

FLIPCLOAK

The Window Manager System for Overlapping Windows with Vacuum Metaphor of Visualizations

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Abstract: Overlapping windows prevent us from finding the target window immediately. They reduce the operability and the visibility so that it is important issue how to visualize and manage the windows on a desktop. In this research we propose the new window management method that uses combinational operation with a personal computer and a smartphone. Then we prototype the application called the FlipCloak. The FlipCloak is the system that controls transfer of windows on the desktop between devices with simple gestural interaction. Using the FlipCloak we can manage windows on a desktop efficiently by putting the low-priority window in the other device temporarily as putting one's stuff in the cloakroom.

1 INTRODUCTION

It is a important issue how to visualize overlapping windows on a desktop. Development of the information processing technology allows us to open many application windows simultaneously. Though it helps us to work on a computer comfortably by multitasking, it harms the both operability and visibility, because desktop has limited space. We often have an experience which cannot find the target window immediately from a overlapping windows.

There are some existing functions on operating systems or each applications to help for task management and document comparison such as *minimization*, *alt-tab/command-tab*, *tab-window system*, *spaces* or *expose*. Furthermore Robertson made a system called the Task Gallery, a window manager that uses interactive 3D graphics (Robertson, 2000). Yamanaka proposed a method that the user slides the mouse cursor under the windows (Yamanaka, 2011). Then Dragicevic proposed a technique, called "fold-and-drop", uses a natural metaphor that makes it possible to seamlessly drag and drop objects from a window to any window underneath with the paper-based metaphors (Dragicevic, 2004).

Both existing functions and related works enhance the speed of the window management. However it is not the system that reduce the number of the window on a desktop. They visualize the many windows

efficiently by thumbnailing or abbreviating the title. Therefore the more window we open, the less the operability and the visibility are reduced.

In this paper we explain the system called the FlipCloak, that solves the issues discussed above by combinational operation with a personal computer and a smartphone.

2 FLIPCLOAK

The FlipCloak is the system that controls transference of windows on the desktop between devices with simple gestural interaction. While working on a computer with the FlipCloak, if we tip a mouse, the target window on the desktop of the personal computer transfers to the display of the smartphone (Figure 1). And if we tip the smartphone to the personal computer, the target window on the smartphone returns to the personal computer. Putting the low-priority windows in other devices temporarily with simple gesture, we can manage windows on a desktop efficiently, as putting one's stuff in the cloakroom. Then we describe details of the system.

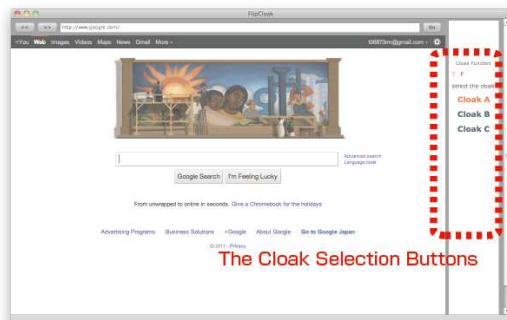
2.1 The Cloak Function

Using the *Cloak* function, we can put windows in ot-

Transference from the PC to Smartphone by Mouse Tipping



The Display of the Personal Computer



Transference from the Smartphone to the PC by Smartphone Tipping



The Display of the Smartphone



Figure 1: The image of the system: When we tip a mouse, the target window on the personal computer transfers to the smartphone (above). When we tip the smartphone, the target window on the smartphone return to the personal computer (Bottom).

Figure 2: The image of the *Cloak* function: We can select the cloak by clicking the button on the right (above). We can check inside of the cloak tapping the cloak button (bottom).

her devices with grouping. There are three cloaks in the smartphone (Cloak-A, B and C). We select one of them at a time we flip the mouse (Figure 2). Then we can check the windows in each group on the smartphone with tapping on the cloak button.

2.2 The Whole Selection Function

Normally when we tip the smartphone to the personal computer, only the top window return to the personal computer. However, using the *Whole Selection* function by longtapping on the each cloak button, we can bring back whole windows in the cloak to the personal computer. If we select the Cloak-A, that contains four windows, as a whole, four windows return to the personal computer when we tip the smartphone.

2.3 The Devices Selection Function

We can choose devices to which transfer from the main device with the *Device Selection* function. The FlipCloak can transfer windows not only the main personal computer to the prepared smartphone but also the main computer to the other smartphone or the smartphone to the other smartphones by registering each time.

3 IMPLEMENTATION

In this chapter we explain about the implementation of the FlipCloak.

3.1 System Architecture

Figure 3 shows the image of the system architecture of the FlipCloak. The user needs to use the special mouse which has the Phighets Acceleration Sensor inside. The user also needs to install the FlipCloak Application both in the personal computer and the smartphone.

The FlipCloak Application for the personal computer is implemented by the Adobe Air and the FlipCloak Application for the smartphone is implemented by the Google android2.1. When the mouse gets particular acceleration the top window information is send to the data server and the window is killed with special animation. At a time the the data in the server has changed, it shows the target window on the smartphone.

