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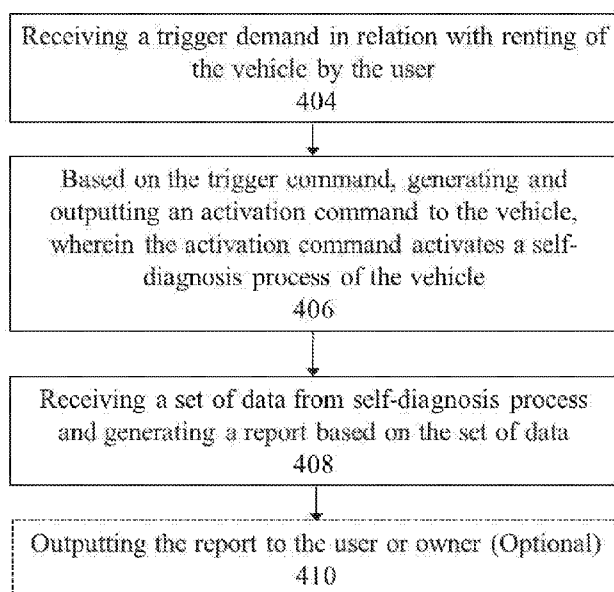


Fig. 4

(57) Abstract: The present disclosure discloses an apparatus, server and method for vehicle sharing, wherein the vehicle sharing is between a user and an owner of a vehicle. A server for vehicle sharing is provided, the server comprises: a receiver configured to receive a trigger command in relation with renting of the vehicle by the user; a controller configured to generate an activation command based on the trigger command, wherein the activation command activates a self-diagnosis process of the vehicle; and a transmitter configured to output the activation command to the vehicle; wherein: the receiver is configured to receive a set of data from the self-diagnosis process; and the controller is configured to generate a report based on the set of data.



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APPARATUS, SERVER AND METHOD FOR VEHICLE SHARING

FIELD OF THE INVENTION

[0001] The present disclosure relates in general to the field of vehicle sharing, and in more particular to an apparatus, server and method for vehicle sharing.

BACKGROUND OF THE INVENTION

[0002] The vehicle sharing service is gradually developing in China in these years. The current vehicle sharing service involves a fairly complicated rental process, including the potential vehicle user meeting the vehicle owner in person to check the condition of the vehicle before renting and checking the condition of the vehicle during vehicle pick-up and return scenarios. Thus, there is a need for an improved apparatus, server and method for vehicle sharing to provide a simple, convenient and easily performed vehicle sharing service.

SUMMARY OF THE INVENTION

[0003] The present disclosure aims to provide an improved apparatus, server and method for vehicle sharing.

[0004] In accordance with an embodiment of the present disclosure, a server for vehicle sharing is provided, the vehicle sharing is between a user and an owner of a vehicle, the server comprises: a receiver configured to receive a trigger command in relation with renting of the vehicle by the user; a controller configured to generate an activation command based on the trigger command, wherein the activation command activates a self-diagnosis process of the vehicle; and an transmitter configured to output the activation command to the vehicle; wherein: the receiver is configured to receive a set of data from the self-diagnosis process; the controller is configured to generate a report based on the set of data.

[0005] In an example of the present embodiment, the trigger command is a selection command indicating that the user selects the vehicle, a pick up vehicle command indicating the user picks up the vehicle, or a usage end command indicating the end of the usage of the vehicle by the user.

[0006] In an example of the present embodiment, generating an activation command based on the trigger command comprises: determining whether another user has selected the vehicle and the report has been generated in the server after the end of last usage of the vehicle; and if determining another user has selected the vehicle and the report has been generated after the end of last usage of the vehicle, the activation command is not generated and the transmitter is further configured to output the generated report to the user; or if determining there is no selection of the vehicle by another user, the activation command is generated.

[0007] In an example of the present embodiment, in the condition that the trigger command is the selection command, the set of data from the self-diagnosis process is a first set of data and the corresponding report is a first report output to the user; in the condition that the trigger command is the usage end command, the set of data from the self-diagnosis process is a second set of data and the corresponding report is a second report output to the user; the controller is further configured to compare the first set of data and the second set of data, and based on the comparison, to generate a third report; and the transmitter is further configured to output the third report to the owner.

[0008] In an example of the present embodiment, the self-diagnosis process comprises: sensors in the vehicle sensing conditions of a plurality of components in the vehicle and generating data indicative of the conditions of the plurality of components.

[0009] In an example of the present embodiment, if an unusual event occurs during the usage of the vehicle, the receiver is configured to receive data with respect to the unusual event from the vehicle, wherein the unusual event indicates that the vehicle is not in normal use; and the transmitter is further configured to output a notification of the unusual event and the data with respect to the unusual event to the owner.

[0010] In accordance with an embodiment of the present disclosure, an apparatus for vehicle sharing is provided, the vehicle sharing is between a user and an owner of the vehicle, the apparatus comprises: a receiver configured to receive an activation command from a server, wherein the activation command activates a self-diagnosis process of the vehicle; a controller configured to activate a self-diagnosis process of the vehicle, in response to the activation command; and an transmitter configured to output data from the self-diagnosis

process to the server.

[0011] In an example of the present embodiment, the apparatus further comprises sensors configured to sense conditions of a plurality of components in the vehicle, and the self-diagnosis process comprises: sensors sensing conditions of a plurality of components in the vehicle and generating data indicative of the conditions of the plurality of components.

[0012] In an example of the present embodiment, if an unusual event occurs during the usage of the vehicle by the user, the controller is configured to record data with respect to the unusual event, and the transmitter is configured to output the data with respect to the unusual event to the server, wherein the unusual event indicates that the vehicle is not in normal use.

[0013] In accordance with an embodiment of the present disclosure, a computer-implemented method for vehicle sharing is provided, the vehicle sharing is between a user and an owner of a vehicle, the method comprises: receiving a trigger command in relation with renting of the vehicle by the user; based on the trigger command, generating an activation command and outputting the activation command to the vehicle, wherein the activation command activates a self-diagnosis process of the vehicle; receiving a set of data from the self-diagnosis process and generating a report based on the set of data.

[0014] In an example of the present embodiment, the trigger command is a selection command indicating that the user selects the vehicle, a pick up vehicle command indicating the user picks up the vehicle, or a usage end command indicating the end of the usage of the vehicle by the user.

[0015] In an example of the present embodiment, generating an activation command and outputting the activation command to the vehicle based on the trigger command comprises: determining whether another user has selected the vehicle and the report has been generated in the server after the end of last usage of the vehicle; and if determining another user has selected the vehicle and the report has been generated after the end of last usage of the vehicle, the activation command is not generated and the generated report is output to the user; or if determining there is no selection of the vehicle by another user, the activation command is generated and output to the vehicle.

[0016] In an example of the present embodiment, in the condition that the trigger

command is the selection command, the set of data from the self-diagnosis process is a first set of data and the corresponding report output to the user is a first report; in the condition that the trigger command is the usage end command, the set of data from the self-diagnosis process is a second set of data and the corresponding report output to the user is a second report; the method further comprises: comparing the first set of data and the second set of data; and based on the comparison, generating a third report and outputting the third report to the owner of the vehicle.

