

Method and Device for Selecting Information Trigger Position

The present application claims the priority of Chinese Patent Application No. 201110308758.8, filed to the Patent Office of the People's Republic of China on October 12, 2011, entitled "Device and Method for Selecting Information Trigger Position", the entire contents of which are incorporated herein by reference.

Field of the Invention

The invention relates to the field of intelligent traffic information service, and particularly to a method and device for selecting information trigger position.

Background of the Invention

With the continuous improvement of the field of intelligent traffic technology, more and more users start using various terminals, for example, global positioning systems (GPS), mobile phone terminals, etc., to acquire real-time graphical traffic information. Taking GPS as example, the map, the current position of a vehicle, the running speed, the route prompts, the steering at intersections and other driving information will be displayed on the GPS. When a vehicle runs to an information trigger position, the GPS may send a request to a server automatically, and display the graphical real-time traffic information of a graph representation position at an intersection ahead after the GPS has received the information returned by the server, so that a user can know the real-time traffic situation at an intersection ahead clearly and then make a corresponding decision.

During the implementation of the above technical solution, the inventors find that there are at least the following problems in the prior art: in the prior art, if an information trigger position is too far away from a graph representation position, the graphical real-time traffic information will be displayed on a terminal too early so that the driving of a user is influenced; if the information trigger position is too close to the graph representation position, the graphical real-time traffic information will be displayed on the terminal too late so that the user has no enough time to make a

decision. In both the above cases, no high-quality display function of graphical real-time traffic information can be provided on the terminal, resulting in poor experience to the user.

Summary of the Invention

Embodiments of the invention provide a method and device for selecting information trigger position, which can display graphical real-time traffic information on a terminal in appropriate time, and can improve the quality of the graphical real-time traffic information displayed on the terminal.

To achieve the above purposes, the embodiments of the invention employ the following technical solutions.

A method for selecting information trigger position, comprising:

a pre-estimation information trigger position is selected;

a reference speed from the pre-estimation information trigger position to a graph representation position is acquired according to a pre-estimation information trigger distance between the pre-estimation information trigger position and graph representation position and the historical time recording value of running for the pre-estimation information trigger distance;

a practical information trigger distance is calculated according to the reference speed and a preset reference time, and then a practical information trigger position is determined.

A device for selecting information trigger position, comprising:

a pre-estimation information trigger position selection unit configured to select a pre-estimation information trigger position;

a reference speed acquisition unit configured to acquire a reference speed from the pre-estimation information trigger position to a graph representation position according to a pre-estimation information trigger distance between the pre-estimation information trigger position and the graph representation position and the historical time recording value of running for the pre-estimation information trigger distance;

a practical information trigger position selection unit configured to calculate a

practical information trigger distance according to the reference speed and a preset reference time and then determining a practical information trigger position.

In the method and device for selecting information trigger position provided by the embodiments of the invention, the reference speed at which a vehicle runs from the pre-estimation information trigger position to the graph representation position is acquired according to the set pre-estimation information trigger distance and the historical time recording value during which the vehicle runs for the pre-estimation information trigger distance. Sequentially, an appropriate practical information trigger distance is acquired by multiplying the reference speed by the preset reference time so that an appropriate practical information trigger position is determined. Consequently, the graphical real-time traffic information can be displayed on the terminal in appropriate time, and the quality of the graphical real-time traffic information displayed on the terminal is improved.

Brief Description of the Drawings

To describe embodiments of the invention or technical solutions in the prior art clearly, the drawings to be used in the descriptions of the embodiments or the prior art will be introduced simply as below. Apparently, the drawings to be described below are just some embodiments of the invention. An ordinary person skilled in the art may also acquire other drawings according to these drawings without any creative labor.

Fig. 1 is a flow chart of a method for selecting information trigger position provided in Embodiment 1;

Fig. 2 is a flow chart of a method for selecting information trigger position provided in Embodiment 2;

Fig. 3 is a structure diagram of a device for selecting information trigger position provided in Embodiment 3;

Fig. 4 is a schematic diagram of a specifically practical road in the method for selecting information trigger position provided in Embodiment 2.

Detailed Description of the Preferred Embodiments

The technical solutions in the embodiments of the invention will be described clearly and completely as below with reference to the drawings in the embodiments of the invention. Apparently, the described embodiments are just part of, not all, embodiments of the invention. Based on the embodiments of the invention, all other embodiments acquired by an ordinary person skilled in the art without any creative labor should fall into the protection scope of the invention.

