PATENT APPLICATION

Methods and Systems for Defining Vehicle User Profiles and Managing User Profiles via Cloud Systems and Applying Learned Settings to User Profiles

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Claim of Priority

[0001] The present invention claims priority to U.S. Provisional Patent Application No. 61/745,729, filed on December 24, 2012, and entitled "METHODS AND SYSTEMS FOR ELECTRIC VEHICLE (EV) CHARGING, CHARGING SYSTEMS, INTERNET APPLICATIONS AND USER NOTIFICATIONS", which is herein incorporated by reference. This Application is also a continuation-in-part of US Application No. 13/452,882, filed April 22, 2012, and entitled "ELECTRIC VEHICLE (EV) RANGE EXTENDING CHARGE SYSTEMS, DISTRIBUTED NETWORKS OF CHARGE KIOSKS, AND CHARGE LOCATING MOBILE APPS", which claims priority to US Provisional Application No. 61/478,436, filed on April 22, 2011, all of which are incorporated herein by reference.

Field of the embodiments

[0002] The present invention relates to systems and methods for managing user profiles for vehicles and exchange of information with cloud-based processing systems.

BACKGROUND

[0003] Vehicles, such as motorized vehicles and electric vehicles have been around for some time. Vehicles provide a means that enable humans to drive from place to place. In today's world, vehicles have become an indispensable mode of

transportation, and provide the freedom to travel at any time of day and for various distances. Vehicles can be publically operated or can be privately owned. Humans most commonly operate vehicles, no matter the type, whether electric or combustion engine based. In recent years, technology has been advancing to allow for better wireless interfacing and networking with vehicles.

[0004] It is in this context that embodiments of the invention arise.

SUMMARY

[0005] The methods, systems and apparatus include electronics of vehicles that drive display devices in vehicles and communicate wirelessly with Internet services.

Methods and systems provide access to cloud services over the Internet for managing a user profile of a vehicle on a cloud processing system connected to the Internet. One example method includes receiving requests to access the user profile to define settings for one or more vehicles. The method includes receiving input for user settings at the vehicle using the cloud processing system. The method includes processing the input over time to learn behavior associated with the input to the use settings. The method includes transmitting settings to the vehicle to be automatically implemented based on the learned behavior. In one example, the profile is associated with a plurality of vehicle types and the method includes detecting a violation of a setting or an incompatible setting in the profile that is user defined via the user account. The method can then automatically send a notification to a predefined administrator of the profile. The method being executed by a processor.

[0006] The profile can be transferred to one or more vehicles, can be set for a temporary period of time, can be set with wireless payment systems, and is accessible over the Internet to accept changes or updates.

[0007] In one embodiment, a method is provided. The method includes receiving a request to manage a profile for a user account. The method includes identifying a vehicle type for the profile. The method includes receiving a plurality of settings for the profile, the settings being stored on a profile database of a cloud services system. The method includes transferring the profile to a vehicle identified in the plurality of settings. The transferring is via wireless communication transfer over the Internet, and

the profile is applied so that the settings are implemented by the vehicle. The method includes receiving communication from the vehicle to update the profile with changes made at the vehicle or learned from user input at the vehicle, the method being executed by a processor.

[0008] In some embodiments, the profile stored in the profile database is accessible via a device having connection to the Internet, the profile receiving a profile update from the device.

[0009] In some embodiments, the profile update is transferred to the vehicle.

[0010] In some embodiments, the device is one of a portable device, or a computer, or a vehicle computer interface.

[0011] In some embodiments, the profile includes one or more roles of predefined settings, each of the roles provided with a login, each role when logged in provides predefined settings to the vehicle.

[0012] In some embodiments, the predefined settings include restrictions, and wherein when a restriction is violated a notification is automatically transmitted to an administrator of the profile.

[0013] In some embodiments, each role enables or disables systems or functions of the vehicle, and use of the vehicle in accordance with each role saves a history of user for access at the cloud services system.

[0014] In some embodiments, the profile is associated with a plurality of vehicle types.

[0015] In some embodiments, the profile is to be disabled at the vehicle if a user associated with the user account is not validated to be using the vehicle with the profile.

[0016] In some embodiments, the profile is activated on the vehicle when credentials of a user of the user account are verified.

[0017] In some embodiments, the user is verified using biometrics.

[0018] In some embodiments, each role can include one or more of fuel use settings, or driving characteristics settings, or location based settings, or time based use and restrictions settings, or automatic purchase settings, or combinations thereof.

[0019] In some embodiments, the profile is enabled with automatic purchase settings that link the vehicle use to a financial institution to enable the transaction.

[0020] In some embodiments, the automatic purchase settings include a verification during use of the vehicle to determine if the vehicle is being accessed by a user associate with the user account.

[0021] In some embodiments, the plurality of settings include one or more of the following: tracking and metrics, comfort, entertainment, driving modes, refueling routing and purchase.

[0022] In some embodiments, the plurality of settings are automatically adjusted in response to learned user behavior, the learned user behavior being from use over time.

[0023] In one embodiment, a method for managing a profile of a user account of a vehicle is provided. The method includes receiving a plurality of settings for the profile, the settings being stored on a profile database of a cloud services system. The method includes transferring the profile to the vehicle identified in the plurality of settings, the transferring being via wireless communication transfer over the Internet, the profile being applied so that the settings are implemented by the vehicle. The method includes receiving communication from the vehicle to update one or more settings of the profile with changes learned from user input at the vehicle over time, the method being executed by a processor.

[0024] In one embodiment, a method for managing a profile of a user account of a vehicle is provided. The method includes receiving a plurality of settings for the

profile, the settings being stored on a profile database of a cloud services system. The method includes transferring the profile to the vehicle identified in the plurality of settings, the transferring being via wireless communication transfer over the Internet, the profile being applied so that the settings are implemented by the vehicle. The method includes detecting a request from the vehicle to transact a payment for a service. The method includes validating the request against settings in the profile, the validation allowing the vehicle to complete the payment for the service using a wireless payment transaction. The method includes receiving payment receipt for the wireless payment transaction and saving the payment receipt in the profile, the method being executed by a processor.

[0025] In one embodiment a method can include receiving communication from the vehicle to update one or more settings of the profile with changes made at the vehicle or from an Internet connected device.

[0026] In some embodiments, the completing of the payment includes communication with a payment account.

[0027] In some embodiments, the payment account is a credit card associated with the profile.

[0028] In some embodiments, the request from the vehicle to transact a payment is for one of a car wash service, a fast food service, a toll road service, a goods purchase service, a rental service, a lease service, or combinations thereof.

[0029] In one embodiment, a method for locating and providing access to a shared vehicle of a shared vehicle network is provided. The method includes receiving a request from a portable device to locate a vehicle to use for a shared period of time. The method includes providing an option of vehicles proximate to a location identified by the request. The method includes detecting proximity of the user device to the

vehicle proximate to the location identified by the request. The method includes transferring a user profile to the vehicle, the profile configured to automatically set user preferences of the vehicle. The method includes communicating use data of the vehicle while the profile is set for the vehicle.

[0030] In some embodiments, the profile deactivated on the vehicle when use of the vehicle is discontinued.

[0031] In some embodiments, the profile is saved to a cloud services database, the profile being accessible and updatable via a device having Internet access.

[0032] In some embodiments, the profile includes user settings, the user settings include one or more of radio settings, or user interface settings, or temperature settings for particular times of day, or learned settings from user historical use, or seat settings, or automatic payment settings for vehicle money payment transactions, or combinations thereof.

[0033] In some embodiments, profiles are associated with vehicle types; the vehicle types include vehicle makes and vehicle models.

[0034] In some embodiments, the profile includes verifiable biometrics for a user associated with the user profile.

[0035] In some embodiments, face recognition is used to validate access to the profile of the vehicle.

[0036] In some embodiments, the profile includes a group of users; each user is associated with one or more settings.

[0037] In some embodiments, the profile includes defined access to cameras of one or more vehicles, record settings, and remote access controls.

[0038] In one embodiment, a method for defining a user profile for a vehicle is provided. The vehicle profile is managed via a cloud processing system. The method

includes receiving a plurality of settings for a user profile for the vehicle. The method includes communicating the user profile to the vehicle. The method includes causing adjustment of the settings of the user profile over time based on learned behavior at the vehicle, the method being executed by a processor.

[0039] In one embodiment, a method for managing a user profile of a vehicle on a cloud processing system connected to the Internet is provided. The method includes accessing the user profile to define settings for one or more vehicles. The method includes communicating input to user settings at the vehicle to the cloud processing system, the cloud processing system processing the input over time to learn behavior associated with the input to the use settings. The method includes receiving automatic settings at the vehicle based on the learned behavior, the method being executed by a processor.

[0040] In some embodiments, the accessing is via electronics of the vehicle having access to the Internet.

[0041] In some embodiments, the accessing is via a computer having access to the Internet and credentials for accessing the user profile.

[0042] In some embodiments, the user profile is transferrable to one or more vehicles, or transferrable to another vehicle for a period of time.

[0043] In one embodiment, a method for managing a user profile of a vehicle on a cloud processing system connected to the Internet is provided. The method includes receiving requests to access the user profile to define settings for one or more vehicles. The method includes receiving input to user settings at the vehicle at the cloud processing system. The method includes processing the input over time to learn behavior associated with the input to the use settings. The method includes

transmitting settings to the vehicle to be automatically implemented based on the learned behavior, the method being executed by a processor.

[0044] In some embodiments, the user profile is transferrable to one or more vehicles, or transferrable to another vehicle for a period of time.

[0045] In some embodiments, the user profile is transferrable to a rental vehicle.

[0046] In some embodiments, the profile includes automatic payment settings to allow the vehicle to make wireless payment for services.

[0047] In one embodiment, a method for managing a profile of a user account of a vehicle is provided. The method includes receiving a plurality of settings for the profile, the settings being stored on a profile database of a cloud services system. The method includes transferring the profile to the vehicle identified in the plurality of settings, the transferring being via wireless communication transfer over the Internet, the profile being applied so that the settings are implemented by the vehicle. The method includes receiving communication from the vehicle to update one or more settings of the profile with changes learned from user input at the vehicle over time, wherein the profile is caused to be disabled at the vehicle if a user associated with the user account is not validated to be authorized for use in the profile. The method includes sending a notification over the Internet automatically to an administrator of the user account, the notification including a link to a user interface that enables communication with electronics of the vehicle, (a) to view images in and around the vehicle, or (b) to control an instrument of the vehicle, or (c) to remotely grant a guest profile for the vehicle, or (d) to sound an alarm at the vehicle, or (e) to establish a two-way audio/video communication with a person that is proximate to the vehicle, the user interface accessed via the link is presented a display of a computing device that is remote from the vehicle.

[0048] In one embodiment, the user is verified using biometrics, and the biometrics automatically select a role for the vehicle that allow access to certain predefined preferences in the user profile.

[0049] In one embodiment, a profile update is transferred to the vehicle and the profile update learned from user input is stored to the profile database. In one example process, the method includes accessing a plurality of profiles of different users stored in the profile database and detecting pattern similarities in changes made to the profiles, of different users, based on respective learned user input. The patterns can include type of input, time of day inputs, time of season inputs, inputs based on certain conditions being met, such as comfort, temperature, security, number of occupants in the vehicle, weather, age of vehicle, service requirements of the vehicle, etc. In one embodiment, a method provides a suggested setting to the user account of the profile, where the suggested setting is identified from the detected pattern similarities of the different users. Because the database or distributed database can include data from many users, the data can be analyzed for patterns, overlaps, similarities in regions of the world, age associated similarities, demographics of the users, social connections of the users, social graph intersections, comments made by many users, crowed sourced data, etc.

[0050] In one embodiment, a device used to access a profile may be one of a portable device, or a computer, or a vehicle computer interface, and the user account is provided with notifications requesting approval of a learned setting from the user input over time or learned from input of different similar users. The notification can be transmitted to an application, and the application provides data, interfaces and selections to view and modify data and view a history of learned settings and history of approval or disapproval of the learned settings. This history can then be mined to find overlaps in patterns and patterns between one user and another user.

[0051] In one embodiment, a user account is provided with notifications requesting approval of a recommended learned setting from the user input over time. The notification is transmitted to an application. The application provides a user interface of a history of learned settings and history of approval or disapproval of the learned settings. The method, such as on a server or local device, can process the approvals and disapprovals to determine a probability that the user will accept a future recommended learned setting, and if the probability is below a predefined threshold, the future recommended learned settings is not provided as a notification to the user account.

[0052] In one embodiment, a profile is caused to be disabled at the vehicle if a user associated with the user account is not validated to be using the vehicle with the profile, and sending a notification to an administrator of the user account. The notification including a link to a user interface that enables communication with electronics of the vehicle, (a) to view images in and around the vehicle, or (b) to control an instrument of the vehicle, or (c) to remotely grant a guest profile for the vehicle, or (d) to sound an alarm at the vehicle, or (e) to establish a two-way audio/video communication with a person that is proximate to the vehicle from a remote location of a device connected to the Internet.

[0053] In one embodiment, when a vehicle is designed to make payment, the making or completing of a payment can include communication with a payment account and providing a user interface in the vehicle or a portable device associated with the user account to accept completion of the payment. The acceptable of completion including one of accepting a signature at the user interface, selecting button(s) or setting on the user interface, validating the user via biometrics saved to the profile, or combination thereof, the method being executed by a processor.

[0054] In one embodiment, security encryption can encapsulate the transaction and communication with a payment agent or third party. The security encryption can also be provided for any communication between any vehicle, the cloud services and user devices.

BRIEF DESCRIPTION OF DRAWINGS

[0055] Figure 1 shows example profiles settings for a vehicle, and association to roles, in accordance with one embodiment.

[0056] Figure 2 shows additional role settings for different users, in accordance with one embodiment.

[0057] Figures 3-5 show additional vehicle profile settings, in accordance with one embodiment.

[0058] Figures 6-9B show example pairing of a vehicle to a user profile, and examples of a shared vehicle transfers of profiles for limited use of the profiles on the shared vehicles, in accordance with one embodiment.

[0059] Figure 10 illustrates validation method for enabling a profile on a vehicle and biometric validation, in accordance with one embodiment.

[0060] Figure 11 illustrates various settings for a profile and adjustments that can be made over the Internet via a device, e.g., using a portable device or the vehicle electronics and displays, and remote controls and settings in accordance with one embodiment.

[0061] Figure 12 describes a system in which a user interacts with a model view controller software environment useful for processing APPS using APIs on vehicles with vehicle operating systems capable of processing computer code, in accordance with one embodiment.

[0062] Figure 13A describes how vehicle on board computer with input output system useful for accepting input, processing input and displaying results in conjunction with stored computer readable programs or functions in the forms of APPs may be structured, in accordance with one embodiment.

[0063] Figure 13B describes one example of how stored data and function declarations may be compiled to provide intermediary access to a vehicle's computer controlling vehicle systems, in accordance with one embodiment.

[0064] Figure 13C describes a set of computer readable and executable code that can be compiled together by a third party APP developer in the form of an APP, in accordance with one embodiment.

[0065] Figure 14 describes the stepped flow of events as a user interacts with an APP, in this case, an HVAC APP, in accordance with one embodiment.

[0066] Figure 15 Describes further ways an APP may take, process and produce results, in accordance with one embodiment.

[0067] Figure 16A describes an ecosystem where an APP in conjunction with a vehicle API may work together to make assumptions, make decisions and take actions, in accordance with one embodiment.

[0068] Figure 16B describes how one of many types of inputs into an assumption and reasoning logic module can be compiled over time, in accordance with one embodiment.

[0069] Figure 16C describes one example of what an assumption and reasoning logic module may produce using the data points collected on an ongoing basis in Figure 16B, in accordance with one embodiment.

[0070] Figure 16D describes an example list of decision the decision and action engine may take based on information provided by the assumption and reasoning logic module and sets of assumptions created, in accordance with one embodiment.

DETAILED EMBODIMENTS

[0071] Embodiments of the present invention define methods, systems and apparatus for use in vehicles. The methods, systems and apparatus include electronics of vehicles that drive display devices in vehicles and communicate wirelessly with Internet services.

[0072] The Internet services provide access to cloud services. The cloud services provide access to user accounts and access to settings, configurations, applications and other customization defined by the user. Customization can include user interface customization of a vehicle display or displays. The customization can include the ability to select specific applications (APPS) to be activated by the vehicle and interfaced via the display or displays, voice input, touch input, etc. The customization is also provided with a learning engine that learns use behavior by the user or patterns of behavior of multiple users, and automatically implements settings or programming to aspects of the user interface, or provides recommendations or notifications with recommendations. The programming can include automatic programming at certain times, days, months, years, etc., and can be updated or molded over time as the user continues to use the vehicle UI.

[0073] In one embodiment, a user can access cloud services for a vehicle manufacturer and identify the particular vehicle from selected choices. The user can then identify a customization profile for the vehicle by defining the look and feel of a UI display, arrangement of vehicle controls on displays, add and associate third party APPS to the vehicle display, and save the configuration.

[0074] The configuration, in one embodiment, is saved to the profile of the user. In one embodiment, the profile is saved on a database of a specific vehicle manufacturer

that offers the customization option. In still other embodiments, once a configuration is saved to the profile account of a user, that configuration can be shared to other vehicles of the user. In still other embodiments, when a user buys a new car, the custom configuration can be transferred either entirely or partially to the new vehicle. In some embodiments, if the vehicle has more or less system functions, the customization can be adjusted automatically or the user can be provided with options to update the customization to add or delete features. In one embodiment, the customization will be facilitated via a website. In one embodiment, the website may be of the vehicle manufacturer. In one embodiment, the website of the vehicle manufacturer can allow the user to add APPS that are created by third parties. The third parties can create APPS that communicate with APIs of the system components of specific vehicles of the manufacturer. Once APPS are selected, the user can add them to the custom user interface (UI) display.

[0075] The user can also be allowed to arrange the APPS or icons of APPS in a specific custom arrangement that is saved to the user's profile. In one embodiment, the user's profile can also be run on various vehicles, other than those owned by the user. For instance, if the user is renting a vehicle and the vehicle has access to cloud services, the user can enter his user name and password (or other identifiers), which log the user into the cloud services and saved profiles. The saved profiles will then enable logic to build a custom UI for the user based on the vehicle being driven. In one embodiment, the system components and APIs of the system components of the rented vehicle can be paired or linked to the user's saved APP selections.

[0076] The user's saved UI configuration may also be transferred to the display of the rented (or other vehicle) vehicle. A best-fit configuration can also be generated using the user's profile selections, so that the configuration provided for the other vehicle will

closely resemble or appear as it does for the configured vehicle. In other embodiments, the user's use metrics can be monitored. The use metrics can include use of APPS, use be of system components of the vehicle, use of the vehicle, environment conditions, and historical actions taken by the user via the input/output controls of the vehicle (e.g., buttons, levers, keys, fobs, display selections, display interface actions, communication actions, etc.).

[0077] These historical actions can then be used to define learned actions. The learned actions can be analyzed to change configuration settings in the user's saved profile. For instance, if the user uses a particular APP every day at a particular time, that APP icon can be surfaced to the display or preset to start. The APP can then provide information to the user at about the same time the user normally needs the information. Other historical use patterns can be monitored and such data can be saved to the user's profile.

