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(54) Title: INFORMATION RETRIEVAL SYSTEM FOR DRIVERS

(57) Abstract

A user-friendly and interactive multi-modal video/audio user information real-time service and apparatus covering substantially all important and alternative aspects of an informational area, such as travel by various modes, to provide "one-stop shopping" for a user with such integrated multi database consolidation, and with user interaction with the video screen presentations, locally or remotely, to access the same and perform intelligent branching.
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INFORMATION RETRIEVAL SYSTEM FOR DRIVERS

The present invention relates to the consolidating, integrating and providing of multi-modal video and audio real-time multi-source information, as for alternative travel opportunities or for other informational purposes, and with interaction by the user at remote locations.

Background

In various areas, there are many user requirements for the provision of real-time information from different database resources to enable the user to make intelligent selections and choices as to the information to be utilized or otherwise acted upon. Among these is the area of providing interactive multimodal advanced traveler information to the traveling public as to road traffic, road conditions, and alternative routes and the like, as currently provided in the New England area by the interactive auditext system developed by SmartRoute Systems, Inc., assignee of the current invention, and described in a 1995 summary entitled "Smart Route Systems," and as proposed in more sophisticated form, in U.S. Patent No. 5,131,020 of said assignee and in U.S. Patent No. 4,812,843, among others.

Experience in providing such service has now shown that there is a significant need for a service and an end-consumer product which will provide a fully integrated set of information covering not just travel by automobile, but also relevant alternative modes and other aspects of travel, as well. This integrated service would provide "one stop
shopping” to the consumers for any traveler information they may need. Examples of such integrated and interrelated information are traffic and road conditions, transit conditions and schedules, real-time airline arrival and departure information, destination weather, ride-sharing information, and alternative route information which transparently factors in current traffic conditions. Such an integrated service, however, has not heretofore been possible even though such would greatly enhance the efficiency of access by the public to the information that they need prior to traveling for informed and intelligent decision making. Currently, indeed, travelers have to access separate and unrelated databases of different suppliers to obtain all the alternative information that they need.

In accordance with the present invention, however, a method and apparatus have been evolved that can integrate, for example, the assignee’s proprietary traffic and transit databases along with current commercial weather databases, the FAA flight database from the federal centers, specific ride-sharing databases now being set up in most metropolitan areas, and modified navigable map databases. This consolidated and integrated data, furthermore, is presented with an extremely user-friendly interactive multimedia interface designed to be ported, in whole or in part, to multimedia PCs, interactive television, personal digital assistants, personal communications devices, kiosks, in-vehicle platforms, and other “terminals” on the information “superhighway”.

The novel multimedia video and audio presentations hereinvolved, furthermore, enable remote terminal users simply to access the service, select from appropriate menus and easily and intuitively retrieve the consolidated and integrated and alternative traveler information that they need to make fully informed decisions.
While described in connection with the illustrative consolidated information bearing upon travel, moreover, the novel techniques of the invention are more generally applicable, also, to multi-source consolidated information and coordinated novel video/audio presentation and remote user interaction in connection with other areas of information and service provision, as well.

**Objects of Invention**

An object of the present invention, accordingly, is to provide a new and improved method of and apparatus for supplying multi-source multimedia video and audio presentations of consolidated and integrated information with novel remote user interaction, for the above-described and related purposes.

A further object is to provide such a method and apparatus particularly tailored to the field of travel information, with user access to and remote interaction with separate and unrelated and alternative databases of different suppliers to enable the user to obtain all relevant and alternative information needed for travel decisions.

Other and further objects will be explained hereinafter and are more particularly delineated in the appended claims.

**Summary**

In summary, however, from one of its broader aspects, indeed, the invention embraces a method of providing a user-friendly and interactive multi-modal video and audio user real-time information service covering important and different aspects of a plurality of different sets of real-time information from corresponding proprietary real-time information databases, that comprises, generating a video information map/menu presentation for
and from each of the different sets of information databases with active specific item-accentuating video graphics in the map/menu presentation and accompanied by background sound and by voice prompts and user-selectable icon buttons; generating respective video text information presentations and voice-over audio reporting data for and from each of said map/menu presentations; enabling user access thereto by user icon button response to the respective said voice prompts accompanying the video graphics of the respective map/menu presentations; providing respective user intelligent branching selection for each of said video text information; and interfacing the generated video maps/menus and graphics, text, sound and user response and selection access with user terminals for interaction.

Preferred and best mode designs and operation, including application to the illustrative and important area of travel information, are hereinafter presented.

