
Visualizing Digital Text Conversations

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Abstract

In this paper, we discuss three visualizations of digital conversations in which we explore the use of different metaphors to provide a consistent aesthetic. As more people take part in online conversations, there is a growing awareness that different software influences the conversational styles. However, this awareness is largely built on personal impressions. Visualizations are a possible method by which social patterns in digital conversations may be revealed. Using metaphor as an approach to aesthetics has allowed us to create different styles of visualizations which reveal selected aspects of the data available from digital conversations. We outline the steps in our creative process and then illustrate it with three study projects.

Keywords

Aesthetic Design, Social Visualization, Temporal Data, Social Interaction

ACM Classification Keywords

H5.m. Information interfaces and presentation: Miscellaneous.

Introduction

Digital trace of text conversations opens new possibilities for analyzing and reviewing past conversations. By revisiting the information of text conversations, one is able to reminisce upon this material like a journal or diary. Not only can such a reflection be used to show personal growth apparent in social interaction but more importantly one can discover and analyze overarching interaction patterns with other people. The discovery and analysis of these patterns produces a powerful social tool. Such awareness can both positively and negatively affect how one views themselves and their social relationships with others. In return, this may change how one socializes with others in future conversations. Thus the ability to look at the quantity, frequency, emotional tone, etc. can provide deeper social significance to visualizing text conversations.

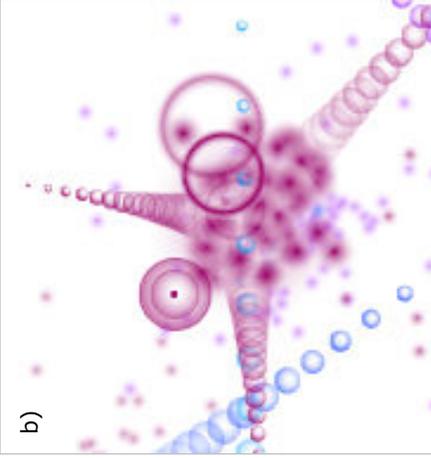
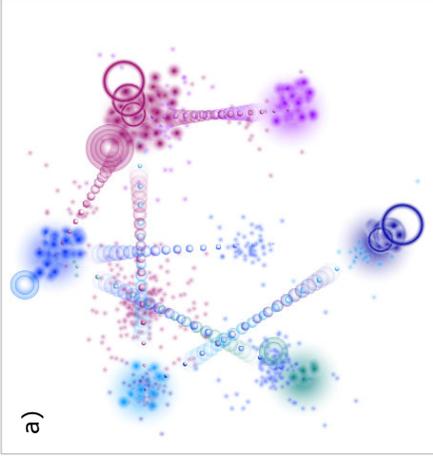


figure 1. a) BubbaTalk visualizing a transcribed conversation of six people from a meeting b) one person talking to multiple individuals

An extensive number of visualizations have been created in response to these problems and some examples are [1,2,4,6,7,9-12]. These visualizations capture and present salient social information that is not easily noticeable in plain text. By providing a visual representation, this kind of social information can be more easily discerned and more meaningfully expressed. Beyond this consideration, we have begun to explore the integration of aesthetics into social visualization. Designers in HCI and Information Visualization are becoming more interested in the impact that aesthetics have on interfaces and visualizations [2,3,5,8]. Kurosu and Kashimura found that aesthetics affect people's perceptions of usability, which in turn influence their attitude toward the system in the long run [3]. The choice of presentation style is one of the important factors to be considered when designing a visualization.

We have created three visualizations: BubbaTalk [6] (figure 1), The Growing Message Post (figure 2), and CrystalChat [7] (figure 3). They are used to visualize the data of three different digital conversations, Transcribed Digital Conversations, Bulletin Board Message Systems, and Instant Messaging Systems, respectively. These three visualizations explore social and temporal interactions in digital conversations to illustrate our design process. While the visual appearance of these three examples differs considerably, the basic design methodology followed is the same for each of them. Our design methodology has four basic processes. While there is some temporality to these processes, in that they are started in the order listed, there is considerable overlapping and back tracking within the development of a given case study.

