

ROBUST VOICE- BROWSER SYSTEM AND VOICE ACTIVATED INFORMATION ACCESS SYSTEMDEVICE CONTROLLER

FIELD OF THE INVENTION

The present invention relates generally to the field of providing a robust and highly reliable system that allows users to browse web sites and retrieve information access. In particular, the by using conversational voice commands. Additionally, the present invention relates to voice access allows users to information and audio transmission of retrieved information control and monitor other systems and devices that are connected the Internet or any other network by using voice commands.

BACKGROUND OF THE INVENTION

~~Standard access to information over the Internet requires the use of a personal computer (PC). Standard Internet access is thus limited to situations where personal computers are accessible—for example at a desk or at times during travel when a portable PC can be used. Portable PCs allow for Internet access in a variety of situations, but if they are to be used away from wall connectors, they must be used with costly portable modems or constant mobile phone connections. Further, the user must generally have space to place a portable PC to obtain a reasonable means of access to the Internet.~~

~~Telephones and mobile phones, on the other hand, offer convenient and relatively inexpensive methods of communication. Mobile phones in particular can be used in virtually any situation or environment, and home, office, and pay telephones are almost always accessible and cost much less than mobile phones or mobile modems. Telephones and mobile phones on their own, however, do not currently allow a user voice access to information via the Internet because a useful connection generally requires some type of input device and display to give and receive information over the Internet. Thus, a need exists for an Internet information access method that makes the vast resources on the Internet available to telephone and mobile phone users without bulky and costly input devices and displays.~~

Currently, three options exist for a user who wishes to gather information from a web site accessible over the Internet. The first option is to use a desktop or a laptop computer connected to a telephone line via a modem or connected to a network with Internet access. The second option is to use a Personal Digital Assistant (PDA) that has the capability of connecting to the Internet either through a modem or a wireless connection. The third option is to use one of the newly designed web-phones or web-pagers that are now being offered on the market. Although each of these options can allow a user to access the Internet and browse web sites, each of them have their own drawbacks.

Desktop computers are very large and bulky and are difficult to transport. Laptop computers solve this inconvenience, but many are still quite heavy and are inconvenient to carry. Further, laptop computers cannot be carried and used everywhere that a user travels. For instance, if a user wishes to obtain information from a remote location where no electricity or communication lines are installed, it would be nearly impossible to use a laptop computer. Oftentimes, information is needed on an immediate basis where a computer is not accessible.

Furthermore, the use of laptop or desktop computers to access the Internet requires a connection to either a network or a POTS (Plain Old Telephone Service) line. Oftentimes, such connections are not available when a user desires to connect to the Internet.

The second option for remotely accessing web sites is the use of PDAs. These devices also have their own set of drawbacks. First, PDAs that have the ability to connect to the Internet and access web sites are not readily available. As a result, these PDAs tend to be very expensive. Furthermore, users are usually required to pay a special service fee to enable the web browsing feature of the PDA. A further disadvantage of these PDAs is that web sites must be specifically designed to allow these devices to access information on the web site. Therefore, a limited number of web sites are available that are accessible by these web-enabled PDAs. Finally, it is very common today for users to carry cell phones, however, users must also carry a separate PDA if they require the ability to gather information from various web sites. Therefore, users must carry two separate devices and must also subscribe to and pay for two separate services. That is, a user must pay for both cellular telephone service and also for the web-enabling service for the PDA. This results in a very expensive alternative for the consumer.

The third alternative mentioned above is the use of web-phones or web-pagers. These devices suffer many of the same drawbacks as PDAs. First, these devices are expensive to purchase. Further, the number of web sites accessible to these devices is limited since web sites must be specifically designed to allow access by these devices. Furthermore, users are often required to pay an additional fee in order to gain wireless web access. Again, this service is expensive. Another drawback of these web-phones or web-pagers is that as technology develops, the methods used by the various web sites to allow access by these devices may change. These changes may require users to purchase new web-phones or web-pagers or have the current device serviced in order to upgrade the firmware or operating system stored within the device. At the least, this would be inconvenient to users and may actually be quite expensive.