[0078] The data can then be used by algorithms that build assumptions based on historical inputs by a user as well as environmental inputs, location inputs, vehicle diagnostic inputs, internet connected marketing deals, the user's calendar, traffic conditions as well as news. The assumptions the algorithm builds are then processed into decisions and actions by an additional algorithmic process to activate local or remote audio and visual alerts, change vehicle systems, display information on a vehicle's displays and request a decision from a user locally or remotely to complete an action.

[0079] A number of embodiments are described below, with reference to specific implementations that refer to vehicles, but such implementations should be broadly construed to include any type of vehicle, structure or object. Without limitation, vehicles can include any type of moving object that can be steered, and can include

vehicles that are for human occupancy or not. Vehicles can include those that are privately owned, owned by corporations, commercially operated vehicles, such as buses, automobiles, trucks, cars, buses, trains, trolleys, etc. Example vehicles can include those that are combustion engine based, electric engine (EV) based, hybrids, or other types of energy source vehicles.

[0080] A cloud processing system, as described herein, will include systems that are operated and connected to the Internet or to each other using local networking communication protocols. A cloud processing system can be defined as an interconnected and distributed physical or virtual software defined network that utilizes virtual or physical processing and storage machines that enable various applications and operating systems to facilitate the communication with and between various client devices (vehicles, user devices, structures, objects etc.).

[0081] The communication with and between the various client devices will enable the cloud processing system to deliver additional processing information, data, and real-time metrics concerning data obtained from other processing systems as well as client feedback data. The distributed nature of the cloud processing system will enable users of various vehicles, structures and objects to access the Internet, and be presented with more flexible processing power that will provide the requested services in a more effective manner.

[0082] The processing systems can be defined from various data centers that include multiple computing systems that provide the processing power to execute one or more computer readable programs. The processing of the computer readable programs can produce operations that can respond to requests made by other processing systems that may be local to a vehicle's electronic system. For example, a vehicle can include

electronics that utilize memory and a processor to execute program instructions to provide services.

[0083] In other embodiments, the electronics of a vehicle can synchronize with a user's portable electronics. The user's electronics can include, for example mobile devices that include smartphones, tablet computers, laptop computers, general-purpose computers, special purpose computers, etc. The various computing devices of the vehicle, and or the computing devices of the user (smart devices) can be connected to the Internet or to each other. Provided that a user has access or account access to the cloud service, the cloud processing services on the Internet can provide additional processing information to the electronics of the vehicle.

[0084] The wireless communication can include cellular tower communication that couples and communicates through various networks to the Internet, to provide access to cloud processing 120. Other methods can include providing Wi-Fi communication to local Wi-Fi transmitters and receivers, which communicate with cloud processing 120. Other types of communication can include radio frequency communication, such as 802.11.ac, 802.11ad and subsequent wireless networking protocols, Bluetooth communication or combinations of Wi-Fi and Bluetooth. It should be understood that vehicle electronics can communicate with cloud processing 120 via any number of communication methods, so long as exchanges of data can be made with cloud processing 120 from time to time.

[0085] The communication can be made by vehicle electronics while the vehicle is on or when the vehicle is off, so long as communication and processing circuitry of vehicle electronics has a power source. The power source can include battery power that powers vehicle electronics to communicate with cloud processing 120 when

vehicle is turned off. When vehicle is turned on, the battery that drives vehicle electronics can be recharged.

[0086] Still further, certain applications can increase in size when being used or decrease in size to enable selection at a later time. For example, selecting the temperature system component may expand the system component to a larger space, thus temporarily removing other displayed components. The user can also select other buttons to access other system controls, other apps, or modify or add applications or system controls. When modifications are made, the modifications are saved to a user database and profile of the user, as managed by cloud services.

[0087] Cloud services will therefore allow any future modifications to be made to the custom configuration at any time and from any computer connected to the Internet. Still further, the custom configuration can be transferred to a second vehicle. If the custom configuration is transferred to a second vehicle, the system can select the system components for the second vehicle and attempted do a best match of applications available for the second vehicle that resemble or match the ones used in a first vehicle. Specific settings, arrangements and other features may also be transferred to a second vehicle, by simply transferring the custom configuration to a second vehicle.

[0088] In one embodiment, the functions of the specific applications illustrated in the display will be monitored and restricted depending on safety considerations while driving. For example, if the interfacing functionality requires more interactivity with the display, or requires a reading of text or inputting text, those functions will be disabled during operation of the vehicle. Once the vehicle comes to a stop, or is placed in Park, certain of these functions will be activated. In other embodiments, other safety considerations will allow for applications to shift from outputting text to outputting audio or voice. The input can also be changed from touchscreen, button touches,

selections, and/or voice input. In still other embodiments, safety considerations can allow certain user interface components to move about the display to provide easier reading while driving or automatic conversion of text to audio.

[0089] For example, content being displayed in the center panel display of the vehicle, can be automatically shown in the dashboard display region of the vehicle, such as in front of the steering wheel. In still other embodiments, some content or display data can be moved from the center console or the display in front of the steering wheel to the windshield of the vehicle in a heads-up display area. Accordingly, algorithms executed by the applications and applications of the manufacturer, can cooperate to provide functionality to the application features and interfaces, while maintaining safety parameters defined by rules. The safety parameters will therefore allow content of the user interface to be shifted around to various displays of the vehicle, or translated to voice or audio at certain points in time.

[0090] These settings and customizations can be made through the web/cloud services and tools provided by the website of, for example the manufacturer of the vehicle. In one embodiment, the cloud services provided by the manufacturer can be provided by a partner of the manufacturer. The partners of the manufacturer can include software companies that develop, host, or manage certain functionality provided by the vehicle manufacturer. In other embodiments, the partner software companies can integrate tools or components with tools and components of the vehicle manufacturer. This provides for integration with one or more cloud services, software services, Internet services, and services provided by systems of vehicles or systems of the vehicle manufacture. In either case, whether the software and logic is designed and constructed by one or more entities, the cloud services provided by the vehicle manufacturer or the website that provides the tools for customization will appear as a unified simple to use interface for

the user. As mentioned above, the cloud services can provide databases for saving the user profile and data associated with the user account.

[0091] The user profile can include settings made by the user, customizations made by the user, identification of applications purchased or added to the vehicle customizations, etc. Still further, the user profile data can be part or be associated with the user account. In this manner, the user that customized a user interface can access the Internet at any time, whether through the vehicle or through any other computing device having access to the Internet and make changes, modifications, or access control features of the vehicle remotely. In one embodiment, the profile of the user can be accessed from any vehicle, such as rented vehicles or shared vehicles. Settings and profile data can then be shared for a period of time on any vehicle and use data on that vehicle can be stored.

[0092] When the user is not using the vehicle, the custom configuration can be turned off or locked out for another session. Once the user wants to start a new session, the user can log back in and the custom configuration returns. In other embodiments, the custom configuration will automatically turn off when the user is not driving the vehicle or has not logged into the vehicle. In other embodiments, the custom configuration can be automatically turned on when the user is detected. The user can be detected using biometrics, login credentials, image detection of the face, fingerprint detection, retina scans, etc. In some embodiments, biometrics can include data used to identify the user, such as face recognition, fingerprint reading, retina scans, voice detection, or combinations thereof. Still further, the custom configuration can be transferred to other vehicles.

[0093] If the user wishes to use his or her custom configuration in another vehicle, the user can login to the custom configuration or user account from another vehicle. If the

other vehicle does not have all the system components needed to define the custom configuration, the custom configuration can be supplemented with other similar components automatically. In other embodiments, the custom configuration can be transferred from one vehicle to another, or when the user buys a new vehicle. In another embodiment, the custom configuration can be adjusted based on the driver. The custom configuration can also be preset remotely from the Internet, using the cloud services. The custom configuration can also be configured to provide limited use of certain systems or the vehicle, such as when a guest is driving the vehicle. In other embodiments, restrictions can be placed on the vehicle speed, location of driving, and automatic notifications for the user or the master user of the vehicle. The master user of the vehicle can have a master account with administrator credentials.

[0094] In still another embodiment, the vehicle can be loaned to a child of driving age (under 21/18 years of age), and the child can be provided with restricted use of the vehicle. When the child exceeds or does not follow the restrictions of the vehicle, automatic notifications can be provided to the user that is the administrator of the vehicle. The notifications can be by cell phone, smartphone, tablet computer, mobile device, text messages, phone calls, commendations of phone calls and text, audio messages, audible sounds, vibrations, and commendations thereof. History use of the vehicle can also be maintained in cloud services. The history use can provide the user with information as to where the vehicle has been, the speed or events, violations that occurred when use of the vehicle etc. The configuration can also provide messages to the driver warning the driver of when the vehicle has exceeded a restriction, or is approaching a restriction in use, driving area, speed, etc.

[0095] The screen displays can have various configurations, placements, sizes, number of pages, tabs, etc., and the user can provide controls for some or all of the

interfaces and controls in certain locations. The selection can be enabled for third-party applications. The third-party applications can be selected from the vehicle site, or by providing links to third-party sites. The third-party applications can be pre-identified by the site and displayed to the user if they are compatible with the particular vehicle selected. In another embodiment, the third-party applications can all be shown to the user whether or not they are compatible with the vehicle. Upon binding/pairing or attempting to find application for the vehicle, compliance as to whether the applications operate or comply with the particular vehicle can be made.

[0096] In one embodiment, certain third-party applications can be reviewed by the vehicle site administrators before they are made available to users for selection. In other embodiments, the third-party applications can be approved or disapproved. In still other embodiments, the third-party applications can be augmented with restrictions made by the vehicle manufacturer, or dictated by law. The restrictions can be applied, based on the anticipated interfacing with the vehicle interfaces, to ensure safety during driving. For instance, if a particular application requires entry of text, navigation of controls, or other activities that would distract the driver during operation of the vehicle, such vehicle controls or application controls for application interfaces can be temporarily disabled, or can be automatically transferred to a heads up display, or can switch to take audio vocal input from the user. In some embodiments, when the vehicle has come to a stop or is place to park, certain controls or interfaces can be re-enabled, or moved back to original display location or converted back from voice input to touch input. In one embodiment, tools provided by the vehicle site or third-party site can provide for customization of the layout of the display screens of the user interface.

[0097] The customization can include organizing or laying out system interfaces as well as application interfaces, such as those interfaces provided by 3rd parties. In one

embodiment, interface rules are applied to determine if the system interfaces can be replaced with third-party application interfaces, while providing access to the control interfaces via the APIs of the systems. For example, if the user wants to provide a custom speed indicator, the speed indicator must be compliant (via APIs and/or mapping) with the system interfaces so that the speed readings can be populated to the third-party application. In one embodiment, rules can be integrated with or applied to the applications and system user interfaces for when the vehicle is moving. As mentioned above, such rules can limit interactivity with certain user interfaces while the vehicle is moving to prevent unsafe driving. In one embodiment, the custom user interface is saved to the user profile.

[0098] The user profile may contain settings, such as selections of the user interface components associated with the system of the vehicle, as well as user interface is provided by third-party applications. In addition, the user profile can contain and store settings provided by the user. The settings provided by the user, as mentioned is this disclosure can also be learned settings based on use. The settings can further include remote access settings, as well as settings allow the user to control vehicle components from a remote location or a remote computer. The setting can also include providing access to the user account to view historical driving patterns, recent driving activities, the performance of the vehicle during specific driving sessions, the performance of specific vehicle components, etc.

[0099] In one embodiment, the custom user interface configuration can be transferred to the vehicle. The custom configuration, as mentioned above is stored in the database of the vehicle manufacturer, or a database held by a 3rd party that cooperates with the vehicle manufacturer to provide cloud services. The database, in one embodiment, is a network accessible storage which allows access to the user to program and modify the

user interface using any computer or device having access to the Internet, including the vehicle itself or a third-party vehicle. The method then proceeds to operation where the custom user interface can be activated in managed for Internet connectivity for components of the custom interface. For example, the vehicle's Internet access protocols can be set, or registered with an Internet provider or service provider for the cloud services. The service provider for the cloud services can be the vehicle manufacturer, a company cooperating with the vehicle manufacturer, a third-party company, or combinations thereof.

[00100] In one embodiment, the method/logic can also enable local communication with mobile devices that may be in the vehicle. The enablement may be provided by allowing synchronization with the computing system of the vehicle, or with the computing communications of the portable device. For example, the local communication can be paired automatically, based on a preset pairing process where pairing keys are entered. This provides for automatic settings and synchronization when the user enters the vehicle with the portal device. As mentioned above, user interfaces associated with applications loaded on the user's portal device can also synchronize to the display screens of the vehicle, as predefined by the user.

[00101] In one embodiment, vehicle settings are saved to either a memory number button on the vehicle or synced to a key fob, or accessible via an interface or voice activation. In one example, a vehicle operator profile is provided to allow users to maintain their individualized profiles, settings and accounts for vehicles from any internet connected device or be able to login to their vehicle physically in or near the vehicle by the use of a fob, thumb print, eye scan and or manual login using an input device that interacts with the vehicle's login system.

[00102] In one embodiment, the profile can be managed at a user account saved to a central or cloud distributed system, to manage access. Any vehicle can be abstracted so that any user can log into any vehicle if they have an account that allows access to that vehicle. For instance, a vehicle owner with the role of "administrator" (e.g., an administrator of a user account that has a profile associated therewith or multiple/sub profiles) can create logins for his or her vehicle(s) for additional users such as his or her children, spouse, mechanic, and valet driver among other applications. Logins can be created for individuals or for roles such as the role of "child" where all users with the role "child" would have the same vehicle specifications applied to the vehicle they will be logging into. Similarly, the role of valet can be given and shared by any valet driver.

[00103] The purpose of abstracting vehicle operators from the vehicle itself is a shift from the current state of the art in which settings are vehicle specific- each vehicle typically only having the ability to store 1-3 sets of settings, to where vehicle settings are user specific and 1-n logins can be managed through an access management system. The embodiments defined herein allow each user to apply his or her settings to any vehicle based on their login information in which they provide their login and password. When a user logs into a vehicle, the vehicle will determine locally on board and/or communicate remotely with a central or distributed access management system to determine the validity of the login presented to the system. If the user's login is recognized, the system will apply settings and use privileges to the vehicle prescribed by the login.

[00104] Logins can have "role" specific settings and privileges or settings and privileges set only by the administrator that cannot be overridden by the user of the login. For instance, an administrator may create a login for "John" their 16-year-old

son. The administrator can apply settings to John's login that John cannot override such as the maximum speed the vehicle can travel. For instance, Although the vehicle may have the ability to travel at a speed of 130 mph, John's login will only allow the vehicle to travel at a speed up to 90 mph. Additionally, every login may have settings that the user of the login can toggle to their liking such as the list of radio stations they would like pre-programed every time they log in to any vehicle that accepts their login.

[00105] Logins can control all aspects of a vehicle's behavior and can be attributed to individuals or roles. These settings can be toggled via a network connected device such as a computer, web application, smart-phone or directly on the vehicle. Administrators can decide which settings are locked for specific logins or roles, which are open for the login user to toggle and which settings are to be enforced depending on the time of year, or time or day etc., or when a condition or event is detected.

[00106] Login settings that can be set and remotely administered include but are not limited to, driving characteristics (rate of speed, fuel consumption guidelines) location based settings (GPS aided travel restrictions, travel radius boundaries, dynamically loading maps, dynamically loading directions, dynamically loading fuel, charge and battery service and purchase locations etc.), time of day based use restrictions (day driving only for example), automatic purchase settings (financial institution linking for automatic purchasing of fuel, charge time, batteries, car washes, etc.), fuel settings (Electric only, fuel only, hybrid only etc.), refueling routing and purchase (incentive based re-fueling maps, incentive based refueling offers etc.) driving characteristic settings (sport, comfortable, soft, off-road, high performance, economy mode), entertainment system settings (radio memory settings, internet access or restriction, streaming services settings), comfort & HVAC settings (climate control, seat positions, seat heater/cooler, suspension/ride settings, entry lighting, remote start,

remote stop etc.) tracking/metric settings (camera/video recording guidelines, mileage, top speed, average speed, MPG, wear and tear settings and notifications, historical travel maps).

[00107] Automatic purchase settings can be processed in response to requests from the vehicle. The request can be, for example, to transact a payment is for one of a car wash service, a fast food service, a toll road service, a goods purchase service, a rental service, a lease service, or combinations thereof.

[00108] Additionally, combinations of settings or setting profiles (such as "sport" where your seat moves to sport position for additional support, suspension stiffens, throttle response becomes aggressive etc.) can be set as well instead of individually setting use characteristics. In one embodiment, logins are user specific, not vehicle specific, so any family member can use their login on any family vehicle and the vehicle will perform based on the metrics and restrictions dictated by the login used to operate the vehicle.

[00109] Companies or entities can create and manage logins to company vehicles for delivery drivers, car washers, and mechanics among other applications. Each login can be configured to provide or restrict access based on the user logged into the vehicle. A company may only allow a delivery vehicle to travel at a maximum speed of 80 mph to limit reckless driving. A company may create a role of "local delivery only" where a driver with that login can only drive the vehicle within their territory. Breaches in territory travel will result in a recorded event and notification to the vehicle administrator as well as the vehicle operator. A grace period will be given to re-route back into the driver's territory before more aggressive vehicle disabling mechanisms are deployed. The driver will be given visual and audio cues as to how to avoid vehicle disabling.

[00110] A dealership can grant "test drive" logins to potential customers, which allows them to operate less than 100mph and only within a 5-mile radius. In one embodiment, alerts or notifications can be automatically triggered if violations in the restrictions are detected. A dealership may also grant a “demo” login for instance which showcases the vehicle’s capabilities, available APPS, features and benefits. Variations of the “demo” login can be used on variations of potential buyers. A “ 18-24 year old demo” may be useful for enticing that demographic and showcases the vehicle’s features 18-24 year olds are most receptive to.

[00111] A valet can be given a password to login only as “Valet” which will impose restrictions on trunk operation, vehicle speed operation, vehicle location notification settings etc. A recording option can be provided, which can set a recording within and around the vehicle when in the valet mode. This way, the user can login to see what the valet driver did while in possession the car, in case the owner feels that something is not correct when the vehicle is returned to the owner. Additionally, while the valet is driving the car, a notification can be provided to the valet that will alert the valet that recording is in progress, and their face can be shown on the display while the valet parks the car.

[00112] A user may set the valet login to alert the user that left the vehicle with a valet that the car has traveled beyond the allowed radius or has reached a speed greater than 100mph, for example. This alert can be sent wirelessly to an email address, texted via mobile phone number or sent to a mobile device having a login-profile mobile application capable of sharing current vehicle location, speed, fuel status among other metrics. The last logged in user of the vehicle or vehicle administrator can send visual, audio or auto override notifications to the valet letting them know they need their car back, they are traveling too fast or even auto shut down to prevent theft.

[00113] A parent can set up a login to the family vehicle for their child that only allows the child to drive within a certain radius. For example the vehicle may only be used to drive between home and school. A map can be outlined on the account management interface by a parent when setting up the child's login to support the home to school restriction intended.