[0017] In an example of the present embodiment, the self-diagnosis process comprises: sensors in the vehicle sensing conditions of a plurality of components in the vehicle and generating data indicative of the conditions of the plurality of components.

[0018] In accordance with an embodiment of the present disclosure, a computer-implemented method for vehicle sharing is provided, the vehicle sharing is between a user and an owner of the vehicle, the method comprises: by the vehicle, receiving an activation command from a server, wherein the activation command activates a self-diagnosis process of the vehicle; in response to the activation command, activating a self-diagnosis process of the vehicle; and outputting data from the self-diagnosis process to the server.

[0019] In an example of the present embodiment, the self-diagnosis process comprises: sensors in the vehicle sensing conditions of a plurality of components in the vehicle and generating data indicative of the conditions of the plurality of components.

[0020] In an example of the present embodiment, the method further comprises: if an unusual event occurs during the usage of the vehicle by the user, recording data with respect to the unusual event and outputting the data to the server, wherein the unusual event indicates that the vehicle is not in normal-use.

[0021] In accordance with an embodiment of the present disclosure, an apparatus for vehicle sharing is provided, the vehicle sharing is between a user and an owner of the vehicle, the apparatus comprises: a memory configured to store a series of computer executable instructions; and a processor configured to execute said series of computer executable instructions, wherein said series of computer executable instructions, when executed by the processor, cause the processor to perform operations of any of the above mentioned methods.

[0022] In accordance with an embodiment of the present disclosure, a non-transitory

computer readable medium having instructions stored thereon that is provided, when executed by a processor, causes the processor to perform operations of any of above mentioned methods.

[0023] Further scope of applicability of the present disclosure will become apparent from the detailed description given hereinafter. However, it should be understood that the detailed description and specific examples, while indicating preferred embodiments of the present disclosure, are given by way of illustration only, since various changes and modifications within the spirit and scope of the present disclosure will become apparent to those skilled in the art from the following detailed description.

BRIEF DESCRIPTION OF THE DRAWINGS

[0024] The above and other aspects and advantages of the present disclosure will become apparent from the following detailed description of exemplary embodiments taken in conjunction with the accompanying drawings which illustrate, by way of example, the principles of the present disclosure. Note that the drawings are not necessarily drawn to scale.

[0025] Fig. 1 illustrates a block diagram of a system for vehicle sharing service.

[0026] Fig. 2 illustrates a block diagram of a server for vehicle sharing in accordance with an exemplary embodiment of the present disclosure.

[0027] Fig. 3 illustrates a block diagram of an apparatus for vehicle sharing within the vehicle in accordance with an exemplary embodiment of the present disclosure.

[0028] Fig. 4 illustrates a flow chart showing a process for vehicle condition monitoring performed by the server in accordance with an exemplary embodiment of the present disclosure.

[0029] Fig. 5 illustrates a flow chart showing an alternative process for vehicle condition monitoring performed by the server in accordance with an exemplary embodiment of the present disclosure.

[0030] Fig. 6 illustrates a flow chart showing a process for vehicle condition monitoring performed by the apparatus within the vehicle in accordance with an exemplary embodiment of the present disclosure.

[0031] Fig. 7 illustrates a general hardware environment wherein the present

disclosure is applicable in accordance with an exemplary embodiment of the present disclosure.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0032] In the following detailed description, numerous specific details are set forth to provide a thorough understanding of the described exemplary embodiments. It will be apparent, however, to one skilled in the art that the described embodiments can be practiced without some or all of these specific details. In other exemplary embodiments, well known structures or process steps have not been described in detail in order to avoid unnecessarily obscuring the concept of the present disclosure.

[0033] The term “vehicle” used through the specification refers to a motor vehicle which comprises but is not limited to a car, a truck, a bus, or the like. The term “server” may be any machine configured to perform processing and/or calculations, may be but is not limited to a work station, a desktop computer, a laptop computer, a tablet computer, a personal data assistant, a smart phone or any combination thereof. It should further be understood that components of server may be distributed across a network. For example, some processing may be performed using one processor while other processing may be performed by other processor (s) remote from the one processor. Other components of the server may also be similarly distributed. As such, the server may be interpreted as a distributed computing system that performs processing in multiple locations.

[0034] Referring first to Fig. 1, there is shown a block diagram of a system 100 for vehicle sharing service. The system 100 comprises server(s) 102, vehicle user terminal(s) 106, vehicle owner terminal(s) 108 and vehicle(s) 110 connected and communicated with each other through network(s) 104, as shown in Fig. 1, wherein the network(s) 104 may transmit data or information with respect to the vehicle, the user and the owner between the server(s) 102, the vehicle user terminal(s) 106, the vehicle owner terminal(s) 108 and the vehicle(s) 110. In a specific example, the server(s) 102 may receive data from the vehicle, the vehicle user terminal and the vehicle owner terminal, process the received data and output the processed data. The network 104 may be but is not limited to a local area network (LAN), a wide area network (WAN) or a world wide network such as Internet. The vehicle user

terminal 106 or the vehicle owner terminal 108 may be but is not limited to a smartphone, a tablet, a personal digital assistant, a desktop computer, a laptop computer or any other application or apparatus capable of receiving, displaying and outputting data and information.

[0035] Fig. 2 illustrates a block diagram of a server 200 for vehicle sharing in accordance with an embodiment. The server 200 comprises receiver(s) 202, controller(s) 204, transmitter(s) 206 and one or more input/output interfaces (I/O interfaces) 208. The server 200 may communicate with external devices through the I/O interfaces 208. The controller 204 may control overall operations of the server 200, and it may be a processor, a microprocessor or the like. The sever 200 may further comprises a storage device (not shown) for storing data, information, commands, computer readable instructions or the like. The storage device may be accessed by the controller 204 or other components.

[0036] Fig. 3 illustrates a block diagram of an apparatus 300 for vehicle sharing within the vehicle in accordance with an embodiment. The apparatus 300 included in the vehicle comprises receiver(s) 302, controller(s) 304, transmitter(s) 306 and one or more input/output interfaces 308. The apparatus 300 may communicate with the server or any external devices through the one or more input/output interfaces 308. The controller 304 may control overall operations of the apparatus 300, and it may be a processor, a microprocessor or the like. The vehicle may further comprise one or more sensors 310 and a head unit 312 coupled to the apparatus 300. The one or more sensors 310 may be mounted to or coupled to a plurality of components within the vehicle, such as tires, brakes, lights, warning system, battery, chassis, suspensions, motors, steering wheel, control system or any other components within the vehicle, to measure conditions of the vehicle and its respective components, for example, mileage, battery level, brake functioning conditions, or steering functioning conditions. The one or more sensors 310 may include but are not limited to speed sensors, acceleration sensors, ranging sensors, location and angle sensors, liquid level sensors, temperature sensors, pressure sensors and flow sensors. The head unit 312 may be a storage device mounted within the vehicle such as a memory of a random type which is used to save data or information with respect to critical events occurring to the vehicle.

[0037] Fig. 4 illustrates a flow chart showing a process 400 for vehicle condition monitoring performed by the server 200 in accordance with an exemplary embodiment. With

reference to Fig. 2 and Fig. 4, operations in the process 400 are described as follows.

