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Linking Images and Sound in a 3D Museum Exhibit Demonstration

Briana M. Sullivan
University of New Hampshire, Durham, briana.sullivan@unh.edu

Colin Ware
University of New Hampshire, Durham, colin.ware@unh.edu

Matthew D. Plumlee
University of New Hampshire, Durham, Matthew.Plumlee@unh.edu

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Linking images and sound in a 3D museum exhibit

Briana M. Sullivan, Colin Ware, Matthew Plumlee

University of New Hampshire - Data Visualization Research Lab/Center for Coastal and Ocean Mapping

1. Introduction

This experiment is the result of the need to develop a functioning exhibit at the Seacoast Science Center (SSC). The Data Visualization Research Lab located at the Center for Coastal and Ocean Mapping (CCOM) at UNH was contracted to create a computer-based 3D interactive exhibit that would combine real data (bathymetry) collected by CCOM with informational landmarks (images) that would describe things happening in the area local to the data.

As the exhibit was being built, questions arose regarding how to effectively link visual 3D images with recorded spoken descriptions while a user is navigating. Moreover, we wanted to investigate active vs. passive methods for activating audio. Therefore, we designed and tested 5 methods of audio activation before choosing the most effective one for the exhibit.

2. Design

The exhibit software, GeoExplorer 3D, was developed using a visualization system for viewing geographic data spaces with a Geographic Zooming User Interface in 3 dimensions, called GeoZui3D (Ware et al., 2001).

The main content of the exhibit consists of a 3D scene built around an accurate 3D data representation (bathymetry) of the bottom of the Piscataqua River, NH (Fig. 1). A person explores the river by using an arcade-style flight yoke to drive a dive sled around, constrained by areas where bathymetry is present.

Movie clips and images lie throughout the length of the river at various locations. Associated with each image/movie clip is an audio clip that gives a short narrative. In Figure 2, an overhead view of the layout of the virtual environment shows an ìxî at each location with an image and its associated sound clip.

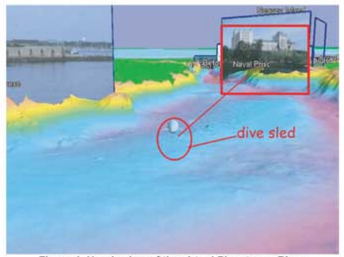


Figure 1. User's view of the virtual Piscataqua River.

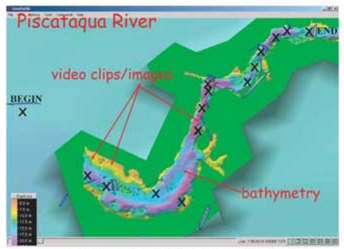
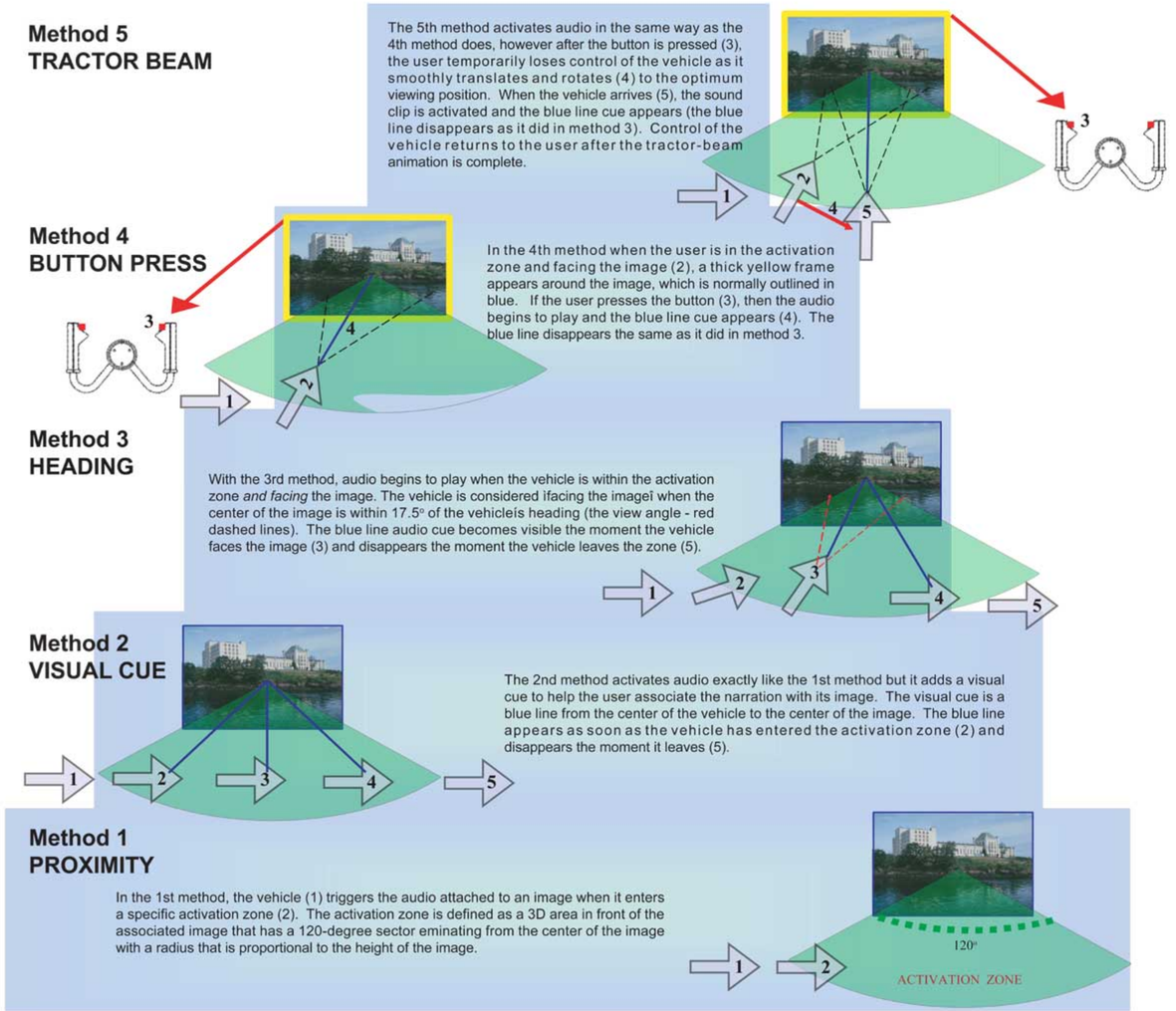