[00114] In one embodiment, a parent or company may give a child or company driver a login that also carries a financial allowance connected to one or more financial institutions administered through the access management and/or login management system by administrators. For instance, a child may have the need to re-fuel the vehicle by purchasing either traditional fuel, battery units, and or charging time but a parent does not want to give a general credit card to the child. The parent will set a budget for fuel purchase for the given login and the login will then allow the vehicle will communicate with the fuel, battery, and or charge-dispensing unit automatically using a wired or wireless communication systems funding the purchase automatically up to the allotted budget set in the login of the vehicle.

[00115] In one embodiment, these features are useful for fleet vehicles where company vehicle users currently use a corporate credit card to purchase fuel where fraud may exist in the form of using company credit cards, or company fuel accounts to fuel personal vehicles. The new system ensures only the company owned vehicle is approved to purchase the traditional fuel, battery, charging time and also maintains metrics on which logged in user consumed fuel and re-fueled which vehicle.

[00116] In one embodiment, a process is created so that some or all manufacturers use the same type of login/access management system. By way of example, any user can log into any vehicle from any brand in so far as they have account creation access or a recognized login. Once logged in, each vehicle will receive

and impose the login-based settings as long as the manufacturer supports the login/access system.

[00117] Figure 1 shows various methods a user can interact with a vehicle login system, in accordance with one embodiment. The user may use any network-connected device ranging from a mobile computer, mobile phone, mobile network device all connecting to a remote converged or distributed network cloud system. The user may also interact with the vehicle login system directly on or near the vehicle. The user supplies login credentials to a vehicle login interface which are sent to the remote distributed or centralized user login authentication system or onboard vehicle authentication system. The processing logic receiving the login credentials processes the data and returns an authentication response to the user attempting to log in. If the authentication is a success, the vehicle the user attempted to log into has vehicle settings applied to it and the user is allowed to operate the vehicle. If the authentication is a failure, the user is presented with a failed access notification on the login interface.

[00118] Figure 2 shows two different types of users and an example of how the user is organized, in accordance with one embodiment. In this example, User 1 is an administrator of a vehicle login system over vehicles he or she owns. User 1 has the ability to add or remove logins, roles and vehicles to his login system. Since User 1 is an administrator, he or she can add more logins and or roles to the system to allow a family member to have access to the family vehicles for instance. In this case, a family member "User 2" is shown. The administrator has given this family member a login named User 2 and has granted two roles to User 2. User 1 may only want User 2 to have access to a certain vehicle and to certain roles only. User 1 may only want User 2 to have access to the vehicle for the purposes of traveling between school and home. In

this case User 1 has created a role that is applied to User 2, which only allows the vehicle to travel within certain restrictions and geographical locations.

[00119] In this example, User 2 does not have the ability to alter his or her login, role or vehicle since they do not have administrator access. However, User 1 can make changes on behalf of User 2. The full range of settings over a vehicle that applies to a given role or login is a super set of settings. User 2 may have access to a subset of settings that User 1 allows changes to by User 2.

[00120] Figure 3 shows a graphical representation of a example set of settings an administrator such as User 1 may have to administer logins, roles, and vehicles. Figure 3 further expands the depth of settings, including but not limited to, vehicle administration, adding or deleting users and roles, vehicle global settings that apply to all roles and logins, adding or deleting vehicles among other settings.

[00121] Figure 4 shows one sample of many potential configuration settings for a given vehicle. In this case, User 2 has a login created for him or her named "CHILD". This login contains a set of settings that may or may not be configurable by User 2 since User 2 is not an administrator, only a subset of settings are open to him or her to alter. The drawing illustrates the settings that are user editable and admin only or restricted. The left column lists the type of settings corresponding on the same row on the right column. These settings are examples and may be altered, added to, or subtracted from in different embodiments. For instance, fuel use settings allow an admin in this case to choose what type of fuel the user login CHILD is allowed to use while logged into the vehicle. Similarly, location based settings allows an administrator to draw out a map of the area the user login CHILD is allowed to travel within while logged into the vehicle.

[00122] Figure 5 describes extended settings from Figure 4. This figure describes additional vehicle settings that are configurable by the user with the login "CHILD" and those that are only configurable by User one being the Administrator. Figure 5 also describes a subset of settings a user login CHILD in this case is allowed to change. For example, the user login CHILD is allowed to select his or her radio stations, streaming services, and Internet access settings for a unified experience in any vehicle they log into using this log in. Similarly, the user login CHILD can access driving modes and set the vehicle mode to sport for instance. It should be understood that the example "CHILD" profile is just that, an example, and any type of user profile may be set with the defined privileges and/or restrictions.

[00123] Figure 6 illustrates an example of utilizing a profile of the user, to access cloud services 120, and a database 115, in accordance with one embodiment of the present invention. In this example, a user may utilize a connected device 110 to access cloud services 120. Using the connected device 110, the user, in this case Bob, is accessing his universal profile settings. His profile settings may include settings that have been selected before in earlier sessions, or default settings implemented by a vehicle manufacturer, or another user such as an administrator. In the example, the user may access particular active settings managed by cloud services 120 which can cause Bob's profile in database 115 to be updated.

[00124] In one embodiment, Bob's profile can include specific settings, preferences, use history, and learned settings from earlier uses of one or more vehicles. The profile settings defined by Bob, are then transferred by cloud services 122 one or more vehicles utilized by Bob. For example, if the user wishes to utilize his regular everyday car, the profile settings may already be stored on the vehicle. If the user wishes to utilize a different vehicle, such as a friend's vehicle, a rented vehicle, a shared

vehicle, a temporary vehicle, a loaner vehicle, a test drive vehicle, a company vehicle, etc., the user's profiles can also be transferred to that vehicle.

[00125] The user profiles can include standard settings that may be set at the various vehicles, or custom settings that can be selected for the user based on learned settings over time by use of various vehicles. In one embodiment, the user profiles are continuously updated and store to a database 115, which is accessible by cloud services 120. Database 115 may include data storage, such as cloud storage, data center databases, distributed databases, local storage on vehicles, network storage, and the like.

[00126] Figure 7 illustrates an example of a user (Bob) that may wish to utilize a car 200, in accordance with one embodiment of the present invention. For example, the car 200 may be a shared vehicle, such as those commonly shared in urban cities. Shared vehicles are those that belong to a company and where the company provides accounts to users to access the vehicles for specific trips, specific times, periods of time, etc. Users that share those vehicles typically park the vehicles at different locations throughout an urban city. Users wishing to find a vehicle to use can access an application or website having access to an Internet connected application to find the vehicle closest to the particular user.

[00127] Once the user has located a proximate vehicle, such as car 200, the user may approach the vehicle so as to utilize the vehicle 200. In one embodiment, when the user approaches the vehicle, and comes in close proximity to the vehicle as detected by the geo-location of the users mobile device, a pairing request can be detected. The pairing request may be triggered once the proximity zone of the car 200 and the proximity zone of the user substantially or partially overlap. The proximity

zone's may overlap when the user comes in close proximity to the vehicle, such as within a few feet, within a mile, or the user has touched or bumped the vehicle.

[00128] The pairing request may be automatically sent by the users device to cloud services 120. The pairing request can include sending the model of the vehicle 200, that may have been obtained by the users mobile device from the vehicle 200 directly. In the illustrated example, the pairing request by the users mobile device can include identification of the vehicle that the user has come in close proximity to. A pairing module 170, can then communicate with a mapping engine 118 that determines information associated with car 200.

[00129] An automaker database 116 can include data regarding a plurality of vehicles, including standard user interfaces, configuration interfaces, and other information necessary to provide user Bob with a custom interface for vehicle 200.

[00130] The mapping engine 118, in this example includes a map or that communicates with the automakers database to identify the settings, applications, APIs, or modules that allow integration of Bob's user profile from the user profiles database 160 so that Bob's profile can be sent to car 200. In the illustrated example, the mapping engine, the of the mapper, will obtain Bob's profile 160 for cloud services and obtain vehicle information for the user interfaces of the vehicle desired for use by the user.

[00131] The mapping engine 118 will the transfer Bob's profile to vehicle 200. At this point, the user, Bob, can be provided with an interface on a mobile device to allow access to the vehicle. The user interface can include a plurality of screens with instructions, check information, cost information, billing information, etc. As illustrated in figure 7, the users mobile device can provide various notifications, such as identifying to the user that the user standing next to a blue model M7 from maker C. The user interface can ask Bob if Bob wishes to pair settings to the specific vehicle

200. If Bob desires to actually utilize the shared vehicle 200, the pairing request may be initiated as mentioned above.

[00132] Figure 8 illustrates another embodiment where the user Bob has utilized his mobile device 100a to define or access a plurality of settings. In one embodiment, the user may register 214 with a car sharing service, such as via a user interface or application having access to the Internet and the company providing the service. Cloud services 120 can then provide access to the profile database 160 where Bob's profile may be stored. The profile 160 may be accessible to 3rd parties, such as car sharing service.

[00133] Also shown in cloud services 120 is the car database 116/115. The car database can then be provided with information from the car sharing company 210 that identifies the cars that the company owns and that are shared with the service. The car data including assigned IDs to the vehicles and cars can be stored in the car database 116/115. Additional data can be supplemented from vehicle manufacturers 212. The cloud services 120, in accordance with one embodiment, can include logic for profile identification for vehicles 224, logic for proximity detection 222, user request logic 220, and other managing logic for receiving request from users, managing databases from a car sharing database, managing data from vehicle manufacturers, and receiving request to manage profiles an axis vehicles.

[00134] As illustrated, when the user Bob approaches the vehicle 200, the Bob's mobile device 110a can identify the closest car, which may be car A. In this example, Bob is identified to be proximate to the car having an ID 1528ABC. In one embodiment, when the user comes in proximity to the car 200, the car can beep or light up when enabled, it can open the doors to allow the user to access the vehicle when the logic has paired the user to the vehicle, the profile of the user can be transferred to the

vehicle, the use of the vehicle is managed by the user's online account (storing historical use data and any billing information), automatic payment for use can be made from predefined payment arrangements stored in the profile, and use of the vehicle can be restricted to predefined rules, based on the profile. Accordingly, the profile database 160 can include both profiles of the user, such as user settings, as well as profile restrictions that may be set by the car sharing service.

[00135] Figure 9A shows one example process for utilizing user profile settings from a registered user and utilizing settings of a shared vehicle network, in accordance with one embodiment of the present invention. In this illustration, operation 300 receives the user profile settings from a registered user of a shared vehicle network. The registered users profile can be obtained from a cloud services profile, such as the profile used for a number of vehicles which may be in or outside of the shared vehicle network.

[00136] In another embodiment, the profile may be the profile set by the shared vehicle network, based on the service contract entered by the user. In operation 302, vehicle IDs for each vehicle assigned to a shared vehicle network are received by cloud services 120. Cloud services 120 will therefore maintain a user database 160 with a plurality of user profiles.

[00137] Cloud services can also maintain a vehicle inventory database 310 for the shared vehicle network. Servers 350, which operate cloud services 120, and therefore managing access database 160 and 310, as well as provide logic for providing access to vehicles, unlocking vehicles, and transferring user profiles to specific vehicles. In operation 360, the servers 350 may receive a request to locate a vehicle on a map from a computing device. The request may be provided with reference to the user's current location, using GPS or the like. The request is then processed by servers

350, and servers 350 communicate the forward a list of available vehicles proximate to the user or for the users identified area in operation 362. In operation 364, a selection request is received from the user for a specific vehicle and a reservation is made for the use of the vehicle for a set period of time.

[00138] In operation 366, a command is sent to the vehicle the signal alert when the user is detected to approach the vehicle within a particular distance, notifying the user that the vehicle is the vehicle that the user reserved. This provides for a method of allowing the user to easily identify the vehicle that the user reserved. For example, if the user is instructed to go to a specific parking lot to identify the vehicle that was reserved, the user would have a difficult time identifying which vehicle it is that the user reserved. However, by allowing cloud services to signal to the vehicle to sound the alarm, turn on a light, beep, for make any other identifying gesture, the user can easily identify the vehicle in the parking lot.

[00139] In operation 368, a user interface is provided to the user's mobile device that will provide a notification to the user indicating that the person/user has arrived at the vehicle. In operation 370, the users profile is transferred to the vehicle. The transfer of the profile will allow the settings of the user to automatically be set in the vehicle. The settings can include, for example, temperature, radio settings, seat settings, meter settings, air settings, etc.

[00140] In operation 372, the settings that are made by the user when in the vehicle or adjustment settings can be sent back to the user profile. Thus, when the user offering the vehicle and making changes to his or her profile, those changes can also be communicated back to the profile database in cloud services 120. This provides for a continuous feedback loop over time, to allow the users profile settings to be managed

and maintained current to the users best liked preferences. The operation then proceeds to B in Figure 9B.

[00141] In operation 374, it is detected that the user has completed use of the vehicle upon some user entry at a computing device. The computing device may be computing device of the vehicle, or a mobile device. The entry can be, for example, the user logging out of the vehicle indicating that the user has terminated use of the vehicle. At logout, the vehicle's original profile settings will then be returned, and the users custom profile settings will be terminated.

[00142] In operation 378, a report sent back to the server regarding the use of the vehicle and the charges to the users account for the use. In one embodiment, the use reporting can occur continuously while the user is driving vehicle. In operation 380, the drivers session log can be saved user profile, keeping a history of the user's travels. In operation 382, survey data can be requested of the user regarding the vehicle use. Because the user was utilizing a shared vehicle, feedback from the user can be helpful to potential future users that may want to rent or utilize vehicles from the same company.

[00143] The user may be provided with options to publish likes and dislikes or commentary to a social network 390. Ratings can also be transferred to rating companies, such as those that allow internet users to view user comments, reviews, complaints, etc. The social network 390 can allow the data to be open data 394, or data that is shared with friends 392. In operation 384, problems with shared vehicle can be reported to the vehicle network to allow repairs before making the vehicle available for reuse. Cloud services for the shared vehicle network can then be updated in cloud services 120. For example, if the vehicle has been identified as having some mechanical malfunction, the cloud services can update that vehicle as being out of

service, so that discovery of that vehicle does not cause users to access that specific vehicle that may be out of commission.

[00144] Figure 10 illustrates a user (Bob) entering the vehicle, such as a shared vehicle 200, in accordance with one embodiment of the present invention. In this example, the user has been identified by the vehicle, such as using a camera 402. The camera 402 may use face detection 406 to automatically identify the user, and set the users preferences and settings for the vehicle automatically. In some embodiments, this allows verification that the user driving the vehicle 200, from the shared network, is the driver that unlocked the vehicle from a remote location (such as a mobile device). In this example, the vehicle 200 may also include a plurality of cameras, such as cameras 404, 408, 410, 412, 402, etc. Any one of these cameras can be accessed from a remote location, if the user's profile provides access, or the privacy setting allows such access.

[00145] These cameras can be used to detect and monitor the exterior portions of the vehicle as the vehicle drives around, as well as interior portions of the vehicle. These cameras can be used by the vehicle sharing company to monitor the status of the vehicle, and the location where the vehicle is parked. In one embodiment, the user who has rented the vehicle can set a privacy setting to disable certain cameras. In one embodiment, a speaker 420 can be activated to allow the vehicle to speak and communicate with the user. Vehicle electronics and logic 400 can be in communication with cloud services 120.

[00146] Cloud services 120 can also be in communication with user profiles 160. In one embodiment, the user profiles 160 can also include specific profiles for registered users. In one embodiment, the registered users can include a family of users. A specific family can have a number of drivers or users that have been registered with a service. For example, the database can include users ABC123xi (such code is only an

example, and any form of ID/code can be used), and the users can include a particular family or group of people. The group of people can also be a group associate with a company, a sharing service, a group established for a particular event, or other types of groupings. The vehicles can therefore be monitored for use by the specific users in a particular family or group. In one embodiment, the particular family and groups can be associate with their own profile history settings, which include data from their previous uses.

[00147] In one embodiment, figure 10 illustrates a process utilize to communicate between vehicles, users, and cloud services. In operation 450, a vehicle with communications is provided with cloud services. The cloud services will be in account, software, or interface that allows communication with cloud services 120. In operation 452, the user in the vehicle may be detected, and the face of the driver or other biometric data can be used to identify the specific user sitting in the car. The detection of the user can, in one embodiment be enabled or restricted based on privacy settings desired by the user.

[00148] In operation 454, the user may be identified and the users profile can be automatically retrieved from cloud services and the user profile 160. The preferences settings for the user can be identified from the database in operation 456, and the settings can be applied in operation 458. The settings can be applied to the vehicle for the identified user. When the user terminates use of the vehicle, the settings can't be deactivated, or return to a neutral setting.

[00149] Figure 11 illustrates an example of particular types of settings that can be set, or recorded, or accessed, in accordance one embodiment of the present invention. In one example, cameras 480 can be provided as options for access by the user. The cameras can be accessed to view historical uses by the user, or can be access

to view current and live video of the vehicle. For example, if the user has rented a vehicle for a period of time, and parked it in a specific location, the user can monitor the vehicle from a remote device connected to the Internet.

[00150] Record settings 482 can also be set by the user, the vehicle provider, or cloud services. A plurality of recording options and access can be set or adjusted by the user from a remote location. Remote access 484 also provides the user with options to control specific features of the vehicle. The control the vehicle can be set for a period of time when the users profile is associated with the vehicle.

[00151] In a car sharing environment, the remote access of the vehicle can be enabled during the period of time when the user is assigned or the users account is assigned to that vehicle. In examples where the user owns the vehicle or is more tightly connected to the vehicle, the remote access can be provided by entering axis control information, credentials, passwords, usernames, and biometric data or combinations of one or more.

[00152] In still other embodiments, user interfaces are provided to provision customized data regarding available charge station locations. In one embodiment, users having other devices, such as smartphones or portable electronics can obtain data, which can be shared with other user interfaces. The sharing can be by way of a sync operation, that can be automatic when the user enters the vehicle or on demand by the user. In other embodiments, the application or program running on the user portable electronic device can continue to execute the processing, while allowing the display of the vehicle to show all activity on the display. For example, if the vehicle electronics are not capable for processing an application or access a cloud service, the portable device can act as the agent for the vehicle electronics. In one embodiment, the display and I/O of the EV simply acts as a passive interface, while the processing or accessing

to cloud processing is done by the user's portable electronics (e.g., smartphone or the like).

[00153] In some embodiments, the user's portable device is already programmed with access codes, passwords, etc., so the user may wish to use the portable electronics instead of having to program the vehicle. This is important when users share a vehicle. If users share a vehicle, one user may have the electronics programmed to their likes or dislikes. By allowing programming, data settings, etc., to be shared or synced (e.g., temporarily or not), users can more easily share vehicles, while keeping the settings that the user is used to having.

[00154] In still another embodiment, allowing the user's smart phone or portable electronics to sync with an EV, users of rental cars can more easily step into cars with pre-programmed settings. Thus, users that temporarily use vehicles need not worry about programming the car's settings upon entering the car, but simply sync with the vehicle to allow the vehicle to run display, IO and services based on the custom settings of the user's portable device.

