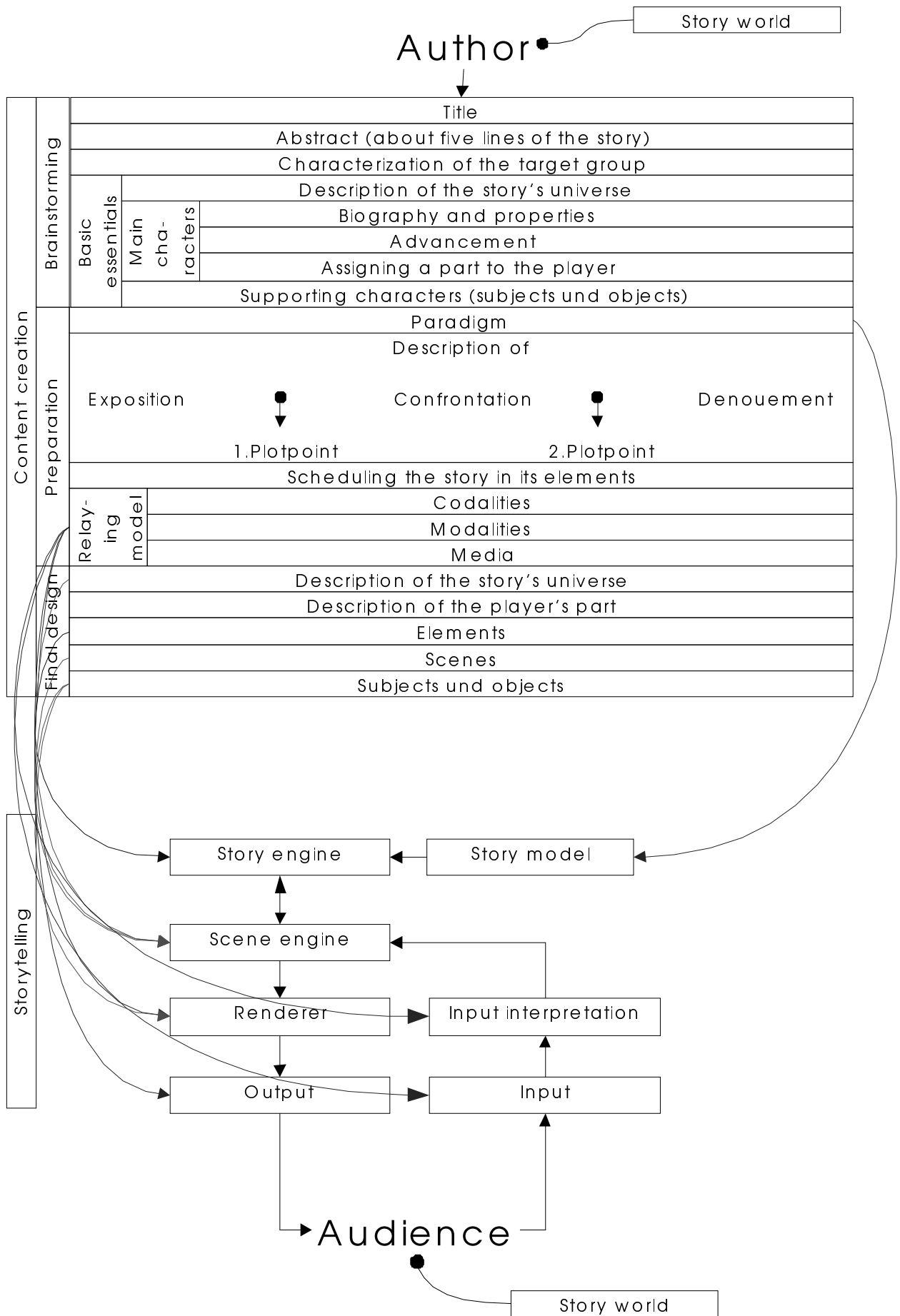
Figure 2: Overall storytelling concept

agreeableness, conscientiousness and openness and will influence, e.g. the characters' sense, appraisement, norms, goals and decisions.

The author has the possibility to access the system on several levels of interaction design, story design, and dramaturgical design. These possibilities have to be presented in a structured way. First of all, he has to create the story. In our case, this is more than just generating the content. He has to think about the form of presentation, bearing in mind the non-linear interactive storytelling.

Secondly, 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.

