The memory book

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ABSTRACT

In this paper we present an Augmented Reality book for remembering past events and to plan future ones. We have developed this system using Brainstorm eStudio. We have incorporated Augmented Reality options into Brainstorm eStudio using a plugin of ARToolKit. The user can create his own book selecting images, objects and videos from a database. The selection of elements and their inclusion into the book is achieved using a tangible interface.

Keywords

Augmented Reality, memory book, storytelling

1. INTRODUCTION

The MagicBook [1] was the first system that combined a book metaphor and Augmented Reality (AR) for storytelling. Later, other systems have been developed using the same combination, such as: Hello Kitty Book [2]. Following a similar idea, other storytelling applications have been presented, such as Magic Story Cube [3]. Magic Story Cube is an AR interactive interface for storytelling that uses a physical cube. This physical cube combines multiple modalities including speech, 3D audio, 3D graphics and touch to provide the user (especially children) with multi-sensory experiences in the process of storytelling. The memory book that we present combines a book metaphor and AR as well. Our memory book is a book where the user can put elements (images, videos and objects). In this case, the idea is that the user can use this book as the same he uses a photograph album for entertainment. The user can select the type of elements he will include into the book. Later, he can remember the experiences and emotions he had in that moment of his life. The book can also be used to reflect his expectation about the future.

We have included ARToolKit [4] into Brainstorm eStudio as a plugin. Similar integrations have been presented, such as AMIRE or DART. The AMIRE [5] (Authoring Mixed Reality) framework uses a component oriented technology and consists of the minimal set of components required for a demonstrator, a reusable GEM collection and a visual authoring tool for building Mixed Reality applications. The object tracking system of AMIRE is also based on ARToolKit. DART [6] (Designer's Augmented Reality Toolkit) is based on the Macromedia Director multimedia-programming environment. The fiducial registration is realized using a plugin of ARToolKit writing in C++.

2. THE MEMORY BOOK

2.1. System architecture and implementation

Our system runs in a PC AMD Athlon with 1 Gb Ram and under Microsoft Windows XP. The video stream is captured using a USB camera. We have used Logitech QickCam Pro 4000. We have used 5DT HMD (5DT Inc., 800 H x 600 V, High 40º FOV) as visualization system.

The registration is achieved using markers. The elements that are recognised using markers are: the type of elements (option space) and the elements (database space) to be included into the book, the selector, the drain and the book. Figure 1 shows these elements. Option space and database space have 4 markers. We have used 4 markers because the user can cover till 3 markers and the system will recognise the other marker. If the system recognises one marker, it has enough information to proceed. If the system had one marker and if the user covered it, the system would not be able to recognise it and it would not work properly. The book has another marker to indicate the page of the book.

The system has been developed using Brainstorm eStudio. Braintorm eStudio is commercial software (www.brainstorm.es). Brainstorm eStudio is an Advanced, Multiplatform Real Time 3D Graphics presentation tool. This tool incorporates features such as: the inclusion of 3D objects in a very easy way, they can be imported from files, erased or be animated; generate 3D texts, to change their colours or to add videos to surfaces; generate its own interfaces and timers; to add actions to objects when they are selected; to add sounds; to load or save configurations; all of this can be done using the mouse, pop-up menus or drag and drop actions. The language used to program is Python. Brainstorm eStudio can be defined as an interface that the programmer can use to create 3D complex visualizations without using OpenGL, only using tool options. We have included ARToolKit [4] into Brainstorm eStudio as a plugin writing in C++. So, in this way we have included AR options into a 3D graphics presentation tool with the advantages that this presents.

2.2. User interaction

The memory book works as a photograph album. In a photograph album, the user chooses a photograph and puts it in the desired place of the selected page. In the memory book is nearly the same. The user utilizes a selector to choose the elements and he also puts them over a page of the book. The user can choose among videos, objects or images. These elements appear over a page with 4 markers (option space). Once the user has chosen the type of element he wants, he selects the desired element. These elements

appear over a page with 4 markers (database space). The user can remove an element from the book. He puts the selector over it and he drags it over the drain.

