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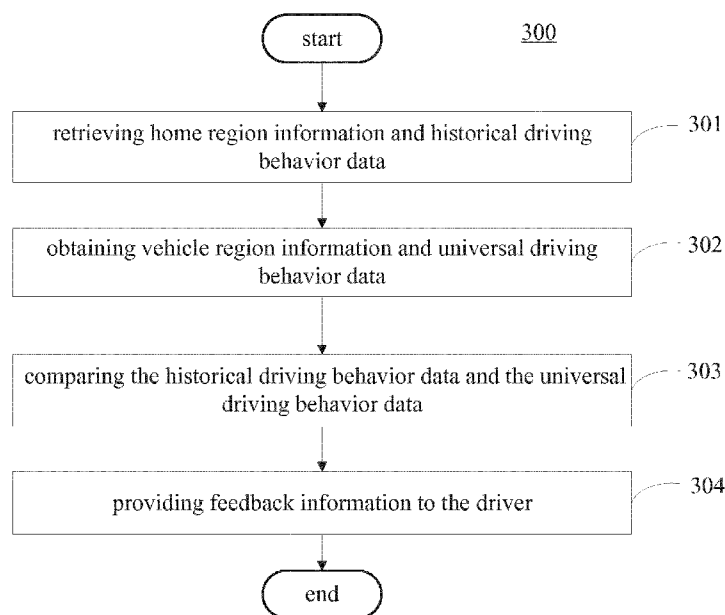


FIG 3

(57) Abstract: A driver assistance method and system for a vehicle is disclosed. The driver assistance method for a vehicle includes: retrieving home region information and historical driving behavior data for a driver of the vehicle; obtaining vehicle region information for the vehicle and universal driving behavior data corresponding to the vehicle region information; comparing the historical driving behavior data and the universal driving behavior data, in response to the home region information not matching the vehicle region information; and providing feedback information to the driver, in response to a difference between the historical driving behavior data and the universal driving behavior data being greater than a predetermined threshold. The driver may adjust his driving behavior based on the feedback information, so as to drive the vehicle more safely.

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DRIVER ASSISTANCE METHOD AND SYSTEM FOR A VEHICLE

FIELD

[0001] The present disclosure generally relates to a field of automobile, and more particularly, to a driver assistance method and system for a vehicle.

BACKGROUND

[0002] In modern society, the quality of life is constantly improving, driving becomes an essential skill of people, who not only drive their private-ownership vehicles, but also drive sharing vehicles like rental cars. People may enjoy a variety of fun with driving, and their life may be greatly facilitated. With development of automobile industry, the vehicles become more intelligent, and a variety of vehicle control systems and driver assistance systems may greatly improve people's driving experience.

[0003] The process of globalization causes people to have more and more opportunities to study, visit or travel in other countries or regions. The development of car rental and car sharing also causes people to have the possibility of driving vehicles around the world, which followed by people have more demand of driving vehicles in these other countries or regions.

SUMMARY

[0004] A driver assistance method for a vehicle according to an embodiment of the present disclosure, comprising: retrieving home region information and historical driving behavior data for a driver of the vehicle; obtaining vehicle region information for the vehicle and universal driving behavior data corresponding to the vehicle region information; comparing the historical driving behavior data and the universal driving behavior data, in response to the home region information not matching the vehicle region information; and providing feedback information to the driver, in response to a difference between the historical driving behavior data and the universal driving behavior data being greater than a predetermined threshold.

[0005] In an embodiment, wherein the home region information and the historical driving behavior data are obtained based on identity information of the driver, and the identity

information comprises one or more of a facial feature, a fingerprint, an identification feature.

[0006] In an embodiment, wherein the historical driving behavior data and the universal driving behavior data each comprise one or more of an average speed, an acceleration from standing, a braking time, a steering angle.

[0007] In an embodiment, wherein the vehicle region information is determined based on one or more of a registration location of the vehicle, a current location of the vehicle provided by the positioning system.

[0008] In an embodiment, wherein the universal driving behavior data is predetermined.

[0009] In an embodiment, wherein the universal driving behavior data is obtained with respect to the vehicle region information by calculating driving behavior data of a plurality of users whose home region information matches the vehicle region information.

[0010] In an embodiment, wherein the feedback information comprises one or more of audio information, visual information, tactile information.

[0011] A driver assistance system for a vehicle according to an embodiment of the present disclosure, comprising: a driver information retrieving unit configured to retrieve home region information and historical driving behavior data for a driver of the vehicle; a vehicle information obtaining unit configured to obtain vehicle region information for the vehicle and universal driving behavior data corresponding to the vehicle region information; a comparing unit configured to compare the historical driving behavior data and the universal driving behavior data, in response to the home region information not matching the vehicle region information; and a feedback unit configured to provide feedback information to the driver, in response to a difference between the historical driving behavior data and the universal driving behavior data being greater than a predetermined threshold.

[0012] In an embodiment, wherein the driver information retrieving unit is configured to obtain the home region information and the historical driving behavior data based on identity information of the driver, and the identity information comprises one or more of a facial feature, a fingerprint, an identification feature.

[0013] In an embodiment, wherein the historical driving behavior data and the universal driving behavior data each comprise one or more of an average speed, an acceleration from standing, a braking time, a steering angle.

