Abstract: The present invention relates to a navigation system and route search method which provides a search method for easier route setting. The route search method, including: providing a road list including road names identical to a search word inputted by a user; and providing, when the user selects a road from the road list, a detailed road section list of the selected road.

FIG. 2

START

EXECUTE USER MENU FOR ROAD SEARCH ~ S10

SEARCH ROAD AND DISPLAY ROAD LIST ~ S20

PROVIDE DETAILED ROAD SECTION LIST OF SELECTED ROAD ~ S30

SET SELECTED ROAD SECTION AS INTERMEDIATE POINT ~ S40

PROVIDE GUIDANCE ABOUT ROUTE ~ S50

END

(54) Title: NAVIGATION SYSTEM AND METHOD FOR SEARCHING ROAD
NAVIGATION SYSTEM AND METHOD FOR SEARCHING ROAD

Technical Field
The present invention relates to a navigation system, and more particularly, to a navigation system and route search method which provides a search method for easier route setting.

Background Art
A navigation system is a system which provides information for driving of a transportation device, such as a vehicle, using an artificial satellite. The navigation system is automatic.

The navigation system receives predetermined data from a Global Positioning System (GPS) satellite above the Earth using a GPS receiver, and calculates its own location based on the received data.

The navigation system may provide a user with information about a current location of a vehicle based on calculated location information, perform routing to calculate a route to a desired destination, and provide guidance about the route.

The navigation system stores map data about an entire map and Point Of Interest (POI) information, and uses the map data and POI information as information for route guidance. The POI information includes information about areas, buildings, and roads on a map.

When a destination is set for route setting, the navigation system uses a route search menu. A method for route search includes an address search, name search, surrounding search, road name search, and the like.

The address search retrieves a location using an address corresponding to a destination. The name search retrieves a location using a name corresponding to a destination. The surrounding search retrieves a location using facilities, that is, POI. The road name search retrieves a location using a road name.

Particularly, the road name search retrieves a specific road name, and is helpful when setting an intermediate road or going to a destination adjacent to a road through a road name search for each area.

In a road name search method in a conventional art, a road name identical to a
search word inputted by a user is retrieved, and a search list is provided. The search word includes an initial sound of a word, full word, and a word where an initial sound of a word and full word are combined.

In general, a road includes a plurality of road sections. Accordingly, when providing a search list, an administrative name which is a start point of a corresponding road from among road sections is randomly included in a search list and displayed.

A search list in a conventional art provides only administrative name of an area corresponding to a start point, not a road section list. Accordingly, a user may not retrieve a specific road section.

Disclosure of Invention

Technical Goals

The present invention provides a navigation system and route search method which provides a detailed road section list to enable a user to easily retrieve a road section.

The present invention also provides a navigation system and route search method which enables a user to easily set and add an intermediate point for route setting through a detailed road section list.

Technical solutions

According to an aspect of the present invention, there is provided a route search method, including: providing a road list including road names identical to a search word inputted by a user; and providing, when the user selects a road from the road list, a detailed road section list of the selected road.

According to another aspect of the present invention, there is provided a navigation system, including: a storage unit storing map data of a national map and road-related information of the national map; and a control unit executing a road name search menu to search for a road and road section of each road based on the map data or road-related information stored in the storage unit, and providing guidance about a route which passes through a road section, set by a user, through the road name search menu.

According to an aspect of the present invention, a road list and a detailed road section list for each road are provided on a road name search menu for road search to
enable a user to easily search and set a road section.

Brief Description of Drawings

FIG. 1 is a diagram illustrating a configuration of a navigation system according to an embodiment of the present invention;

FIG. 2 is a flowchart illustrating a route search method for route setting according to an embodiment of the present invention;

FIG. 3 is a diagram illustrating a main menu of a navigation system;

FIG. 4 is a diagram illustrating a search menu for route setting;

FIG. 5 is a diagram illustrating a name search screen for road search;

FIG. 6 is a diagram illustrating a screen displaying a detailed road section list of a specific road; and

FIG. 7 is a diagram illustrating a screen for route setting of a specific road section.

Best Mode for Carrying Out the Invention

Hereinafter, embodiments of the present invention are described in detail by referring to the figures.

First, a navigation system for road search is described.

The navigation system according to an embodiment of the present invention provides a road section list of a road, selected by a user, on a road search menu for route search, and provides guidance about a route which passes through a road section selected by the user.

FIG. 1 is a diagram illustrating a configuration of a navigation system according to an embodiment of the present invention.

The navigation system includes a Global Positioning System (GPS) module 10. The GPS module 10 receives a location signal from at least three GPS satellites, and calculates its own location.

