Lumisight Table: Interactive View-Dependent Display-Table Surrounded by Multiple Users

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1 Introduction

When you use a computer, your eyes are focused on a display, and your hands are restricted to a keyboard or mouse device. This is bad for communication and collaboration. In a collaboration, non-verbal communication modalities, such as eye contact, facial expressions, and handling physical objects together, are just as important as the verbal modality. With our "Lumisight Table" you can stay close enough to maintain nonverbal communication and collaboration while using computers, since its display is physically single but visually multiple (See Fig.1). Moreover, computers can be controlled by hand gestures or by placing physical objects on the display.
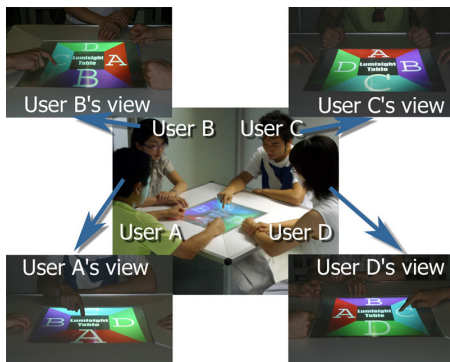

Figure 1: Lumisight Table.

2 LumisightTable

Lumisight Table offers four core technical innovations:

- Optical design of a special screen system composed of a building material called Lumisty film and a Fresnel lens. The system combines these films and lenses with projectors and cameras to display four different images, one for each user's view.
- A software approach to adjusts four projector images geometrically on the screen. With this method, four projectors can project identical portions of images onto identical positions on the screen.
- A method for mixed and integrated display of public and private information on the screen. The identical portions of images can be regarded as public to all the users, while the other portions, private to each user.
- A method for capturing the appearance of the tabletop from inside the system.

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3 Applications

Lumisight Table could improve the efficiency of some applications in computer supported cooperative work because it optimizes the direction of projected information (letters and characters) to each user around the table. Furthermore, the users can control the system by placing physical objects on the screen (See Fig.2). Lumisight Table could also open up new kinds of video games, including mahjong and poker (See Fig.3) For example, you can use physical chess pieces while Lumisight Table acts like a computerized chess board on which you can see both a shared public game board and some unique private hints for you.
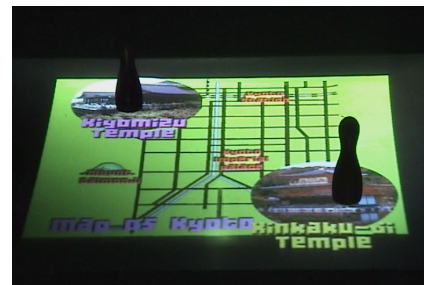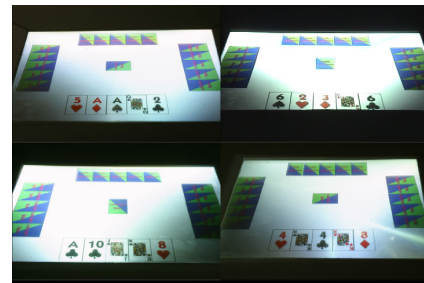

Figure 2: Placing physical objects.

Figure 3: Four different views of a poker game.

4 Conclusion

Lumisight Table is not just an interactive display technology. Now, you have a new canvas. You can display anything, and design new interactive applications on it. The possibilities are unlimited: entertainment, computer supported cooperative work, networked applications, and media art works. In order to realize Lumasight Table, we will implement an application program interface in the near future.