Dynamic Display for Information Browsing on the Web

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ABSTRACT

As the amount of information on the Web has increased, the Web has become a critical method of gaining information for people in every walk of life. Because of the large amount of information on the Web, search engines are often needed. Search Engines are far from perfect, however. For example, the time and effort required to browse information via search engines includes the cognitive overhead of both clicking and deciding what to click, and the delays associated with download times. This paper suggests a way to save time and effort in information retrieval on the Web via what we call Dynamic Display.

KEYWORDS: Dynamic display, navigation display, static display, content display, browsers

INTRODUCTION

A significant limitation of current Web search engines is the need to move back and forth between the list of URLs returned by the search engine, and documents and other resources referenced in that list. This navigation problem leads to frequent use of the "back" button and contributes to the "lost in hyperspace" problem. Both of these shortcomings are because the user sees either context (the list of URLs), or focus (particular content), but not both at once. Having both focus and context present simultaneously has been the subject of numerous reports, such as fisheye displays and, for text presentation, the Document Lens (Robertson and Mackinlay 1993). A favorite approach taken by Web sites is to display a frame containing links side-by-side with content obtained by following a specific link. Yet this approach is not taken by the major Web search engines.

In this work we extend the use of HTML frames for focus+context display to the Web search engines. One small frame is used for choosing which search engine to use, a medium sized frame is used for presenting the list of URLs the chosen search engine returns, and the largest frame is used for presenting the document or other resource obtained by clicking on a link in the list of links that the search engine returns. This is a simpler aid to navigation than Kandogan and Shneiderman (1997) though without their filtering and interactive organization functionalities.

DISPLAYS: DYNAMIC AND STATIC, CONTENT AND NAVIGATION

In HTML, frames provide a mechanism for having several windows displayed simultaneously on the screen. This capability can be used to facilitate effective browsing and display of information. In our system, each frame is classified as either a content display frame or a navigation display frame, depending on the type of information displayed in it, and as either a static display frame or a dynamic display frame, depending on the frame update method. Therefore, each frame can be classified as a static content display frame, a static navigation display frame, a dynamic content display frame, or a dynamic navigation display frame.

Content Display vs. Navigation Display

In this work, the focus is actual content, and the context is navigation relevant information consisting of search engine and URL lists. This is why we classify frames as either for content display or navigation display.

Static Display and Dynamic Display

A static display shows material that is stored permanently or semi-permanently. On the other hand, a dynamic display shows material that is computed in response to a request.

