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(54) **CUSTOMIZATION OF VEHICLE CONTROLS AND SETTINGS BASED ON USER PROFILE DATA**

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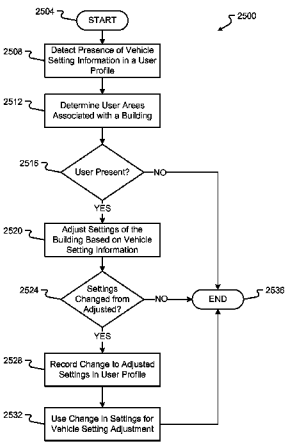
(57) **ABSTRACT**

Methods and systems for a complete vehicle ecosystem are provided. Specifically, systems that when taken alone, or together, provide an individual or group of individuals with an intuitive and comfortable vehicular environment. The present disclosure includes a system that provides various outputs based on a user profile and determined context. An output provided by the present disclosure can change a configuration of a vehicle, device, building, and/or a system associated with the user profile. The configurations can include comfort and interface settings that can be adjusted based on the user profile information. Further, the user profiles can track health data related to the user and make adjustments to the configuration to assist the health of the user.

20 Claims, 41 Drawing Sheets



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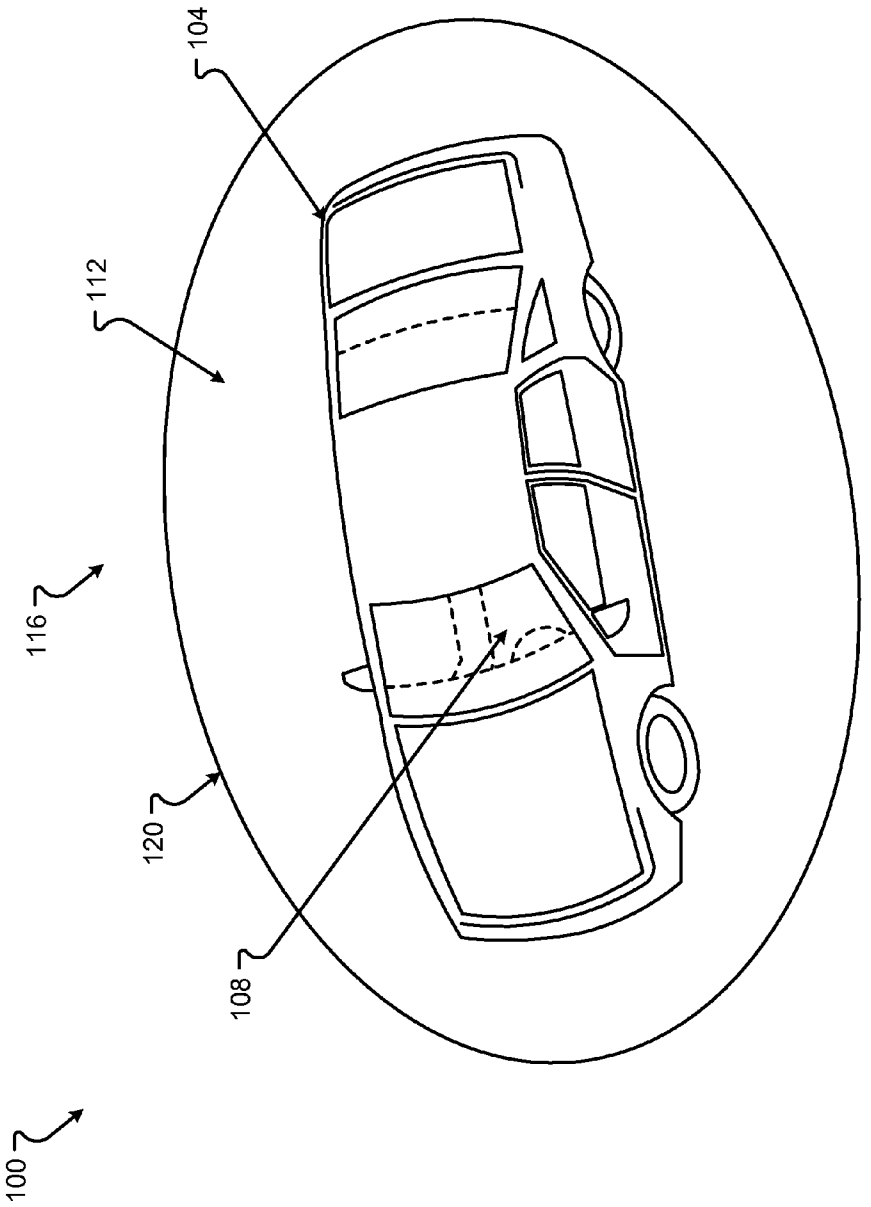


Fig. 1

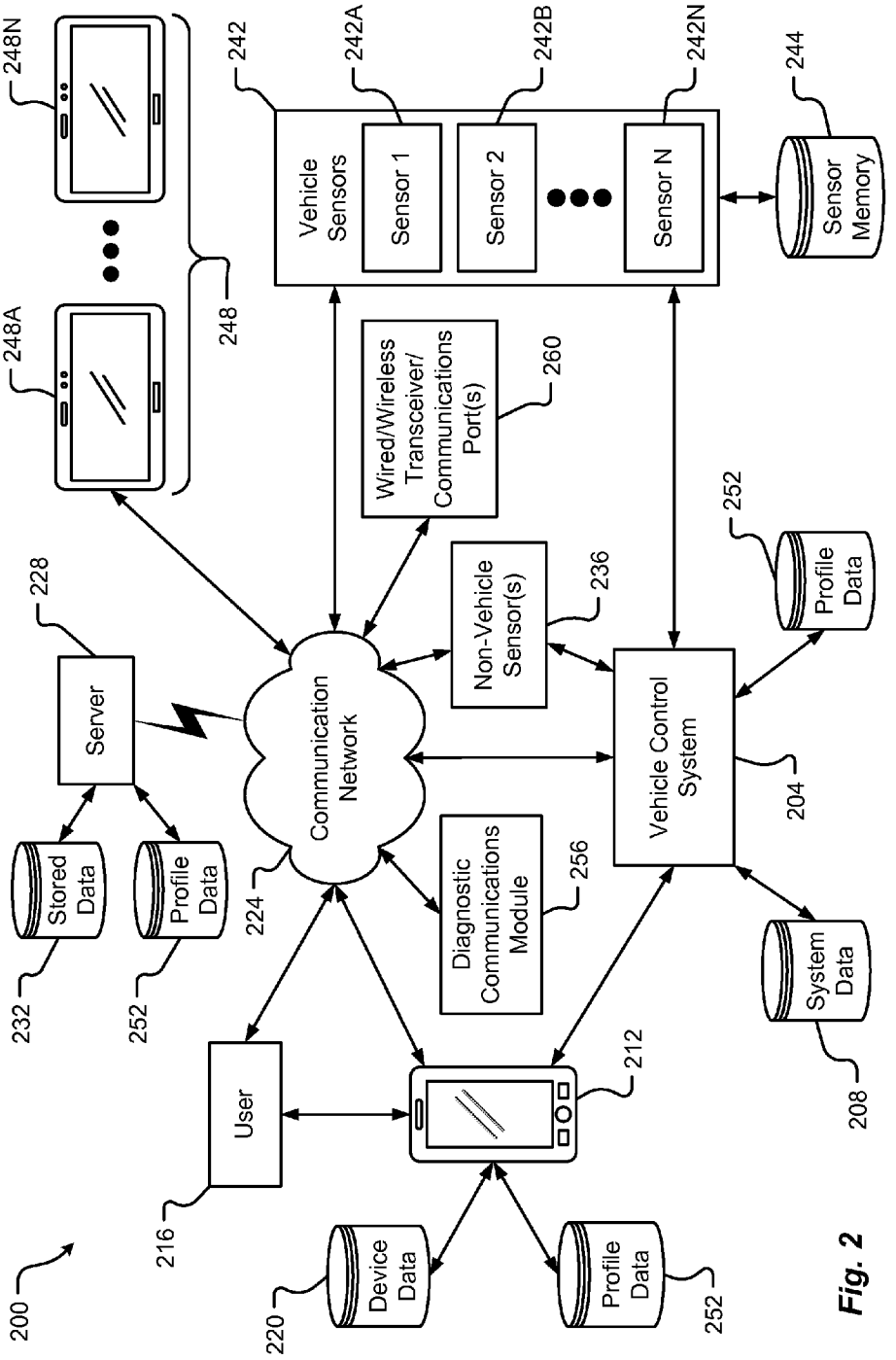

248N
248A
248
242
242A
242B
242N
244
Vehicle Sensors
Sensor 1
Sensor 2
Sensor N
Sensor Memory
Wired/Wireless Transceiver/ Communications Port(s)
260
228
Server
Communication Network
Non-Vehicle Sensor(s)
236
252
Profile Data
Vehicle Control System
204
Stored Data
232
Profile Data
252
224
Diagnostic Communications Module
256
System Data
208
User
216
212
200
Device Data
220
Profile Data
252

Fig. 2

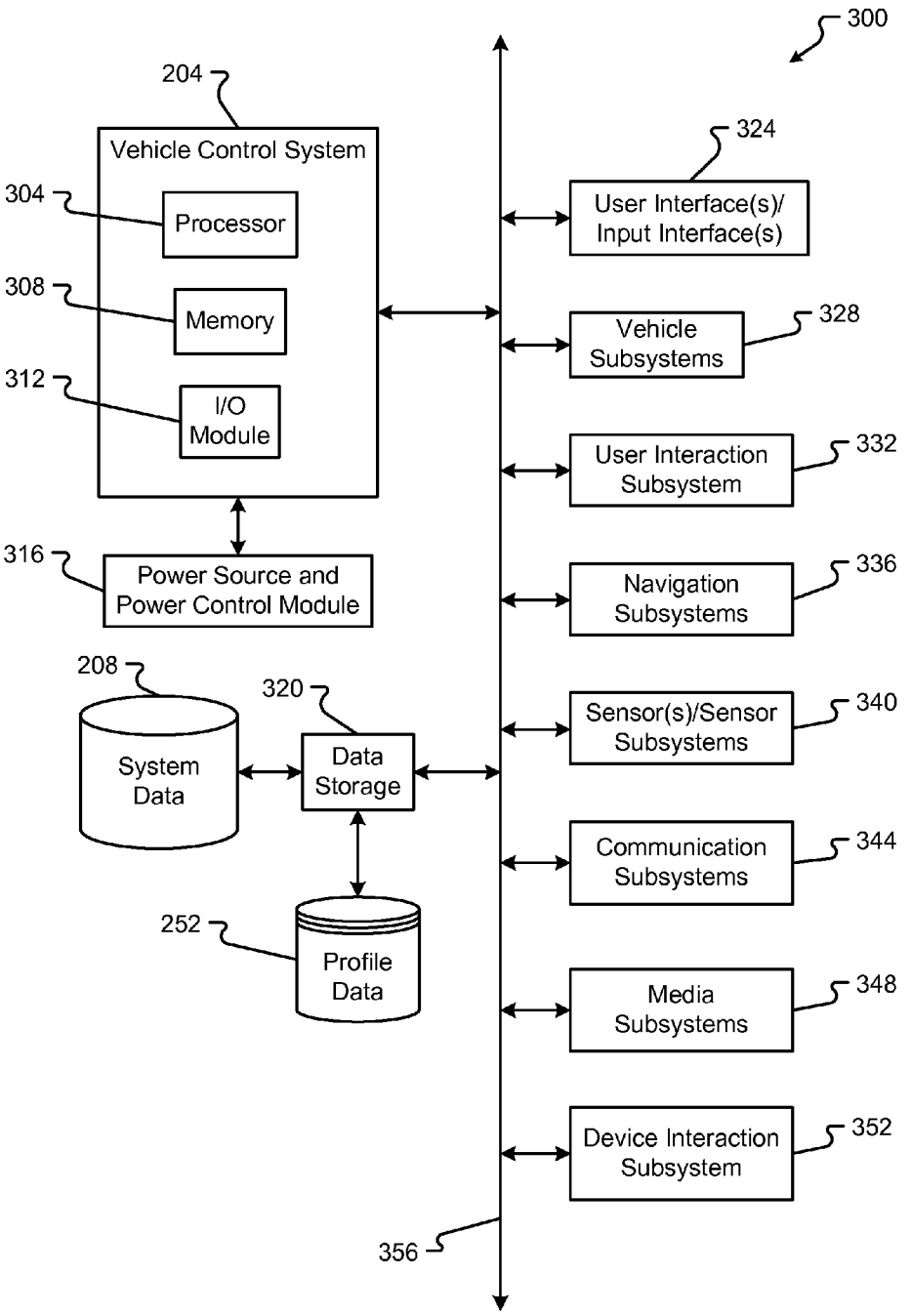

300
204
Vehicle Control System
304
Processor
308
Memory
312
I/O Module
316
Power Source and Power Control Module
208
System Data
320
Data Storage
252
Profile Data
324
User Interface(s)/ Input Interface(s)
Vehicle Subsystems
328
User Interaction Subsystem
332
Navigation Subsystems
336
Sensor(s)/Sensor Subsystems
340
Communication Subsystems
344
Media Subsystems
348
Device Interaction Subsystem
352
356

Fig. 3

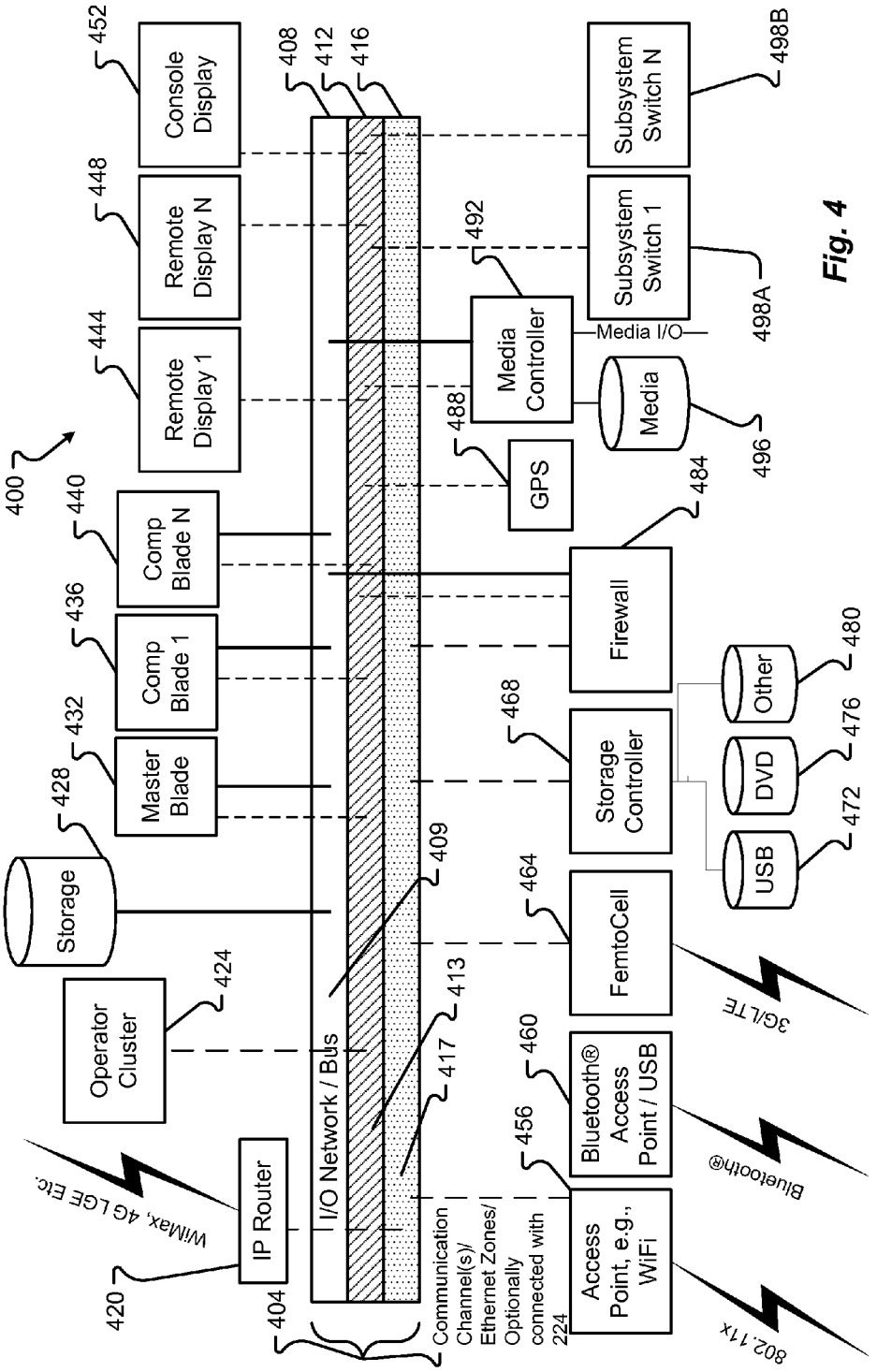

400
Console Display
452
Remote Display N
448
Remote Display 1
444
Comp Blade N
440
Comp Blade 1
436
Master Blade
432
Storage
428
Operator Cluster
424
IP Router
420
WiMax, 4G LGE Etc.
404
I/O Network / Bus
408
412
416
409
413
417
Communication Channel(s)/ Ethernet Zones/ Optionally connected with 224
Subsystem Switch N
498B
Subsystem Switch 1
498A
Media I/O
Media Controller
492
Media
496
GPS
488
Firewall
484
Storage Controller
468
Other
480
DVD
476
USB
472
FemtoCell
464
3G/LTE
Bluetooth® Access Point / USB
460
Bluetooth®
Access Point, e.g., WiFi
456
802.11x