[0014] In an embodiment, wherein the vehicle information obtaining unit is configured to determine the vehicle region information based on one or more of a registration location of the vehicle, a current location of the vehicle provided by the positioning system.

[0015] In an embodiment, wherein the universal driving behavior data is predetermined.

[0016] In an embodiment, wherein the universal driving behavior data is obtained with respect to the vehicle region information by calculating driving behavior data of a plurality of users whose home region information matches the vehicle region information.

[0017] In an embodiment, wherein the feedback information comprises one or more of audio information, visual information, tactile information.

[0018] A driver assistance system for a vehicle according to an embodiment of the present disclosure, comprising: a processor; a memory for storing instructions executable by the processor; wherein the processor is configured to: retrieving home region information and historical driving behavior data for a driver of the vehicle; obtaining vehicle region information for the vehicle and universal driving behavior data corresponding to the vehicle region information; comparing the historical driving behavior data and the universal driving behavior data, in response to the home region information not matching the vehicle region information; and providing feedback information to the driver, in response to a difference between the historical driving behavior data and the universal driving behavior data being greater than a predetermined threshold.

[0019] With the driver assistance method and system for a vehicle according to the embodiments of the present disclosure, the driver may adjust his driving behavior based on the feedback information, so as to adapt local driving habits of other geographic regions and drive the vehicle more safely.

BRIEF DESCRIPTION OF THE DRAWINGS

[0020] The present disclosure will be interpreted better from the following detailed description in conjunction with the accompanying drawings, in which:

[0021] Fig. 1 is a simplified block diagram of a vehicle having a driver assistance system according to an embodiment of the present disclosure;

[0022] Fig. 2 is a block diagram illustrating a driver assistance system for a vehicle

according to an embodiment of the present disclosure;

[0023] Fig. 3 is a flow diagram illustrating a driver assistance method for a vehicle according to an embodiment of the present disclosure;

[0024] Fig. 4 is a schematic diagram of an information processing device with which a driver assistance system according to an embodiment of the present disclosure may be implemented.

DETAILED DESCRIPTION

[0025] Features of various aspects and exemplary embodiments of the disclosure will be described in details in conjunction with the accompanying drawings. In the following detailed description, numerous specific details are provided in order to provide thorough understanding of embodiments of the disclosure. One skilled in the relevant art will appreciate that the disclosure may be practiced without one or more of the specific details. The following descriptions of the embodiments are intended to provide clearer understanding of the disclosure by way of illustrating the examples. The disclosure is not limited to any specific configuration and algorithm, and encompasses any modification, alternative and change for elements, components and algorithms without departing from the spirit of the disclosure.

[0026] Fig. 1 is a simplified block diagram of a vehicle 100. The vehicle may be various vehicles, such as sedan, van, truck, trolleybus, motorcycle, sport utility vehicle, tractor, etc., which may have one or more of an internal-combustion engine, an electric motor, etc. as its power mechanism.

[0027] As shown in Fig. 1, the vehicle 100 may include a control system 110, a sensor 120 and a driver assistance system 130, which may be connected with each other, for example, by a controller area network (CAN) bus 160 or a FlexRay® network. For simplicity, some well-known components such as power and steering system, transmission, etc. are not shown in Fig. 1. The vehicle 100 may optionally include a navigation device 140, a communication device 150, I/O device 170, an entertainment device (not shown), etc., which may also be connected via respective interfaces to the control system 110, the driver assistance system 130, etc.

[0028] The control system 110 may include, for example, an electronic control unit (ECU). The ECU may include one or more of processor (e.g. micro-processor), controller (e.g. micro-controller), programmable logic circuit (e.g. field programmable gate array (FPGA)), and application specific integrated circuit (ASIC), etc. The ECU may include one or more memory, such as random access memory (RAM), read only memory (ROM), erasable programmable ROM (EPROM), electrically EPROM (EEPROM), etc. The memory may store data, instructions, software, codes, etc., which may be executed to perform the actions described herein.

[0029] The sensor 120 may include one or more of: one or more camera device, one or more ultrasonic sensor, one or more radar device, one or more laser device, and one or more fingerprint sensors. The camera device may be mounted at front, rear, side, top, or inside part(s) of the vehicle, and may include a visible light camera, an infrared camera, or the like. The visible light camera may capture (e.g. in a view angle of about 60 degrees) images inside or outside the vehicle in real time and present the images to the driver and/or the passengers. In addition, by analyzing the images captured by the camera, such information as indications of traffic lights, situations of an intersection, status of other vehicles, etc. may be obtained. The infrared camera can capture images of objects at night. The ultrasonic sensor may be mounted around the vehicle to measure a distance of an outside object to the vehicle accurately. The ultrasonic sensor will typically have a higher accuracy in range measurement for a near object than for a far object. The radar device may be mounted at front, rear or other part(s) of the vehicle. Taking advantage of electromagnetic waves, the radar device may measure the distance of an outside object to the vehicle, and will typically have a higher sensitivity for metal objects. Owing to the Doppler Effect, the radar device may also be used to measure a change of speed of the vehicle relative to an outside object. The laser device (e.g. Light Detection and Ranging, LIDAR) may be mounted at front, rear or other part(s) of the vehicle. The laser device may detect accurate information of edge or shape of an object to conduct a precise object recognition and tracking. The fingerprint sensors may be mounted on a vehicle dashboard or a door handle which may be touched by the finger, and the fingerprint sensors may capture fingerprint information of the driver and/or a passenger. In the present disclosure, it should be appreciated that the fingerprint sensors may encompass a device

capable of detecting biometric information (e.g., vein texture, iris, intonation, posture etc.) of the driver and/or the passenger. The sensor 120 may further include devices for sensing the vehicle's own state (e.g. payloads and their distribution, maintenance status or travelling status of the vehicle), the ambient conditions around the vehicle (e.g. temperature, humidity, brightness, atmospheric pressure, etc.) or the like.