Embodiment 1

This embodiment of the invention provides a method for selecting information trigger position. As shown in Fig. 1, the method comprises the following steps:

101: A pre-estimation information trigger position is selected.

102: A reference speed from the pre-estimation information trigger position to a graph representation position is acquired according to a pre-estimation information trigger distance between the pre-estimation information trigger position and the graph representation position and the historical time recording value of running for the pre-estimation information trigger distance.

The pre-estimation information trigger position is described relative to the graph representation position. The graph representation position is a first intersection described in accordance with the graphical real-time traffic information. The distance from the graph representation position to the pre-estimation information trigger position refers to the pre-estimation information trigger distance. The pre-estimation information trigger position may be selected according to the determined graph representation position and the set pre-estimation information trigger distance.

The historical time recording value may be acquired based on the historical traffic information data. The reference speed may be acquired by dividing the set pre-estimation information trigger distance by the above historical time recording value.

103: A practical information trigger distance according to the reference speed and a preset reference time is calculated, and then a practical information trigger position is determined.

The practical information trigger position refers to a position where the terminal begins to request the graphical real-time traffic information to a server.

In the method for selecting information trigger position provided by the embodiment of the invention, the reference speed at which a vehicle runs from the pre-estimation information trigger position to the graph representation position is obtained by dividing the set pre-estimation information trigger distance by the historical time recording value during which the vehicle runs for the pre-estimation information trigger distance. Sequentially, an appropriate practical information trigger distance is acquired by multiplying the reference speed by the preset reference time so that an appropriate practical information trigger position is determined. Consequently, the graphical real-time traffic information can be displayed on the terminal in appropriate time, and the quality of the graphical real-time traffic information displayed on the terminal is improved.

Embodiment 2

This embodiment of the invention provides a method for selecting information trigger position. As shown in Fig. 2, the method comprises the following steps:

201: A pre-estimation information trigger position is selected according to a preset selection rule.

202: A reference speed from the pre-estimation information trigger position to a graph representation position is acquired according to a pre-estimation information trigger distance between the pre-estimation information trigger position and the graph representation position and the historical time recording value of running for the pre-estimation information trigger distance.

The pre-estimation information trigger position is described with respect to the graph representation position. The graph representation position is a first intersection described in accordance with the graphical real-time traffic information. The distance between the graph representation position and the pre-estimation information trigger position refers to the pre-estimation information trigger distance. The running speed of the vehicle on difference roads is different (for example, the running speed of a vehicle on an expressway is faster than that on an ordinary road), so the set

pre-estimation information trigger distance is different. The pre-estimation information trigger distance may be set according to the selection rule that different distance values are preset for different roads. The pre-estimation information trigger position is selected according to the set pre-estimation information trigger distance.

The historical time recording value therein comprises an arithmetic mean value of at least two historical time records.

The historical time recording value may be acquired based on the historical traffic information data, wherein at least two historical time records are acquired, and then the arithmetic mean value of the historical time records is taken as the historical time recording value, thus the historical time recording value is more accurate and will not have large contingency for emergency, traffic jam or other reasons. As a result, the selection of the practical information trigger position is more reasonable.

203: A practical information trigger distance is calculated according to the reference speed and a preset reference time, and then a practical information trigger position is determined.

Wherein, the reference time comprises: the sum of the communication time during which a terminal sends a request and then a server returns graphical real-time traffic information and the time consumed by a user to read information, make a decision and take an action. The reference time above is preset in a terminal.

The communication time during which a terminal sends a request and then a server returns graphical real-time traffic information is associated with the communication speed of the terminal. The communication time may be set according to different terminal systems. The time consumed by a user to read information, make a decision and take an action may be acquired by an empirical value of the human response.

The selection method of the practical information trigger position will be described as below with examples.

Firstly, the pre-estimation information trigger position will be selected according to the pre-estimation information trigger distance in 1000m on an expressway and a

highway and in 800m on an ordinary road. There is at least one traffic information release section (the traffic information release section is a shortest section for traffic information release) between the pre-estimation information trigger position and the graph representation position. As shown in Fig. 4, it is assumed that there are totally 4 release sections R1, R2, R3 and R4, in lengths of DR1, DR2, DR3 and DR4, the travel time of a vehicle during all the release sections is expressed as t(R1), t(R2), t(R3) and t(R4), respectively.