This is a very difficult and unfamiliar job for the author: humans are used to interactive narration between humans; they are not used to transferring this knowledge to a computer system – in most cases, they do not even know that they have this knowledge. This implies some demands on the authoring application, of course. Therefore, this naturally implies some demands on the authoring application. The author wants his history idea and world to be transmitted and to give the recipient a persuasive presentation. He desires an "easy-to-use" authoring environment; therefore, the technology used is of secondary importance.

Figure 2 shows the overall storytelling concept with the focus on authoring. We believe, that this is the way the author feels most comfortable during the whole authoring process. The authoring environment accompanies him from brainstorming till the end of the content creation and gives him the help he needs.
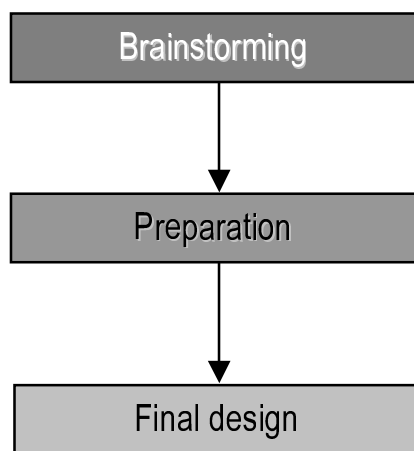

Figure 3: Content creation process

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 3 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 might go forwards and backwards through the elements.

BRAINSTORMING

During the brainstorming process, the author creates the story basics, see figure 4. Therefore, it is important to write down the title of the story and then to sketch approximately four or five lines of its content. Before he starts to write anything further, it is essential to think about the target group:

- Who will be the recipients?
- What are they like?
- What do they know?
- In which situation will they receive the narration?
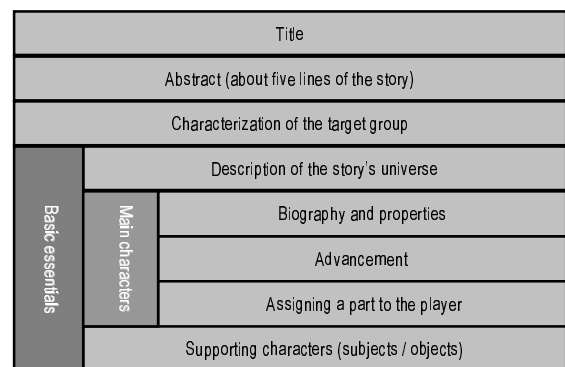- How will they interact?

Figure 4: Story brainstorming process

Now, the basic story elements are fundamental. So, the circumstances of the story should be recorded. Due to the non-linear interactive presentation of the narration, story elements can take place at another location or time than expected. Consequentially, the story world needs a very precise description, e.g.:

- In which era does the story take place?
- How do people live?
- What do all the locations look like?

Let's have a look at the main characters: an author must be sure about the main attributes - what they are like at the beginning of the story. So, he needs their complete and elaborate biography and an accurate description of their properties.

During the narration, the main characters' development will advance the story. Before writing the content in detail, it is important to know the main characters' behaviour in the story:

- Resolve
- Growth
- Approach

Since the author is creating a non-linear interactive narration, there will be a user interacting with it. Consequently, he needs a role. Will he be the

- Protagonist?
- Antagonist?
- Contagonist?

The story basics will be completed by the description of the supporting characters. This means both subjects and objects.

PREPARATION

After completing the brainstorming process, the story type and the manner of storytelling have to be specified. Figure 5 gives an overview.
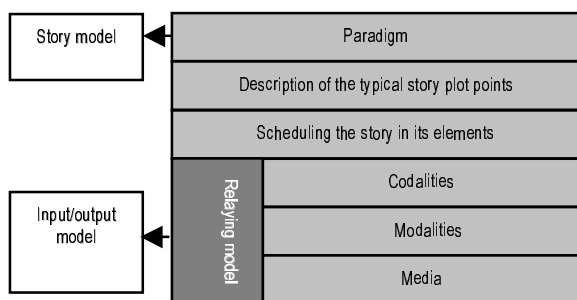

Figure 5: Story preparation process

First of all, the author should choose the paradigm of its narration, e.g. the classical three-act paradigm or the Propp model. This selection provides one important input for the Story-Engine: the story model. Each of these models has its own style and typical story progression with plot points and journeys. These have to be described in further detail.