[0030] The driver assistance system 130 may be connected to the control system 110 and the transmission (not shown). The driver assistance system 130 may have one or more of the functions of, for example, lights control, horn control, lane keeping, automatic parking, actuating control of gear switch, braking, acceleration, steering, etc. The driver assistance system 130 may include one or more memory, such as random access memory (RAM), read only memory (ROM), erasable programmable ROM (EPROM), electrically EPROM (EEPROM), etc. The memory may store data, instructions, software, codes, etc., which may be executed to perform the actions described herein.

[0031] Onboard navigation device 140 may provide navigation information for the vehicle 100, such as information on current position, traveling speed and direction, route planning, facilities around, traffic condition, historical traffic data or the like. The navigation device 140 may operate based on satellite positioning (e.g. GPS, Glonass, Beidou, etc.), inertial positioning, assisted global positioning system (A-GPS) and/or triangulation location. The navigation device 140 may operate based on electronic maps locally stored on the vehicle 100, or based on electronic map data received externally.

[0032] The communication device 150 may include wireless communication device enabling the vehicle 100 to communicate with other information sources. For example, the vehicle 100 may communicate with nearby vehicles (known as "Car to Car (Car2Car)" or "Vehicle to Vehicle (V2V)" communication). More generally, the vehicle 100 may communicate with nearby vehicles, pedestrians, facilities, etc. (known as "Car to X (Car2X)" or "Vehicle to X (V2X)" communication). For example, the vehicle may send to a traffic light via the communication device 150 a request for its current state (e.g. whether it's green or red). The traffic light may also broadcast such state to nearby vehicles. The vehicle 100 may also send its own information, e.g. model, traveling direction, traveling speed, or the like, to nearby vehicles or facilitates. The communication device 150 may include one based on any

type of electromagnetic waves (e.g. infrared, microwave, millimeter waves, etc.), and may perform Car2Car or Car2X communications based on any predefined communication protocols.

[0033] The I/O device 170 may include various devices that allow the user to interact with the vehicle 100, including, for example, a keyboard, a mouse, a touchpad, a touch screen, a joystick, a button, a microphone, a speaker, a display, and the like.

[0034] Currently, more and more people have the opportunity to go to other countries or regions to study, visit or travel, etc., such that people have more opportunities to drive vehicles in these other countries or regions. This brings a lot of problems, for example, because the driving behavior of each country or region is not the same, when a tourist driving a vehicle (which may be a friend's vehicle, a leased vehicle, or his own vehicle, etc.) in foreign countries, the driving behavior of the visitor may not match the driving behavior of a local driver. For example, the visitor's acceleration from standing may be very high, and the local driver's acceleration from standing may be low, which may cause trouble or even safe problems for the visitor. Therefore, there is a need for a driver assistance method and system for a vehicle, so as to assist the driver in adapting to local driving behavior.

[0035] Fig. 2 is a block diagram illustrating a driver assistance system 130 for a vehicle according to an embodiment of the present disclosure. As shown in Fig. 2, the driver assistance system 130 for a vehicle according to an embodiment of the present disclosure may include a driver information retrieving unit 201, a vehicle information obtaining unit 202, a comparing unit 203, a feedback unit 204. The units may be implemented in hardware circuits, or software modules, or both. The units will be described in detail in the following.

[0036] Fig. 3 is a flow diagram illustrating a driver assistance method 300 for a vehicle according to an embodiment of the present disclosure. According to embodiments of the disclosure, when the driver driving the vehicle 100, the driver assistance system 130 may perform the method 300, such that the driver may adjust his driving behavior based on the feedback information so as to drive the vehicle more safely. As shown in Fig. 3, the driver assistance method 300 for a vehicle according to an embodiment of the present disclosure may include the following steps.

[0037] In step 301, the driver information retrieving unit 201 in the driver assistance system

130 may retrieve home region information and historical driving behavior data for a driver of the vehicle. In some embodiments, the home region information and the historical driving behavior data may be associated with identity information of the driver. The home region information and the historical driving behavior data as well as the identity information of the driver may be stored in a database. The database may be stored in a memory of the driver assistance system 130, or may be stored in a server which may be connected with the driver assistance system 130 via the communication device 150.

