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[Continued on next page]

- (54) **Title:** METHOD AND SYSTEM FOR VEHICLE PERSONALIZATION

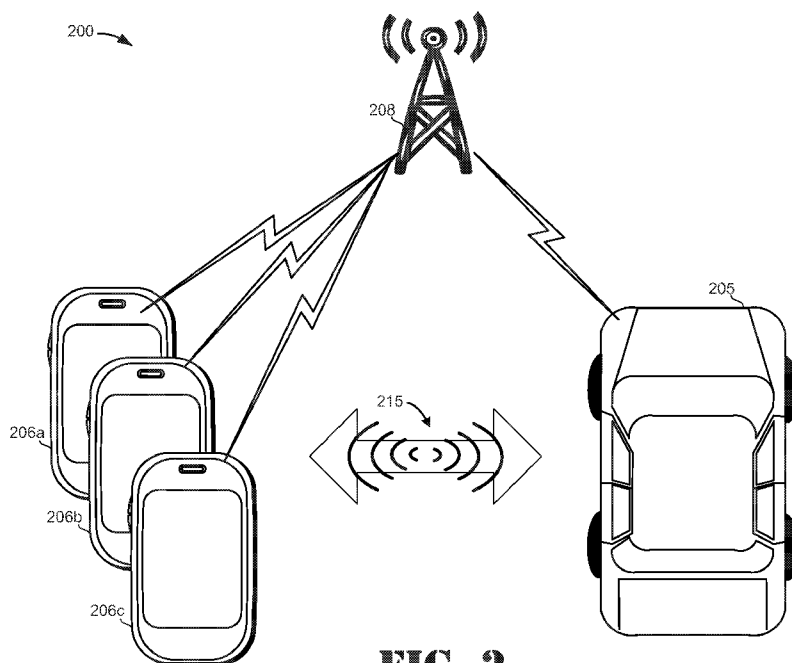


FIG. 2

- (57) **Abstract:** Embodiments of the present invention disclose a system and method for vehicle personalization. According to one embodiment, at least one customizable setting of a plurality of configuration settings associated with the vehicle is determined. Upon receiving a request for personalization of at least one configuration setting, user profile and preference setting information is retrieved. Furthermore, at least one customizable setting of the vehicle is adjusted based on the preference settings of the user profile information.

**Declarations under Rule 4.17:**

- *as to the identity of the inventor (Rule 4.17(i))*
- *as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))*

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METHOD AND SYSTEM FOR VEHICLE PERSONALIZATION

BACKGROUND

[0001] The emergence and popularity of mobile computing has made various types of portable electronic devices a staple in today's marketplace. Mobile networking has afforded such portable electronic devices the ability to communicate with a host of external devices. Meanwhile, modern automobiles are now equipped with on-board computing systems and allow for enhanced technological capabilities. For example, some vehicles include global positioning and navigations systems, Bluetooth™ interfaces for voice-activated calling, and touch-enabled displays for interacting with the operating user or driver. And though users typically operate a number of various vehicles over time, many operate each vehicle in the same manner and with the same desired preferences and/or configurations.

BRIEF DESCRIPTION OF THE DRAWINGS

[0002] The features and advantages of the inventions as well as additional features and advantages thereof will be more clearly understood hereinafter as a result of a detailed description of particular embodiments of the invention when taken in conjunction with the following drawings in which:

[0003] FIG. 1 is a simplified block diagram of the vehicle personalization system according to an example of the present invention.

[0004] FIG. 2 is a concept illustration of data exchange between a plurality of portable electronic devices and an automobile via the vehicle personalization system in accordance with an example of the present invention.

[0005] FIG. 3 is a simplified flow chart of the processing steps for vehicle personalization in accordance with an example of the present invention.

DETAILED DESCRIPTION OF THE INVENTION

[0006] The following discussion is directed to various embodiments. Although one or more of these embodiments may be discussed in detail, the embodiments disclosed should not be interpreted, or otherwise used, as limiting the scope of the disclosure, including the claims. In addition, one skilled in the art

- 2 -

will understand that the following description has broad application, and the discussion of any embodiment is meant only to be an example of that embodiment, and not intended to intimate that the scope of the disclosure, including the claims, is limited to that embodiment. Furthermore, as used herein, the designators "A", "B" and "N" particularly with respect to the reference numerals in the drawings, indicate that a number of the particular feature so designated can be included with examples of the present disclosure. The designators can represent the same or different numbers of the particular features.

