Interactive Poster: faMailiar – Intimacy-based Email Visualization

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ABSTRACT
Email has developed into one of the most extensively used computer applications. Email interfaces, on the other hand, have gone through very few transformations since their inception, and as the growing volumes of email data accumulate in users' email boxes, these interfaces fail to provide effective message handling and browsing support. Saved email messages provide not only a vast record of one's electronic past, but also a potential source of valuable insights into the structure and dynamics of one's social network. In this paper, we present faMailiar, a novel email visualization that draws upon email's inherently personal character by using intimacy as a key visualization parameter. The program presents a visualization of email use over time. faMailiar facilitates navigation through large email collections, enabling the user to discover communication rhythms and patterns.

CR Categories: H.5.2 [Information Interfaces and Presentation]: User Interfaces - Graphical User Interfaces (GUI)

Keywords: information visualization, electronic mail

1 INTRODUCTION

Email is a pervasive medium of communication. Globally, as of 1999, almost every seventh human being (on average) owned an email account [3]. In 1998 alone an estimated 3 billion email messages were sent daily just in the USA [4]. However, the *form* of the medium hasn't developed in a manner commensurate with its rise in prominence. Popular email applications, such as Microsoft Outlook, enable users to organize messages in folders. Yet, according to several studies [1, 12], folders are not suitable for retrieval and management of the large amounts and types of data contained in email. Numerous problems that users encounter when dealing with email folders are evidenced by the fact that about half do not sort their messages into folders, but instead, keep all of them in their inboxes [12].

The large data sets created by email use make it an obvious medium in which to apply information visualization methodologies. In approaching email visualization, as in other visualization domains, a crucial question is: what are the important parameters that can serve as the basis for visualization? Our desired goals are to facilitate browsing, and to make visible significant patterns within email usage that would otherwise remain hidden. Because email functions as a primary electronic "habitat" [2] for interaction between people, it would be valuable to be able to see how social structure develops over time [10, 11]. In recognition of email's personal and social role, we answer the aforementioned question by focusing on intimacy.

Visual mappings and support for filtering help the user to see patterns in the data. Zooming, panning and implicit semantic zooming enable navigation across large email collections. We are building this functionality using the Piccolo ZUI toolkit [9].

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Figure 1. Outgoing (top) and incoming (bottom) message icons. Moving from left to right, decreasing contact intimacy is mapped to the gradation in hue both for outgoing and incoming message icons, and number of sides only for the incoming message icons.

2 VISUALIZING INTIMACY

Lamming and Flynn introduce intimate computing in a ubiquitous computing context, referring to a computer's "intimate knowledge" of the user [6]. While providing several references to relevant research in the field of psychology, they point out that such an "intimate" computer could be crucial in supporting the user's autobiographical memory. Even though we consider intimacy in a more traditional, interpersonal manner, we recognize its potential to support human memory in the same way. Furthermore, we acknowledge and underline email's intrinsically personal character. We define intimacy in the email domain as a combination of the following two metrics:

- *contact intimacy category*,
- *message intimacy weight*.

Contact intimacy category is a user-defined parameter that reflects how intimate the user feels about her email contacts. faMailiar enables the user to categorize her contacts into five intimacy categories ranging from the most to the least intimate (Figure 2, right). As relationships change over time, the user can change the intimacy rating for any of her contacts. On the other hand, *message intimacy weight* is a derived parameter, based on message data. Each message is procedurally assigned an intimacy weight rating, using Lucene [7], as a result of information retrieval analysis of the presence of intimate and "anti-intimate" keywords. Additionally, forwarded messages and those having more than one recipient are assigned decreasing intimacy weight.

faMailiar uses hue and iconography to represent contact intimacy categories (Figure 1). Itten states, "cold-warm contrast ... contains elements suggesting nearness and distance" [5]. Mackinlay points out that color hue is effective encoding in nominal perceptual tasks [8]. faMailiar shows messages from the contacts that the user categorized as the most intimate, using a warm, yellow hue in contrast to the grey background. In the same schema, messages from the contacts in the fifth, default category are represented by a cold, grey hue, and by design, almost blend into the background. Messages from contacts in the categories between the two extrema are shown in red (second), green (third) and blue (fourth). Similarly, there is a gradation in the number of edges of the shapes that are used to represent incoming messages - messages from the most intimate (closer) contacts are visualized as triangles, while the messages from the least intimate (more distant) ones are depicted as circles. While all the incoming messages are represented as gradually more complex icons, the messages that were sent by the user have a distinctly different shape. They are represented as stars. Like incoming messages, they are assigned an appropriate hue, based on the recipient's contact intimacy ranking. We realize that user may need to learn these mappings.