The navigation system includes a user interface 20, display unit 30, voice output unit 40, storage unit 50, and control unit 60.

The storage unit 50 stores a map database and road section database. The map database establishes map data of a national map and route guidance data associated with
the map data. The road section database establishes road-related information about roads of the national map and detailed road section of each of the roads. Also, the control unit 60 stores a route guidance control program and route search control program. The route guidance control program controls overall operations, including a route guidance function, of the navigation system. The route search control program provides a search environment for searching a road using a road name.

The display unit 30 displays a variety of contents based on the overall operations and map data for the route guidance. A Liquid Crystal Display (LCD), Electro Luminescence (EL), and the like may be used as the display unit 30.

The user interface 20 is used to input a user command with respect to the navigation system, for example, inputting a destination with respect to the route guidance function. The user interface 20 may be configured as a touch pad integrally formed with the display unit 30, and provide a user graphic interface unit. All the menu environments associated with the route guidance function of the navigation system are provided as a graphic screen through the display unit 30. Accordingly, the user command may be inputted by touching a specific location of the graphic screen using a stylus pen, fingers, and the like.

The voice output unit 40 provides voice guidance when providing guidance about a route, and outputs a voice signal for the route guidance.

The control unit 60 ascertains a current location of a user using a GPS signal. The GPS signal is received via the GPS module 10 under the route guidance control program. Also, the control unit 60 searches and generates a route from the current location to a destination from the map data stored in the storage unit 50. The control unit 60 provides guidance about the route to the destination using the display unit 30 and/or voice output unit 40.

Specifically, the control unit 60 provides a road name search menu to search a road and road section of each road under the route search control program. Also, the control unit 60 provides guidance about a route which passes through at least one road section set by the user through the road name search menu.

A control method of the control unit 60 which provides the road name search menu and provides guidance about the route based on the set road section is described in detail.
FIG. 2 is a flowchart illustrating a route search method for route setting according to an embodiment of the present invention.

In operation S10, a user menu for retrieving a road name, that is, road name search menu, is executed.

The road name search menu may be performed using various methods widely used in the related art, for example, accessing a corresponding menu from an upper menu or directly accessing the corresponding menu.

For example, FIGS. 3 and 4 illustrate an upper menu which may access the road name search menu 41. When a user executes a main menu of a navigation system, a main menu screen associated with a route guidance function is provided as illustrated in FIG. 3. The main menu screen includes a search menu 31 to enable a user to retrieve a route in association with the route guidance function. When the search menu 31 is executed on the main menu screen, a corresponding lower menu screen is provided as illustrated in FIG. 4. The lower menu screen provides a search menu list according to a variety of search methods (for example, address search, name search, surrounding search, theme search, road search, and the like). It is preferable that the search menu list includes a road name search menu 41 to retrieve a specific road name using a road name.

When the road name search menu 41 is executed, a road name search screen is provided as illustrated in FIG. 5. In this instance, the road name search screen includes a search word input text-box 51 and a search result screen 53. The search word input bar 51 is for inputting a search word. The search result screen 53 displays a road list including road names identical to the search word or including the search word inputted through the search word input bar 51.

In operation S20, when the user inputs the search word (an initial sound of a road name or full word) associated with a desired road on the search word input bar 51 and a search command is inputted, roads including the inputted search word or having a road name identical to the search word are retrieved, and thus a road list based on the search result is displayed on the search result screen 53.

A road where a moving object such as a vehicle moves includes at least one point corresponding to a start point on the road, and includes a plurality of road sections based on the start point. When the road list of FIG. 5 is provided, an administrative
name corresponding to the start point of the road is included in the road list as illustrated in FIG. 5.

In operation S30, when the user selects a specific road considering the start point of the road from the road list provided in the search result screen 53, a detailed road section list is provided based on a start point of the selected road.

FIGS. 6 and 7 are diagrams illustrating a screen displaying a detailed road section list of a specific road and a screen for route setting of the specific road section.

A detailed road section list 61 arranges road sections from a start point of a road, selected by a user, in a predetermined order based on the start point as illustrated in FIG. 6 for an easy road section search and route setting. That is, the road sections adjacent to the start point of the selected road are arranged and the detailed road section list 61 is provided.

A screen displaying the detailed road section list 61 provides a user interface menu for the route setting.

As illustrated in FIG. 6, the user interface menu includes a route setting icon 11, location view icon 13, and search icon 15. The route setting icon 11 is for setting a route with respect to a specific road section of the detailed road section list 61. The location view icon 13 is for providing location information of each of the road sections. The search icon 15 is for providing guidance about a route which passes through the road section selected by the user.

