IPOS

200003824-0 10 JUL 2000

NETWORK TRANSMISSION OF PAGES IN LINKABLE MARKUP LANGUAGE TO RECEIVING DISPLAY STATIONS WITH FUNCTIONS IN CURRENTLY DISPLAYED PAGES CONTROLLED BY TAGS IN SUCCEEDING PAGES

Technical Field

The present invention relates to computer managed communication networks such as the World Wide Web (Web) and, particularly, to ease of use of interactive computer controlled display interfaces for receiving a succession of transmitted pages in progressions, or shifting between pages which are user friendly and provide the user, as well as the creator of the Web pages, with some control over progressions between pages.

Background of Related Art

The 1990's decade has been marked by a technological revolution driven by the convergence of the data

processing industry with the consumer electronics industry. The effect has, in turn, driven technologies which have been known and available but relatively quiescent over the years. A major one of these technologies is the Internet or Web related distribution of documents, media and programs. The convergence of the electronic entertainment and consumer industries with data processing exponentially accelerated the demand for wide ranging communication distribution channels, and the Web or Internet, which had quietly existed for over a generation as a loose academic and government data distribution facility, reached "critical mass" and commenced a period of phenomenal expansion. With this expansion, businesses and consumers have direct access to all matter of documents, media and computer programs.

In addition, mark-up languages and, particularly Hypertext Markup Language (HTML), which had been the documentation language of the Internet or Web for years, offered direct links between received pages and other pages on the Web with a variety of related data sources, which were at first text and then evolved into media, i.e. "hypermedia". This even further exploded the use of the Internet or Web.

It has been quite remarkable that a facility like the Web, which many originally regarded as almost antiquated, has been able to handle the phenomenal volume of traffic required to meet the demand. During the past few years, most of the technological resource associated

with the Web has been exhaustively applied in meeting the greatly increasing traffic demands. As a result, relatively little effort has been applied in enhancing Web user interfaces in order to make them more user friendly, i.e. to make the masses of relatively unsophisticated computer users who are turning to the Web more comfortable in a more aesthetically pleasing ambiance.

Finally, at the present point in the development of the Web, there are computer hardware and software resources available beyond just what it takes to meet traffic flow demands, and consequently techniques for aesthetically enhancing human/Web interfaces and by making the user more comfortable may be addressed. The present invention is directed to such an end. It should clear to anyone who has browsed the Web that the shifting or progression between current and succeeding pages are at best abrupt, and, at worst, quite disconcerting as the user has to stand by while the current page drops out and the succeeding page fragments itself together.

Summary of the Present Invention

The present invention provides progressions or shifting between current and succeeding Web pages which make the user comfortable, and may be easily variable by both designers and users of Web pages. The invention is directed to computer managed communication networks such as the Web or Internet. (In the present application,

these terms are used synonymously.) Conventionally, user access to the network is through a plurality of data processor controlled interactive receiving display stations. The displayed received pages have been transmitted in a linkable markup language to the receiving display stations from locations remote from said stations. The received pages contain text, images and markup language control tags. In its broadest aspect, the invention involves the use of such control tags in a transmitted page selected to succeed a currently displayed page for controlling display functions in said currently displayed page in combination with means responsive to these control tags for implementing said display functions. In the implementation, control tags in the current page are selectively activatable in response to control tags in the succeeding page. In accordance with an optional aspect of the invention, the current page further includes data for selectively determining whether the current page is controllable by said succeeding page. This data my be a list of URLs (Uniform Resource Linkages) of succeeding pages only by which the current page may be controlled. Conversely, the succeeding page may be set up to include this data for selectively determining whether said current page is controllable by said succeeding page. Aspects of the effective and desirable progressions described above may be implemented through at least one activatable control tag in said

current page controlling a display function for a selected functional progression from said current page to said succeeding page. In accordance with a significant aspect of the present invention, the desired progression involves the manipulation of a portion of the currently displayed page and the inclusion of said manipulated portion in said succeeding displayed page. Also, the progression from the current to the succeeding Web page may involve aesthetically pleasing and user comfortable transitions between pages, as covered in greater detail in our above-mentioned cross-referenced copending patent application.