[0038] In some embodiments, when the driver enters the vehicle 100, the driver information retrieving unit 201 may obtain the home region information and the historical driving behavior data based on the identity information of the driver. The identity information may include a facial feature, a fingerprint, an identification feature, and the like. For example, the driver information retrieving unit 201 may obtain the facial feature via a camera device of the vehicle 100, obtain the fingerprint via a fingerprint sensor of the vehicle 100, and obtain the identification feature entered by the driver via the I/O device 170 of the vehicle 100. The home region information may be nationality information or region information of the driver, for example, China, German, Hong Kong, Beijing, Berlin, and the like.

[0039] In step 302, the vehicle information obtaining unit 202 in the driver assistance system 130 may obtain vehicle region information for the vehicle and universal driving behavior data corresponding to the vehicle region information. In some embodiments, the vehicle region information may be determined based on a registration location of the vehicle, a current location of the vehicle provided by the positioning system, and the like. For example, the vehicle 100 may be generally used in the registered location of the vehicle, and the vehicle region information may correspond to the registration location of the vehicle. The vehicle region information may also correspond to the current location of the vehicle 100 provided by the navigation device 140. The vehicle region information may be, for example, China, German, Hong Kong, Beijing, Berlin, and the like.

[0040] In some embodiments, the historical driving behavior data and the universal driving behavior data each may include an average speed, an acceleration from standing, a braking time, a steering angle, and the like. The average speed may be an average speed of the vehicle 100 throughout the trip, for example, 60 km/h, 20 m/s, and so on. The average speed may

also be an average speed of the vehicle 100 in some distance, for example, near a crosswalk line, near a school gate. The acceleration from standing may indicate an acceleration of the vehicle 100 from a stationary state to a normal running state, for example, 1 m/s^2 , 1.5 m/s^2 , and so on. The braking time may be the time of the vehicle 100 from the normal running state to the stationary state, for example, 4s, 5s and so on. The steering angle may be a rotation angle of wheels when the vehicle 100 turns, for example, 8 degrees, 10 degrees, and so on. The historical driving behavior data and the universal driving behavior data may also include data consist of one or more parameters associated with the vehicle 100, or other data capable of reflecting the driving behavior of the driver.

[0041] In some embodiments, the historical driving behavior data may be entered by the driver himself, that is, the driver may define his own historical driving behavior data. For example, a predetermined value may be set for each of the average speed, the acceleration from standing, the braking time, and the steering angle. In another embodiment, the historical driving behavior data may also be obtained based on the driver's historical driving records. For example, the historical driving behavior data may be obtained by calculating (e.g., arithmetic averaging, weighted averaging, etc.) each driving behavior data of the driver.

[0042] In some embodiments, the universal driving behavior data may be predetermined. For example, based on specific vehicle region information (e.g., a country or a region), a predetermined value may be set for each of the average speed, the acceleration from standing, the braking time, and the steering angle. In another embodiment, the universal driving behavior data may be obtained with respect to the vehicle region information by calculating driving behavior data of a plurality of users whose home region information matches the vehicle region information. For example, with respect to particular vehicle region information, there may be a plurality of users whose home region information matches the particular vehicle region information. The universal driving behavior data may be obtained by calculating (e.g., arithmetic averaging, weighted averaging, etc.) the driving behavior data of these users. For example, when the vehicle region information is Hong Kong, driving behavior data of a plurality of users whose home region information is Hong Kong may be averaged to obtain universal driving behavior data.

[0043] In step 303, the comparing unit 203 in the driver assistance system 130 may compare

the historical driving behavior data and the universal driving behavior data, in response to the home region information not matching the vehicle region information. In some embodiments, when users go to other countries or regions to study, visit or travel, etc., the users may drive vehicles (which may be friend's vehicles, leased vehicles, or their own vehicles, etc.) in these other countries or regions. In this case, the home region information of the user does not match the vehicle region information. Thus, the comparing unit 203 may compare the historical driving behavior data with the universal driving behavior data. For example, the comparing unit 203 may compare the historical average speed of the driver with the universal average speed.

[0044] In step 304, the feedback unit 204 in the driver assistance system 130 may provide feedback information to the driver, in response to a difference between the historical driving behavior data and the universal driving behavior data being greater than a predetermined threshold. In some embodiments, the comparing unit 203 may set a threshold for the difference between the historical driving behavior data and the universal driving behavior data. When the difference is greater than a predetermined threshold, the comparing unit 203 may consider that the historical driving behavior data does not match the universal driving behavior data. The predetermined threshold value may be a ratio with respect to any one of the historical driving behavior data and the universal driving behavior data, or may be an absolute value. The difference may be an absolute value, or a norm of a vector. For example, when the difference between the historical average speed and the universal average speed is greater than 20% or 15 km/h, the comparing unit 203 may consider that the historical average speed does not match the universal average speed. In this case, the feedback unit 204 may provide the feedback information to the driver.

[0045] In some embodiments, the feedback information may include audio information, visual information, tactile information, and the like. The feedback unit 204 may remind the driver by a voice, for example, "Attention. Your average speed is too fast, in this country you should slow down". The feedback unit 204 may also remind the driver by a display in the vehicle, for example, the display may display "Attention. Your average speed is too fast, in this country you should slow down". The feedback unit 204 may also remind the driver by the actuating control, for example, a reverse force may be applied to the accelerator pedal to

alert the driver to decelerate.