The story should now be scheduled in its elements, e.g. scenes. The author titles these elements.

How should the narration be presented? Regarding this, the author needs to answer the following questions:

- Which codalities will be used?
- Which modalities will be used?
- Which media will be used?

The descriptions will be merged to the relaying model and will lead the input/output model of the Storytelling-Engine during runtime.

FINAL DESIGN

The structure of the narration is clear, the characters are developed, and the story driver and outcome has been chosen. It is now time to bring real life into the story: the final design process starts at this point.

All the work from now on will feed the modules of the Storytelling-Engine, see figure 6. Some of the questions are from the brainstorming process, but have to be answered now with great precision, since all of this information runs directly into the user's presentation.
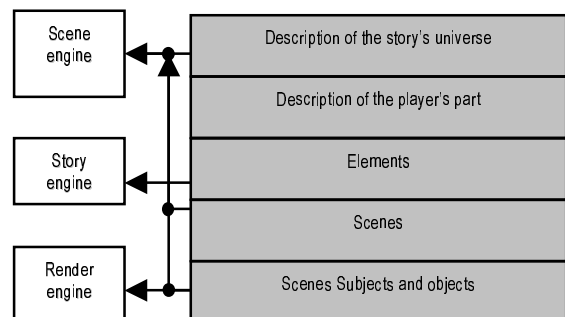

Figure 6: Final design process

First of all, the story's universe has to be designed in detail. This means all of the locations where the narration takes place, including the landscape, buildings, plants and more. This is like a (descriptive) 3D map of the environment.

Afterwards, the user's part has to be pinpointed:

- What is his role?
- How is he able to interact?
- What is his goal?
- How can he be motivated?

The story elements have to be defined, e.g. what happens in the elements and all the context dependencies:

- Location
- Point in time
- Duration
- History
- User's task to resolve the scene
- etc.

The author describes the scenes, which are the concretion of the story elements. All of the objects and subjects and their dependencies and behaviour have to be described with definitions of:

- Objects and subjects
- Movements and animations
- Pro-, re- and interaction
- etc.

Last, but not least, all of the subjects and objects have to be designed and constructed. This will be the essential information for the Scene-Engine and the render engine.

4. IMPLEMENTATION

The development of some parts of the authoring environment is in progress.

We started with the Story-Engine content authoring tool, which is one of the key elements for interactive storytelling. This tool helps the author to find his way through the story. Furthermore, all of its dependencies show different views on the narration and its elements, guide the author to structure his narration in a non-linear way, and report dependency errors like dead ends and unreachable elements.

The application's schematic draft of the GUI is shown in Figure 7. The GUI is designed as a highly customisable authoring environment, giving the author different views on the story creation process and the different tools available. The right side of the main window shows a view for the content creation - the scene description. On the left side a view for brainstorming notes is visible and in the middle there are two different views showing the story's structure and content. Additionally you can find the interactive help on the right side.

The authoring environment will be implemented in C++ using Trolltech's QT libraries, providing platform independence. Additionally some parts will use KDE, as the first supported operating system will be Linux.
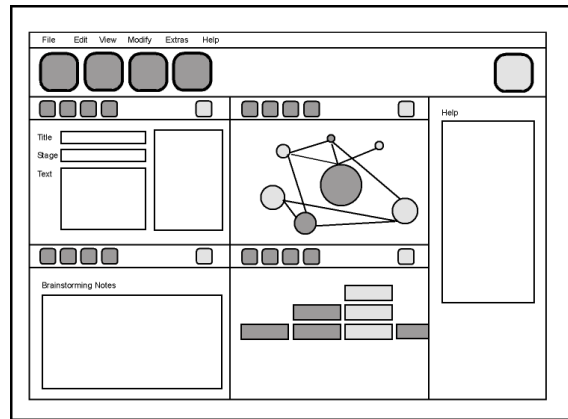

Figure 7: Schematic draft of the GUI of the story engine authoring enviroment

Further support for the author is a tool to design character behaviour. We deal with parameters like extroversion-introversion, neuroticism, agreeableness, conscientiousness and openness, their visual representation and how to give the author easy access to these parameters in the interactive storytelling context.