[0038] In the process 400, at operation 404, the receiver 202 as shown in Fig. 2 may receive from the vehicle user (e.g., from the vehicle user terminal 106 as shown in Fig. 1) through the I/O interfaces 208 a trigger command in relation with renting of the vehicle by the user. In an example, the trigger command may be a selection command indicating that the user selects the vehicle. In another example, the trigger command may be a pick up vehicle command indicating the user picks up the vehicle. In a further example, the trigger command may be a usage end command indicating the end of the usage of the vehicle by the user.

[0039] At operation 406, the controller 204 may generate an activation command in response to receiving the trigger command, wherein the activation command is a command sent to the vehicle to activate a self-diagnosis process of the vehicle. The self-diagnosis process may refer to the sensors 310 within the vehicle (as shown in Fig. 3) sensing conditions of a plurality of components in the vehicle and generating data indicative of the conditions of the plurality of components. As described above, the plurality of components may comprise but are not limited to tires, brakes, lights, warning system, battery, chassis, suspensions, motors, steering wheel, and control system.

[0040] At operation 406, the transmitter 206 may further output the generated activation command to the vehicle through the I/O interfaces 208.

[0041] After the self-diagnose of the vehicle has been performed, at operation 408, the receiver 202 may receive a set of data related to the self-diagnosis process through the I/O interfaces 208 from the vehicle. The controller 204 may then generate a report based on the set of data and the report may be stored in the server. The report presents the conditions of the whole vehicle and the plurality of components by using “Normal”, “Failure”, visual graphic symbols or any other appropriate measures.

[0042] Optionally, in one example, the transmitter 206 may send the report to the user or the owner of the vehicle as required, at operation 410. The report may be used to present the current performance and conditions of the whole vehicle and its individual components to the user or the owner.

[0043] By the process 400, upon the potential user of the vehicle selects a vehicle on his/her terminal, he/she could check the current performance and conditions of the vehicle

and various components only by viewing the report displayed on his/her terminal at any place, without meeting the owner of the vehicle in person and performing the cumbersome and complicated vehicle checking process in the field. And it is difficult to check some hidden components such as the chassis or motor of the vehicle by checking in the field, whereas in the present disclosure, the conditions of the hidden components can be easily displayed in the report for view by the potential user.

[0044] After viewing the report, if the potential user determines to rent this vehicle, again by the process 400, when he/she picks up the vehicle, he/she could also issue a trigger command to activate a self-diagnosis process of the vehicle to be performed instantaneously in order to check the current performance and conditions of the vehicle and various components again, thereby avoiding being unaware of some unexpected damages or failures in the vehicle occurred during the period between selecting the vehicle on the user terminal and picking up the vehicle.

[0045] After the usage of the vehicle, by the process 400, upon the user returns the vehicle, another self-diagnosis process of the vehicle could be activated and the corresponding report could be sent to the user or the owner of the vehicle for his/her view, thereby enabling the owner to monitor the usage of the vehicle by viewing the conditions of the vehicle displayed on the report and feel secure to offer the vehicle.

[0046] Fig. 5 illustrates a flow chart showing an alternative process 500 for vehicle condition monitoring performed by the server 200 in accordance with an exemplary embodiment.

[0047] In an example, in the alternative process 500, at operation 504, the receiver 202 receives from the user (e.g., vehicle user terminal 106 as shown in Fig. 1) through the I/O interfaces 208 a trigger command which is the selection command indicating that the user selects the vehicle.

[0048] At operation 506, the controller 204 may determine whether another user has selected the vehicle and the corresponding report has been generated in the server after the end of last usage of the vehicle, according to records in the server. Then if the controller 204 determines that after the end of last usage of the vehicle, there is another user who has selected the vehicle and a corresponding report which has been generated, at operation 509,

the controller 204 may not generate an activation command since an available report has been generated and stored in the server, and the transmitter 206 may then output the available report to the user through the I/O interfaces 208. If the controller 204 determines that there is no selection of the vehicle by another user after the end of last usage of the vehicle, at operation 508, the controller 204 may generate the activation command, and the transmitter 206 may then output the generated activation command to the vehicle as described above in operation 406 as shown in Fig. 4. By operations 506, 508, 509, the server 200 does not need to frequently activate the self-diagnosis process of the vehicle in the case of many individual potential users select the vehicle to check its conditions and functions, thereby improving operating efficiency of the vehicle sharing and avoiding adverse impact on the vehicle caused by frequently activated self-diagnosis processes.

[0049] As shown in Fig. 5, the subsequent operations 510 and 512 are similar to the corresponding operations 408 and 410 in Fig. 4.

[0050] Fig. 6 illustrates a flow chart showing a process 600 for vehicle condition monitoring performed by the apparatus within the vehicle according to an embodiment of the disclosure. In the process 600, at operation 604, the receiver 302 within the vehicle as shown in Fig. 3 may receive an activation command through the I/O interfaces 308 from the server 102, wherein the activation command is used to activate a self-diagnosis process of the vehicle, as described above in detail. At operation 606, the controller 304 may activate a self-diagnosis process of the vehicle as described above in detail, in response to the receiver 302 receiving the activation command. After the self-diagnosis process is performed, the sensors 310 may output the obtained data to the controller 304 through the I/O interfaces 308 and the receiver 302. Then, at operation 608, the transmitter 306 within the vehicle may output data obtained from the self-diagnosis process to the server 102.

[0051] The complete vehicle sharing process according to an embodiment of the disclosure will be described as follows. Through a general user interface of specific applications on the vehicle user terminal 106, a potential vehicle user may firstly selects the vehicle pick-up and return location, the vehicle pick-up and return date/time, and inputs the user's personal information such as user name, ID number, driving license number. Then, a list of available vehicles and their corresponding prices/cost are displayed on the user

interface for further selection of the user, and the potential vehicle user may select a vehicle from the list through the user interface on the vehicle user terminal 106. In response to the selection of the vehicle, the vehicle user terminal 106 may send a selection command to the server 102 (i.e., server 200 as shown in Fig. 2) through the network(s) 104.

[0052] In an example, as shown in Fig. 4, the receiver 202 within the server 200 may receive a trigger command which is a selection command indicating that the user selects the vehicle at operation 404, and after the operation 406 as described above in detail, the receiver 202 may receive a first set of data obtained from the self-diagnosis process and the controller 204 may generate a first report based on the first set of data. Then optionally, in another example, the transmitter 206 may output the first report to the vehicle user terminal 106 for view of the user. If the conditions of the plurality of components in the vehicle displayed in the first report are satisfactory for the user and the user determines to rent the selected vehicle, the user may sign an agreement with respect to the selected items including pick-up and return location, pick-up and return date/time, vehicle and costs, and place an order of renting the selected vehicle according to the agreement. Then as shown in Fig. 1, the server 102 may receive the order and agreement from the vehicle user terminal 106 over the network(s) 104, and in turn send the order and agreement to the vehicle owner terminal 108 over the network(s) 104 for confirmation of the owner. If the owner confirms the order and agreement, the order is determined and corresponding vehicle sharing service will be provided to the user.

