

GPS TRAVELING CONTROL SYSTEM AND THE METHOD OF THE SAME

BACKGROUND OF THE INVENTION

5 1. Field of the Invention

The present invention relates to a traveling control system and the method of the same, and especially to a GPS traveling control system and the method of the same, the system is suitable to be used in a moving vehicle with a GPS global positioning system for
10 automatically controlling the operation of the components of vehicle.

2. Description of Related Art

The vehicles with a prior GPS global positioning system receive signals from global positioning satellites per unit time (for example, one, two, or five seconds) and then calculate the longitude/ latitude,
15 velocity, altitude, etc. of the vehicle.

The vehicles with a prior GPS global positioning system also record the number of the global positioning satellites, time / date, unit ID, etc. of the vehicle to be as a GPS global positioning data so
20 as to form a GPS traveling recorder (Fig. 1).

In the prior art, information provides to drivers, for example, electronics maps displayed in a liquid crystal display, or dialing an GSM / hand free system or linking to an information provider so as to request information, such as traveling paths, stock prices, and
25 other service.

The plurality of GPS global positioning data stored in prior art GPS traveling recorder may only be as a recorder, the data therein can not be used real-time. It is analyzed only after the vehicle is back to a base. The driver must check the GPS global positioning system manually for acquiring data. Furthermore, the components in a vehicle are controlled by the driver himself (or herself). The system has no ability of monitoring traveling information automatically, reporting the location and time of the vehicle, and controlling the components of the vehicle automatically. If a control center wants to track the vehicle actively, in the prior system the data is transferred periodically by the driver manually. If the time interval is short, the reporting cost is high, while if the interval is long, the timing can not be captured accurately. Thus, the prior art is not an ideal design.

Therefore, it is desirable to provide an improved traveling control system to mitigate and/or obviate the aforementioned problems.

SUMMARY OF THE INVENTION

Accordingly, the primary object of the present invention is to provide a GPS traveling control system and the method of the same for monitoring a vehicle moving information so as to control the components in the vehicle automatically.

Another object of the present invention is to provide a GPS traveling control system and the method of the same, wherein the system further comprises an input device for inputting data through

wired or wireless transmission to change the control condition and / or instruction. Therefore, the components of a vehicle can be controlled flexibly.

5 A further object of the present invention is to provide a GPS traveling control system and the method of the same, wherein the track of the vehicle can be automatically reported to a control center so as to monitor the vehicle at any time.

To achieve the objects, the present invention provides a GPS traveling control system. The GPS traveling control system mainly
10 includes a GPS global positioning device, a memory device, and a microprocessor. The GPS traveling control system utilizes in a moving vehicle for receiving signals from global positioning satellites and for automatically controlling the operation of at least one component in the vehicle. The GPS global positioning device
15 serves for receiving signals from the global positioning satellites and then deriving global positioning data about longitude and latitude, date, and / or speed, and altitude of the vehicle. The memory device stores at least one control condition and at least one instruction corresponding to each control condition. The control
20 condition defines a judge condition to determine whether the corresponding instruction to be executed; and the control condition contains at least one control parameter. The microprocessor is using for comparing the global positioning data from the GPS global positioning device with the control condition in the memory device,
25 and determining whether the global positioning data is matched to the control condition. If yes, the corresponding vehicle component

is controlled to execute the corresponding instruction. Therefore, the present invention can monitor the vehicle moving information so as to control the corresponding component automatically.

5 The component of the vehicle according to the present invention is selected from any electronic device, such as head lamps, fog lamps, an audio device, a video device, radio, stereo, or other multimedia devices, GSM / hand free system, air conditioner, buzzer, warning lamp, or any other equivalent audio / video warning devices. The present invention can define a specific location, or a specific
10 time / date in the control condition to activate a GSM / hand free system automatically reporting the location of the vehicle to a control center, so as to monitor the vehicle at any time.

Each control condition may include at least one of the following parameters, and Boolean logic operations thereof:

15 (a) Time / date parameter: defining a specific time / date, or a time interval for executing the corresponding instructions;

(b) Longitude / latitude parameter: defining a location having a specific longitude/latitude, or a geometric zone for executing the corresponding instruction;

20 (c) Speed parameter: defining a specific speed, or a speed range for executing the corresponding instruction; and

(d) Altitude parameter: defining a specific altitude, or an altitude range for executing the corresponding instruction.

