Create & Play: Exploiting the Dramatic Experience of Children by Playing Adventure Games

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1 Introduction

Within the process of plot development, authors create a complete story universe and develop the traits of its inhabitants. The inherit complexity of the story universe only adumbrates in the storyline, but it is crucial for its attractiveness and emotional impact. Interactive storytelling systems exploit the power of the author's imagination by generating a variety of plots from a rich story universe. The aim of this project is to develop an adventure game within the fairy tale world, where children can spin their own stories.

Bettelheim [Be75] reveals a huge variety of psychological processes going on in children listening to fairy tales. These stories help them to solve conflicts within their families and their social environment. One important feature of fairy tales is that the plot is parsimonious, leaving room for the storyteller and the audience to insert details in order to adopt it to their needs and their imaginative power. These psychological processes involve the identification of the hearer with some character of the story, which is also a basic feature of all adventure games.

To prevent obstructing the imaginative power of children, we want to integrate editing tools into game play. If these extensions could be collected, game development and game play are intertwined. Hence, our approach aims at interactive and collaborative storytelling *and* -creation. In our approach the game play is just a mean to acquire the huge amount of common-sense knowledge required to create rich and fascinating story universes and to exploit the dramatic experience of the audience.

2 Interactive Storytelling in Adventure Games

Even though, modern adventure games provide powerful means to develop complex plots and carefully adjusted character interactions, they still lack the depth, richness, and attractiveness of fairy tales or myths. There are things apart from collecting items and fighting

battles. In order to motivate our approach, we first summarize and discuss those problems, which *Adams'* [Ad97] finds most challenging for interactive storytelling: amnesia, internal consistency, and narrative flow.

Characters have an in-depth knowledge of their story universe which is partly presented throughout the exposition. If the user's avatar plays the role of main character, the game designer has to provide enough information about the story universe before the game starts to overcome the player's **amnesia**. This is often achieved through animations or conversations between characters. In *Neverwinter Nights*, for example, it is a common practice to provide information through the player's avatar, often implying some surprise about its unexpected behavior. In the settings of our project, however, we assume that the player is familiar with the properties and regularities of the fairy tale universe. Unfortunately, this also requires the existence of a rich story universe, with complex fantastic environments and believable characters.

In interactive storytelling systems, the game engine's drama manager has to ensure the plot's **internal consistency**. However, the detection of plot flaws requires a huge amount of common-sense knowledge.[1] An important aspect of this problem is to restrict users to role-preserving actions and to select appropriate reactions for the remaining characters.

Finally, the game should follow the classical **narrative flow**. All story segments (exposition, development, climax, and denouement) raise specific challenges for the drama manager of an interactive storytelling system.

During *exposition* all characters, their traits, and the props required for the dramatic climax have to be introduced. It is a common practice to deposit a collection of items throughout the game universe. The player has to find them and use them in an often surprising manner to solve puzzles in order to proceed. In everyday life, a person searching for hidden items would be regarded as a thief, a scavenger, or a ragman. The invention of weird abuses of common devices is normally associated with some kind of strange, unhandy, maniac or genius people. These implicit negative characterization of the player's character is often incompatible with his desired traits. If the player misses some required items or behaves in an unpredicted manner the storyline does not proceed. Obviously, there can't be enough alternative ways in order to prevent a jerky game play, but the drama manager should also know the conditions for their successful application.

Development: To establish an interesting fiction, the drama manager should consider the dramatic structure, i.e., the desired tension function. It is influenced by the emotional state, the motivation, and the attitudes of characters. Each plot segment aims at changing these parameters for some character. Hence, these parameters as well as the impact of actions on them should be represented.

The construction of an exciting dramatic *climax* often requires to send the main characters into extreme situations, i.e., situations without any possible continuation. Their *denouement* often requires fantastic or supernatural abilities or rare coincidence. Whereas all actions apart from those occurring in the climax should model regularities of our everyday experience, we have also to model actions to overcome impossible situations and irregular circumstances. Of course, also these actions have to be prepared carefully.

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[1] Very often human authors also fail to detect them, which is a common topic on fan sites

3 Cooperative Story Development

Propp's famous analysis of the macrostructure of Russian folktales [Pr68] and his classification of dramatis personae initiated the structuralistic analysis of folktales, myths, and narratives in general. His detailed elaboration of unique plot elements (functions in *Propp*'s terms) and their sequence within the story enables us to formalize them in hierarchical plans. Based on the specification of the initial story universe, which the user creates, a hierarchical task network planner (*SHOP2* [NAI$^+$03]) combines appropriate plot elements to construct a plot.

