Supporting Peripheral Web Awareness Using Wallpaper

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Abstract: This paper describes a technique for generating images on the screen wallpaper to show changes in information. By automatically collecting images from user-selected web sites, applying color filters to them, and positioning the filtered images on the screen background, our system provides a visible, non-intrusive way to raise awareness.

Keywords: peripheral displays, awareness, wallpaper, passive browsing

1 Introduction

The World Wide Web is an easily accessible and widely used information resource, yet its constantly changing nature makes it difficult for users to stay abreast of the latest happenings. In order to facilitate the users' desire to stay aware of changes, tools that periodically monitor the web and inform the user are needed. Ideally, these tools will not require constant conscious effort from the user or they could degrade the user's performance on other, more important tasks. In this paper, we consider techniques for monitoring the web and passively summarizing the changing content to the user. Such techniques should help the user maintain a desired level of awareness without affecting performance on primary tasks.

Most techniques for maintaining awareness of changes to the web are text based, but the web is rich in other media types as well. For example, embedded images can reflect the contents of the web pages that contain them, and as such could be used to facilitate information awareness. Humans can distinguish the presence of new images quickly. Image recognition also requires less cognitive processing than text recognition, thereby allowing users to easily scan and assess the content of an image and, in turn, the represented web page. Given that most tasks are textual, using images also takes advantage of our cognitive ability to simultaneously handle both verbal (textual) and non-verbal (images) events.

Several systems use extracted images to convey information. Previous work by Helfman and Kerne uses images from bookmark lists, browsing history, Web sites, and shared image proxies to create conglomerate imagemaps (Helfman, 1999; Kerne, 1997). They can be displayed on a screensaver, stored on the web, or emailed to other users to allow users to leverage navigation tasks of others.

One underutilized location to display information is on the background of the computer desktop, known as the wallpaper. Typically users display a pattern or picture on their wallpaper, but it seems to provide a natural peripheral display because its visibility corresponds inversely to a user's work activity. When the user is busy and has multiple windows open then the images are less visible and are not distracting. On the other hand, when the user is less busy and has fewer windows open, the images are more likely to be seen and catch the user's attention.

2 Generating a wallpaper design

Our work builds on the CWIC (Continuous Web Image Collector) system, a passive browsing tool that offers an alternative to traditional, active monitoring of the web by collecting and displaying web images (Brown and McCrickard, 2000). CWIC begins at user-defined sites and periodically visits them and their linked pages to obtain the latest images. Images that potentially contain valuable content are automatically selected. The images are combined in a collage and displayed using a stand-alone application, a web page, a screen saver, or as desktop wallpaper.

Based on reactions from our users, this followup work focuses on the desktop as the primary display mechanism. Earlier versions of CWIC used full color images, which users perceived as distracting. Color

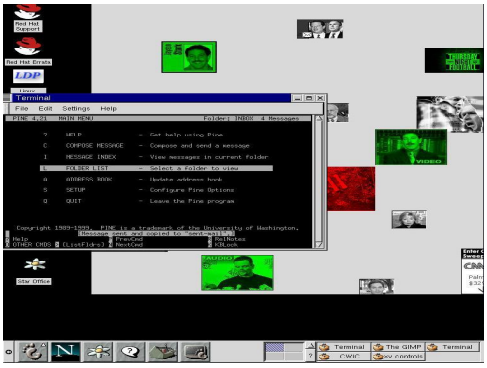

Figure 1: CWIC displaying images in the background wallpaper. As the user becomes busy and opens more windows, the background images become less visible.

typically attracts attention and can draw a user away from their primary task, and full color images presented in the background often would mask a user's icons, making them indistinguishable from the desktop. Earlier versions also displayed all images in an identical manner, regardless of the web site and the web content that was associated with an image. Yet, failing to distinguish images based on their context can cause them to be uninformative to the user.

In extending CWIC, we included various filters to dull the colors. As a default, images appeared in grayscale to provide a neutral, subdued effect in the display that does not conflict with desktop icons. A user-selected categorization mechanism allows users to associate colors with categories and, in turn, categories with URLs. The display becomes a collection of color-scaled images, enhancing the at-a-glance contextual information provided. For example, say the user has associated a News category with red. Then, by just glancing at the display, a user can tell that a newly drawn, red-scaled image is associated with a news web site. Thus all the red-scaled images form a relevant subset of the presented images that pertain to the user's immediate interest.

An initial survey of seven users indicated that they appreciated passive information gathering via images because it allowed them to keep abreast of interesting happenings on the web without investing great amounts of conscious effort. Users glanced at images throughout the day but could click on an image to pull up a web browser and peruse the corresponding web site. In addition, the CWIC system extended their normal browsing scope, as it encouraged users to keep up to date on information of marginal importance or interest. Users noted that they used CWIC to browse web sites that they normally would not visit because of a lack of time or serious interest.

Images seemed to convey ideas at coarse information granularity. We observed that images gave users enough information to pique their interest and communicate the general theme of the associated page, but did not provide enough specific details to encourage them to investigate further. Image categorization conveyed enough at-a-glance contextual information to begin addressing this concern, yet users still stated a desire for a more insightful presentation. However, this method of classifying images did provide users with enough context to divert them away from uninteresting websites and thus saved them time by reducing the number of wasted investigations.

3 Ongoing work

Our work showed that users are very interested in staying abreast of happenings on the web, yet they did not want to interrupt other tasks. They appreciated the CWIC system because it provided a passive browsing tool that enabled them to peruse interesting websites without interfering with their main task performance. By using the desktop wallpaper, CWIC was integrated into their natural work environment in a non-intrusive manner.

Color-scaled images offered by the system provided at-a-glance contextual information to a certain extent. However, image grabbing alone does not provide enough contextual information for many users. We plan to develop other techniques for automatically categorizing and contextualizing images. For example, the categorization of images could be supplemented by text from the Web page. Another useful addition would be an image display history mechanism that would allow users to apply not only semantic context but also chronological context to the presented images.

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