The Promise of Zoomable User Interfaces

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Expanded version at HCIL Tech Report HCIL-2002-21
http://www.cs.umd.edu/localphp/hcil/tech-reports-search.php?number=2009-21

Zoomable User Interfaces (ZUIs) have received a significant amount of attention in the 17 years since they were introduced. They have enjoyed some success, and elements of ZUIs are widely used in computers today, although the grand vision of a zoomable desktop has not materialized. This paper describes the premise and promise of ZUIs along with their challenges. It describes design guidelines, and offers a cautionary tale about research and innovation.

The essential problem that Zoomable User Interfaces (ZUIs) aim to solve is a fundamental one – that there is more information than fits on the screen. The common solutions to this problem are, roughly, scrolling, linking & searching, along with denser representations (i.e., information visualization). Zooming, like fisheye displays, is an instance of the latter – a kind of information visualization that aims to take advantage of human spatial perception and memory. ZUIs place documents in two-dimensional space at any size, enabling (and requiring) animated spatial navigation to move among documents.

I have identified three key characteristics that have attracted people's attention over the years. The promise of ZUIs comes largely from the following general expectations.

Engaging: The animation is visually attention grabbing. It takes advantage of human visual perception abilities.
Visually rich: There are more degrees of freedom to visually structure objects, and thus they offer the potential of great creative expression.
Lure of simplicity: The fact that you find information by looking for it in a place implies a promise of simplicity that will solve our organizational and information retrieval problems.
But the potential benefits of ZUIs are sometimes mirages. ZUIs can be engaging, but they also make some people feel physically sick. They can be visually rich, but only if the author knows how to take good advantage of the platform's capabilities. Finally, the promise of simplicity often falls short. While human visual perception does make it easy to see where one is navigating, the reality is that it places a heavy load on short term memory to remember where in space you just were and where things are. And the requirement of human memory to know how space is organized means that ZUIs don't scale up very well. ZUIs are often motivated by the physical world and how people like laying papers out on their desk. But no one wants all of their papers on their desk. It is much more common to have only a relatively small number of papers that are actually being worked with.

So this talk discusses the potential of ZUIs along with their challengs along with a number of design guidelines that should be considered when designing ZUIs.

PAPERS FOR FURTHER READING

1. Bederson, B. B. and Hollan, J. D. 1994. Pad++: a zooming graphical interface for exploring alternate interface physics. *In Proc. of the 7th Annual ACM Symposium on User interface Software and Technology UIST 1994*. ACM, New York, NY, 17-26.
2. Bederson, B. B., & Meyer, J. (1998). Implementing a Zooming User Interface: Experience Building Pad++. Software: Prac. and Experience, 28(10), pp. 1101-1135.