CaveWriting 2006: A Hypertext Authoring System in Virtual Reality

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Abstract

In experimental hypertext fiction workshops at Brown University, undergraduate writers work with programmers to create interactive literary experiences in immersive virtual reality. To involve the writer more directly in the process of implementation, we have created *CaveWriting 2006*, a spatial hypertext authoring system. Authors can manipulate a graphical front-end to position text, multimedia, and 3D models within virtual space, apply special effects, and create hyperlinks which initiate theatrical events. The result can be previewed at any time inside a desktop window. Moreover, the system's features can be extended in C++, allowing programmers and writers to collaborate directly and work simultaneously.

1 Background

The interdisciplinary "Cave Writing" workshop, first taught in 2002, brings together undergraduate writers, programmers, digital artists, and computer musicians to collaborate on immersive narratives in the VR environment of a 4-wall Cave, where users physically engage with hypertext by navigating virtual space. Works created in the class have been displayed at several venues, including the Boston CyberArts Festival in 2003 and 2005. However, despite the success of the final product, the production process itself often frustrated the writers, who spent much of their time waiting for the programmers to finish the next iteration of the code. After the creation of the Cave project *Screen* [Carroll et al. 2003], a meditation on memory in which users physically interact with the written word, workshop programmers began designing tools to allow writers a more active role in the production of projects by inserting interactive text directly into virtual spaces. *CaveWriting* is the evolutionary result of these efforts.

2 System

Tbe *CaveWriting* authoring system consists of three major components: (1) a cross-platform application and software library written in C++, (2) a web-accessible, graphical front-end written in Java with the JAXFront design tool, and (3) a Max/MSP patch which spatializes audio in the 5.1 surround sound system.

The application layer reads from an XML-based story file that defines a hierarchy of tags consisting of <*section*> and <*scene*> objects: respectively, planes of text and multimedia (e.g. 2D and stereographic images, video, and 3D models) oriented in space, and dramatic events that take place at scripted times or in response to the activation of hyperlinks by the user. Once the story has been loaded, its Sections are rendered in real time via software libraries including FTGL, OpenQuicktime, and the open-source rendering engine G3D. The application also queries two 6DOF input devices, a head tracker and a three-button handheld wand, to track the user's movement and generate events in response to interaction.

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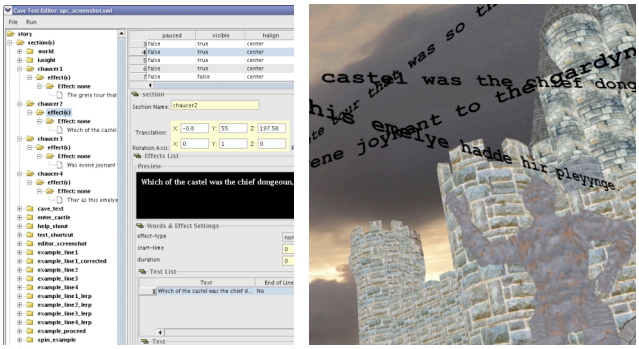

Figure 1. Using the Cave Text Editor to create stories in VR

The Java front-end, which we call the *Cave Text Editor*, allows writers to create and edit stories by manipulating a simple GUI instead of writing code (figure 1). Authors can align Sections along arbitrary planes in space, change visual attributes such as color and scale, assign hyperlinks, apply special effects (which currently include fading, animation, spatialized audio, and cinematic camera movement), and edit the hierarchy of Scenes to define events in response to hyperlinks. When the author saves his or her story, the Text Editor produces an XML file compliant with the *CaveWriting* schema, which can be immediately previewed in a desktop window or executed in the Cave.

3 Results

Projects that would have previously taken weeks of collaborative work can now be prototyped in a single afternoon, which has freed students to experiment with both form and content. One student used *CaveWriting* to create a novel way of reading Pessoa's fragmented *Book of Disquiet* [1991] by selecting from vertical columns of numbers that seem to float in space around the user's body. Another has crafted an emerging autobiographical narrative, where randomly selected childhood memories enter the environment in response to hyperlinked events. *CaveWriting*'s features are expanding rapidly as it is more widely adopted; writers and programmers now collaborate directly, as programmers continue to extend *CaveWriting* with new effects requested by writers using the system. A graduate student has even created his own *CaveWriting* front-end in Macromedia Flash for programmatically generating thousands of Sections at a time. Given the success of the software within our workshop, we plan to port *CaveWriting* to additional platforms beyond the limited confines of the Cave, allowing stories created with the system to be displayed anywhere from a classroom to a museum gallery.

References

CARROLL, COOVER, GREENLEE, MCCLAIN, and WARDRIP-FRUIN. 2003. *Screen*: Bodily Interaction with Text in Immersive VR. *SIGGRAPH 2003 Sketches & Applications*. NYC: ACM Press.

PESSOA, FERNANDO. 1991. *The Book of Disquiet*. London: Serpent's Tail.