Fig. 4

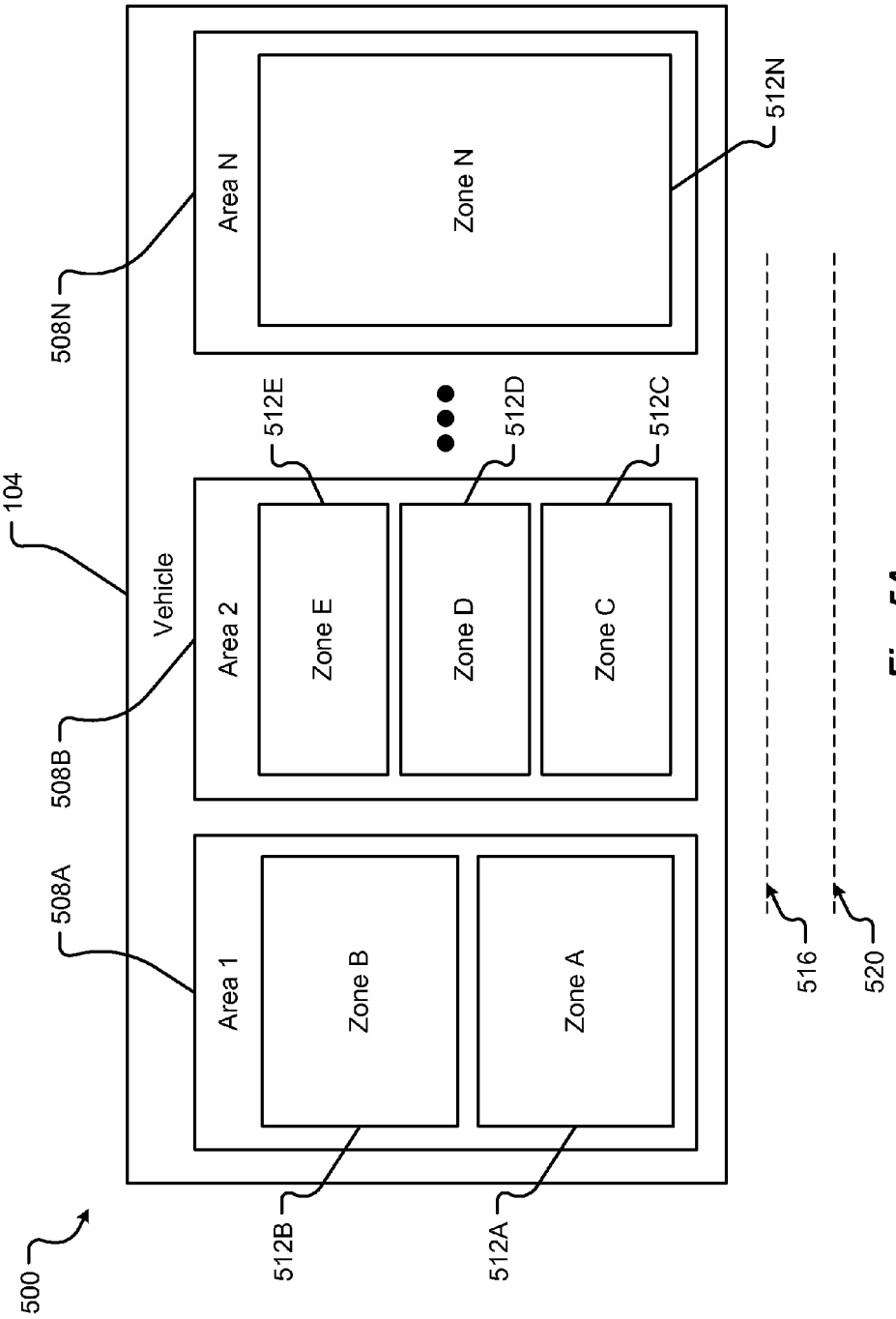

500
104
Vehicle
508A
508B
508N
Area 1
Area 2
Area N
Zone B
Zone A
Zone E
Zone D
Zone C
Zone N
512B
512A
512E
512D
512C
512N
516
520

Fig. 5A

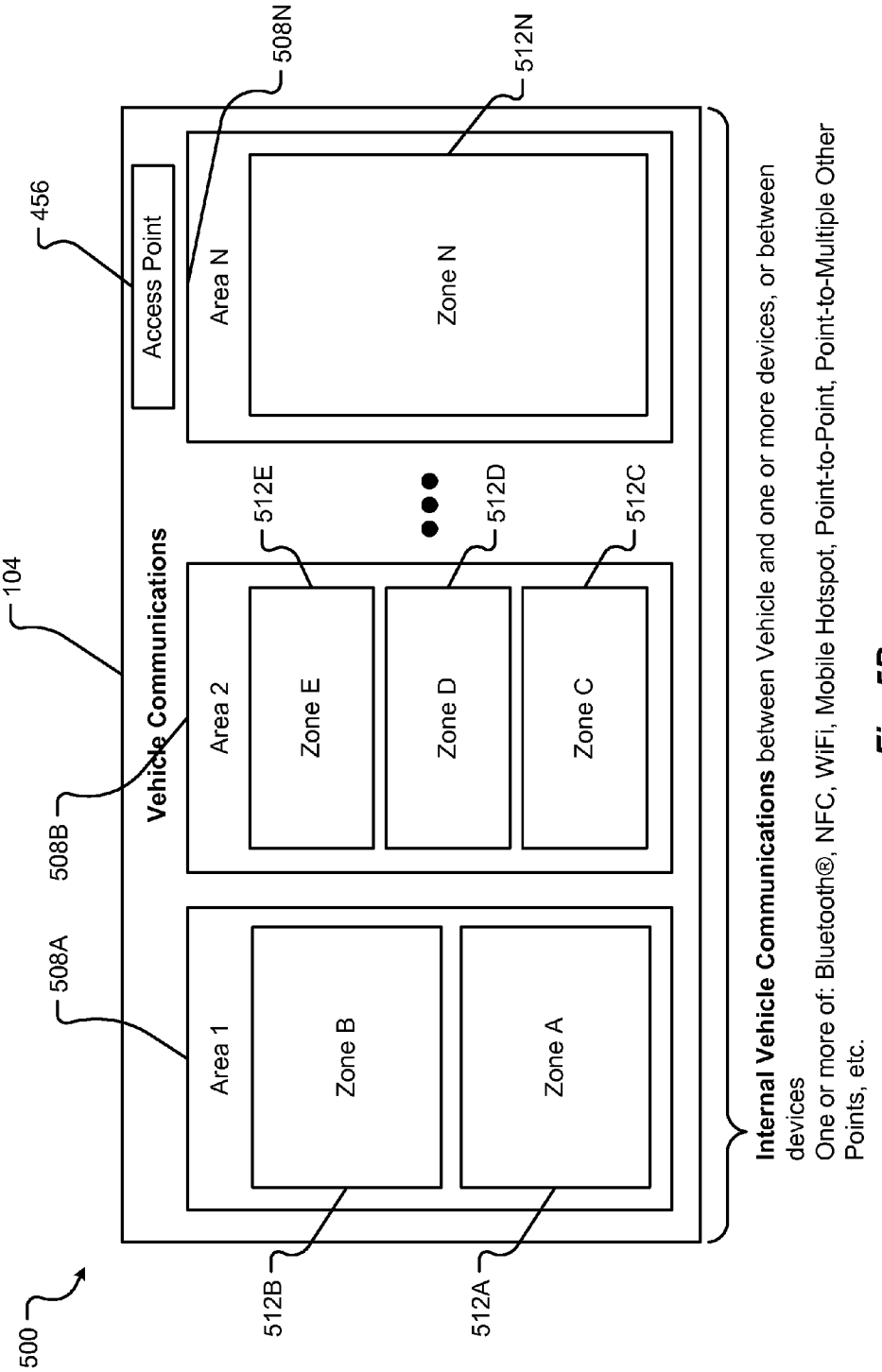

500
104
Vehicle Communications
456
Access Point
508A
508B
508N
Area 1
Area 2
Area N
Zone A
Zone B
Zone C
Zone D
Zone E
Zone N
512A
512B
512C
512D
512E
512N
Internal Vehicle Communications between Vehicle and one or more devices, or between devices
One or more of: Bluetooth®, NFC, WiFi, Mobile Hotspot, Point-to-Point, Point-to-Multiple Other Points, etc.

Fig. 5B

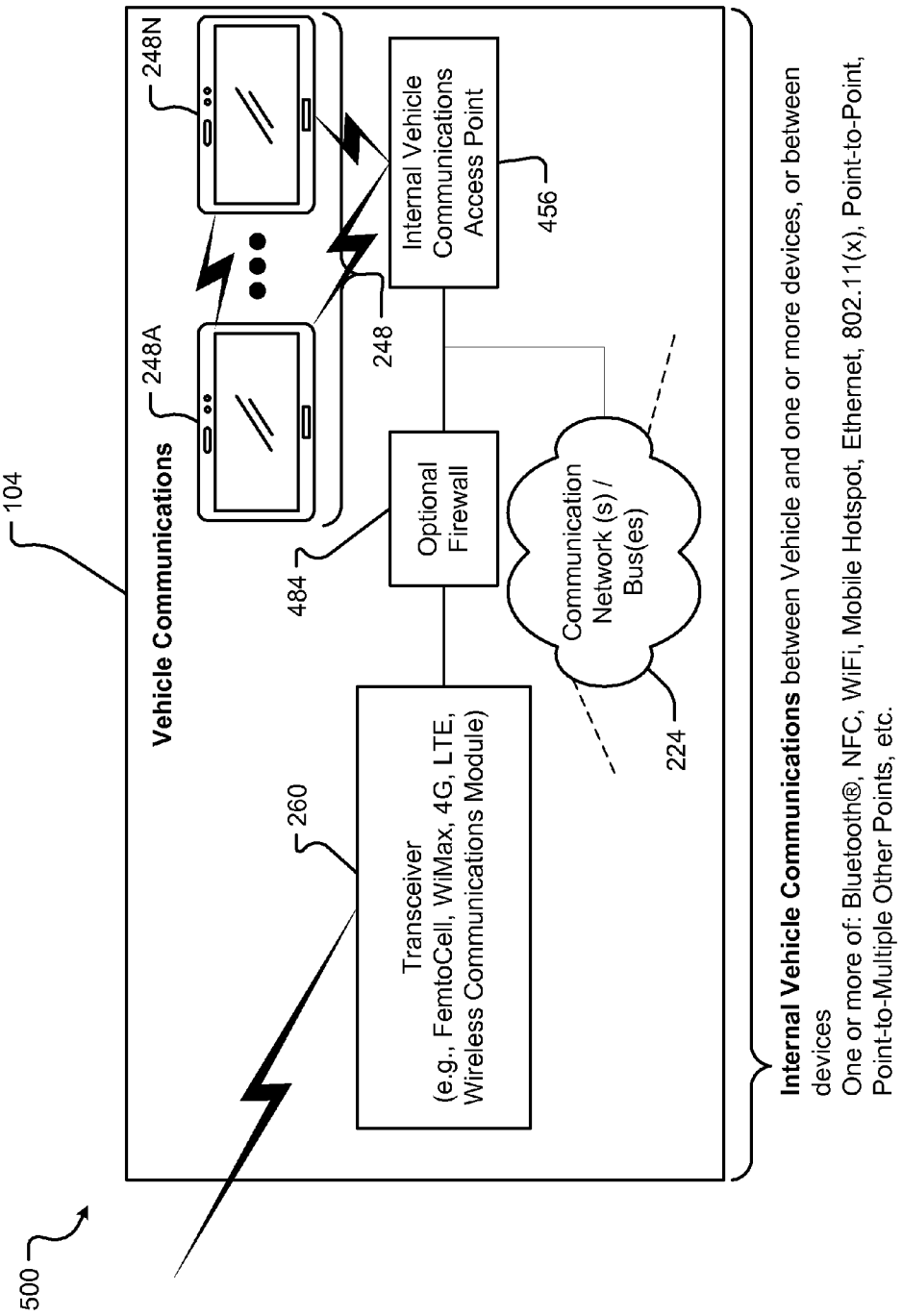

500
104
Vehicle Communications
248A
248N
248
Internal Vehicle Communications Access Point
456
484
Optional Firewall
Communication Network (s) / Bus(es)
224
260
Transceiver (e.g., FemtoCell, WiMax, 4G, LTE, Wireless Communications Module)
Internal Vehicle Communications between Vehicle and one or more devices, or between devices
One or more of: Bluetooth®, NFC, WiFi, Mobile Hotspot, Ethernet, 802.11(x), Point-to-Point, Point-to-Multiple Other Points, etc.

Fig. 5C

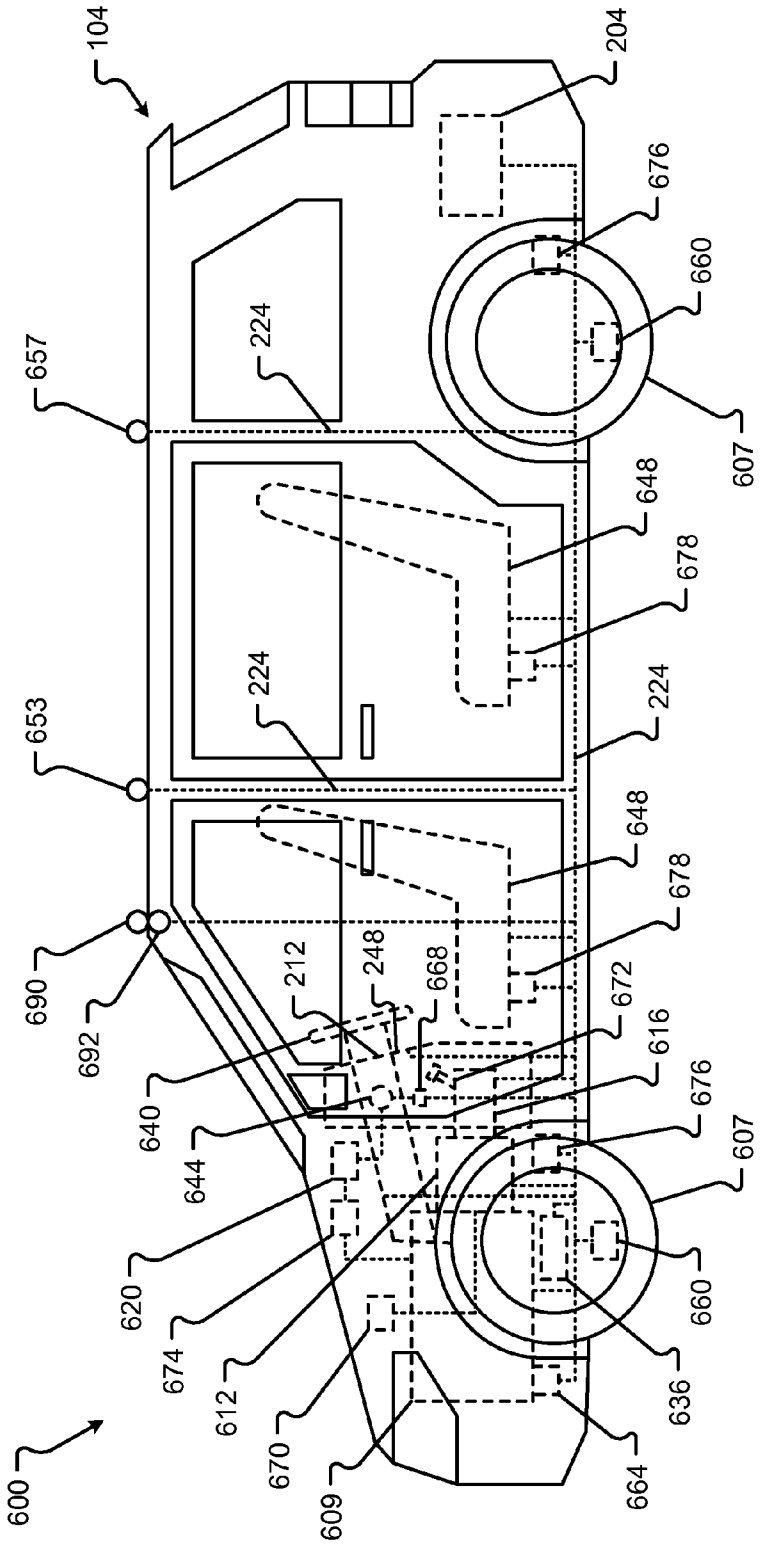

104
204
676
660
607
657
224
648
678
224
653
224
648
678
690
692
212
248
668
672
616
640
644
676
607
620
674
612
670
609
660
636
664
600

