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(54) **USER INTERFACE SELECTABLE REAL TIME INFORMATION DELIVERY SYSTEM AND METHOD**

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(57) **ABSTRACT**

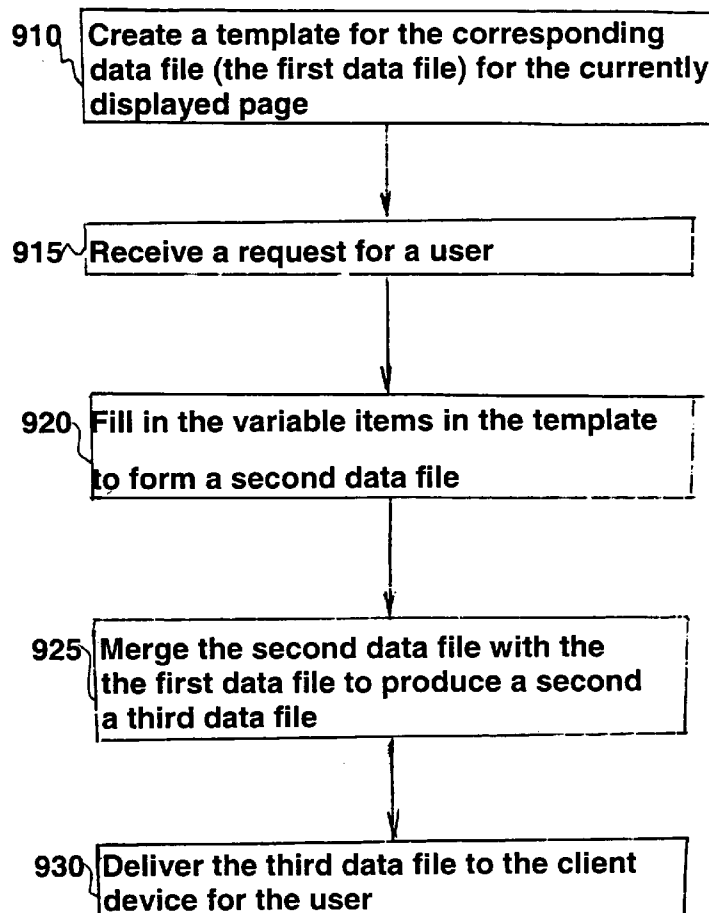
An information delivery system including a client device and server interconnected by a network passes data files in accordance with a well known protocol. The server creates an audio version of a displayed page associated with a first data file. The audio version includes information from the first data file and other items, so that the information is presented in the form of conversation-like natural speech. The server merges the audio version and the data file to produce a second data file and delivers the second data file to the client device. Advantageously, the client device includes a speech synthesizer engine and a display so that the data file can be viewed using the first data file and/or heard by a user using the audio version, both included in the second data file.

(21) Appl. No.: **11/336,182**

(22) Filed: **Jan. 20, 2006**

**Related U.S. Application Data**

(60) Division of application No. 10/274,685, filed on Oct. 21, 2002, now Pat. No. 7,020,611, which is a continuation of application No. 10/081,159, filed on Feb. 21, 2002, now abandoned.