The present invention further comprises an input device for
25 inputting data through wired or wireless transmission to change the

control condition and / or instruction. Therefore, the components of a vehicle can be controlled flexibly.

The present invention provides a GPS traveling control method comprising the following steps:

5 receiving signals from the global positioning satellites and then deriving global positioning data about longitude and latitude, date, and / or speed, and altitude of the vehicle;

 comparing the global positioning data with the control condition, and determining whether the global positioning data is matched to
10 the control condition;

 reading the instruction corresponding to the control condition if the global positioning data matches the control condition; and

 controlling the corresponding vehicle component to execute the corresponding instruction.

15 The GPS vehicle traveling control method may be programmed for execution. The program can be stored in any recording medium identified and read by a microprocessor or any object without being confined by any form. For example, the recording medium may be an IC chip, a CD, a CD-R, an MO, a hard disk, or a floppy disk, the
20 object may contain any recording medium used by those skilled in the art. Preferably, the object is a random access memory (RAM) updated easily.

 Other objects, advantages, and novel features of the invention will become more apparent from the following detailed description
25 when taken in conjunction with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 shows the data contents recorded in a prior GPS traveling recorder.

5 Fig. 2 shows a schematic view of the preferred embodiment of the present invention.

Fig. 3 shows the functional block diagram of the preferred embodiment of the present invention.

Fig. 4 shows the plurality of control conditions and corresponding instructions stored in the memory device of the present invention.

10 Fig. 5 shows a flow diagram of the preferred embodiment of the present invention.

Fig. 6 shows the schedule file of the preferred embodiment of the present invention stored in the memory device.

Fig. 7 shows a schematic view of the path of the schedule file in

15 Fig. 6.

Fig. 8 shows another schedule file of the preferred embodiment of the present invention stored in a memory device.

Fig. 9 shows a schedule file updated from Fig. 6.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to Fig. 2 and Fig. 3, the GPS traveling control system of the present invention is illustrated. The GPS traveling control system is installed in a passenger vehicle 8 (or other kinds
25 of vehicles, such as commercial car, truck, train...etc.). The vehicle 8 has head lamps 81, fog lamps 82, or an audio device 831, a video

device 832, and other multimedia systems 83, or a GSM / hand free system 84, etc.

With reference to Fig. 3, the above components are connected to a microprocessor 3 through a bus 30. Furthermore, a GPS global positioning device 1 and a memory device 2 are connected to the bus 30, respectively.

In this embodiment, the memory device 2 may be a memory card reader (not shown) for reading the content of a memory card. Fig. 4 shows that a plurality of events and corresponding control conditions, and instructions are stored in the memory card. Each event means that when the control condition is matched, a respective component (head lamps 81, fog lamps 82, an audio device 831, a video device 832, or other multimedia systems 83, etc, or GSM / hand free system 84) is controlled for executing the respective instruction. It should be noted that the control condition of each event may include one or more control parameter (time / date, longitude and latitude, speed, altitude, etc.). Of course, it may contain Boolean logic operations therebetween. The details will be described in the following.

Referring to Fig. 5, the flow diagram of this embodiment is illustrated. At first, in step SA, the GPS global positioning device 1 receives signals from three global positioning satellites 91, 92, and 93 through the GPS antenna 11 (referring to Fig. 2). Then, the microprocessor 12 calculates the global positioning data of the vehicle 8 at that time, which includes time / date, longitude and latitude, speed, altitude, etc. In step SB, the microprocessor 3

compares the calculated global positioning data with the control conditions in the memory device 2 and determines whether they are matched? In step SC, when the global positioning data matches one of the conditions, then the microprocessor 3 reads the corresponding instruction of the matched condition. In step SD, the corresponding component in the vehicle is instructed to execute the corresponding instruction.

Therefore with the abovesaid description, each event in Fig. 4 can be understood easily as below:

Event 1: when vehicle 8 enters into a specific location of a tunnel, the microprocessor 3 may actuate the head lamps 81 automatically for illuminating the tunnel.

Event 2: when the vehicle 8 accesses a specific zone of a city, at a specific time interval, for example, from PM 5: 00 to AM 7:00, the head lamps 81 can be actuated automatically to light the road. It should be noted that the specific zone and time interval are assembled by Boolean logic operation "AND".