Fig. 6A

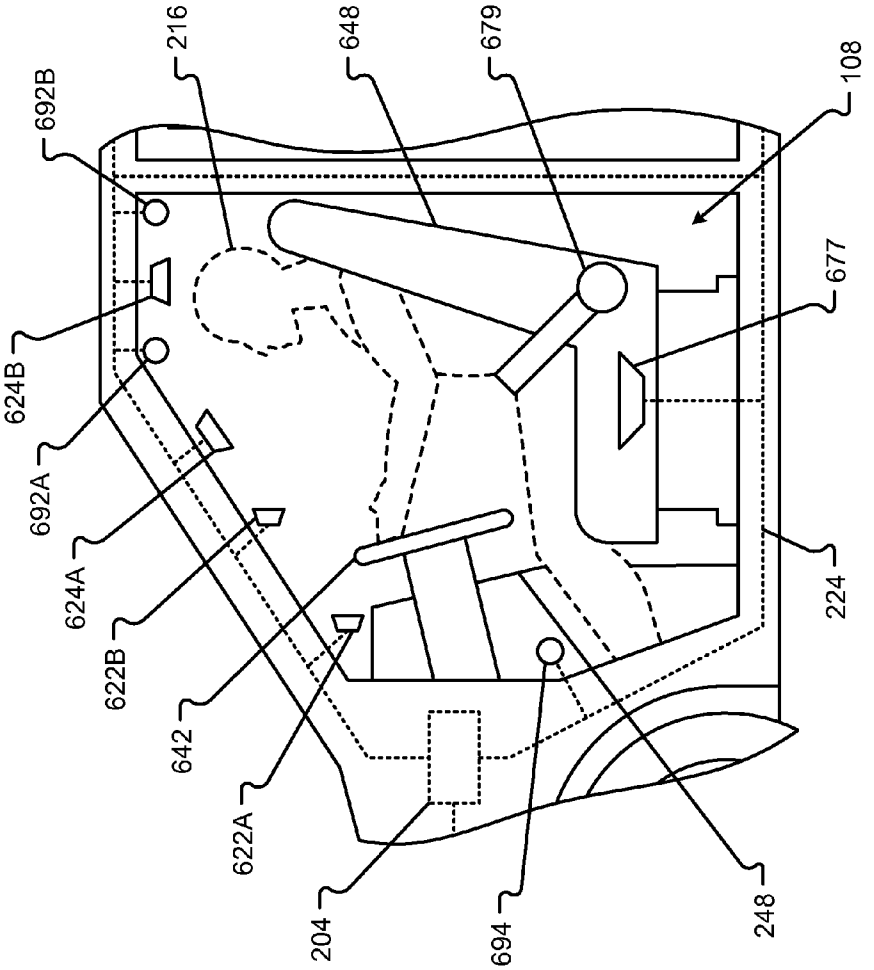

692B
624B
692A
624A
622B
642
622A
204
694
248
224
677
108
679
648
216

Fig. 6B

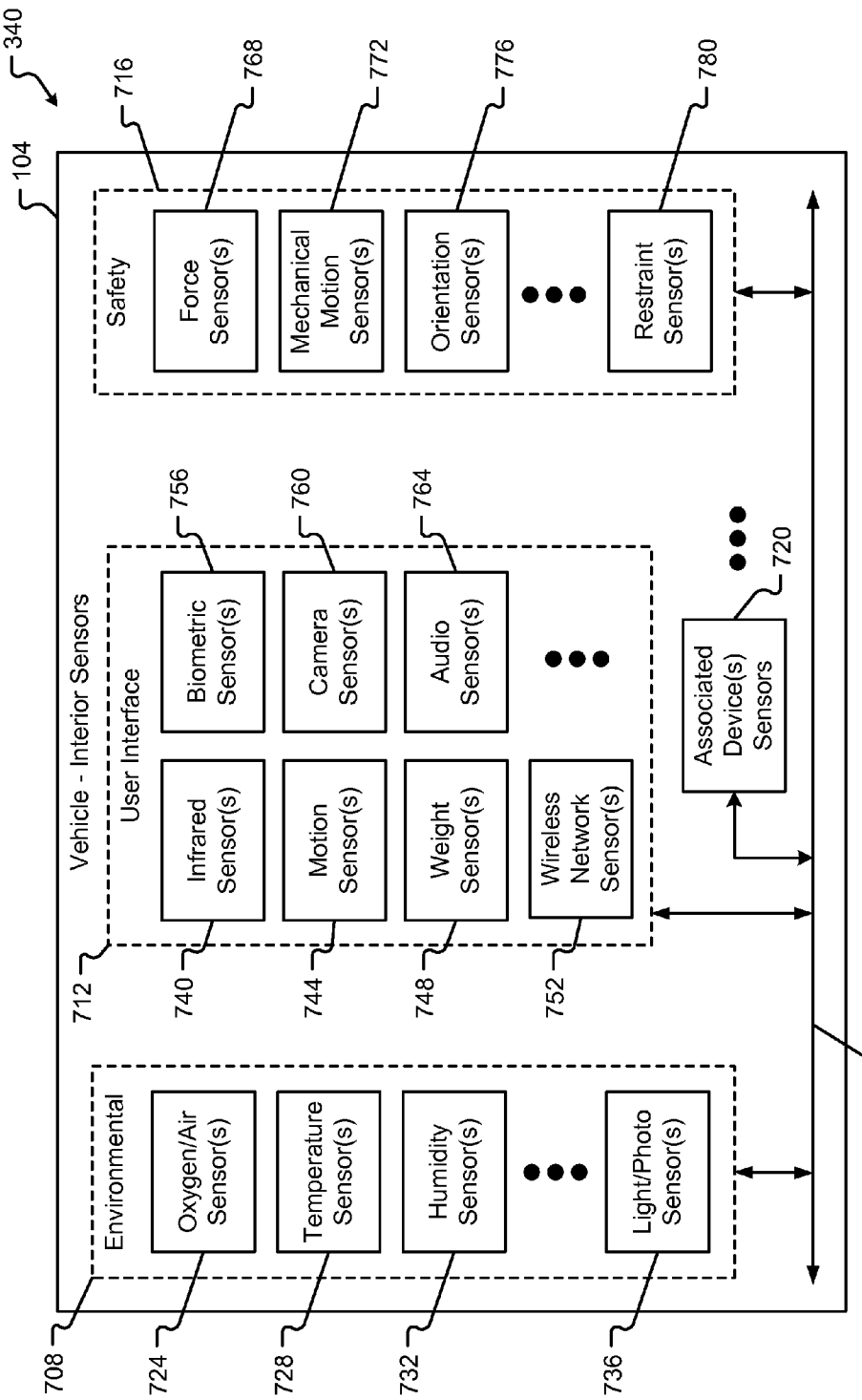

340
104
Vehicle - Interior Sensors
Safety
716
Force Sensor(s)
768
Mechanical Motion Sensor(s)
772
Orientation Sensor(s)
776
Restraint Sensor(s)
780
User Interface
712
Infrared Sensor(s)
740
Biometric Sensor(s)
756
Motion Sensor(s)
744
Camera Sensor(s)
760
Weight Sensor(s)
748
Audio Sensor(s)
764
Wireless Network Sensor(s)
752
Associated Device(s) Sensors
720
Environmental
708
Oxygen/Air Sensor(s)
724
Temperature Sensor(s)
728
Humidity Sensor(s)
732
Light/Photo Sensor(s)
736
356

Fig. 7A

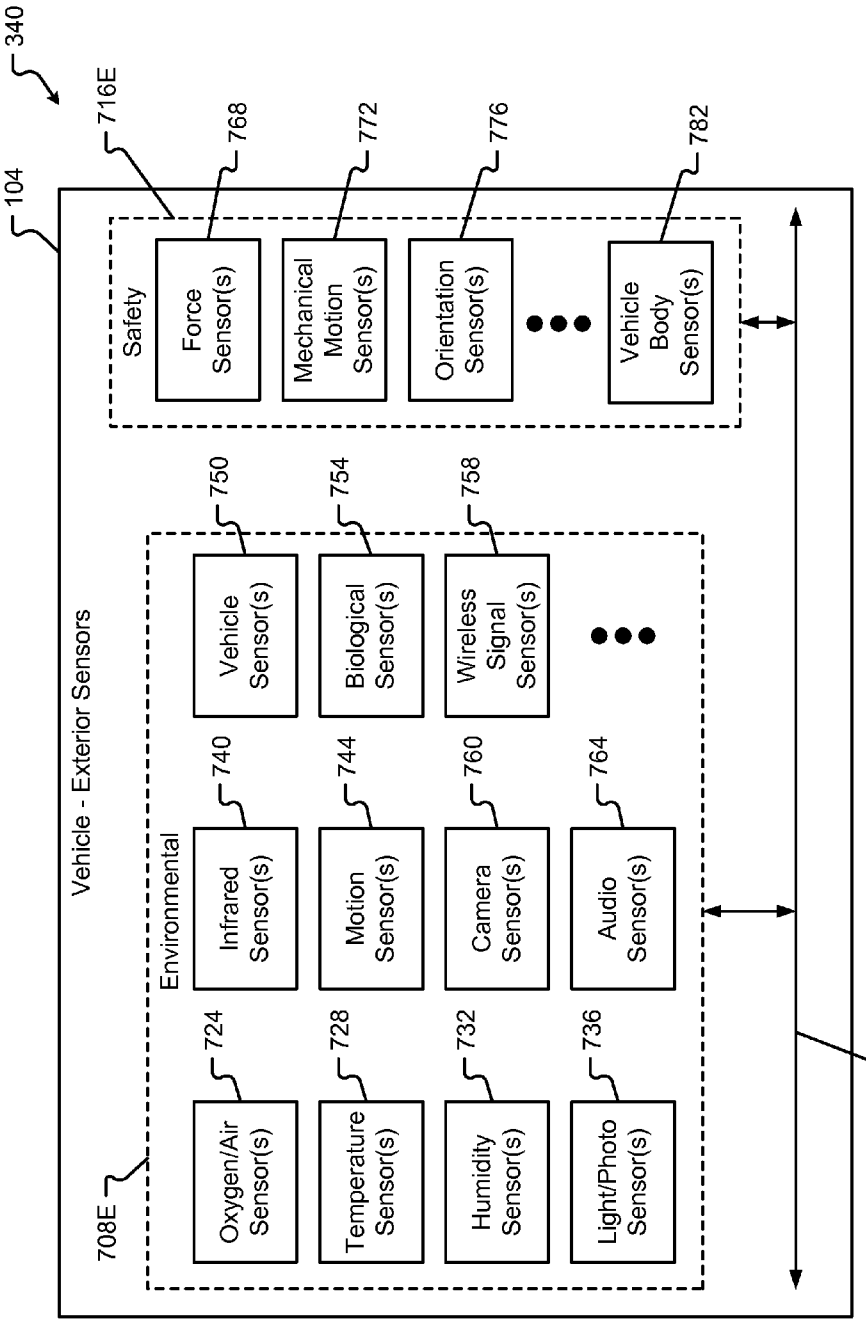

340
104
716E
Vehicle - Exterior Sensors
Safety
768
Force Sensor(s)
772
Mechanical Motion Sensor(s)
776
Orientation Sensor(s)
782
Vehicle Body Sensor(s)
708E
Environmental
724
Oxygen/Air Sensor(s)
728
Temperature Sensor(s)
732
Humidity Sensor(s)
736
Light/Photo Sensor(s)
740
Infrared Sensor(s)
744
Motion Sensor(s)
760
Camera Sensor(s)
764
Audio Sensor(s)
750
Vehicle Sensor(s)
754
Biological Sensor(s)
758
Wireless Signal Sensor(s)
356

Fig. 7B

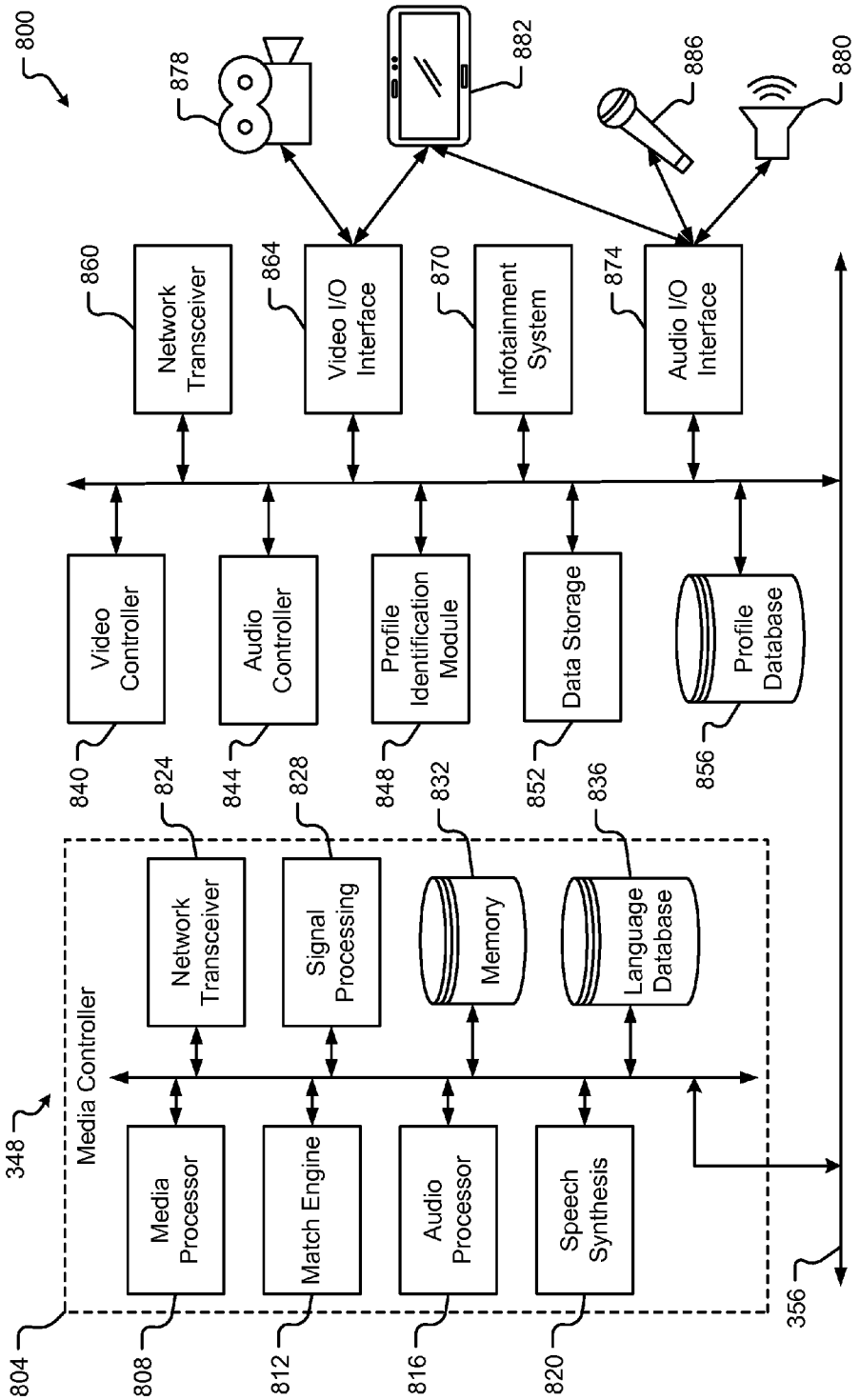

800
878
882
886
880
860
Network Transceiver
864
Video I/O Interface
870
Infotainment System
874
Audio I/O Interface
Video Controller
Audio Controller
Profile Identification Module
Data Storage
Profile Database
840
844
848
852
856
824
828
832
836
Network Transceiver
Signal Processing
Memory
Language Database
348
Media Controller
Media Processor
Match Engine
Audio Processor
Speech Synthesis
804
808
812
816
820
356

Fig. 8A

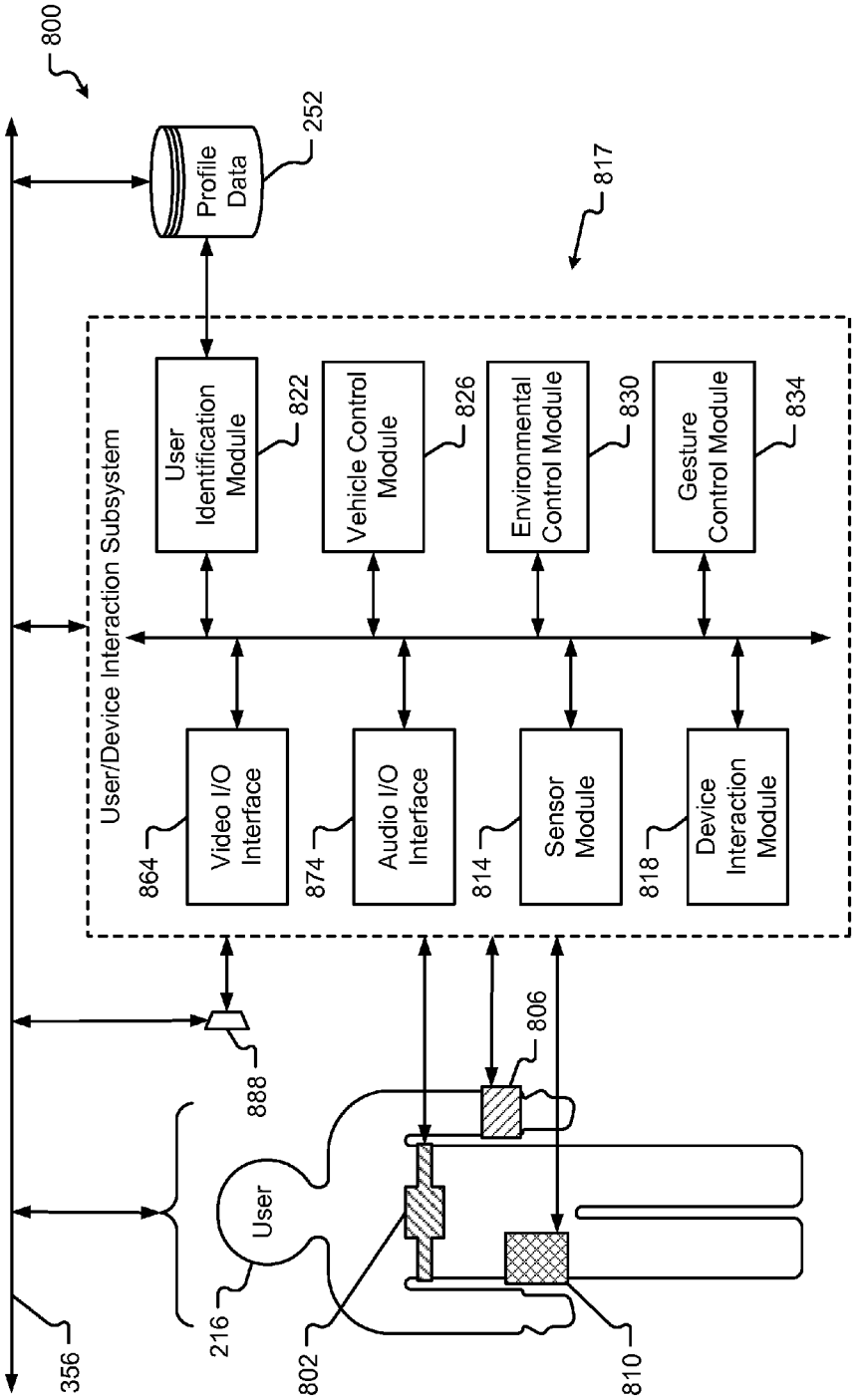

800
252
Profile Data
817
User/Device Interaction Subsystem
User Identification Module
822
Vehicle Control Module
826
Environmental Control Module
830
Gesture Control Module
834
Video I/O Interface
864
Audio I/O Interface
874
Sensor Module
814
Device Interaction Module
818
888
806
User
216
802
810
356

Fig. 8B

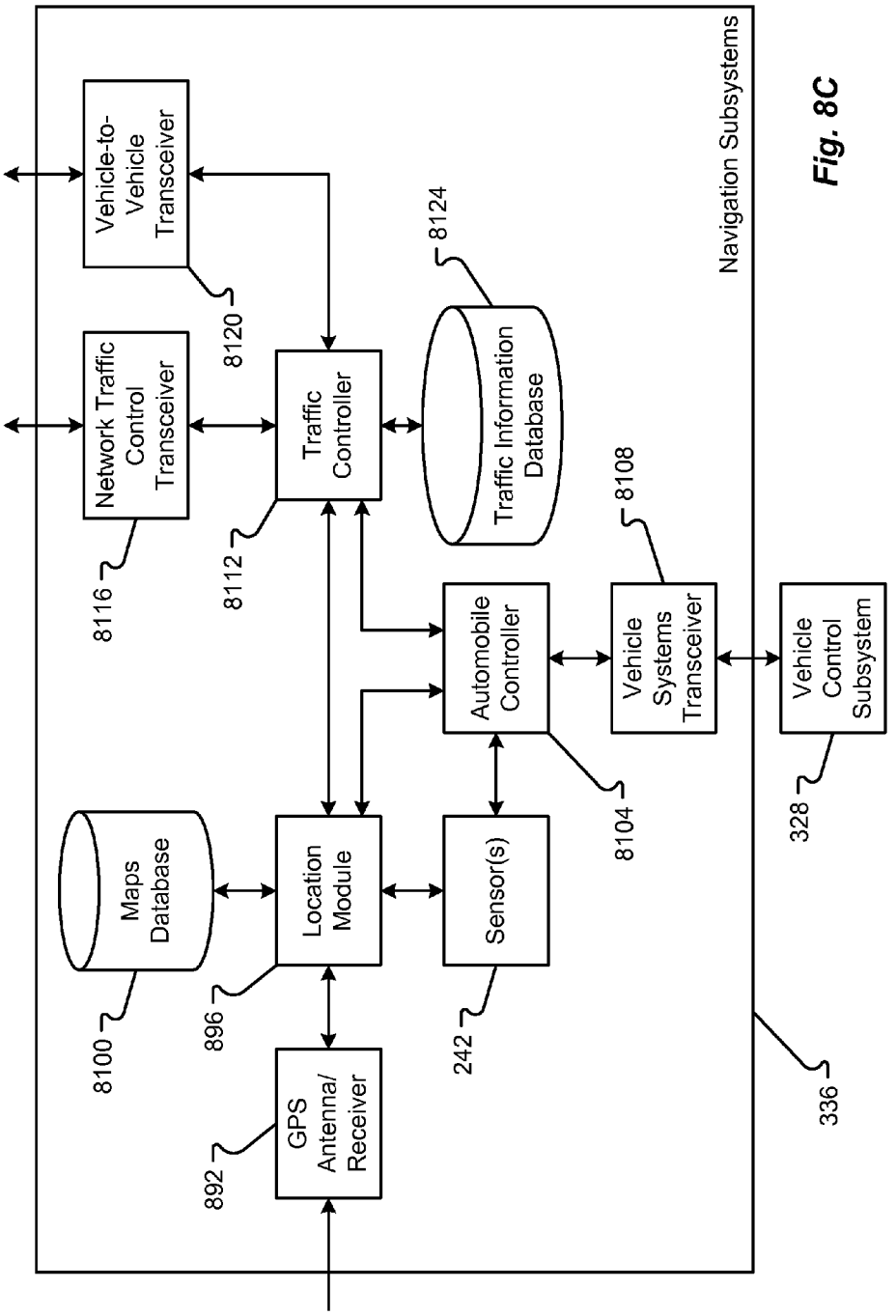

Vehicle-to-Vehicle Transceiver
8120
Network Traffic Control Transceiver
8116
Traffic Controller
8112
8124
Traffic Information Database
Navigation Subsystems
8108
Automobile Controller
Vehicle Systems Transceiver
Vehicle Control Subsystem
8104
328
Maps Database
8100
Location Module
896
Sensor(s)
242
GPS Antenna/ Receiver
892
336