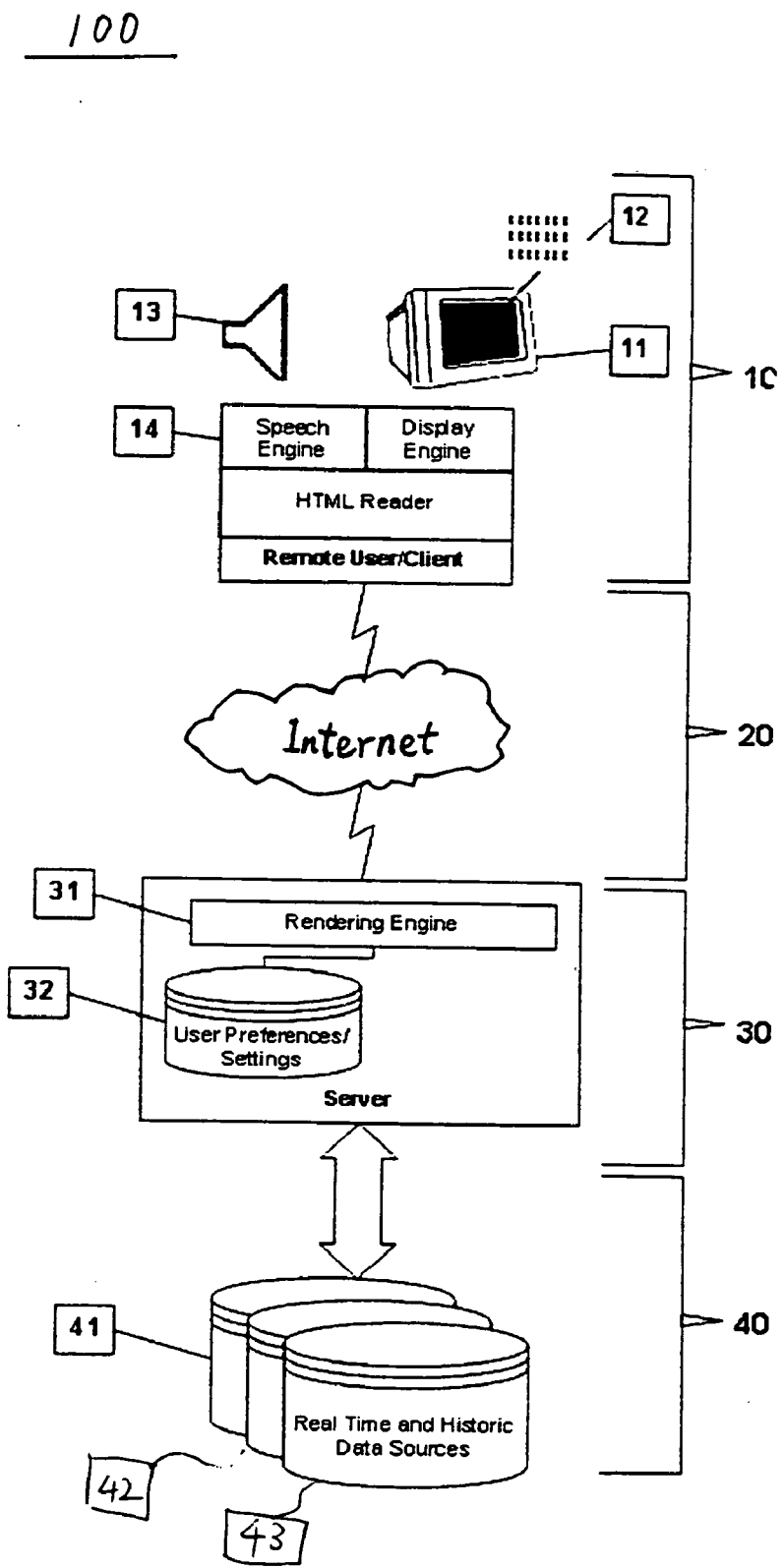


Fig. 1

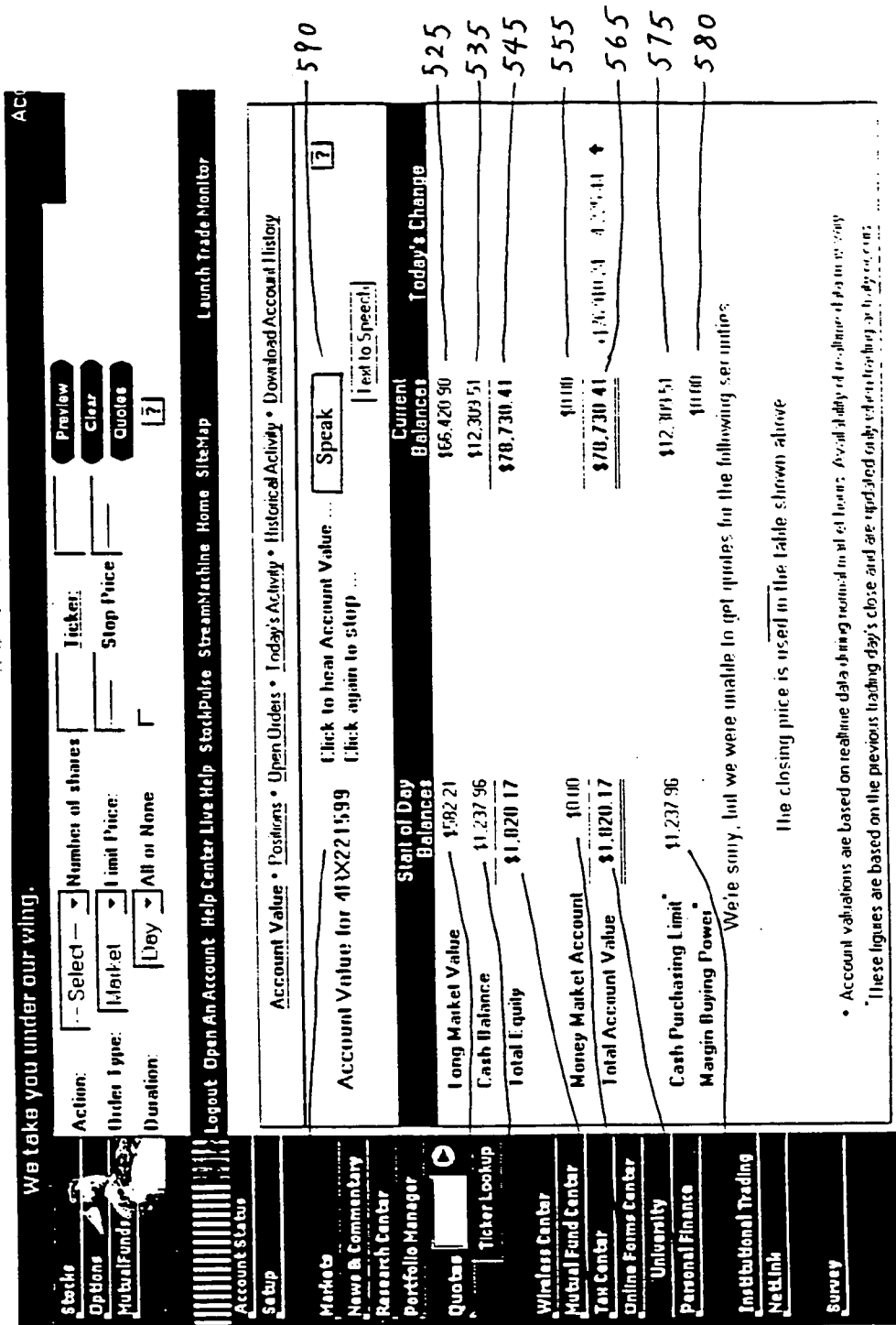


Fig. 2

510

520

530

540

550

560

570

Barzoni  
 We take you under our wing.  
 About NDB Help Center Live Help Home SiteMap

Trading  
 Account Status  
 Setup

Markets  
 News & Commentary  
 Research Center  
 Portfolio Manager  
 StockPulse Demo

Quotes  
 Ticker Lookup

Wireless Center  
 Mutual Fund Center  
 Tax Center  
 Online Forms Center  
 Margin Center  
 NDB University  
 Personal Finance

Institutional Trading  
 NetLink

**Speak**

**Speak Customization**

Welcome to Speak! You can customize this application by choosing a speaking voice, setting the reading speed, even tell Speak how you would like to be addressed - by filling out the fields below

1. Please select the voice you would like to hear.  [listening] **610**

2. Please choose a speaking speed.  [listening] **620**

3. How would you like NDBSpeak to address you?  
 Please address me as:  **630**  
 (Hear a demo of your greeting in the voice you've selected)

4. After greeting you, NDBSpeak can also add an additional salutation, if desired.  
 Additional Salutation:  **640**  
 (Hear a demo of your greeting in the voice you've selected)

**Account Setup**  
 ▶ Get Start Page  
 ▶ Password  
 ▶ Trade Applications  
 ▶ Graphics On / Off  
 ▶ Account Profile  
 ▶ Link Accounts  
 ▶ ECN Pending  
 ▶ Speak

Fig. 3

810                      820                      830

Good morning, Tom! Welcome to .com!

As of two twenty-three AM TODAY, August 23, 2000, for account number 4RX221599: Your long market value is 66,420 dollars and 90 cents.

850

840

Your cash balance is 12,309 dollars and 51 cents, and your total equity is 78,730 dollars and 41 cents.

Your have 0 dollars and 0 cents in your market account.

In total, your account value is 78,730 dollars and 41 cents, up 4325.44 cents from "yesterday" closing balance of 1,820 dollars and 17 cents.

[If one or more of the below line items is non-zero:]

Your cash purchasing limit is 0 dollars and 0 cents, and your margin buying power is 0 dollars and 0 cents. Please note that these figures are based on the previous trading day's close and are updated only when trading activity occurs.

[If a disclaimer about inability to get quotes for certain securities appears at the bottom of the screen:]

We are unable to obtain quotes for \_\_\_\_\_ in your account, so we have used its closing price in calculating account value. Please refer to your screen for the specific securities.

Please note the important disclaimers on your Account Value screen. If you have any questions, feel free to call us, email us, or take advantage of live, online customer help, through our iAnswer. Have a good [day].