[0007] The figures herein follow a numbering convention in which the first digit or digits correspond to the drawing figure number and the remaining digits identify an element or component in the drawing. Similar elements or components between different figures may be identified by the user of similar digits. For example, 143 may reference element "43" in Figure 1, and a similar element may be referenced as 243 in Figure 2. Elements shown in the various figures herein can be added, exchanged, and/or eliminated so as to provide a number of additional examples of the present disclosure. In addition, the proportion and the relative scale of the elements provided in the figures are intended to illustrate the examples of the present disclosure, and should not be taken in a limiting sense.

[0008] Today, some manufacturers and companies have transitioned to some degree of personalization for specific vehicle options. For example, OnStar® provides personalized information to the user related to the current engine diagnostics, tire pressure, and maintenance needs of a particular vehicle. Other solutions allow for vehicle personalization (e.g., custom wheels, transmission options) at the dealership and under the guidance of an experienced sales person. Still other solutions are directed to fleet managers monitoring vehicles in the field for diagnosing the configuration status of a specific vehicle. For example, Patent Publication No. 2009/0079555 discloses a method for remotely reading vehicle setting parameters and configurations so as to control aspects (e.g., speed) of an on-board GPS device while providing alerts based on location-based information of the vehicle. However, there is still a need in the art for allowing a user to consolidate all vehicle data and personalization

- 3 -

preferences into one centralized location for enabling automated configuration of a user vehicle.

[0009] Embodiments of the present invention disclose a system and method for vehicle personalization. According to one embodiment, communication between an electronic device and the vehicle for enables specification and implementation of software-based vehicle configuration. The software-based specification for vehicle configuration may be accomplished using rules and constraints, resulting in personalized vehicle settings for a particular user. Additionally, examples described herein aim to provide a remote user interface with access to one or more vehicles in one location and for multiple users each having a preferred/personalized vehicle configuration settings. Moreover, the configuration and portability of vehicle personalization may be accomplished through loading of user preferred settings stored on an external storage device.

[00010] Referring now in more detail to the drawings in which like numerals identify corresponding parts throughout the views, FIG. 1 is a simplified block diagram of the vehicle personalization system according to an example of the present invention. As shown here, the system 100 includes a computing device 106, a network-based server 108, and a vehicle processing unit 102. The vehicle processing unit 102 represents a central processing unit (CPU), microcontroller, microprocessor, or logic configured to execute programming instructions associated with the system 100. The computing device 106 represents a portable electronic or web-based interface configured to communicate with the vehicle through a vehicle interface module 120 so as to attain available and relevant configuration settings. For example, relevant configuration and settings of a particular vehicle may include data relating to in-car entertainment and/or communication, vehicle powertrain settings, and/or vehicle running equipment. According to example embodiment, the relevant configuration settings are attained through readings of devices associated with vehicle such as electronic modules 121, vehicle sensors 123, and vehicle controls 125 for example (e.g., seat settings, radio settings, music player, engine, chassis, transmission, etc.). In one example, the connectors 126 interfacing with the specific vehicle components and sensors (i.e., 121, 123, 125) are capable of assigning a

- 4 -

configurable value (e.g., yes/no) to the collected configuration data. Alternatively, manufacturers may define a set of configuration parameters, type, valid values, and the like, for personal customization by the user or driver. Still further, the configuration settings may be retrieved via the internetwork through entry of the vehicle identification number, which may be used to provide an entire list of vehicle equipment and customizable features including the vehicle's base configuration parameters.

[00011] Network-based storage device 108 represents a cloud or similar networked online storage device and service for storing preference information associated with a user. More particularly, the cloud network 108 provides a web-based user profile interface 116 for allowing a user to manage and store their profile information (e.g., vehicle identification number of vehicles owned, vehicle preference data, etc.). As the web-based interface parameters 116 are stored in the cloud in accordance with one example embodiment, the profile and preference data is virtual to the user and accessible anywhere. Additionally, the user may also adjust their user profile and preference information in real-time through use of a local and dedicated application running on the computing device 106. The configuration device 112 is enabled to communicate with the cloud storage network 108 for retrieving user profile data stored therein, and also with the vehicle interface module 110 to retrieve the available configurable settings for vehicle personalization. Rules engine 114 represents a set of configuration parameters and/or thresholds for establishing the compatibility of various configurations. For example, rules engine may establish – for safety precaution – that the driver-side mirror may not be adjusted to the preferred angle setting based on the size and weight of the driver, or based on the preferred seat position.