Event 3: when the vehicle 8 enters into a zone which is easily covered by fog in a specific time interval, and the geometric boundary of the foggy zone is defined in the control condition, the microprocessor 3 can actuate the fog lamps 82.

Event 4: when the vehicle 8 enters into a landscape location, the microprocessor 3 will actuate the audio device 831, video device 832 or other multimedia system, etc. automatically for playing the introduction about the landscape.

Event 5: when the vehicle 8 enters into a specific location of a licensed store or department store in a specific time interval, for example the time interval for promotion, the microprocessor 3 may actuate the audio device 831, video device 832 or other multimedia system, etc. automatically for playing the promotion advertisement of products.

Event 6: when the vehicle 8 is driven in a specific zone of a super highway, and the vehicle speed is larger than 90km/ h, the microprocessor 3 may actuate the audio device 831 for playing an alert voice of over speed.

Event 7: when the vehicle 8 enters into a specific zone of a snow region and has a height over 2000m, the microprocessor 3 may actuate the audio device 831 automatically to inform the user an alert voice to add chains to the wheels. In this embodiment, it is preferred that signals of four satellites are received.

Event 8: when the vehicle 8 enters into a specific location of an accident, the microprocessor 3 may actuate the audio device 831 to play an alert voice to change the traveling path.

Other vehicle components, such as GSM / hand free system 84, buzzer, warning lamps, or other audio and video alarm device, or radio, stereo may be actuated according to the required condition. Those skilled in the art may execute these actions according to the above embodiment, and thus the details will not be further described.

Therefore, in the present invention, a moving vehicle may utilize the global positioning data of date, longitude and latitude, speed, altitude, etc. for monitoring the vehicle itself at any time, and

for controlling the components in the vehicle to be automatically actuated according to the preset conditions. Therefore, the present invention is more novel than the prior art.

Fig. 3 shows an input device 31, which can be used in step S0, i.e., it is used to input or change the control condition and / or instruction in advance. Thereby, these data may be stored in the memory device 2 through the microprocessor 3 for being used in the next time for monitoring the traveling information. Therefore, the components of the vehicle can be controlled flexibly.

The simplest form of the input device 31 is a keyboard which is wired-connected, or other wirelessly connected devices (such as through GSM wireless communication network, wireless pager network, or other wireless transmission way) for receiving the revised control conditions or instructions wirelessly from a control center 40. Thereby, the data in the memory device 2 can be updated. The wireless transmission is especially used in the field that the control condition must be changed frequently. For example, in above events 3 and 7, it is preferred that the actual situation of foggy zone or snowing zone from the climate report center can be updated by wireless communication. In above event 8, the data about the traffic accident from the traffic control center and voice data for changing traveling path can be updated wirelessly any time. The voice or video content of any event may be stored in the memory device 2, or a further memory with a larger capacity can be installed. For example, it is prerecorded in a compact disk for displaying to the driver. Preferably, in above event 5, an

information provider 4 updates the video contents through a larger bandwidth wirelessly.

In the application of the present invention, a plurality of control conditions and the corresponding instructions can be arranged in a schedule file and then are stored in the memory device 2. Fig. 6 shows a schedule file for tour traveling prerecorded in the memory device 2, wherein a plurality of events A1 ~ A5 are recorded, which shows the optimum path from the start point L0 to object L5 (referring to Fig. 7). When vehicle 8 moves to the specific location L1, L2, L3 or L4, it may execute respective instruction automatically for dialing the GSM / hand free system 84 to the control center 40 for reporting the location / time of the vehicle at that time. Therefore, the control center 40 may completely monitor and track the path of the vehicle. When the vehicle 8 accesses the object location L5, the microprocessor 3 executes the instruction for actuating the multimedia system to play the VCD compact disk video of the introduction of landscape. It has a preferred tour guide effect.

Another schedule file is illustrated in Fig. 8, wherein a plurality of events T1 to A9 are recorded. In that the control condition is defined every one hour, or when the vehicle arrives to the object L9, the corresponding instructions are all executed automatically for dialing the GSM / hand free system 84 to report the location / time to the control center 40. Thereby, the control center 40 may completely know the trace of the vehicle. This function is especially suitable for vehicles which must be tracked,

such as oil tank vehicles, refrigerator trucks, transferring vehicles of linking supermarket, etc.