[0046] The following discussion takes the difference between the driving behavior of a Chinese driver and the driving behavior of a German driver as an example. In one embodiment, when the red turns green, the acceleration from standing of the Chinese driver may usually be low to prevent someone from running a red light, and the acceleration from standing of the German driver may be high to make the traffic more efficient. In a case when a user (whose the home region information is China) drives a vehicle in Germany (i.e., the vehicle region information is Germany), when the red turns green, the comparing unit 203 in the driver assistance system 130 may determine that the difference between the historical acceleration from standing of the user and the universal acceleration from standing of Germany is greater than a certain threshold (e.g., 20%, or 0.5 m/s^2), so that the feedback unit 204 in the driver assistance system 130 may alert the user to be faster. In a case when a user (whose the home region information is Germany) drives a vehicle in China (i.e., the vehicle region information is China), when the red turns green, the comparing unit 203 in the driver assistance system 130 may determine that the difference between the historical acceleration from standing of the user and the universal acceleration from standing of China is greater than a certain threshold (e.g., 20%, or 0.5 m/s^2), so that the feedback unit 204 in the driver assistance system 130 may alert the user to be slower.

[0047] In another embodiment, the historical driving behavior data and the universal driving behavior data may also be, for example, an average speed through a crosswalk line. A Chinese driver may likely be very fast when approaching the crosswalk line, while a German driver may slow down or even stop for waiting when approaching the crosswalk line. In a case when a user (whose the home region information is China) drives a vehicle in Germany, when approaching the crosswalk line, the comparing unit 203 in the driver assistance system 130 may determine that the difference between the historical average speed of the user and the universal average speed of Germany is greater than a certain threshold, so that the feedback unit 204 in the driver assistance system 130 may alert the user to slow down. In a case when a user (whose the home region information is Germany) drives a vehicle in China, when approaching the crosswalk line, the comparing unit 203 in the driver assistance system 130 may determine that the difference between the historical average speed of the user and

the universal average speed of China is greater than a certain threshold, so that the feedback unit 204 in the driver assistance system 130 may alert the user to be faster.

[0048] Fig. 4 is a schematic diagram of an information processing device 400 with which the driver assistance system 130 according to the embodiments can be implemented. As shown in Fig. 4, the device 400 may include one or more of a processor 420, a memory 430, a power component 440, an input/output (I/O) interface 460 and a communication interface 480, which may be communicatively coupled, for example, by a bus 410.

[0049] The processor 420 controls overall operations of the device 400, e.g. the operations associated with data communication and computation process. The processor 420 may include one or more processing cores and may execute instructions to perform some or all of the steps in the method described herein. The processor 420 may include various devices capable of processing, including but not limited to, general purpose processor, specific purpose processor, micro-processor, micro-controller, graphics processing unit (GPU), digital signal processor (DSP), application specific integrated circuit (ASIC), programmable logic device (PLD), Field Programmable Gate Array (FPGA), or the like. The processor 420 may include a cache 425 or may communicate with the cache 425 to increase the access of data.

[0050] The memory 430 is configured to store various instructions and/or data to support the operations of the device 400. The memory 430 may be implemented by any type of volatile or non-volatile storages, or their combinations. The memory 430 may include a semiconductor memory such as random access memory (RAM), static RAM (SRAM), dynamic RAM (DRAM), read-only memory (ROM), programmable ROM (PROM), erasable PROM (EPROM), electrically erasable PROM (EEPROM), flash memory, etc. The memory 430 may also include any storage using paper, magnetic, and/or optical media, such as tape, hard disk, cassette, floppy, magneto-optic (MO), compact-disc (CD), digital versatile disc (DVD), Blue-ray, etc.

[0051] The power component 440 provides power to various components of the device 400. The power component 440 may include an internal battery and/or an external power interface, and may include a power management system and other components associated with generating, managing and distributing power for the device 400.

[0052] The I/O interface 460 provides an interface by which a user can interact with the

device 400. The I/O interface 460 may include interface(s) based on, for example, PS/2, RS-232, USB, FireWire, Lightning, VGA, HDMI, DisplayPort, etc., to enable a user to interact with the device 400 by peripheral devices such as keypad, mouse, touch pad, touch screen, joystick, button, microphone, loudspeaker, display, camera, projection port, etc.

[0053] The communication interface 480 is configured to enable the device 400 to communicate with other devices wiredly or wirelessly. Through the communication interface 480, the device 400 may access a network based on one or more of communication standards such as Wi-Fi, 2G, 3G, 4G communication networks. In an exemplary embodiment, the communication interface 480 may receive broadcast signals or broadcast-related information from an external broadcast management system through a broadcast channel. Examples of communication interface 480 may include interfaces based on Near Field Communication (NFC), Radio Frequency Identification (RFID), Infrared Data Association (IrDA), Ultra Wide Band (UWB), Bluetooth (BT), etc.