[00012] Once the settings are configured, the vehicle processing unit 102 may save the user preference information for each operator of the vehicle locally as driver profile data 116. The profile data 116 may then be managed directly on the vehicle via a display or interface module 110. Such a configuration allows for personalization of the same vehicle for multiple operators as will be described with reference to FIG. 2. Moreover, in the event that the target vehicle is not configured with network access, the system 100 and configurable vehicle settings

- 5 -

may be personalized by the vehicle operator through settings transfer from an external device 104 such as a Universal Serial Bus (USB) adapter, smart Card, electronic key fob (RFID), or via auxiliary input for example.

[00013] FIG. 2 is a concept illustration of data exchange between a plurality of portable electronic devices and an automobile via the vehicle personalization system in accordance with an example of the present invention. As shown here, the system 200 includes multiple computing devices 206a – 206c used to personalize configurable settings of a vehicle 205. As described in the previous example embodiment, the computing devices 206a – 206c are utilized by an operating user and communicate with network 208 for configuring user profile and preference information. The profile information may include the user's physical characteristics such as height and weight for establishing a driving comfort range, in addition to preferences and/or driving parameters (e.g., highway/city driving, engine tuning, transmission shifting, chassis setup, etc.). Examples of configurations and/or settings that may be personalized and transferred between multiple vehicles include: pre-configured radio stations (e.g., AM, FM, Sirius/XM), metric system for dashboard, Bluetooth® pairing information, personal phone directory and address contact list from a cell phone and/or email account, settings relating to downloadable music, mirror/seat positioning, software configurable vehicle suspensions, and the like. Moreover, operating users may transfer their personal configuration directly from the computing device 206a – 206c such as a smartphone for example, to the vehicle 205 via Bluetooth® or similar communication interface/protocol 215. Specifically, each computing device 206a – 206c may include distinct user profile information that causes the vehicle computing device to adjust configurable settings of the vehicle 205 based upon receiving a configuration change request from a particular device (via a short-range communication interface), or through proximity detection of each computing device (e.g, configuration adjustment only for the driver's computing device when multiple passengers/devices present).

[00014] FIG. 3 is a simplified flow chart of the processing steps for vehicle personalization the in accordance with an example of the present invention. In step 304, configuration and setting ("C&S") data of the vehicle are retrieved. According to one example embodiment, retrieval of vehicle C&S information may

- 6 -

be accomplished at the manufacturing level, through online lookup of the vehicle's VIN number, or via a computing device and vehicle interface module. Next, in step 304, the system determines the customizable features of the configuration and settings data. That is, given the present list of configurations and settings associated with the vehicle, a determination is made as to which configurations and settings are capable of being personalized by the operating user. The determination may be accomplished through manufacturer's listing of preset configurable parameters; analysis of data parameters encoded with the configuration or setting of a particular device/sensor or connector; or via an online database of vehicle identification information tagged by VIN or the make and year of the vehicle. Upon receiving a configuration change request in step 306 (via proximity detection or manually), preference settings associated with the requesting user are then downloaded and received at the vehicle interface module of the target vehicle in step 308. As discussed above, the user profile and vehicle preference settings may be obtained via the cloud network, directly from the user computing device, or via an external storage device. Next, in step 310 the preferred settings of the user are analyzed by the rules engine for validating compatibility of the user preferred settings with other configurations and/or settings of the vehicle. In step 312, the user profile and preference settings are then applied to configuration module so as to adjust the current configuration and/or settings of the vehicle (e.g., adjust current seat settings to accommodate physical characteristics of user). Lastly, in step 314, the user profile and settings may then be stored locally on the vehicle processing unit for subsequent retrieval. For example, the preference settings of the current driver may be associated with the Bluetooth pairing information of the user's portable electronic device such that when the user enters the car in the future, the vehicle processing unit is able to automatically pair with this device and then apply all of the user's stored preference settings.

[00015] Embodiments of the present invention provide system and method for vehicle personalization. Many safety and other advantages are afforded by the vehicle personalization system disclosed herein. For example, the automated aspect of the present examples helps to greatly reduce the time required to setup a vehicle with driver preferences. And since the driver is not preoccupied

- 7 -

physically configuring the vehicle during transit, the driver's ability to focus on the road and other drivers is greatly improved. Still further, the present system also allows drivers to take preferred configurations and settings from vehicle to vehicle with minimal setup time via the cloud-based user profile.