Fig. 8C

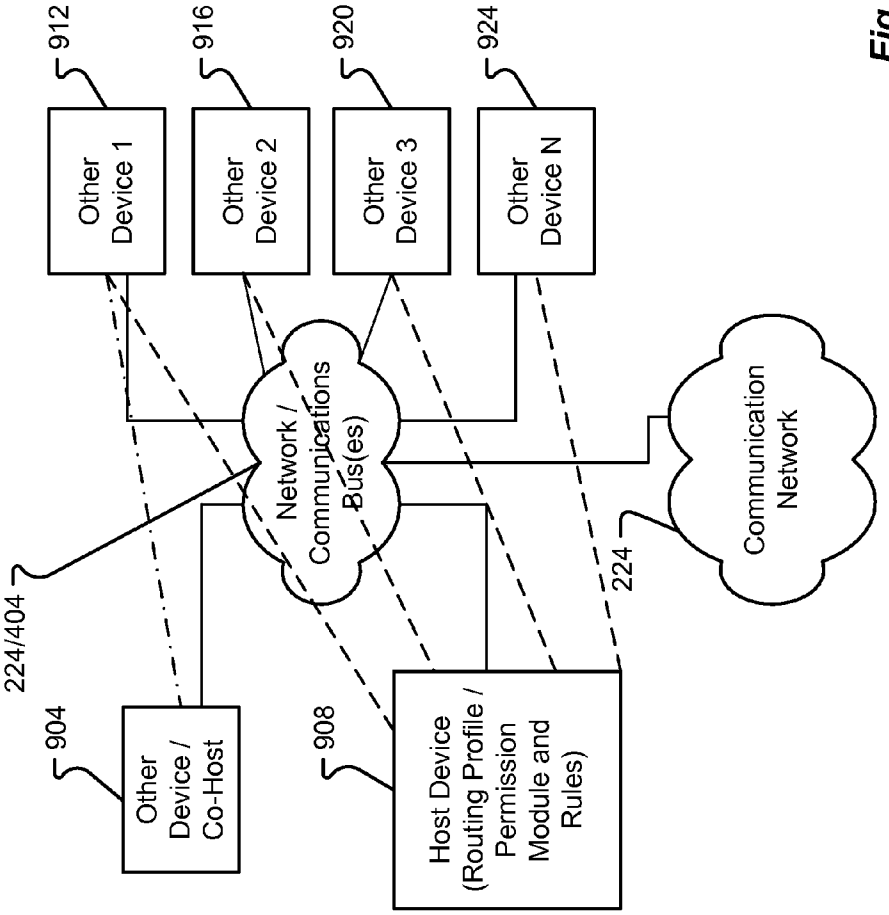

912
Other Device 1
916
Other Device 2
920
Other Device 3
924
Other Device N
224/404
Network / Communications Bus(es)
224
Communication Network
904
Other Device / Co-Host
908
Host Device (Routing Profile / Permission Module and Rules)

Fig. 9

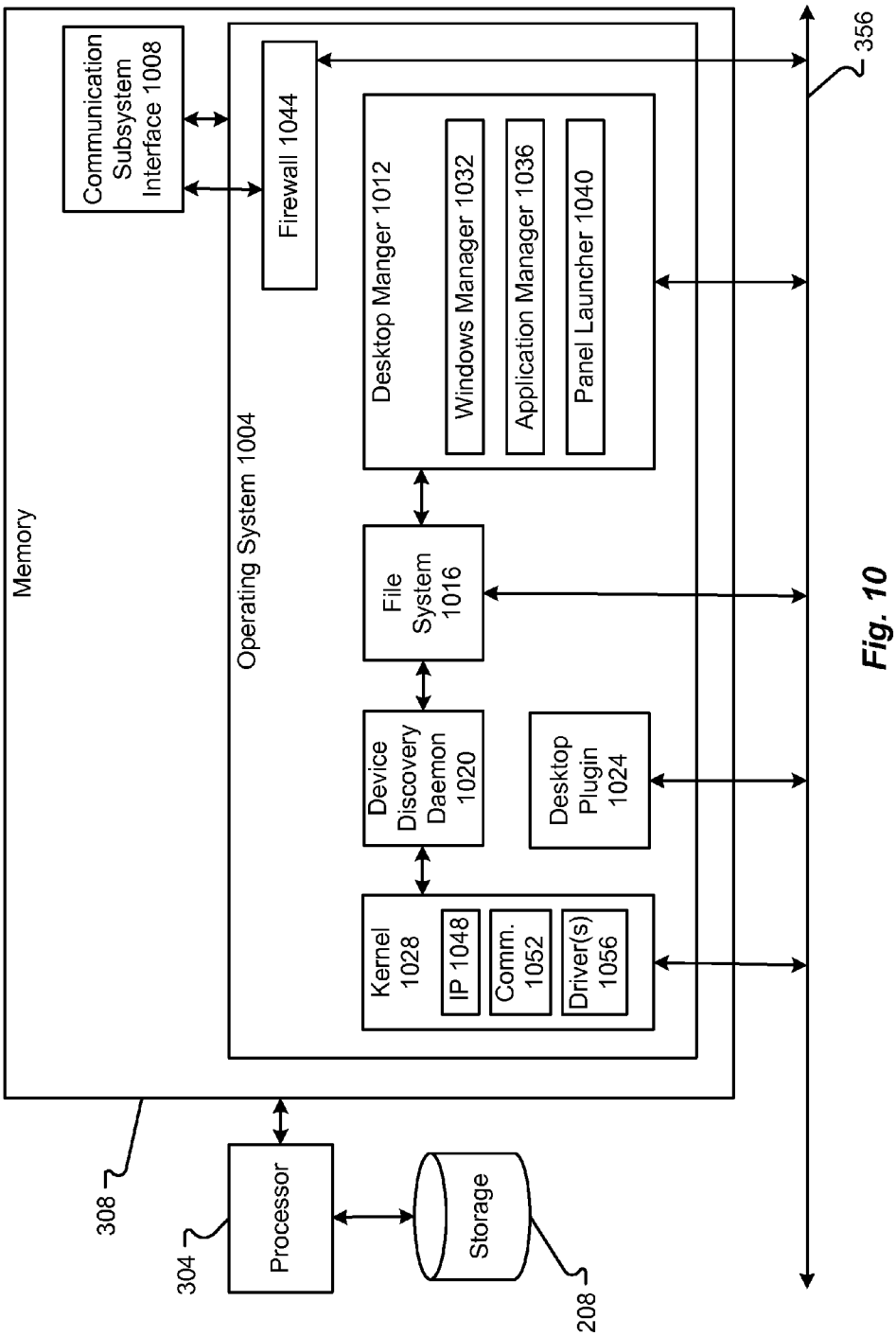

Memory
Communication Subsystem Interface 1008
Operating System 1004
Firewall 1044
Desktop Manger 1012
Windows Manager 1032
Application Manager 1036
Panel Launcher 1040
File System 1016
Device Discovery Daemon 1020
Desktop Plugin 1024
Kernel 1028
IP 1048
Comm. 1052
Driver(s) 1056
308
Processor
304
Storage
208
356

Fig. 10

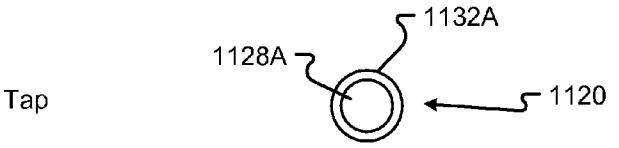


FIG. 11A

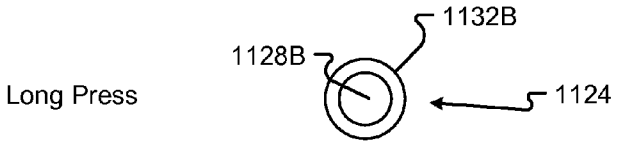


FIG. 11B

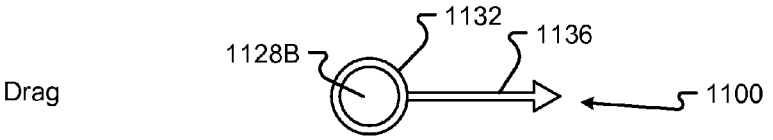


FIG. 11C

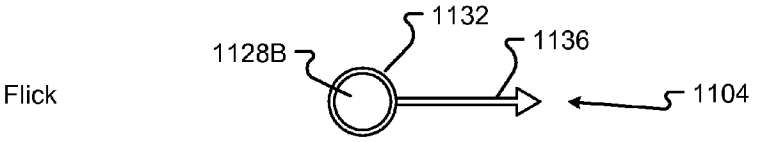
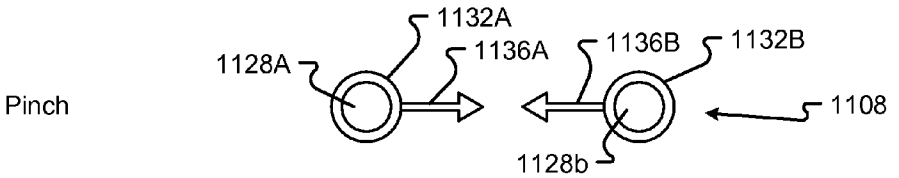


FIG. 11D



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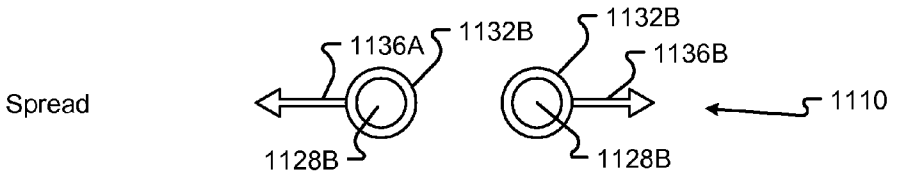


FIG. 11F

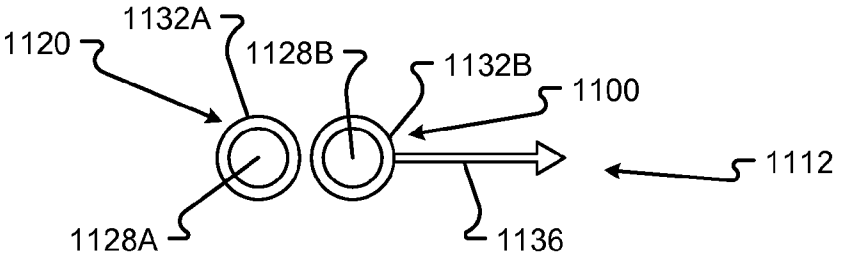


FIG. 11G

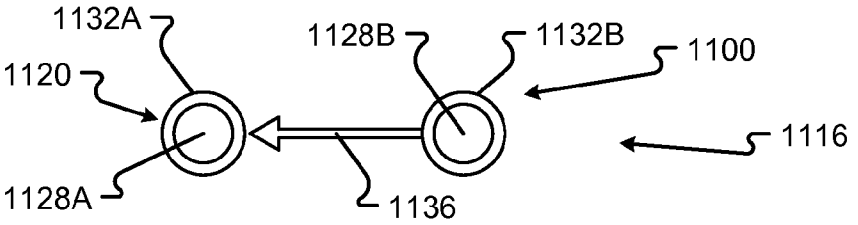


FIG. 11H

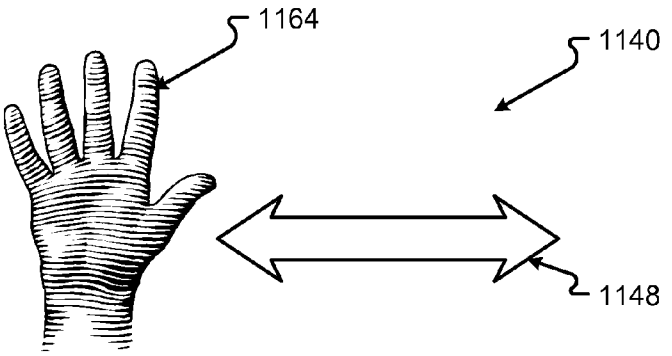


FIG. 11I

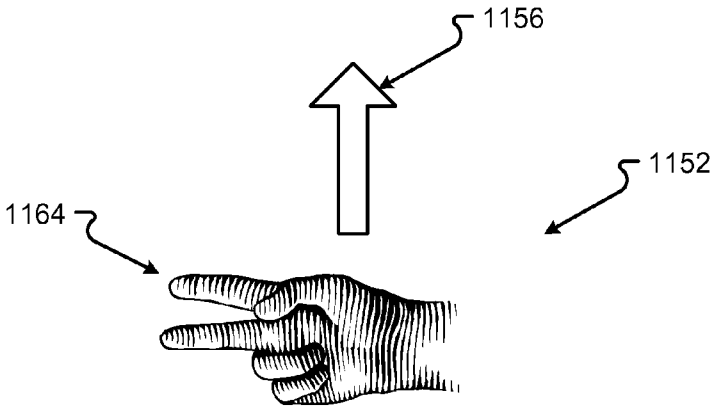


FIG. 11J

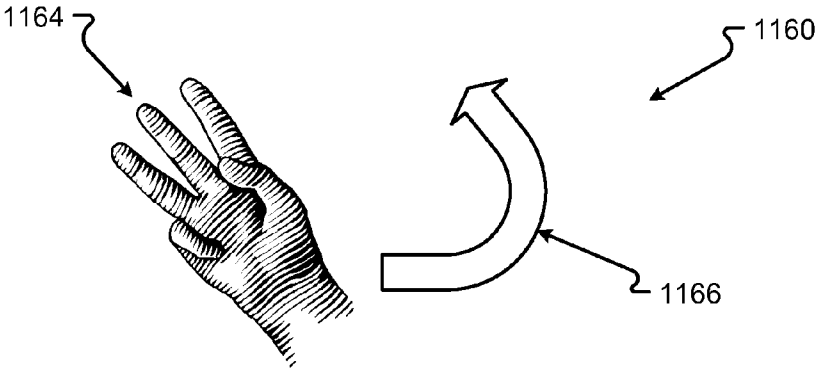


FIG. 11K

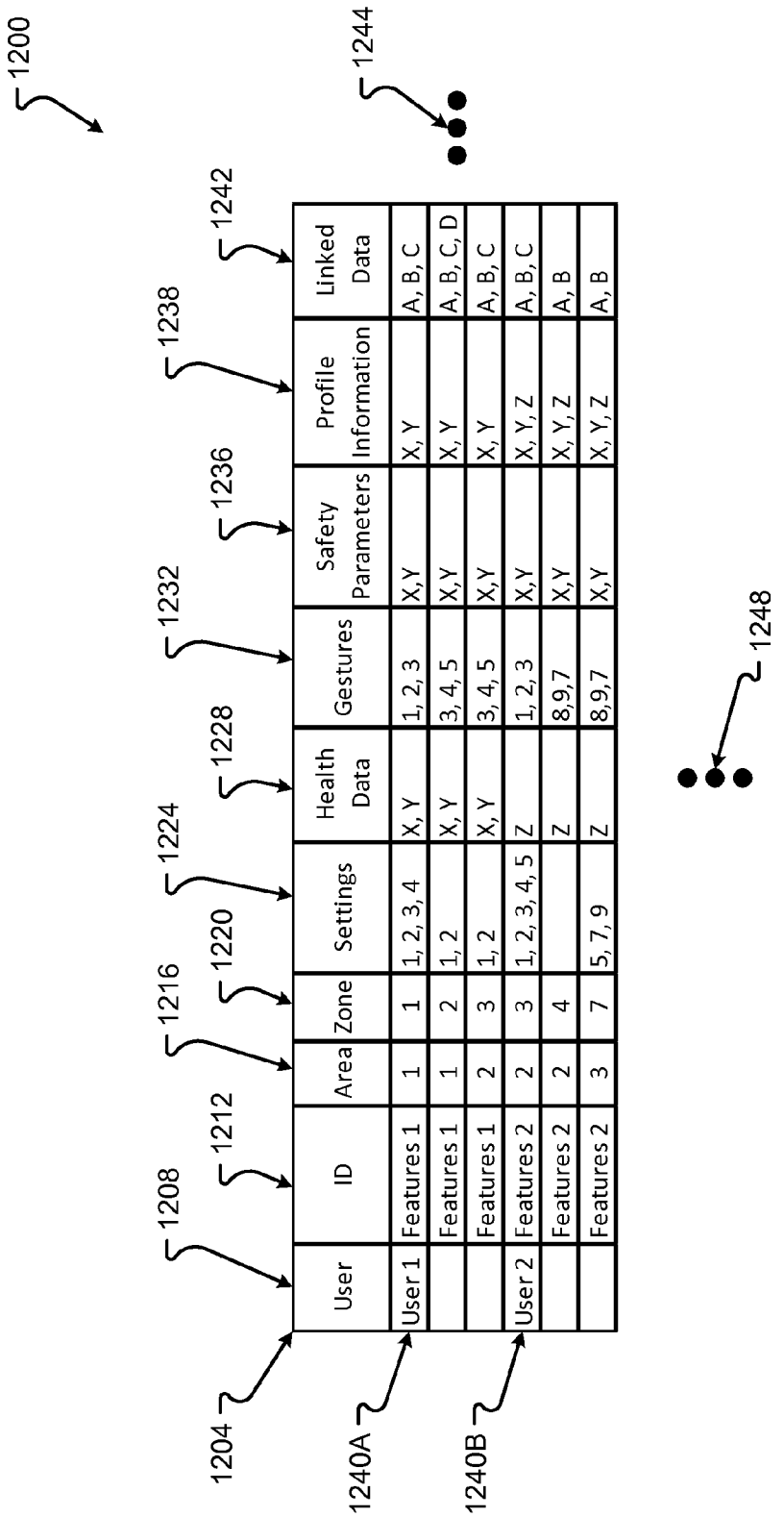

1200
1204
1208
User
1212
ID
1216
Area
1220
Zone
1224
Settings
1228
Health Data
1232
Gestures
1236
Safety Parameters
1238
Profile Information
1242
Linked Data
1240A
1240B
User 1
Features 1
1 1 1, 2, 3, 4 X, Y 1, 2, 3 X,Y X, Y A, B, C
Features 1
1 2 1, 2 X, Y 3, 4, 5 X,Y X, Y A, B, C, D
Features 1
2 3 1, 2 X, Y 3, 4, 5 X,Y X, Y A, B, C
User 2
Features 2
2 3 1, 2, 3, 4, 5 Z 1, 2, 3 X,Y X, Y, Z A, B, C
Features 2
2 4 Z 8,9,7 X,Y X, Y, Z A, B
Features 2
3 7 5, 7, 9 Z 8,9,7 X,Y X, Y, Z A, B
1244
1248