[0054] Function blocks shown in the above block diagram(s) can be implemented in hardware, software, firmware or their combination. When the function blocks are implemented in hardware, they may be, for example, electronic circuit, ASIC, suitable firmware, plug-in, functional card, etc. When the function blocks are implemented in software, the elements may be programs or code segments for performing required tasks. The programs or code segments may be stored in a non-transitory machine-readable medium, or may be transmitted over some transmission medium or communication links by signals in carrier waves. The term “machine-readable medium” may include any medium that can store or transmit information, e.g. a volatile computer-readable medium or a non-volatile computer-readable medium. Examples of machine-readable medium may include electronic circuit, semiconductor memory, ROM, flash memory, erasable ROM (EROM), floppy, CD-ROM, optical disk, hard disk, optical fiber, radio frequency link, etc. The code segments can be downloaded via a computer network such as Internet, intranet and the like.

[0055] The present techniques can be implemented in other ways without departing from the spirit and essence thereof. For example, the algorithms described in specific embodiments can be modified while the architecture of the system does not depart from the spirit of the present disclosure. Therefore, the embodiments should in all aspects be regarded as

illustrative instead of limiting. The scope of the present disclosure is defined by the claims rather than by the above embodiments.

WHAT IS CLAIMED IS:

1. A driver assistance method for a vehicle, comprising:
retrieving home region information and historical driving behavior data for a driver of the vehicle;
obtaining vehicle region information for the vehicle and universal driving behavior data corresponding to the vehicle region information;
comparing the historical driving behavior data and the universal driving behavior data, in response to the home region information not matching the vehicle region information; and
providing feedback information to the driver, in response to a difference between the historical driving behavior data and the universal driving behavior data being greater than a predetermined threshold.
2. The method of claim 1, wherein the home region information and the historical driving behavior data are obtained based on identity information of the driver, and the identity information comprises one or more of a facial feature, a fingerprint, an identification feature.
3. The method of claim 1, wherein the historical driving behavior data and the universal driving behavior data each comprise one or more of an average speed, an acceleration from standing, a braking time, a steering angle.
4. The method of claim 1, wherein the vehicle region information is determined based on one or more of a registration location of the vehicle, a current location of the vehicle provided by the positioning system.
5. The method of claim 1, wherein the universal driving behavior data is predetermined.
6. The method of claim 1, wherein the universal driving behavior data is obtained with respect to the vehicle region information by calculating driving behavior data of a plurality of

users whose home region information matches the vehicle region information.

7. The method of claim 1, wherein the feedback information comprises one or more of audio information, visual information, tactile information.

8. A driver assistance system for a vehicle, comprising:

a driver information retrieving unit configured to retrieve home region information and historical driving behavior data for a driver of the vehicle;

a vehicle information obtaining unit configured to obtain vehicle region information for the vehicle and universal driving behavior data corresponding to the vehicle region information;

a comparing unit configured to compare the historical driving behavior data and the universal driving behavior data, in response to the home region information not matching the vehicle region information; and

a feedback unit configured to provide feedback information to the driver, in response to a difference between the historical driving behavior data and the universal driving behavior data being greater than a predetermined threshold.

9. The system of claim 1, wherein the driver information retrieving unit is configured to obtain the home region information and the historical driving behavior data based on identity information of the driver, and the identity information comprises one or more of a facial feature, a fingerprint, an identification feature.

10. The system of claim 1, wherein the historical driving behavior data and the universal driving behavior data each comprise one or more of an average speed, an acceleration from standing, a braking time, a steering angle.

11. The system of claim 1, wherein the vehicle information obtaining unit is configured to determine the vehicle region information based on one or more of a registration location of the vehicle, a current location of the vehicle provided by the positioning system.

12. The system of claim 1, wherein the universal driving behavior data is predetermined.

13. The system of claim 1, wherein the universal driving behavior data is obtained with respect to the vehicle region information by calculating driving behavior data of a plurality of users whose home region information matches the vehicle region information.

14. The system of claim 1, wherein the feedback information comprises one or more of audio information, visual information, tactile information.

15. A driver assistance system for a vehicle, comprising:
a processor;
a memory for storing instructions executable by the processor;
wherein the processor is configured to:
retrieving home region information and historical driving behavior data for a driver of the vehicle;
obtaining vehicle region information for the vehicle and universal driving behavior data corresponding to the vehicle region information;
comparing the historical driving behavior data and the universal driving behavior data, in response to the home region information not matching the vehicle region information; and
providing feedback information to the driver, in response to a difference between the historical driving behavior data and the universal driving behavior data being greater than a predetermined threshold.