[00016] Furthermore, while the invention has been described with respect to exemplary embodiments, one skilled in the art will recognize that numerous modifications are possible. For example, although exemplary embodiments depict a smartphone as the computing device, the invention is not limited thereto. For example, the disclosed computing device may be a netbook, a tablet personal computer, or any other electronic device capable of communication with the vehicle interface module. Thus, although the invention has been described with respect to exemplary embodiments, it will be appreciated that the invention is intended to cover all modifications and equivalents within the scope of the following claims.

- 8 -

WHAT IS CLAIMED IS:

1 1. A computer-implemented method for vehicle personalization, the
2 method comprising:
3 determining, via a vehicle processing unit, at least one customizable
4 setting from a plurality of configuration settings associated with the vehicle;
5 receiving, at the vehicle processing unit, a request for personalization of at
6 least one configuration setting;
7 retrieving, via the vehicle processing unit, user profile information, wherein
8 the user profile information includes a plurality of preference settings associated
9 with a vehicle; and
10 adjusting at least one customizable setting of the vehicle based on the
11 preference settings of the user profile information.

1 2. The method of claim 1, wherein the step of adjusting the at least
2 one customizable setting further comprises:
3 determining the compatibility of the user preference setting against the
4 plurality of configuration settings associated with the vehicle.

1 3. The method of claim 1, wherein the user profile information is
2 retrieved via a network-based server.

1 4. The method of claim 1, wherein the user preference settings are
2 received via an external data storage device.

1 5. The method of claim 2, wherein the vehicle processing unit is
2 configured to store user profile information associated with a plurality of operating
3 users.

1 6. The method of claim 5, further comprising:
2 locally storing user preference data associated with a plurality of operating
3 users; and

- 9 -

4 automatically adjusting the at least one customizable setting of the vehicle
5 based on proximity detection of the operating user and the stored user data
6 associated with the detected operating user.

1 7. The method of claim 6, wherein the user profile information includes
2 driving parameters, physical characteristics, entertainment preferences, and/or
3 communication preferences of the operating user.

1 8. The method of claim 6, wherein the configuration settings of the
2 vehicle include a radio station, phone contact list, music phone directory, vehicle
3 powertrain settings, and/or vehicle running equipment settings.

1 9. A system for personalization of a vehicle comprising:
2 a network-based server configured to store user profile information
3 associated with a driver, wherein the profile information includes a plurality of
4 vehicle preference settings;
5 a vehicle processing unit in communication with the network-based server
6 and configured to adjust at least one customizable setting of a plurality of vehicle
7 configuration settings;
8 wherein upon receiving a request for vehicle setting personalization, the
9 vehicle processing unit retrieves the stored user profile information associated
10 with the driver and adjusts at least one customizable setting of the vehicle based
11 on preference settings of the user profile.

1 10. The system of claim 9, wherein the vehicle processing unit further
2 comprises:
3 a rules analyzing module configured to determine the compatibility of the
4 user preference settings against the plurality of configuration settings associated
5 with the vehicle.

1 11. The system of claim 9, wherein the vehicle processing unit is
2 configured to store user profile information associated with a plurality of operating
3 users, and

- 10 -

4 wherein at least one customizable setting of the vehicle is adjusted based
5 on proximity detection of the operating user and the stored user profile
6 information associated with the detected operating user.

1 12. The system of claim 9, wherein the user profile include driving
2 parameters, physical characteristics, entertainment preferences, and/or
3 communication preferences of the operating user.

1 13. The system of claim 9, wherein the configuration settings of the
2 vehicle include a radio station, phone contact list, music phone directory, vehicle
3 power train, and/or vehicle running equipment.

1 14. A non-transitory computer readable storage medium having stored
2 executable instructions, that when executed by a processor unit associated with a
3 vehicle system, causes the system to:

4 determine at least one customizable setting from a plurality of vehicle
5 configuration settings;

6 receive a request for personalization of at least one configuration setting;

7 retrieve user vehicle preference data, wherein the preference data
8 includes a plurality of preferred settings associated with a vehicle; and

9 analyze the compatibility of the user preference setting against the plurality
10 of configuration settings associated with the vehicle;

11 adjust at least one customizable setting of the vehicle based on the
12 preferred settings of the user preference data and the compatibility of the .