Drawings

The invention will now be described in connection with the accompanying drawings, Fig. 1 of which is a block and flow diagram of the apparatus and method of operation underlying the invention;

Figs. 2 and 3 are similar diagrams of the video map presentation;

Fig. 4 outlines a suitable-sector text reporting screen generation, accessible from the map presentation of Fig. 2; and

Fig. 5 is a similar diagram of remote user interfacing with the service for selection of detailed information.
Preferred Embodiment(s) Of The Invention

Referring to Fig. 1, in the novel basic and interactive service provided by the invention, again shown as applied to the illustrative alternative travel information service, there is supplied traveler information covering substantially all important aspects of travel useful to the user of the service, including information from proprietary route-specific road traffic and road condition databases, alternate route directions into which are factored current road conditions (as, for example, by the techniques described in the before-mentioned patents and in the SmartRoutes System), ride-sharing and commercial transit schedule and operational databases (available respectively from city ride-sharing services and company postings), and commercial real-time airline arrival and departure flight information (from FAA databases), and destination weather databases from weather-reporting services, among others.

In accordance with the technique underlying the present invention, the road traffic information is transformed into a video map (or menu) screen presentation M1, Fig. 1, the generation of the screen map/menu from such data being shown in Figs. 2 and 3.

Emphasis or accentuation of specific items of the video graphics, as by color strobe or flashing segments, as shown at “Best Bet” and “Get off here if you can!” in Fig. 3, is desirable to call attention to current situations of particular interest or concern. Background sounds, such as those related to traffic conditions preferably accompany the screen presentation, with icon buttons B, later discussed, available for remote user response to voice prompts provided as the screen appears.
Associated with the video graphics route-specific traffic map M1 is a traffic information report R1. Fig. 1, also presented in video screen format and preferably as flying text with voice-over, as shown in Fig. 4 — such being accessed by the user selecting the appropriate sector icon button B for a report on that sector. The user may intelligently further select more detailed information or smaller sub-sector report text by the branching buttons B1.

Similar video graphic maps are generated respectively at M2 and M3 for road condition information and transit information in similar fashion to the above-described road traffic presentation M1, but using the respective road condition and alternative route data and transit schedule and operation data. Further in accordance with the invention, each of the road information video map M2 and traffic video map M3 has icon buttons B provided for user access, in response to voice prompts, to enable the presentation of road information and transit information video-flashing text reports R2 and R3, respectively, with voice-over, and further branching button selecting functions, also.

For airline arrival/departure video presentation at M4, the data is preferably presented in video screen menu form, aided by animated graphics for emphasis and specific attention, usefully having background sounds such as are found in a real airport environment for better user understanding and relating, and voice prompts for enabling generating an airline arrival/departure information text report R4, preferably with background music and, again, preferably branching button user interaction.
Similarly to the traffic, road and transit video screens M1, M2 and M3, the destination city weather information is presented on a video map M5, and the ride-sharing M6, as a video menu, each again with animated graphic presentations and background sounds and voice prompts; and each having corresponding video text information reports R5 and R6, with the weather report usefully having voice-over, and the ride-sharing information, background music — both also preferably enabling user branching button access.

This substantially complete integrated travel information presentation may be interfaced and transmitted to remote user locations, as before described, by radio link, cellular telephone, wire fiber and/or television transmission and the like, permitting remote user interaction in response to voice prompts by icon button selection, as at B in Fig. 5 and by information report branching as at B1.

Once requesting the service of the invention, a remote user customer (or, if in a kiosk terminal or the like, a local user in that sense) is presented with a welcome video screen W, Fig. 1, preferably with animated logo, background music and voice prompts to enable the user to access the main menu M carrying preferably flying text and further voice prompts. Fees per transaction are indicated as shown, under the control of a directional service animated graphics menu D1, and a directions or delivery confirmation text screen D2. The desired basic services can be accessed directly through M1-R1, M2-R2, M3-R3, M4-R4, M5-R5 and M6-R6, as before described.

Thus, the interactive traveler video/audio service and product of the invention provides, in its exemplary form, an integrated and consolidated content of route-specific traffic conditions, route-specific road conditions (construction, icing, etc.), directional
service, ridesharing, transit system conditions, airline arrival/departure information and
destination city weather -- all through delivery of interactive video graphics and animated
graphics, text, background music, voice-overs, menu-driven prompts, and user interacting
in the use of button-driven selection and intelligent branching.