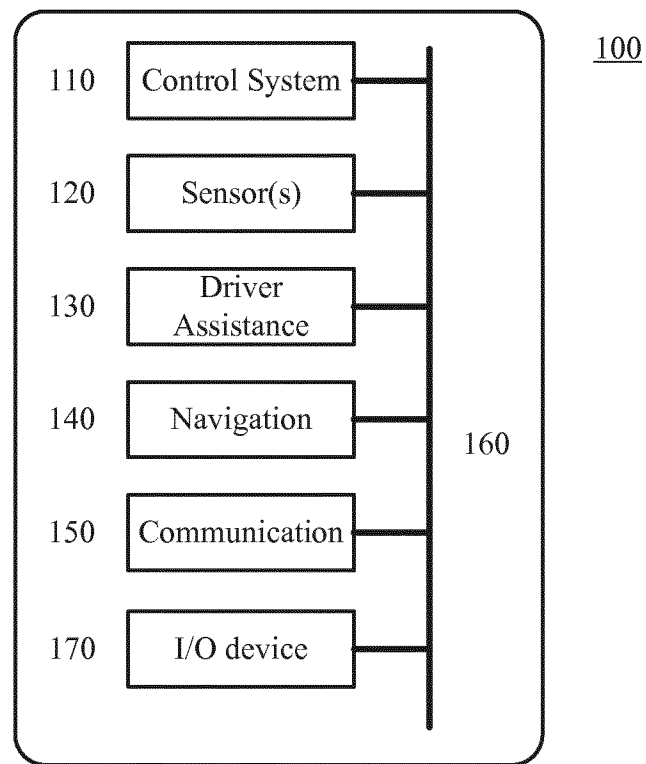
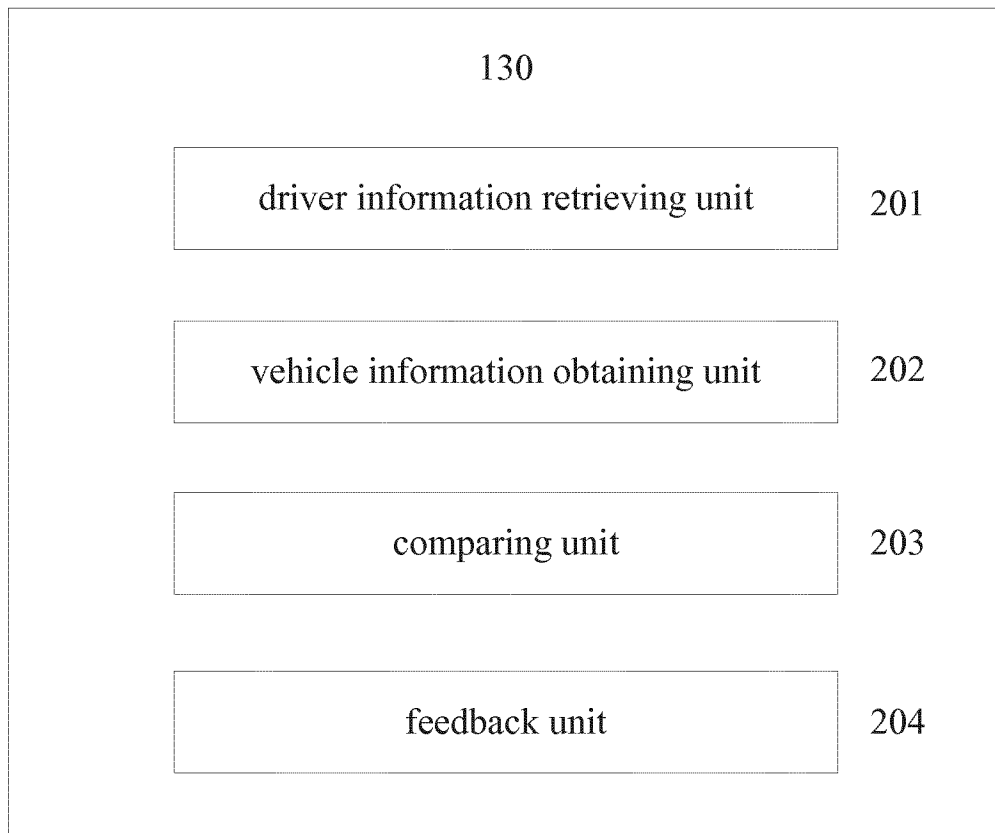
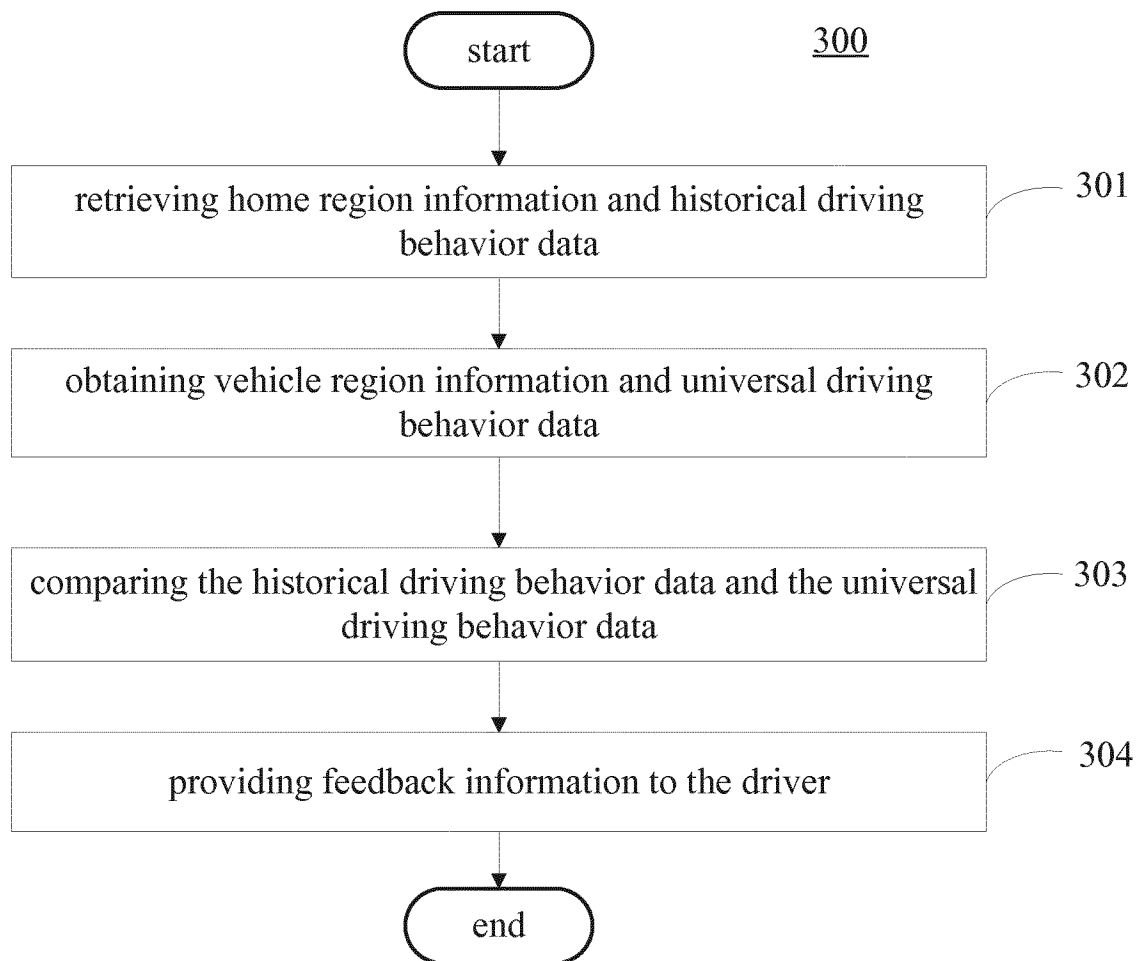