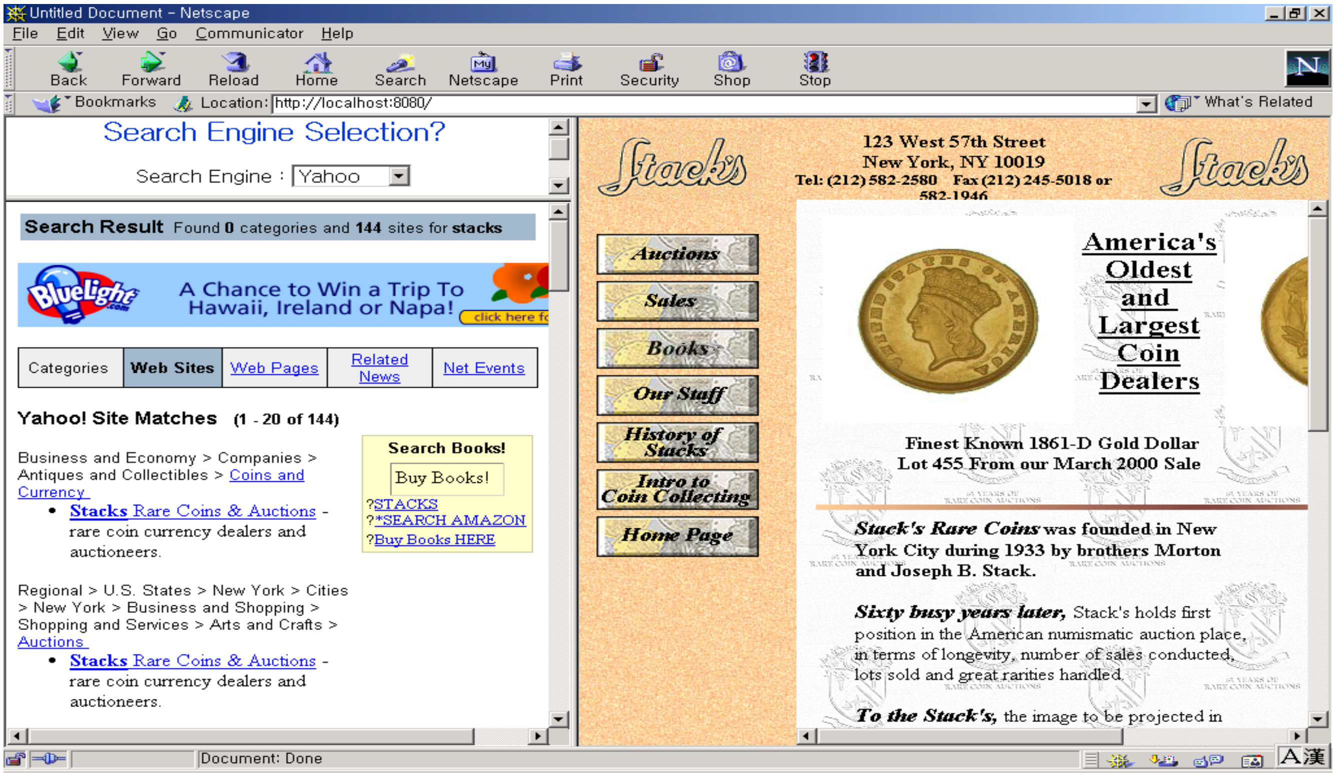
Information retrieval

Widely used search engines such as Yahoo and Altavista display lists of URLs annotated with a few unintelligently chosen lines of text. Users can also navigate using the browser's "Back" and "Forward" buttons and by typing a desired URL in the address input window. The navigation capabilities are rounded out by clickable links embedded in content and by a list of bookmarks, cached URL names that the user has chosen to store on a semi-permanent basis.

To reduce the number of clicks necessary during navigation, it can help if the user could move easily among the levels of a hierarchical taxonomy of content links during browsing. Many sites do this, displaying information about the hierarchy in a separate frame. This frame is consistent with our characterization of a static navigation display. Typically, the hierarchical taxonomy is shown on the left, top or bottom side of the browser window, and the content display frame changes based on clicks on links in the taxonomy.

Web browsing with Dynamic display

The Web browsing system we have implemented is divided into three parts as shown in Figure 1: a search engine selection window, a search engine interaction window, and a document viewer window. In the case of the search engine selection window, the user can add new search engines or delete existing search engines. The search engine interaction window shows the home page of the search engine that the user selected. The search engine interaction window is a dynamic navigation display, because it is dynamically updated in response to the user clicking in the search engine selection window. The document viewer window is a content display frame, since it presents document content. It is also a dynamic display, since it changes as the user browses.


Untitled Document - Netscape
File Edit View Go Communicator Help
Back Forward Reload Home Search Netscape Print Security Shop Stop
Bookmarks
What's Related

Location: http://localhost:8080/

Search Engine Selection?

Search Engine : Yahoo

Search Result Found **0** categories and **144** sites for **stacks**

Categories	**Web Sites**	Web Pages	Related News	Net Events

Yahoo! Site Matches (1 - 20 of 144)

Business and Economy > Companies > Antiques and Collectibles > Coins and Currency

- **Stacks** Rare Coins & Auctions - rare coin currency dealers and auctioneers.

Search Books!
Buy Books!
?STACKS
?*SEARCH AMAZON
?Buy Books HERE

Regional > U.S. States > New York > Cities > New York > Business and Shopping > Shopping and Services > Arts and Crafts > Auctions

- **Stacks** Rare Coins & Auctions - rare coin currency dealers and auctioneers.