While, as before stated, the latter delivery or presentation technique is particularly
useful for integrated travel information service, clearly its format can be used in other
areas of informational services for multi and varied databases containing alternative or
different types of information that are usefully coordinated to obviate the necessity of the
user having to go separately to varied sources.

Further modifications will also thus occur to those skilled in this art, and such are
considered to fall within the spirit and scope of the invention as defined in the appended
claims.
CLAIMS

1. A method of providing a user-friendly and interactive multi-modal video and audio traveler information real-time service covering substantially all important aspects of travel, including integrated and consolidated information from proprietary route-specific road traffic and road condition databases, alternate route directions which factor in current road conditions, ride-sharing and commercial transit data bases, and commercial real-time flight and destination weather data bases, among others, that comprises, generating from each of the route-specific road traffic, road condition and alternative routes transit and destination weather information, respective video maps/menus presented with visually active and specific item-accentuating video graphics accompanied by background and voice prompts sound; generating from each of the flight and ridesharing information, respective moving video graphic video presentations accompanied by background audio sound and voice prompts; generating respective video text information and voice-over audio reporting data for each of said traffic, road condition and alternative route and transit maps, and enabling user access thereto by user response to the respective video graphics of the respective road traffic, road condition and alternative route and transit maps; generating respective video information text and background sound for each of said flight, destination weather and ridesharing video presentations, and enabling user access thereto by user response to the respective said voice prompts accompanying the respective video graphics presentations of the respective flight, destination weather and ridesharing video graphics; and providing user intelligent branching selection for each of said video text information.
2. A method as claimed in claim 1 and in which said visually active and accentuating graphics is provided by one of accentuating colored or flashing segments.

3. A method as claimed in claim 1 and in which said moving video graphic video presentation is provided by animated graphics.

4. A method as claimed in claim 1 and in which icon-button responding is provided in each of said route-specific traffic, road condition and alternative route, and transit video maps, enabling said user response to the respective said voice prompts.

5. A method as claimed in claim 4 and in which said video text of each of the said route-specific road traffic, road condition and alternative route, and transit reporting data is in flying text presentation with voice-over sound.

6. A method as claimed in claim 1 and in which said video text of each of said flight and ridesharing video presentations is accompanied by background music, and the video text of the said destination weather video presentation is accompanied by voice-over sound.

7. A method as claimed in claim 1 and in which access to the said multi-modal video and audio traveler information is attained through a welcoming and main menu video screen presentation.

8. A method as claimed in claim 7 and in which said welcoming video screen presentation includes animated video logo, background music and voice prompting.

9. A method as claimed in claim 7 and in which said main menu video screen presentation includes flying text, background music and voice prompting.
10. A method as claimed in claim 7 and in which said directional service menu includes animated graphics, background sounds and voice prompts.

11. A method as claimed in claim 1 and in which said video presentations generated from each of the flight and ridesharing information are presented in the form of an airline arrival/departure video menu and a ridesharing video menu, respectively.

12. A method as claimed in claim 1, and in which the generated video maps, video graphics, text, sound and user response accessing and selection is interfaced with and transmitted to remote user terminal for interaction.

13. A method of providing a user-friendly and interactive multi-modal video and audio traveler information real-time service covering important aspects of travel including integrated and consolidated information from proprietary route-specific road traffic and road condition databases and alternate route directions which factor in current road conditions, that comprises, generating from each of the route-specific road traffic, road condition and alternative route information, respective video maps/menus presented with visually active specific item-accentuating video graphics accompanied by background sound and by voice prompts and user-selectable buttons; generating respective video text information and voice-over audio reporting data for each of said road traffic, road condition and alternative route maps/menu; enabling user access thereto by user icon button response to the respective said voice prompts accompanying the video graphics of the respective road traffic, road condition and alternative route maps/menus; providing respective user intelligent branching selection for each of said video text information; and interfacing the generated
video maps/menus and graphics, text, sound and user response and selection access with remote user terminals for interaction.

14. A method as claimed in claim 13 and in which said visually active and accentuating video graphics is provided by one of accentuating colored or flashing segments.

15. A method as claimed in claim 13 and in which said video text information is in flying text form with voice-over sound.

