

which may carry out a variety of functions under the control of one or more microprocessors or other control devices. In addition, those skilled in the art will appreciate that the present invention may be practiced in conjunction with any number of data transmission protocols and that the systems described herein are merely exemplary applications for the invention.

[0045] It should be appreciated that the particular implementations shown and described herein are illustrative of the invention and its best mode and are not intended to otherwise limit the scope of the invention in any way. Indeed, for the sake of brevity, conventional techniques for signal processing, data transmission, signaling, network control, and other functional aspects of the systems (and the individual operating components of the systems) may not be described in detail herein. Furthermore, the connecting lines shown in the various figures contained herein are intended to represent exemplary functional relationships and/or physical couplings between the various elements. It should be noted that many alternative or additional functional relationships or physical connections may be present in a practical embodiment.

[0046] Overview

[0047] The present invention provides end users with an interactive navigation interface that makes it easy for the end users to view, search, and locate a plurality of graphical symbols corresponding to different content files, content sources, data, information, web pages, active links, or the like. In practical deployments, the present invention is suitable for use in connection with television programming schedules, streaming media (audio and/or video) broadcast information, web page bookmarking, computer file managing and organizing, or the like. The present invention provides users with a graphical display metaphor that is easy to understand and is capable of organizing and displaying a large amount of information in an intuitive and easy-to-use format. The user's experience is enhanced by displaying the information using a map metaphor that is graphical, dynamic, interactive, and enjoyable to use. The interactive map interface leverages spatial memory to allow users to quickly re-locate media items that they found during a previous viewing.

[0048] In lieu of a traditional hierarchical or list-based approach, the navigation interface displays available broadcasters using a graphical map generated in a format suitable for use with the particular presentation device, e.g., a television, a personal computer, a personal digital assistant (PDA), a wireless telephone, or the like. In the preferred implementation, the map features a mythical group of islands, continents, and seas, each with a set of symbols or icons representing available broadcasters, service providers, program titles, files, media items, web site addresses, or the like. In this preferred embodiment, each region on the map is labeled to represent a different genre or category, with related icons or active map items located within the appropriate region. In addition, logical sub-regions represent subsets or subcategories of a genre. For example, one massive island representing sports programming may be identified as "Sports Land." One portion of this island may be dedicated to baseball, another may relate to golf, and so on.

[0049] The navigation map can be displayed in a two-dimensional manner or in a three dimensional perspective,

with rolling hills, water, forests, deserts, and other features. The end user can zoom in and out, scroll or pan across the overall map, select an active map item to view additional information regarding the associated content provider, program, or file, and access other related functions. In accordance with one aspect of the present invention, the display is dynamic in that it reflects realtime operating conditions and/or programming characteristics. For example, the appearance of the active map item icons may change depending upon what content is being broadcast, the level of interest to the user, whether the map items are marked as personal "favorites," or any other criteria.

[0050] In the preferred implementation, the interactive navigation map employs a natural hierarchical scheme, which enables it to support thousands of media items without overwhelming the user. An analogy to this map interface is a roadmap where the most important information, e.g., major cities and highways, is displayed prominently and more obscure information, e.g., two-lane roads and small towns, is displayed in a less pronounced manner or perhaps only displayed on a more detailed (or magnified) map view.

[0051] A practical implementation of the present invention may reside in a number of software elements that reside at one or more processing locations. In accordance with one preferred embodiment, the software is configured to operate in conjunction with any Java-based web server platform operating open database connectivity (ODBC) or SQL compliant data. This ensures that the back-end is highly scalable, robust, distributable, and easy to maintain. The interactive navigation system is preferably configured such that it is entirely server based and capable of automatically scaling its features to the capability of the client presentation device. Consequently, the end user need not perform any downloading, software installation, or hardware reconfiguring. In addition, ongoing maintenance, changes, and enhancements to the navigation interface system can be centralized at a server and can be made completely transparent to the end user.

[0052] The system architecture is also capable of storing end user personalization data in an industry standard SQL data store. Thus, broadcast service providers employing the navigation system can use online analytical processing (OLAP) tools to extract critical demographic data about the end users, thus enabling more efficient marketing, advertising, and programming techniques. Accordingly, in addition to enhancing the users' experiences through pervasive personalization, service providers can learn more about the users' viewing habits and access patterns, which allows the service providers to deliver better services and, ultimately, generate more revenue.

[0053] The system architecture may include a server-based map system and any number of presentation layers, where different presentation layers may be suitably configured for compatibility with different presentation devices (cable television settop boxes, personal computers, and the like). In a current implementation of the present invention, the presentation layers support hypertext markup language (HTML), dynamic HTML (DHTML), and PDA (e.g., PALM) web-clipping front ends. Such flexibility enables the presentation layers to work on different web browser applications, including those utilized by many wireless devices,