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Technical Perspective
Finding and Telling Stories with Data

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VISUAL ANALYSIS, A powerful method for finding and telling stories with data, is moving from research into widespread use. The research began in the 1960s with graphical user interfaces (GUIs), which supplanted command line interfaces by exploiting the power of the human visual/motor system. In the mid-1980s, advances in computer graphics hardware prompted research on visualization, the use of interactive, visual representations of data to amplify cognition. The early focus of visualization research was on individual analysts trying to find stories with data, first in the area of scientific data and then more generally with abstract information.[1]

Since 2000, the research focus has expanded from the visualization of an individual analyst to visual analysis—the use of visualization in larger processes of sensemaking.[2] Reduced to its essence, visual analysis has a four-part cycle:

- Focus on a data-oriented task,
- Forage for relevant data,
- Visualize the data, and
- Perform an appropriate action.

Given a task, analysts forage for relevant data, which is mapped to visualizations that exploit the power of the human visual system. Visualizations lead to findings, which prompt actions. When the actions are new data analysis tasks, the cycle repeats. There are also internal cycles in this problem-solving process. For example, visualizations can indicate the need to forage for new data.

Voyagers and Voyeurs: Supporting Asynchronous Collaborative Visualization by Jeffrey Heer, Fernanda B. Viégas, and Martin Wattenberg further expanded the research focus into the area of collaborative visualization, in which telling stories with data plays a central role. In Part 4 of the visual analysis cycle, most analysts must collaborate with colleagues and managers before actions are approved. Data views make data understandable, which encourages collaboration with people who are not skilled analysts. Interactive data views allow people to do their own analysis with data views authored by others.

The authors describe a prototype Web application that includes several techniques for supporting collaborative visualization, and report on user studies involving the prototype.

The most interesting aspect of the prototype is a bookmarking mechanism that supports doubly linked discussions. Data views have the property that the same view can be specified in multiple ways. The authors describe how to associate a bookmark with a data view rather than the various specifications of the data view, which supports asynchronous discussions about views.

The most interesting aspect of the user studies was that their subjects switched between data-driven exploration and social navigation—that is, between being data voyagers and data voyeurs.

This paper represents an important early step in research on collaborative visualization. The authors made the excellent choice to focus their prototype on the U.S. census data set. By focusing on a single public domain data set, they reduced their prototype's data foraging complexity, thus encouraging their users to focus on collaborative activities. Furthermore, many people are interested in census data.

The next step for research on collaborative visualization is to address topics that arise in more fully featured visual analysis applications. For example, most visual analysis tasks involve multiple data sources. Unlike the U.S. census data set, many data sources have security issues that make collaboration more difficult. Some data sources also change rapidly, making asynchronous conversations more complex. Finally, tasks involving multiple data sources often require conversations that compare and contrast multiple data views that must be viewed simultaneously.

Finding and telling stories with data can help people understand the world more clearly. For example, the mortgage-backed security crisis might have been averted if mortgage data had been available for storytelling. The key is to have visual analysis technology and use it appropriately. C

References

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