[00155] This processing that allows users to sync a vehicle with a user's custom settings stored in the user's portable device can also have application to car sharing environments. In big cities, companies allow users to locate vehicles in a proximity to their current location, and simply enter the vehicle using their membership code. In addition to providing users with access to the vehicle, the user/driver's settings can be synced to the vehicle. This can include settings of the seats, the mirrors, the temperature, the radio stations, and the Internet apps to display on the car's display, etc. Custom information, such as prior uses of the car, cost for driving, etc., can be displayed on the car's display, via the sync data from the user's portable device. The

sync data can be obtained at any time, such as by using the user's portable Internet link, etc.

[00156] In one embodiment, a user's EV or non-EV vehicle can be in communication with cloud services, and the cloud services can be interfaced with data from various entities that provide power for the grid, provide charging units (CUs), provide discounts to charge at particular CUs, geo location services, mapping services, live traffic data, etc. The user of the EV can communicate with the vehicles electronics via a display unit and its associated electronics, can provide input via touch or voice, can request data regarding routs to local charge stations, cost estimates at the various charge locations, how crowded the charge stations are at the various locations, etc.

[00157] The cloud services 120 are also accessible via a computer that has access to the Internet, a smart device (e.g., smart phone, tablet, etc.), etc. Thus, data can be acquired from various sources and data can be consumed by various sources. The data that is acquired, shared or accessed can be launched on the user's device and then transferred to share in real-time with the display and/or electronics of the vehicle. Thus, a unified access display can be customized to the user, regardless of the vehicle that the user chooses to drive. This is in contrast to current models that customize settings for one vehicle owner or owners.

[00158] In one embodiment, the user's settings are seamlessly transferred to the vehicle the user chooses to drive. This is especially useful for cases where a user drives many cars, but wishes to keep his settings constant. Settings can include cloud services, or local settings such as seat positions for the size of the user, mirror positions, radio stations, weather stations, history of routs taken, favorite locations to visit, etc. The application that allows syncing of a user's settings on a portable device to the vehicle electronics is especially useful for car sharing applications, which is common in

large cities and may expand in the future. As car sharing increases, it is most useful to allow a user to save his/her settings in their mobile device, instead of relying on the fixed settings of the vehicle. In another embodiment, it is also possible for a user to type in their universal login code (e.g., user name / password) into the car display, and all of the user's settings are transferred to the vehicle while the user is driving the EV. Once the user stops using the EV, the car can go back to the normal mode for another user to login. The data regarding the user's settings would, in this embodiment, be saved in the cloud.

[00159] In one embodiment, user interfaces of a mobile device can share data with the vehicle's display and native apps. App unification allows EV system to display APPS on the user's smartphone device in an opt-in PAIR mode. In one embodiment, this allows one person to enter another's EV, share apps on the EV display while in the EV, and when the person leaves the EV, the Apps de-pair. This auto-sync facilitates sharing of data and also allows users to unify their settings across any number of vehicles the user may drive.

[00160] In one embodiment, the synchronization will enable users to universally transfer settings from portable devices to electronics of a vehicle. In some embodiments, the vehicle that the user wishes to drive is not his vehicle. For instance, the vehicle may be a friend's vehicle, a rented vehicle or a shared vehicle. If the user has programmed settings in his or her device, the settings that are useful for the vehicle will be transferred to the vehicle. Settings can include travel speed restrictions, car seat settings, mirror settings, remote access to home controls (e.g., lighting, garage doors, etc.), radio settings, satellite radio settings, internet settings, etc. In some cases, only some settings are directly transferrable. In other embodiments, a database can be accessed to find a translation metric. The translation metric can include mapping tables

that allow for settings to be transferred between functions of one vehicle to other vehicles. In one embodiment, vehicle makers can upload their translation metric for each model and the mapping tables can be used to provide the sync operation.

[00161] Figure 12 describes a system in which a user interacts with a model view controller software environment 1800 useful for processing APPS using APIs 130 on vehicles with vehicle operating systems 129 capable of processing computer code. The APPS can execute profile retrieval, updates, and sync operations. The model view controller paradigm 1800 shows basic interaction, control, processing, and updating of data useful for manipulating and viewing resulting actions by ta vehicle running an APP in such a system. Such a system useful for running APPS on vehicle operating systems will accept inputs by a user 121, cloud services 120 via data streams, vehicle systems feedback and data streams 1812 used by a controller 1804 that may constantly poll electrical, capacitive and physical sensors, and input streams to detect if interactions 1808 such as network passive updates, network active updates, user touch, user speech, user input, user selection among others has been triggered.

[00162] Each input 1804 will then trigger manipulation of the system's model 1802 portion of the APP software paradigm thus invoking stored routines within APPS 104 which then in turn interact with the vehicle's API system 130 built upon the vehicle's operating system 129. Depending on the app presented to the user 121, the input may trigger stored routines or functions on APP software or operating system level restricted stored routines or functions.

[00163] After the processing of stored procedure code is manipulated with arguments provided by the controller 1804 inputs, visual and or sensory results are presented to the user in the view 1806 portion of the model view controller paradigm. These sensory outputs, data streams, electrical signals may all be translated as

additional options, results, dynamic updating, audio or visual graphical user interface changes 1810 on any of the user's connected display devices. The user will notice these results visually or audibly but may also feel or detect changes in the vehicle's mechanical systems. Updates from the model 1802 may also be used to toggle vehicle settings 1814 which in turn may invoke changes in the vehicle's physical, mechanical and electrical systems 128.

[00164] Finally, the system controller 1804 may receive additional updates from the vehicle systems affected or additional user 121, cloud services 120, vehicle systems feedback inputs 1812 to re-engage the user in a cyclical fashion. If no inputs are sensed, the system's controller will continue to poll its electrical and data I/O systems for input on a continuous basis.

[00165] The model view controller paradigm 1800 described is one example of the software input output lifecycle that may be used to invoke, manipulate, process, update portions of computer readable code such as APPS 104 using an intermediary API 130 to communicate with the vehicle's operating system 130. However, APPS 104 may be run on physically wired, wirelessly connected or remote devices having processing abilities to translate the computer readable code in APPS into actionable invocations on one or more vehicles in order to facilitate or utilize the vehicle's electrical and mechanical systems in prescribed or customizable fashions.

[00166] Figure 13A describes how vehicle on board computer with input out put system 1900 useful for accepting input, processing input and displaying results in conjunction with stored computer readable programs or functions in the forms of APPs 104 may be structured. Although system 1900 describes one way to provide vehicle on board computing power to run APPs 104, the arrangement of the vehicle computer 1906 may be altered or arranged in differing fashions with differing connection routing

in order to achieve the same. In this example, vehicle on board computer 1906 may be comprised of components such as the network interface 1910, memory 1912, a central processing unit 1914, an input output buffer useful for streaming data 1916, storage 1908 having the ability to store computer data in long term or short term fashion useful for stored computer code procedures in the form of an operating system 129, intermediary stored procedure code in the form of APIs 130, stored subsets of computer code procedures APPs 104 interacting with API 130 as an intermediary to the operating system 129.

[00167] In this example, the vehicle computer 1906 has the ability to transmit, receive and process information using wired or wireless connections. One such wireless connection is provided by a wireless data sending and receiving antenna 1928 connected to a network interface 1910 useful for pairing with and communicating data with portable or stationary wireless devices which may or may not be part of a network 1902. Such wireless devices include but are not limited to wireless displays 210b, portable smart phones 210a, portable computers, 210c and even stationary objects, structures, buildings, toll bridges, other vehicles etc. The vehicle's network interface 1910 through antenna 1928 may also communicate with cloud services 120 to receive instructions from a remote location that invokes stored programs such as APPs 104 on the vehicle's computer.

[00168] The vehicle may also send and receive data wirelessly in order to establish a connection with a peer-to-peer ad-hoc network. Invocations may result in output data streams interpreted by wireless devices 210b, 210a, 210c as well as wired devices such as wired displays 210d or vehicle integrated display devices such as windshield heads up projected display or integrated glass displays 210e. All data streams generated by APPs 104 stored on the vehicle's computer may also be triggered

by wired devices such as vehicle sensors 1918, vehicle electrical systems 1920, vehicle electrical systems 1922, engine control systems 1924, vehicle diagnostics systems 1926, user input as well as environmental input.

[00169] A user and or vehicle may find system 1900 useful in one example, where the user drives the vehicle past an electronic toll bridge where a fee is required to pass the toll bridge. The vehicle's computer will communicate wirelessly as it passes the stationary structure transmitting and receiving information with it as it drives by. The user's vehicle may have an APP 104 installed on the vehicle computer 1906 that can process the input using the computer's wireless antenna 1928, network interface 1910, input output system, 1916 automatically responding to the toll bridge with payment information. Once the payment is received and processed, the APP 104 receives information from the stationary wireless toll taking device which is then stored either locally on the vehicle's storage 1908 or remotely using cloud services 120. The results of the transaction are then sent via data stream from the compute code running on the APP 104 to a display device(s) where the user can visually confirm that the toll was paid, accepted and show the user's remaining balance all through the GUI displayed for APP 104.

[00170] Figure 13B describes one example of how stored data and function declarations may be compiled to provided intermediary access to a vehicle's computer controlling vehicle systems 1950. Such routines, data and functions may be arranged in such a way that limited access is given to third party code on APPs 104 to manipulate certain unrestricted operating system functions and vehicle systems. Such a method of providing the intermediary allowed stored function set to third party code can be referred to as an API 130.

[00171] In this example of an API 130, computer readable code is arranged in such a fashion that the type of API is described and in this case, an API that allows third party control of the vehicle's HAVC system is declared. A declaration may be useful for reserving the vehicle's computer long term and short-term memory in order to run stored procedures. The shown declaration 1954 describes an example set of data that may reference memory locations and their contents. The contents of these memory location may be modified by stored procedures 1956 or functions.

[00172] This HVAC API 130 has the ability to store data relating to the vehicle's temperature, status, target temperature, split zone temperate, data from electrical and mechanical sensors, calendar dates, error information among others. Invocable functions 1956 are the methods by which a third party APP 104 may manipulate data 1954 on board a computer. Free access is not given to the restricted data on a vehicle's computer, thus a structured method or methods are described for user by third party APP developers.

[00173] These functions 1956 that may or may not take arguments in order to execute may include functions in the example HVAC API that update temperatures for both the left and right or given zones of the vehicle, toggle are conditioning, allow visual skins on the APP GUI, manipulate schedules and displays etc. The HVAC API 130 described is one example of how one API can control one vehicle system. There may be variations of the APIs for multiple vehicle systems or one superset API that allows access to all of the vehicle's systems through stored procedures or methods.

[00174] Figure 13C describes a set of computer readable and executable code 1970 that can be compiled together by a third party APP 104 developer in the form of an APP. The APP 104 uses structured programming languages to execute stored functions allowed by the vehicle's system API 130. In this example, the APP is a third

party HVAC app that allows a GUI to be displayed to a user giving them the option to adjust the temperature on the left or right side of the vehicle up or down. In this case, the APP's GUI has provided a data stream to the APP letting it know that the user has selected to set the temperature on the left side of the vehicle to 80 degrees and the right side of the vehicle to 76 degrees.

[00175] The APP 104 will then use functions available from the vehicle's API 130 to manipulate the data on the vehicle's storage system which in turn will be electrically polled by sensors, data streams etc. to manipulate the vehicle's electrical and mechanical HVAC systems. The user will notice the result visually by the data provided by the APP to the GUI as well as environmentally as the temperature is changed in the vehicle.

[00176] Figure 14 describes the stepped flow of events 2000 as a user interacts with an APP 104, in this case, an HVAC APP 104. The GUI shown for APP 104 describes the first step 2002 where a user physically interacts with a sensor, screen, voice system etc. polling to see if an input has been received. The user's input in 2002 has been interpreted by the app to raise the temperature on the left hand side of the vehicle to 80 degrees and maintain the temperature on the right hand side of the vehicle at 76 degrees. This input invokes step 2004, which calls a stored function on the APP 104 that is API 130 allowable with arguments. The stored function may invoke other helper or associate functions within the API 130 in step 2006, which all in tern invokes restricted computer readable code at the operating system and or kernel level in step 2008. These invocations will then in turn command mechanical and or electrical systems in step 2005 in order to achieve the requested response in step 2002.

[00177] The results of the commands on the vehicles systems are based back to the vehicle's operating system or kernel level in step 2012 which then updates data on

the API 130 in step 2014 that the APP 104 is polling, such as updating the display to show the resulting temperature in step 2016. The results of a function that is invoked at the API 130 level updating the display produces a data stream translatable and displayable by the vehicle's screen showing the APP 104's GUI in 2018.

[00178] Figure 15 describes further example ways an APP 104 may take, process and produce results 2100. Figure 14 shows a way to interact with an APP 104 locally but a vehicle computer system may relay data, inputs and information to the APP while connected to a wide area network, local area network, cloud process 120 or private cloud. A remote action to invoke change on an APP 1808 may be initiated via a network and pass to the APP running on the vehicle 160 using the vehicle's antenna 1928 or wired interface. An APP 104 running virtually on a network or cloud services 120 may also take input remotely and process the results accordingly.

[00179] Some of the inputs and results 2102 that an APP can take and produce locally or remotely include but are note limited to the set 2104 that can receive an action, react to an action, control an action, manipulate data models, report changes to a view or GUI, record events or incidents, learn the types of requests being submitted, learn the times of request being submitted over time, learn the days of the year the requests are being submitted over time, generalize and interpret requests, assume user intent in order to automatically invoke changes, automatically and pre-emptively act on behalf of a user, fine tune learned user behavior etc.

[00180] The learned behavior (e.g., learned settings that provide for automatic programming) can be assigned to particular applications, particular sub-features of applications, to particular native system features of the vehicle, or combination of one or more thereof. The learned settings can also be managed via an interface, which

shows to the user settings that have been learned and provides the user with options to modify learned settings.

[00181] The modifications of the learned settings can be made via the vehicle display or any other device having access to cloud services. The learned settings can also be communicated to the user via notifications. Such as, "*We noticed you like your truck temperature at 3 pm to be 60 degrees? Please confirm*," or "*We noticed you like your car temperature at 8 am to be 75 degrees, this will be preset for you automatically*," or "*We have detected your favorite settings, please login to your account to see settings we have programmed for you or make updates*," or other similar notifications via the vehicle or to any connected device over the Internet.

[00182] In other cases, notifications may not be sent. In some cases, the settings will just occur automatically. In some examples, notifications can be provided with a link or access to a user interface of an application. Via the application, the user can manage, set, control or view any aspect of the connected vehicle. In some cases, the settings can be manually adjusted by the user way from the auto settings. In such cases, the manual setting can be learned and can be provided more weighting since the user took the time to correct an auto setting. Thus, various levels of weighting or importance can be given to learned settings. In other embodiments, the learned settings can be compared against learned settings of other vehicle owners having access to cloud processing. Using data from these different user profiles, learned settings can be obtained or generated.

[00183] Generation or analysis can be by way of overlap processes, cluster analysis algorithms, Connectivity based clustering, centroid-based clustering, clustering model most closely related to statistics is based on distribution models, cluster validation, density-based clustering, KNN/profile similarity, collaborative filtering,

content-based filtering, hybrid recommender systems, mobile recommender systems, cross-sectional analysis, similarities in particular data types or settings, concentration in similar settings by particular demographics, and other similarity analysis calculators and aggregators. These settings can then be recommended to the user or can be automatically added to the profile. Recommender systems can the user the analyzed data to generate the custom recommendations for settings to users' profiles.

[00184] Figure 16A describes an ecosystem where an APP 104 in conjunction with a vehicle API 130 may work together to make assumptions, make decisions and take actions 2200. API and APP code together can be arranged in such a fashion that creates an assumption and reasoning logic module 2216. This Assumption and reasoning logic module can take inputs from various systems and data streams including but not limited to GPS 2206, calendars 2208, traffic conditions 2204, local news 2202, past data of user behavior and interaction 2210, vehicle diagnostics 1926, user preferences 2214, user login profiles 506, environmental interpretations by sensors 2212, marketing deals 2224 among others. These inputs can be local and physical or remote and abstract via a network. The assumption and reasoning logic module 2216 compiles data from these sources to invoke decisions and actions on a decision and action engine 2218.

[00185] This decision and action engine 2218 has the ability to execute on what the assumption and reasoning logic module has determined needs to be done. The decision and action engine has the ability to produce alerts, both local, on screen, audibly, visually or remotely on a remote display device 210a-e using a data network. The decision and action engine 2218 also has the ability to change vehicle controls automatically on behalf of a user without user action based on assumptions made by the assumption and reasoning logic module 2216. Additionally, the decision and action

engine has the ability to request a decision from the user preemptively in order to change vehicle controls.

[00186] This may be achieved locally or remotely requiring input from a user to proceed. For instance, the assumption and reasoning logic engine has determined that the user may want to have his or her car automatically started at 7:55 am because the user typically starts the car at 8 am. Starting the car at five minutes early will allow the system to heat the vehicle to the user's typical liking. However, the assumption and reasoning logic may have only reached a level of confidence of 75% where 80% confidence is required to act without user input. Thus, the system, being only 75% sure that the car should be turned on will automatically send the user an alert requesting a decision on whether or not to turn the vehicle on. Once the user 121 provides an decision remotely on their remote device 210a, the decision engine 2218 updates the assumption module 2216 so that it can augment it's assumptions for an updated level of confidence on the next action trigger. These actions by the user automatically and continually update the assumption and reasoning logic module 2216 in order to fine tune the level of confidence on acting without user input and learn the user's behavior for future decisions.

[00187] Figure 16B describes how one of many types of inputs into an assumption and reasoning logic module 2216 can be compiled over time. Although inputs can come from many sources, this particular example focuses on input into the assumption and reasoning logic module 2216 from past data originating and triggered by user behavior in order for module 2216 to learn. Past actions 2210 are logged into a database either locally on the vehicle computer or remotely which are fed into to module 2216. In this example, data about when the user's actions are stored, along with unique identifiers that will allow assumptions to be made in the future.

[00188] These identifiers include times, dates, rates, capacities, temperatures, frequency, degrees, distance, etc. In this example, the system has been keeping track of when the user has been starting his or her engine in the morning on weekday sand weekends. The system harvests all data points associated with given events. These data points 2210 are purely mined data points and no assumptions or reasoning occurs at this point. This data will be used by the assumption and reasoning logic 2216 to determine future actions.

[00189] Figure 16C describes one example of what an assumption and reasoning logic module 2216 may produce using the data points collected on an ongoing basis in Figure 16B. Over time, using inputs that are continually harvested by a user's action, assumptions are made and refined to aid in making decisions for a user in advance or behalf. Module 2216 has taken the inputs provided by 2210 past data and behavior to determine that before a decision can be made, the user's local or network-stored calendar should be polled to determine how the user's schedule might impact the system's pending actions. For instance, if the system had determined that the user typically starts his vehicle at 8am but the user's calendar shows a meeting at 730am located at a location that does not match the current location, the vehicle may assume that the car should be started at 725. They system will determine its level of confidence of the decision and may poll the user for a decision.