[0053] Then at the agreed location and time, the user may pick up the vehicle. The vehicle pick up may be achieved in the manner of operating on the user interface of the specific applications on the vehicle user terminal, password unlocking, phone swiping a reader on the vehicle by radio frequency identification devices (RFID), fingerprint identification or any other market available unlocking approaches. In response to the pick-up of the vehicle by the user, the vehicle user terminal 106 may send a pick up vehicle command indicating the user picks up the vehicle to the server 102 (i.e., server 200 as shown in Fig. 2) through the network(s) 104. Alternatively or additionally, in an example, the receiver 202 within the server 200 as shown in Fig. 2 may receive from the vehicle user terminal 106 through the I/O interfaces 208 a trigger command which is the pick up vehicle command, at

operation 404. Then, operation 406 may be performed to activate a self-diagnosis process of the vehicle, and then the receiver 202 may receive a second set of data obtained from the self-diagnosis process and the controller 204 may generate a second report, wherein the second report may present the current conditions of the vehicle and its various components at the time of picking up the vehicle. Optionally, in one example, the transmitter 206 may output the second report to the user or the owner. As such, the user could check the current performance and conditions of the vehicle and various components only by viewing the report displayed on his/her terminal, without performing the cumbersome and complicated vehicle checking process in the field. And the owner could feel secure to offer the vehicle by viewing the conditions of the vehicle at the time of the user picking up the vehicle.

[0054] In another example of the present embodiment, if sensor(s) 310 within the vehicle detect an unusual event during the normal usage of the vehicle, the receiver 302 within the vehicle may receive data with respect to the unusual event from sensor(s) 310 through the input/output interfaces 308, then the data may be passed to the controller 304 or the transmitter 306. Notably, the unusual event indicates that the vehicle is not in normal use. Specifically, in an example, the unusual event may be but is not limited to crush, flat tire, scratch, replacing original components with fake ones, or forcibly and inappropriately manipulating the steering wheel. In one example, data or information related to the unusual event may be stored in the head unit 312 as shown in Fig. 3. In one example, the data with respect to the unusual event may be output from the transmitter 306 within the vehicle to the server 102 (server 200 as shown in Fig. 2). Then, the receiver 202 within the server 200 may receive data with respect to the unusual event. After processing of the data by the controller 204, the transmitter 206 within the server 200 may output a notification of the unusual event and the data with respect to the unusual event to vehicle owner terminal 108. In one example, the notification of unusual event may be a short message, information push displayed on specific applications of the vehicle owner terminal 108 or an audio alert or information in any other forms. As such, the owner of the vehicle could monitor the usage of his/her vehicle remotely in real time, enabling the owner to feel secure to rent the vehicle.

[0055] In another example, after the usage of the vehicle, the user may return the vehicle at the agreed vehicle return location and time. Similar to the vehicle pick-up, the

vehicle return may be achieved in the manner of operating on the graphic user interface of the vehicle user terminal, password locking, phone swiping the reader on the vehicle by RFID, fingerprint identification or any other market available locking approaches. In response to the return of the vehicle by the user, the vehicle user terminal 106 may send a usage end command indicating the end of the usage of the vehicle to the server 102 (i.e., server 200 as shown in Fig. 2) through the network(s) 104. Alternatively or additionally, in one example, the receiver 202 within the server 200 may receive from the vehicle user terminal 106 a trigger command which is the usage end command at operation 404. Then by operation 406 and operation 408 as described above in detail, the receiver 202 may receive a third set of data from the self-diagnosis process and the controller 204 may generate a third report based on the third set of data. Optionally, in one example, the transmitter 206 may output the third report to the vehicle user terminal 106 for view of the user. As such, the user could check the current conditions of the vehicle only by viewing the report displayed on his/her terminal, without performing the cumbersome and complicated vehicle checking process in the field.

[0056] In one specific example, after the end of usage by the user, the controller 204 within the server 200 may compare the first set of data obtained upon user selecting the vehicle and the third set of data obtained upon user returning the vehicle, or compare the second set of data obtained upon user picking up the vehicle and the third set of data obtained upon user returning the vehicle. Then based on the comparison, the controller 204 may generate a fourth report displaying changes of conditions of the vehicle and its various components, and the transmitter 206 may output the fourth report to the owner of the vehicle. As such, the owner of the vehicle could check the changes of conditions of the whole vehicle and its various components by only viewing the fourth report, and accordingly charge the user for unusual condition changes or contact the user for future compensation.

[0057] The operations of the process (400 or 500 or 600) presented above are intended to be illustrative. In some embodiments, the process may be accomplished with one or more additional operations not described, and/or without one or more of the operations discussed. Additionally, the order in which the operations of process are illustrated in FIG. 4-6 and described above is not intended to be limiting. In some embodiments, process may be implemented in one or more processing devices (e.g., a digital processor, an analog processor,

a digital circuit designed to process information, an analog circuit designed to process information, a state machine, and/or other mechanisms for electronically processing information). The one or more processing devices may include one or more modules executing some or all of the steps of method in response to instructions stored electronically on an electronic storage medium. The one or more processing modules may include one or more devices configured through hardware, firmware, and/or software to be specifically designed for execution of one or more of the operations of the process.

[0058] In addition, in a further embodiment, the user or owner may access the server through his/her terminal 106/108 at any time to check the stored report or data with respect to conditions of vehicle obtained from the last self-analysis of the vehicle thereon. And the owner may also proactively access the server through his terminal 108 at any time to check the stored data or detailed information with respect to the unusual events occurring on the vehicle thereon.

[0059] Fig. 7 illustrates a general hardware environment 700 wherein the present disclosure is applicable in accordance with an exemplary embodiment of the present disclosure.

[0060] With reference to FIG. 7, a computing device 700, which is an example of the hardware device that may be applied to the aspects of the present disclosure, will now be described. The computing device 700 may be any machine configured to perform processing and/or calculations, may be but is not limited to a work station, a server, a desktop computer, a laptop computer, a tablet computer, a personal data assistant, a smart phone, an on-vehicle computer or any combination thereof. The aforementioned intelligent voice assistant apparatus 200 may be wholly or at least partially implemented by the computing device 700 or a similar device or system.

[0061] The computing device 700 may comprise elements that are connected with or in communication with a bus 702, possibly via one or more interfaces. For example, the computing device 700 may comprise the bus 702, and one or more processors 704, one or more input devices 706 and one or more output devices 708. The one or more processors 704 may be any kinds of processors, and may comprise but are not limited to one or more general-purpose processors and/or one or more special-purpose processors (such as special

processing chips). The input devices 706 may be any kinds of devices that can input information to the computing device, and may comprise but are not limited to a mouse, a keyboard, a touch screen, a microphone and/or a remote control. The output devices 708 may be any kinds of devices that can present information, and may comprise but are not limited to display, a speaker, a video/audio output terminal, a vibrator and/or a printer. The computing device 700 may also comprise or be connected with non-transitory storage devices 710 which may be any storage devices that are non-transitory and can implement data stores, and may comprise but are not limited to a disk drive, an optical storage device, a solid-state storage, a floppy disk, a flexible disk, hard disk, a magnetic tape or any other magnetic medium, a compact disc or any other optical medium, a ROM (Read Only Memory), a RAM (Random Access Memory), a cache memory and/or any other memory chip or cartridge, and/or any other medium from which a computer may read data, instructions and/or code. The non-transitory storage devices 710 may be detachable from an interface. The non-transitory storage devices 710 may have data/instructions/code for implementing the methods and steps which are described above. The computing device 700 may also comprise a communication device 712. The communication device 712 may be any kinds of device or system that can enable communication with external apparatuses and/or with a network, and may comprise but are not limited to a modem, a network card, an infrared communication device, a wireless communication device and/or a chipset such as a Bluetooth™ device, 1302.11 device, WiFi device, WiMax device, cellular communication facilities and/or the like. The transceiver(s) 107 as aforementioned may, for example, be implemented by the communication device 712.

