LiveWeb: Visualizing Live User Activities on Web

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Currently, Web users have little knowledge about the activities of fellow users. They cannot see the flow of on-line crowds or identify centers of on-line activity. LiveWeb seeks to enrich Web users' experience by visualizing the real-time activities of other users. The visualizations can help answer user questions about overall patterns and specifics such as

> What are other people looking at? What is hot?
> Who is interested in what I am interested in?

LiveWeb visualizes two kinds of data about a Web site: its underlying structure and real-time user accesses. The visualizations first lay out the site structure, then overlay access data on top. The visual structure of a Web site can be generated in one of three ways: 1) custom made, 2) automatically generated, or 3)emerge from users' pattern of traversal. We have created two sample visualizations, WebMap and WebFan, using the first two methods.

WebMap visualizes activities at Web sites that can be mapped to physical structures. The custom-created layout is derived from a floor plan as shown in Figure 1. Each Web user is represented by a dot. As users move among pages, their dots move correspondingly through the WebMap. Other features include

- Distinguishing users from different domains by color.

- Showing WebMap user's own traversal in context of others'.

- Indicating how long a user has been on a page and what other pages he/she has visited.

- Accumulating user accesses over time to identify Web pages that are visited more often.

- Allowing users to navigate directly using WebMap.

WebFan visualizes Web activities using a fan-like hierarchical structure. This abstract structure allows a large set of Web pages with multiple levels to be represented at the same time for overview and comparison. Users can also interactively explore the fan structure to find out more about individual pages.

Figure 2 shows a WebFan visualization of a Web-based message board, which contain user postings and replies that each resides on a separate Web page. WebFan can also be used to visualize a generic Web site by first extracting its hierarchical structure using a Web crawler.

LiveWeb URL: *http://graphics.lcs.mit.edu/liveweb/*

Figure 1   **Web Map** visualizes the Web site for a research group. Each office contains one or more rectangular areas that represent group or individual member's homepages. Each visitor to a Web page is represented by a dot in the corresponding rectangular area.
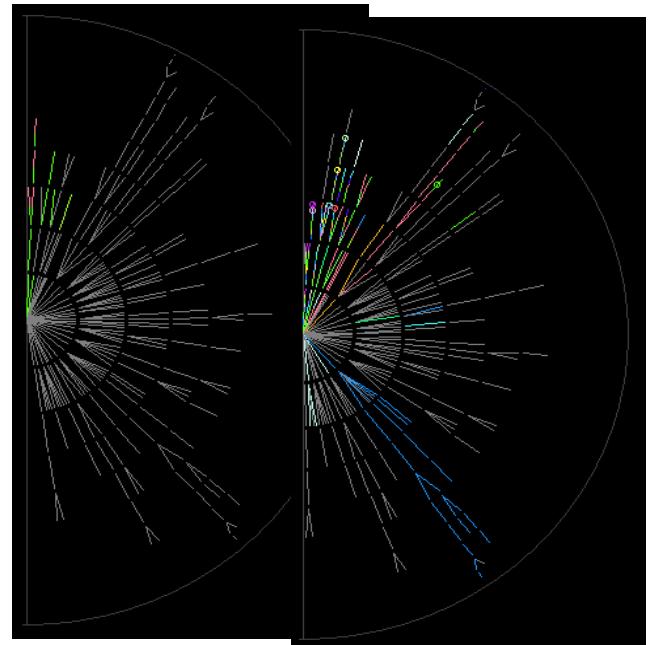

Figure 2   **WebFan** visualizes activities on a Web-based message board. It uses the message-reply structure to layout the message in a fan-like fashion. Each time a Web visitor reads a message, the line segment representing the message will change to the visitor's color. A circle on the colored section indicates that the user is currently viewing the page.