- Deciding on what data the visualization should be based. There is a wealth of possible data within a text conversation including social interaction, temporality and the varying quantity of text

However, there are many problems that arise with text conversations. The initial problem with text conversation is that much of the rich, abundant information of face-to-face conversations is lost. Body language, tone of voice and facial expression is hidden in text; thus, recorded text is clearly impoverished. Another problem with text conversations is the sheer volume of visual space required for display. This makes comparisons between conversations of more than one person on the same screen visually cumbersome. A third problem with text conversations is that social patterns cannot be picked out at a glance as there are no visual cues. Plain text only represents the meaning of the words themselves. Whereas, visual cues such as colors and shapes can be used abstractly, thus, lending themselves more appropriate to identifying visual patterns. For instance, if the words used to describe the emotional state of anger were highlighted in red within a body of text, it would be much easier to pick out and identify the frequency, quantity, and in general the tone of the message that was written.

- contributed by the different participants. These decisions are based on who is interested in the visualization and what they might want to learn.
 - Choosing a metaphor and/or constraints. This step sets the stage for developing a unique but consistent aesthetic.
 - Developing meaningful and expressive mappings from the text data to a visual representation, given the choice in step two.
 - Choosing interactions that enable a person to use and manipulate the visualization to have a good fit with the representation as created in step three.
- The following sections describe in more detail our three digital conversation visualizations.

BubbaTalk - Transcribed Digital Conversations (figure 1)

The data for this visualization is text data that was transcribed from a recorded conversation of a meeting. For this piece, visualization constraints were used. Within the visual limits of circles and pastels, we developed an abstract representation of social interaction patterns in conversation. The dynamic movement of these circles creates a simple and consistent aesthetic, evoking a natural feel of a conversation. The intention of BubbaTalk was to provide a visual impression of the quality and tone of the conversation that took place in the meeting. More specifically, the goal was to find visual representations that responded to volume of postings, number of characters, number of words, and number of punctuations.

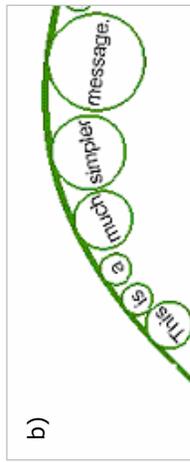
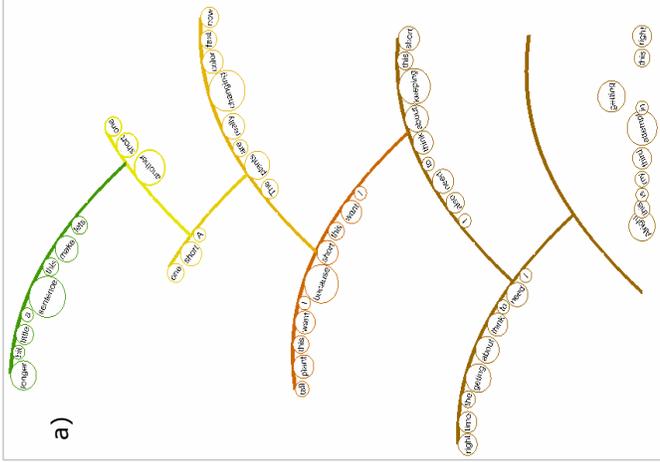


figure 2. a) The Growing Messaging Post visualizing Bulletin Board Message System b) Close up view of the text

Working with a fellow classmate, Russell Kruger, the data focus was on temporality such as sequencing, time gaps between postings and age of a particular message. In keeping with this data aspect, a visualization metaphor of a plant growing and aging was chosen. Using the same plant metaphor, word complexity was also incorporated into the same visualization by varying characteristics of the plant such as changing the thickness of the leaf lines. On this message-board conversation, length of time since last posting was used to position the start of the new posting and the age of each posting would change colours like autumn and eventually each leaf, containing a word inside, will fall to the ground below. Using the plant metaphor the text is presented in an aesthetically natural environment, thus making the visualization less intimidating and more tangible.