SUMMARY OF THE INVENTION

~~One object of this invention is to allow quick, efficient, and inexpensive information retrieval from the Internet or other computer networks via standard telephones, mobile phones, or other voice-based communication devices.~~

~~Another object of this invention is to provide secure and reliable retrieval of information over the Internet or other computer network in any situation where a user has access to a standard telephone or mobile phone.~~

~~In accordance with one aspect of the present invention, these and other objectives are realized by a voice-activated information access method. The voice-activated information access method comprises a user communicating with voice servers. The voice servers receive voice messages from the users and employ speech-to-text conversion programs to translate the voice messages to computer-readable requests. These computer-readable requests are then sent to information retrieval computers which access and retrieve information from sites on the Internet or other networks or information sources corresponding to the requests received from the voice servers. The information retrieval computers associate incoming requests with proper locators which can be used to access information sources. These locators are sent to access their~~

~~corresponding information sources. Information from the corresponding information sources is then sent back to the retrieval computers. The retrieval computers process the information to assure the information is in a proper text-based format. This text-based information is then sent back to the voice servers. The voice servers process the text into speech recognizable by the user, and transmit a speech message with the requested information back to the user.~~

The present invention allows users to access and browse web sites without being subjected to the added expenses, inconveniences, and limitations that exist in currently available web browsing systems. This is accomplished by providing a system and method that allows users to browse web sites using conversational voice commands spoken into any type of voice receiving device (i.e., any type of wireline or wireless telephone, IP phone, or other wireless device). These spoken commands are then converted into data messages by a speech recognition engine running on a media server. These data messages are then processed by a web browsing module and transmitted to the desired web site using the Internet. Responses sent from a web site are received and processed by the web browsing module and transmitted as formatted data to the media server. The media server converts this data into audible messages by either matching the data with a prerecorded audio prompt or by using a speech synthesizer.

The voice browser system and method of the present invention uses a web site polling and ranking methodology that allows the system to detect changes in web sites and adapt to those changes in real-time. This enables the voice browser system to deliver highly reliable information to users over any voice enabled device. This ranking system also enables the present invention to provide rapid responses to user requests. Long delays before receiving responses to requests are not tolerated by users of voice-based systems, such as telephones. When a user speaks into a telephone, an almost immediate response is expected. This expectation does not exist for non-voice communications, such as email transmissions or accessing a web site using a personal computer. In such situations, a reasonable amount of transmission delay is acceptable. The ranking system of the present invention ensures users will always receive the fastest possible response to their request.

An alternative embodiment of the present invention allows users to control and monitor the operation of a variety of devices connected to a network using voice commands spoken into a voice receiving device.

It is an object of the present invention to allow users to gather information from web sites by using voice receiving devices, such as wireline or wireless telephones.

An additional object of the present invention is to provide a system and method that allows the searching and retrieving of publicly available information by controlling a web browsing module using naturally spoken voice commands.

It is an object of the present invention to provide a robust voice browsing system that can obtain the same information from several web sites based upon a ranking order. The ranking order is automatically adjusted if the system detects that a given web site is not functioning, is too slow, or has been modified in such a way that the requested information cannot be retrieved any longer.

A further object of the present invention is to provide a system and method that allows users to browse web sites using a single device that requires only one subscription service.

A still further object of the invention is to allow users to gather information from web sites from any location where a telephonic connection can be made.

Another object of the present invention is to allows users to browse web sites on the Internet using conversational voice commands spoken into wireless or wireline telephones.

An additional object of the present invention is to provide a system and method for using voice commands to control and monitor devices connected to a network.

It is an object of the present invention to provide a system and method which allows devices connected to a network to be controlled by conversational voice commands spoken into any voice enabled device interconnected with the same network.