[0062] When the computing device 700 is used as an on-vehicle device, it may also be connected to external device, for example, a GPS receiver, sensors for sensing different environmental data such as an acceleration sensor, a wheel speed sensor, a gyroscope and so on. In this way, the computing device 700 may, for example, receive location data and sensor data indicating the travelling situation of the vehicle. When the computing device 700 is used as an on-vehicle device, it may also be connected to other facilities (such as an engine system, a wiper, an anti-lock Braking System or the like) for controlling the traveling and operation of the vehicle.

[0063] In addition, the non-transitory storage device 710 may have map information

and software elements so that the processor 704 may perform route guidance processing. In addition, the output device 706 may comprise a display for displaying the map, the location mark of the vehicle and also images indicating the travelling situation of the vehicle. The output device 706 may also comprise a speaker or interface with an ear phone for audio guidance.

[0064] The bus 702 may include but is not limited to Industry Standard Architecture (ISA) bus, Micro Channel Architecture (MCA) bus, Enhanced ISA (EISA) bus, Video Electronics Standards Association (VESA) local bus, and Peripheral Component Interconnect (PCI) bus. Particularly, for an on-vehicle device, the bus 702 may also include a Controller Area Network (CAN) bus or other architectures designed for application on an automobile.

[0065] The computing device 700 may also comprise a working memory 714, which may be any kind of working memory that may store instructions and/or data useful for the working of the processor 704, and may comprise but is not limited to a random access memory and/or a read-only memory device.

[0066] Software elements may be located in the working memory 714, including but are not limited to an operating system 716, one or more application programs 718, drivers and/or other data and codes. Instructions for performing the methods and steps described in the above may be comprised in the one or more application programs 718. The executable codes or source codes of the instructions of the software elements may be stored in a non-transitory computer-readable storage medium, such as the storage device(s) 710 described above, and may be read into the working memory 714 possibly with compilation and/or installation. The executable codes or source codes of the instructions of the software elements may also be downloaded from a remote location.

[0067] Those skilled in the art may clearly know from the above embodiments that the present disclosure may be implemented by software with necessary hardware, or by hardware, firmware and the like. Based on such understanding, the embodiments of the present disclosure may be embodied in part in a software form. The computer software may be stored in a readable storage medium such as a floppy disk, a hard disk, an optical disk or a flash memory of the computer. The computer software comprises a series of instructions to make the computer (e.g., a personal computer, a service station or a network terminal)

execute the method or a part thereof according to respective embodiment of the present disclosure.

[0068] The present disclosure being thus described, it will be obvious that the same may be varied in many ways. Such variations are not to be regarded as a departure from the spirit and scope of the present disclosure, and all such modifications as would be obvious to those skilled in the art are intended to be included within the scope of the following claims.

WHAT IS CLAIMED IS:

1. A server for vehicle sharing, the vehicle sharing is between a user and an owner of a vehicle, the server comprising:

a receiver configured to receive a trigger command in relation with renting of the vehicle by the user;

a controller configured to generate an activation command based on the trigger command, wherein the activation command activates a self-diagnosis process of the vehicle; and
an transmitter configured to output the activation command to the vehicle;

wherein:

the receiver is configured to receive a set of data from the self-diagnosis process; and

the controller is configured to generate a report based on the set of data.

2. The server of claim 1, wherein the trigger command is a selection command indicating that the user selects the vehicle, a pick up vehicle command indicating the user picks up the vehicle, or a usage end command indicating the end of the usage of the vehicle by the user.

3. The server of claim 1, wherein generating an activation command based on the trigger command comprising:

determining whether another user has selected the vehicle and the report has been generated in the server after the end of last usage of the vehicle; and

if determining another user has selected the vehicle and the report has been generated after the end of last usage of the vehicle, the activation command is not generated and the transmitter is further configured to output the generated report to the user; or

if determining there is no selection of the vehicle by another user, the activation command is generated.

4. The server of claim 2, wherein:

in the condition that the trigger command is the selection command, the set of data from the self-diagnosis process is a first set of data and the corresponding report is a first report output

to the user;

in the condition that the trigger command is the usage end command, the set of data from the self-diagnosis process is a second set of data and the corresponding report is a second report output to the user;

the controller is further configured to compare the first set of data and the second set of data, and based on the comparison, to generate a third report; and

the transmitter is further configured to output the third report to the owner.

5. The server of claim 1, wherein the self-diagnosis process comprises:

sensors in the vehicle sensing conditions of a plurality of components in the vehicle and generating data indicative of the conditions of the plurality of components.

6. The server of claim 1, wherein:

if an unusual event occurs during the usage of the vehicle, the receiver is configured to receive data with respect to the unusual event from the vehicle, wherein the unusual event indicates that the vehicle is not in normal use; and

the transmitter is further configured to output a notification of the unusual event and the data with respect to the unusual event to the owner.

7. An apparatus for vehicle sharing, the vehicle sharing is between a user and an owner of the vehicle, comprising:

a receiver configured to receive an activation command from a server, wherein the activation command activates a self-diagnosis process of the vehicle;

a controller configured to activate a self-diagnosis process of the vehicle, in response to the activation command; and

an transmitter configured to output data from the self-diagnosis process to the server.

8. The apparatus of claim 7, wherein the apparatus further comprises sensors configured to sense conditions of a plurality of components in the vehicle, and the self-diagnosis process comprises:

sensors sensing conditions of a plurality of components in the vehicle and generating data indicative of the conditions of the plurality of components.

9. The apparatus of claim 7, wherein: if an unusual event occurs during the usage of the vehicle by the user, the controller is configured to record data with respect to the unusual event, and the transmitter is configured to output the data with respect to the unusual event to the server, wherein the unusual event indicates that the vehicle is not in normal use.

10. A computer-implemented method for vehicle sharing, the vehicle sharing is between a user and an owner of a vehicle, comprising:

- receiving a trigger command in relation with renting of the vehicle by the user;
- based on the trigger command, generating an activation command and outputting the activation command to the vehicle, wherein the activation command activates a self-diagnosis process of the vehicle; and
- receiving a set of data from the self-diagnosis process and generating a report based on the set of data.

11. The computer-implemented method of claim 10, wherein the trigger command is a selection command indicating that the user selects the vehicle, a pick up vehicle command indicating the user picks up the vehicle, or a usage end command indicating the end of the usage of the vehicle by the user.

12. The computer-implemented method of claim 10, wherein generating an activation command and outputting the activation command to the vehicle based on the trigger command comprising:

- determining whether another user has selected the vehicle and the report has been generated in the server after the end of last usage of the vehicle; and
- if determining another user has selected the vehicle and the report has been generated after the end of last usage of the vehicle, the activation command is not generated and the generated report is output to the user; or

if determining there is no selection of the vehicle by another user, the activation command is generated and output to the vehicle.