Then, from 7:00 to 20:00 everyday, the historical data during the latest week of a special event (for example, the holiday of National Day) without influence on traffic condition are selected. A time band is set as 5 minutes, thus there are 12 time bands during one hour, and there are 12*13=156 time bands from 7:00 to 20:00 everyday. Therefore, the acquired data volume n is equal to 7*156=1092 from 7:00 to 20:00 during one week. The running time of a vehicle during all time bands of the release sections is marked as t(R)1, t(R)2, t(R)3.....t(R)n. For example, the running time of a vehicle during all time bands of the release section R1 is t(R1)1, t(R1)2, t(R1)3.....t(R1)n. The time records during all time bands of R1 to R4 are recorded as t1, t2, t3.....tn, then:

$$t1=t(R1)1+t(R2)1+t(R3)1+t(R4)1$$

$$t2=t(R1)2+t(R2)2+t(R3)2+t(R4)2$$

.....

So the historical time recording value is expressed as the following formula:

$$T = \frac{\sum_{i=1}^n ti}{n}$$

the reference speed is expressed as the following formula:

$$V = \frac{D_{R1} + D_{R2} + D_{R3} + D_{R4}}{T}$$

Herein, the communication time may be set as 5 seconds; the time for a user to read the graphical real-time traffic information is set as 5 seconds; the time to make

a decision is set as 5 seconds; and the time to take an action is set as 10 seconds; so the preset reference time T_c is 25 seconds.

Therefore, the practical information trigger distance L is equal to $V \cdot T_c$.

The practical information trigger position may be selected according to the acquired practical information trigger distance and the determined corresponding graph representation position.

When a user is driving a vehicle on a road, a terminal will determine the current position and driving direction of the vehicle. When the vehicle reaches a practical information trigger position, the terminal will judge whether the driving direction of the vehicle is oriented to a graph representation position corresponding to the practical information trigger position; if so, the terminal will request a server to send graphical real-time traffic information; and if not, the terminal will not send a request to the server. If the server has received the request, the server will send the graphical real-time traffic information corresponding to the practical information trigger position to the terminal; and then, the terminal will receive and display the graphical real-time traffic information. The user may decide a driving path according to the displayed graphical real-time traffic information. The terminal may judge whether the vehicle is driven away from the graph representation position; if so, the graphical real-time traffic information will be closed; and if not, the graphical real-time traffic information will continue to be displayed.

In the method for selecting information trigger position provided by the embodiment of the invention, the reference speed at which a vehicle runs from the pre-estimation information trigger distance to the graph representation position is obtained by dividing the set pre-estimation information trigger distance by the historical time recording value during which the vehicle runs for the pre-estimation information trigger distance. Sequentially, an appropriate practical information trigger distance is acquired by multiplying the reference speed by the preset reference time so that an appropriate practical information trigger position is determined. Consequently, the graphical real-time traffic information can be displayed on the terminal in appropriate time, and the quality of the graphical real-time traffic

information displayed on the terminal is improved. In the embodiment of the invention, the pre-estimation information trigger distance is set according to the preset selection rule, and the arithmetic mean value of at least two historical time records is taken as the historical time recording value, thus the selection of the practical information trigger position is more reasonable.

Embodiment 3

This embodiment of the invention provides a device for selecting information trigger position. As shown in Fig. 3, the device comprises: a pre-estimation information trigger position selection unit 31, a reference speed acquisition unit 32 and a practical information trigger position selection unit 33.

The pre-estimation information trigger position selection unit 31 is used for selecting a pre-estimation information trigger position.

The reference speed acquisition unit 32 is used for acquiring a reference speed from the pre-estimation information trigger position to the graph representation position according to a pre-estimation information trigger distance between the pre-estimation information trigger position and the graph representation position and the historical time recording value of running for the pre-estimation information trigger distance.

The pre-estimation information trigger position is described with respect to the graph representation position. The graph representation position is a first intersection described in accordance with the graphical real-time traffic information. The distance between the graph representation position and the pre-estimation information trigger position refers to the pre-estimation information trigger distance. The pre-estimation information trigger position may be selected according to the determined graph representation position and the set pre-estimation information trigger distance.

The above historical time recording value may be acquired based on the historical traffic information data, wherein at least two historical time records are acquired, and then the arithmetic mean value of the historical time records is taken as the historical time recording value, thus the historical time recording value is more accurate and will not have large contingency for emergency, traffic jam or other

reasons. As a result, the selection of the practical information trigger position is more reasonable.

The practical information trigger position selection unit 33 is used for calculating a practical information trigger distance according to the reference speed and a preset reference time, and then determining a practical information trigger position.