Fig. 4

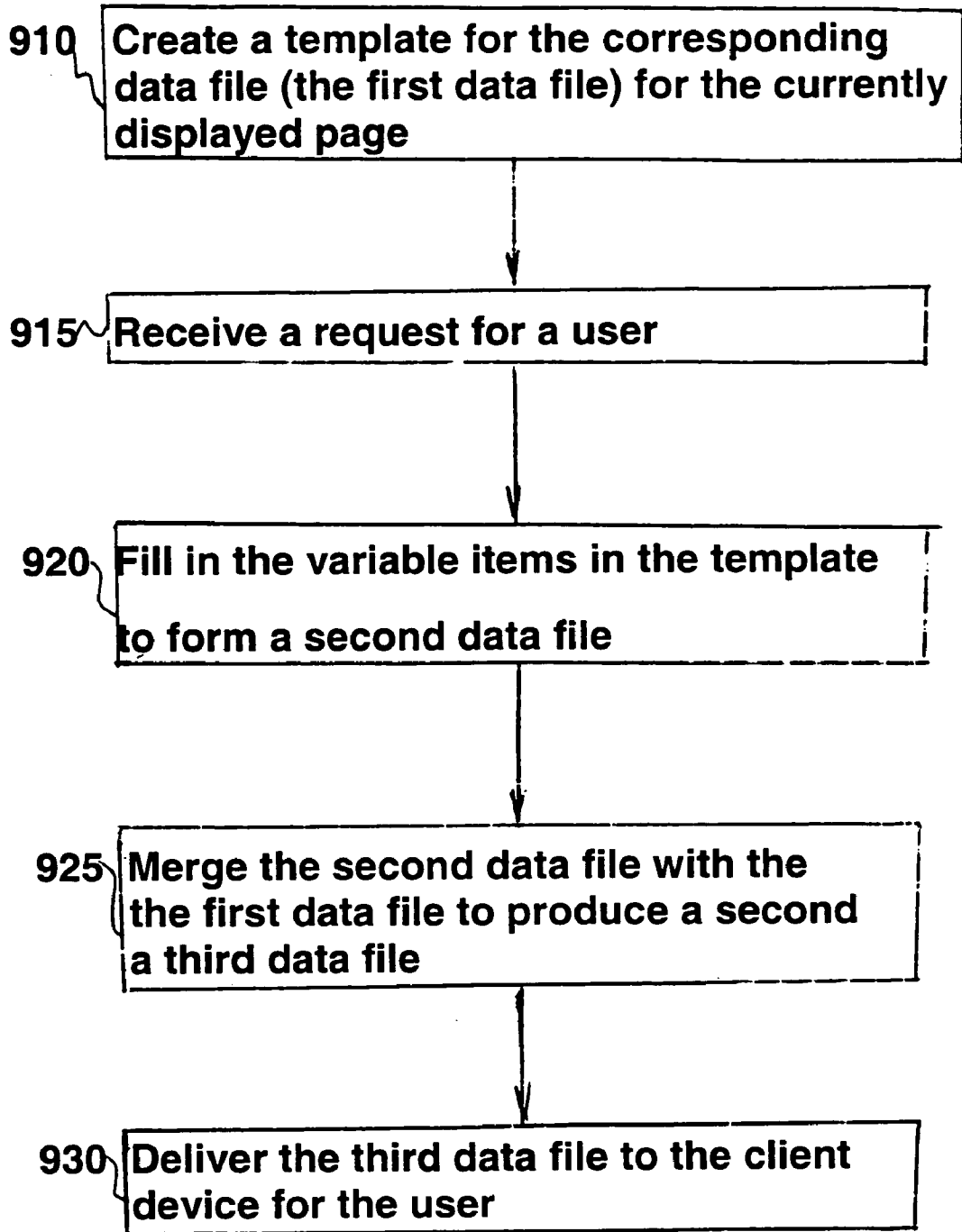


FIG. 5

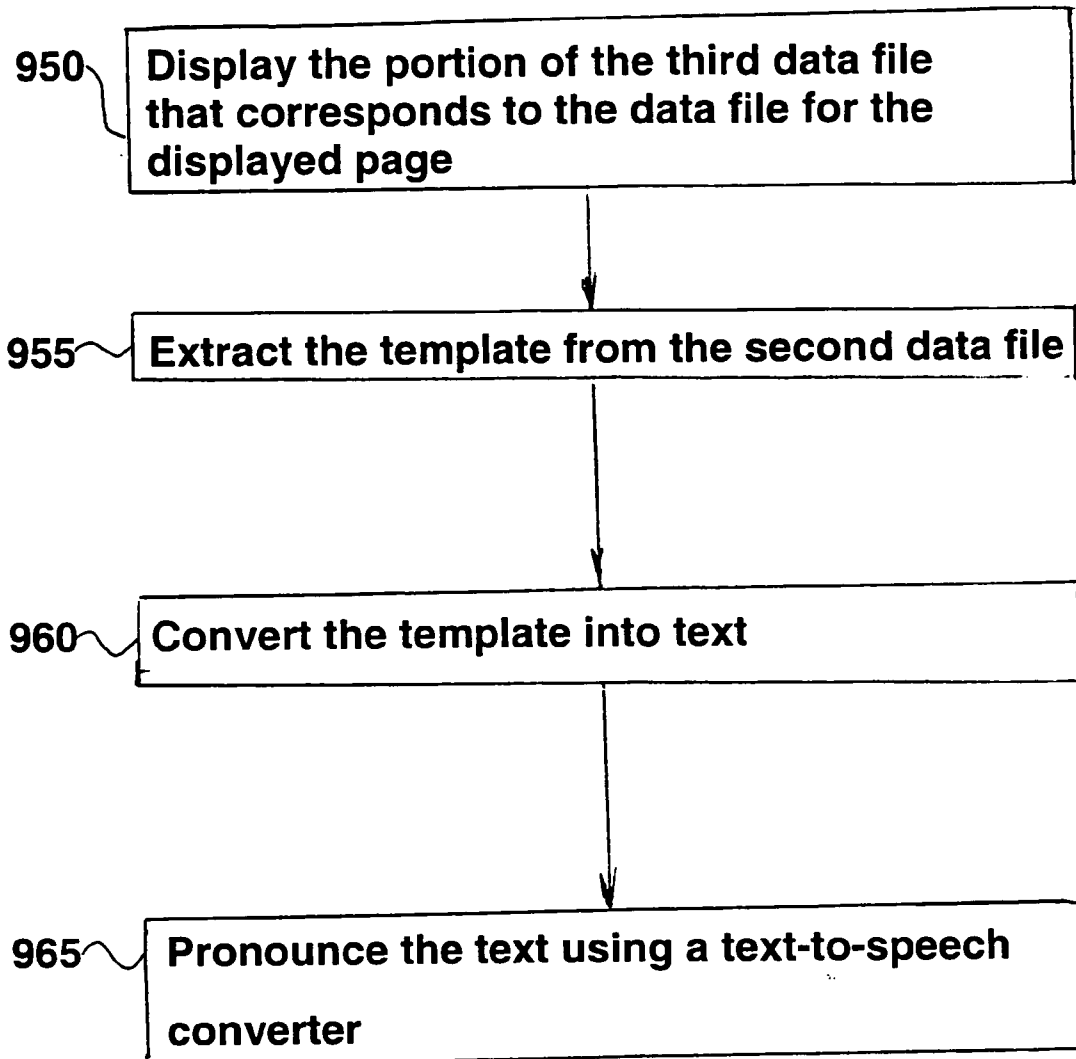


FIG. 6

**USER INTERFACE SELECTABLE REAL TIME INFORMATION DELIVERY SYSTEM AND METHOD**

**CROSS REFERENCE TO RELATED APPLICATION**

[0001] This application is a divisional of application Ser. No. 10/274,685, filed Oct. 21, 2002, which is a continuation of and claims the benefit of U.S. application Ser. No. 10/081,159 filed on Feb. 21, 2002, which claims priority from U.S. Provisional Application No. 60,270,358 filed on Feb. 21, 2001. The above mentioned applications are incorporated herein by reference.

**FIELD OF THE INVENTION**

[0002] The present invention generally relates to an information delivery system, and more particularly to a system that generates a user-friendly version of a first data file, wherein the first data file is suited for one type of user interface and the user-friendly version is suited for a different type of user interface. Both versions are simultaneously delivered to a user, so that the user can retrieve the same information from two different types of user interface.

**BACKGROUND OF THE INVENTION**

[0003] The Internet provides a robust facility for providing information on diverse topics. For many topics, such as account information and stock quotes, the information consists primarily of tables or lists of numbers and symbols, and usually in a format that is suited only for a graphic display in a user device, such as a monitor attached to a computer. Generally, a service provider does not provide a voice translation of the displayed information. Thus, the user has no option to listen to such information even if the user device is equipped with a speaker.

[0004] A possible solution is to use a text-to-speech converter. However, unlike news story for example, this type of information is not in the format of straight text, i.e., not in the form of conversation-like natural speech or acontextual. As a result, the converted audio may be incomprehensible. Thus, there is a need to develop a system and method for enabling a user to listen to such information in the form of conversation-like audio.

**SUMMARY OF THE INVENTION**

[0005] A system according to the principles of the invention enables users to retrieve information from different types of user interfaces. The information is originally saved in a format suitable for a particular type of user interface, such as video displays. The information is then converted to a different format suitable for a different type of user interface, such as an audio speaker. The converted format includes the information provided in the original format but also includes other elements, so that the information retrieved by the different type of user interface is tailored to natural human communication. For example, if the different type of user interface is an audio speaker, prefatory and other transitional phases may be added to communicate the information in a manner most closely resembling natural language speech.