It should be emphasized that the present invention is based upon the concept that the following, or succeeding page, controls the transition from the currently displayed page to this succeeding page. For example, the control function in the succeeding page may specify that all displayed prior, i.e. currently displayed pages, are to be unrendered or exited in a specified manner irrespective of the HTML content of such pages.

Brief Description of the Drawings

The present invention will be better understood and its numerous objects and advantages will become more apparent to those skilled in the art by reference to the following drawings, in conjunction with the accompanying specification, in which:

Fig. 1 is a block diagram of a data processing system including a central processing unit and network connections via a communications adapter which is capable of implementing a user interactive display station on which the received data may be converted into a displayed Web page, and succeeding pages transitioned into display in accordance with the present invention;

Fig. 2 is a generalized diagrammatic view of an Internet or Web portion upon which the present invention may be implemented;

Fig. 3 is a general flowchart of a program set up to implement the present invention for enabling users and designers of Web pages to provide for control tags in succeeding pages to control display functions in currently displayed pages; and

Fig 4 is a flowchart of an illustrative run of a program set up in accordance with the flowchart of Fig. 3.

Detailed Description of the Preferred Embodiment

Before going into the details of specific embodiments, it will be helpful to understand from a more general perspective the various elements and methods which may be related to the present invention. Since a major aspect of the present invention is directed to documents such as Web pages transmitted over networks, an understanding of networks and their operating principles would be helpful. We will not go into great detail in

describing the networks to which the present invention is applicable. Reference has also been made to the applicability of the present invention to a global network, such as the Internet. For details on Internet nodes, objects and links, reference is made to the text, Mastering the Internet, G. H. Cady et al., published by Sybex Inc., Alameda, CA, 1996.

Any data communication system which interconnects or links computer controlled systems with various sites defines a communications network. A network may be as simple as two linked computers or it may be any combination of Local Area Networks (LANs) or Wide Area Networks (WANs). Of course, the Internet or Web is a global network of a heterogeneous mix of computer technologies and operating systems. Higher level objects are linked to the lower level objects in the hierarchy through a variety of network server computers. These network servers are the key to network distribution, such as the distribution of Web pages and related documentation. The HTML language is described in detail in: "Just Java", 2nd Edition, Peter van der Linden, Sun Microsystems, 1997; in the text Dynamic HTML in Action, Michele Petrovsky, Osbourne, McGraw-Hill, Berkeley, CA, 1998, which deals extensively with the use of HTML tags at pp. 87-103; and also in the text, Mastering the Internet, Cady et al., published by Sybex, Alameda, CA, 1996, particularly at pp. 637-642 on HTML in the formation of Web pages. In addition, some aspects of

this invention will involve Web browsers. A general and comprehensive description of browsers may be found in the aforementioned Cady et al. text, pp. 291-313.

Referring to Fig. 1, a typical data processing terminal is shown which may function as a basic computer controlled network receiving terminal used in implementing the present invention for controlling functions in currently displayed pages by tags in succeeding pages. A central processing unit (CPU) 10, such as one of the PC microprocessors or workstations, e.g. RISC System/6000(TM) (RISC System/6000 is a trademark of International Business Machines Corporation) series available from International Business Machines Corporation (IBM), is provided and interconnected to various other components by system bus 12. An operating system 41 runs on CPU 10, provides control and is used to coordinate the function of the various components of Fig. 1. Operating system 41 may be one of the commercially available operating systems such as the AIX 6000(TM) operating system or OS/2(TM) operating system available from IBM (AIX 6000 and OS/2 are trademarks of International Business Machines Corporation); Microsoft's Windows 98(TM) or Windows NT(TM), as well as UNIX and AIX operating systems. Application programs 40 controlled by the system are moved into and out of the main memory RAM 14. These programs include the program of the present invention for controlling functions in current pages by tags in succeeding pages. Such programs may be used in

