Interaction Design for the Media PC

Kelvin Cheng¹, David Vronay² and Frank Yu²

¹NICTA (National ICT Australia) and ViSLAB The University of Sydney
NSW 2006, Australia
kcheng@it.usyd.edu.au

²Center for Interaction Design
Microsoft Research Asia
Beijing 100080, China
{davevr, i-franky}@microsoft.com

ABSTRACT
In this paper, we report on a usability experiment conducted to investigate the use of two pointing devices, a mouse and a remote controller, in a Media PC user interface that supports both devices. Differences in selection paradigm and the discoverability of user interface actions are examples of problems with such combined design approach. Unified appearance, target correspondence, as well as designing for user experience, are guidelines that we have suggested to improve the design of user interfaces that work to the advantages of both devices.

Keywords
Remote control, mouse, Media PC, interaction design, user studies, 10 foot user interface, user interface design

INTRODUCTION
Various studies [1-4] have shown that the computer mouse is a simple to use and efficient input method for the desktop graphical user interface (GUI). On the other hand, the remote controller is most commonly used with consumer electronic devices that require simple input such as televisions. As computer technology becomes more advanced and their multimedia capabilities increase, we see an increasing number of computers making their way from the desk into the living room. The current desktop GUI loses effectiveness when viewed from a 10 foot distance. Manufacturers have attempted to address this problem in two ways. The dedicated device approach focused on making specialty devices specifically for handling media with a custom user interface designed for a 10’ operation via a remote control. The Media PC approach kept the desktop user interface for most tasks but add specific software, with a dedicated user interface, to handle the media related tasks. Unlike dedicated devices, Media PCs can be used in both the traditional desktop setting as well as the living room setting. This presents a unique challenge for the interaction design team, as they must come up with a design that works in the mouse-operated desktop setting and in the remote-operated 10’ UI setting.

Copyright is held by the author/owner.
UIST ’04, October 24–27, 2004, Santa Fe, New Mexico, USA
ACM 1-58113-962-4/04/0010
turning on a piece of specified music to provide a relaxing environment. Tasks 2 involved simply finding a specified photo from the visible photos. Task 3 required scrolling to find the target photo. Task 4 tested the efficiency of the interface for multiple directories requiring large amount of repetitive movements (moving in and out of folders) uncovering problems and inconvenience with each device. Tasks 5 tested the interaction with standard UI widgets such as dropdown menus. Task 6 tested for fatigue requiring multiple clicks to find a photo. The tasks were repeated with the other device. Two different sets of photos were used and randomised to reduce bias. Finally, users were asked to complete a questionnaire.

Results
The average overall task time for the mouse (mean = 134 seconds) was faster than for the remote (mean = 152 seconds) but it was not statistically significant at the 0.05 level, t(14) = 1.84, p = 0.09. In task 2 and 4, the differences between the devices were not significant. In task 3, the remote was significantly faster than the mouse, while in task 5, the mouse was significantly faster than the remote. Gender effect, experience with remote and presentation order were not factors in our study.

Questionnaire
Participants were asked to compare the devices with respect to different attributes. Subjects felt that more control could be exerted over the mouse and that it was faster and more accurate comparatively. However, the remote was reported to be more comfortable. Interestingly enough, when asked which device was preferred overall, all participants were able to reach a preference (i.e. no preference for neutral) even though the mean respond was neutral. We can conclude that although subjects agreed on preferring the mouse for its control, speed and accuracy, and preferred the remote for its comfort, there was no consensus on which device they preferred overall.

DISCUSSION and OBSERVATIONS
The mouse is a general purpose input device. Familiarity with its functionality from one application allows the user to be competent with other PC based applications. The remote control, on the other hand, is typically designed for a single user interface. Each action in the user interface has a dedicated button on the remote. Whereas in mouse driven application only screen interface will determine usability. With remotes, both screen and remote interfaces will need to be learned in some way by new users.

One of the primary user confusions with switching between these devices is the difference in selection paradigms. Specifically, mouse UI supports states where no object is selected, but with the remote control UI at least one object is selected at all times. Another came from the discoverability of possible user interface actions. On a remote control, the user can quickly see all possible actions, whereas the mouse UI must be explored by the user in order to discover command targets. In general, users found the mouse to be more direct but restrictive, while the remote was more comfortable and enjoyable but slow to learn.

RECOMMENDATIONS
Unified Selection – The mouse should function more like a remote. The UI targets should be larger and adjacent to minimize targetting, as well as having obvious highlighting to indicate that they are targeted when the mouse is over them. Many problems were the result of the differences in selection modality between the two devices.

Keyboard / Remote Equivalence - Users draw a natural correspondence between the buttons on the remote control and the buttons on the keyboard. Therefore, those buttons that are shared between these devices should have the same effect in the UI.

Action Target / Remote Correspondence - Often users who are familiar with the user interface for one device have difficulty transferring that knowledge to operate the other device. Action targets in the GUI and the action buttons on the remote should correspond as closely as possible, in both graphical appearance and relative spatial layout.

Software solutions – Novel hardware devices combining both mouse and remote have not proven to be more efficient as presented in [1] with the Gyration mouse. The remote is more accurate because of its constrained movements compare to the mouse. It might be possible to allow the mouse to have as much accuracy as the remote by constraining the mouse as well.

Design for User Experience - Although the results show that based on time and user feedback the mouse was faster and had better control, users still felt that the comfort and convenience of the less precise device made it equal to using the mouse by preference. Future UI and interaction design should aim to address users’ satisfaction with at least the same priority as quantitative performance, if not higher priority.

ACKNOWLEDGMENTS
We would like to thank Wang Shuo and Weiru Cai for moderating the user experiment and Dong Jingbo for designing the poster.

REFERENCES