

Observe the User Interactive Behavior with a Large Multi-touch Display in Public Space

Chien-Hsu Chen, Hsiao-Mei Hung, I-Jui Lee,
Yu-Wen Chen, and Fong-Gong Wu

Industrial Design Department, National Cheng Kung University
No 1. University Road, Tainan 701, Taiwan
Chenhsu@mail.ncku.edu.tw

Abstract. Multi touch is a new-type technology of human computer interaction, it can provide multi user to operate on the same display. Hence, different type of interface design will cause manipulation problem. This study is going to create a 100 inch multi-touch display to observe the user's interactive behavior through the 6 cameras in public space area. In addition to the manipulation interface, a "Photo.DIG" interface is development to control photos in the depth.

Keywords: Multi-Touch display, Public space.

1 Introduction

Multi touch is a new-type technology of human computer interaction, it can provide multi user to operate on the same display. Therefore, different type of interface design will cause manipulation problem. Most of large Multi-touch display research topic is in large public space display, it focus on promote share information and spread broadcast ability of people communication and social network. However, how to encourage the people to interactive with the public display is the core problem to solve.

Brignull's [1,2] research point out the most limited of people to interactive with the large public display is their user experience of the psychological aspects, like the "Social embarrassment" will barriers on people interaction with the display. He proposed a public interaction flow model to explain the "Social embarrassment," including three activities: peripheral awareness activities, focal awareness activities, and direct interaction activities. Prante et al. [3] also notice a "Hello.Wall" interact model which is dependent on distinguish distance from inside to outside space: ambient zone, notification zone, and cell interaction zone.

Vogel & Balakrishnan [4] developed an interaction framework. By dividing Prante et al's "cell interaction zone" into the subtle and personal interaction phases and by generalizing the notion of a "notification zone" into an implicit interaction phase, this framework suggests a wider range of implicit and explicit interaction techniques. It covers the range from distant implicit public interaction to up-close explicit personal interaction, with four continuous phases with fluid inter-phase transitions: ambient display, implicit interaction, subtle interaction, and personal interaction. This interaction framework differs from the three zone model used in Prante et al's

“Hello.Wall”model. It did not rely solely on physical proximity to delineate different phases. It emphasized fluid transitions between phases and supported sharing by several users each within their own interaction phase.

In this study, we are going to build a 100 inch multi-touch display to observe the user’s interactive behavior through the 6 cameras in the public space area. In addition to the manipulation interface, a "Photo.DIG " interface is development to control photos in the depth.

2 Build Multi-touch Display

As computers become pervasive in our daily life, researchers bring up the idea that technologies and computers should offer friendly interfaces for their users, such as to bridge the gap between people and digital information. Natural user interface, such as Multi-touch, is the most popular and important topic in Human-Computer Interface research area recently. Multi-touch can not only give us the ability to use more fingers simultaneously to interact with the information/objects on the screen without traditional input devices, such as physical mouse or keyboard, but also provide the possibility of multi-user interaction. These characteristics of Multi-touch blur the line between physical and virtual worlds, and lead the concepts of Human-Computer Interaction to a great revolution. The rise of Multi-Touch technology enables new ways of interacting with information. The developments of Intuitive gestures and innovative interfaces are still ongoing. Therefore, build up a Multi-Touch platform to support the new kind of interface research is the beginning of this study. First, the frame structure is designed and simulated with CAD software to arrange the camera position (Fig. 1).

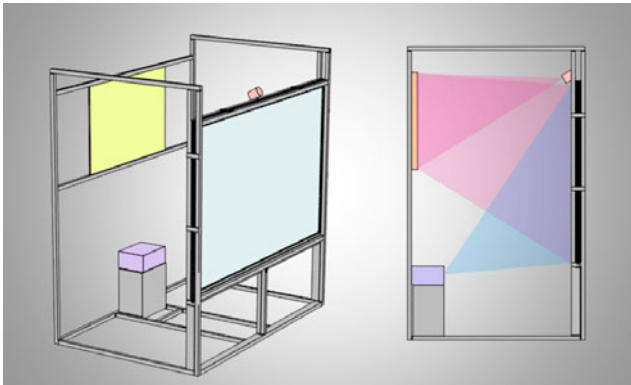


Fig. 1. Design the frame structure of Multi-Touch display

After that, we setup the whole 100 inch multi-touch platform at the art gallery of Chi-Mei building in national cheng-kung university. Figure 2 shows the interior design construction.



Fig. 2. Interior design construction of 100-inch multi-touch display

2.1 Photo.Dig Interface

For interface design process, we observe the people how to find a bunch of photos scattered on the desk. Usually people will using their both hand poke the upper photo to search the one they real want to see, the gesture is very nature and directly. We contrast this metaphor just like the tradition way to find the photos, we call it “Dig.Gesture”(Fig. 3), it let the user can direct use their both hand to expose their photo like the real tradition way.

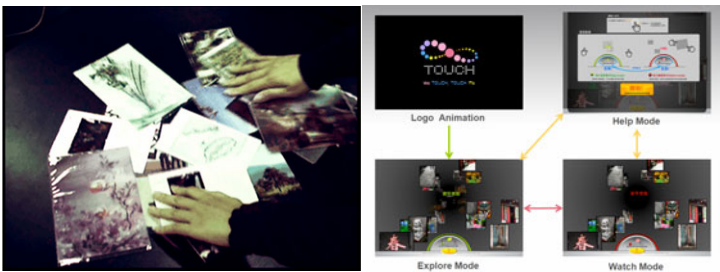


Fig. 3. Dig.Gesture to implement Photo.Dig interface

Like the search photo way of “Dig.Gesture”, we utilize the photo within historical timeline scale to be the design contents, and collect the old photos at NCKU (National Cheng Kung University), to arrange the photo in period from 1920 to 2000, by use the Dig.Gesture to control the timeline to change the batch photo show on the screen, this way use the timeline concept correspond the depth axis to represent the different period.

3 Results and Conclusion

After finish the platform construction and interface design, we setup 6 cameras around the multi-touch platform to observe users' behavior during manipulation the Photo.Dig interface. In 9 days' observation period, we found people moving from outside of exhibition space into the inside exhibition space, then to be close to the display wall, and finally touch the multi-touch interface. We conclude the user behavior into the five-stage: pedestrians, visitors, viewers, users, and operators. We observe the visitor into the space usually have two main types: active and passive. The people in passive type sometimes mostly because of the peer's traction, and often appear in parents and children, at this time the children always played a pioneer role, the parents are following. But there have other visitors in the observe space, it will enhance the existing pedestrian initiative noted that the proportion of space, especially when people in use around multi-touch screen, it is particularly attractive other pedestrians into this area to visit it, and join other people use the screen wall.

The group interaction usually appear in the visitors groups themselves, different groups of visitors will not appear too much further more interaction, but will choose a different part of contents to visit. However, different groups of visitors will be attracted and gathered in front of the large size of the multi-touch display.

In this study, we usually observe the users' social interaction behaviors: people are trying to touch the display without body contact to each other, and only familiar users or children have personal interaction during operate the same part of interface without body contact. The body contact interaction will happen in intimate users.

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