Figure 2. Overhead view of the virtual Piscataqua River.

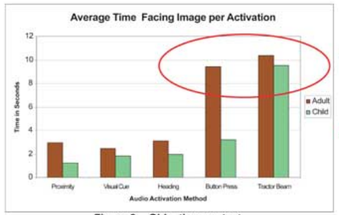


3. Solution

Five audio activation methods were developed (Sullivan et al., 2006) and tested by presenting them to children and adults, to determine which method best captured and held the users attention, as well as encouraged interaction with objects in the exhibit.

4. Results

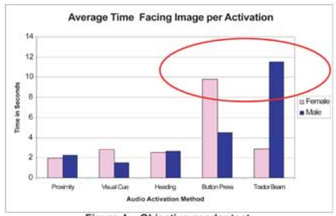
The results of both the objective and subjective phases of testing indicate that those audio activation methods that involve an explicit act of selection (a button click) are superior to the other more passive methods with both adults/children (fig. 3) and male/female (fig. 4). The button press and the tractor-beam audio activation methods yielded longer times facing the images with audio playing and received the highest subjective ratings (fig. 5).



Adult: Button press
Tractor beam

Child: Tractor beam

Figure 3. - Objective age test



Female: Button press

Male: Tractor beam

Figure 4. - Objective gender test

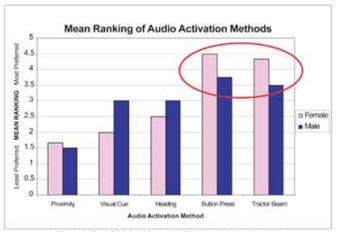


Figure 5. - Subjective preference gender test

5. Conclusion

The key issue in the ultimate success of the exhibit is solving the problem dealing with how to activate audio to best capture the user's attention. This research has shown that users appear more interested in exhibit content the more interaction there is. From this research, the Tractor Beam Method (method 5) was chosen as the technique for linking images and sound in the Seacoast Science Center exhibit.

6. Literature cited

Sullivan, B., Ware, C., & Plumlee, M. 2006. Linking audio and visual information while navigating in a virtual reality kiosk display. Journal of Educational Multimedia and Hypermedia 15:2.

Ware, C., Plumlee, M., Arsenault, R., Mayer, L.A., Smith, S., & House, D. 2001. GeoZui3D: Data fusion for interpreting oceanographic data. Proceedings Oceans 2001 3:1960-1964.

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8. For further information

Please contact briana@ccom.unh.edu. More information on this and related projects can be obtained at http://www.ccom.unh.edu/vislab/index.html. A link to an online, PDF-version of the poster is located at: http://ccom.unh.edu/index.php?p=26&page=image_gallery/posters.php.