[00190] The system, by using prior data points has stored assumptions based on conditions, the day it is, the temperature of the environment and historical events, that the user will most likely start the vehicle's engine between 803am and 805am, and if the temperature is in the 30s inside the vehicle, the user will most likely set the interior temperature to between 70 and 80 degrees, it is not likely that the user will use the are conditioning unit, if there is ice on the windshield, the user will most likely defrost the

windshield for 7 minutes before departure, the user usually drives between 15 and 18 miles at this time of day, the user typically starts the vehicle again in the afternoon between 505pm and 510pm, if the temperature is in the mid 70s, the user usually activates the AC and sets the temperature to 65 degrees, typical weekend behavior, the user typically makes frequents stops, does not have a set time the vehicle is started, uses certain APPs at certain times and has a history of certain destinations as recorded by GPS.

[00191] Figure 16D describes an example list of decision the decision and action engine 2218 may take based on information provided by the assumption and reasoning logic module 2216 and sets of assumptions created. The decision and action engine 2218 will attempt, using a degree of confidence to anticipate what the user will want to do in terms of engine start and stop, location destinations, preferences of temperature, driving habits and poll vehicle capacities to ensure the intended path the user usually takes is attainable. For example, the user usually drives a distance in the morning at a certain time, however, the vehicle's fuel supply will not allow for that distance to be traveled. Thus, the decision and action engine polls the user as a reminder that the user should begin their intended travel sooner than usual to allow for refueling time.

[00192] In one embodiment, at a remote location, a user is able to access a user interface for an application, which provides users access to user accounts. A user account can be for a user and the user can add one or more vehicles, objects, data or appliances for remote reporting, viewing and control. In one embodiment, a user is an owner or user of a vehicle. The user can register the vehicle with a remote service.

[00193] The remote service can be accessed over the Internet, such as via a website or application of a portable device. The remote service can provide a multitude

of cloud services for the user, such as remote control features, remote viewing services, remote alarm controls, remote camera activation, remote audio/video recording of the vehicle (i.e., areas around the vehicle and inside the vehicle). In one embodiment, the vehicle is able to connect to the Internet (e.g., when the vehicle engine is off, on, and/or is occupied or un-occupied) to allow a user, via a remote cloud service, to access features of the vehicle. The vehicle can be accessed when running, when parked, when stopped, when moving, etc. The vehicle and its audio recording devices and video cameras can be accessed from remote locations, to allow users to remotely communicate with the vehicle or with people riding or residing inside the vehicle.

[00194] The remote communication can also allow a person to communicate remotely with people standing outside (or inside) of a vehicle. For instance, if a user is accessing his or her vehicle from a remote location, cameras installed in and/or on the vehicle allow the remote user to see a person standing proximate to the vehicle. The remote user can then communicate with a person standing proximate to the vehicle using microphones and speakers of the vehicle.

[00195] In some embodiments described herein, vehicles, structures and objects may include circuitry and communication logic to enable communication with a cloud processing system over the Internet.

[00196] In one embodiment, the services provided by the electronic systems of a vehicle can include services that access the various components or subsystems of a vehicle, such as door locks, service histories, user profiles, audio settings, entertainment settings, mapping functions, communications systems, telecommunication synchronization systems, speakers, heating and cooling functions, auto-engine start/shut-off remotely via smart devices, remote heating/cooling initiation, remote face-to-face conferencing, etc. The electronic systems within a vehicle can also

provide a user interface, such as a graphical user interface. The graphical user interface can include a plurality of buttons, controls and transceivers to receive input from a user.

[00197] The input from a user can also be provided by voice input, facial recognition, eye-retina scans, fingerprint scans, a combination of biometrics, or via a capacitive or regular touchscreen contained or displayed within the vehicle, the vehicle's glass, doors, dashboard, etc.

[00198] In one embodiment, vehicles can maintain information regarding where they are, where they are heading and their destination maintained which is maintained by GPS and navigation systems on board. The information collected and maintained by every vehicle may be mutually exclusive, meaning that only each individual vehicle is aware of its own heading, rate of speed and current location. This information, in one embodiment is crowd sourced and/or crowd shared/consumed for use in for accident avoidance or other communication. By networking vehicles within a certain radius together, all individually location-aware vehicles become aware of all other vehicles in their sphere of influence. Vehicles may network with vehicles in their range using wireless communication systems such as but not limited to Wi-Fi, Wi-Gig LTE, cellular, radio, near field communication or other methods.

[00199] In one embodiment, the communications of the vehicle and electronics of the vehicle will enable direct communication with a user of the vehicle. The user of the vehicle can include, for instance, the owner of the vehicle, a driver of the vehicle, or any third party having access to the vehicle (either to drive the vehicle, to monitor the vehicle remotely, etc.)

[00200] The access to the data can also be encrypted to prevent unauthorized access to the data. GPS and mapping services can also be in communication with the

cloud processing 120 provide data concerning the locations of the vehicles and activities that occurred to the vehicles when at particular locations. The cloud processing 120 can be access by the vehicles themselves using their electronics and communications, via mobile devices, from home, from work, etc.

[00201] In some embodiments, the vehicles may establish peer-to-peer links to facilitate fast transfer of data. In other embodiments, vehicles may link to each other using pairing algorithms that allow the vehicles to exchange data using WiFi, Bluetooth, near field communication (NFC), or some other short range communication protocol.

[00202] A user's APP homepage may also include dynamically updating sections in which the most important information at a given time may be displayed or surfaced to a user. If a user has parked in a certain parking area, he or she may want to monitor metrics related to incidents that may have occurred to his or her vehicle, vehicles around his or her vehicle, any dynamically received alerts, as well as precaution levels. Additionally, a user may choose to configure his or her APP homepage to display the most pertinent audio and video feeds to their needs.

[00203] In one embodiment, the vehicles can communicate directly with each other via a temporary pairing process. The temporary pairing process can be automatically enabled when vehicles become too close to each other, for example. When this happens, local communication between the vehicles, such as a peer-to-peer connection, Wi-Fi connection, NFC connection, or Bluetooth connection can be established to enable the vehicles to share information concerning their proximity to one another.

[00204] This local communication will enable one or both vehicles to take correction actions or alert a driver to change course or trigger automatic collision prevention measures (e.g., more aggressive notifications to one or both operators, slow the speed of one or more vehicles, change the driving direction of one or more vehicles, etc.). Once the close proximity communication occurs and some corrective action is made, the data regarding the occurrence and the actions taken can be communicated to the cloud system for storage. The information can then be viewed by a registered user having access to an account for the vehicle(s).

[00205] The various embodiments may be embodied in computer readable media, which is saved in storage. The storage may be saved on cloud storage, data centers, or the like, which are accessible over the Internet. The access may be wired or wireless. In vehicles, the connection to the Internet may be wireless, and the connection can be continuous or non-continuous depending connection. Code on the vehicle electrons can execute at least some of the method operations when not connected and other operations are executed jointly between vehicle electronics (e.g., memory, code and processors of a vehicle) and cloud processing, which may implement one or more servers, either virtual or not.

[00206] It will be obvious, however, to one skilled in the art, that the present invention may be practiced without some or all of these specific details. In other instances, well known process operations have not been described in detail in order not to unnecessarily obscure the present invention.

[00207] The various embodiments defined herein may define individual implementations or can define implementations that rely on combinations of one or more of the defined embodiments. Further, embodiments of the present invention may be practiced with various computer system configurations including hand-held devices,

microprocessor systems, microprocessor-based or programmable consumer electronics, minicomputers, mainframe computers and the like. The invention can also be practiced in distributed computing environments where tasks are performed by remote processing devices that are linked through a wire-based or wireless network.

[00208] With the above embodiments in mind, it should be understood that the invention could employ various computer-implemented operations involving data stored in computer systems. These operations are those requiring physical manipulation of physical quantities. Usually, though not necessarily, these quantities take the form of electrical or magnetic signals capable of being stored, transferred, combined, compared and otherwise manipulated.

[00209] Any of the operations described herein that form part of the invention are useful machine operations. The invention also relates to a device or an apparatus for performing these operations. The apparatus can be specially constructed for the required purpose, or the apparatus can be a general-purpose computer selectively activated or configured by a computer program stored in the computer. In particular, various general-purpose machines can be used with computer programs written in accordance with the teachings herein, or it may be more convenient to construct a more specialized apparatus to perform the required operations.

[00210] The invention can also be embodied as computer readable code on a computer readable medium. The computer readable medium is any data storage device that can store data, which can thereafter be read by a computer system. The computer readable medium can also be distributed over a network-coupled computer system so that the computer readable code is stored and executed in a distributed fashion.

[00211] Additional embodiments can include, without limitation, the following:

[00212] A1. A method for locating and providing access to a shared vehicle of a shared vehicle network, comprising,

receiving a request from a portable device to locate a vehicle to use for a shared period of time;

providing an option of a vehicles proximate to a location identified by the request;

detecting proximity of the user device to the vehicle proximate to the location identified by the request;

transferring a user profile to the vehicle, the profile configured to automatically set user preferences of the vehicle; and

communicating use data of the vehicle while the profile is set for the vehicle.

[00213] A2. The method of claim A1, wherein the profile deactivated on the vehicle when use of the vehicle is discontinued.

[00214] A3. The method of claim A2, wherein profile is saved to a cloud services database, the profile being accessible and updatable via a device having Internet access.

[00215] A4. The method of claim A2, wherein the profile includes user settings, the user settings include one or more of radio settings, or user interface settings, or temperature settings for particular times of day, or learned settings from user historical use, or seat settings, or automatic payment settings for vehicle money payment transactions, or combinations thereof.

[00216] A5. The method of claim A2, wherein profiles are associated with vehicle types, the vehicle types include vehicle makers and vehicle models.

[00217] A6. The method of claim A2, wherein the profile includes verifiable biometrics for a user associated with the user profile.

[00218] A7. The method of claim A2, wherein face recognition is used to validate access to the profile of the vehicle.

[00219] A8. The method claim A2, wherein the profile includes a group of users, each user is associated with one or more settings.

[00220] A9. The method of claim A2, wherein the profile includes defined access to cameras of one or more vehicles, record settings, and remote access controls.

[00221] B1. A method for defining a user profile for a vehicle, the vehicle profile being managed via a cloud processing system, comprising,

receiving a plurality of settings for a user profile for the vehicle;

communicating the user profile to the vehicle; and

causing adjustment of the settings of the user profile over time based on learned behavior at the vehicle, the method being executed by a processor.

[00222] C1. A method for managing a user profile of a vehicle on a cloud processing system connected to the Internet, comprising,

accessing the user profile to define settings for one or more vehicles;

communicating input to user settings at the vehicle to the cloud processing system, the cloud processing system processing the input over time to learn behavior associated with the input to the use settings;

receiving automatic settings at the vehicle based on the learned behavior, the method being executed by a processor.

[00223] C2. The method of claim C1, wherein the accessing is via electronics of the vehicle having access to the Internet.

[00224] C3. The method of claim C2, wherein the accessing is via a computer having access to the Internet and credentials for accessing the user profile.

[00225] C4. The method of claim C2, wherein the user profile is transferrable to one or more vehicles, or transferrable to another vehicle for a period of time.

[00226] D1. A method for managing a user profile of a vehicle on a cloud processing system connected to the Internet, comprising,

receiving requests to access the user profile to define settings for one or more vehicles;

receiving input to user settings at the vehicle at the cloud processing system;

processing the input over time to learn behavior associated with the input to the use settings; and

transmitting settings to the vehicle to be automatically implemented based on the learned behavior, the method being executed by a processor.

[00227] D2. The method of claim D1, wherein the user profile is transferrable to one or more vehicles, or transferrable to another vehicle for a period of time.

[00228] D3. The method of claim D1, wherein the user profile is transferrable to a rental vehicle.

[00229] D4. The method of claim D3, wherein the profile includes automatic payment settings to allow the vehicle to make wireless payment for services.

[00230] Although the foregoing invention has been described in some detail for purposes of clarity of understanding, it will be apparent that certain changes and modifications can be practiced within the scope of the appended claims. Accordingly,

the present embodiments are to be considered as illustrative and not restrictive, and the invention is not to be limited to the details given herein, but may be modified within the scope and equivalents of the description and claims.

what is claimed is:

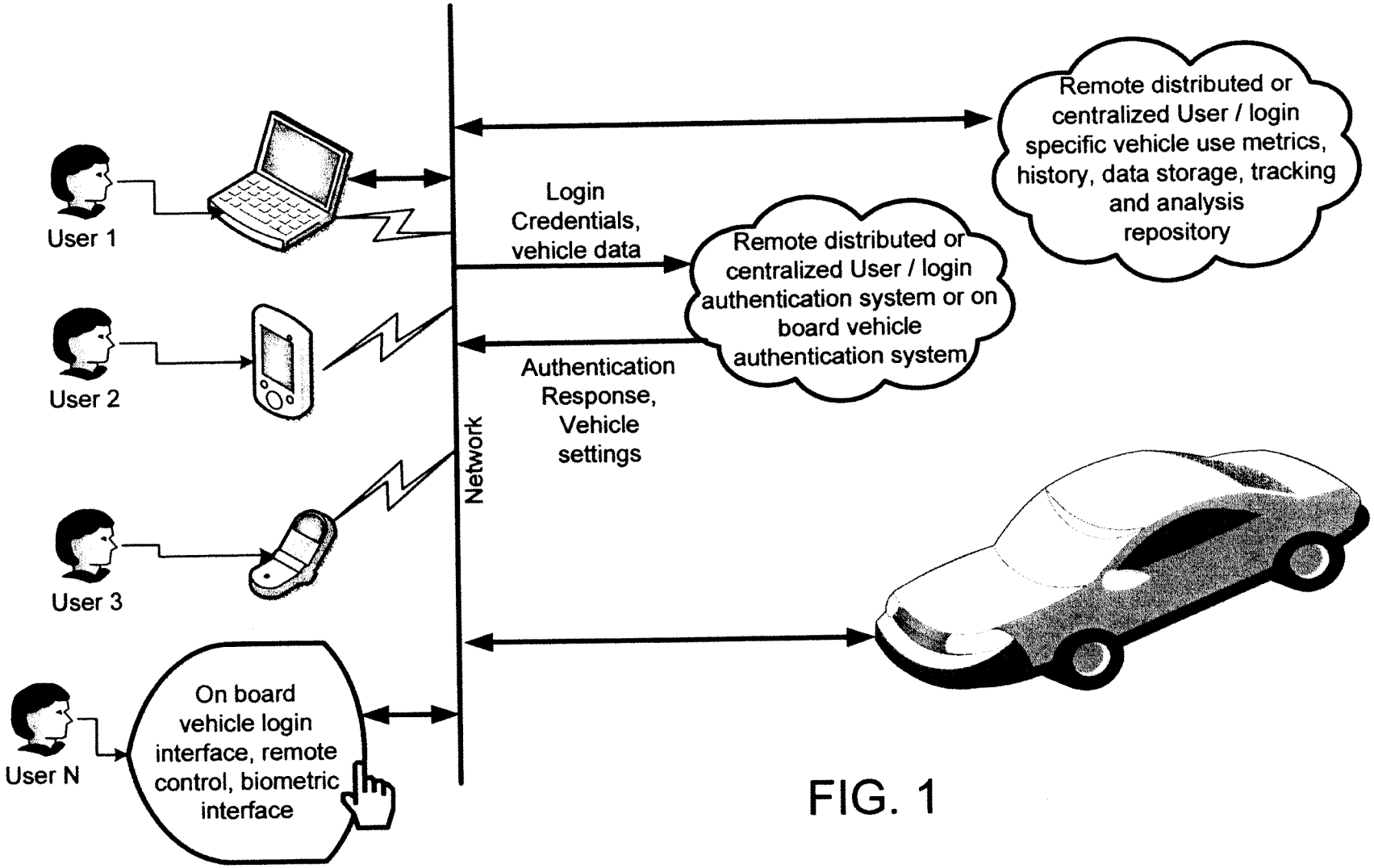

User 1
User 2
User 3
User N
Network
Login Credentials, vehicle data
Authentication Response, Vehicle settings
Remote distributed or centralized User / login authentication system or on board vehicle authentication system
Remote distributed or centralized User / login specific vehicle use metrics, history, data storage, tracking and analysis repository
On board vehicle login interface, remote control, biometric interface

FIG. 1

User 1

User 1 Logins	User 1 Roles	User 1 Vehicles
• Administrator(edit) Add New	• Owner(edit) • Weekend driving(edit) • Commute driving(edit) Add New	• Ford SUV(edit) • Honda Hybrid(edit) Add New

User 2

User 2 Logins	User 2 Roles	User 2 Vehicles
• Child(edit)	• School commute(edit) • Errands(edit)	• Honda Hybrid

User 1

User 2 Logins	User 2 Roles	User 2 Vehicles
• Child(edit) Add New	• School commute(edit) • Errands(edit) Add New	• Honda Hybrid Add New

FIG. 2

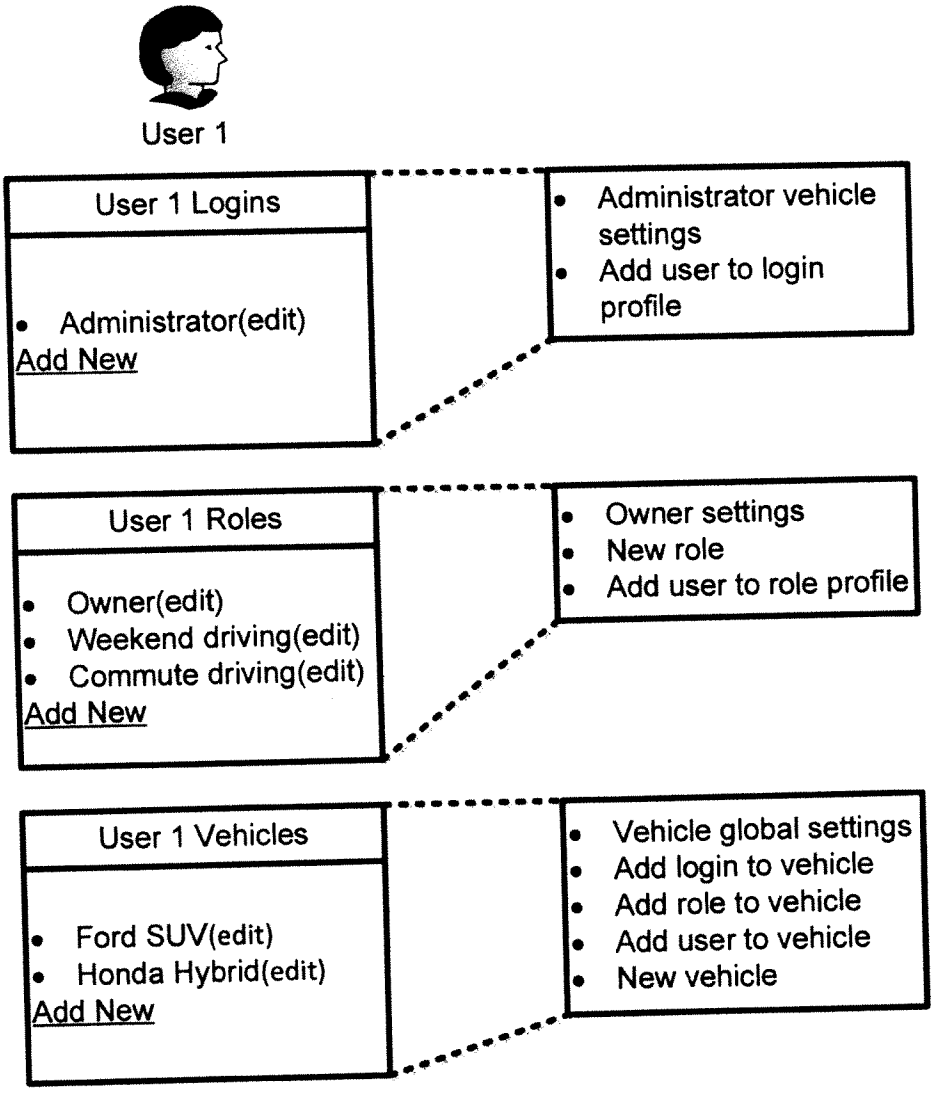

User 1
User 1 Logins
Administrator(edit)
Add New
Administrator vehicle settings
Add user to login profile
User 1 Roles
Owner(edit)
Weekend driving(edit)
Commute driving(edit)
Add New
Owner settings
New role
Add user to role profile
User 1 Vehicles
Ford SUV(edit)
Honda Hybrid(edit)
Add New
Vehicle global settings
Add login to vehicle
Add role to vehicle
Add user to vehicle
New vehicle

