Email Visualization: A Context-Based Approach

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Abstract

Email has become a widespread communication medium, but its interface has not undergone many changes over the years. The main contribution of this work is to propose a context-based email visualization application, which goal is help users acquire habits of email management and search.

Keywords

Information Visualization, Human-Computer Interaction

1. INTRODUCTION

Nowadays, most people communicate using one or more email accounts, leading to an increasing amount of sent and received emails. This fact, combined with email persistency (i.e. email messages may remain on accounts for long periods of time), increases the difficulty to find particular information.

Over the past years, multiple features (such as instant messaging) have been added to email clients such as Microsoft Outlook, Mozilla Thunderbird, Gmail, among others. However, none of these changes addressed the user interface paradigm. There are several email visualizations (eg.: Anymails [Horn07] and Mail Garden [Wilkens08]), their purpose is not the same as that of an email system, as these only allow a limited set of actions to be performed.

The main goals of this work were the analysis of existing email visualizations, a brief study of the user's needs (for our study, college students), the development of a new visualization application to help users search email messages and to make them acquire email organization habits by avoiding the accumulation of email messages in the inbox. Low and medium-fidelity prototypes were developed and evaluated. The visualization developed presents a different design while also incorporating the main functionalities of an email client. A different feature is the fact that the email client is context-based.

2. RELATED WORK

Most email clients explore the information of emails regarding the relations between contacts, threads and keywords, among other criteria. Recently, new visualization concepts have emerged, providing new metaphors for email systems. Anymails and Mail Garden are examples of such metaphors. Anymails, created by Carolin Horn in 2007 [Horn07], represents received emails as colored microbes. The microbes "swim" freely across the screen with different speeds, according to their status (read, unread or replied). Mail Garden, proposed by Ken Wilkens in 2008 [Wilkens08], represents emails as trees in a forest. Each tree represents an email and its height the email size. On both visualizations, the presentation of information related to a certain email is triggered by hovering the mouse over an entity representing it.

3. METHODOLOGY

This work followed a user-centered design approach [Abras04]. Data collection was accomplished through semi-structured interviews [Unger09]. This technique helped us to understand users' habits and difficulties while using their usual email system. This type of interviews enabled the authors to deepen some interesting points of the conversation. After collecting the information from the interviews, a low-fidelity prototype [Rudd96] was developed. After the prototype conclusion, several users were subjected to a usability test [Dumas99]. With the results collected from this test, a redesign was made to improve the identified problems. When the redesign was finished, another usability test was made with different subjects, allowing the authors to evaluate other functionalities that were not previously tested and to verify if the improvements were correctly implemented. During the test, the subjects were asked to "report out loud" or "say out loud" any thoughts, feelings and opinions experienced during the task [Senger93]. Also, during the test, we simulate the real behavior of the application. In the end of each usability test, the participants were asked to complete a questionnaire in order to collect information about the importance of some functionalities and the usability of the application. Questionnaires were also performed at the beginning of each of the interviews and usability tests in order to gather demographic data.

4. USER RESEARCH AND DATA COLLECTION

College students are the target audience of the developed visualization approach, since the largest uptick in email use occurs when students enter college and then this ef-

fect continues as these students graduate and enters the workforce [Stewart09].

For this study, seven students attending their undergraduate or masters degrees studies were interviewed. To compare results, four professors that receive a large number of emails were also interviewed, since these people experience more problems while managing their emails. Results showed that the differences between the two groups that stood out the most were the ability to organize email into folders and the management of the received emails by the professors. The students did not exhibited the habit to organize emails into folders, had difficulties to find a specific email and did not relate too much information to their contacts. Usually, the students only related the name of the contact. The main problem of the professors is the large amount of received emails causing them to have difficulties organizing and reading all their email messages.

5. PROTOTYPE AND EVALUATION

Figure 1 shows a sketch of the email visualization approach that we developed and that uses the visualization metaphor of an office desk. The application is composed by one table (1 in Figure 1), where received email messages are disposed, and two walls. One wall is composed by archives (3 in Figure 1), which contain folders, where the messages can be organized. The other wall (2 in Figure 1) displays the contacts.

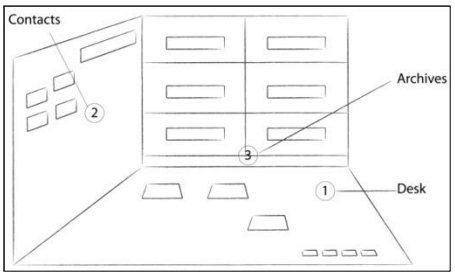

Figure 1 - Email visualization sketch

Functionalities, considered to be beyond the normal email functionalities, are suggestions (that pop-up whenever a subject is repeated over a number of emails) and the different areas to view contacts, folders or incoming messages. The letters are sorted from the left upper corner to the bottom right corner by received date. The user can also sort the letters and create piles by sender or date. He can also drag and arrange them at will. When the user has too many letters on the table, these start accumulating on a pile. When the number of archives exceeds the visible area, a scroll bar appears. The user can search for the archive name by using the search option on the contacts wall menu. Through this menu the user can also delete or create archives or folders. To access archives and folders the user just has to double-click. The user can move letters between folders and archives dragging them or through the option "Move". It is possible visualize the letters by its sender. The user can also go to the contacts wall menu and visualize the received letters from a given contact. The paper prototype shown in Figure 2 was tested with twelve persons, divided in two usability tests. In the first test, the main problems were related to deleting messages, moving messages between folders and identifying some actions that were more hidden. The application was redesigned in order to solve these problems and explore other aspects. The second test showed that the changes made had been correctly implemented.

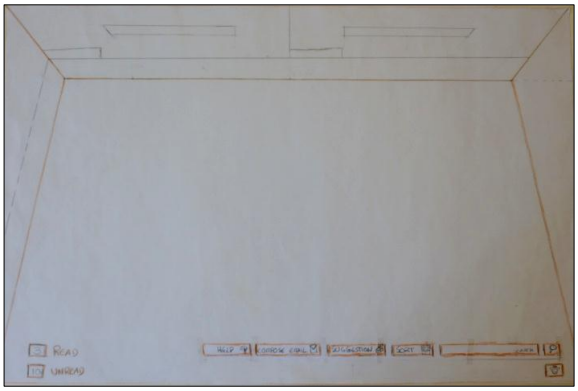

Figure 2 - Paper prototype

6. DISCUSSION AND CONCLUSIONS

Interviews provided helpful information to the prototyping phase. The feedback obtained from the usability tests was important, considering the subject's opinions and problems identified. Low-fidelity and medium fidelity prototypes allowed quick modifications.

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