Movie-in-Shadow: Your Shadow is a Display

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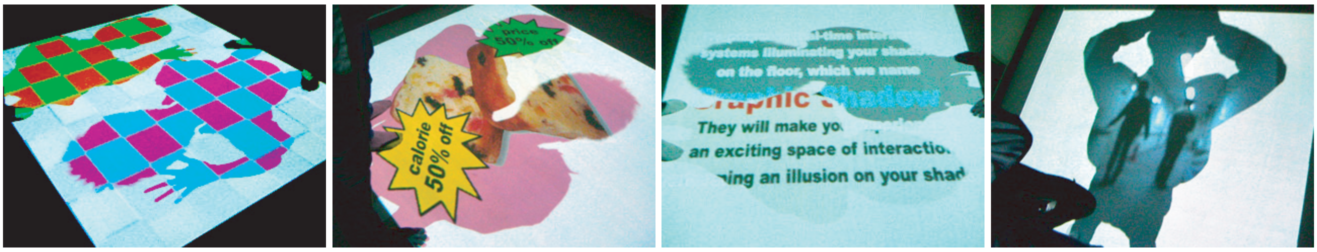

Texture | Picture | Text | Live Video

Figure 1: Your shadow displays texture animation, colorful pictures, text data or live videos on a plain white floor.

1 Introduction

You may believe that your shadow is just a black or dark region on the floor; however one of the authors proposed an attractive system named “Textured Shadow,” which can defy such a common thought [Kato et al. 2003]. This paper extends this prior work to transform shadows into a more versatile display.

2 Movie-in-Shadow

Shadows of users have always been a problem for front-projection systems. We turn this problem into our advantage, and make positive use of the shadow made by the user blocking the projector light.

When the system has no user in it, the floor seems to be just lighted up in white. In the case of Textured Shadow, when you enter the system and occlude the projector light, your shadow would emerge with colorful textures. An advanced implementation in this paper allows your shadow to have a colorful picture, sharp characters, and even a movie. We call this new system “Movie-in-Shadow.”

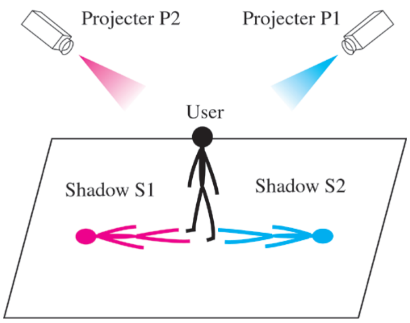

Figure 2: Diagram of the system.

As shown in Fig.2, the diagram of Movie-in-Shadow (MS) is almost the same as that of Textured Shadow (TS). Two projectors (P1 and P2) are placed in such a way that their projection areas converge onto the floor. The trick hidden in this system is that P1 casts some colorful image onto the floor, while P2 compensates it to white by casting the complementary color for each pixel on the floor. Since it is based on optical processing, no latency or digitized artifacts can be seen.

The main difference between TS and MS lies in the process of synthesizing complementary images. TS needs to generate all the complementary images before you enter the system. This is because TS adopted a camera-based approach. In other words, TS has a camera, and its output is used for the image generation. Consequently, geometrical and optical restrictions of TS come from the camera’s capability, TS also can not display live videos. On the contrary, MS adopted a table-based approach. In the initializing process of MS, we make a table which describes pairs of complementary colors between two projectors, by using a colorimeter. This pre-acquired table allows us to generate complementary color images anytime you want. As for the geometrical alignment of the two projectors, we have implemented a user interface to achieve pixel by pixel accuracy on the floor.

Fig.1 shows experimental results. You can experience an exciting space of interaction by performing an illusion onto your own shadow.

3 Conclusion

Interaction with shadows is acquiring increasing attention in diverse fields of media art [Chikamori and Kunoh 1998; Simpson 2002]. Movie-in-Shadow could be one of the most versatile shadows. Special thanks go to Prof. Hiroshi Harashima for his helpful advice.

References

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