5 The two schedules illustrated in Figs. 6 and 8 are arranged at a specific location or a specific time, wherein the corresponding instructions are executed automatically for dialing the GSM / hand free system 84 to report the location / time to the control center 40. However, as the vehicle is driven in a large area, such as big country of U.S.A. or China, the service telephone numbers of the control centers are not the same in every state. Therefore, a setting
10 condition may be used, wherein as the vehicle 8 enters into a specific area, the vehicle 8 may capture automatically the service telephone number of the new control center from the old one. And then, the GSM / hand free system 84 is dialed to report the location / time to the new control center.

15 Since in the present invention, the vehicle can be tracked at any time by defining the report condition, the control center 40 may actively provide the real-time service to the vehicle driver. For example, if a traffic accident occurs in L3, the control center 40 may notice the vehicle driver immediately through the GSM / hand free
20 system to change the path, and then a new schedule (referring to Fig. 9) file is downloaded through the GSM wireless network for replacing the old one (referring to Fig. 6). Then the new schedule file is stored in the memory device 2 for tracking continuously. It should be noted that L3 has been cancelled in Fig. 9, and another
25 two new reporting locations L6 and L7 are added for detouring around the location L3.

Another, when the vehicle owner requests the control center 40 to provide the nearest repairing centers, oil stations, restaurants, or other specific locations. The control center 40 may download a new schedule file through the GSM wireless network and stores the file in the memory device 2 for tracking continuously. When the vehicle moves near the specific location, for example, a repairing center, about a pre-determined distance (for example, 300 to 500m), the control center 40 may actively inform the repairing center the repairing requirement of the vehicle. Thereby, the repairing center may prepare in advance to receive the guest.

The abovesaid schedule file may be wirelessly downloaded by the control center 40 automatically for updating the contents in the memory device 2. Of course, it can be input manually by the vehicle owner. For example, the preferred contents in a schedule file may be inputted from a keyboard by the vehicle owner. Alternatively, the control center 40 may offer a web site server for vehicle owner to set his own schedule file in Internet. Then, the file is downloaded through GSM wireless network from the control center 40 to the memory device 2 of the vehicle to be used next time.

In the present invention, the GPS vehicle traveling control method may be programmed for execution. The program can be stored in any recording medium identified and read by a microprocessor, or any object contains the recording medium without being confined by any form. Preferably, the recording medium is a random access memory (RAM), the cashe memory 32 in Fig. 3, an IC chip, a CD, a CD-R, an MO, a hard disk, a floppy disk,

or other object containing the recording medium used by those skilled in the art. Since the method of the present invention has been disclosed completely, and those skilled in the art may write the software program from above description. Thus, the details about
5 writing the program will not be further described herein.

Although the present invention has been explained in relation to its preferred embodiment, it is to be understood that many other possible modifications and variations can be made without departing from the spirit and scope of the invention as hereinafter claimed.

10



WHAT IS CLAIMED IS:

1. A GPS traveling control system utilized in a moving vehicle for receiving signals from global positioning satellites and for automatically controlling the operation of at least one component in the vehicle, the GPS traveling control system comprising:

a GPS global positioning device for receiving signals from the global positioning satellites and then deriving global positioning data about longitude / latitude, time / date, and / or speed, and altitude of the vehicle;

a memory device storing at least one control condition and at least one instruction corresponding to each control condition; the control condition defining a judge condition to determine whether the corresponding instruction to be executed; and the control condition containing at least one control parameter; and

a microprocessor for comparing the global positioning data from the GPS global positioning device with the control condition in the memory device, and determining whether the global positioning data is matched to the control condition, if yes, the corresponding vehicle component is controlled to execute the corresponding instruction.

2. The GPS traveling control system as claimed in claim 1, wherein the component of the vehicle is selected from one of a group containing head lamps, fog lamps, an audio device, a video device, a multimedia system, and a GSM / hand free system.



3. The GPS traveling control system as claimed in claim 1, wherein each control condition includes at least one of the following control parameters:

5 (a) time / date parameter: defining a specific time / date, or a time interval for executing the corresponding instruction;

(b) longitude / latitude parameter: defining a location having a specific longitude/latitude, or a geometric zone for executing the corresponding instruction;

10 (c) speed parameter: defining a specific speed, or a speed range for executing the corresponding instruction; and

(d) altitude parameter: defining a specific altitude, or an altitude range for executing the corresponding instruction.

