Data Exploration with Paired Hierarchical Visualizations: Initial Designs of PairTrees

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System Demonstration Abstract

Paired hierarchical visualizations (PairTrees) integrate treemaps, node-link diagrams, choropleth maps and other information visualization techniques to support exploration of hierarchical data sets at multiple levels of abstraction (Kules, Shneiderman et al., in press). Coordinated visualizations are an effective way to support exploratory data analysis of multidimensional data sets. Hierarchies are often used to reduce complexity, show structure, and support reasoning at multiple levels of abstraction or aggregation. Our work seeks to integrate hierarchical and coordinated visualizations, taking advantage of the semantics embedded in aggregate, sub-class, containment, and other forms of hierarchy.

This demonstration shows two novel applications of PairTrees in the econometric and health statistics domains. The first application demonstrates PairTrees used to enhance the immediate comprehension and usability of a treemap of disease mortality data from the National Center for Health Statistics. Treemaps (Johnson and Shneiderman, 1991) are an effective way to visualize hierarchies of quantitative data, however their structure is often not immediately apparent to users because of the visual complexity of the display. To improve the immediate usability of this information-rich display and reduce learning time, the treemap is coupled with a SpaceTree interactive node-link diagram (Grosjean, Plaisant et al., 2002) to show an alternate view of the same hierarchy. Users can quickly find a node in the treemap by brushing it in the node-link diagram, and vice-versa. Zooming is also supported.

The second application demonstrates simultaneous multi-level comparisons of aggregate data from separate hierarchies, using data from the US Census Bureau's Economic Census, specifically revenue data for the "Professional, Scientific and Technical Services" sector of the North American Industry Classification System (NAICS). Two treemaps are displayed, each showing a different aggregation hierarchy for revenues. One hierarchy is the NAICS industry breakdown; the other is revenue line (sources of revenue). Users see an initial overview of revenues within all industries and all revenue lines, and can then drill down to explore industry sub-sectors or specific revenue lines.

References

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