5. APPLICATION

This authoring concept is being evaluated for the first time with the GEIST project. The GEIST system is a mobile computer game and arouses the user's interest in historical information during a real city tour by means of an interactive narration, see figure 8.
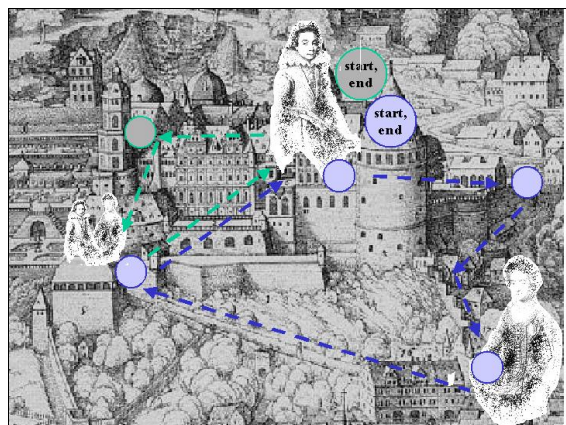

Figure 8: Defining the way through the AR story

Augmented reality technology shows the ghost characters and add-on objects, in addition to the substantial surrounding area, see figure 9.

Figure 9: Viewing a ghost in the Heidelberg palace using augmented reality as storytelling tool

The workflow described in this paper has been developed in collaboration with the author of the GEIST story. The scheme in Figure 10 illustrates the different stages within Heidelberg's castle where the story takes place and their dependencies used for the first GEIST demonstrator. Besides a surrounding "non stage" is installed (no. 4) to give feedback to the user when leaving the story area.

As shown in Figure 10 the story has a pre-defined starting point ("Anfang") but not a pre-defined way through. The way the story is told is independent of the users journey - the story engine will find an immersive way for telling the narration.
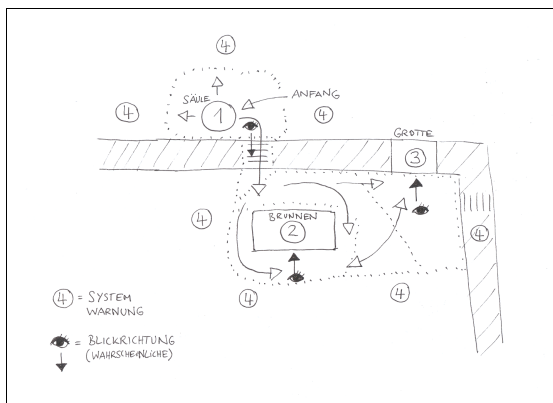

Figure 10: Stages of the first Geist demonstrator

Figure 11 shows the dependencies of the actors to the locations. The numbers above the actors are the same as the numbers of the stages in figure 10.
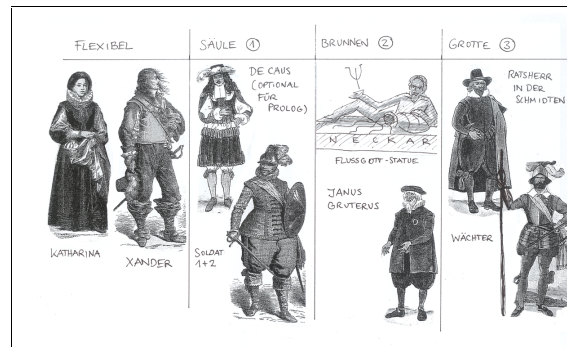

Figure 11: Actors of the story for the first Geist demonstrator

Of course, the final GEIST project will include many more stages and the area will be extended to Heidelberg downtown. As interaction metaphors there will be the changing of stages, a speech input and the usage of the "magic equipment" like "magic rings", "magic drinks" and a "magic wand".

Authoring for a digital trade show booth is another example of authoring in the interactive storytelling context. The user and a virtual character have a conversation about business and product information. The author's task is to create a different story model than the one used in the GEIST project; he creates the content and models the behaviour of the virtual character.

6. CONCLUSION

The basis of all storytelling systems is the quality of the content. What else should they narrate? Hence, the author's easy access to the system is essential.

Within this paper, a fundamental approach to an authoring environment for interactive storytelling is shown. 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.

The approach is used in research and development projects like the GEIST project and the digital trade show booth.

Future work will focus on the development of more authoring modules, e.g. for the story model and the relaying model. Later on, we will design

their communication to each other and build the authoring environment's frame architecture. After all, we need some more research work in interpretation and interweaving the author's brainstorming outcomes to provide him with a better support for structure and suspense.

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