A normal interaction could be the following:

1) The user takes the selector.
2) The user chooses the desired type of elements (videos, objects or images). To do this, the user puts the selector over the correct area of the option space.
3) The user chooses the desired element. He puts the selector over the database space. The user picks one element among the elements that appear over the database space.
4) The user puts the desired element over a page of the memory book. The user puts the selector with the selected object over one of the pages of the book.

A more detailed description of the physical elements used by the system is the following:

1) The selector allows the user to transport objects among the different components of the system. When the selector is over an area of the option space where is possible to select one of the types of elements (videos, objects or images), this option affects the type of elements that are visualized over the database space. When the selector is over an area of the database space where is possible to select one element, this selected element appears over the selector and can be transported to the book. If the selector with a selected element is over a free area of the book, the element is placed over it. It the selector is free and it is over the book with and object, this object is removed from the book and it puts over the selector. If the selector with a selected object is over the drain, the object is removed and swallowed by the drain.

2) The option space shows three options: videos, objects and images. The selected option affects the elements that the database space shows.

3) The database space is divided into 6 areas where videos, objects or images can appear depending on the selected options. If there is more than 6 elements, in the right side appears a word that allows the user to go to the next 6 elements (Next). If the user is in this second page, the user can come back to the first page, selecting the word that appears on the left side (Back).

4) The book is composed of 20 pages. Each of these pages is divided into 6 areas where videos, images or objects can be placed.

5) The drain is the place where elements are destroyed.

An image of the application is shown in figure 2. If the selected type of elements are objects, one possible page with 6 elements is shown in figure 2. In this figure can also be seen how the user has selected the object 'plane' and it is over the selector.

3. CONCLUSIONS

We have included the AR options of ARToolKit into Brainstorm eStudio. This combination allows programmers to create AR applications with advanced 3D graphics in an easy way.

We have developed a memory book using Brainstorm eStudio and ARToolKit. We think it is possible to use this system to have a memory book from past events and to think about future plans. The user can include not only photographs but also objects and

videos. Now the application has fixed elements, but we will incorporate the possibility that the user can add his own images and videos in a near future.

4. REFERENCES

[1] Billinghurst, M., Kato, H., Poupyrev, I., The magicbook - moving seamlessly between reality and virtuality. IEEE Computer Graphics and Applications, 21(3):6-8, 2001, www.hitl.washington.edu/magicbook/
[2] Hello Kitty Book, mixedreality.nus.edu.sg
[3] Zhou, Z., Cheok, A.D., Pan, J., Li, Y., Magic Story Cube: An Interactive Tangible Interface for Storytelling, ACM SIGCHI International Conference on Advances in Computer Entertainment Technology (ACE 2004), poster N. 10, 2004
[4] Kato, H., Billinghurst, M., Marker tracking and HMD calibration for a video-based augmented reality, 2nd IEEE and ACM International Workshop on Augmented Reality (IWAR'99), 85-94, 1999
[5] Grimm P., Haller M., Paelke V., Reinhold S., Reimann C., Zauner J., AMIRE - Authoring Mixed Reality, The First IEEE International Augmented Reality Toolkit Workshop, 2002, www.amire.net
[6] MacIntyre, B., Gandy, M., Bolter, J., Dow, S., Hannigan, B., DART: The Designer's Augmented Reality Toolkit, The second IEEE and ACM International Symposium on Mixed and Augmented Reality, 329-330, 2003, www.cc.gatech.edu/ael/projects/dart.html
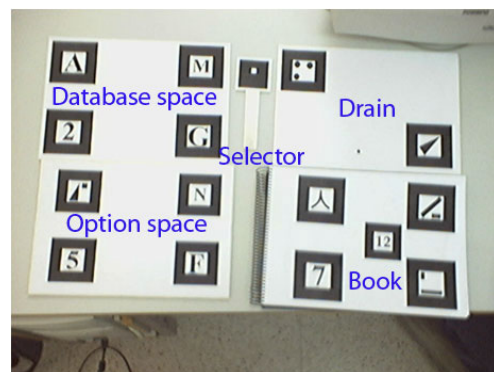
Figure 1. The 5 physical elements used by the system. Markers used in each element

Figure 2. A page of the database space