This plot refers to primitive actions, which in turn are refined in order to generate animations and dialogues. Being interested in exploring the dramatic potential of fairy tales, we plan to integrate tools, which stimulate the user to add annotations, hints, or suggestions. They could be selected from context-sensitive menus or can be formulated using templates or unrestricted expressions in natural language. These tools should stimulate users to specify the personality and abilities of their dramatis personae and the impact of actions onto them. Moreover, we are interested in new ways to proceed within the storyline, to increase or decrease the tension, and to solve impossible situations.

This approach is inspired by the *Open Mind Common Sense* Project currently being developed at MIT MediaLab. This project demonstrates the enormous potential of collaborative acquisition of common-sense knowledge. The groups around Marvin *Minsky* and Henry *Lieberman* developed various reasoning strategies with this informal and imprecise knowledge. However, their corpus is formulated in English and they just start to collect narrative-relevant knowledge.

4 Related Work

The focus of our approach is novel integration of content creation by game playing. Hence, this work is based on existing content creation toolkits, concepts to preserve an intended dramatic and narrative structure within interactive adventures, and frameworks for common-sense acquisition, representation, and reasoning.

Content Creation Toolkits for Adventure Games: After the success of the *Zork* series of text adventures, the *Inform* programming language, Z-code compiler, and *FROTZ* interpreter are available for almost all game platforms. Thus, the online community was able to develop rich and complex plots for adventure games. The *Interactive Fiction Archive*, for example, contains a huge game collection.

In this spirit, a number of content developer toolkits including powerful scripting languages were released for popular 3D adventure games and 3D shooters (*Aurora* for *Neverwinter Nights*, *Unreal* and *Quake* Scripts). Some of them were also used to integrate powerful AI planning mechanisms into modern 3D computer games (*Interactive Storytelling* [CLM$^+$03], *Mimesis* [RY04]). These systems employ partial-ordered planner to achieve actor goals, which then trigger animation sequences and dialogues between characters. The main challenges are the development of multi-agent plans and to refine or adopt

these plans to integrate user interactions. In these systems, the formal plan descriptions induce narrative and dramatic structures.

Dramatic and Narrative Structures: *Bates* [Jo92] introduced with the *Oz* system a drama manager responsible for selecting actions appropriate to the desired dramatic structure. This mechanism was extended by *Weyhrauch* [We97] and *Mateas* [MS03]. The drama manager within the *Façade* system [MS03] is based on beats, modeled through preconditions and their effects with respect to story values.[2] The rise or fall of tension implied by beat realizations enables the drama manager to adjust the game play to match the dramatic structure of a one-act-play. The interactive drama, which was created with *Façade* by the artist Andrew *Stern*, exploits the conflicts inherent to a midlife crisis of two married characters. *Stern* created a rich personality for both actors, which are expressed within thoroughly worked out beats, leading to an impressive and fascinating game experience.

Whereas the latter approaches focus on the narrative microstructure, i.e., beats or actions, structuralistic approaches analyze narrative macrostructure. The most famous examples are *Propp*'s story morphology [Pr68], or story grammars ([Co73], [Ru75]). These macrostructures are exploited in various research projects (e.g., [SBH03]).

Common-Sense Acquisition, Representation, and Reasoning: The *Open Mind Common Sense* seize the old AI challenge to acquire and represent common-sense knowledge in a novel way. This project requests the online community to support their endeavor by explaining the contextual knowledge required to understand simple statements. The acquired corpora and some of their tools are in turn released as public domain. Automated language processing and data mining processes generate conceptual networks. Spreading activation and thesaurus-based generalizations are exploited to reason [LS04] in a number of challenging applications, as image retrieval, document classification, predicting the emotional impact, or story generation [LLSB04]. This project encouraged us to tackle once again one of the oldest AI challenges: interacting with the computer using natural language and spinning interesting stories.

5   Conclusion

Despite the rapid development of interactive storytelling in the recent years, there is still a lack of tools and resources that can be used within research or industrial projects. Therefore, we aim at a collaborative effort to represent the common-sense knowledge and the dramatic experience underlying fairy tale plots. All acquired resources and tools should be available in public domain.

Being inspired from the idea of collaborative acquisition of common-sense knowledge and common-sense reasoning in natural language, this work focuses on the representation of actions and their complex dependencies in plots, their impacts on the emotions and attitudes of characters, and on the construction and denouement of exceptional situations that forms the climax of almost any good plot. Hence, the embedding of this knowledge

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[2]Beats and story values are narrative concepts used by *McKee* [Mc97]

acquisition process into the game play is a novel approach for interactive storytelling, which might help to overcome the lack of interesting plots.

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