[0006] A system according to the principles of the invention includes a client device connected to an information

server via a network wherein the client device and server are adapted to pass data files (such as hypertext files) in accordance with a well known protocol (such as HyperText Transfer Protocol—"HTTP"). The server is further adapted to create data files suitable for a first type of user interface from data files suitable for a second but different type of user interface as requested by the client device. Such data files can be created in real-time and may contain either real-time information and/or historical information.

[0007] The system allows a user accessing the server via the client device to request and view the requested data files on the display of the client device. To provide this capability, the data file received by the client device is read using a well known markup language reader, such as a web or wap browser. Advantageously, the present invention further includes a speech synthesis engine installed on the client device adapted to convert information from the data file into an audio format.

[0008] In another embodiment of the present invention, the server is adapted to deliver data files containing information along with settings for controlling the operation of the speech synthesizer engine in the client device.

[0009] In another embodiment of the present invention, the server includes a storage device for storing the control settings of the speech synthesizer engine.

[0010] In yet another embodiment of the present invention, the server delivers data files containing information in both an audible and a visual format. The hypertext files further include a user interface for selecting access to the information in audible format.

[0011] In yet another embodiment, the server and client device may be configured to allow the client device to deliver unsolicited information in a data file. The user may pre-select whether the delivered information is provided in a visual and/or an audible format.

**BRIEF DESCRIPTION OF THE DRAWINGS**

[0012] A more complete understanding of the present invention may be obtained from consideration of the following description in conjunction with the drawings in which:

[0013] **FIG. 1** is a functional diagram of an illustrative information delivery system in accordance with the present invention;

[0014] **FIG. 2** illustrates a displayed page for the status of an account;

[0015] **FIG. 3** shows an illustrative customization page according to the principles of the invention;

[0016] **FIG. 4** shows an illustrative text version of the data file for the displayed page shown in **FIG. 2**;

[0017] **FIG. 5** illustrates a method used by the server for creating and merging the text file according to the principles of the invention; and

[0018] **FIG. 6** illustrates a method for a client device when the merged data file is received.

**DETAILED DESCRIPTION**

[0019] With reference to the **FIG. 1**, system **100** includes a client device **10** connected to an information server **30** via



a network 20. The client device and server are adapted to pass data files in accordance with a well known protocol such as HyperText Transfer Protocol—"HTTP." Server 30 includes a markup language rendering engine 31, adapted to format information for delivery through network 20, and a client preference/settings database 32. Server 30 has access to additional real time and historic data sources 40, which, for example, include data sources 41-43. In the following illustration, the markup language is the HyperText Markup Language (HTML). The client device 10 includes a display 11.

[0020] The server is further adapted to create HTML data files in real time as requested by the client device. Accordingly, a user, accessing the server via the client device, can request and view these real time HTML data files on display 11 using a HTML reader installed in the client device. The HTML reader passes the information in the HTML files to the graphic designated by reference numeral 12 in FIG. 1, so that the data files can be visually displayed in the graphic.

[0021] Advantageously, the present invention further includes a speech synthesis engine 14 installed on the client device. This engine is adapted to convert information from a HTML file into an audio format and comprises two layers. The first layer interfaces with an HTML compatible software program, such as a web browser, and retrieves any HTML file having an audio component from the browser and generates an audio output therefrom. The audio output is preferably in the form of text. The second layer is any speech application program interface ("SAPI") compatible program. One example of a SAPI compatible program is SAPI Version 5.0 distributed by Microsoft Corporation of Redmond, Wash., U.S.A. Reference numeral 14 indicates the audio output to speaker 13 of client device 10. If the audio output is in the form of text, a text-to-speech converter (not shown) included in the speech engine can be used to pronounce the text.

[0022] In another embodiment of the present invention, the server is adapted to deliver hypertext files containing information and control settings for operating the speech engine contained on the client device.

[0023] The server can include storage 32 for storing the control settings of the speech synthesizer.

[0024] In yet another embodiment of the present invention, the server delivers HTML files containing information in both an audible and a visual format. The hypertext files further include a user interface for selecting access to the information in an audible format.

[0025] The server and client device can be configured to provide for the delivery of unsolicited information in a HTML file. The unsolicited information as used herein is the information delivered to a user other than in response to an interactive request. Rather, the user may subscribe to a service available in the server and the server then delivers the information provided by that service when certain events have occurred. For example, the user may subscribe to a service that periodically supplies updated stock quotes for certain stocks selected by the user in an interval specified by the user. The user may pre-select whether the information is to be delivered to the user in a visual or an audible format. More particularly, the server and the client device are adapted to deliver hypertext files to the user wherein the information in such files is tailored to the user.

