



View Points

Using visual languages in management

Kang Zhang^{a,b,*}^a School of Software Engineering, Tianjin University, Tianjin 300072, China^b Department of Computer Science, University of Texas at Dallas, Richardson, TX 75080-3021, USA

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ABSTRACT

Recent great advances of information visualization and visual languages have not been utilized in the management field. This View point article advocates the use of appropriate visual languages in general and visualization in particular to maximize human's visual perceptual power for rapid and effective communication in management.

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1. Introduction

Mankind communicated using symbols and drawings long before spoken languages were developed. We consider those symbols and drawings as *visual languages* [1], that carry specific meanings, or semantics and serve effective communication purposes. In a broader sense, visual languages refer to any two or more dimensional communication medias, including art, images, sign languages, maps, and charts, to name a few, not limited to *visual programming languages* [8]. In other words, visual languages serve the purpose of *visual communication* between humans and between human and machine. *Visualization* is a type of visual language for representing (statically or dynamically) sophisticated concepts or datasets in a two or more dimensional fashion.

Maximizing the effectiveness of visual communication, video, visual art and design have also been successfully utilized in marketing and advertising [7]. Yet in many management activities, visual languages or visualization have been largely limited to the stereotypes of statistical charts, that mostly encode two attributes at a time and

fail to convey any complex relationships. Various new concepts introduced in management sciences are described in lengthy texts or tedious tables, and there is an apparent lack of innovative use of intuitive visual languages to communicate the concepts. Recent great advances of information visualization and visual languages have not been utilized in the management field. This View Point article advocates the use of appropriate visual languages in general and visualization in particular to maximize human's visual perceptual power for rapid and effective communication in management.

2. Visual communication in management

Marketing is an area that has already been successfully exploring visual communication in its activities [7], such as reaching potential customers. This section will demonstrate a few examples of visualization approaches appropriate in some other subareas of management. The aim here is to encourage more applications of effective visual languages in all aspects of management.

2.1. Finance

Stock pricing over a period of time is a typical type of time series data and various time series representations, most notably historic candlestick and line charts, have

* Corresponding author at: Department of Computer Science, University of Texas at Dallas, Richardson, TX 75080-3021, USA. Tel.: +1 972 8836351; fax: +1 972 8832349.

E-mail address: kzhang@utdallas.edu

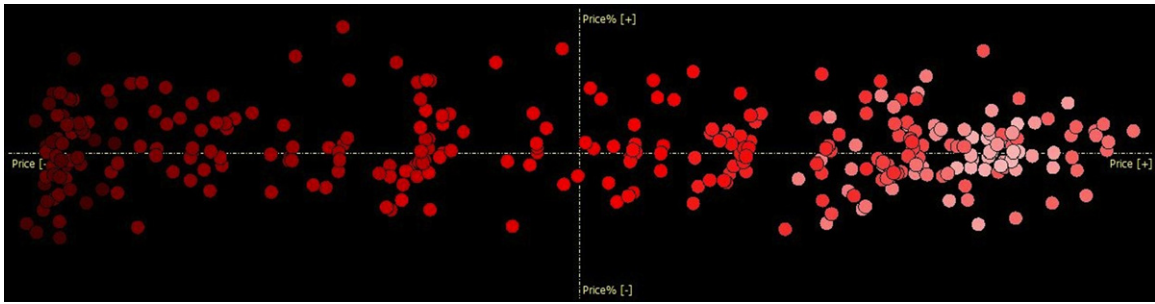


Fig. 1. Stock price variation using a scatter plot to visualize stock prices and changes in percentage (the color shading of each dot shows the time of the data). (For interpretation of the references to color in this figure legend, the reader is referred to the web version of this article.)

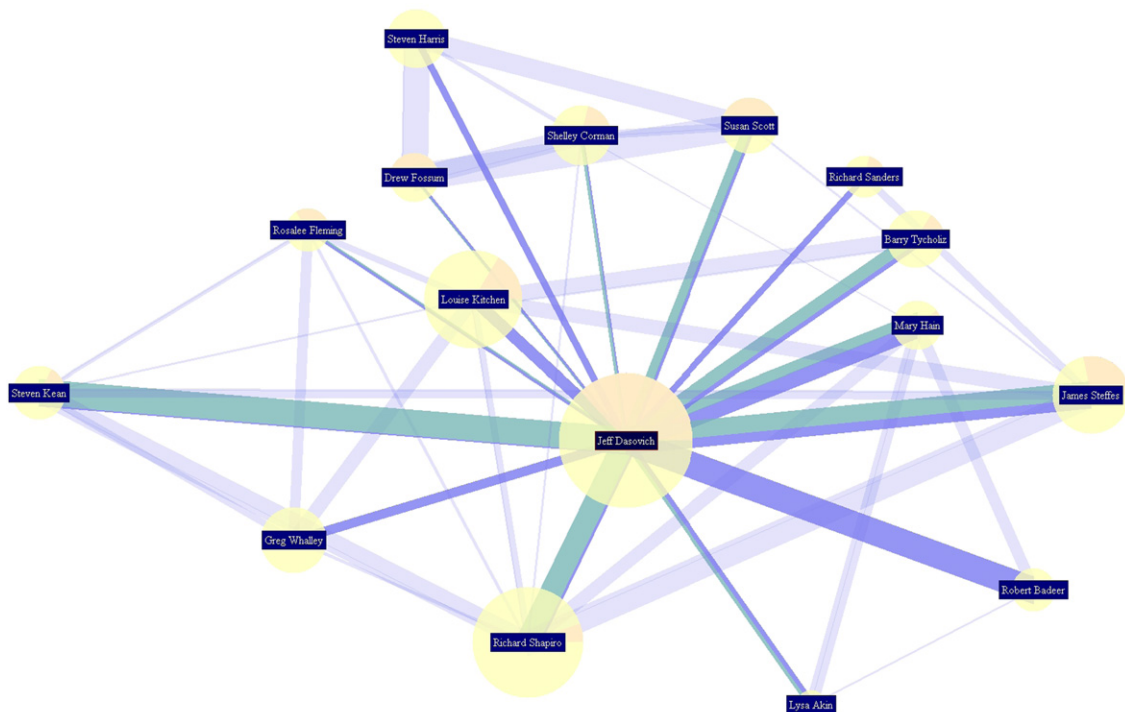


Fig. 2. An example social network encoded with communication volumes and recency (Courtesy Quang Vinh Nguyen).

been commercially used. Lei [6] recently investigated various types of visual representations and metaphors for stock related financial data. One of the representations is an adapted scatter plot for stock pricing clustering [5]. The basic idea of stock pricing clustering is to reveal the trading barrier of a stock and identify its resilience. The data to be clustered is the price change and price value of a stock. Such data are placed in a scatter plot as shown in Fig. 1. The horizontal axis represents the price, and the vertical axis is for the price change in percentage. The color shading of each data point indicates the date. The darker the earlier date a stock is recorded on. Unlike traditional charts used for technical analysis such as candlestick charts and line charts, the advantage of this plot is that it condenses the data within a finite display area and clearly shows the aggregated areas.

2.2. Organization

The corporate structure and personal relationships within a corporate are best visualized as node-edge diagrams. The hierarchical structure charts used by HR departments and recently popular social network visualization are all good examples of effective use of visual languages for communicating complex network structures. Fig. 2 depicts a social network structure, where people are shown in light yellow nodes, interconnected by their job relationships in a company. The thickness of a link between two persons indicates their communication volume while the darkness encodes the recency of the communication between them. It is easy to see who in the network play important roles, and if removed, parts of the network are no longer connected and many people

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