FIG. 1

**FIG. 2**

**FIG. 3**

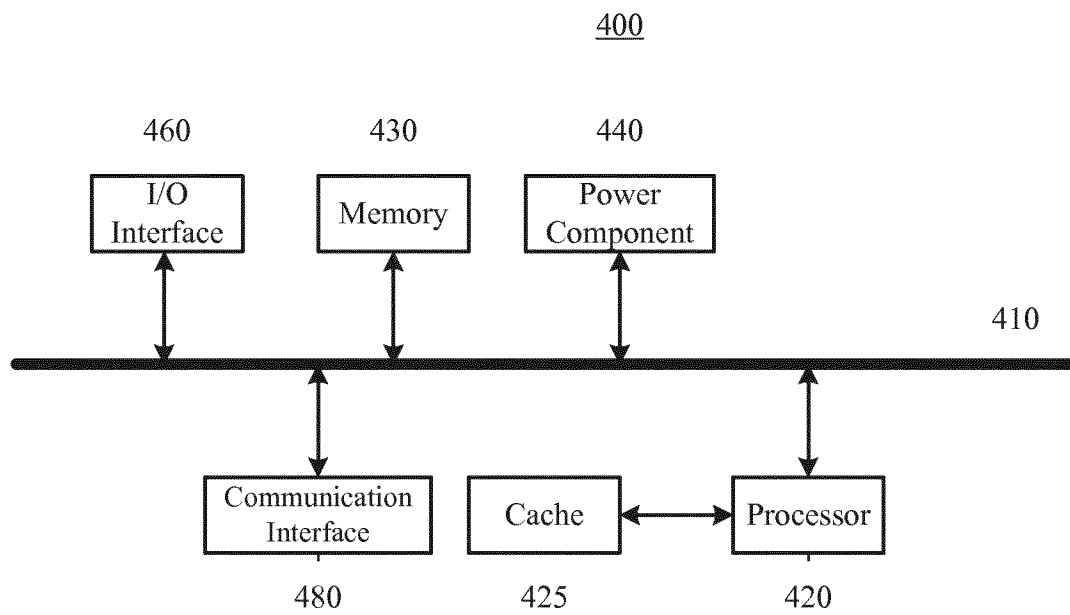


FIG. 4

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2018/071376

A. CLASSIFICATION OF SUBJECT MATTER
INV. B60W50/14 B60W40/09 B60W50/00
ADD.

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)
B60W

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 practicable, search terms used)

EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	EP 3 048 026 A1 (VOLVO CAR CORP [SE]) 27 July 2016 (2016-07-27) the whole document -----	1-15
A	US 2014/244125 A1 (DORUM OLE HENRY [US] ET AL) 28 August 2014 (2014-08-28) the whole document -----	1-15
A	GB 2 512 602 A (SCHRODER DAVID JOHN [GB]) 8 October 2014 (2014-10-08) the whole document -----	1-15
A	EP 2 116 984 A1 (BOSCH GMBH ROBERT [DE]) 11 November 2009 (2009-11-11) the whole document -----	1-15
A	DE 10 2005 052175 A1 (BOSCH GMBH ROBERT [DE]) 24 May 2007 (2007-05-24) the whole document -----	1-15



Further documents are listed in the continuation of Box C.



See patent family annex.

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"&" document member of the same patent family

Date of the actual completion of the international search

6 December 2018

Date of mailing of the international search report

20/12/2018

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/EP2018/071376

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