FIG. 3

User 2

User 2's login settings for login: CHILD	
Fuel use settings	• Electric battery • Plug in • Fuel • Hybrid
Driving characteristics	• Speed restrictions • Fuel use restrictions
Location based settings	• GPS aided travel restrictions • Map restrictions • Travel radius boundaries • Dynamically load maps • Dynamically load directions • Dynamically load fuel • Dynamically load charge • Dynamically load battery • Fuel purchase location restrictions
Time based use and restrictions	• Day driving • Night driving • Time specific driving
Automatic purchase settings	• Financial institution linking • Fuel purchase settings • Charge time purchase settings • Battery purchase settings • Car wash purchase settings

User editable

Admin or restricted

FIG. 4

User 2

User 1's login settings for login: CHILD	
Tracking & metrics	• Vehicle cameras • Vehicle event recording • Mileage usage characteristics • Top & average speeds • Driving history maps and graphs • Fuel efficiency • Wear and tear notifications
Comfort	• Climate • Seats positions • Seat heater / cooler • Suspension/ride settings • Entry lighting • Remote start / stop
Entertainment	• Radio Memory • Internet access settings • Streaming services
Driving Modes	• Sport • Comfortable • Soft • Off-road • High performance • Economy
Refueling routing and purchase	• Incentive based fuel finder • Refueling availability maps • Offers • History • Metrics

User editable

Admin or restricted

FIG. 5

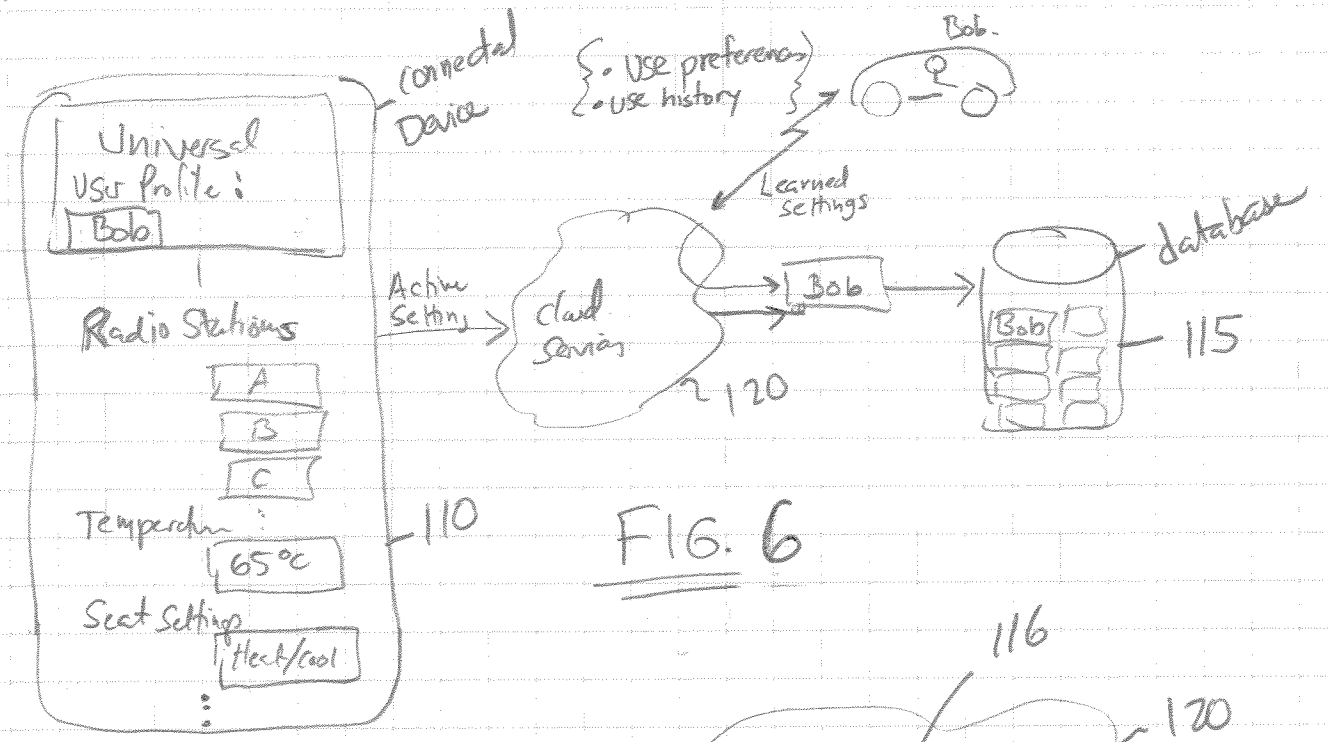

connected Device
Universal User Profile:
Bob
Radio Stations
A
B
C
Temperature
65°C
Seat Settings
Heat/cool
110
• use preferences
• use history
Bob
Learned settings
Active Settings
Cloud Services
120
Bob
database
Bob
115

FIG. 6

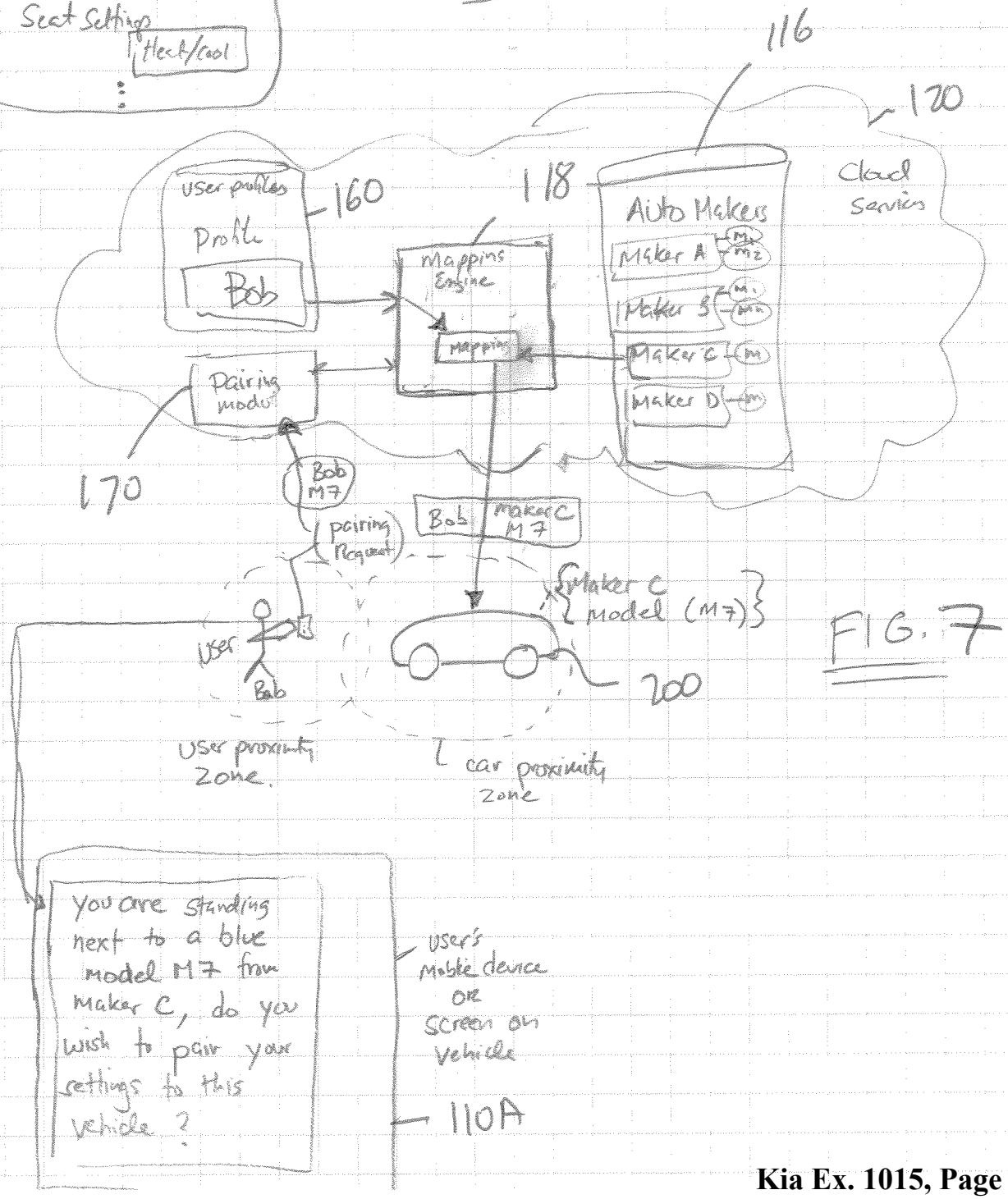

116
120
User profiles
Profile
Bob
160
118
Mapping Engine
mapping
Auto Makers
Maker A
Maker B
Maker C
Maker D
Cloud Services
Pairing module
170
Bob M7
pairing Request
Bob
maker C M7
{Maker C Model (M7)}
User
Bob
200
User proximity zone
car proximity zone
you are standing next to a blue model M7 from maker C, do you wish to pair your settings to this vehicle?
User's Mobile device or screen on vehicle
110A

FIG. 7

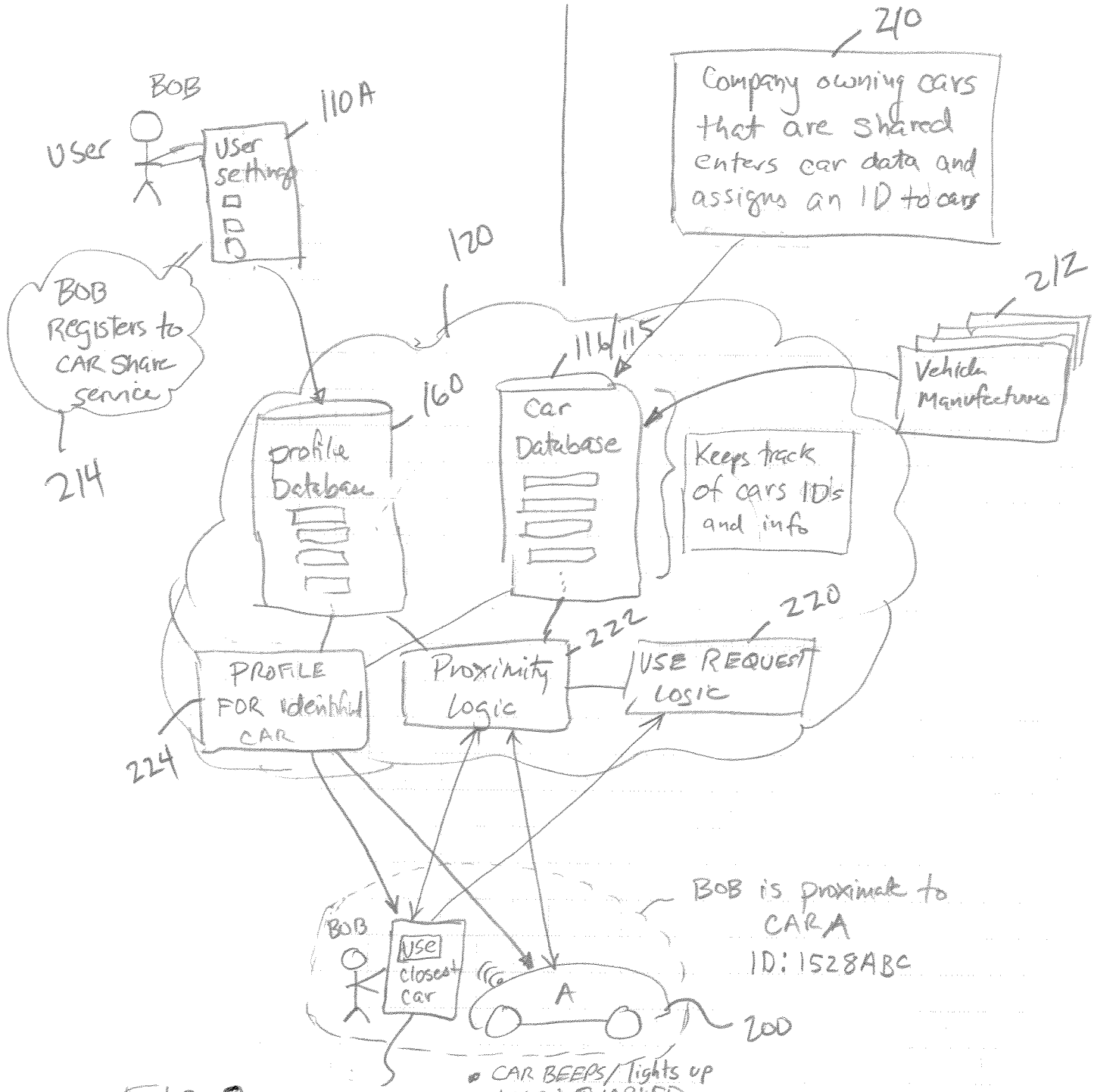


FIG. 8

- CAR BEEPS/Lights up WHEN ENABLED
- OPENS
- PROFILE TRANSFERED TO CAR A
- USE OF CAR A IS MANAGED IN BOB'S ONLINE ACCOUNT
- PAYMENT FOR USE MADE DIRECT
- USE OF CAR A IS Allowed by predefined Rules

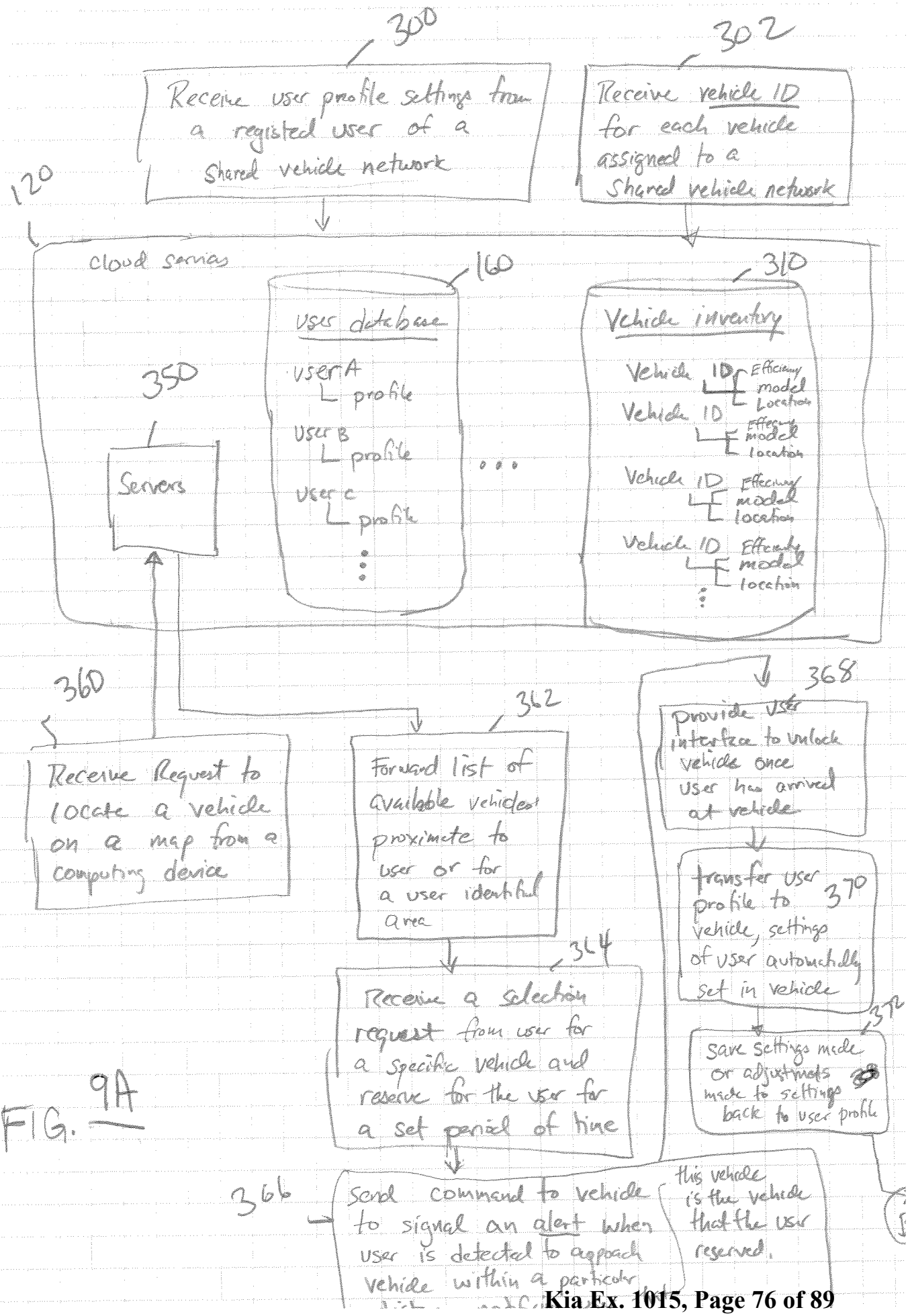

300
Receive user profile settings from a registed user of a shared vehicle network
302
Receive vehicle ID for each vehicle assigned to a shared vehicle network
120
cloud services
160
User database
User A
profile
User B
profile
User C
profile
310
Vehicle inventory
Vehicle ID
Efficiency
model
Location
Vehicle ID
Efficiency
model
location
Vehicle ID
Efficiency
model
location
Vehicle ID
Efficiency
model
location
350
Servers
360
Receive Request to locate a vehicle on a map from a computing device
362
Forward list of available vehicles proximate to user or for a user identified area
364
Receive a selection request from user for a specific vehicle and reserve for the user for a set period of time
366
Send command to vehicle to signal an alert when user is detected to approach vehicle within a particular
this vehicle is the vehicle that the user reserved.
368
provide user interface to unlock vehicle once user has arrived at vehicle
370
transfer user profile to vehicle, settings of user automatically set in vehicle
372
save settings made or adjustments made to settings back to user profile