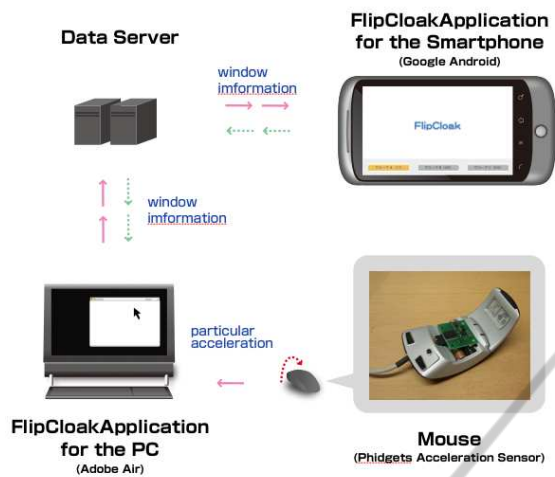


Figure 3: The image of the system architecture: The FlipCloak consists the PC application, the smartphone application, the data server and the mouse with acceleration sensor.

3.2 Vacuum Metaphor of Visualizations

The features of this system are simple gestural interaction and window animation at the time transfer to the other device. Figure 4 is the screenshot of the moment of the transference. The window on the desktop is killed with the animation that is like getting sucked into the smartphone. It helps users to understand the transference of the windows into the other device using vacuum metaphor.



Figure 4: The Screenshot of the moment of the transference. The window transfers to the smartphone as like vacuumed.

4 USE CASE

In this chapter we show some examples of use cases of the FlipCloak.

4.1 Selecting the Plan with Grouping

We can select the information with grouping. While searching the restaurant or trip plan on the internet, we can put perspectives on the smartphone temporarily with the *Cloak* function. For example at the time we search the restaurant, we can put the restaurants good for its price in the *Cloak A*, the restaurants good for its location in the *Cloak B*, and the restaurants good for its reputation in the *Cloak C* (Figure 5). It helps us comparing the plans.

4.2 Transfer with the Article with Different Devices

For example if we find the remarkable articles on the web news at home, we can put the article in the smartphone only with tipping and can check it in the train. Then if you arrive the office with unread articles, we can read it on the desktop computer in the office only with tipping the smartphone with the *Device Selection* function.

4.3 Exchanging the Information Easily

We can exchange the information without mailing its URL, uploading, or using QR code. We just tip smartphone each other with the *Device Selection* function.

5 DISCUSSION

The FlipCloak has been nominated the top twenty-five on the five hundred applications at the MashUp Awards 7 (<http://ma7.mashupaward.jp/>), one of the largest competition of mashupped web applications in Japan. We got many comments at the screening from judges and also got many feedbacks from engineers, designers and directors. They were sympathize with the necessity for the FlipCloak. Then all feedbacks are positive about the animation of the transference. However some of them gave us the feedback that not to use the spacial device which is the mouse with acceleration sensor. We completely agree with the feedback. Therefore it is our future task to implement mouse function on a smartphone.

6 CONCLUSIONS

In this research we propose the new window management method that uses combinational operation with a

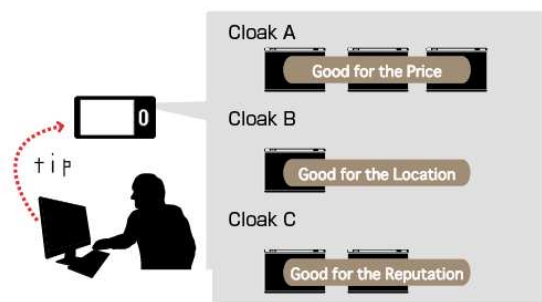


Figure 5: The image of searching the restaurant with grouping using the *Cloak* function.

personal computer and a smartphone. Then we prototype the application called FlipCloak. The FlipCloak is the system that controls transference of windows on the desktop between devices with simple gestural interaction. It is difficult to find the target window immediately from overlapping windows on a desktop. Using the FlipCloak we can manage windows on a desktop efficiently by putting the low-priority window in the other device temporarily as like putting one's stuff in the cloakroom. The FlipCloak obtained good results in the competition in its concept and its visualization.

REFERENCES

- Dragicevic, P. (2004). Combining crossing-based and paper-based interaction paradigms for dragging and dropping between overlapping windows. In *Proceedings of the 17th annual ACM Symposium on UIST '04*, pages 193–196.
- Mashup Awards 7 (2011). <http://ma7.mashupaward.jp/>.
- Robertson, G., Dantzich, M., Robbins, D., Czerwinski, M., Hinckley, K., Ridsen, K., Thiel, D., and Gorohovsky, V. (2000). The task gallery: A 3d window manager. In *Proceedings of CHI '00*, pages 494–501.
- Yamanaka, S. and Miyashita, H. (2011). A mouse cursor operation for overlapped windowing. Technical report, IPSJ SIG.