Fig. 12A

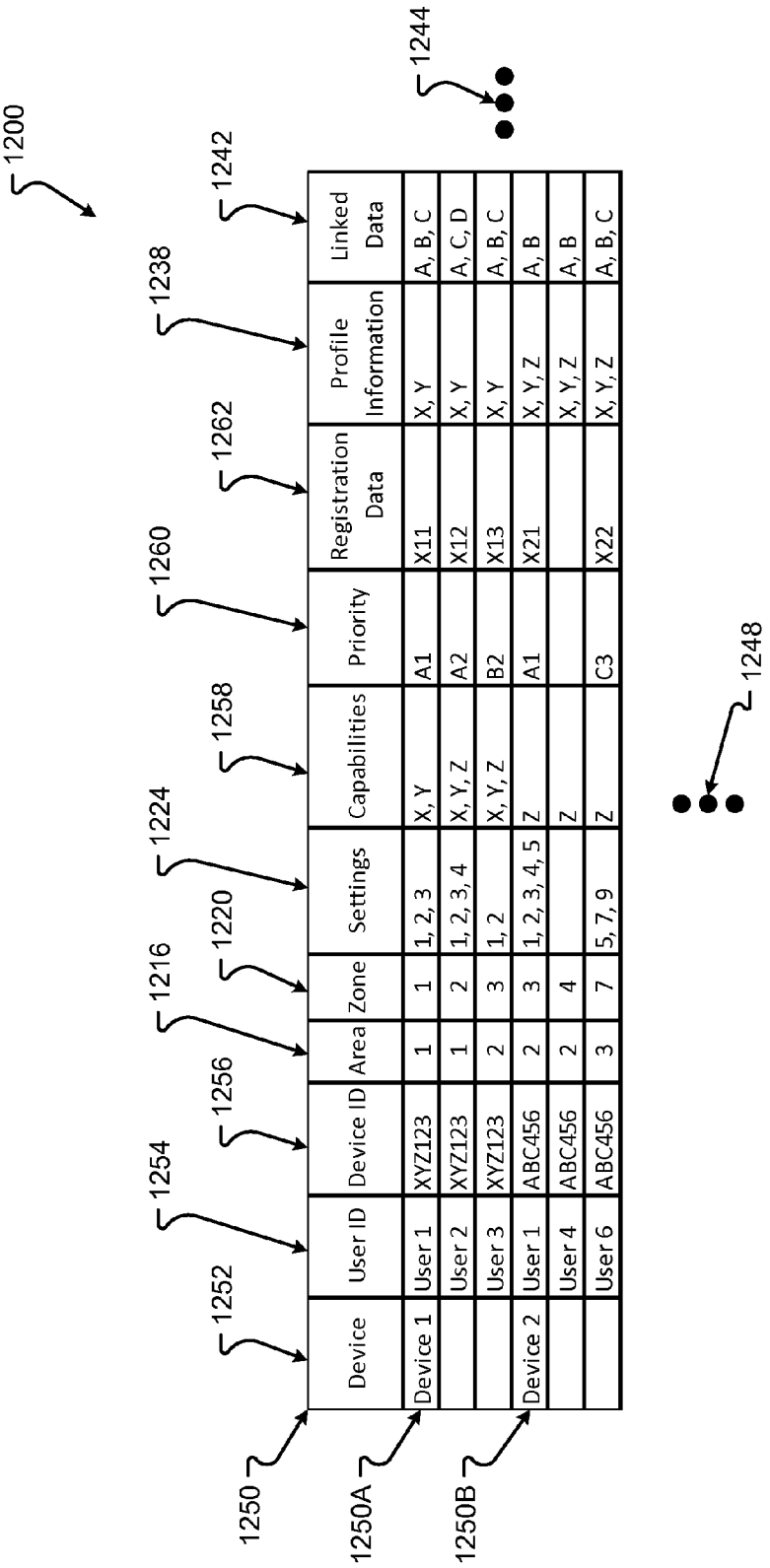
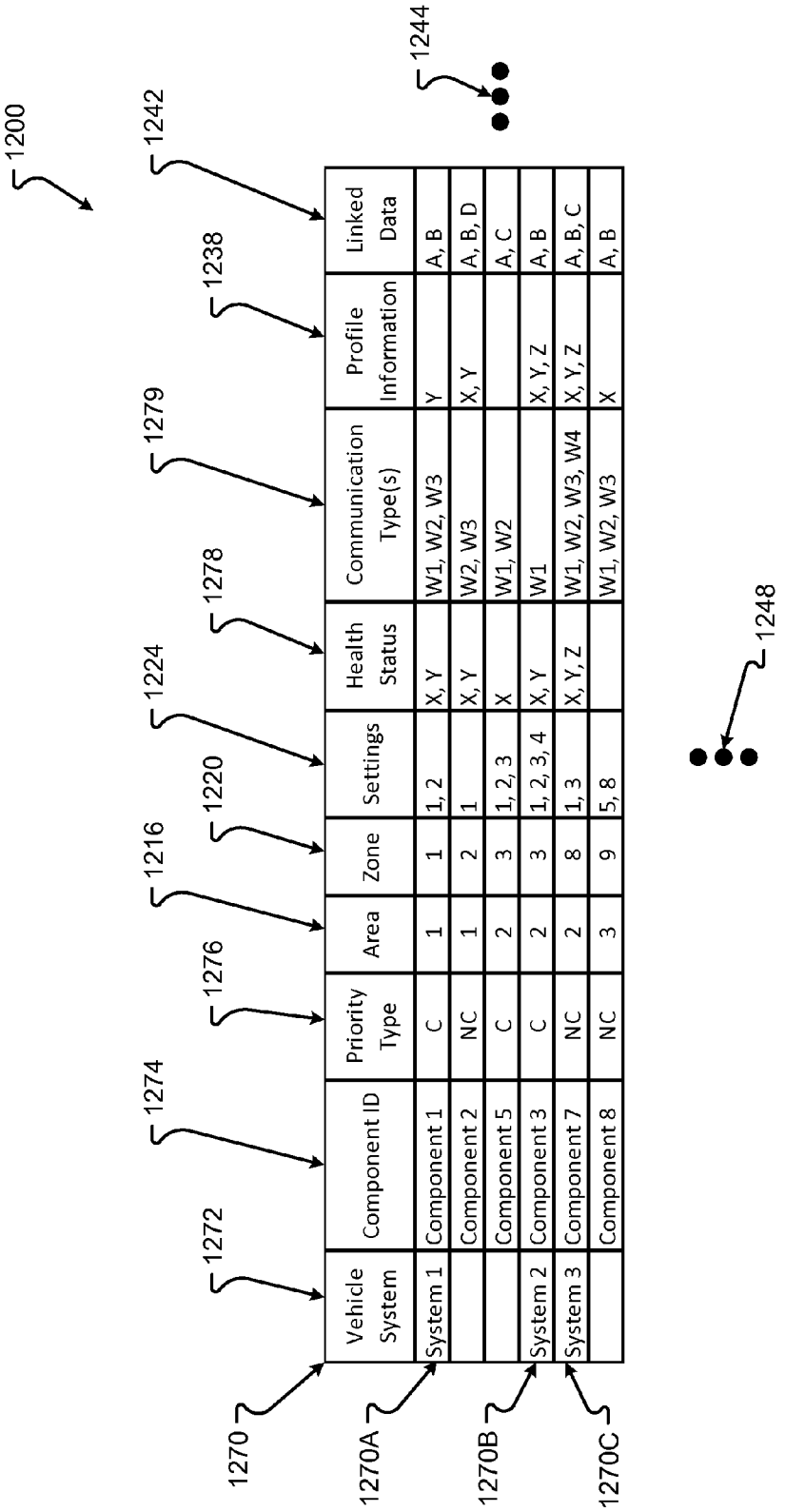
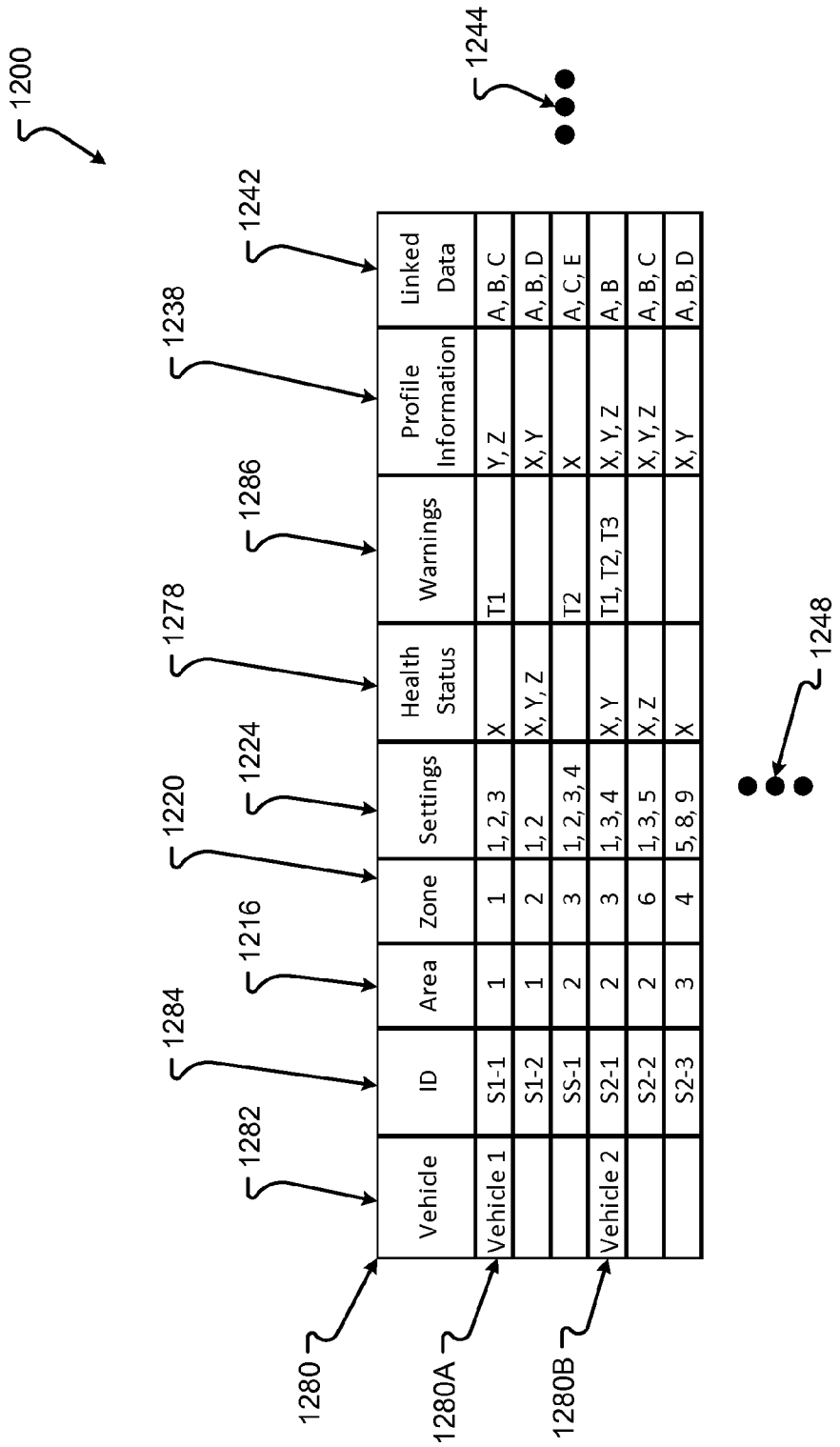

1200
1250
1250A
1250B
1252
1254
1256
1216
1220
1224
1258
1260
1262
1238
1242
1244
1248
Device
User ID
Device ID
Area
Zone
Settings
Capabilities
Priority
Registration Data
Profile Information
Linked Data
Device 1
User 1
XYZ123
1
1
1, 2, 3
X, Y
A1
X11
X, Y
A, B, C
User 2
XYZ123
1
2
1, 2, 3, 4
X, Y, Z
A2
X12
X, Y
A, C, D
User 3
XYZ123
2
3
1, 2
X, Y, Z
B2
X13
X, Y
A, B, C
Device 2
User 1
ABC456
2
3
1, 2, 3, 4, 5
Z
A1
X21
X, Y, Z
A, B
User 4
ABC456
2
4
Z
X, Y, Z
A, B
User 6
ABC456
3
7
5, 7, 9
Z
C3
X22
X, Y, Z
A, B, C

Fig. 12B



Vehicle System	Component ID	Priority Type	Area	Zone	Settings	Health Status	Communication Type(s)	Profile Information	Linked Data
System 1	Component 1	C	1	1	1, 2	X, Y	W1, W2, W3	Y	A, B
	Component 2	NC	1	2	1	X, Y	W2, W3	X, Y	A, B, D
	Component 5	C	2	3	1, 2, 3	X	W1, W2		A, C
System 2	Component 3	C	2	3	1, 2, 3, 4	X, Y	W1	X, Y, Z	A, B
System 3	Component 7	NC	2	8	1, 3	X, Y, Z	W1, W2, W3, W4	X, Y, Z	A, B, C
	Component 8	NC	3	9	5, 8		W1, W2, W3	X	A, B

Fig. 12C



Vehicle	ID	Area	Zone	Settings	Health Status	Warnings	Profile Information	Linked Data
Vehicle 1	S1-1	1	1	1, 2, 3	X	T1	Y, Z	A, B, C
	S1-2	1	2	1, 2	X, Y, Z		X, Y	A, B, D
	SS-1	2	3	1, 2, 3, 4		T2	X	A, C, E
Vehicle 2	S2-1	2	3	1, 3, 4	X, Y	T1, T2, T3	X, Y, Z	A, B
	S2-2	2	6	1, 3, 5	X, Z		X, Y, Z	A, B, C
	S2-3	3	4	5, 8, 9	X		X, Y	A, B, D

Fig. 12D

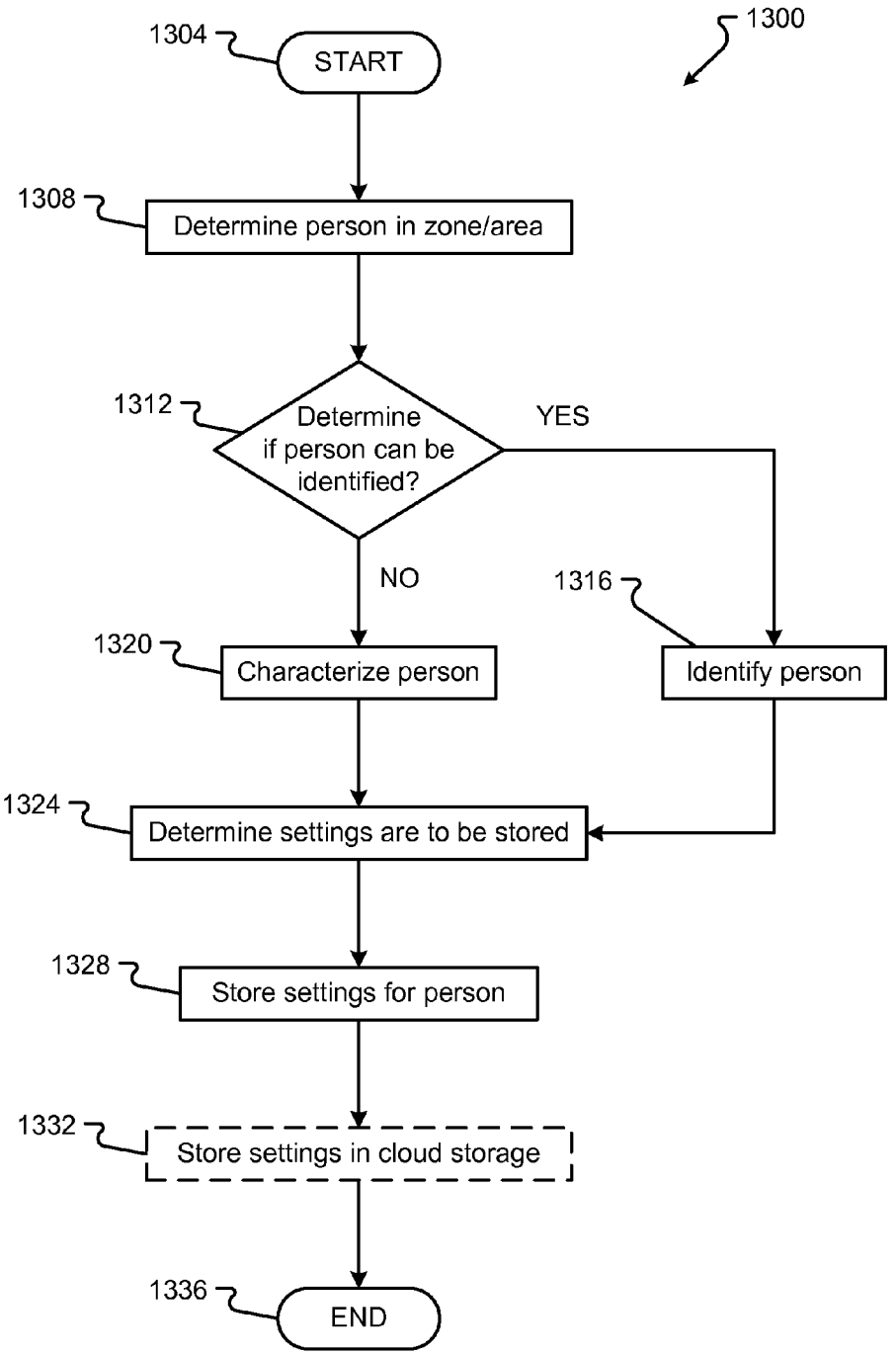

1300
1304
START
1308
Determine person in zone/area
1312
Determine if person can be identified?
YES
NO
1316
Identify person
1320
Characterize person
1324
Determine settings are to be stored
1328
Store settings for person
1332
Store settings in cloud storage
1336
END