13. The computer-implemented method of claim 11, wherein:

in the condition that the trigger command is the selection command, the set of data from the self-diagnosis process is a first set of data and the corresponding report output to the user is a first report;

in the condition that the trigger command is the usage end command, the set of data from the self-diagnosis process is a second set of data and the corresponding report output to the user is a second report;

the method further comprising:

comparing the first set of data and the second set of data; and

based on the comparison, generating a third report and outputting the third report to the owner of the vehicle.

14. The computer-implemented method of claim 10, the self-diagnosis process comprises:

sensors in the vehicle sensing conditions of a plurality of components in the vehicle and generating data indicative of the conditions of the plurality of components.

15. The computer-implemented method of claim 10, further comprising:

if an unusual event occurs during the usage of the vehicle by the user, receiving data with respect to the unusual event from the vehicle, wherein the unusual event indicates that the vehicle is not in normal use; and

notifying the owner occurrence of the unusual event and outputting the data with respect to the unusual event to the owner.

16. A computer-implemented method for vehicle sharing, the vehicle sharing is between a user and an owner of the vehicle, comprising:

by the vehicle:

receiving an activation command from a server, wherein the activation command

activates a self-diagnosis process of the vehicle;
in response to the activation command, activating a self-diagnosis process of the vehicle;
and
outputting data from the self-diagnosis process to the server.

17. The computer-implemented method of claim 16, wherein the self-diagnosis process comprises:

sensors in the vehicle sensing conditions of a plurality of components in the vehicle and generating data indicative of the conditions of the plurality of components.

18. The computer-implemented method of claim 16, further comprising:

if an unusual event occurs during the usage of the vehicle by the user, recording data with respect to the unusual event and outputting the data to the server, wherein the unusual event indicates that the vehicle is not in normal-use.

19. An apparatus for vehicle sharing, the vehicle sharing is between a user and an owner of the vehicle, comprising:

a memory configured to store a series of computer executable instructions; and
a processor configured to execute said series of computer executable instructions,
wherein said series of computer executable instructions, when executed by the processor, cause the processor to perform a method of any one of claims 10-15 or claims 16-18.

20. A non-transitory computer readable medium having instructions stored thereon that, when executed by a processor, cause the processor to perform a method of any one of claims 10-15 or claims 16-18.

