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COM496 - Research Seminar

Abstract:

This research addresses the accessibility of open application windows on a large display. The task bar, being located in a peripheral area, does not work well when using a large display. We propose a design that has a user activated functionality to shrink down the content of the display to an area comfortable to the user to see what applications are available on the display. The user can then access the windows with ease, select a window to transfer from its original location to the location that is easy to the user to see, or remove a window without having to move around the room to see where it is.

Introduction

Large displays have proven to be effective in tasks where the user may utilise multiple applications open at once since the space available is larger than that of personal desktops. We can assume that the user will drag application windows away from their area of work to some far away area on the display instead of minimizing due to the large space available. With that in mind, recovering previously opened application windows may be challenging or may require the user to physically move around the room in order to be able to see the entire content of the screen. With repetitive tasks, this may not be convenient for users and will make the system difficult to use.

This study suggests a method to tackle this issue. The proposed design shrinks the screen contents to an area that is determined by the user's location. This helps making the content available at once without the need for physical movement, which has been proven by previous studies to have a negative impact on user experience.

Related Work

Many studies have been conducted to evaluate multiple aspects of the experience of using a large display. Our interest is narrowed down to the issue of making application windows accessible. Related studies were conducted by Microsoft to evaluate a generalization of the drag and drop design for large displays, and a modification of that method by the University of

Toronto. Both methods tackled the issue of making things that are hard to reach more accessible by extending the location of the pointer and treating it as a 'vacuum' point that clones the screen content on the far end and puts it near the user's pointer. However, both methods lacked presenting screen content as a whole, and they assumed that when the user wanted a specific application window, the user knew the general location of the window.

Method

This study tackles the issue of accessing previously opened application windows that are potentially out of the user's sight or hard to see without physical movement, by proposing a design that shrinks down the content of the screen to an area determined by the location of the user relative to the display to assure ease of access and present the screen content as a whole. The design was implemented using Processing. A window that represents the desktop is drawn, with multiple images representing application windows scattered across the display. A button is assigned to the function that shrinks down the desktop content to a location based on where the pointer is when the key is pressed (this will be changed to incorporate the user's location with respect to the screen instead of the pointer location). After the shrunk view is displayed, the user may select any of the representative windows from that view, then upon selecting one, the shrunk view is exited, and the desktop is redrawn with the selected window relocated at the new position where its representative window was drawn. All other windows remain at their original locations. This function is called everytime the user wants to examine what application windows are available on the screen with ease, which potentially minimizes the need for physical movement.
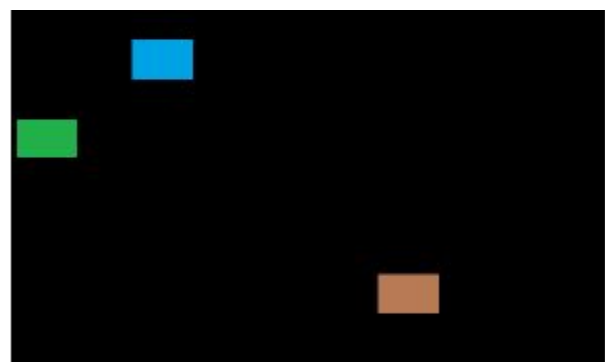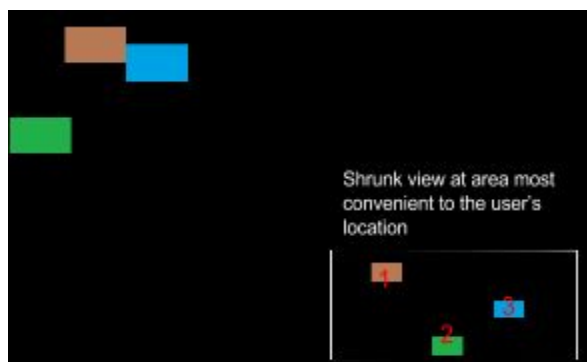
a. screen when the shrink is active   b. screen after window 1 is selected

Task Design

The proposed design is evaluated by assigning users a simple task that requires toggling between multiple open windows that contain relevant information to the task. The task is a list of one sentence or multiple choice answers. In order for a question to be answered, multiple sources have to be utilised to extract full information. The sources are given as the open application windows on the desktop. The answer to a given question may require to toggle between multiple sources. For instance, to answer a question about the distance between planet A and planet B in a given distance unit, one source can give information about planet A, another source about planet B, a source for calculating distance between two points, and a source for unit conversion. The point of the task is to test the validity of the design when multiple windows need to be accessed in order to accomplish a task.

User Study
--work in progress--

Results
--work in progress--
Conclusion
--work in progress--

References:
(Work in progress)
[1] R. Ball and C. North, "An Analysis of User Behavior on High-Resolution Tiled Displays" , Center for Human-Computer Interaction, Virginia Polytechnic Institute and State University, Blacksburg, Virginia, 2005.

[2] A. Bezerianos and R. Balakrishnan, "The Vacuum: Facilitating the Manipulation of Distant Objects", Department of Computer Science, University of Toronto, 2005.