Fig. 13

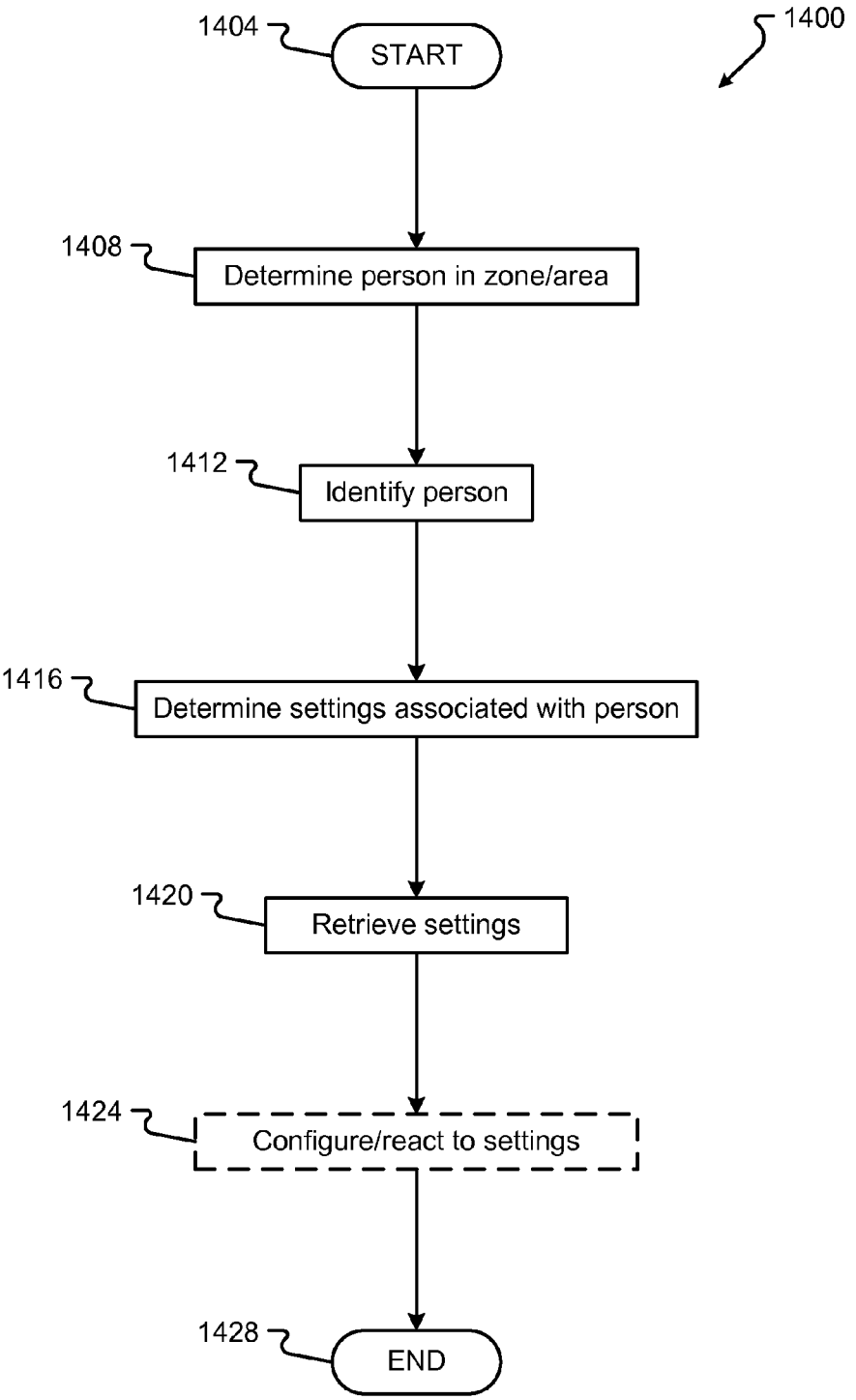

1400
1404
START
1408
Determine person in zone/area
1412
Identify person
1416
Determine settings associated with person
1420
Retrieve settings
1424
Configure/react to settings
1428
END

Fig. 14

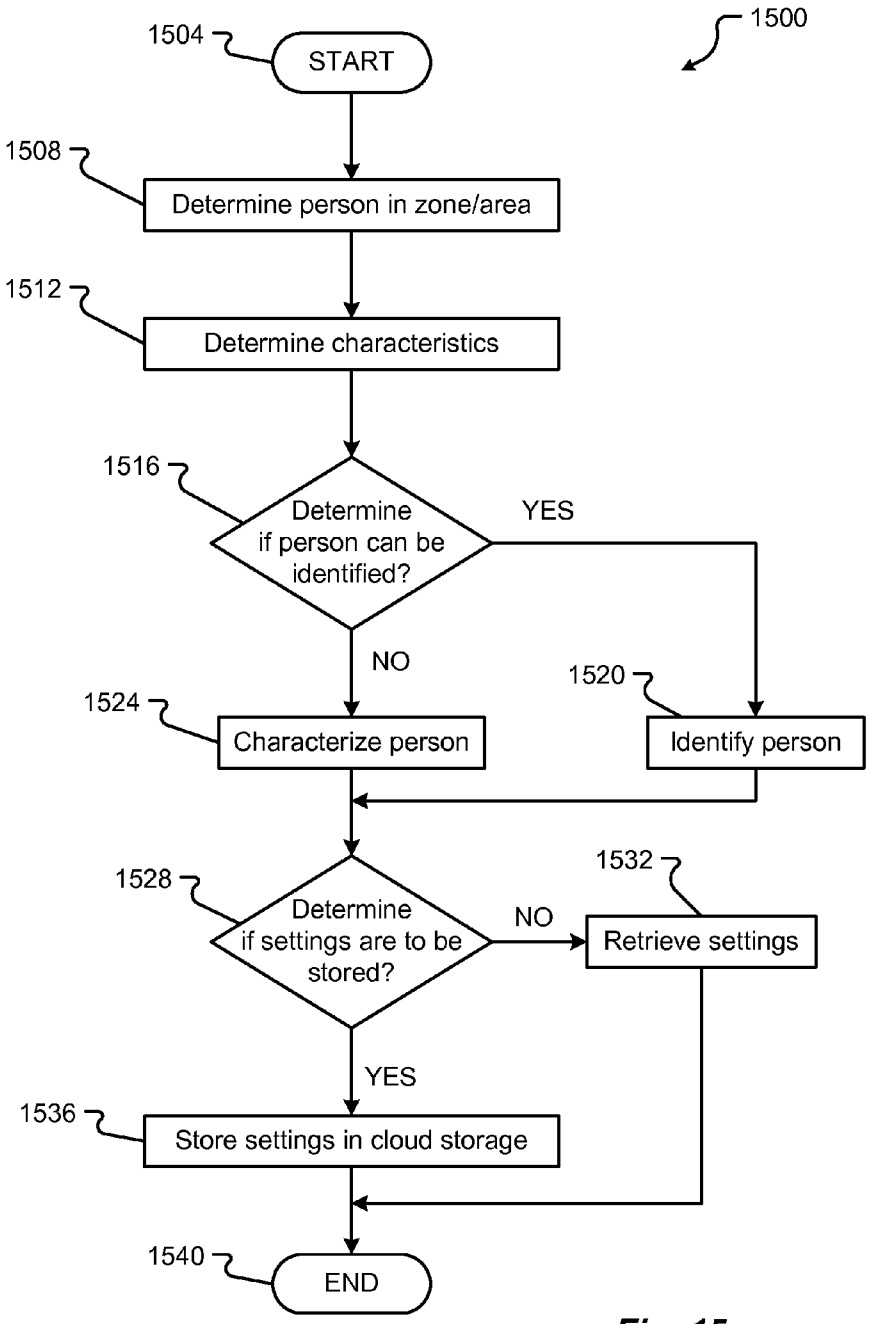

1500
1504
START
1508
Determine person in zone/area
1512
Determine characteristics
1516
Determine if person can be identified?
YES
NO
1520
Identify person
1524
Characterize person
1528
Determine if settings are to be stored?
NO
1532
Retrieve settings
YES
1536
Store settings in cloud storage
1540
END

Fig. 15

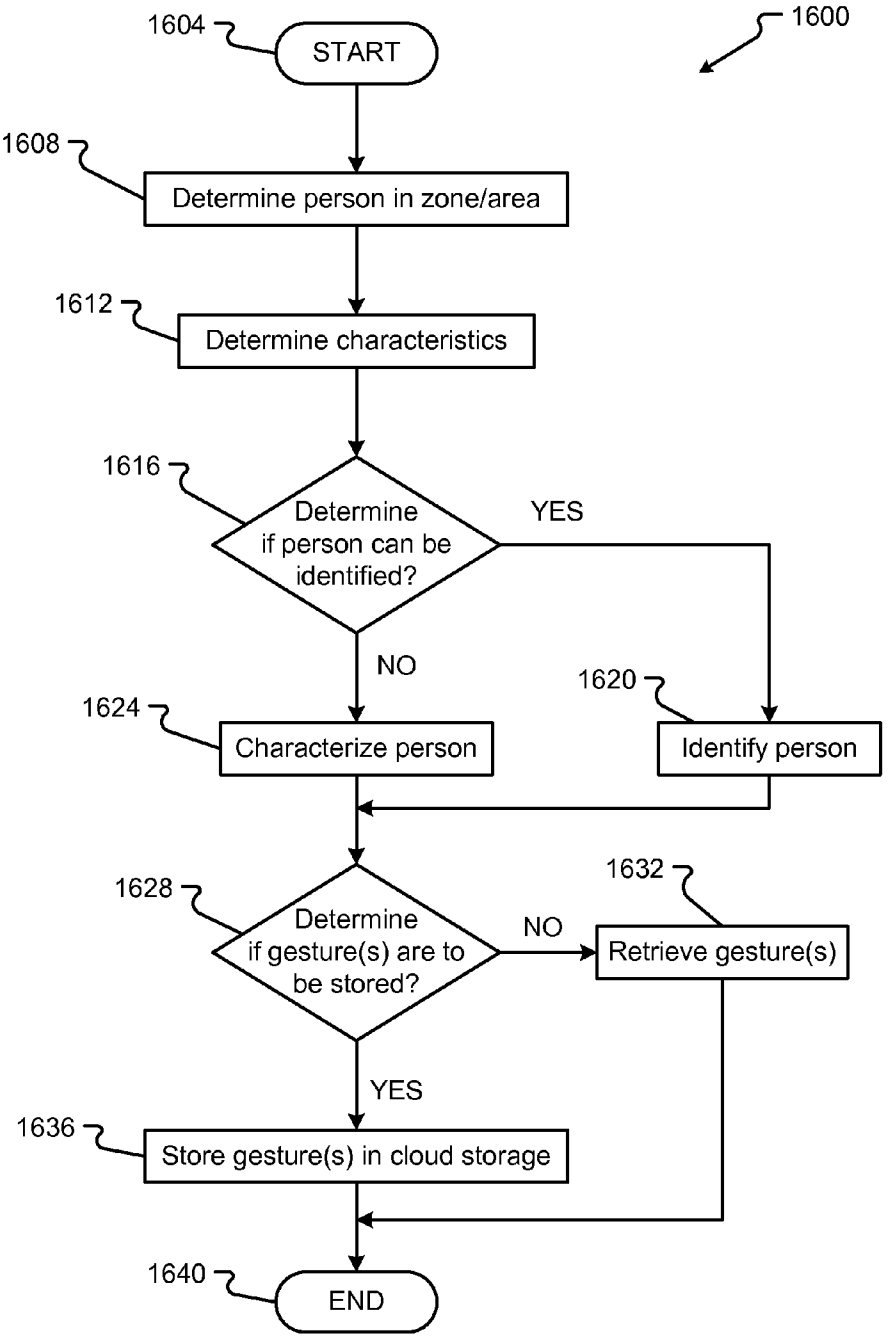

1600
1604
START
1608
Determine person in zone/area
1612
Determine characteristics
1616
Determine if person can be identified?
YES
NO
1620
Identify person
1624
Characterize person
1628
Determine if gesture(s) are to be stored?
NO
1632
Retrieve gesture(s)
YES
1636
Store gesture(s) in cloud storage
1640
END

Fig. 16

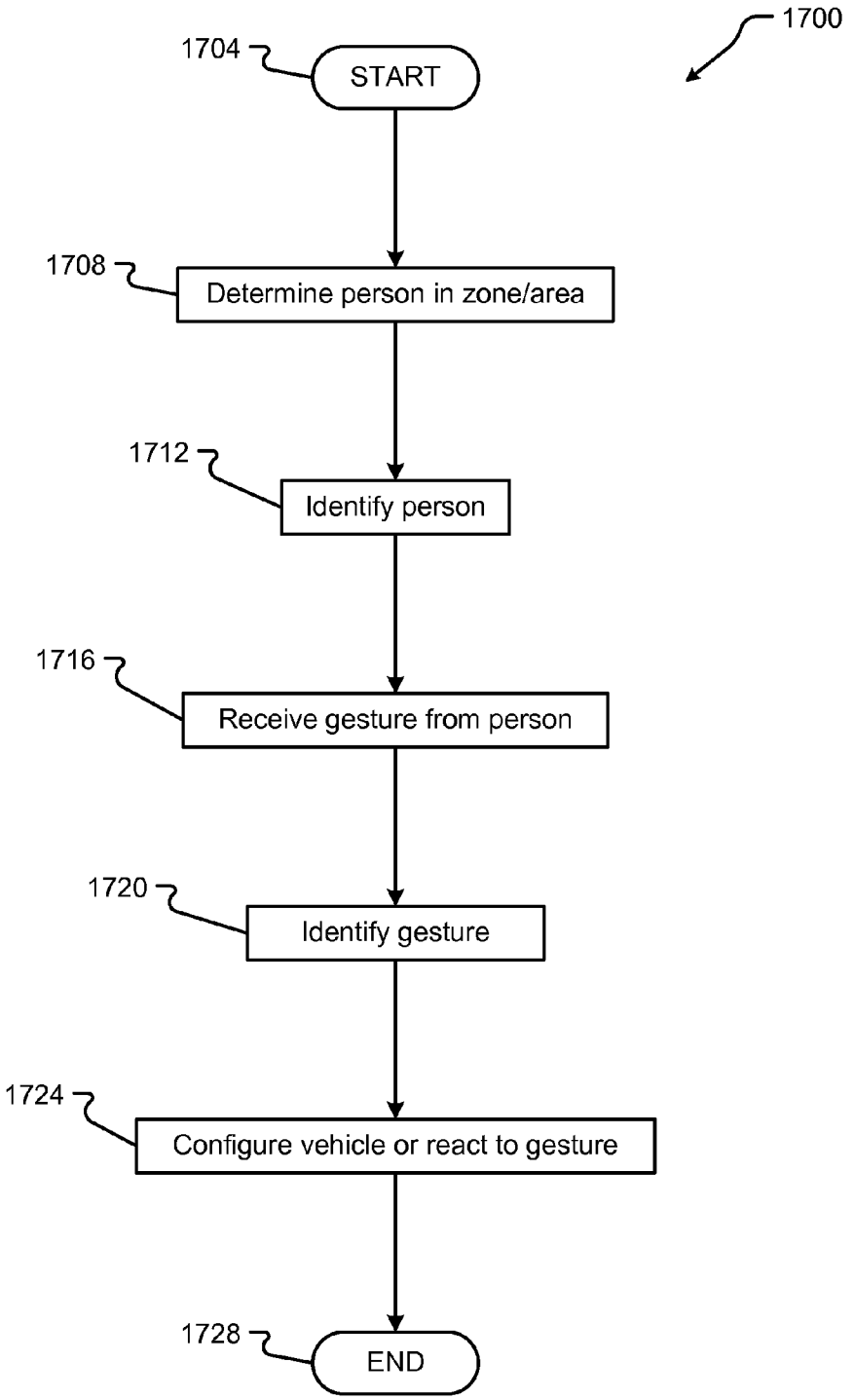

1700
1704
START
1708
Determine person in zone/area
1712
Identify person
1716
Receive gesture from person
1720
Identify gesture
1724
Configure vehicle or react to gesture
1728
END