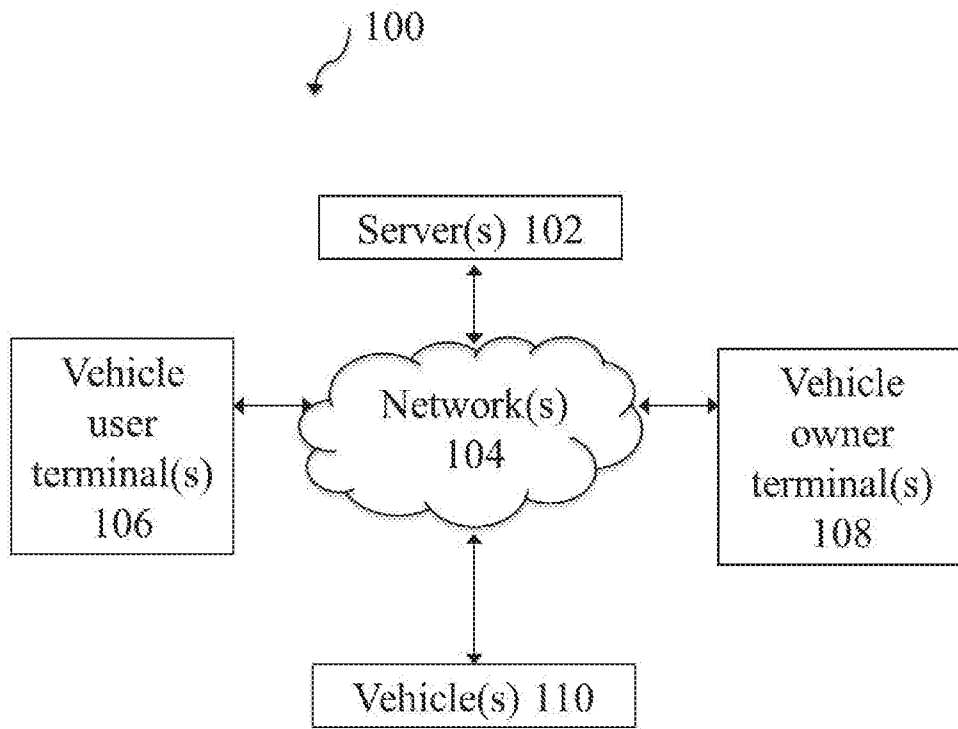


Fig. 1

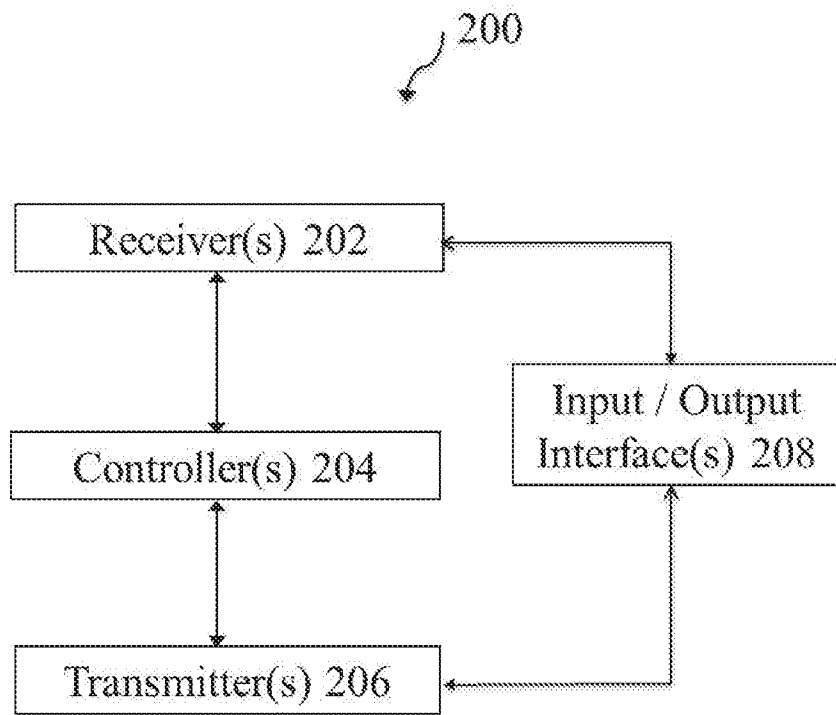


Fig. 2

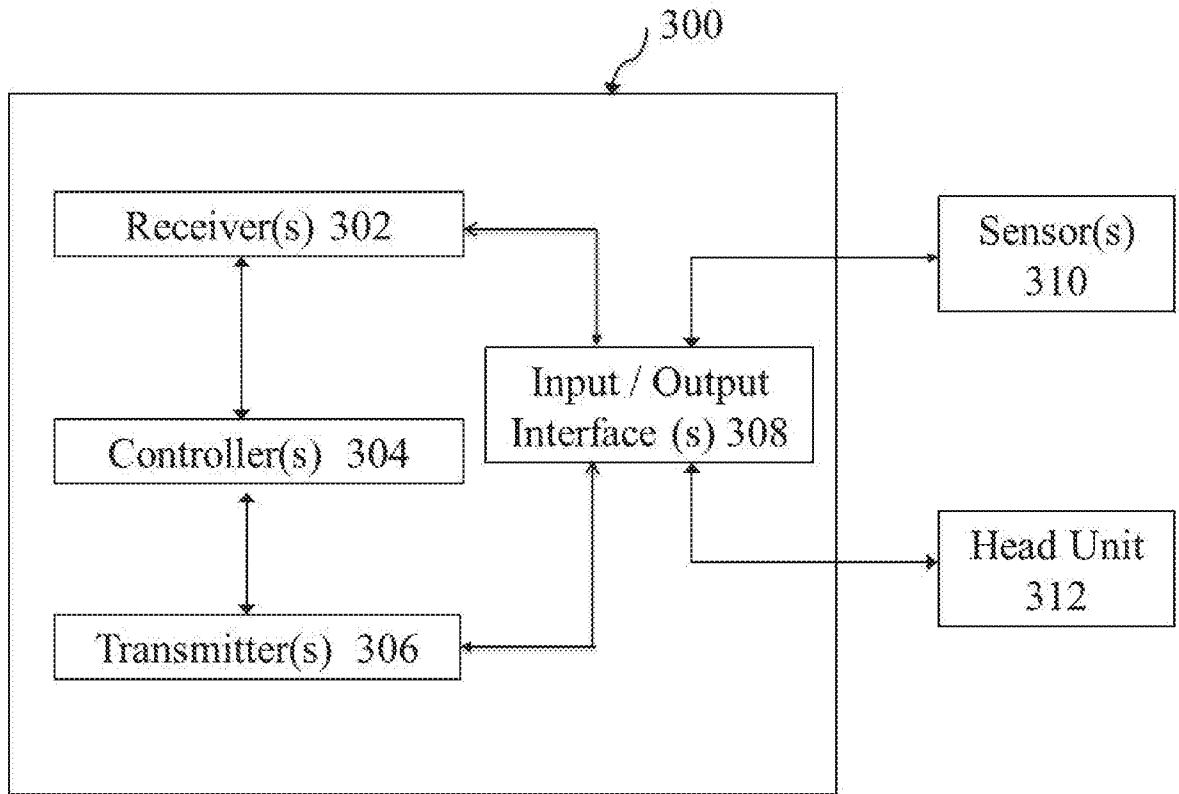


Fig. 3

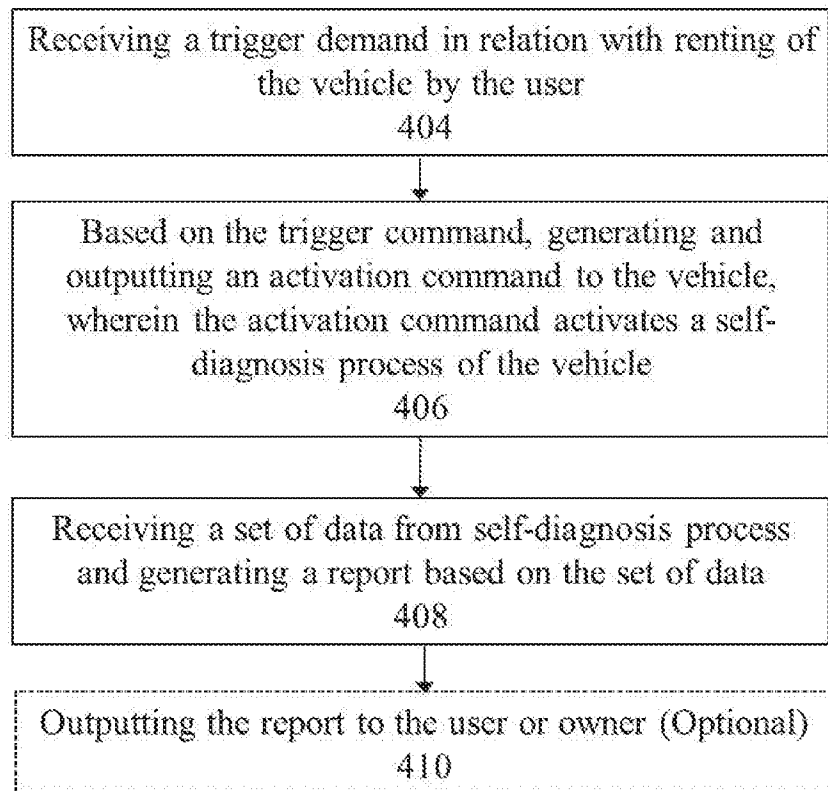


Fig. 4

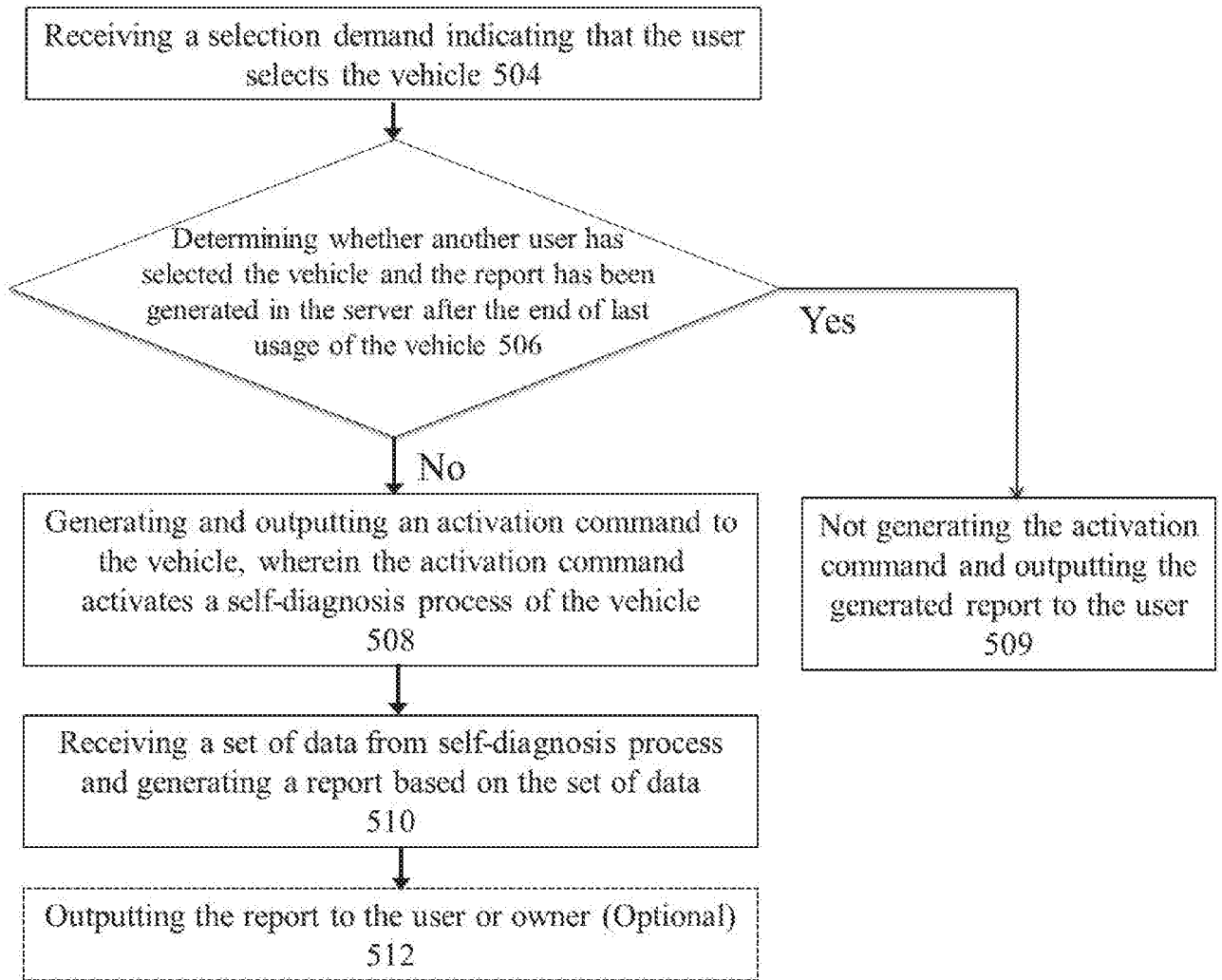


Fig. 5

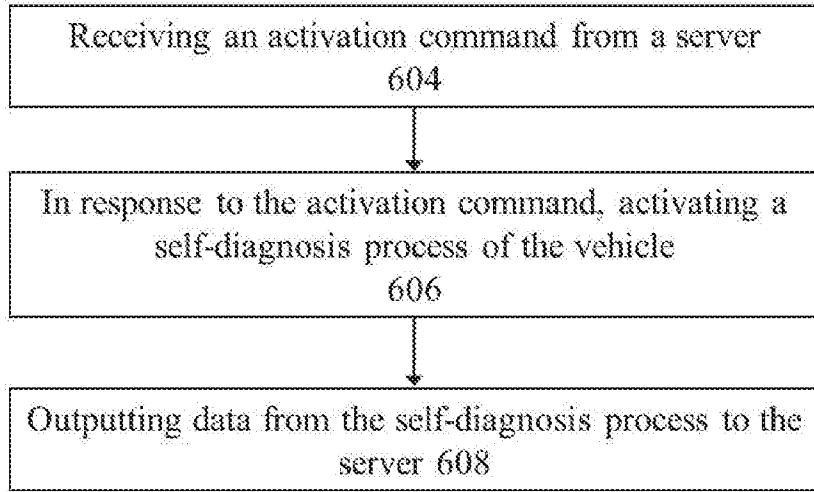


Fig. 6

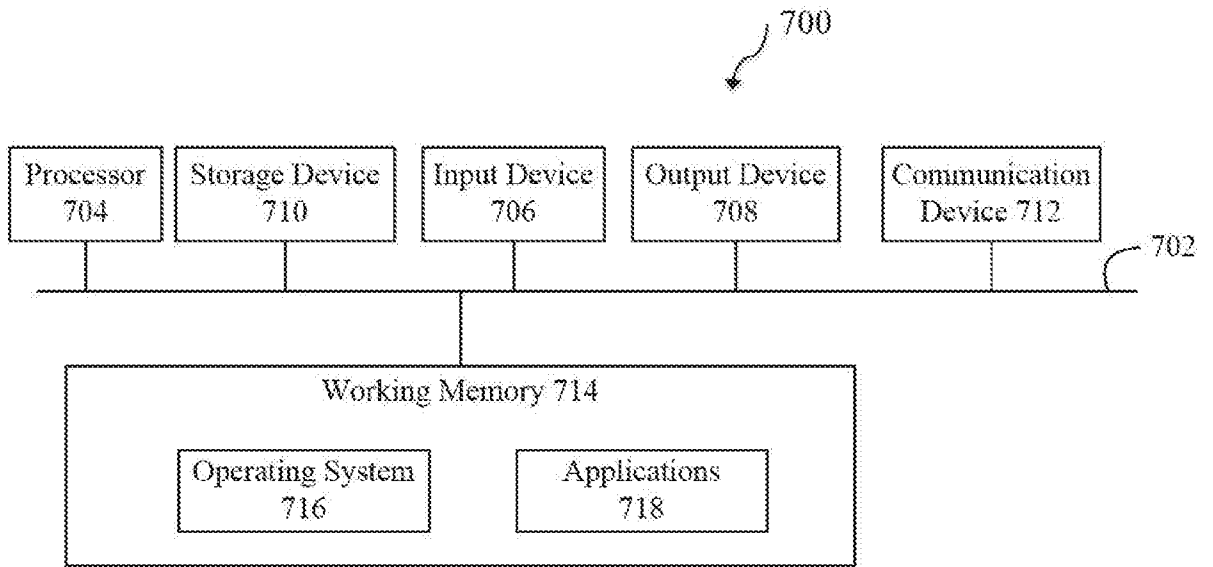


Fig. 7

INTERNATIONAL SEARCH REPORT

International application No.

PCT/CN2017/080246

A. CLASSIFICATION OF SUBJECT MATTER G07F 17/00(2006.01)i According to International Patent Classification (IPC) or to both national classification and IPC		
B. FIELDS SEARCHED Minimum documentation searched (classification system followed by classification symbols) G07F; H04L 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) CNPAT, WPI, EPODOC, IEEE, GOOGLE, CNKI: car, vehicle, shar+, lease, rent+, check+, examin+, select+, pick up, end, compar+, report, time, consumption, mileage, state, fault		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	CN 101751721 A (INDUSTRIAL TECHNOLOGY RESEARCH INSTITUTE) 23 June 2010 (2010-06-23) description, paragraphs [0002]-[0003], [0022]-[0034]	1-20
A	CN 106557826 A (SHANGHAI LIANGMING TECHNOLOGY DEVELOPMENT CO., LTD.) 05 April 2017 (2017-04-05) the whole document	1-20
A	CN 103617450 A (HANGZHOU CHERRIES INTELLIGENT TECHNOLOGY CO., LTD.) 05 March 2014 (2014-03-05) the whole document	1-20