Stacks

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New York, NY 10019
Tel: (212) 582-2580 Fax (212) 245-5018 or 582-1946

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Lot 455 From our March 2000 Sale

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To the Stack's, the image to be projected in

Document: Done

Figure 1: The System Layout.

The structure suggested in this paper is to have dynamic navigation display and dynamic content display frames coexisting in the browser window. This allows the user to retain the URL list returned by a search engine on the screen while simultaneously browsing among the documents referred to by the links in that list. The URL list is treated somewhat like a table of contents (Nation 1998). The user therefore does not need to use the "Back" button and does not need to expend cognitive overhead in remembering what was on previously displayed pages.

IMPLEMENTATION

The structure of our Web browsing system with dynamic navigation and dynamic content display frames is shown in Figure 2. The system was developed in the Apache 1.3.4 environment with JavaScript and CGI. The 4.X version Netscape browser was used as a client.

Temp file creation CGI program

The temp file creation CGI program maintains two temporary files (Temp1.html and Temp2.html). Temp1 is the HTML document showing the search engine output. Temp2 is the HTML document retrieved when a specific URL was clicked in either the search engine interaction window or the document viewer window.

Frame handler

The frame handler (Figure 2) coordinates the search engine interaction window and the document viewer window using a special temporary file, and Temp1.html and Temp2.html. When the user clicks a particular hyperlink in the search engine interaction window, the frame handler presents Temp2.html in the document viewer window and refreshes Temp1.html in the search engine interaction window.

Temp1.html, the output of the search engine, is presented in a navigation display frame. Temp2.html, a document from among those whose URLs are returned by the search engine, is presented in a content display frame. Both of these are dynamic display frames. In contrast, the top left frame, in which the user chooses which search engine to use, is a static display frame.

CONCLUSION

Search engines are a primary tool of internet users. At present, the search engines generally used offer keyword retrieval and hierarchical subject retrieval. This has both advantages and disadvantages.

The present search engines need lots of unnecessary clicking, including the 'Back' button on the browser, to navigate for information and it is not possible to browse information while keeping the results returned by the search engines on the same screen. This paper describes a system that saves time and effort in Web browsing by using dynamic navigation and dynamic content display frames.

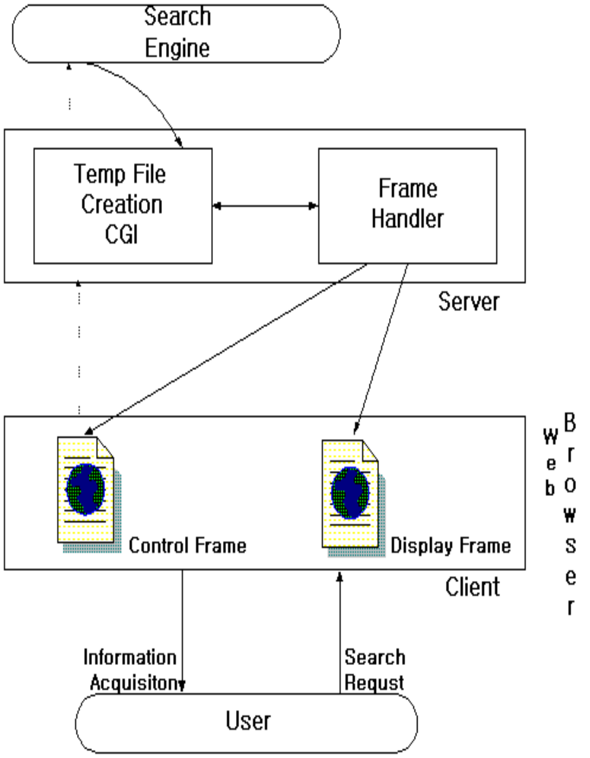

Figure 2: The System Architecture. The dotted arrows in the figure show the direct connection with search engine, not using CGI.

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