

Collection Awareness on the Web via Livemaps

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ABSTRACT

With the increasing proliferation of chat applications on the Web, the old vision of “adding people” to the Web, is becoming a reality. While infrastructure seems to be scalable and stable enough to support collaboration, the user model is not well defined yet. In particular, there seems to be a certain lack of abstraction and granularity in existing solutions. This paper studies the current restrictions of two common concepts in collaboration on the Web, namely “people awareness” and “document awareness”, and proposes a more general one that we call “collection awareness”, which seems more adequate to the graph structure of the Web. We introduce a new medium for supporting this higher-level awareness: “Livemaps”.

Keywords

awareness, collaboration, site mapping, chat

INTRODUCTION

The World Wide Web is a giant assembly of “virtual places” that Web surfers visit at will, without being, in most cases, aware of other Web surfers activities. It has been proposed, in the early days of the WWW, to “add people to the Web” by associating them to “virtual places” [10], but the approach never really caught on, probably because most of the models required a modified browser, or in the best case a plug-in. Thus, in the last few years surfing has mostly remained an individual experience. On the other hand, the extraordinary success of instant messaging applications such as ICQ [5], and of chat rooms on a large scale basis, as well as the (re) emergence of computer-supported cooperative applications demonstrate the increased interest in collaboration and synchronous communication around the Web, as well as the existence of a stable infrastructure for collective surfing.

We propose here to revisit the virtual place paradigm and extend it so as to reconnect collaboration tools to the Web, and consider again the Web not only as communication

medium but as a collaboration medium. In particular, we propose to generalize the two fundamental principles of virtual places, namely “people awareness” (who is on line at the same instant) and “document awareness” (who sees the same document at the same instant), into a new concept of “collection awareness”. We introduce a new medium to support this more general awareness, that we call “a livemap”. Livemaps take advantage of the Mapuccino technology (developed in the past by the authors) for visualizing Web sites and extend it with awareness information. Note that we concentrate here mostly on the awareness and collaboration aspects of Livemaps since the underlying site mapping and visualization technology has been described elsewhere [7, 3, 1].

In this extended abstract, we introduce the notions of collection awareness and chat in context, and present the livemap approach. A few usage scenarios are also given. Related work and the system architecture will be discussed in the full version of the paper.

RELATED WORK

There are a variety of awareness and chat applications, available on the Web. The one example is instant messaging applications, like ICQ [5] or Sametime Connect [9]. These abstract systems, though, are still centered around one single virtual place and are detached from the Web as an information repository.

Collaborative browsing idea is not new either. Many collaborative applications do take the Web into account, by allowing users to meet at a Web site, chat, surf together or share a browser. To cite just a few, ICQ Surf [6], NetElement [8] and Gooley [2] enable users to chat while simultaneously surfing on the same Web page. When a registered user of one of these programs visits a given Web site, a window on the user's browser lists other registered users who are also visiting the site at that very moment. There are also other approaches, defining “meeting places” for collaborative browsing (like CoBrow [11]).

Most of the applications described above present a few drawbacks. First, from a conceptual viewpoint these applications provide people awareness either at the page or at the entire site level, with no finer level of granularity.

Second, from an implementation viewpoint, they either require the installation of a dedicated application/plugin or are based on high-risk applets.

OUR APPROACH

As mentioned above, one of the limitations of the awareness function on Web sites that support it, is its level of granularity. Awareness is typically provided either at the entire site level, or at the single page level. For the sake of the example, let us consider a typical collaboration server that supports awareness - namely Lotus Sametime Server [9]. It supports two concepts that are used in most collaboration servers (sometimes under different terminology though):

- **“people awareness”**: which can be explained as the knowledge of who is “on-line”. Being on-line means being logged-in to a given site and/or to the associated collaboration server. It provides the basic event information needed to perform synchronous applications among on-line people such as instant messaging.
- **“document awareness”**: which can be explained as the knowledge of the people who are at the same instant visiting a virtual place like a chat room, or a Web page.

Document awareness is the basis for collaborative surfing on the Web. However, when applied in its strictest sense it presents the major drawback of forcing people to agree on a meeting place in advance. If the meeting place is not defined in advance, the awareness of co-visitors at an arbitrary page (single page awareness) might be too small for productive collaboration, and relevant people browsing in the neighborhood of that page would be missed. On the other hand, using the root of the site as a meeting place for all visitors of the site wherever they are on the site might be too coarse. It seems that a better level of granularity would be to define a collection as meeting place, the size and shape of the collection depending on the targeted communities. Note that it might well happen that there be so many visitors at one single page that the page itself is too coarse. In that case either the collection needs to be assembled differently or the visitors filtered.

