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# Visualizing Chat: Issues and Prospects

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## **Why Visualize Chat?**

Chat, particularly in the form of instant messaging, is becoming an increasingly frequently used communication channel in corporate environments. A number of researchers have studied the use of instant messaging (IM) in the workplace. For instance [3] notes the use of IM for short questions, coordination, and negotiating the timing of longer interactions, and [2] notes similar uses, but also suggests that IM's primary use is for complex tasks.

While the "instant" in instant messaging is often taken to refer both to the speed of interaction and the ephemeral nature of the messages, messages – although created on-the-fly -- sometimes persist. First, we have data from admittedly unsystematic surveys that suggest a majority of power users of an IBM chat client save some or all of their IM transcripts. Second, in a study of a broadcast messaging system used to initiate group chats at IBM [4], 29% percent of users who had broadcast a question reported saving the complete transcript of the resulting chat, and another 9% reported saving parts of the transcript.

Third, also within IBM, ethnographic studies of a small group of consultants indicate that saving instant messaging transcripts is not uncommon. In particular, Halverson [1] reports an in depth study of a single consultant who saves *all* his chat transcripts. He not

just saves chats, but actively organizes and searches them. Saving, accessing and mining chats is a critical component of his job – providing expert level help to other consultants involved in high profile mission critical engagements. We believe that such behavior, while extreme now, is a harbinger of the future and suggest that, given the increasingly important role played by chat in business settings, that explorations of how to save, organize, browse and search chat archives would provide much of value.

### **Visualizing Messaging Histories**

We think the key issue in making persisted chat logs more useful is to help users explore and understand the content of the corpus of conversations. The naïve approach of just providing a search function would scratch only the surface of the wealth of information that can be discovered in such a collection because it neglects exposing structure within conversations, (temporal) relationships between conversations and the social aspects of such a collection.

In its simplest form a conversation browser would help users re-find information they know is contained in a previous conversation where it is difficult to define a query. A typical scenario would be to “find a URL I know Ted mentioned in a chat roughly 2 weeks ago”. Another might be to find “what’s the email of that guy in group G who used to work with Steve. I remember Steve mentioned him in a conversation last month and gave me his email address”. These scenarios point at several typical aspects of such message retrieval:

- Users start with vague or incomplete information.

- Users might be looking for data embedded in the conversation stream, such as URLs, email addresses, phone numbers and the like.
- Queries are often based not on the information sought for, but on another aspect of the conversation the user remembers.
- Searches tend to hinge on a person. Users remember or think they remember they got the information from X. This is an important point because it means that even if we don’t find the information in the transcript we can get in touch with that person and try to retrieve the information from them.
- Typically we have a coarse idea of a time range where that information was given. The further back in time we go the less accurate this time component tends to get.

While a lot of work has been done in email systems to support re-finding information and understanding threads of communication (see for instance [6]), much less effort has been spent on tools to understand persistent messaging. There are a couple of unusual aspects of instant messaging that are good starting points to visually distinguish messages in a social visualization:

- Messages can differ a lot in character. Some are very short (e.g. “going to lunch now”), others are lengthy. Some people write in short spurts, others tend to formulate a longer thought before hitting send.

- Conversations vary in turn-taking behavior, and to what extent the conversation is multi-threaded.
- Conversations can be more or less synchronous. There can be longer pauses, with people being away from the desk for an hour or more so that the communication exchange almost develops an email-like character.
- Conversations across different time zones might span multiple days and still be considered one conversation.
- Conversations can be among 2 or more participants. Some participants might join later and (depending on the system) not all participants have the complete transcript of the conversation (see also [3]).
- Messaging logs typically are kept locally on a machine. However users might switch machine during a conversation such they have an incomplete repository of conversations on each machine. Users clearly would think of such a situation as one conversation, like when switching from a regular phone handset to a wireless headset.

These and related issues are not only challenges but also opportunities, because each of them is at a relevant feature of the conversation that can be used to better characterize it. A social visualization that lets users explore their conversation logs would hinge on exposing any number of such features and users might dynamically show and hide display of various features

in the visualization. For instance features might differentiate between very short and lengthy conversations, mark conversations that contain email addresses or attachments, mark conversations that occurred at unusual times (conference trip, couldn't sleep), conversations that span days, contain many long gaps or conversations that involve several people. Incidentally these are exactly the kind of features used in the vague queries in the scenarios above.

Time obviously is an appropriate organizing principle for such a system (another is work location or current activity) and a possible design approach is based on time-line visualizations such as the ContextLens [5]. Context lenses are based on a time line. Time is segmented into blocks that indicate whether certain features are present within the block. In the context of a conversation context lens features can indicate presence of recognizable data types such as URLs, phone numbers, pictures, and attachments but they could also recognize names from a corporate address book or any kind of relevant keyword such as a competitor's name, project names, etc (see figure 1).

Features focusing on the social aspects of conversations could indicate that I had another chat with other people at the same time, took a phone call, whether the conversation occurred while in a meeting, while working from home or in a different time zone at a conference. Features can also be aggregated to show, for instance, conversations with a member of a group instead of with a specific person. Hovering on a time segment in a context lens opens a popup-window showing additional information such as a snippet of the conversation, or who I was actually talking to.

## Summary

We have learnt to accept email systems as a focal point of our work day and as repository where we share and keep information. We see that persistent chat has the potential to become another highly relevant repository for information and artifacts about our work, only in a less formal way. To be really useful, we need to devise systems that let us easily organize conversation logs and find information again in them. As chat is less formal than email it is important to support very vague queries into the corpus of communication by exposing structure in the corpus and within the individual communications.

## References

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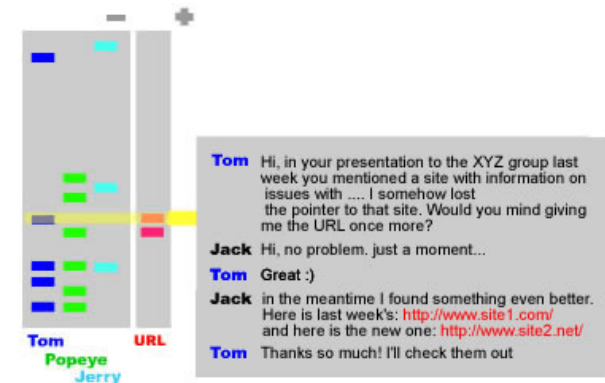


Fig 1: Design sketch chat-context lens indicating speaker and embedded URLs. Jack is not a feature in the visualization. But we know the information was in a chat with Tom and it contained URLs.

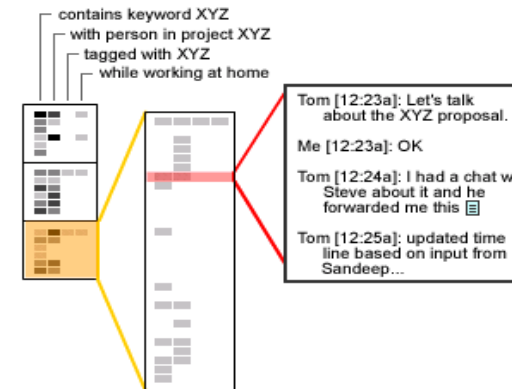


Fig 2: Hierarchical context lens indicating specified keywords, tags and social (conversation with a person in a specific project) or location (working at home) information. Darker marks indicate multiple occurrences (aggregation)