

Interactive Poster: Visualizations in the ReMail Prototype

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Abstract

Over the past several years, the Collaborative User Experience research group, in conjunction with the Lotus Software division of IBM, has been investigating how people use email and how we might design and build a better email system. In this demonstration, we will show a prototype email client developed as part of a larger project on “reinventing email.” Among other new features, this prototype incorporates novel visualizations of the documents within mail databases to aid understanding and navigation. The visualizations include a thread map for navigating among related messages, a correspondent map for highlighting the senders of messages, and a message map which shows message relationships within a folder. Our goal in developing this prototype is to gather user experience data as people try these visualizations and others on their own email.

Keywords: electronic mail, information visualization.

1 Motivation

Electronic mail has become the most widely used business productivity application. However, people increasingly feel frustrated by their email. They are overwhelmed by the volume (receiving hundreds of messages a day is not atypical [Levitt 2000]), lose important items (folders fail to help people find and recall messages [Whittaker and Sidner 1996]), and feel pressure to respond quickly (often within seconds [Jackson et al. 2003]). Though email usage has changed, our email clients largely have not [Ducheneaut and Bellotti 2001]. As our reliance on email for performing an increasing number of daily activities grows, the situation promises to worsen.

2 The Prototype

To address these problems, our research group has been investigating electronic mail. In addition to user studies and design mockups, we have implemented several prototype email clients [Rohall and Gruen 2002]. Figure 1 shows a portion of our latest prototype highlighting three novel visualizations: the *thread map* (2.1), the *correspondent map* (2.2), and the *message map* (2.3). The thread map is shown as part of the message’s summary information, along with its subject and recipients. The correspondent and the message maps are shown as separate panels. Since the prototype is built as a set of plugins for the Eclipse environment, the correspondent and message maps can be easily rearranged and resized (or not shown at all). This

flexibility allows us to explore their use in various combinations. These three visualizations are described in more detail below.

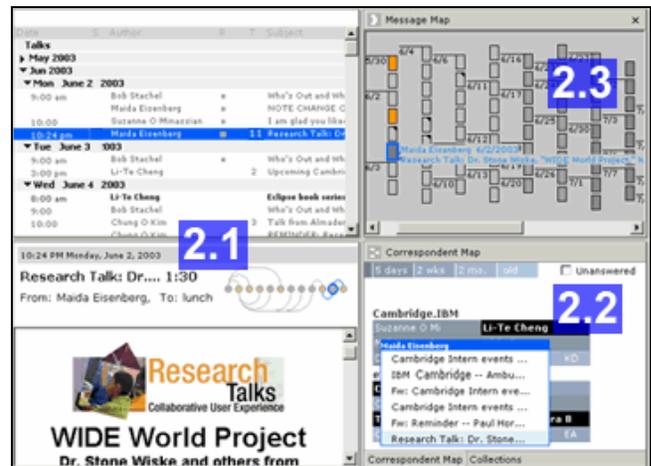


Figure 1. Overview of the ReMail Prototype

Even though the visualizations are implemented as separate plugins, they are integrated when used in the prototype. Selecting a message in one will select that message in the others as well as open it in the preview window. Other visualizations are easily incorporated in this architecture.

2.1 Thread Map

Email threads are groups of replies that, directly or indirectly, are responses to an initial email message. Ideally, e-mail threads can reduce the perceived volume of mail in users’ inboxes, enhance awareness of others’ contributions on a topic, and minimize lost messages by clustering related e-mail.



Figure 2. Thread map visualization

Our prototype supports threads of email messages by providing a visualization of the thread tree when any message is selected [Kerr 2003; Rohall et al. 2001] (Figure 2). (The prototype currently supports a subset of the functionality described by Kerr [2003].) The currently selected node is highlighted with blue. Unread messages are indicated with a bold, black border. Messages that the user has sent are filled with orange.

The oldest message is drawn on the left and newer messages are added to the right. No attempt is made to indicate an accurate time scale for the message nodes; instead, nodes are evenly spaced simply indicating which messages are more recent. This

design maintains compactness with either deep or wide trees while clearly displaying chronological order (which users have told us is important).

Hovering over a node in the tree view provides summary information for that message including the first line of the message body. Clicking on a node causes that message to be opened in the preview pane. The ability to view messages by clicking on the thread map has proven especially useful when a thread spans several days or weeks and not all of its messages are visible in the list view.

2.2 Correspondent Map

Our research has shown that the sender of an email message is one of the most important factors in determining the order in which people will process their messages. The correspondent map groups the messages in a folder by sender (Figure 3). Senders are also grouped by their domain. Within a domain, people are ordered by the number of messages they have sent, senders of more messages being shown first. If there are many senders (and/or the correspondent map view is reduced in size), the rectangles representing senders are reduced in size and may only show first names or initials. The color of the rectangles indicates the age of the most recent message from that sender. Selecting the “unanswered” check box grays out the rectangles of those to whom the user has sent mail more recently than they’ve received it (i.e., those people the user has already answered).