When a specific road section is selected from the detailed road section list 61, the specific road section is set as a destination which passes through the start point and end point of the selected road section.

When the route setting icon 11 is inputted after selecting the specific road section from the detailed road section list 61 of FIG. 6, the screen for route setting of FIG. 7 is displayed.

Detailed information of the selected road section, that is, the start point and end point of the road section, and location information, and the like, may be provided through the screen for route setting of FIG. 7, and thereby may provide guidance about a route.

FIG. 7 illustrates a screen displaying detailed information 75 of the road section selected by the user from the detailed road section list 61. The detailed information 75
includes a name 75a of a point corresponding to each of the start point and end point of the selected road section. That is, the screen displays the name 75a.

Also, the screen displaying the detailed information of the selected road section provides a user interface menu for route setting.

As illustrated in FIG. 7, the user interface menu includes a location view icon 25, search icon 27, deletion icon 21, and revision icon 23. The location view icon 25 is for providing location information of each of the start point and end point. The search icon 27 is for providing guidance about a route which passes through the start point and end point. The deletion icon 21 and revision icon 23 are for deleting and revising the selected road section.

Also, the user interface menu further includes a destination addition icon 73 for additionally setting another road section excluding the selected road section. When the destination addition icon 73 is inputted, a screen of FIG. 6, that is, the screen displaying a detailed road section 61, is displayed, and thus the other road section to pass through may be additionally set.

In operation S40, after a user selects at least one road section from the detailed road section list 61 through the user interface menu as described above and a route setting command is inputted, the selected road section may be set as an intermediate point. In operation S50, a guidance about a route which sequentially passes through a start point and end point of the road section, set as the intermediate point according to the route setting command, may be provided.

Accordingly, a user interface including a detailed road section list of a corresponding road is provided to enable a user to easily retrieve a road section of a specific road and set a route.

The above-described embodiment of the present invention may be recorded in computer-readable media including program instructions to implement various operations embodied by a computer. The media may also include, alone or in combination with the program instructions, data files, data structures, and the like. The media and program instructions may be those specially designed and constructed for the purposes of the present invention, or they may be of the kind well-known and available to those having skill in the computer software arts. Examples of computer-readable media include magnetic media such as hard disks, floppy disks, and magnetic tape;
optical media such as CD ROM disks and DVD; magneto-optical media such as optical
disks; and hardware devices that are specially configured to store and perform program
instructions, such as read-only memory (ROM), random access memory (RAM), flash
memory, and the like. Examples of program instructions include both machine code,
such as produced by a compiler, and files containing higher level code that may be
executed by the computer using an interpreter. The described hardware devices may
be configured to act as one or more software modules in order to perform the operations
of the above-described embodiments of the present invention.

According to an embodiment of the present invention, a navigation system and
route search method provides a detailed road section list of each road and road list for
route setting in a road search environment, and thereby may enable a user to easily
retrieve a desired road section, and provide an improved menu environment.

Also, according to an embodiment of the present invention, a navigation system
and route search method improves convenience of a user for route search and provides a
user interface for a convenient road section setting.

Although a few embodiments of the present invention have been shown and
described, the present invention is not limited to the described embodiments. Instead,
it would be appreciated by those skilled in the art that changes may be made to these
embodiments without departing from the principles and spirit of the invention, the scope
of which is defined by the claims and their equivalents.
CLAIMS

1. A route search method, comprising:
   providing a road list including road names identical to a search word inputted by a user; and
   providing, when the user selects a road from the road list, a detailed road section list of the selected road.

2. The route search method of claim 1, wherein the providing of the detailed road section list comprises arranging road sections included in the selected road in a predetermined order to provide the detailed road section list.

3. The route search method of claim 1, wherein the providing of the detailed road section list comprises:
   determining a start point of the selected road; and
   sequentially arranging road sections included in the selected road from the start point to provide the detailed road section list.

4. The route search method of claim 1, further comprising:
   providing guidance about a route which passes through a selected road section when the user selects a road section to pass through from the detailed road section list.

5. The route search method of claim 4, wherein the providing guidance about the route comprises:
   selecting, by the user, at least one road section from the detailed road section list;
   setting the selected road section as an intermediate point; and
   providing guidance about the route which passes through the set intermediate point.

6. The route search method of claim 5, wherein the providing guidance about the route further comprises providing a user interface for a user setting of the road section.
7. The route search method of claim 6, wherein the user interface comprises a destination addition icon to select the road section corresponding to the intermediate point from the detailed road section list, and a search icon to provide guidance about the route which passes through the selected road section as the intermediate point.