1 15. The non-transitory computer readable medium of claim 14, wherein
2 the computer-executable instructions further cause the system to:

3 store user vehicle preference data associated with a plurality of operating
4 users;

5 automatically adjusting at least one customizable setting of the vehicle
6 based on proximity detection of the operating user and the stored vehicle
7 preference data associated with the detected operating user.

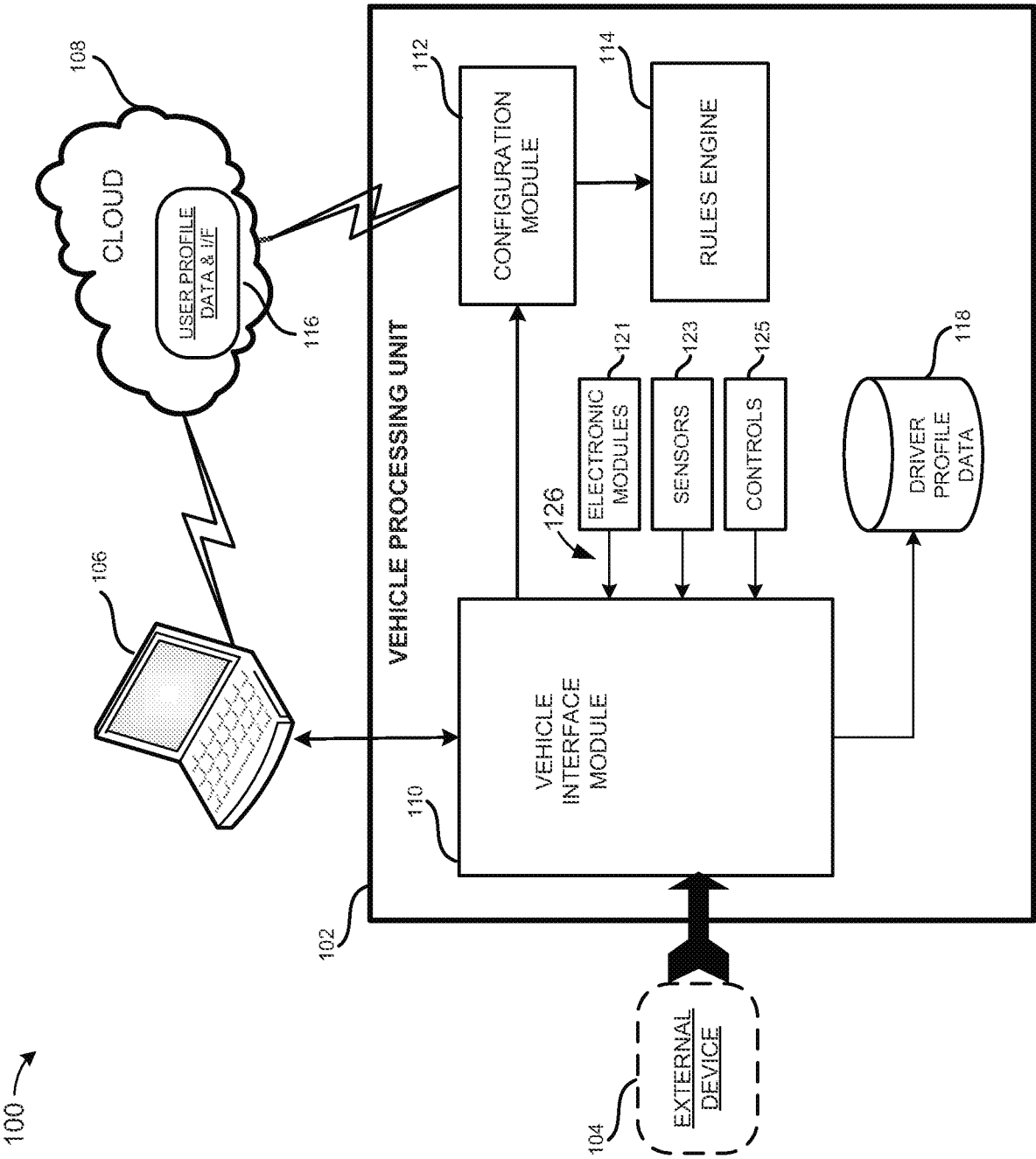


FIG. 1

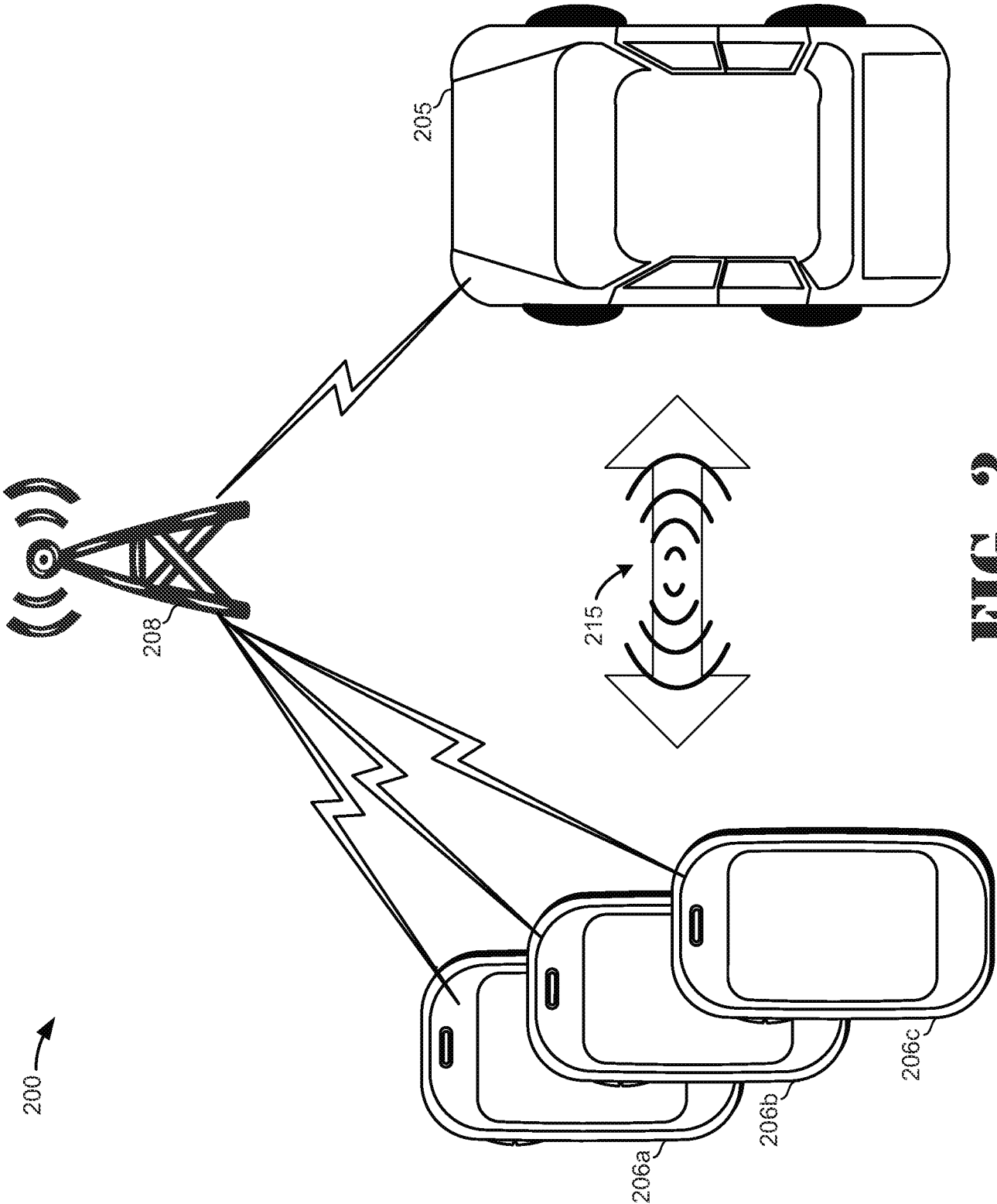
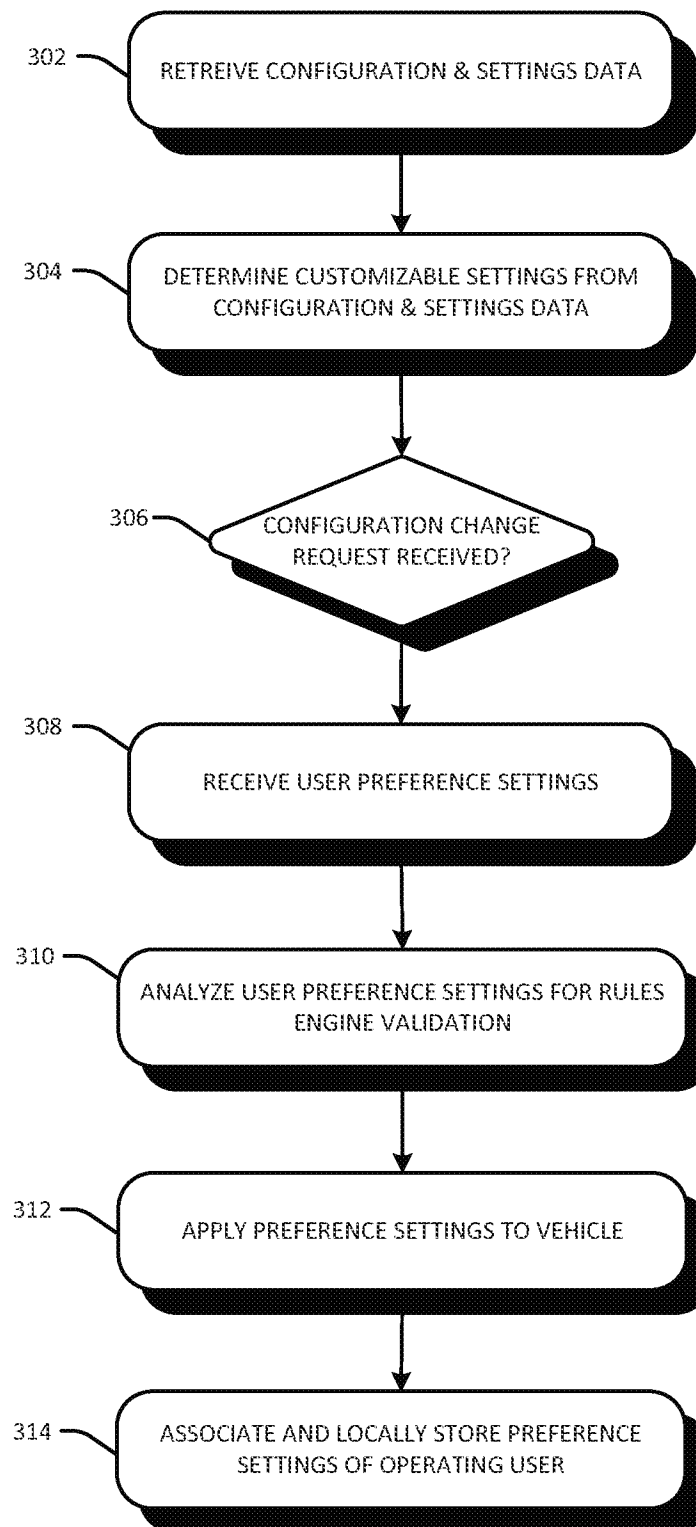