CrystalChat - Instant Messaging Chat History (figure 3)

This study of Instant Messaging Systems is explores the design space of developing representations that visualize the patterns of the social network and temporal aspects of instant messaging archives. CrystalChat focused on visualizing the social interaction centered towards one person, supporting personal use for self exploration of one's own chat history. In developing CrystalChat as a visualization that combined social and temporal data, we worked with the constraint of 2D planes within a 3D environment. Here the constraint was the focus of the design process and the metaphor of a crystal with its multiple planer facets came later. Like a crystal, this design draws on elements of symmetry, consistency, and intricacy generating a mesmerizing aesthetic appeal. The goal of the design was based on combining the social network and the temporal aspect into one 3D representational structure. Patterns were created to reveal information about temporal clustering, conversation initiation, conversation termination, length of conversations, length of postings, patterns of

repeating or alternating postings, and emotional tone as represented by emoticons.

Discussion and Conclusion

The three above visualizations show that many characteristics of a conversation can be visualized. From looking at the resulting pattern of BubbaTalk, one can see who was interacting more and who was interacting less. Also from these patterns, one can intuit the speaker's emotional state and how one is connected to another speaker during a conversation. With the Growing Message Post visualization, one is able to gather historical information by looking at the overall patterns visually afforded by the metaphorical representation of a plant. Different characteristics of the plant design can also convey word and reading complexity. The visualization of CrystalChat as one single visual structure is capable of revealing temporal interactivity and providing information of one's social network through the quantity and frequency of message posting. This structure also provides the emotional content of chat dialog.

Providing a graphical interface that represents conversation through an interesting graphical environment can encourage people to view their past conversations and examine their own social patterns. While existing patterns emerge visually through effective social visualization, peoples' memories of the past can surface and storytelling can occur. Furthermore, personal social habits can be realized and can influence one's future social interaction [7].

We have investigated in the application of simple aesthetics to visualization. Graphical patterns can revolve around the conversation, creating an abstract piece of artwork. From the positive responses given by many people to the three visualizations described above, aesthetics can capture one's attention and interest, thus, influencing people's desire to use the visualization. However, one must be careful not to be

carried away with aesthetics as accurate and precise representations are still important.

Acknowledgements

This research was supported in part by Natural Sciences and Engineering Research Council (NSERC). We would also like to thank researchers from the Interactions Lab at the University of Calgary for their insightful comments on this work.

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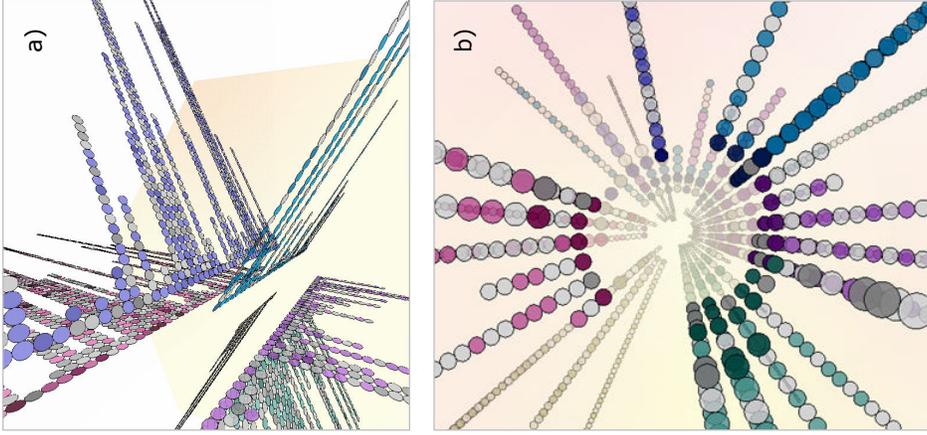


figure 3. a) An aerial view of the structure of instant messaging conversations in CrystalChat b) A top view of CrystalChat

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