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# Visualizing Egocentric Social Relationships in Instant Messaging

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## **Abstract**

Instant messaging (IM) allows us to maintain relationships with our social network through messaging and status information. We present early iterations of visualizations of IM interactions that help to visually identify several different types of relationships, such as *intimate socials*, *long-lost-friend*, and asymmetric relationships. Our work is motivated by an interest in designing awareness systems that can help reflect or even *affect* our desired social relationships.

## **Keywords**

Instant messaging (IM), information visualization, social relationships

## **ACM Classification Keywords**

H5.m. Information interfaces and presentation (e.g., HCI): Miscellaneous.

## **Introduction**

Instant messaging (IM) systems [2] often treat a user's contacts as equals: every contact receives the same amount of awareness information (such as presence and status message), regardless of whether they are *intimate socials* or *extended socials* [4]. Yet one varies his/her levels of *personal distance* toward others based

on one's social relationship with various contacts [4]. To help researchers and designers understand how these relationships are manifest in online relations, we have modified and repurposed existing visualization techniques (e.g. [6][7]).

People maintain an awareness of others' activities, location and status by interacting with them (face-to-face or mediated), and by using environmental cues (e.g. a coat on the coat rack indicates that someone is home), yet the frequency and detail at which this awareness is maintained varies depends on our relationship with that individual [4]. In day-to-day interactions, people can manage the manner or amount of awareness information others can gather about us, for example, by reconfiguring the workspace or work activities [1], or by selectively informing some people of our location/activities (e.g. going to see the doctor).

Yet most IM systems (e.g. MSN Messenger, Yahoo! Messenger) typically assume that contacts are all fairly close: every contact receives status updates as well as presence updates. These clients do not provide fine-grained control over how these updates are passed along, and in a sense force users into treating all of their contacts in the same way.

Even given IM's limited ability to convey information, we know that users often use the features of the system to update others' of their status, although users desire to selectively control the nature of these status updates [5]. Yet, how can we determine *which* contacts should get these kinds of updates?

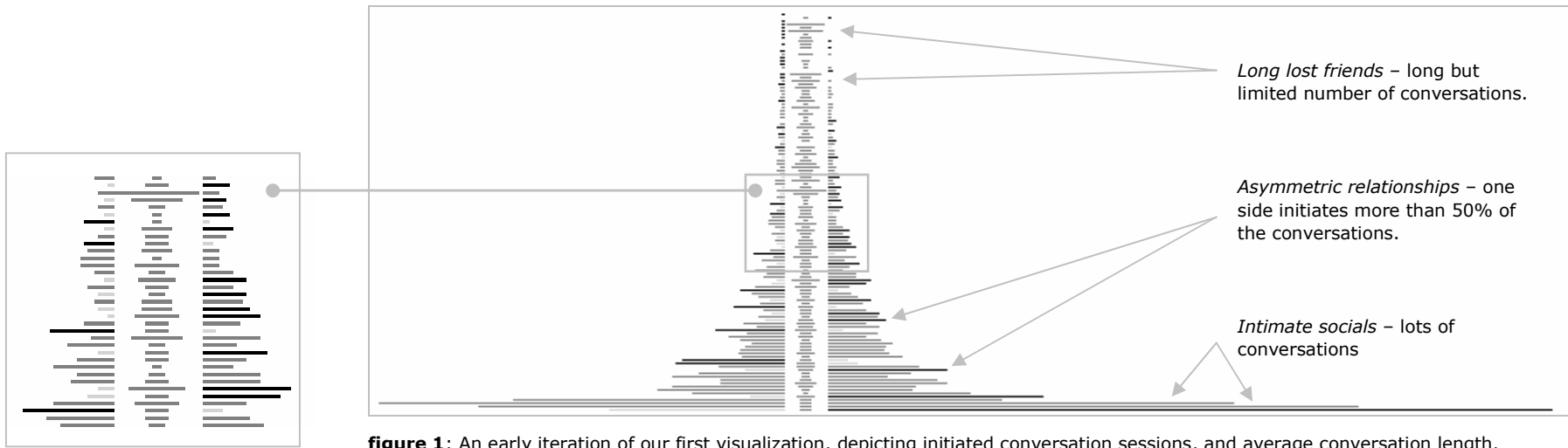
## Approach

To help guide our early analysis, we have explored existing techniques that visualize newsgroup activities, such as Newsgroup Crowds and Authorlines [7]. While these techniques were constructed to visualize how people interacted with a *virtual space*, we suspected they could be repurposed to visualize how people interacted with *any entity*—so long as the interaction mechanics could be meaningfully mapped. To explore this idea, with respect to instant messaging, we considered the following mappings:

- Newsgroup Threads = IM Conversations
- Initiating Newsgroup Thread = Initiating IM Conversation
- Newsgroup Posts = IM Messages

The key difference with considering instant messaging as opposed to a newsgroup is that all IM activities have one constant: an individual. Thus, social metrics reflect relationships not to the newsgroup (e.g. livelihood of a newsgroup), but instead describe a relationship with an individual—an approach used on social metrics for email in the social network and relationship finder (SNARF) [3].

