

Evolution of Interactive Audiobooks

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Abstract. Audiobooks and radio plays have enjoyed an increase in popularity over the recent years and are still growing. One of the reasons are their ease of use, but also a deepened immersion due to an auditory presentation of the story. Interactive Audiobooks combine the advantages of such an auditory narration with interactive elements known from computer games, therefore allowing a more intense perception by focussing on an auditory presentation.

This paper summarizes the ideas behind interactive audiobooks and sketches the various developments and improvements over the last year. Here we focus especially on the user interface design, used for story sonification and game interaction, as well as on the development of a mobile sound/story engine that allows an implementation on mobile devices.

1 Introduction

An acoustic narration of a story line has several advantages. It integrates the listener into the story by requiring an active participation in order to reconstruct the fictional universe. This reconstruction takes place using the listeners own imagination and phantasy, therefore adding and building it from personal information and experiences. Oral presentations are therefore considered to be much more stimulant and immersive than audio/visual presentations. Additionally, auditory narrations are easier to author and design and require less hardware for their presentation. Furthermore, auditory content is easier to perceive and evaluate than audio/visual depictions.

The recently introduced *Interactive Audiobooks* take the approach of auditory narration one step further by combining the advantages of complex (non-)linear narratives with interactive elements from computer games [1]. These interactive elements represent parts of the story line and actively integrate the listener/player as part of the story. The underlying engine is thereby designed with a varying degree of interactivity, that allows anything between a passive listening to the story up to an interactive audio-only computer game.

2 Interactive Audiobooks

The authoring and the design of immersive, non-linear plots remains one of the main challenges in interactive digital storytelling. The main advantages of interactive audiobooks are a non-linear story line, but also a varying degree of interaction. Both become feasible with

the utilization of story trees, which offer an interesting alternative to create a non-linear story design [2]. This method is also often used by game designers to provide alternative plots and endings that are consistent with the player's action and interaction. Our system is based on such a story-graph structure and further extended by interaction nodes. These interactive nodes represent essential parts of the story line that can be actively played by the user. The interaction nodes comprise story-related mini-games and dialogs, but also techniques to interfere with the story-line and to influence the story's characters. As they are based on narrative nodes, they also contain narrative content, in case the listener does not wish to interact. Here the system chooses among possible directions and the story continues depending on previously made decisions. Figure 1 shows a simplified story-graph, in which *narrative nodes* (light/green) and *interactive nodes* (dark/blue) intertwine. The story starts at the top with the root node and traverses down till it reaches an end condition (*terminal nodes*). The graph branches at predefined points, at which decisions and challenges in the form of interactive parts are placed. The perceived story line depends on the players interaction, but also on the character's behavior, and can be re-played multiple times to explore alternative pathways and endings.

As all information is presented acoustically, sophisticated techniques for information sonification, as well as interaction are required. Here we employ several techniques which are commonly used in 3D virtual auditory environments [3], but have especially concentrated on an intuitive interaction paradigm that can be imple-

mented using a minimal interface. The first prototype was built around a regular gamepad that was used for interaction and control [1]. A preliminary user evaluation, however, revealed several difficulties and problems, of which the interface design and uncertainties whether or not interaction was possible were among the severest. Starting from there, several different approaches were evaluated, leading to a modified design of the interface/interaction paradigm. The main character/storyline is now affected and indirectly controlled based on four types of interaction: *thinking*, *aggressive*

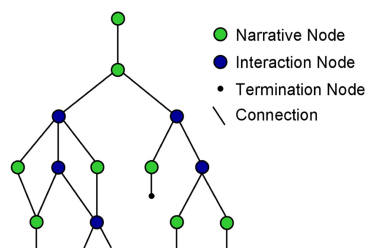


Figure 1: Story Tree Structure.

2.1 System and Design

The developed system is divided into two parts and consists of an authoring environment (Figure 2) and a runtime system. At the moment the runtime system is also located on the PC-platform, but currently being ported for mobile implementation. The initial implementation was based on OpenAL/EFX and employed only partially 3D sounds and EFX effects for the sound rendering. Using mobile devices and a new sound engine, we hope to utilize and exploit these functionalities stronger and integrate them into the scene presentation and even into some of the mini games. For the mobile implementation, we target cell phones, PDAs and mobile gaming consoles. Recently, we have developed a fast and sophisticated DSP sound engine that supports several streams and DSP filtering in real-time, and which runs on nearly all mobile platforms. The next task will be a conversion of the runtime system including the story engine and the current user interface setup, which has been laid out with mobile devices in mind.

Figure 2 shows an overview of the authoring environment that is currently used to create and design interactive audiobooks. The screen is mainly divided into three parts, of which the left one shows the entire story, while the middle screen displays the current selected scene along all contained narrative and interaction nodes. The right part of the authoring environment is used to specify interactions, design mini-games and to assign sounds and ambient music to the nodes.

and *defensive* behavior, and *passive* waiting. In the current implementation, this approach has proven to be successful, although an elaborate user evaluation needs to be performed.

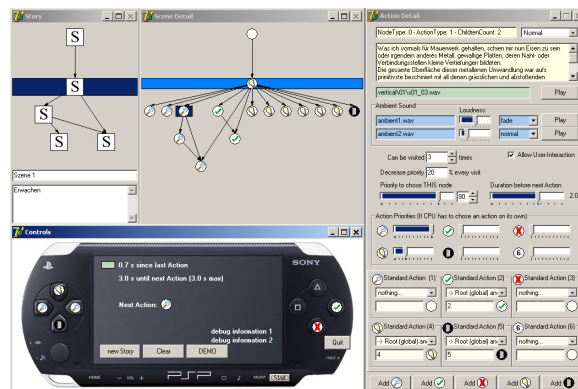


Figure 2: Authoring Environment.

So far several smaller interactive audiobooks have been created, with one being an adaptation of a short story from Edgar Allan Poe and another a story that combines several myth of the Magdeburg Cathedral [3]. In the latter attempt, the story has been designed more tightly around the interactive audiobook's concept, to ensure a higher acceptance among the users.

3 Summary and Conclusions

We have discussed the concept of interactive audiobooks along several improvements and modifications that have evolved over the last year. Here we focussed especially on the user interface design and an implementation for mobile devices.

Although, the new interface has proven to work very well, several ideas remain for future improvements. The current sound rendering only allows sound spatialization and room acoustics to a minimal degree. Also topics like multi-player and augmented audio reality are yet to be explored and will hopefully soon extend the possibilities of interactive audiobooks.

References

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