Electronic Popables: Exploring Paper-Based Computing through an Interactive Pop-Up Book

Qi, Jie, and Leah Buechley. "Electronic popables: exploring paper-based computing through an interactive pop-up book." *Proceedings of the fourth international conference on Tangible, embedded, and embodied interaction*. 2010.

The researchers proposed a product called Electronic Popables, an interactive pop-up book, aiming to explore paper-based computing with interactive design. Popular ebook reading devices like Kindles do not allow users to interact with a pop-up book. Therefore the researchers came up with Electronic Popables as a solution, allowing the use of electronics in paper-based books. This project stands out as it focuses only on paper books instead of using paper as a user interface. The paper explained the design and implementation of each page in detail, containing 6 pages, each with a different theme and sensor mechanisms. The pages are about Pink Flowers and Switches, Orange Ocean and Potentiometers, Blue Skies and Skin Galvanic Response Sensors, Yellow Solar System and Pressure Sensors, Purple NYC and Bend Sensors, and Green Venus Flytraps, Capacitive Sensors, and Movement. Generally, this project explores physical computing on paper books, its interactive aspect, and its aesthetic aspect.

Listen to Reader: an electronically augmented paper-based book.

Back, Maribeth, et al. "Listen reader: an electronically augmented paper-based book." *Proceedings of the SIGCHI conference on Human factors in computing systems*. 2001.

In this paper, the researchers described the method for utilizing electronic augmentation on paper-based books. The Listen Reader they proposed retains the quality of paper books while also containing an interactive soundtrack setup, and combines the elements and ideas from ubiquitous computing, tangible media, and augmented reality. It contains a chair with sound components embedded and a swing arm table with a book fixed on it. The paper explains the interactive design of this project, including continuous controllers, and content-related sound effects. For the system design, two major components are applied: Electric field sensors and RFID tags, mainly for sensing page identification and user actions. This project explores the interactive quality of paper and sound electronics, and introduces the unique setup, allowing users to read paper books with contextual soundtracks.

Creating Interactive Physics Education Books with Augmented Reality

Dünser, Andreas, et al. "Creating interactive physics education books with augmented reality." *Proceedings of the 24th Australian computer-human interaction conference*. 2012.

This paper provides a framework for creating educational Augmented Reality (AR) books that create virtual content overlaid over real book pages and enable multiple user interactions. By using this framework, the researcher created three books centering on electromagnetism concepts and proved the effectiveness of such forms of books through observation. The framework they proposed allows non-professionals to make AR books faster and in an easier way. It includes implementations of actions including Viewpoint Tracking, Graphics Rendering, Interactivity, and Scene Creation. The example AR books they made require to be read with a handheld AR device connected to a PC. Besides the AR images, it also includes some interaction that requires the user's actions such as manipulating provided components. This study explores the possibility of integrating AR technology with paper books, feasible interactions, and experiments to state the effectiveness of 3D imageries in teaching/learning spatial knowledge.

People in Books: Using a FlashCam to Become Part of an Interactive Book for Connected Reading

Follmer, Sean, et al. "People in books: using a FlashCam to become part of an interactive book for connected reading." *Proceedings of the ACM 2012 conference on Computer supported cooperative work*. 2012.

People in Books is an interactive book embedded with FlashCam technology, aiming to allow children and their families to engage in reading even at long distances. It enables family members to act as characters in the storybooks, by putting the video streams of people onto the storybook pages. The book is read through tablet-like mobile devices, contributing to the development of digital books and their interactive features. The paper described the UI and the content design of the book, also the implementation of human subtraction from videos. They also conducted simple experiments combining approaches such as survey, interview, and observation, confirming the effect of interactive books like this on encouraging the engagement of family reading. This study developed the idea of long-distance family reading and multi-people reading, further exploring the possibility of interactive books.

Interacting with Printed Books Using Digital Pens and Smart Mobile Projection

Dachselt, Raimund, and Sarmad Al-Saiegh. "Interacting with printed books using digital pens and smart mobile projection." *Proc. of the Workshop on Mobile and Personal Projection (MP2)@ ACM CHI*. Vol. 11. 2011.

In this paper, the author introduced the idea of Projective Augmented Books (PAB). The main idea is to attach a lamp-like projection device to books, with the application of digital pens and paper, the user would be able to have information projected onto the paper-based books and interact with the book as usual while having all the annotations recorded and saved. The paper described the function of these devices including Basic Page Annotations, Copy and Delete, E-Mail, Translation, Encyclopedia, Graphical Palette, and so on. This project explores the possibilities of paper books by utilizing the existing technologies, enabling users to have more options for interacting with paper books.