The above reference time comprises: the sum of the communication time during which a terminal sends a request and then a server returns graphical real-time traffic information and the time consumed by a user to read information, make a decision and take an action. The communication time during which a terminal sends a request and then a server returns graphical real-time traffic information is associated with the communication speed of the terminal. The communication time may be set according to different terminal systems. The time consumed by a user to read information, make a decision and take an action may be acquired by an empirical value of the human response. The above reference time is preset in the practical information trigger position selection unit 33.

Further, the pre-estimation information trigger position selection unit 31 is further used for selecting a pre-estimation information trigger position according to a preset selection rule.

The pre-estimation information trigger position is described with respect to the graph representation position. The graph representation position is a first intersection described in accordance with the graphical real-time traffic information. The distance between the graph representation position and the pre-estimation information trigger position refers to the pre-estimation information trigger distance. The running speed of the vehicle on different roads is different (for example, the running speed of a vehicle on an expressway is faster than that on an ordinary road), so the set pre-estimation information trigger distance is different. The pre-estimation information trigger distance may be set according to the selection rule that different distance values are preset for different roads. The pre-estimation information trigger position is selected according to the set pre-estimation information trigger distance.

The pre-estimation information trigger position selection unit 31, the reference

speed acquisition unit 32 and the practical information trigger position selection unit 33 are set in a terminal.

In the device for selecting information trigger position provided by the embodiment of the invention, the reference speed at which a vehicle runs from the pre-estimation information trigger distance to the graph representation position is obtained by dividing the set pre-estimation information trigger distance by the historical time recording value during which the vehicle runs for the pre-estimation information trigger distance. Sequentially, an appropriate practical information trigger distance is acquired by multiplying the reference speed by the preset reference time so that an appropriate practical information trigger position is determined. Consequently, the graphical real-time traffic information can be displayed on the terminal in appropriate time, and the quality of the graphical real-time traffic information displayed on the terminal is improved. In the embodiment of the invention, the pre-estimation information trigger distance is set according to the preset selection rule, and the arithmetic mean value of at least two historical time records is taken as the historical time recording value, thus the selection of the practical information trigger position is more reasonable.

An ordinary person skilled in the art should understand that the implementation of all or parts of steps of embodiments of the above method may be accomplished by program instructions associated hardware, the aforementioned programs may be stored in computer readable storage mediums, and the programs may execute the steps of embodiments of the above method; and the aforementioned storage mediums include: ROM, RAM, magnetic disks, optical disks, and other various media capable of storing program codes.

The above contents just describe the specific implementations of the invention, but are not intended to limit the protection scope of the invention. Any variation or substitution, easy to obtained by those skilled in the art within the technical scope disclosed by the invention, should be regarded as falling into the protection scope of the invention. Therefore, the protection scope of the invention should be subject to the projection scope of the claims.

WHAT IS CLAIMED IS:

1. A method for selecting information trigger position, comprising:

selecting a pre-estimation information trigger position;

acquiring a reference speed from the pre-estimation information trigger position to a graph representation position according to a pre-estimation information trigger distance between the pre-estimation information trigger position and graph representation position and the historical time recording value of running for the pre-estimation information trigger distance;

calculating a practical information trigger distance according to the reference speed and a preset reference time, and then determining a practical information trigger position.

2. The method according to claim 1, characterized in that selecting a pre-estimation information trigger position further comprises:

selecting the pre-estimation information trigger position according to a preset selection rule.

3. The method according to claim 1, characterized in that the historical time recording value comprises an arithmetic mean value of at least two historical time records.

4. The method according to claim 1, characterized in that the reference time comprises: the sum of the communication time during which a terminal sends a request and then a server returns graphical real-time traffic information and the time consumed by a user to read information, make a decision and take an action.

5. A device for selecting information trigger position, comprising:

a pre-estimation information trigger position selection unit configured to select a pre-estimation information trigger position;

a reference speed acquisition unit configured to acquire a reference speed from the pre-estimation information trigger position to a graph representation position according to a pre-estimation information trigger distance between the pre-estimation information trigger position and the graph representation position and the historical time recording value of running for the pre-estimation information trigger distance;

a practical information trigger position selection unit configured to calculate a practical information trigger distance according to the reference speed and a preset reference time and then determining a practical information trigger position.

6. The device according to claim 5, characterized in that the pre-estimation information trigger position selection unit is further configured to select the pre-estimation information trigger position according to a preset selection rule.