[0026] With reference to FIG. 1, the present invention utilizes a server connected via a network to a client device. The server and client device utilize software to communicate via the network using the HTTP protocol. Such protocol presently includes the ability to communicate files in HTML form.

[0027] The present invention may be used on a server adapted to transmit information to a remote user in real time. While the information can include any kind of information; in the preferred embodiment of the invention, the server includes stock quote, transaction and current client account information, including real time reporting of user-selected stock market indicators. For example, FIG. 2 illustrates a page for reporting the status of an account. In the figure, element 510 is the account number; elements 520, 530, 540, 550, 560, and 570 are the long market value, the cash balance, the total equity, the money market account, the total account value, and the cash purchasing limit at the start of the day, respectively; elements 525, 535, 545, 555, 565, and 575 represent the current values of the set of parameters above; and element 580 is the margin buying power. A speak button 590 is also provided on the page. This speak button enables a user to request the voice translation of the page. The server includes an HTML rendering engine that is responsive to user requests and provides requested information in HTML format. Advantageously, the present system further includes a text-to-speech engine installed on the client device. The text-to-speech engine is configured by the user and such configuration information is stored on the server. Thus, a user having a tailored configuration can choose any client device having a text-to-speech engine and access their account according to their predetermined specifications.

[0028] The HTML rendering engine is responsive to a client device having a text-to-speech engine 14. In such case, the information delivered to the client device includes commands and information tailored for an audible format. The audio message will vary according to user, time of day and other real time information. An implementation may have the server application merging standard templates with customized user, data source and time of day information. When the HTML file is received, the information formatted for visual display is displayed by the client device using a conventional HTTP compatible browser and the information formatted for audio output is delivered to speech engine 14, which uses a text-to-speech converter.

[0029] FIG. 3 illustrates the customization page provided by the server, so that a user can specify settings for the speech engine in the client device and set other user-specific preferences. In this example, a user is able to select a type of voice at block 610, the speaking speed at block 620, the way he wants to be addressed at block 630, and additional salutation at block 640. Here, the user selects the type of voice identified by "Mary" for used by the speech engine 4. He also specifies the speaking speed of 25 wpm (word per minute), and specifies "Tom" for addressing him. The user does not select additional salutation.

[0030] The use of the text-to-speech engine allows for the reporting of information to the user without requiring this user to focus on the display. Thus, the user can do other tasks away from the client device or operate their account in the background while doing other tasks.

[0031] It should be noted that information is delivered in a different way when delivered by audible format rather than by visual format. For example, additional prefatory phrases or other transitional phrases not required for a visual format are required for the audible format to communicate the information in a manner most closely resembling natural language speech. Natural language speech, for purposes of this application, is not limited to any particular natural language, e.g., English, German, French, etc., but refers to any natural language.

[0032] As an example, FIG. 4 illustrates the text created by the rendering engine 31 in the server from the account status page illustrated in FIG. 2. In FIG. 4, the underlined text items are variable items and those not underlined are fixed items. For example, item 810, "Good," is a fixed item. On the other hand, item 820 is a variable item. Its content depends on the time the user accesses his account information. In the illustration, the user accesses it in the morning, thus, the content of item 820 is "morning." If the user accesses it in the afternoon, the content would be "afternoon." Similarly, if the user accesses it in the evening, the content would be "evening."

[0033] The content of some of the variable items depends on user preferences set by the user through, for example, the customization page shown in FIG. 3. For example, item 830 is "Tom," the preference set by the user at block 630 on the customization page in FIG. 3. Some variable items are for the information such as the long term market value conveyed in the corresponding displayed page. For example, variable items 840 and 850 together represent the current long market value shown on the page for the account status in FIG. 2. Some of the fixed and variable items are optional. For example, the greetings at the first line may be omitted. The format in FIG. 4 is a template designed specifically for the data file associated with the displayed page shown in FIG. 2. A different displayed page should have a different template. These templates may be saved in database 32 or other databases (not shown). Other structures can be used in place of templates for performing the same function.

[0034] The text shown in FIG. 4 is preferably created when the user presses the speak button 590 on the page shown in FIG. 2. This text is merged with the HTML file representing the page shown in FIG. 2, and the merged HTML file is then delivered to the client device. The text portion in the merged HTML file is hidden from the display engine but can be retrieved and pronounced by the speech engine 14, so that the user may simultaneously listen to the content of the displayed page. In one embodiment, the server creates the text file but the text file is not merged with the data file and delivered to the client device until the user has pressed the speech button 590.

