Emoticons and Linguistic Alignment: How Visual Analytics Can Elicit Storytelling

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ABSTRACT

Socio-emotional communication is a critical determining factor in the cohesiveness of international work teams. In recent years, online text communication (e.g., chat, forums, email) has been widely used in cross-cultural collaborations, and emoticons are often viewed as socio-emotional cues in this type of communication. Therefore, it is important to know how emoticons work in online text communication. One way to investigate this topic is to leverage theories in sociolinguistics to find potential mappings between emoticon use and face-to-face language use. In the present work, we propose a visual analytics tool to explore emoticon use among different groups over time and show how visual analytics can elicit storytelling in studying linguistic alignment of emoticons in a chat log dataset from a four-year scientific collaboration between France and the United States.

1 INTRODUCTION

In recent years, online text communication, including chat, forums, email, etc., has been widely used in both social and work environments. In particular, these online text communication tools have enabled both synchronized and asynchronized remote collaboration. A body of studies has focused on how to enhance remote collaborations using online text communication (e.g. [1].) Since high-quality collaboration requires successful communication, and a key to that is understanding the experiences and emotional cues of others [2], it is important to understand how people communicate their socio-emotional information to others. Emoticons are often viewed as such socio-emotional cues in this type of communication. Hence, in order to better support remote collaboration, it is important to understand in more detail how emoticons function in online text-based communication. One way to investigate emoticons in online text communication is to leverage theories in sociolinguistics to find potential mappings between emoticon use and face-to-face language use, including verbal and non-verbal languages. In this poster we focus on finding linguistic alignment in emoticon use.

Linguistic alignment, which is also called coordination, accommodation, or entrainment, can refer to both short-term language production behavior change and long-term language use matching. Previous studies have pointed out that linguistic alignment of a speaker may happen due to social factors such as the relative dominance or perceived prestige of other speakers [3]. In addition, linguistic alignment in long-term matching also involves nonverbal factors such as temporal coordination of language production [4] or posture mirroring [5]. Some studies found that alignment may have a positive influence on collaboration. For instance, LaFrance and Bernier studied posture similarity and mirroring in classrooms and found a significant correlation between self-reported rapport and posture mirroring [5].

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Although emoticons may play an important role in online text communication, the relations between emoticons and linguistic alignment remain unclear. While several studies (e.g. [6]) have documented emoticon use, the types of emoticons are often limited and not viewed in context, and there is no existing tool that can help examine the use of emoticons over time. To deal with this limitation, in this present work we design a visual analytics tool to analyze emoticons in context and we apply the tool to a 4-year chat log dataset from a scientific collaboration. We especially focus on comparing the usage difference among different groups and how it changes over time. The results of our preliminary user study show that the user found two potential stories related to linguistic alignment. In the end we highlight the features that we think elicit storytelling and propose future directions to improve the tool.

2 CURRENT PROTOTYPE

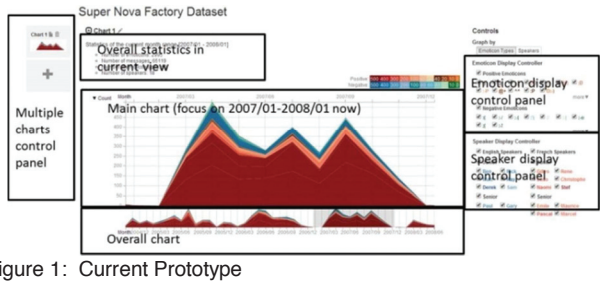

Figure 1: Current Prototype

We built our prototype with D3.js and a four-year chat log dataset from an astrophysics collaboration between France and the United States. Collaboration scientists used AIM (AOL Instant Messenger) chat (augmented by a virtual assistant) and VNC (virtual network computing) as their primary means of communication during remote telescope observation [7]. In four years (2004-2008), they produced about a half million messages. To detect emoticons in the dataset, we ran string matching in Perl with a list of 2301 emotions [8] and manually filtered out those that were not real emoticons. In this study of emoticon use, we restricted the data set to include only active participants, meaning those who used more than 30 emoticons and who contributed 2000 or more messages to the corpus over the period of data collection. These criteria confined our investigation to 10 native French speakers and 8 native English speakers, and a total of 259,256 messages and 8926 emoticons of 58 distinct types. Two of the English speakers are senior scientists, while four of the French speakers are senior scientists and the rest of the speakers are all junior scientists. Figure 1 shows the current prototype of the tool. We use a streamgraph to show the number of emoticons. The layers of the streamgraph can be plotted by either emoticons or speakers. The current view in Figure 1 is plotted by emoticons so that each layer represents a type of emoticon and the number of each type over time. The tool allows users to add multiple charts, zoom in on the chart, toggle the emoticons on and off, and toggle the speakers on and off. The emoticons are grouped by valence (positive/negative) and the speakers are grouped by language (English/French) and status (junior scientist/senior scientist). We also provide the overall statistics in the current view.

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3 Preliminary User Testing

We tested our tool with one of the authors who was not involved in the tool implementation but who was in the scientific collaboration. The user was asked to try the tool to discover patterns she thought to be interesting and to give potential explanations for the patterns. The results of the testing show that the user successfully discovered two patterns and came up with stories as potential explanations of the patterns.

3.1 Story One: The use of sunglasses

One interesting use of emoticons is the use of "sunglasses," which is "8-)". Figure 2 is the view that the user set to show "8-)". From the chart the user found that Paul (indicated in green), a senior American scientist, used sunglasses a lot at the beginning and others seldom used it. However, over time, many other users started to use "8-)" but Paul stopped using it in April 2007 and Maurice became the one who used it the most. Somehow Paul introduced this unique emoticon to the group and it spread. It is possible that Paul's status had something to do with this alignment.

Figure 2: The use of "8-)". Paul (in green) was the initiator.

3.2 Story Two: The nose job

The user then compared the use of emoticons with "noses" (e.g., :-), :-P, :-D) with the use of emoticons without "noses" (e.g., :), :P, :D). Figs. 3 and 4 show the views that the user chose when making comparisons. The user found that junior scientists were the primary users of emoticons without noses, especially at the beginning of the collaboration. However, over time, the senior scientists, especially after July 2005, began to increase their use.

Figure 3: The use of emoticons with and without noses.

What is interesting about this is normally lower status individuals align their linguistic patterns with higher status individuals. Perhaps the senior scientists, when using chat and emoticons, deferred to the junior scientists as more expert in this area. The user also found that French speakers, especially French senior scientists, tended to use more emoticons with noses (Figure. 3). However, starting from May 2006, English speakers started to use more emoticons with noses while French speakers started to use fewer. This is also another potential pattern of how people in different groups or statuses may align with each other.

Figure 4: The use of emoticons with/without noses among senior scientists (represented in green).

4 Features to Elicit Storytelling and Future Work

From the results of preliminary user testing, we suggest that the following features elicit storytelling:

- Showing emoticon use by multiple speakers in the same view, which provides an easy way to see the interactions between multiple users.
- Toggling emoticons and speakers on and off to exclude other potential influential factors of the trends.
- Adding multiple charts so that the user can compare the usage of the same set of emoticons between two different groups of people.

For future work, in addition to enhancing the features that elicit storytelling, we plan to try different types of charts and allow different levels of detail such as changing time buckets or showing the original message text. We also plan to apply the tool to bigger and more recent datasets and conduct formal user testing to see how storytelling through visual analytics can help sociolinguistic studies on investigating emoticons in online text communication and enhancing remote collaboration.

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