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Coeno–Storyboard: An Augmented Surface for Storyboard Presentations

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Abstract

In this paper, we present Coeno-Storyboard, an around-the-table application designed for storyboard presentations. The demonstration is based on a flexible plug-in framework that allows fast development of tabletop applications. Moreover, we integrated different well-known interaction metaphors into the environment to find out which of the metaphors are accepted mostly by users during a discussion.

1 Introduction & Related Work

Mixed Reality has become a popular buzzword used by many researchers moving from the area of Virtual Reality to Augmented Reality (AR). A lot of time has been invested in improving current tracking systems, finding new ways of interaction, searching for adequate displays, and implementing new exciting applications. Inspired by the ideas of the *Future Office* from Henry Fuchs (Raskar et al. 1998) and the *Augmented Surfaces* presented by Jun Rekimoto (Rekimoto & Saitho 1999), we implemented a multi-user shared tabletop application for a storyboard presentation. Tables provide a convenient environment for people to meet, discuss, look over prepared documents, and to present ideas that require face-to-face collaboration. A lot of researchers are already working on new interfaces for improving current brainstorming sessions (cf. Klemmer et al. 2001). However, the presented solutions are either too isolated or too specific for the individual tasks they solve. Similar to Streitz et al. (2003) and Ryall et al. (2004), we combined both the usage of a table for a better communication and the usage and integration of mobile devices (e.g. laptops, Tablet PCs etc.) to achieve the best infrastructure for a successful presentation and discussion environment. In contrast to current solutions, e.g. Roomware (Prante et al. 2004) or MERL's DiamondTouch (Ryall et al. 2004), we wanted to present a competitive solution without any special hardware devices. Unfortunately, it is still too complicated to integrate new hardware devices into existing tabletop frameworks – a lot of provided solutions are based on Java, which makes it too difficult to extend it for new devices or to combine it with current software tools. But

people expect that - they want to see integrated the Office Powerpoint environment if the tabletop application should become successful. Our framework allows us to further explore, experiment, and design novel tabletop interfaces for a face-to-face collaboration and it provides an infrastructure to quickly integrate new interaction metaphors. The presented storyboard application, for example, was rapidly prototyped within four days' time.

2 The Storyboard Presentation Tool

Coeno-Storyboard is a face-to-face presentation environment for storyboard discussions using tabletop technology in combination with augmented, digital information. It offers a cooperative and social experience by allowing multiple participants from different domains (e.g. designers, modellers, project managers etc.) to interact easily while discussing the same story, at the same time, in different space.

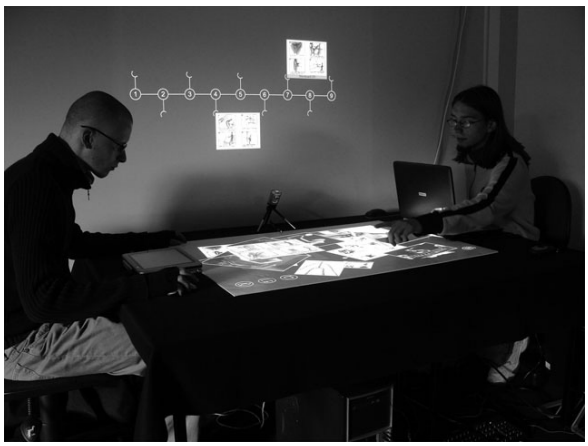
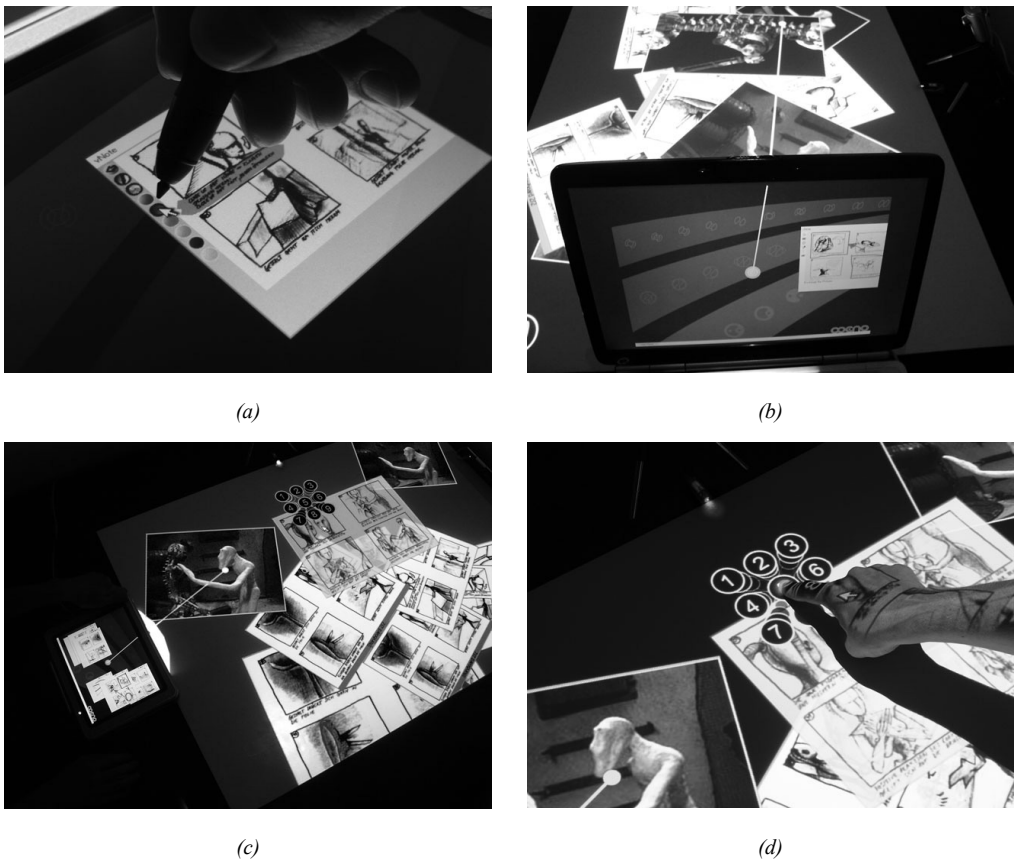


