Multivariate Network Exploration and Presentations

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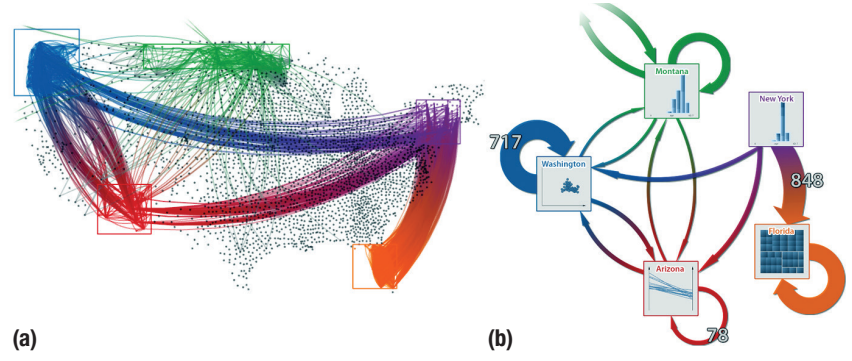

Figure 1. Large multivariate network exploration using selections of interest. (a) Detailed view. (b) High-level, infographic-style overview.

In many big data applications, it's important to explore and understand multivariate networks, whose nodes and edges contain multidimensional attributes. A core challenge is connecting big data with people; that is, presenting—in an understandable and manageable way—the structural and multivariate aspects of data to humans so they can explore both aspects simultaneously to gain insights on the data. In "Multivariate Network Exploration and Presentation: From Detail to Overview via Selections and Aggregations" (*IEEE Trans. Visualization and Computer Graphics*, vol. 20, no. 12, 2014, pp. 2310–2319), Stef van den Elzen and Jarke van Wijk propose a novel solution to this challenge.

When analyzing multivariate networks, users often want to understand the relationship between the network structure and its elements' properties to answer questions like whether communication patterns differ between males and females, or whether people migrate to places with similar characteristics.

To answer such questions, the authors present an approach based on an interactive exploration of the data, from detailed views to high-level overviews via selections and aggregations. For example, users can interactively select a set of nodes. The results are then shown as a detailed view of the nodes and their connecting edges and as a schematic diagram in a high-level overview (see Figure 1), which facilitates exploration. A demonstration video is available at www.win.tue.nl/~selzen/Elzen-Wijk-InfoVis-2014.mp4.

Building on an important trend in visualization, this work combines standard, simple, and familiar metaphors to explore complex data. As shown in Figure 1, the visualization components are standard and familiar: a scatterplot for showing details, an infographic-style overview, and a set of chart visualizations. However, the proposed combination is novel and effective for both data presentation and exploration.

Van den Elzen and van Wijk focus on helping users interact with and explore data by combining standard presentations, rather than displaying large, complex data sets in a single visualization with complex visual encoding. In doing so, the authors highlight an important design mantra, relevant for big data research, that goes beyond visualization.

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