Fig. 17

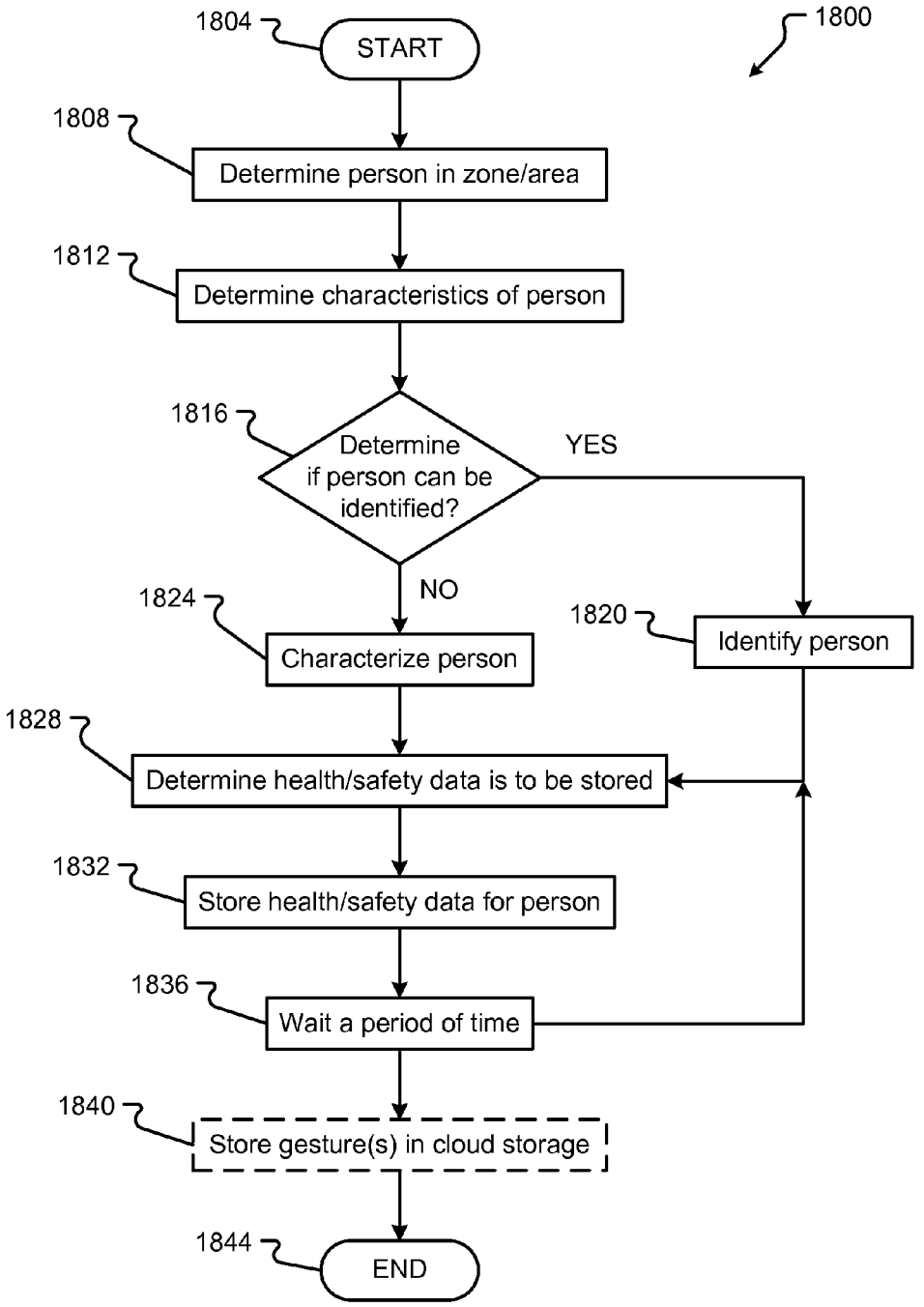

1800
1804
START
1808
Determine person in zone/area
1812
Determine characteristics of person
1816
Determine if person can be identified?
YES
NO
1824
Characterize person
1820
Identify person
1828
Determine health/safety data is to be stored
1832
Store health/safety data for person
1836
Wait a period of time
1840
Store gesture(s) in cloud storage
1844
END

Fig. 18

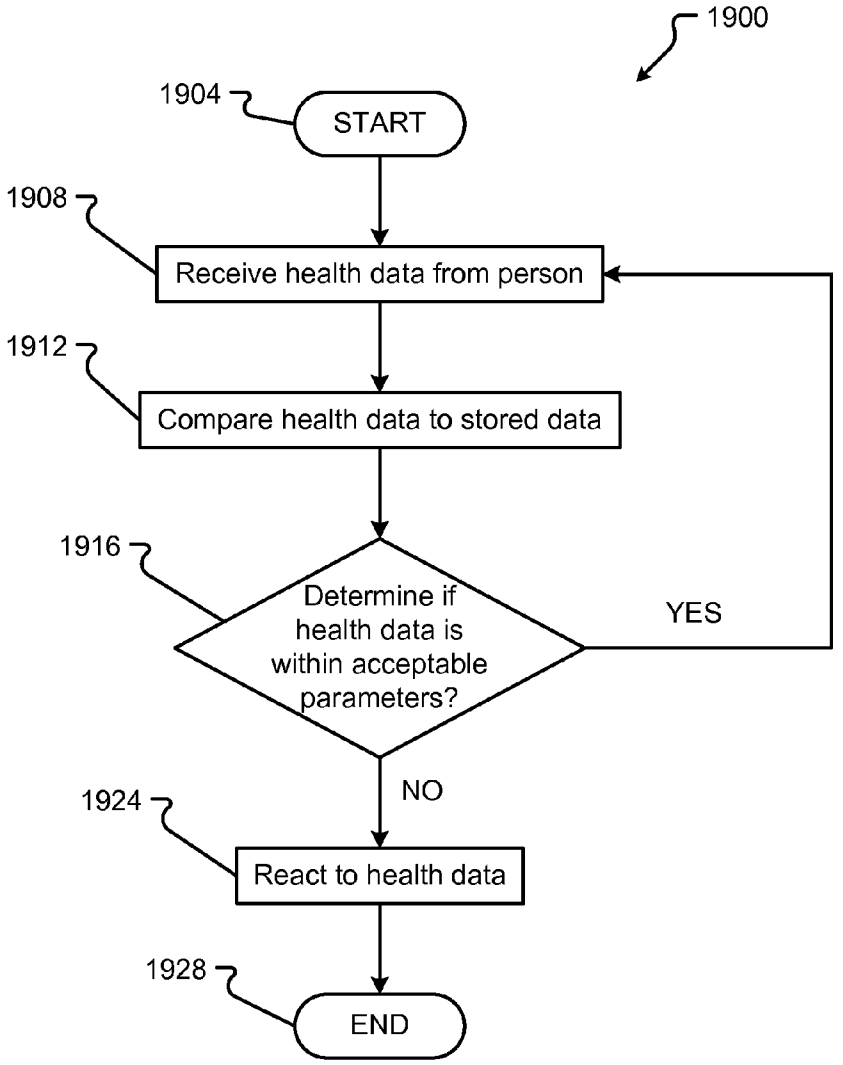

1900
1904
START
1908
Receive health data from person
1912
Compare health data to stored data
1916
Determine if health data is within acceptable parameters?
YES
NO
1924
React to health data
1928
END

Fig. 19

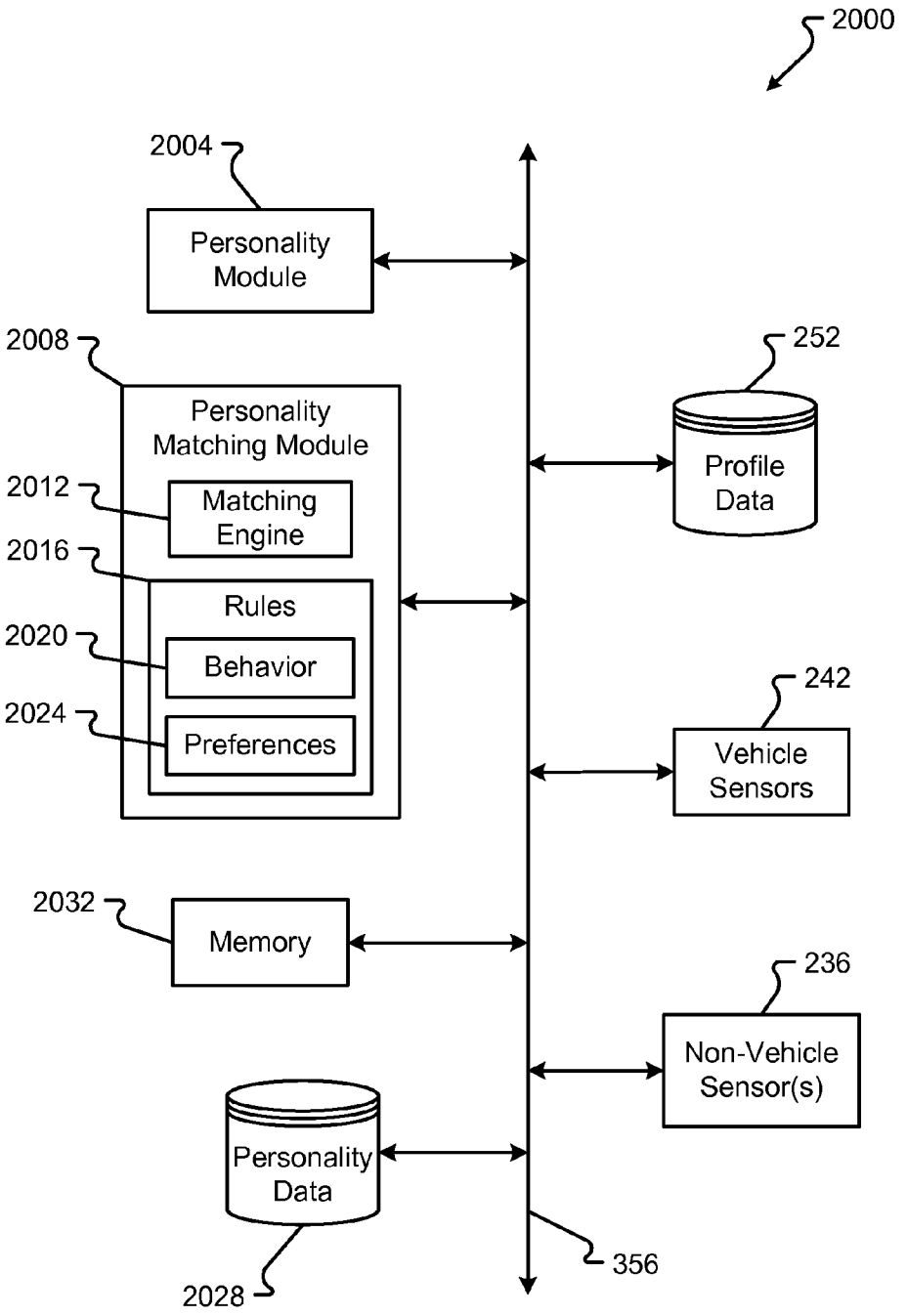

2000
2004
Personality Module
2008
Personality Matching Module
2012
Matching Engine
2016
Rules
2020
Behavior
2024
Preferences
252
Profile Data
242
Vehicle Sensors
2032
Memory
236
Non-Vehicle Sensor(s)
Personality Data
2028
356

Fig. 20

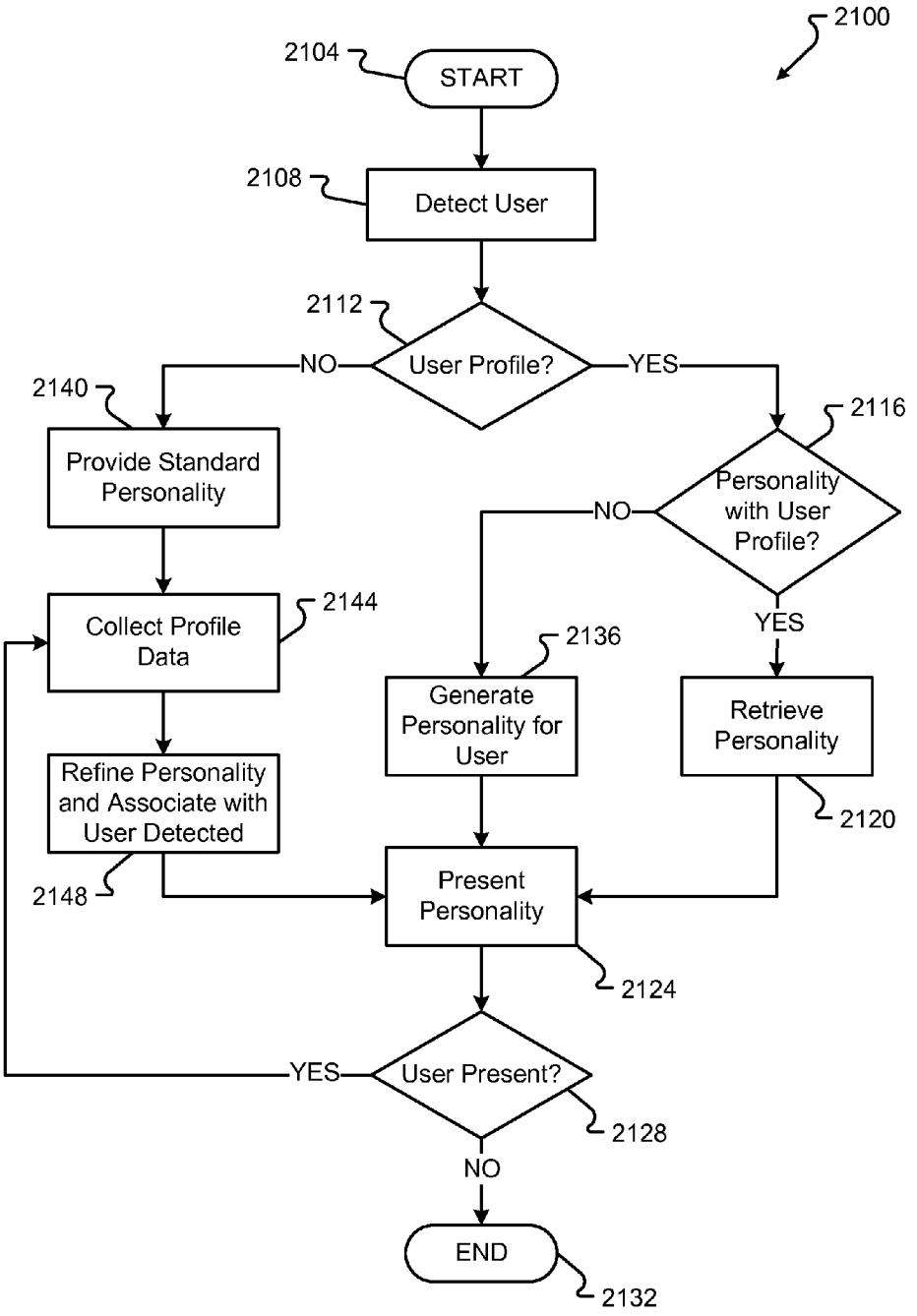

2100
2104
START
2108
Detect User
2112
User Profile?
NO
YES
2140
Provide Standard Personality
2116
Personality with User Profile?
NO
YES
Collect Profile Data
2144
2136
Generate Personality for User
Retrieve Personality
Refine Personality and Associate with User Detected
2120
2148
Present Personality
2124
YES
User Present?
2128
NO
END
2132

Fig. 21

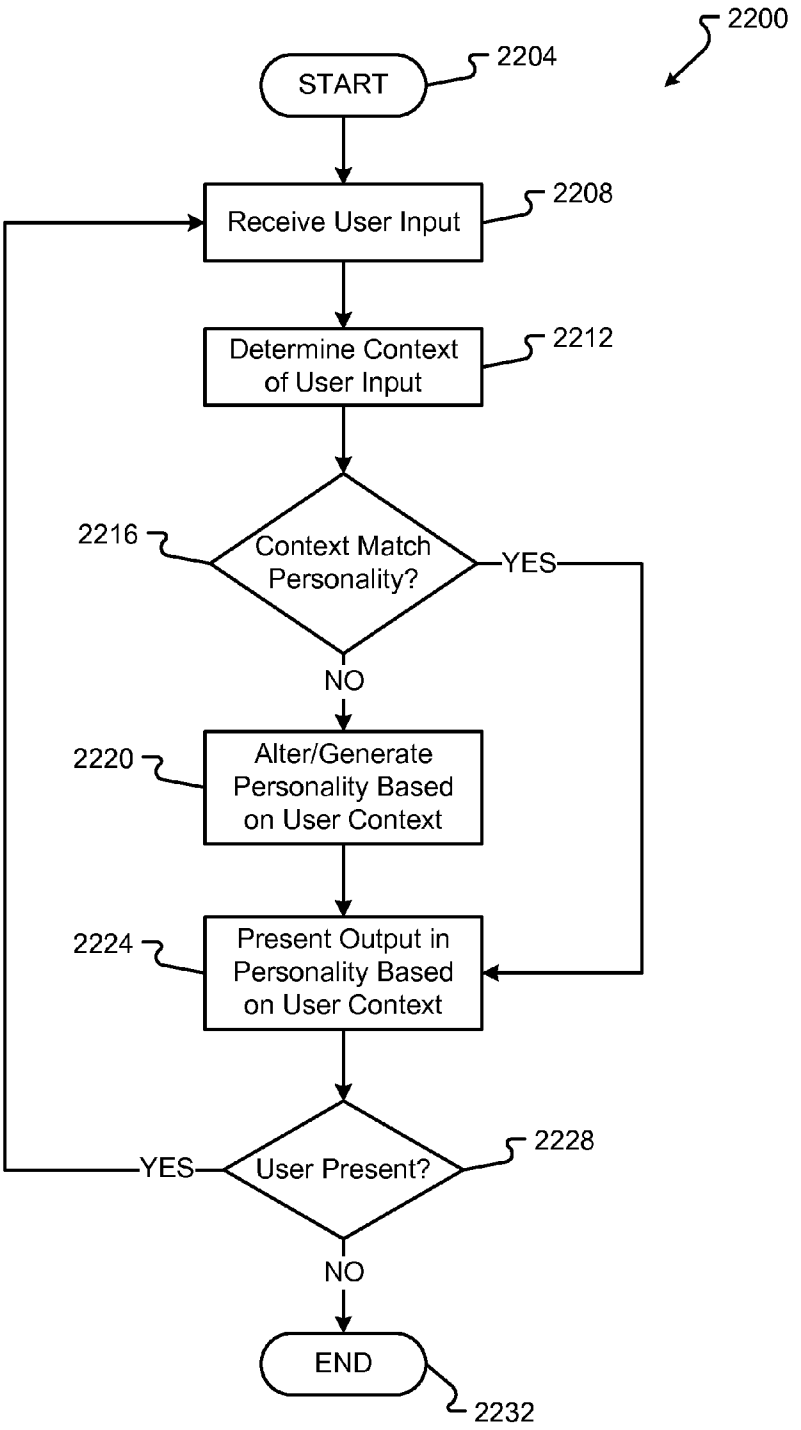

2200
START
2204
Receive User Input
2208
Determine Context of User Input
2212
2216
Context Match Personality?
YES
NO
2220
Alter/Generate Personality Based on User Context
2224
Present Output in Personality Based on User Context
YES
User Present?
2228
NO
END
2232