FIG. 2

3/3

**FIG. 3**

A. CLASSIFICATION OF SUBJECT MATTER***B60R 25/10(2006.01)i, G06F 17/00(2006.01)i, B60W 50/08(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)

B60R 25/10; G06K 5/00; G06F 19/00; G06F 17/00; G06F 17/30; G06F 7/00; G06F 7/04

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

Korean utility models and applications for utility models

Japanese utility models and applications for utility models

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

eKOMPASS(KIPO internal) & Keywords:user, driver, profile, information, server, network

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X Y A	US 2010-0222939 A1 (NAMBURU et al.) 02 September 2010 See paragraphs [0029] - [0031], [0035], [0048], [0049]; claims 3, 4.	1,3,4,9,12,13 11 2,5-8,10,14,15
Y A	US 6,075,454 A (YAMASAKI, SHIGENORI) 13 June 2000 See column 4, lines 47 - 61; figure 1.	11 1-10,12-15
A	US 6,775,603 B2 (YESTER et al.) 10 August 2004 See column 3, line 19 - column 4, line 52.	1-15
A	US 7,076,504 B1 (HANDEL et al.) 11 July 2006 See column 35, line 63 - column 36, line 38; figure 17.	1-15
A	US 2007-0255464 A1 (SINGH et al.) 01 November 2007 See abstract, paragraphs [0038] - [0056]; figure 3.	1-15



Further documents are listed in the continuation of Box C.



See patent family annex.

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"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

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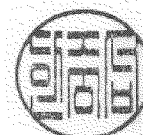
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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/US2012/026733

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