FIG. 9A

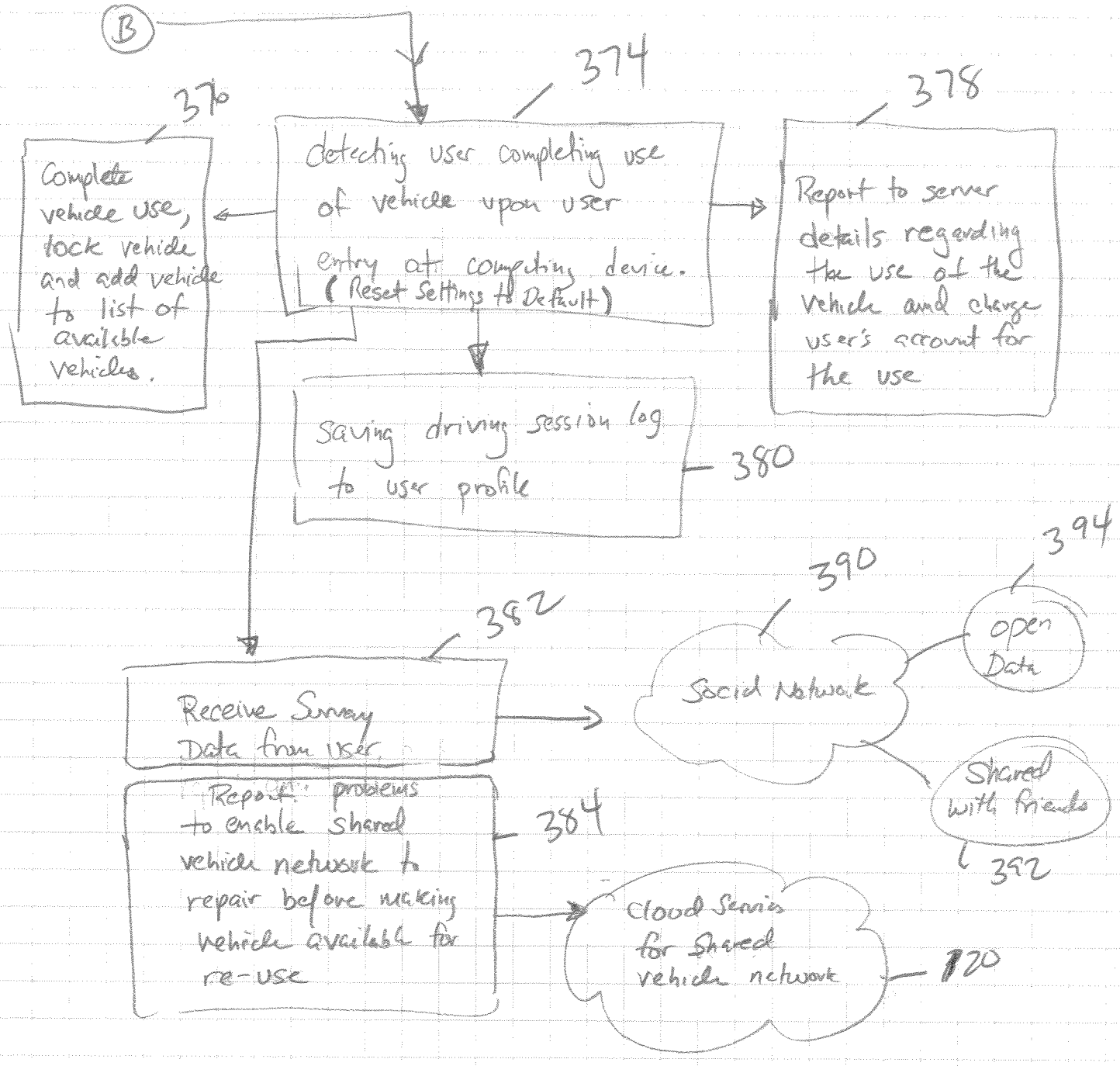
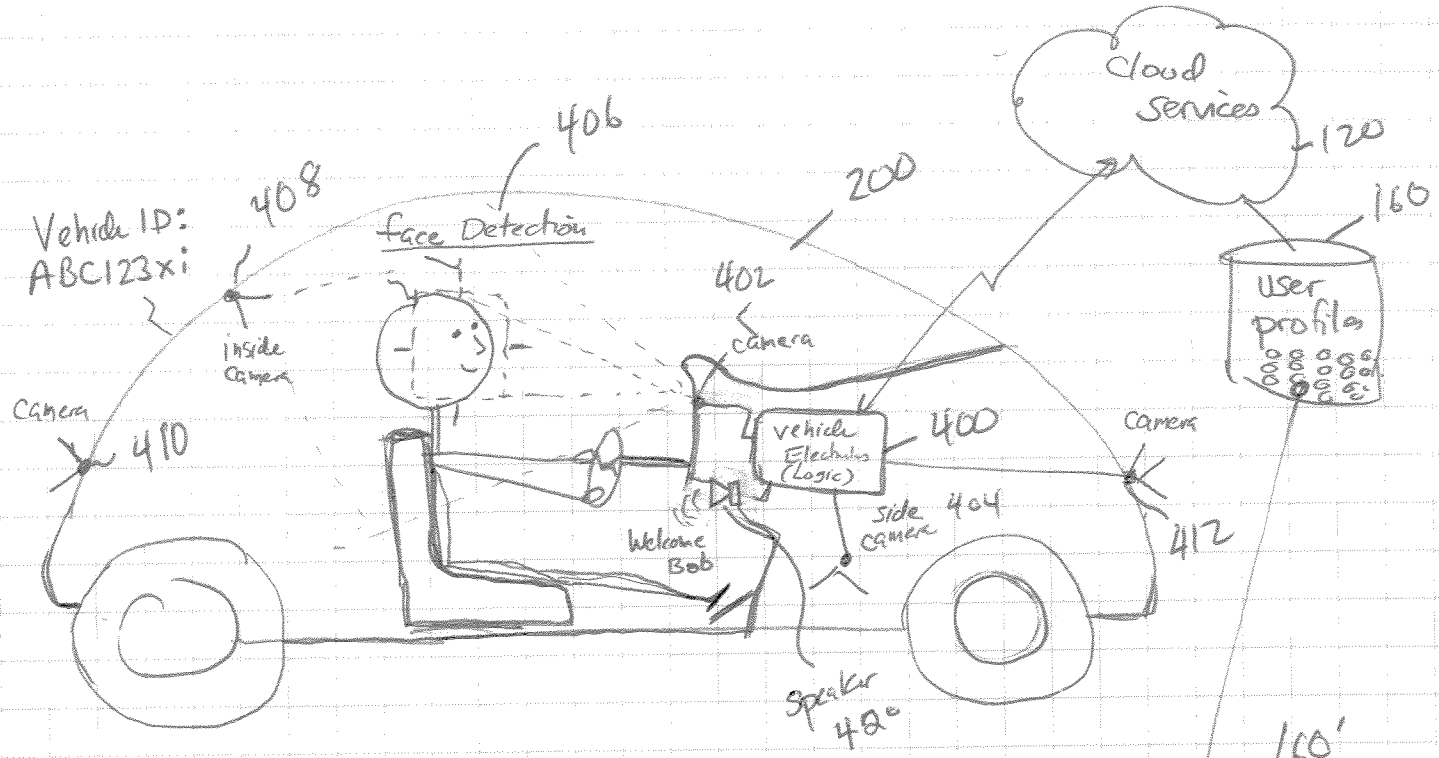
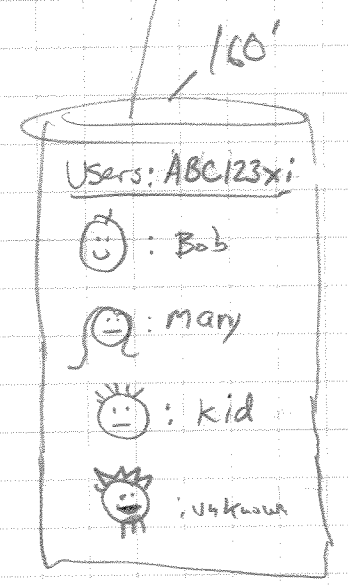

B
374
detecting user completing use of vehicle upon user entry at computing device. (Reset Settings to Default)
376
Complete vehicle use, lock vehicle and add vehicle to list of available vehicles.
378
Report to server details regarding the use of the vehicle and charge user's account for the use
saving driving session log to user profile
380
382
Receive Survey Data from user.
390
Social Network
394
open Data
Shared with friends
392
Report problems to enable shared vehicle network to repair before making vehicle available for re-use
384
Cloud Service for Shared vehicle network
120

FIG. 9B





450 — provide vehicle with communication with cloud services

↓

452 — Detect user in vehicle and identify face of driver (or other Bio-Metric)

↓

454 — Identify user and retrive profile

↓

456 — identify preferences settings for identified user

↓

458 — Apply settings to vehicle for the identified user.

FIG. 10

480 Cameras	482 Record Settings	484 Remote Access
Front Camera	☐ Record when driving ☐ Record circular Buffer ☐ save cloud	☐ Access via any device
Rear camera	☐ save cloud and share	☐ Access after alert or panic button detected
~~Side cameras~~	☐ Social Network Share	☐ Access history clips on cloud
inside cameras	☐ save after accident	☐ Share clips with friends
⋮	☐ access to video conference	☐ provide Link to police to view video after panic event
	☐ save clip to cloud	☐ notification sent to car owner with video/ images of car when Break-in Alert is set off.
	☐ Record after accident to save for insurance	
	☐ Record selected cameras on demand	
	☐ Record when panic button is hit, and sound panic horn while recording	
	☐ Record when car break-in is detected	

FIG. 11

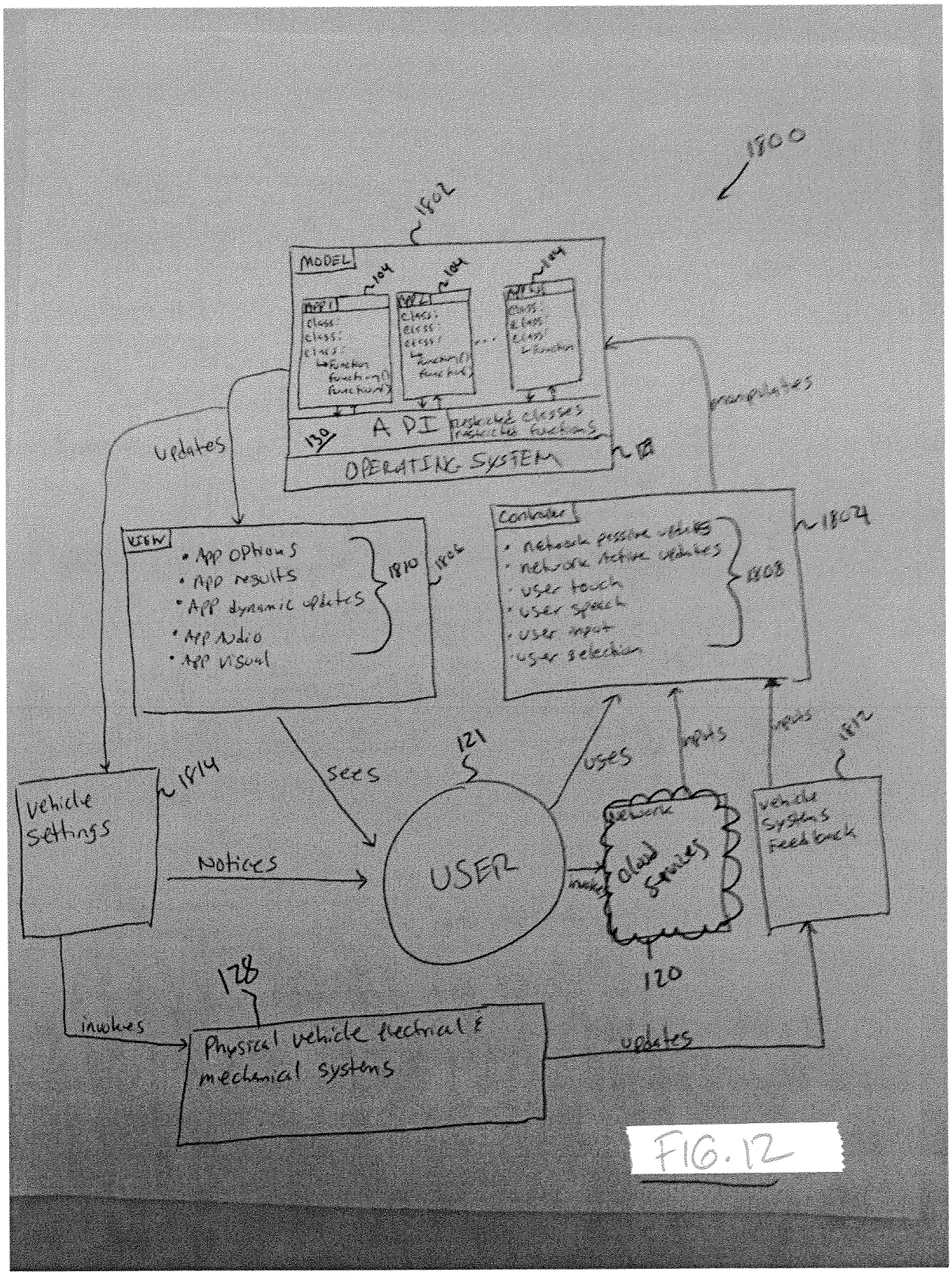

1800
1802
MODEL
104
104
104
APP 1
APP 2
APP 3
class:
class:
class:
function
function()
function()
class:
class:
class:
function()
function()
class:
class:
class:
function
API
restricted classes
restricted functions
130
OPERATING SYSTEM
manipulates
updates
VIEW
• App options
• App results
• App dynamic updates
• App Audio
• App visual
1810
1806
Controller
• network passive updates
• network active updates
• user touch
• user speech
• user input
• user selection
1808
1804
sees
uses
inputs
inputs
121
1814
vehicle settings
Notices
USER
network
cloud services
invokes
120
1812
vehicle systems feedback
128
invokes
Physical vehicle electrical & mechanical systems
updates

FIG. 12

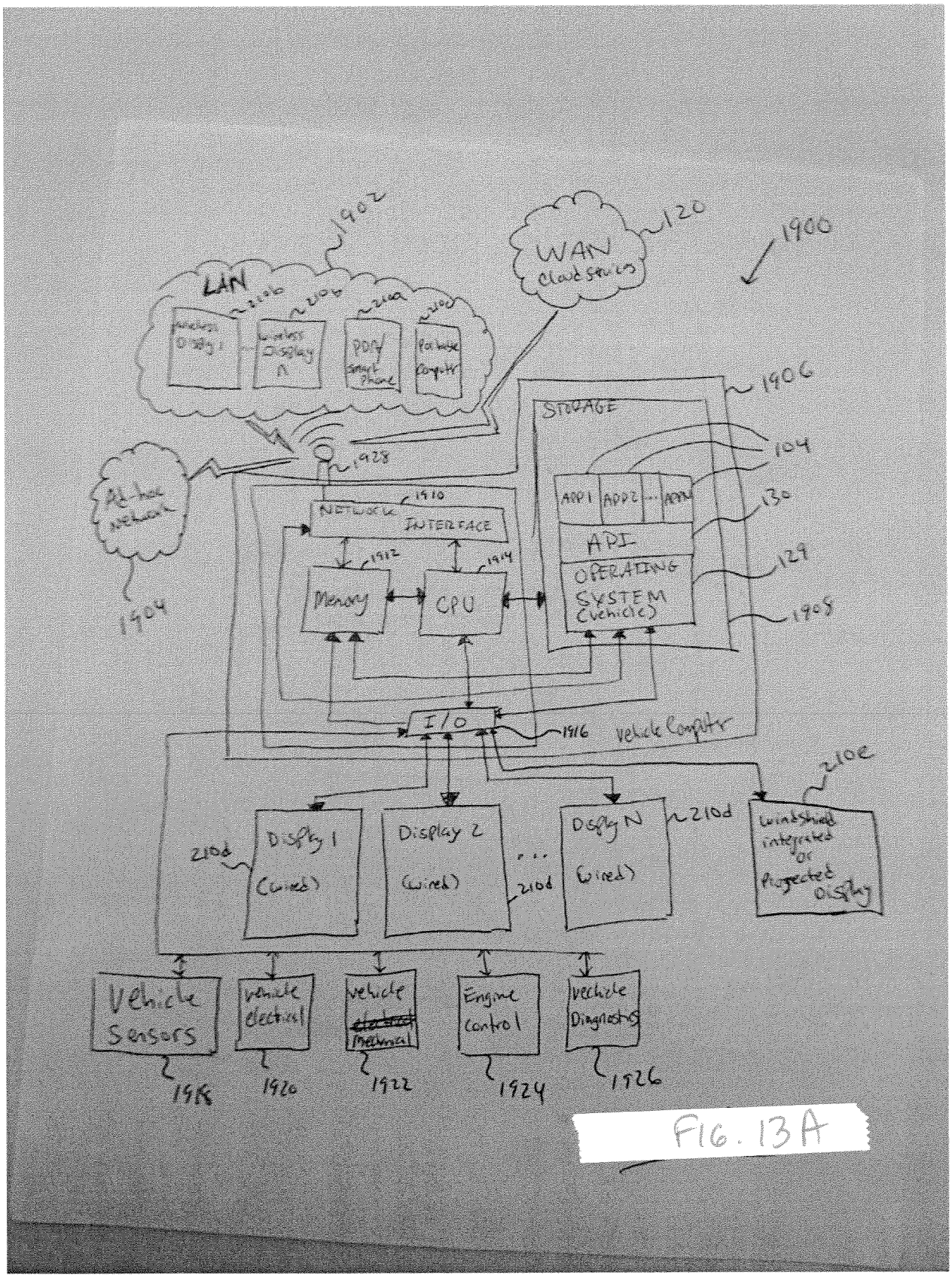

1902
LAN
WAN
Cloud Services
120
1900
Wireless Display 1
Wireless Display n
PDA/ Smart Phone
Portable Computer
1906
STORAGE
104
APP1
APP2
APPN
130
API
129
OPERATING SYSTEM (vehicle)
1908
1928
Ad-hoc network
1904
1910
NETWORK INTERFACE
1912
1914
Memory
CPU
I/O
1916
Vehicle Computer
210e
Display 1 (wired)
Display 2 (wired)
Display N (wired)
210d
Windshield integrated or Projected Display
Vehicle Sensors
Vehicle electrical
Vehicle Mechanical
Engine Control
Vehicle Diagnostics
1918
1920
1922
1924
1926

FIG. 13A

1950

Manufacturer API
Class:
HVAC

130

1954

Data declarations:
currentTempLeft = 60
currentTempRight = 70
StatusAC = True
isAuto = True
isDual = True
displaySkin = modern
scheduleAMtemp(time)
learnedTemp1 = 74
learnedTemp1Time = 803am
learnedTemp1Days = MTWTHF
learnedTemp2 = 60
learnedTemp2Time = 513pm
learnedTemp2Days = MTWTHF
learnedTemp2AC = on
IcePresent = false
fastefrostMode = off
Errors = false