combination with or as part of any conventional Web browser program, such as Netscape 3.0(TM) or Microsoft's Internet Explorer(TM). A read only memory (ROM) 16 is connected to CPU 10 via bus 12 and includes the basic input/output system (BIOS) that controls the basic computer functions. RAM 14, I/O adapter 18 and communications adapter 34 are also interconnected to system bus 12. I/O adapter 18 may be a small computer system interface (SCSI) adapter that communicates with the disk storage device 20. Communications adapter 34 interconnects bus 12 with an outside network enabling the data processing system to communicate with other such systems over a LAN or WAN, which includes, of course, the Web or Internet. The latter two terms are meant to be generally interchangeable and are so used in the present description of the distribution network. I/O devices are also connected to system bus 12 via user interface adapter 22 and display adapter 36. Keyboard 24 and mouse 26 are all interconnected to bus 12 through user interface adapter 22. It is through such input devices that the user may interactively relate to the browser and the related programs according to the present invention. Display adapter 36 includes a frame buffer 39, which is a storage device that holds a representation of each pixel on the display screen 38. Images may be stored in frame buffer 39 for display on monitor 38 through various components, such as a digital to analog converter (not shown) and the like. By using the aforementioned I/O

devices, a user is capable of inputting information to the system through the keyboard 24 or mouse 26 and receiving output information from the system via display 38.

A generalized diagram of a portion of the Internet or Web, which the computer 56 controlled display terminal 57 may use for Web page or document or linked Web page or document access and display according to the present invention is connected as shown in Fig. 2. Computer 56 and display terminal 57 are the computer system shown in Fig. 1 and connection 58 (Fig. 2) is the network connection shown in Fig. 1. Reference may be made to the above-mentioned Mastering the Internet, pp. 136-147, for typical connections between local display workstations to the Internet via network servers, any of which may be used to implement the system on which this invention is used. The system embodiment of Fig. 2 is one of these known as a "host-dial connection". Such host-dial connections have been in use for over 30 years through network access servers 53 which are linked 51 to the Internet 50. The servers 53 are maintained by a service provider to the client's display terminal 57. The host's server 53 is accessed by the client terminal 57 through a normal dial-up telephone linkage 58 via modem 54, telephone line 55 and modem 52. The HTML files representative of the Web pages are downloaded to display terminal 57 through controlling server 53 and computer 56

via the telephone line linkages from server 53 which may have accessed them from the Internet 50 via linkage 51.

The present invention is preferably implemented on the Web browser in combination with standard browser functions. Standard browser processes are used to access and receive Web pages from the Web in a conventional manner. It is to such received documents at receiving display stations that the present invention applies.

Now with reference to Figs. 3 and 4 we will describe a process implemented by the present invention in conjunction with the flowcharts of these figures. Fig. 3 is a flowchart showing the development of a process according to the present invention for providing HTML tags in a succeeding Web page for controlling functions in the currently displayed Web page, which is being replaced by this succeeding page in a progression which the present invention proposes to control. In its broadest aspects, the application program of the present invention is set up to enable designers and or users of Web pages to set up HTML tags in currently displayed Web pages which may be selectively activated by selective control tags in the succeeding Web page to manipulate the current Web page, step 61, Fig. 3. For purposes of the present illustration, we will consider such manipulations with respect to progressional effects in going from the current page to the succeeding page. By such progressional effects, we mean shifts between such pages where portions of the current page are manipulated so as

