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Breaking the Screen Barrier

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Abstract

This thesis is based on an important development in human-computer interface design: the move from primarily screen-based interfaces – based on the Windows-Icons-Menus-Pointer (WIMP) and Graphical Users Interfaces (GUI) paradigm developed for desktop computers – to computer interfaces which take advantage of the richness of the user’s physical environment. A common thread in the thesis is the attempt to expand the user’s workspace, whether that expansion is kept within the limits of the computer screen or brings the interaction to devices outside the desktop – i.e. to “break the screen barrier”, figuratively or literally. The thesis consists of five papers. The first paper describes *flip zooming*, a visualization method that uses the workspace on a screen more effectively. The second paper puts flip zooming and other similar methods within a general theoretical framework, which is both descriptive and constructive. The third paper describes *WEST*, A Web Browser for Small Terminals, which was an application where flip zooming was implemented on hand-held computers. The fourth paper describes the *Hummingbird*, a mobile counterpart to desktop-based workplace awareness applications. The fifth and final paper gives a general theory for interactive systems where physical objects are used to access digital information that is not contained within the actual object. Additionally, the introduction discusses how the thesis relates to Simon’s *science of the artificial*, Dahlbom’s foundations for an artificial science, and *the new informatics*, the scientific discipline within which the work was performed. A spiral model of design, *Verplank’s spiral*, is used to describe the research process.

Keywords

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Front cover: The Zoom Browser; Hummingbirds; WebStickers

Back cover: Verplank's Spiral – napkin sketch courtesy of W. Verplank