We believe that by allowing a finer-grained awareness, surfers could form dynamic communities around common interests as defined by a set of related pages within a site or across sites. Collaborative surfing would then be provided not only to “buddies” (like in the “shop with a friend” model) but to casual acquaintances met on the site.

We propose here to support collection awareness by projecting document awareness onto a collection abstraction such as a site map. The site map is a visual representation of the structure of a collection of pages. This can range from a simple list of pages to a full graph representing the underlying hypertext structure. Each map element, or node in the graph, represents either a single web

page, or a group of related web pages. We have introduced elsewhere a technology that enables to identify and visualize such site maps via the Mapuccino map applet [7]. By decorating the site map with document awareness information, we create what we call a “livemap”, enabling “collection awareness”. The livemap provides a high-level view of the full collection awareness information and can provide various abstractions of the awareness information in various views. We also distinguish between two user roles in the livemap model:

- the **“visitor”** one is a mostly passive role and represents a person visiting any page of the site or collection being monitored
- the **“observer”** one is the real user of Livemaps who wants to have a global awareness image of the site

Note that to avoid the “big brother syndrome”, it is crucial that users not only be warned that they are monitored but actively accept it. Distinguishing between the two roles is important in a variety of collaborative applications. In the most general application, visitors are surfers and Webmasters are observers who want to monitor their site. In a distant learning application, the main observer is the teacher while visitors are students that are typically authenticated to get personalized assistance when needed (auditors of the class can remain anonymous for instance). Similarly in a Helpdesk application, the observer is the Customer Service Representative (CSR), while the visitors are the customers surfing the Helpdesk site (preferred customers will probably request authentication). In socializing applications, which is the application we favor, we believe that observers and visitors merge into the same role, and probably use the anonymous or pseudonym options.

Flexible People Sensitivity

Full people awareness also provides identification of the visitors on the site, while document awareness provides it at each page. Advanced servers like the Sametime server that we use as a reference in this paper, even provide authentication. In order to avoid the “big brother” syndrome, a user entering a livemap-enabled site has to press the “join in” button to become a visitor, as shown in Figure 1, top clip. S/he can then either remain anonymous, pick an unauthenticated pseudonym, or be fully authenticated if s/he has already registered with the site (center clip in Figure 1).

The collaboration server has then at its disposal the basic “who is where” information (i.e., a pair people/place). By taking this information as is, the site can provide each visitor with a list of visitors at the same page as shown in Figure 1 (bottom clip), or with the full list of visitors at the site. We describe below how we extend this model and how

this information can be abstracted and generalized with Livemaps in order to obtain more flexible and usable views.



Figure 1: From Surfer to Visitor

High-level People Sensitivity: the “Water Gauge”

A simple view consists of monitoring the number of current visitors at each page in the collection by attaching a visual clue such as a “water gauge” to each node in a map. By attaching this gauge, the Mapuccino map becomes a “livemap” which dynamically changes as the activity level changes. Figure 2 shows a livemap of the IBM alphaWorks site [4] where each node represents a Web page, and a gauge is added to the left of each node label. The water gauge is a rectangle that remains white (empty gauge) when no one is currently visiting the page, and turns blue (fuller gauge) as if water was poured in it, as soon as at least one visitor entered the page. The more visitors come in, the fuller and darker the gauge gets. One of the key features of the water gauge is its ability to represent graphically in a continuous mode from 0 to 10,000 users. The red annotations in Figure 2 explain in more details the interpretation of the water level per node.