to be included in the succeeding page which will be subsequently described in the present application. Such progressional effects are also meant to include aesthetically desirable transitions between pages, described in greater detail in the above cross-referenced copending application. Also, step 62, the program is set up so as to permit the designers and/or users of the current page to have the ability to determine which succeeding Web pages will be enabled to activate tags in the current page. In other words, the prior or current Web page will be able to table or list Web pages identified by their URLs which will be given access to control the tags in the current page. Likewise, the users and/or designers of the succeeding Web pages may also be given the option, step 64, to choose which current or, thus, previous Web pages will have their tags activated by the control tags in the succeeding Web page. This may also be implemented through a listing in the succeeding page of qualified current Web pages also identified through their URLs. Assuming that both the current and succeeding Web pages are mutually qualified to thus interact, then step 63, the users of the succeeding Web page should be able to select which of the tags in the currently displayed page will be activated to effect the transition. In carrying this function out, the control tags for this purpose in the succeeding Web page should be set up at the front of the HTML format of the succeeding page. These tags should reference the

tags in the current page which will be activated. In turn, the appropriate attributes will be applied which will coact with the browser application creating the page format to render the appropriate manipulations, step 65.

In an illustration of the set up of the application program of Fig. 3, if the sequence of pages are in a navigation system in which the current page shows a map, the succeeding page may be loaded to show the map shifted by some amount. In this connection, it should be understood that in the practice of the present invention, when the succeeding page is accessed, it does not immediately replace the current page but rather there is a progression from the current to the succeeding page. Thus, the map from the current page is still valid and included in the succeeding page but shifted by, let us say, one inch (in pixels or appropriate units) over a given number of milliseconds with a new part shifting or progressing in from the succeeding page. Accordingly, the HTML for the succeeding page could specify that the image tag for the map could be moved by such an amount over such a time, but not erased when the succeeding page is rendered. Thus, in the progression to the succeeding page, the new portion of the map is rendered with a video-like effect so that the user sees the map scroll up smoothly so that the succeeding Web page is seamlessly loaded in. The application can accomplish this effect through direct use of display adapter functions and without the extensive library of graphics used by

conventional operating system graphical user interfaces (GUIs). Similar techniques could be used to produce video-like fade-ins and fade-outs.

The running of the process will now be described with respect to Fig. 4. First, step 71, a current Web page is displayed. This page has been accessed conventionally by an appropriate browser program. Next, a determination is made, step 72, as to whether the next or succeeding Web page has been accessed. If No, the process of the present invention awaits the arrival of the next page while the user addresses the Web page in accordance with his interests. When the decision from step 72 is Yes, the next page has been accessed, the next page does not immediately replace the current page. First, a determination is made, step 74, as to whether there are control tags in this next page for controlling function in the previous or current page. As stated hereinabove, such control tags are usually located near the front of the received HTML format representative of the next page. If there are no such tags, i.e. No from step 74, then, step 73, the next page is routinely displayed without any progressional manipulations. If the decision is Yes, there are such control tags, then a determination is made, step 75, as to whether the current page qualifies to have its tags activated by the control tags in the next page. In other words, does the current page have its URL listed in the next page as a page which the next page may manipulate through a selected

transition between pages. If No, then via branch "A", the process goes back to step 73, and the next page is again conventionally displayed without any special manipulative progression. However, if the decision from step 75 is Yes, the current page qualifies, then a further determination is made, step 76, as to whether the next page qualifies to have its tags activate the control tags in the current page. In other words, does the next page have its URL listed in the current page as a page which the current page may be manipulated through a selected transition between pages. If No, then via branch "A", the process goes back to step 73, and the next page is again conventionally displayed without any special manipulative progression. However, if the decision from step 76 is Yes, the next page qualifies, then step 77, all of the tags in the current page which will manipulate the progression are located and activated to perform their manipulative functions, step 78, after which, through branch "A", the process will return to step 73 and, after appropriate transitions, the new page will be displayed. At this point, as indicated by branch "B" in the process, this next page becomes, in effect, the current page, step 71, the succeeding or next Web page is again awaited, step 72.