Instant messaging data was logged for the first author from three (3) computers for about one year and used for further analysis. We iterated several visualizations in an attempt to draw out answers to questions such as, "Which of these contacts are important to me?" We considered several basic metrics (e.g. # of conversations, # of messages, duration of chat session, # of initiated sessions, etc.) to draw up several visualizations.



**figure 1:** An early iteration of our first visualization, depicting initiated conversation sessions, and average conversation length.

The third contact from the top has a long line in the middle, indicating that conversations with this contact are typically long—as with a *long lost friend*.

Note also the dark lines on the right, reflecting several *asymmetric relationships*, where the individual initiates conversations with these contacts, but the contacts do not reciprocally initiate as many conversations.

### Visualizing Relationships

Figure 1 is an example of one of our visualizations, which can aid in loosely identifying three different types of relationships: intimate socials, long lost friends, and asymmetric relationships. Contacts are each represented by a set of three horizontal lines, and are sorted in ascending order based on the number of total conversations (the bottom-most contact had ~500 conversations). The left line represents the number of conversations initiated by that contact, and the right-most line represents the number of conversations initiated by the log's owner. The middle line depicts the number of messages that were exchanged in each conversation with the contact (average of about 22 messages per conversation in this data set). Finally, asymmetric relationships (defined as having more than 75% of conversations initiated by one individual) are highlighted with darker lines.

#### *Intimate socials*

This visualization allows us to find intimate socials fairly rapidly. Intimate socials are those whom we desire to maintain a constant level of awareness [4]. There is an obvious visual drop-off in the number of conversations per contact after the most frequently engaged contacts (looking at Figure 1 from bottom to top). Interestingly, the number of messages per conversation with these contacts also tends to be surprisingly average.

#### *Long lost friends*

Perhaps the most surprising observation arising from inspection of this visualization is that many of the longest conversations occur with contacts with whom we have little contact. In retrospect, this seems to make perfect sense in the case of “long lost friends,” where interactions are uncommon, but lengthy when they do occur. In this particular data set, the longer

conversation sessions were associated with friends who had moved away.

#### *Asymmetric relationships*

We highlight asymmetric relationships purely for interest's sake. Many of us are familiar with relationships that we must "deal with" simply to maintain a good impression. These relationships are also manifest in IM systems: such contacts, left to their own devices, will initiate many conversations even though they would typically not be contacted. Our visualization depicts such contacts with dark lines on the left side: contacts here initiated many conversations, and these initiations were not necessarily reciprocated. These types of relationships may include power relationships, such as "newbie" and "resident-expert."

#### **Acknowledgements**

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#### **References**

- [1] Heath, C., Svensson, M. S., Hindmarsh, J., Luff, P., and vom Lehn, D. Configuring awareness. *Computer Supported Cooperative Work*, 11 (2002), 317-347.
- [2] Nardi, B. A., Whittaker, S., and Bradner, E. Interaction and outeraction: instant messaging in action. In *Proc. CSCW 2000*, ACM Press (2000), 79-88.
- [3] Neustaedter, C., Brush, A.J., Smith, M., and Fisher, D. The social network and relationship finder: social sorting for email triage. In *Proc CEAS 2005*, Stanford University (2005).

The flip side is that one may be on the other side of such relationships, and these are depicted as dark lines on the right side of the visualization.

#### **Conclusions**

Our interest is in designing instant messaging and other awareness systems that understand and support the flexibility and variety of human relationships. We have begun exploring how visualizations of instant messaging data can aid us in visualizing how human relationships manifest themselves in IM. This understanding will help feed back into the design of such awareness systems to better support and reflect human relationships. While our original goal was to aid researchers and designers of such systems, we see added value in our work for providing users with retrospective tools for analyzing their own relationships.

- [4] Neustaedter, C. and Greenberg, S. Understanding how to design awareness groupware for the home. Technical Report 2005-787-18, Department of Computer Science, University of Calgary, Calgary, Alberta (May, 2005).
- [5] Smale, S., and Greenberg, S. Broadcasting information via display names in instant messaging. In *Proc. GROUP 2005*, ACM Press (2005), 89-98.
- [6] Turner, T. C., Smith, M. A., Fisher, D., and Welser, H. T. Picturing usenet: mapping computer-mediated collective action. *Journal of Computer Mediated Communication*, 10, 4.
- [7] Viegas, F. and Smith, M. Newsgroup crowds and authorlines: visualizing the activity of individuals in conversational cyberspaces. In *Proc. HICSS-37*, (2004).