

Tiny Dreamy Stories: Interactive Paper Book Capable of Changing the Storylines

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1 Introduction

In this paper, the authors propose Tiny Dreamy Stories, which uses a traditional paper book as an interface to experience digital contents, so that it can keep the affordances of paper books while adding electronic augmentation. The aim of this study is to achieve both highly computer-supported contents and natural interface, e.g., highly efficient combination of physical and digital world. With Tiny Dreamy Stories, every person (especially who is not good at operating computers) can enjoy rich digital contents just by flipping pages.

In this study, the authors also aim to develop an efficient and novel system to encourage creativity and activeness of users in reading. To achieve this purpose, it is very important for users to make sequences of a story by their own hand. Therefore Tiny Dreamy Stories was constructed like a bookbinder so that users can easily change a sequence of pages and enjoy several patterns of stories.

2 System Architecture

For page identification, the authors selected RFID (Radio Frequency IDentification) as an efficient method to identify individual pages. However, IC (Integrated Circuit) tag is generally too big and thick to be naturally embedded in a page. To overcome this problem, Tiny Dreamy Stories uses very small and thin (51.5mm height, 1.5mm width, 0.25mm thickness) passive IC tags for this system (Figure 1). By sandwiching them between papers, IC tags become invisible and not touchable for users while pages keep their thinness and naturalness of ordinary papers. So users can flip pages easily like a paper book without IC tags.

To detect embedded IC tags, the RFID antenna is installed under the table. When users turn a page, the RFID antenna recognizes it as the change of the IC tags within its read range.

To keep the IC tags within the detectable area of the RFID antenna, the book is fixed using a magnetic binder. All pages are put together using two rings with magnets and fixed to certain position of the table (Figure 2). With the magnetic binder, users easily fix and unfix all pages to shuffle them. This is one of the most important technical innovations of Tiny Dreamy Stories, that is, shuffling pages as users like and change the storylines. To develop this page-shuffling system, realizing manageability of pages by using very thin IC tags is essential.

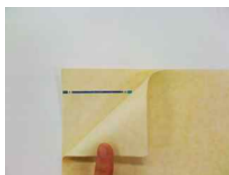


Figure 1: Embedded IC tag in a page.



Figure 2: Woody book covers, paper pages, and woody rings with magnets to bind pages.

Process of creating storylines by shuffling pages goes as follows: Once you take off all pages from the binder, you can see back-

ground images drawn directly onto each page. Next, just shuffle pages to make different row of sequences. When you put back all pages to the binder, the RFID antenna detects rearranged IC tags and corresponding images are projected and new background music starts to play.

The authors made the book with four pages, which gives story branches 24. When one of stories arranged in advance is called up from detected page IDs and movie of characters and narrative texts are projected onto surface of the book and background music starts to play.

3 User Experience

The authors conducted a demonstration experiment of the system in the annual exhibition of University of Tokyo. 240 people experienced the system.

129 of all 240 people asked the authors about the mechanism of page detection. Only 5 people guessed that something is embedded in a page while most people had no idea or guessed that image processing is used. The result indicates that most people didn't notice the presence of detection system inside of the thin papers, suggesting that this system keeps enough naturalness of papers even after sandwiching IC tags.

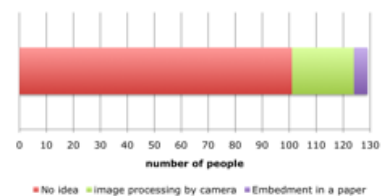


Figure 3: Guess how the system detects individual pages.

How many times people played with shuffling will tell how people can enjoy this system. While some people tried to shuffle pages only once, 225 people shuffled pages more than once. The reason why people played with this over and over are as follows; Some said it is just a fun to play with. Others said they tried to find the mechanism of change of storylines by shuffling pages. This result indicates that the page-shuffling system provides enjoyment to people at some level. Although further experiments are needed to validate the utility of the page-shuffling system.

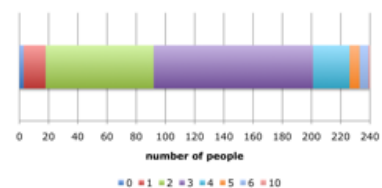


Figure 4: How many times people played with the shuffling system.

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