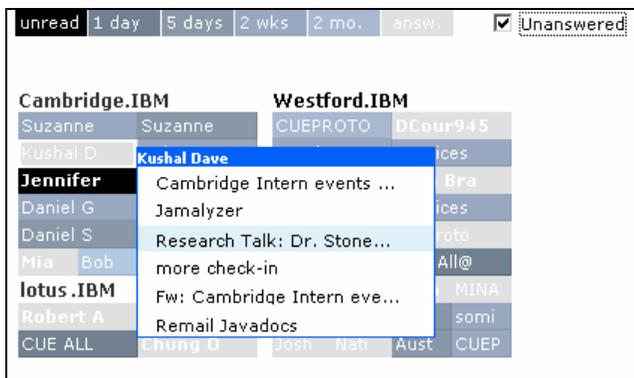


Figure 3. Correspondent map visualization

By displaying people from whom mail has been received more recently than they’ve been sent mail, the user can determine which people are owed a message, either as a response to an important message (a heavy correspondent with a dark blue or black box) or as a way of keeping in touch with an old friend (indicated with a light blue box). Conversely, the gray “unanswered” boxes may indicate that the user is owed a response and that reminders may need to be sent to those individuals.

Selecting a sender rectangle pops up a menu with the subjects of the most recent messages (up to five) from that sender. Selecting a subject line displays that message to the user. In addition, dragging a subject line to another sender’s rectangle serves to forward that message to the indicated individual.

2.3 Message Map

Our most recent work is a message map which provides a visual representation of the messages in a folder (Figure 4). Messages are displayed in chronological order. Similar to the correspondent map, the color of the message rectangles gets lighter as the messages they represent get older; unread messages are indicated with a black border. Rectangles that are drawn as light gray

“ghosts” are ones that have been deselected due to a user-specified search (e.g., in Figure 4, a search was issued for the word “urgent”—messages that don’t match are drawn light gray). The selected message (also shown in the client’s preview window) is drawn with a blue border; other messages in the same thread are drawn with a light blue border. Messages with the same sender are filled with orange. Finally, the “dog ear” on some rectangles indicates a message that the user has authored.

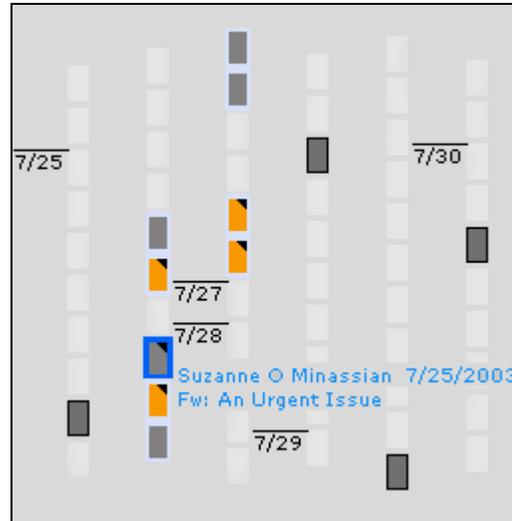


Figure 4. Message map visualization (preliminary version)

This visualization allows the user to quickly see relationships among messages within a folder: which satisfy a query, are in the same thread, are by the same author, and were sent by the user.

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References

- DUCHENEAUT, N. and V. BELLOTTI 2001. “E-mail as Habitat,” *Interactions*, 8(5), September-October 2001, ACM, pp. 30-38.
- JACKSON, T.W., R. DAWSON, and D. WILSON 2003. “Understanding Email Interaction Increases Organizational Productivity,” *Communications of the ACM*, 46(8), August 2003, pp. 80-84.
- KERR, B 2003. “THREAD ARCS: An Email Thread Visualization,” *Proceedings of the IEEE Symposium on Information Visualization*, Seattle, WA, October 19-21, 2003.
- LEVITT, M. 2000. “Email Usage Forecast and Analysis, 2000-2005,” IDC Report # W23011, September 2000.
- ROHALL, S.L. and D. GRUEN 2002, “ReMail: A Reinvented Email Prototype,” demonstration, *Conference Supplement for CSCW 2002*, New Orleans, LA, November 16-20, 2002, pp. 119-122.
- ROHALL, S.L., D. GRUEN, P. MOODY, and S. KELLERMAN 2001. “Email Visualizations to Aid Communications,” *Late Breaking, Hot Topic Proceedings of the IEEE Symposium on Information Visualization*, San Diego, CA, October 22-23, 2001, pp. 12-15.
- WHITTAKER, S. and C. SIDNER 1996. “Email Overload: Exploring Personal Information Management of Email,” *Proceedings of CHI’96*, Vancouver, B.C., April 13-18, 1996, pp. 276-2