8. The route search method of claim 7, wherein the user interface further comprises a deletion/revision icon to delete or revise the road section set as the intermediate point, and a location view icon to provide location information of each road section included in the detailed road section list.

9. The route search method of claim 1, wherein the providing of the road list comprises:
   - executing a road name search menu searching for a location based on a road name according to a command of a user;
   - receiving a search word from the user through the road name search menu; and
   - retrieving a road name identical to the search word or including the received search word and providing a corresponding road list.

10. A computer-readable recording medium storing a program for implementing the method according to any one of claims 1 through 9.

11. A navigation system, comprising:
   - a storage unit storing map data of a national map and road-related information of the national map; and
   - a control unit executing a road name search menu to search for a road and road section of each road based on the map data or road-related information stored in the storage unit, and providing guidance about a route which passes through a road section, set by a user, through the road name search menu.
FIG. 2

START

EXECUTE USER MENU FOR ROAD SEARCH ~ S10

SEARCH ROAD AND DISPLAY ROAD LIST ~ S20

PROVIDE DETAILED ROAD SECTION LIST OF SELECTED ROAD ~ S30

SET SELECTED ROAD SECTION AS INTERMEDIATE POINT ~ S40

PROVIDE GUIDANCE ABOUT ROUTE ~ S50

END
FIG. 3

NAVIGATION MENU

USER LIST

SEARCH

ROUTE

SETTING

INFORMATION

MY MENU

CLOSE

31
<table>
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<tr>
<td>TELEPHONE NUMBER SEARCH</td>
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<td></td>
</tr>
<tr>
<td>THEME SEARCH</td>
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</table>
**FIG. 5**

![Road Search Interface](image)

- **ROAD SEARCH**
  - NBSH
  - ROAD NAME
  - START POINT
  - ADMINISTRATIVE NAME

### Table

<table>
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<tr>
<th>ROAD NAME</th>
<th>START POINT</th>
<th>ADMINISTRATIVE NAME</th>
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<td></td>
<td></td>
</tr>
<tr>
<td>JEONRANAM-DO DAMYANG</td>
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<tr>
<td>SEOUL JUNG OOO</td>
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**Buttons:**
- PREVIOUS
- CLOSE
FIG. 6

ROAD SEARCH > NAMBUSOONHWAN HIGHWAY

<table>
<thead>
<tr>
<th>(EAST) BANGEES CROSSROADS</th>
<th>(WEST) GAEBONG</th>
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STORE LOCATION VIEW ROUTE SETTING SEARCH

13 11 15
FIG. 7

ROAD SEARCH > NAMBUSOONHWAN HIGHWAY
PREVIOUS CLOSE

<ROUTE SETTING>

CURRENT LOCATION

DESTINATION 1

DESTINATION 2

DESTINATION ADDITION

OLYMPIC PARK

EUNMA APARTMENT IN DAechi

DELETE REVISE LOCATION VIEW SEARCH

21 23 25 27
A. CLASSIFICATION OF SUBJECT MATTER

**GOIC 21/34(2006.01)i**

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

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 8 GOIC, GOIS, G06F, G08G

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

Korean utility models and applications for utility models since 1975

Japanese utility models and applications for utility models since 1975

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

eKIPASS (KIPO internet) & Keywords "navigation", "road", and "search"

C. DOCUMENTS CONSIDERED TO BE RELEVANT

<table>
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<td>JP 1121 1500 A (ALPINE ELECTRON INC) 06 AUGUST 1999 See pages 3-8, and figures 1-17</td>
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<td>A</td>
<td>JP 05019687 A (TOKYO ELECTRIC POWER CO, INC) 29 JANUARY 1993 See the whole document</td>
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<td>KR 1020040064868 A (FINEDIGITAL CO ,LTD) 21 JULY 2004 See the whole document</td>
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<td>A</td>
<td>KR 1020060066491 A (LG ELECTRONICS CO ,LTD) 16 JUNE 2006 See the whole document</td>
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☐ Further documents are listed in the continuation of Box C

☒ See patent family annex

*Special categories of cited documents

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance, the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance, the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search

20 MARCH 2008 (20.03.2008)

Date of mailing of the international search report

20 MARCH 2008 (20.03.2008)

Name and mailing address of the ISA/KR

Korean Intellectual Property Office
Government Complex-Daejeon, 139 Seonsa-ro, Seo-gu, Daejeon 302-701, Republic of Korea

Authorized officer

LEE Byung Kyul

Telephone No 82-42-481-8436

Facsimile No 82-42-742-7140

Form PCT/ISA/210 (second sheet) (April 2007)
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