Improving Support for Web-based Visual Analysis of Social Graphs

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ABSTRACT

We discuss the options available for web-based visualisation and present an argument for the need to support more complex visual analysis of the interaction that occurs in social media platforms.

Index Terms: H.3.5 [Information Storage and Retrieval]: Online Information Services—Web-based services

1 INTRODUCTION

Anecdotal evidence and research illustrate the value that visualisation brings to the understanding of complex data and scenarios, whether simply to provide an overview of a data set or to support the analysis of a situation by enabling greater insight.

Visualisation applications usable online are often limited, sometimes due to security and bandwidth restrictions, but more importantly because of the lower support of visualisation toolkits and APIs for web browsers, as well as inherent support in the browsers for the use of plug-ins. End users tend to work around this challenge by downloading web activity logs and other relevant data in order to generate visualisations and perform complex analysis offline, after which summaries of their results are captured to a suitable image format and posted to their web sites.

The power of visualisation can be seen in the adaptation of various techniques to the solution of real world problems, from simple graphs and charts in desktop applications used for basic analysis, to highly sophisticated tools such as *AVS*[1] which provides a suite of modules for complex data visualisation and analysis.

In this paper we posit that supporting more complex, interactive, visual analysis online should increase insight during the exploration of social media. Social web platforms including microblogging services such as *Twitter*[2] are becoming increasingly popular. These platforms are overtaking the use of blogs, by allowing web users to share information socially with their peers and communities of practice (CoPs). The exploration of social data is however limited by the sheer amount of data on the web today, therefore new methodologies must be investigated to support the analytical process.

1.1 Visual Analysis on the Web

Prefuse Flare[3] (developed to support data visualisation and visual encoding), IBM's *Many Eyes*[4] (which takes advantage of "human visual intelligence" for collaborative visualisation and information exploration and discovery), *Google Analytics*[5] (which supports web-based, visual analysis for tracking the content and use of websites), and *Exhibit*[6] (which supports the creation of interactive, visualisation rich websites), are some of the better known, recently developed toolkits for interactive, online visualisation and analysis. Typical functionality includes switching between graphs, timelines, charts and map-based overviews, among others.

1.2 Social Data

Information shared within disparate sources provides an insight into the dynamics of those platforms. The fragmentation of social data throughout the web has led to a distribution of data spanning multiple communities and contexts. A major challenge of the social data on the web is making sense of this distributed information.

It would be beneficial to analyse how social graphs, generated by extracting social data to a structured format to aid machine-processing, changes with context or setting. Users on the web share information about multiple topics on different social platforms and maintain a number of relationships in various social networks.

Supporting the exploration of social data for CoPs and the contextual relationships that occur within this data provides a test bed for investigating analytical methodologies. Moreover, these methodologies could be leveraged to other domains of practice, such as expertise determination in enterprise networks, or discovering communities of support. This is especially useful for identifying and sharing knowledge that has not been formally codified and stored.

2 VISUAL ANALYSIS OF ONLINE SOCIAL INTERACTION

Our position in this paper is that current approaches for visualising (online) social data are limited and unable to convey the underlying dynamics of the data. To date the visualisation in social graphs has been focused on the representation of the relationships held between the members of a group and the number of steps between users. We would like to see support for visualising trends such as which users are contributing to different topics, whether they are involved in discussions and if so, where they make positive, critical or negative contributions.

A key benefit of visualising social data would be the depiction of sentimental agreement. The rise in popularity of microblogging sites allows web users to express their feelings in addition to the traditional textual responses within topics of discussion. Visualising sentimental trends in such data would support the analysis of the overall subjectivity of various topics and the discussions they engender. This is especially useful for explorative analysis of, for instance, perceptions of products and services, and political consensus of events such as the elections in Iran in 2009 or the coal mine workers' strikes in England in 1984.

The ability to track visually users' contributions to specified threads should highlight underlying trends within the overview. For threads that discuss research or other work-related topics, this could be used to weight contributors based on (assumed or defined) expertise, allowing the identification of areas of interest more easily. Exchanges between specified users and the sentiment that accompanies the exchange may also enrich the retrieval of knowledge from the threads to which they contribute.

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[5]Google Analytics: http://www.google.com/analytics
[6]Exhibit: http://www.simile-widgets.org/exhibit