

# The Thrill of Discovery: Information Visualization for High-Dimensional Spaces

Ben Shneiderman

University of Maryland--College Park

## ABSTRACT

Interactive information visualization provide researchers with remarkable tools for discovery. By combining powerful data mining methods with user-controlled interfaces, users are beginning to benefit from these potent telescopes for high-dimensional spaces. They can begin with an overview, zoom in on areas of interest, filter out unwanted items, and then click for details-on-demand. With careful design and efficient algorithms, the dynamic queries approach to data exploration can provide 100msec updates even for million-record databases.

This talk will start by reviewing the growing commercial success stories such as [www.spotfire.com](http://www.spotfire.com), [www.smartmoney.com/marketmap](http://www.smartmoney.com/marketmap) and [www.hivegroup.com](http://www.hivegroup.com). Then it will cover recent research progress for visual exploration of large time series data applied to financial, Ebay auction, and genomic data ([www.cs.umd.edu/hcil/timesearcher](http://www.cs.umd.edu/hcil/timesearcher)).

Our next step was to combine these key ideas to produce the Hierarchical Clustering Explorer 3.0 that now includes the rank-by-feature framework ([www.cs.umd.edu/hcil/hce](http://www.cs.umd.edu/hcil/hce)). By judiciously choosing from appropriate ranking criteria for low-dimensional axis-parallel projections, users can locate desired features of higher dimensional spaces. Demonstrations will be shown.

BEN SHNEIDERMAN (<http://www.cs.umd.edu/~ben>) is a Professor in the Department of Computer Science and Founding Director (1983-2000) of the Human-Computer Interaction Laboratory (<http://www.cs.umd.edu/hcil/>) at the University of Maryland. He was elected as a Fellow of the Association for Computing (ACM) in 1997 and a Fellow of the American Association for the Advancement of Science (AAAS) in 2001. He received the ACM SIGCHI Lifetime Achievement Award in 2001.

Ben is the author of "Designing the User Interface: Strategies for Effective Human-Computer Interaction" (4th ed. April 2004) <http://www.awl.com/DTUI/>. With S. Card and J. Mackinlay, he co-authored "Readings in Information Visualization: Using Vision to Think" (1999). With Ben Bederson he co-authored "The Craft of Information Visualization" (2003). His book "Leonardo's Laptop" appeared in October 2002 (MIT Press) (<http://mitpress.mit.edu/leonardoslaptop>) and won the IEEE book award for Distinguished Literary Contribution.