[0035] FIG. 5 illustrates a method used by the server in creating the merged file to be delivered to the client device and FIG. 6 illustrates how the client device handles the merged file. At block 910 in FIG. 5, the server pre-stores a template specifically designed for the data file (the first data file) associated with the currently displayed page. As described above, the template includes fixed items and variable items for user preferences, data from the first data file, and data that depends on time of access or time of the day information. At block 915, the server receives a request from a user for creating an audio version of the displayed

page. Upon receiving the request, at block 920, the server fills in variable items. As indicated above, the server fills in the variable items to form a second data file by taking information from the currently displayed page, retrieving user preferences from the database 32, and deriving information that depends on the time of the access or the time of the day information. At block 925, the second data file is merged with the first data file to produce a third data file. Finally, at block 930, the server delivers the third data file to the client device using a particular communication protocol such as HTTP. As discussed above, step 915 can be moved after step 920 but before step 925.

[0036] Referring to FIG. 6, when the client device receives the third data file, the client device displays the first data file included in the third data file at step 950. Essentially, the display is not changed. The display function is performed by the display engine in the client device. At step 955, the speech engine 14 of the client device extracts the second data file from the third data file, and at step 960, the speech engine 14 converts the third data file into text. Finally, at step 965, the speech engine 14 pronounces the text using its text-to-speech converter. Although FIGS. 5 and 6 illustrate that both the first and the second data files are simultaneously delivered to the user, the system may give the user an option to deliver either only the first or the second data file.

[0037] The present invention is particularly well suited for use when monitoring information for particular content, such as waiting for a particular transaction to occur. Delivered information may be broadcast to the user upon delivery. Therefore, if the user is not at the client device but within hearing distance of the client device's audio output device, information can still be effectively communicated to the user.

[0038] The methods described above can also be implemented in a computer readable medium without deviating from the principles of the invention.

[0039] Numerous modifications and alternative embodiments of the invention will be apparent to those skilled in the art in view of the foregoing description. Accordingly, this description is to be construed as illustrative only and is for the purpose of teaching those skilled in the art the best mode of carrying out the invention. Details of the structure may be varied substantially without departing from the spirit of the invention and the exclusive use of all modifications which come within the scope of the appended claim is reserved.

What is claimed:

1. A method for delivering information from a server across a network in an audible format of a displayed page, the method comprising the steps of:

creating a template for the audible format of the displayed page, the template including fixed and variable items;

filling the variable items in the template using data at least from the displayed page based on a user preferences set; and

delivering data in the template with the filled variable items to a client device of a user using a network communication protocol.

2. The method of claim 1 further comprising the step of receiving a request from the user before the filling step.

3. The method of claim 1 further comprising the step of receiving a request from the user before the delivering step.

4. The method of claim 1, wherein the variable items include user preferences saved in a database.

5. The method of claim 4, wherein the filling step includes the step of retrieving the user preferences from the database for filling the variable items.

6. A method for displaying a page and playing an audio version of the page in a client device, the method comprising the steps of:

receiving the audio version, wherein the audio version is created from a template having fixed and variable items, and the variable items are filled with data at least from the page;

converting the audio version into text; and

playing the text using a text-to-speech converter.

7. The method of claim 6, wherein the playing step is performed by a speech engine in the client device and the audio version includes control settings for the speech engine.

8. The method of claim 7, wherein one of the settings specifies a playing speed in the unit of words per second.

9. A server for delivering information across a network in an audible format of a displayed page, the server comprising:

a first data base for storing a template for the audible format of the displayed page, the template including fixed and variable items; and

a rendering engine for filling the variable items in the template using data at least from the displayed page based on a user preferences set and delivering data in the template to a client device of a user using a network communication protocol.

10. The server of claim 9 further comprising a second database for storing user preferences.

11. The server of claim 10 wherein the rendering machine retrieves one of the user preferences for filling one of the variable items in the template.

12. A client device for displaying a page and playing an audio version of the page in a client device, the client device comprising:

a remote client for receiving the audio version, wherein the audio version is created from a template having fixed and variable items, and the variable items are filled with data at least from the page based on a user preferences set; and

a speech engine playing the audio version using a text-to-speech converter.

13. The device of claim 12 wherein the speech engine is configured by control settings included in the audio version.

14. The device of claim 13, wherein one of the settings specifies a playing speed in the unit of words per second.

15. A method for providing natural speech rendering of acontextual data, the method comprising:

in a structure comprising natural speech phrases and variable items, filling the variable items with corresponding acontextual data from a database having time associated updates, wherein the natural speech phrases provide context to the acontextual data;

rendering a combination of the natural speech phrases and acontextual data.

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