One of the preferred implementations of the present invention is as an application program 40 made up of programming steps or instructions resident in RAM 14, Fig. 1, during computer operations. Until required by

the computer system, the program instructions may be stored in another readable medium, e.g. in disk drive 20, or in a removable memory such as an optical disk for use in a CD ROM computer input, or in a floppy disk for use in a floppy disk drive computer input. Further, the program instructions may be stored in the memory of another computer prior to use in the system of the present invention and transmitted over a LAN or a WAN, such as the Internet, when required by the user of the present invention. One skilled in the art should appreciate that the processes controlling the present invention are capable of being distributed in the form of computer readable media of a variety of forms.

Although certain preferred embodiments have been shown and described, it will be understood that many changes and modifications may be made therein without departing from the scope and intent of the appended claims.



Claims

What is claimed is:

1. In a computer managed communication network with user access via a plurality of data processor controlled interactive receiving display stations and with a system for displaying received pages transmitted in a linkable markup language to said receiving display stations from locations remote from said stations, said received pages containing text, images and markup language control tags, the improvement comprising:

control tags in a transmitted page selected to succeed a currently displayed page for controlling display functions in said currently displayed page; and

means responsive to said control tags for implementing said display functions.

2. The communication network of claim 1 wherein said means for implementing said display functions comprise control tags in the currently displayed page, selectively activatable by said control tags in said succeeding page.

3. The communication network of claim 2 wherein said succeeding page further includes data for selectively determining whether said current page is controllable by said succeeding page.

4. The communication network of claim 3 wherein said data for determining includes the URL of the current page.

5. The communication network of claim 2 wherein said current page further includes data for selectively determining whether said current page is controllable by said succeeding page.

6. The communication network of claim 5 wherein said data for determining includes the URL of the succeeding page.

7. The communication network of claim 4 wherein said markup language is Hypertext Markup Language and said communication network is the World Wide Web.

8. In a computer managed communication network with user access via a plurality of data processor controlled interactive receiving display stations and with a system for displaying received pages transmitted in a linkable markup language to said receiving display stations from locations remote from said stations, said received pages containing text, images and markup language control tags, a method of controlling display functions comprising:

providing control tags in a transmitted page selected to succeed a currently displayed page for

controlling display functions in said currently displayed page; and

implementing said display functions responsive to said control tags.

9. The method of claim 8 wherein said implementing of said display comprises the step of providing control tags in the currently displayed page, selectively activatable by said control tags in said succeeding page.

10. The method of claim 9 further including the step of providing data in said succeeding page for selectively determining whether said current page is controllable by said succeeding page.

11. The method of claim 10 wherein said data for determining includes the URL of the current page.

12. The method of claim 9 further including the step of providing data in said current page for selectively determining whether said current page is controllable by said succeeding page.

13. The method of claim 10 wherein said data for determining includes the URL of the succeeding page.

14. The method of claim 11 wherein said markup language is Hypertext Markup Language and said communication network is the World Wide Web.

15. A computer program having code recorded on a computer readable medium for controlling display functions in a computer managed communication network with user access via a plurality of data processor controlled interactive receiving display stations and with a system for displaying received pages transmitted in a linkable markup language to said receiving display stations from locations remote from said stations, said received pages containing text, images and markup language control tags, said computer program comprising:

control tags in a transmitted page selected to succeed a currently displayed page for controlling display functions in said currently displayed page; and

means responsive to said control tags for implementing said display functions.

16. The computer program of claim 15 wherein said means for implementing said display functions comprise control tags in the currently displayed page, selectively activatable by said control tags in said succeeding page.

17. The computer program of claim 16 wherein said succeeding page further includes data for selectively

determining whether said current page is controllable by said succeeding page.

18. The computer program of claim 17 wherein said data for determining includes the URL of the current page.

19. The computer program of claim 16 wherein said current page further includes data for selectively determining whether said current page is controllable by said succeeding page.

20. The computer program of claim 19 wherein said data for determining includes the URL of the succeeding page.

21. The computer program of claim 18 wherein said markup language is Hypertext Markup Language and said communication network is the World Wide Web.