A	CN 105117961 A (BEIJING TECHNOLOGY INSTITUTE) 02 December 2015 (2015-12-02) the whole document	1-20
A	US 2015286881 A1 (WISTRON CORP.) 08 October 2015 (2015-10-08) the whole document	1-20
<input type="checkbox"/> Further documents are listed in the continuation of Box C. <input checked="" type="checkbox"/> See patent family annex.		
* Special categories of cited documents: "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier application or patent but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art "&" document member of the same patent family		
Date of the actual completion of the international search 30 November 2017		Date of mailing of the international search report 28 December 2017
Name and mailing address of the ISA/CN STATE INTELLECTUAL PROPERTY OFFICE OF THE P.R.CHINA 6, Xitucheng Rd., Jimen Bridge, Haidian District, Beijing 100088 China		Authorized officer CHEN,Jing Telephone No. (86-10)62413337
Facsimile No. (86-10)62019451		

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No. PCT/CN2017/080246

Patent document cited in search report			Publication date (day/month/year)	Patent family member(s)			Publication date (day/month/year)
CN	101751721	A	23 June 2010	None			
CN	106557826	A	05 April 2017	None			
CN	103617450	A	05 March 2014	None			
CN	105117961	A	02 December 2015	None			
US	2015286881	A1	08 October 2015	TW	201539394	A	16 October 2015
				CN	104978211	A	14 October 2015