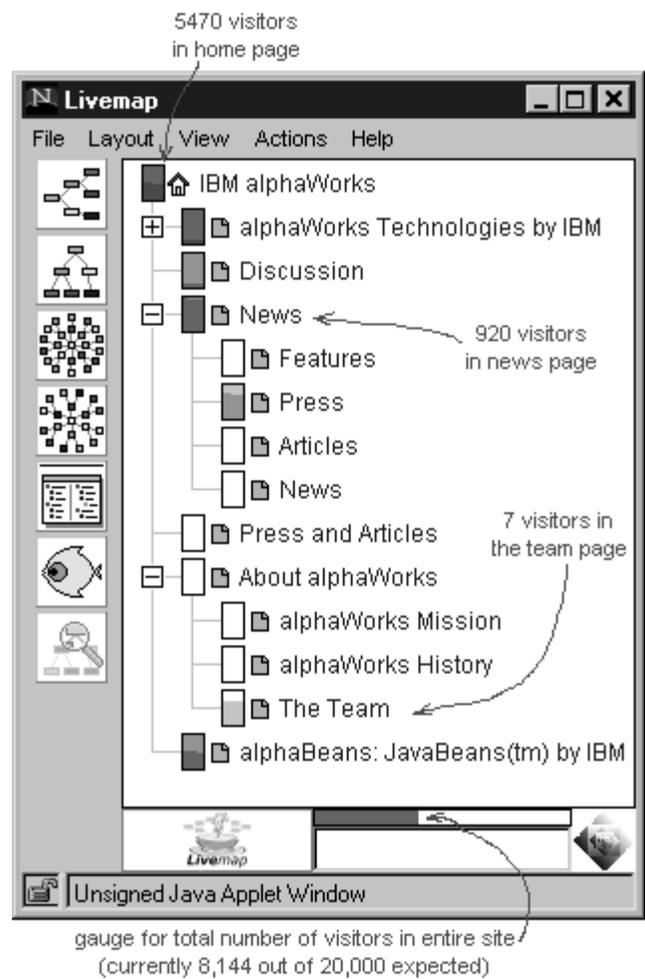


Figure 2: Decorating Livemaps nodes with a “water gauge”

Fine-grained People Sensitivity

In the same way that the Mapuccino map provides a high-level view of the structure of a site and a graphical-user interface (GUI) for browsing activities (e.g. group saving/printing), the livemap serves as a high-level view of document x people and information and a GUI for launch collaborative operations on people. The range of monitoring activities and operations goes smoothly from the entire set of people on-line down to the individual visitor. An observer can define a group of visitors or just one single visitor and monitor and interact with just them, him or her. As an example of possible functions, an observer can click on any node at any time and obtain as a popup the list of current visitors at this node (similar to the bottom clip in Figure 1). If the list is too long, s/he can sort it, filter it, cross it against his or her buddy list.

S/he can select one person or a group of people (not necessarily all at the same page), and obtain further information about them, such as their chronological path in

the site, or in a Helpdesk application for instance, previous history by fetching from a customer-relationship database.

The key usage of the livemap is for launching collaborative applications around a Web page or a collection of Web pages with one visitor or a group of visitors. In the simplest scenario, the observer can initiate a chat session with any other visitor, not necessarily at the same page.

More generally, the livemap abstraction allows to launch applications involving a subset of users at different places on the map (e.g., initiate a conference call when a quorum of people is reached at a page, group of pages, site). Note that because of the constraint we imposed on ourselves not to install any application on the client side, we currently allow Livemaps to invoke only collaboration “applets” rather than applications. Thus we have disabled a previous feature that enabled to call an internet phone program as the latter was a native application.

CONCLUSION

This paper introduces the concept of “collection awareness” as a generalization of document and people awareness as defined in [10]. Collection awareness is supported by a new collaboration medium that we coined - “Livemaps”. Livemaps provide a high-level view of the awareness information at the site or collection level, the same way Mapuccino maps provide a high-level view of the structure of a site or collection on the Web. The parallel goes even further: Livemaps can be used as high-level GUI for collaborative applications on the Web such as chat and collective surfing, the same way Mapuccino maps could be used as a GUI for navigating tasks such as browse, save, and print. By decorating the applet with collection awareness we turned Mapuccino maps into “live” maps and grew them by one dimension: the people dimension. From a functionality viewpoint, the main differentiator between Livemaps and Mapuccino maps is the ability to monitor people and launch collaborative applications.

In the long-run, and if users voluntarily accept being monitored, we believe that Livemaps could be beneficial in a variety of applications. The simplest application is a simple “community” site where all visitors are observers and the livemap is a collection of pages that somehow define the community of users who socialize on the map. Other possible markets are the typical markets for computer-supported collaborative work: education sites where the observers are teachers and the visitors are students, and the livemap represents a course being taken by the students; customer-care sites where the observers are customer-service representatives (CSRs), visitors are customers, and Livemaps are the area of responsibilities on the site of each CSR. Finally, the most profitable application of Livemaps would probably be commerce sites for proactive marketing. In the latter case, the observers would be sales people who monitor visitors as potential customers and offer real-time help based on the visitor's path through the site, personalized data etc. Livemaps could

be the basis for a virtual “may I help you?” as long as we make sure that the technology is not intrusive. Indeed like most recent Web applications, privacy and security need to be enforced in order for the technology to be accepted. In the immediate future we plan to deploy Livemaps on as many active sites as possible in order to evaluate its acceptance and usability especially from a CHI viewpoint. Indeed, even if serious stress test have shown that our system and model is scalable to medium-range sites (limited only by the capacity of the collaboration server), we clearly need to conduct more in-depth users-studies, as soon as enough active Web sites adopt it.

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