16. A method of providing a user-friendly and interactive multi-modal video and audio user information real-time service covering important and different aspects of a plurality of different sets of real-time information from corresponding proprietary real-time information databases, that comprises, generating a video information map/menu presentation for and from each of the different sets of information databases with active specific item accentuating video graphics in the map/menu presentations and accompanied by background sound and by voice prompts and user selectable icon buttons; generating respective video text information presentations and voice-over audio reporting data for and from each of said map/menu presentations; enabling user access thereto by user icon button response to the respective said voice prompts accompanying the video graphics of the respective map/menu presentations; providing respective user intelligent branching selection for each of said video text information; and interfacing the generated video, maps/menus and graphics, text, sound and user response and selection access with user terminals for interaction.
17. A method as claimed in claim 16 and in which the generated maps/menus, video
graphics, text, sound and user response accessing is interfaced with user terminals for in-
teraction.

18. A method as claimed in claim 16 and in which the active specific item-accentuating
video graphics is provided by one of color, flashing or animated segments.

19. A method as claimed in claim 16 and in which said video text information is in fly-
ing text form with voice-over sound.

20. Apparatus for providing a user-friendly and interactive multi-modal video and
audio user information real-time service covering important and different aspects of a
plurality of different sets of real-time information from corresponding proprietary real-time
information databases, having, in combination, means for generating a video information
map/menu presentation for and from each of the different sets of information databases
with active specific item-accentuating video graphics in the map/menu information and
accompanied by background sound and by voice prompts and user-selectable icon buttons;
means for generating respective video text information presentations and voice-over audio
reporting data for and from each of said map/menu presentations; said icon buttons, upon
activation by the user in response to said voice prompts accompanying the video graphics
of the respective video map/menu presentations, having means for causing video
presentation of said corresponding video text information presentation; means for provid-
ing user branching selection for each of said video text information presentations; and
means for interfacing the generated video maps/menus text, sound and user response and
selection with user terminals for interaction.
21. Apparatus as claimed in claim 20 and in which said sets of information comprise route-specific road traffic, road condition and alternative route real-time data.

22. Apparatus as claimed in claim 21 and in which said sets of information further comprise information from ride-sharing, transit, flight, and destination weather databases.

23. Apparatus as claimed in claim 21 and in which said accentuating video graphics comprises at least one of color, flashing, and animation.

24. Apparatus as claimed in claim 21 and in which said video text is in the form of flying text with voice-over sound.

25. Apparatus as claimed in claim 20 and in which means is provided, operable upon user interfacing with the service, for presenting welcoming and main menu video presentations, and means for providing fee per transaction access for directional service graphics and direction or delivery confirmation text video presentations.
FIG. 3

Alternate Routes

GET OFF HERE
IF YOU CAN!

BEST BET!

Main Menu  Region Map  Exit

SUBSTITUTE SHEET (RULE 26)
Traffic Conditions on I-395

▷ OVERTURNED TRUCK AT GLEBE ROAD HAS TRAFFIC BACKED UP TO ROUTE 236. PLAN ON ONE HOUR DELAY.

⊙ ALTERNATE ROUTES: ROUTES 236 OR 7 TO ROUTE 1 OR COLUMBIA PIKE.

FIG. 4
SmarTraveler Traffic Conditions

Traffic Conditions on I-395

- OVERTURNED TRUCK AT GLEBE ROAD HAS TRAFFIC BACKED UP TO ROUTE 236. PLAN ON ONE HOUR DELAY.

- ALTERNATE ROUTES: ROUTES 236 OR 7 TO ROUTE 1 OR COLUMBIA PIKE.

FIG. 5
**INTERNATIONAL SEARCH REPORT**

**International Application No**

**PCI/IB 96/00539**

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**A. CLASSIFICATION OF SUBJECT MATTER**

**IPC 6** G06G1/0962

According to International Patent Classification (IPC) or to both national classification and IPC

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**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)

**IPC 6** G08G G01C

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Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

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**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

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[X] Further documents are listed in the continuation of box C.

Patent family members are listed in annex.

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**Date of the actual completion of the international search**

27 August 1996

**Date of mailing of the international search report**

11.09.96

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<td>AUTOMATISIERUNGSTECHNISCHE PRAXIS - ATP, vol. 35, no. 12, 1 December 1993, pages 677-682, XP000414646 DANOWSKI K: &quot;EIN BEITRAG ZUR WISSENSBASIERTEN MODELLIERUNG VON ENTSCHEIDUNGSPROZESSEN IN VERKEHRSLEIT- UND VERKEHRSCONSTATIONSSYSTEMEN A CONTRIBUTION TO KNOWLEDGE BASED MODELLING OF DECISION PROCESSES IN TRAFFIC CONTROL AND INFORMATION SYSTEMS&quot; see page 679, left-hand column, line 33 - right-hand column, line 9 see page 680, left-hand column, line 30 - right-hand column, line 4</td>
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