1956

Function Declarations
updateTemp(left,right);
getTempRight(temp);
getTempLeft(temp);
setTempLeft(temp);
setTempLeft(temp);
toggleAC();
toggleAuto();
toggleDual();
toggleSkin(skinID);
scheduleAMTemp(temp, time, date, frequency);
schedulePMTemp(temp,time,date,frequency);
learnTempBackgroundRoutine(temp, time, date, frequency);
updateDisplay()

FIG. 13B

1970

104

EZ FUN HVAC APP

1972

```
updateTemp(80,76);
{
        setLeftTo = 80;
        setRightTo = 76;
        theCurrentTempR = getTempRight(temp);
        theCurrenTempL = getTempLeft(temp);
        if setLeftTo != theCurrentTempL
        {
                setTempLeft(left);
        }
        if setRightTo != theCurrentTempR
        {
                setTempRight(right);
        }
        updateDisplay()

        If isError()
        {
                return isError();
        }

}
```

FIG. 13C

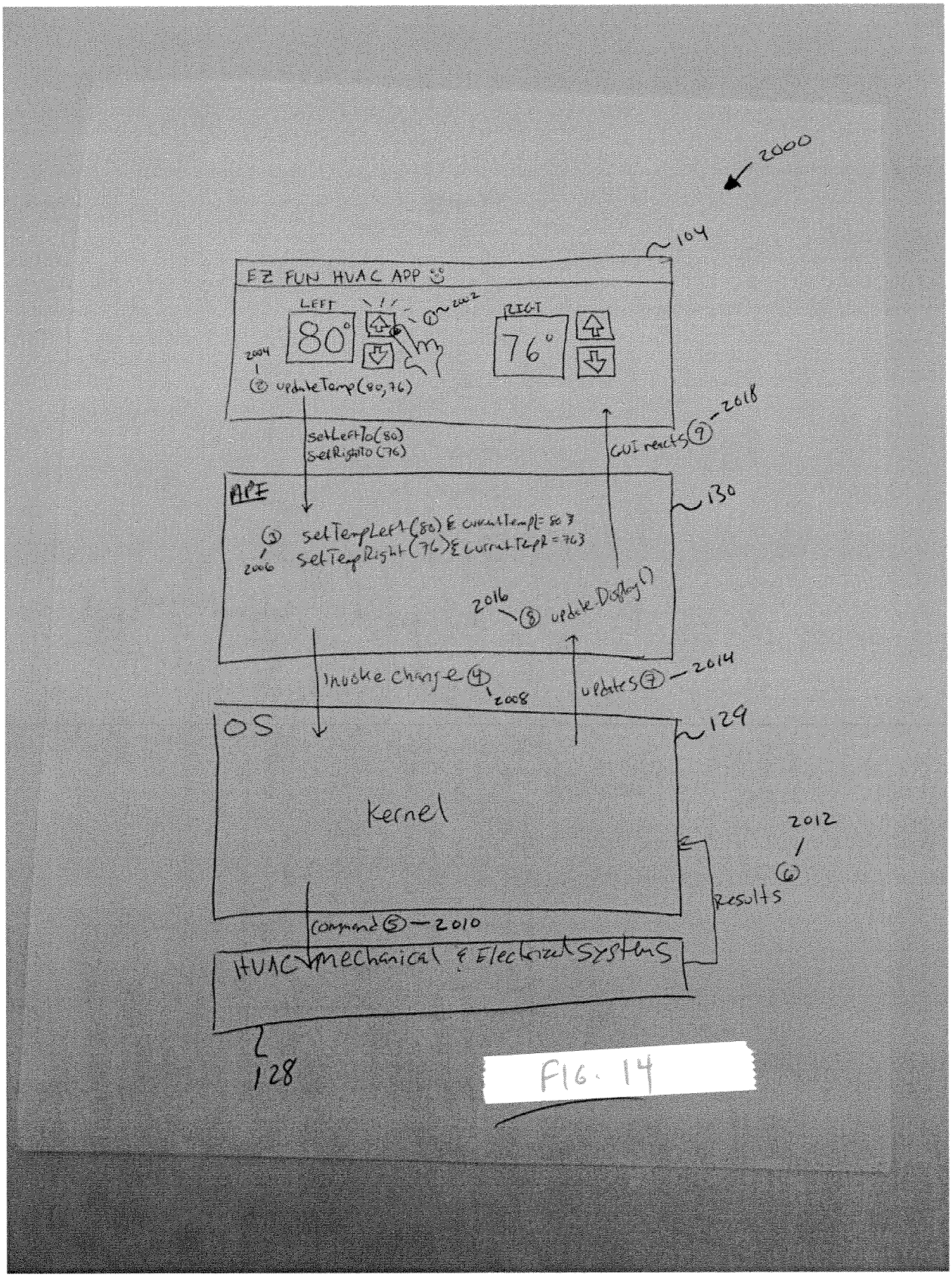
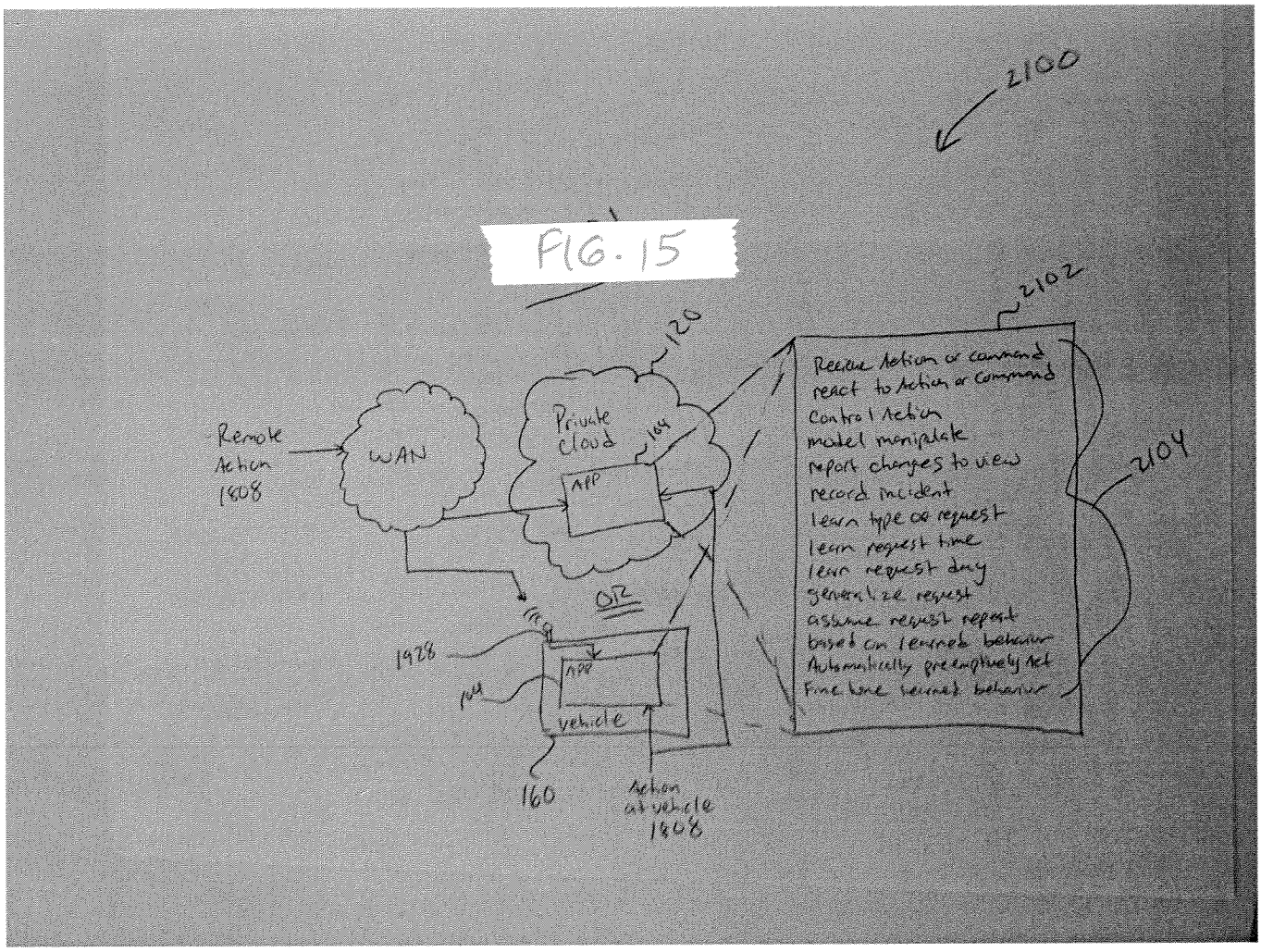

2000
104
EZ FUN HVAC APP
LEFT
80°
2002
RIGHT
76°
2004
updateTemp(80,76)
setLeftTo(80)
setRightTo(76)
GUI reacts 9
2018
API
130
setTempLeft(80) { currentTempL = 80 }
setTempRight(76) { currentTempR = 76 }
2006
2016
update Display()
Invoke change 4
2008
updates 7
2014
OS
129
Kernel
2012
Results 6
command 5
2010
HVAC Mechanical & Electrical Systems
128

FIG. 14


2100
FIG. 15
2102
120
Remote Action 1808
WAN
Private cloud
164
APP
OR
1928
APP
164
vehicle
160
Action at vehicle 1808
Receive Action or command
react to Action or command
Control Action
model manipulate
report changes to view
record incident
learn type of request
learn request time
learn request day
generalize request
assume request repeat
based on learned behavior
Automatically preemptively Act
Fine tune learned behavior
2104

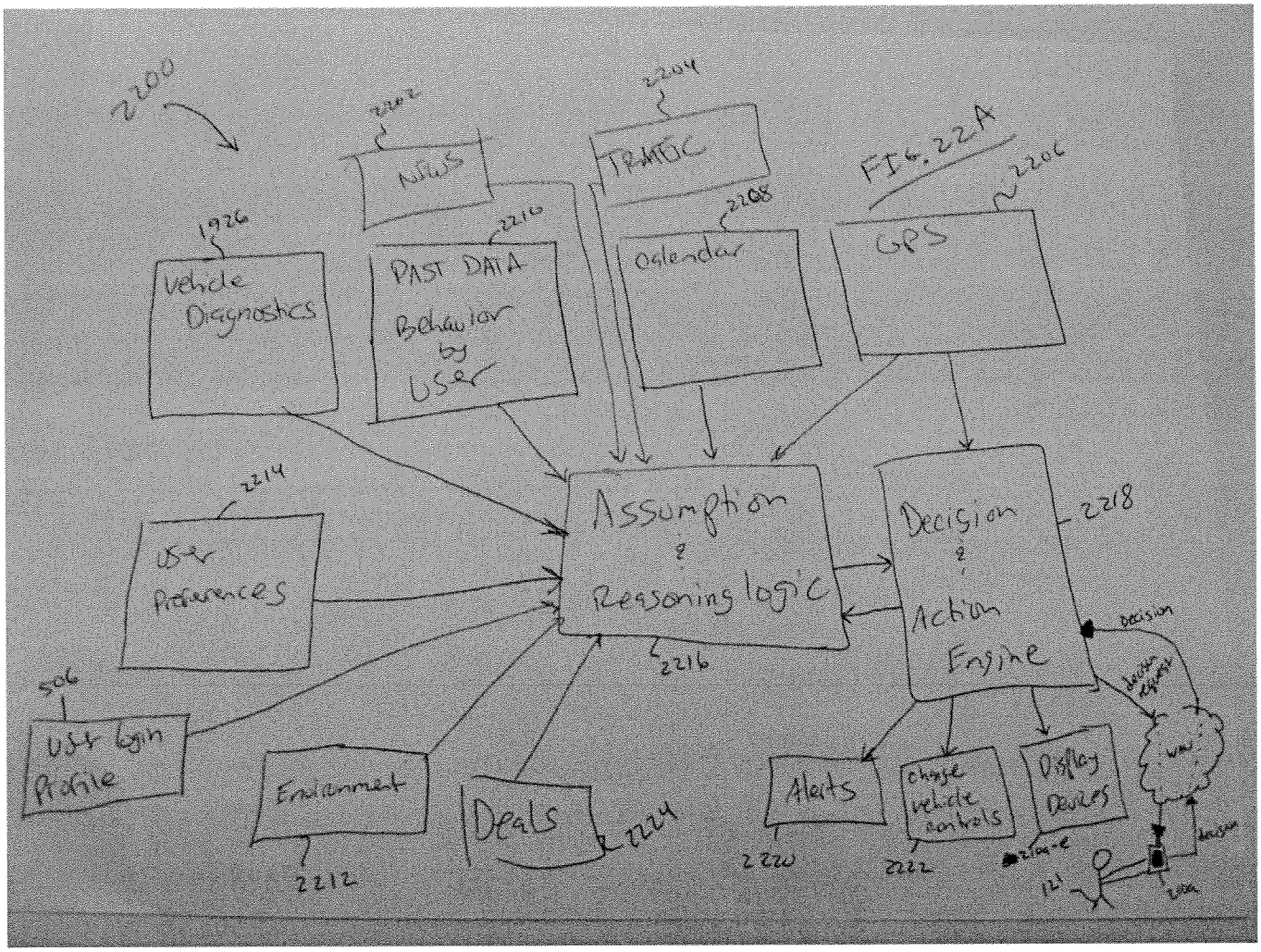

2200
2202
NEWS
2204
TRAFFIC
FIG. 22A
2206
GPS
1926
Vehicle Diagnostics
2210
PAST DATA Behavior by User
2208
Calendar
2214
User Preferences
Assumption & Reasoning logic
2216
Decision & Action Engine
2218
decision
decision request
WAV
decision
506
User login Profile
Environment
2212
Deals
2224
Alerts
2220
change vehicle controls
2222
Display Devices
2100-e
121
200a

FIG. 16A

Learned Behavior Vehicle Application

Past Actions Data

Average for a Monday in December
Engine start: 803am
Fuel level range: 50 miles
Temp in vehicle at start: 32F
Heat set to after vehicle start: 75F
Ice present on windshield: yes
Defrost activated: yes
How long between defrost process and vehicle moving: 7 minutes
Vehicle depart time: 810am
AC set to after vehicle start: NA
Miles driven at vehicle shut off: 15 miles
Engine start: 505PM
Fuel level range: 35 miles
Temp in vehicle at start: 76F
Heat Set to after vehicle start: NA
AC set to after vehicle start: 65F
Time to reach 65F: 4 minutes
Miles Driven at vehicle shut off: 15 miles

Average for a Tuesday in December
Engine start: 805am
Fuel level range: 20 miles
Temp in vehicle at start: 30F
Heat set to after vehicle start: 80F
Ice present on windshield: yes
Defrost activated: yes
How long between defrost process and vehicle moving: 7 minutes
Vehicle depart time: 812am
AC set to after vehicle start: NA
Miles driven at vehicle shut off: 18 miles
Engine start: 510PM
Fuel level range: 5 miles
Temp in vehicle at start: 78F
Heat Set to after vehicle start: NA
AC set to after vehicle start: 65F
Time to reach 65F: 5 minutes
Miles Driven at vehicle shut off: 15 miles

2210

Past Actions Data

Average for a Saturday in December
Engine start: 12:15PM
Fuel level range: 40 miles
Temp in vehicle at start: 65F
Heat set to after vehicle start: NA
Ice present on windshield: no
Defrost activated: no
How long between defrost process and vehicle moving: NA
Vehicle depart time: 12:16PM
AC set to after vehicle start: NA
Miles driven at vehicle shut off: 5 miles
Engine start: 12:28PM
Fuel level range: 35 miles
Temp in vehicle at start: 65F
Heat Set to after vehicle start: NA
AC set to after vehicle start: NA
Time to reach NAF: NA
Miles Driven at vehicle shut off: 5 miles

2210

One example,
Inputs can also be
1926, 2202, 2204, 2208, 2206,
2214, 506, 2212,2214, 2224, etc

FIG. 16B

Learned Behavior Vehicle Application

2216

Learned Behavior Logic Assumptions and Deductive Reasoning

Check the user's calendar and adjust assumptions based on when the first meeting is, the meeting's location, how long it will take to get the vehicle's temperature and defrosting if applicable completed and if the user needs to re-fuel before arriving at work. Decision

User most likely will start the engine between 803am and 805am

If the temperature is in the 30s inside the vehicle, the user will most likely heat the vehicle to the mid 70s to 80 degrees. Also the user is not likely to use the AC.

If there is ice present on the windshield, the user will most likely activate defrosting measures for 7 minutes before departure.

User usually drives between 15 and 18 miles

The user usually starts the vehicle in the afternoon between 5:05 and 5:10PM

If the temperature is in the mid 70s, the user usually activates the AC to achieve a temperature of 65 degrees

The user is normally comfortable on Saturdays when the temperature in the vehicle is 65 degrees. No advance cooling or heating required. The usually makes frequent stops on Saturday and may benefit from route prioritization apps and Gas/Time saving routes, fuel stations, sponsored paths etc.

FIG. 16 C

Learned Behavior Vehicle Application

2218

Potential Actions using Logic & Past Data

Vehicle Learning App Decisions:

Tuesday PM:
The user will most likely need to drive ~16.5 miles on Wednesday morning but only has a range of 5 miles. Email and or text the user that they will need extra time to get to work in the morning due to re-fueling and that the vehicle will be auto starting 12 minutes earlier than usual. Confirm decision is ok with the user.

Wednesday AM:
Vehicle is usually started at ~804am and defrosted for 7 minutes when ice is present and usually departs at 811am, but the user needs 12 minutes to refuel. Start vehicle at 752am and defrost until 759am while heating to 77F because when the temperature is 34F like today inside the vehicle, the user likes the temperature to be about 77F. Set the user's ratio station to 102.5, the most commonly listened to station at this time. Display stock information for the most commonly queries stocks at this time. Check most common commute route in and make sure there aren't delays, else suggest a new route in advance. The user typically goes to coffee on the way to work. Launch the nearest starbucks coffee location APP. The user usually "one button touch" orders and pays for a medium coffee. Directly from the app.

Friday PM:
Tell the user Saturdays are normally full of errands. Suggest the user send tomorrow's itinerary to the vehicle's app on the network or directly on the vehicle to report if and when the user should get started due to traffic, road construction, suggest fuel locations and ask if 65F degrees is still ok or adjust to a different temperature before the user enters the car around 12pm. Ask the user what time they will most likely depart if its not at 12pm like usual. Download specials and coupons for locations the user typically frequents on Saturdays and display to the user on the vehicle's interface on the user's mobile device.

Saturday PM:
The user said they would like to get started at 10am today but the vehicle interior is more than 20% lower than the user usually likes it. Turn the vehicle on at 955am and heat to 65F since 65F seems to be the user's most commonly used temperature. Display the specials for the nearest dry cleaner since the user typically gets dry cleaning done on Saturdays based on GPS data. Show the user lunch specials nearby and deals to claim since the user usually stops for lunch while out on errands on Saturday.

FIG. 16 D