15 4. The GPS traveling control system as claimed in claim 1, wherein the control condition includes at least two control parameters and Boolean logic operations thereof.

5. The GPS traveling control system as claimed in claim 1, further comprising an input device for inputting data through wired transmission to change the control condition and / or instruction.

20 6. The GPS traveling control system as claimed in claim 1, further comprising an input device for inputting data through wireless transmission to change the control condition and / or instruction.

25 7. The GPS traveling control system as claimed in claim 6, wherein the wireless transmission is GSM wireless communication net transmission.



8. A GPS traveling control method utilized in a GPS traveling control system of a moving vehicle for receiving signals from global positioning satellites and for automatically controlling the operation of at least one component in the vehicle; the GPS traveling control system storing at least one control condition and at least one instruction corresponding to each control condition; the control condition defining a judge condition to determine whether the corresponding instruction to be executed; and the control condition containing at least one control parameter; the GPS traveling control method comprising the steps of:

receiving signals from the global positioning satellites and then deriving global positioning data about longitude / latitude, time / date and / or speed, and altitude of the vehicle;

comparing the global positioning data with the control condition, and determining whether the global positioning data is matched to the control condition;

reading the instruction corresponding to the control condition if the global positioning data matches the control condition; and

controlling the corresponding vehicle component to execute the corresponding instruction.

9. The GPS traveling control method as claimed in claim 8, wherein the component of the vehicle is selected from one of a group containing head lamps, fog lamps, an audio device, a video device, a multimedia system, and a GSM / hand free system.



10. The GPS traveling control method as claimed in claim 8, wherein each control condition includes at least one of the following control parameters:

5 (a) time / date parameter: defining a specific time / date, or a time interval for executing the corresponding instruction;

(b) longitude / latitude parameter: defining a location having a specific longitude/latitude, or a geometric zone for executing the corresponding instruction;

10 (c) speed parameter: defining a specific speed, or a speed range for executing the corresponding instruction; and

(d) altitude parameter: defining a specific altitude, or an altitude range for executing the corresponding instruction.

15 11. The GPS traveling control method as claimed in claim 8, wherein the control condition includes at least two control parameters and Boolean logic operations thereof.

12. The GPS traveling control method as claimed in claim 8, further comprising an input device for inputting data to change the control condition and / or instruction.

20 13. The GPS traveling control system as claimed in claim 12, wherein the input device receives data from GSM wireless communication net transmission.

25 14. A computer readable recording medium utilized in a GPS traveling control system of a moving vehicle for receiving signals from global positioning satellites; the GPS traveling control system storing at least one control condition and at least one instruction corresponding to each control condition; the control condition



defining a judge condition to determine whether the corresponding instruction to be executed; and the control condition containing at least one control parameter; the recording medium recording a software program for automatically controlling the operation of at least of component in the vehicle responsive to GPS global positioning data calculated from signals of GPS global positioning satellites; the software program comprising:

first program means for receiving signals from the global positioning satellites and then deriving global positioning data about longitude / latitude, time / date, and / or speed, and altitude of the vehicle;

second program means for comparing the global positioning data with the control condition, and determining whether the global positioning data is matched to the control condition;

third program means for reading the instruction corresponding to the control condition if the global positioning data matches the control condition; and

fourth program means for controlling the corresponding vehicle component to execute the corresponding instruction.

15. The computer readable recording medium as claimed in claim 14, wherein the component of the vehicle is selected from one of a group containing head lamps, fog lamps, an audio device, a video device, a multimedia system, and a GSM / hand free system.

16. The computer readable recording medium as claimed in claim 14, wherein each control condition includes at least one of the following control parameters:



(a) time / date parameter: defining a specific time / date, or a time interval for executing the corresponding instruction;

(b) longitude / latitude parameter: defining a location having a specific longitude/latitude, or a geometric zone for executing the corresponding instruction;

(c) speed parameter: defining a specific speed, or a speed range for executing the corresponding instruction; and

(d) altitude parameter: defining a specific altitude, or an altitude range for executing the corresponding instruction.

10 17. The computer readable recording medium as claimed in claim 14, wherein the control condition includes at least two control parameters and Boolean logic operations thereof.

15 18. The computer readable recording medium as claimed in claim 14, further comprising a fifth program means for inputting data to change the control condition and / or instruction.

19. The computer readable recording medium as claimed in claim 18, wherein the fifth program means receives data from GSM wireless communication net transmission.