Figure 1: Participants can join the discussion session and move their scribble-notes from the laptop/tablet PC to the augmented tabletop projection surface. Intuitive interaction metaphors should support users to have a very intuitive and immersive presence feeling.

Our first demonstrator uses a lot of metaphors that have already presented by Rekimoto & Saitho (1999) and Ryall et al. (2004). Indeed, we wanted to examine in which sense they can motivate the production process in a positive way. During the storyboard creation process, multiple authors and designers can create rich stories. Coeno-Storyboard offers a smooth integration of portable computers (i.e. laptops, tablet PCs) into a meeting room, where the table and walls are acting as an extended public computer display. During the discussion, all participants around the table can quickly re-arrange the data sources. An intuitive passing of documents around the corresponding surfaces guarantees the location of the scribbles on the timeline that is visualized on a wall-sized projection display (cf. Figure 1). Equipped with a

wireless multimedia mouse pointer, one person assumes the role of a coordinator and organizes the "unsorted" data by moving them from the workspace-table to the projected presentation-wall.



(a) *(b)*

(c) *(d)*

Figure 2: Participants can either create new notes and scribble on their laptops/tablet PC or modify them (a). A seamless movement to the augmented surfaces is realized by the hyperdragging metaphor (b), (c). Finally, an optical finger tracking software recognizes finger tips on the desk without having a special hardware infrastructure (d).

One of our main requirements was to involve users in an early stage. Consequently, we want to find out soon which of the interaction metaphors would get accepted by users. So, for example, we implemented and advanced hyperdragging-metaphor (cf. Figure 2 (a)-(c)) proposed by Rekimoto & Saitho (1999), where the table is an extended workspace and data is projected onto the table respectively. What we wanted to find out was the fact if some of the interaction techniques would become too tiresome after people have to work with them for a while. Participants are allowed to create new scribbles and/or modify data only in their private space and then they can move the data to the public space. After our first tests, we soon recognized, that users expect an intuitive and nice interface – but at the same moment, they

expect also an interface that allows is efficient enough to achieve the best working performance.

3 Results and Future Work

We recognized in our first tests that the Coeno-Storyboard supports a stronger relationship to create a storyboard than it is supported by a traditional 2D graphical user interface, where all participants have to sit isolated in front the PC. Thus, users feel a stronger sense of identification with the story, because they can simply concentrate on the story instead of being distracted by the hardware. A lot of the users were surprised of the discussion performance. In fact they loved moving data notes from one client to the table and vice-versa - even with a huge amount of scribbles on the working desk, they never felt lost. Once the scribbles were moved to the table, some of the participants started to interact using their hands with the expectation that they could move and transform the notes accordingly by using their tipping to the table surface.

Even though, we are in an early stage of the project, we recognized a lot of challenges to improve the current application. When several people gather around the table, there is no single directional viewing angle that is ideal for every participant. Therefore, the system should guarantee a flexible and fast movement of data sources around the table.

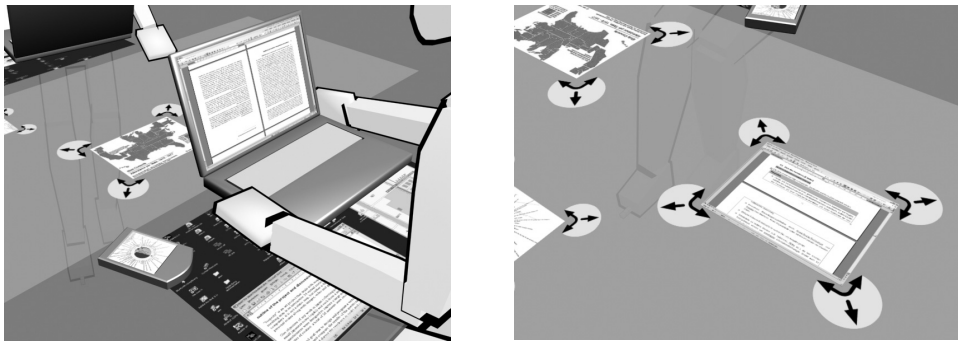


Figure 3: The private space can be implemented as embedded windows on the table. Another improvement would be that multiple people can interact and manipulate the data sources directly on the table.

One of the main goals for the next steps is a formal evaluation of the system. Thus, we want to find out, into which of the in- and output techniques we have to put more effort.

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