A further object of the present invention is to allow devices connected to the Internet to be controlled by conversational voice commands spoken into any voice enabled device connected to the Internet.

BRIEF DESCRIPTION OF THE DRAWINGS

~~FIG. 1 displays an outgoing information request process in one embodiment~~ is a depiction of the present invention;

~~FIG. 2 displays the operation of a voice server for use in one~~ browsing system of the first embodiment of the present invention;

~~FIG. 3 displays~~ 2 is a depiction of the operation of an information retrieval computer for use in one embodiment device browsing system of the ~~present invention;~~ and ~~FIG. 4 displays a returning information process in one~~ second embodiment of the present invention.

DETAILED DESCRIPTION OF THE INVENTION

A first embodiment of the present invention ~~uses various forms of signal~~ is a system and data transmission method for allowing users to allow a user to retrieve information browse web sites by using ~~audio communication.~~ A user verbally requests information and is given the requested information in a conversational voice message.

~~A user may begin interacting with the~~ commands spoken into a voice-receiving device. Users are not required to learn a special language or command set in order to communicate with the voice browsing system of the present invention ~~by placing a telephone call via a standard or mobile telephone to a voice server and verbally requesting information available on the Internet or other computer networks.~~ The voice server processes the request using a speech recognition program. The output of the speech recognition program is a computer-readable request that is sent to an information retrieval computer. The information retrieval computer associates the computer-readable data from the voice server with information sources, which the information retrieval computer contacts with an information request. Multiple information sources may be

prioritized by the information retrieval computer so that if any one source is unavailable, other sources can be quickly contacted. When an information source receives an information request, it responds with the desired information which is transferred back to the information retrieval computer. This begins the information's return trip to the user.

The information retrieval computer processes the incoming information into a text message that is readable by a text to voice converter located on the voice server, and then sends this text message to the voice server. At this point, the information retrieval computer is capable of parsing incoming information from a variety of sources and in a variety of formats. The voice server receives the text message and, using a text to voice converter, converts it into a voice message that it sends back to the user. The user then receives the voice message containing the requested information, completing one session of the voice based information retrieval process. If the user wishes to have more information, he starts the process again with another verbal request.

The invention can be used on a variety of systems with several types of data transmission procedures. In one application of the present invention, the user's initial call to a voice server is made over the Public Switched Telephone Network (PSTN). This call may be made using a standard telephone, a cellular phone, a digital mobile phone, or any other type of PSTN voice communication device. Following the voice recognition step in the voice server, the outgoing request may be transferred to an information retrieval computer using a variety of data communication services. For example, the outgoing request may be transmitted over the Internet using the Transmission Control Protocol/Internet Protocol (TCP/IP) model. Alternately, asynchronous transfer mode (ATM), or a frame relay service may be used to transmit the request from a voice server to an information retrieval computer. A voice server and an information retrieval computer may also be linked to each other via a local area network (LAN), a wide area network (WAN), or a wireless network, using a wide variety of network architectures.

It is presently preferred to transmit digital requests from a voice server to an information retrieval computer through a firewall, using the TCP/IP model. It is also presently preferred for information requests to pass through a firewall on their way out from information retrieval computers, and for the returning information to pass once again through a firewall on its way to an information retrieval computer.

The information retrieval computer is capable of using an intelligent middleware algorithm to track changes in the location and format of information so that pertinent information is consistently available to the user. For example, the information retrieval computer may scan an information source for titles, and transmit these titles back to a voice server. If the user hears a title that he believes will contain the necessary information, the user may say this title to the voice server, which transfers the title back to the information retrieval computer. Then, the information retrieval computer can send back information associated with the title. Using this system, a user may quickly negotiate a complicated information source to find the exact information he wants.

The present invention will now be described in connection with [Common and ordinary commands and phrases are all that is required for a user to operate the voice browsing system.](#) The voice browsing system recognizes naturally spoken voice commands and does not have to

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