Message intimacy weights are visually differentiated through the use of color value. More intimate messages are brighter than the less intimate ones, thus making it easier for the user to find a specific message within a subset representing email interchange with contacts from the same category, or with a single contact.

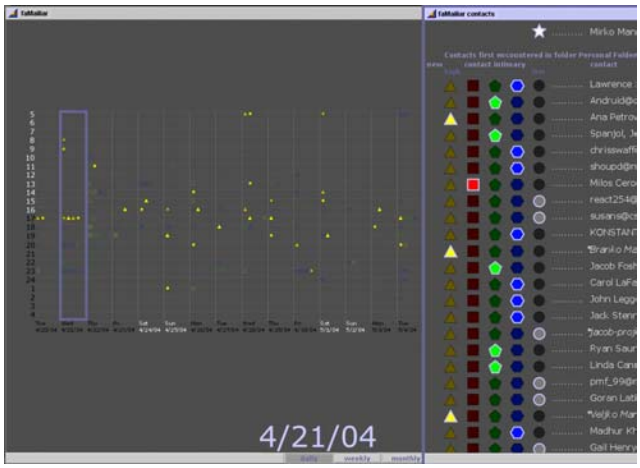

Figure 2. Daily view with a filter applied to email interchange with a specific contact (left) and faMailiar contact window (right). The visualization shows that the user and the selected contact email each other almost daily, and almost always between 2 and 7 PM.

3 Temporal Communication Rhythms and Patterns

When visualizing past email, preserving appropriate chronological relations between messages, and accurately recreating the overall temporal context are crucial for enabling the user to see her communication relationships and rhythms. In order to achieve this, faMailiar organizes message representations on a 2D grid in a calendar-like manner. faMailiar provides daily, weekly and monthly views of email activity.

Daily view is the most detailed. It shows all messages that the user has sent and received. Days are shown along the x-axis, and hours are represented along the y-axis. In this view, experience patterns, such as "person A always emails me after 10 p.m." or "person B never responds the same day I email her" become apparent (Figure 2, left). In order to accentuate the visibility of such patterns, faMailiar supports zooming and filtering of message icons. Messages can be filtered in two ways: using an input box to specify a search (on subject, body, sender and/or recipient), or by example, in a hypertextual manner, using the reply sequence or contact associated with the selected message.

While the user can zoom infinitely in any of the three views, she can also switch between different views through implicit semantic-zooming. By clicking on a specific time view button, the currently displayed view slowly fades out, and the newly chosen view fades in. The calendar metaphor is also present in the weekly and monthly views. In the weekly view, the x-axis is used to represent weeks, and the y-axis to represent days in the week, providing different labeling for weekdays and weekends. The monthly view, on the other hand, lays out months along the x-axis and weeks along the y-axis. Unlike the daily view, which uses icons to represent messages, the weekly and monthly views show aggregated average message intimacy weights (again, using color value) and number of messages (using size) for each of the contact intimacy categories. Multiple views of same data allow for quicker browsing and recognition of communication patterns during larger time intervals and help the user to quickly identify the granular time intervals containing desired messages.

4 Conclusion

In this paper, we introduced faMailiar, a novel email interface. Intimacy-based visualization of email data over time, with a choice of temporal resolutions is accompanied by zooming and filtering capabilities that can help the user to browse through her email collection more efficiently. The visualization also makes observable communication rhythms and patterns that might otherwise remain obscured. Our next step is to conduct a user study to verify the efficacy of the visualization interface.

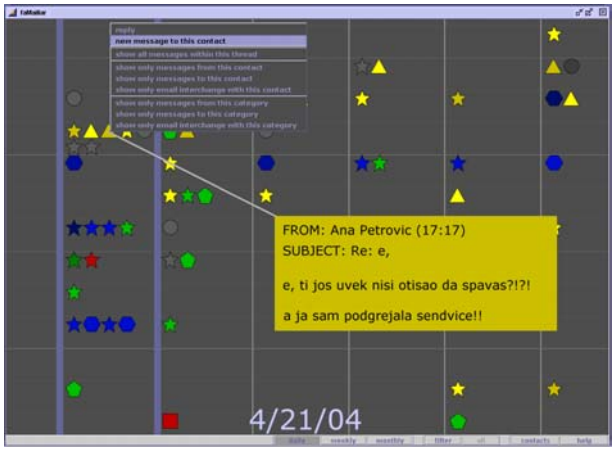

Figure 3. Zoomed-in daily view with an opened message. By mousing-over an icon, the user can see the message subject and the contact's name; by clicking on an icon once, the user can read the message preview (opening words); by double-clicking, the user can read the entire message. Note different color values of messages within the same contact intimacy category, indicating different message intimacy weights.

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