Fig. 22

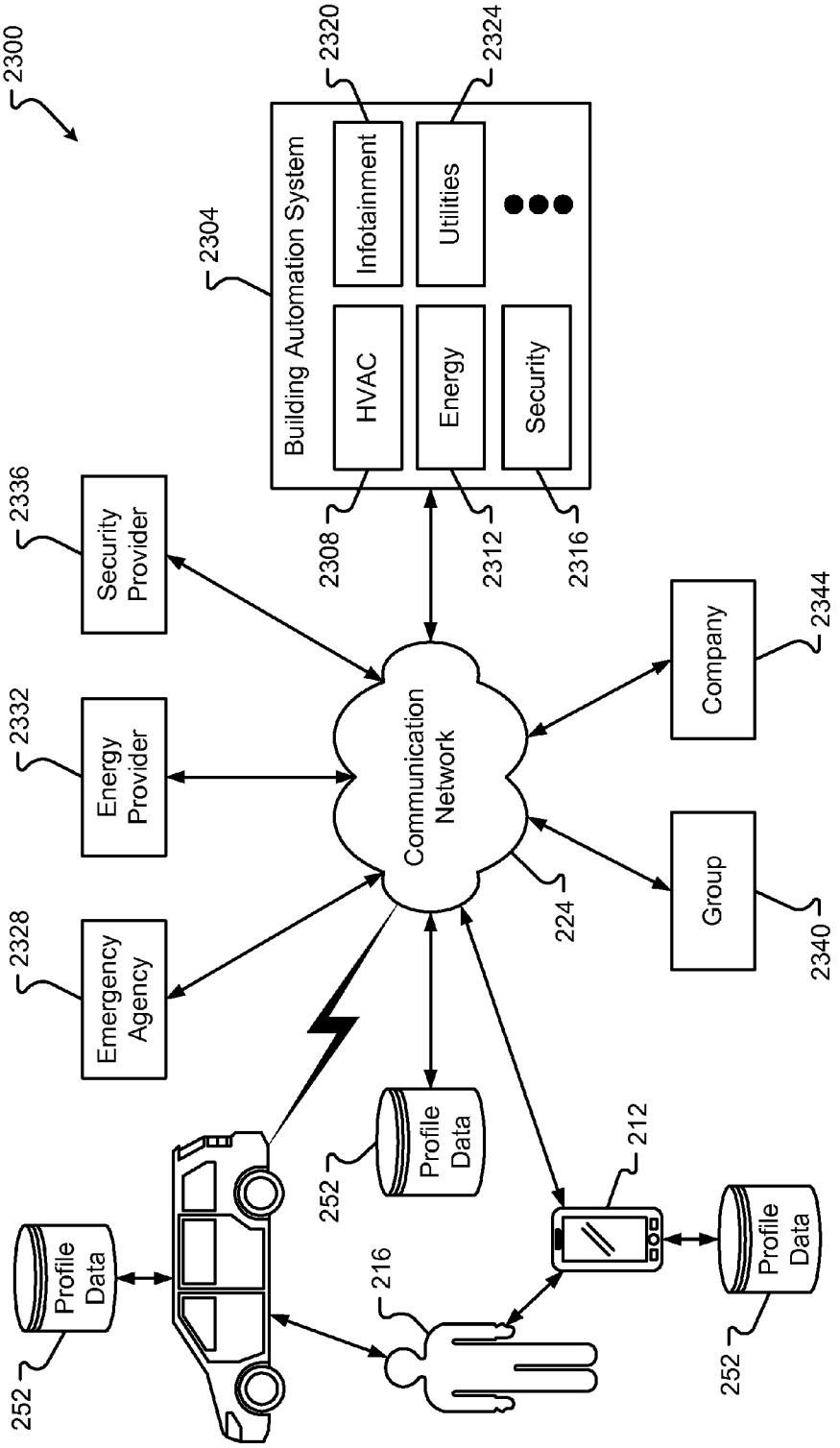

2300
2304
Building Automation System
HVAC
Infotainment
Energy
Utilities
Security
2308
2320
2312
2324
2316
2336
Security Provider
2332
Energy Provider
2328
Emergency Agency
Communication Network
224
Company
2344
Group
2340
Profile Data
252
216
212
Profile Data
252
Profile Data
252

Fig. 23

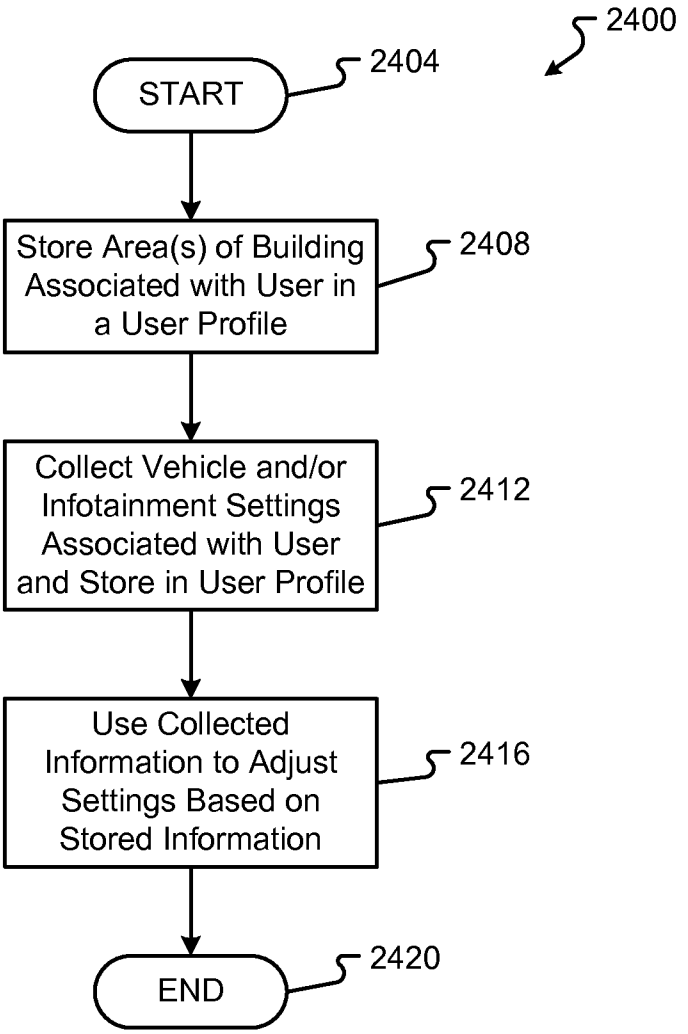

2400
START
2404
Store Area(s) of Building Associated with User in a User Profile
2408
Collect Vehicle and/or Infotainment Settings Associated with User and Store in User Profile
2412
Use Collected Information to Adjust Settings Based on Stored Information
2416
END
2420

Fig. 24

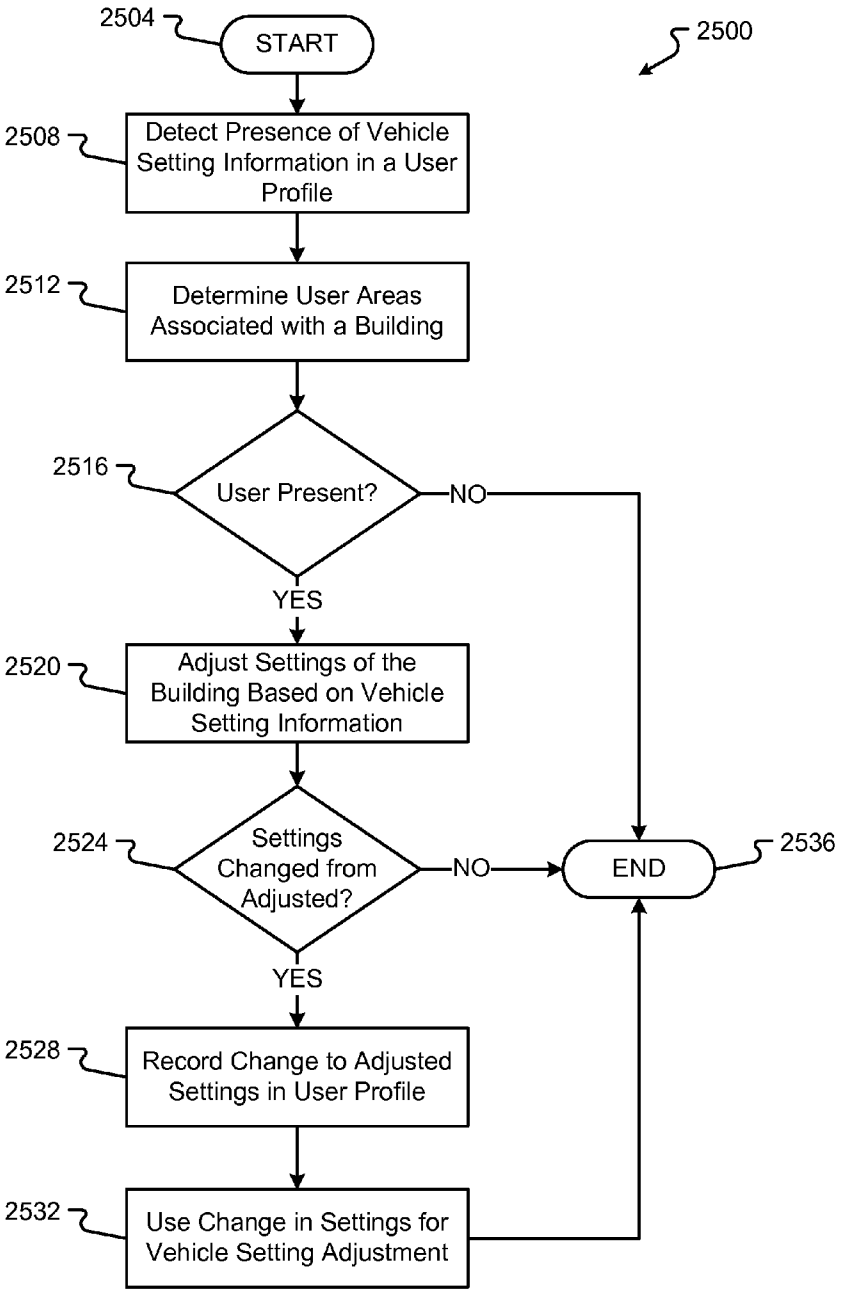

2504
START
2500
2508
Detect Presence of Vehicle Setting Information in a User Profile
2512
Determine User Areas Associated with a Building
2516
User Present?
NO
YES
2520
Adjust Settings of the Building Based on Vehicle Setting Information
2524
Settings Changed from Adjusted?
NO
END
2536
YES
2528
Record Change to Adjusted Settings in User Profile
2532
Use Change in Settings for Vehicle Setting Adjustment

Fig. 25

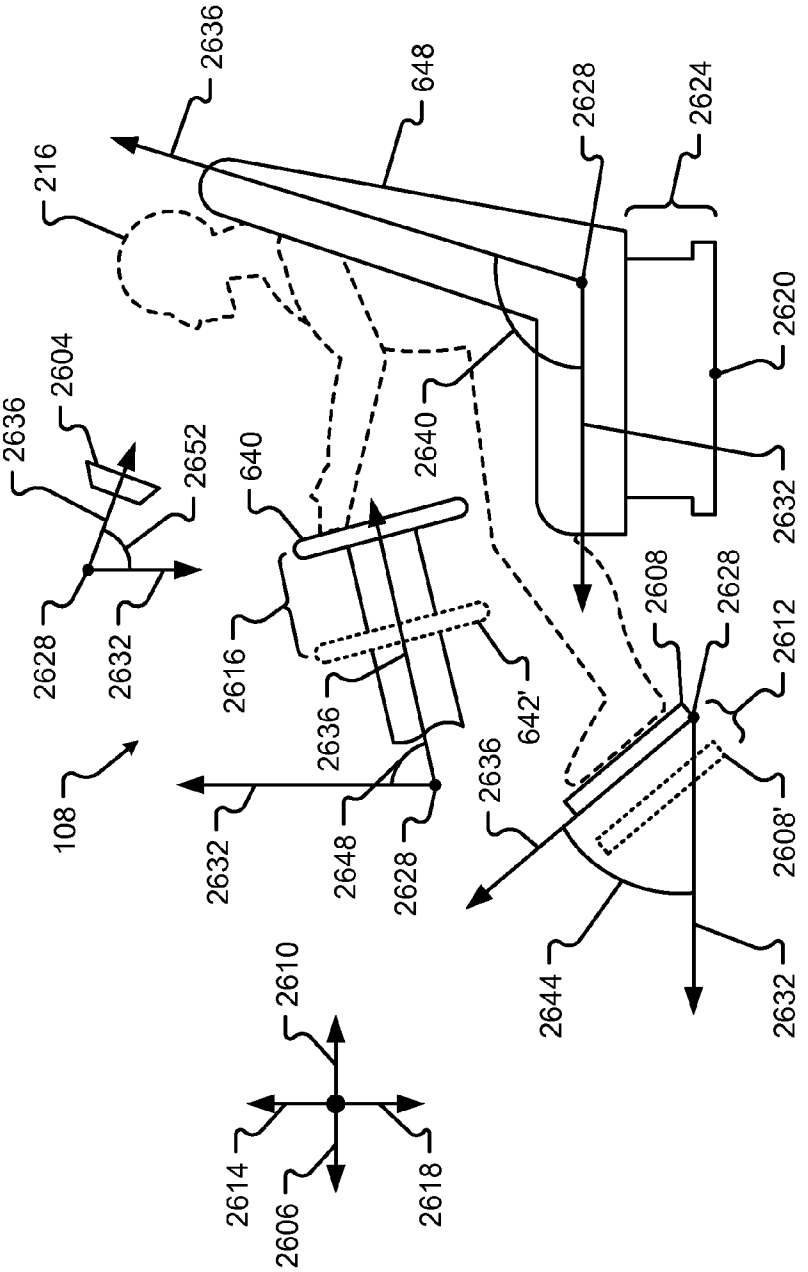

2636
648
2628
2624
216
2620
2604
2636
2652
640
2640
2632
2628
2632
2616
2608
2628
2612
2636
642'
108
2632
2648
2628
2636
2608'
2644
2632
2610
2614
2606
2618

Fig. 26

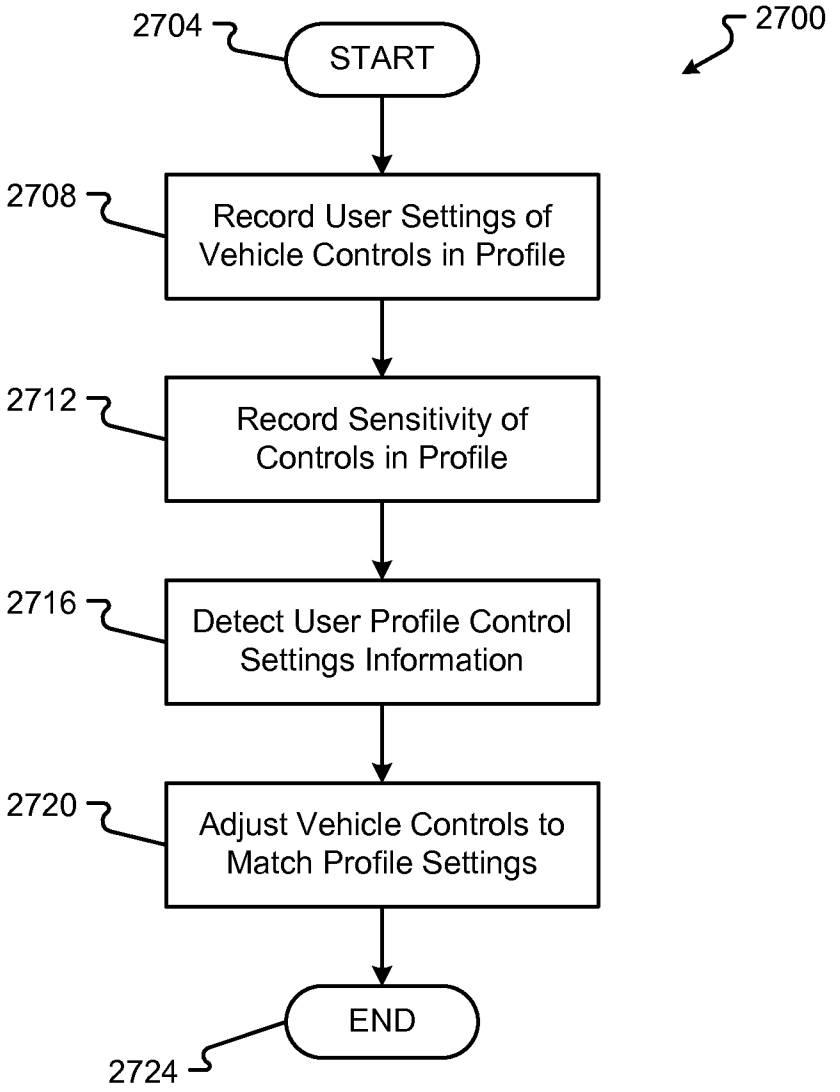

2700
2704
START
2708
Record User Settings of Vehicle Controls in Profile
2712
Record Sensitivity of Controls in Profile
2716
Detect User Profile Control Settings Information
2720
Adjust Vehicle Controls to Match Profile Settings
END
2724

Fig. 27

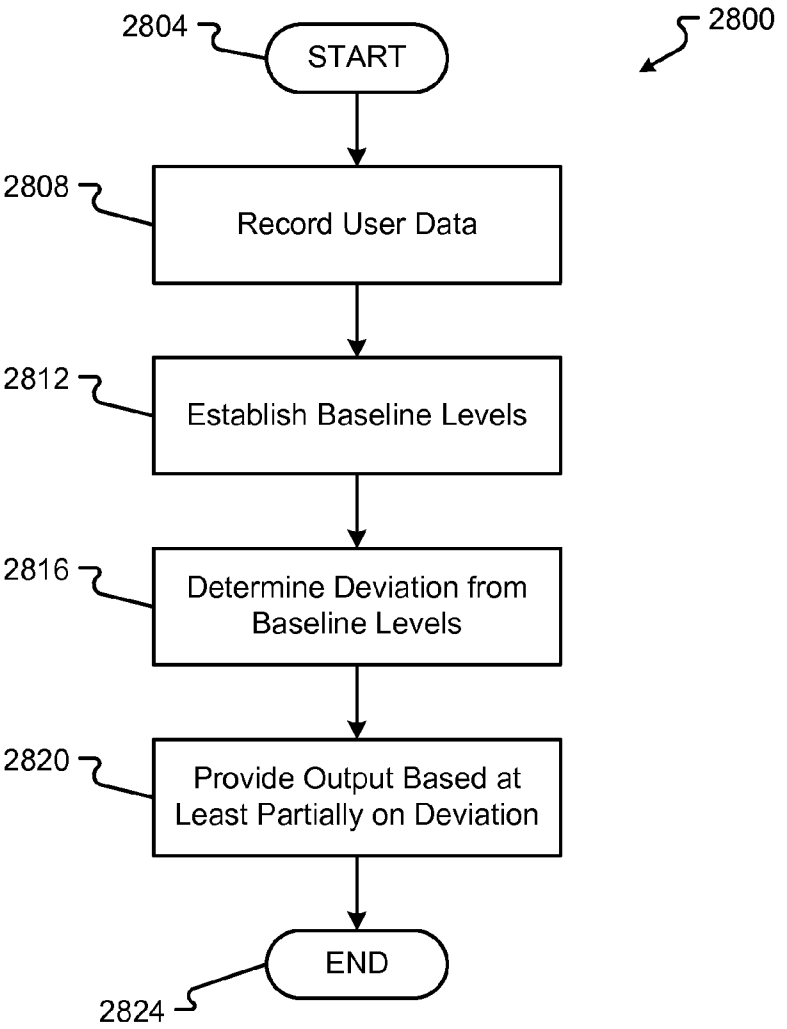

2800
2804
START
2808
Record User Data
2812
Establish Baseline Levels
2816
Determine Deviation from Baseline Levels
2820
Provide Output Based at Least Partially on Deviation
END
2824

Fig. 28

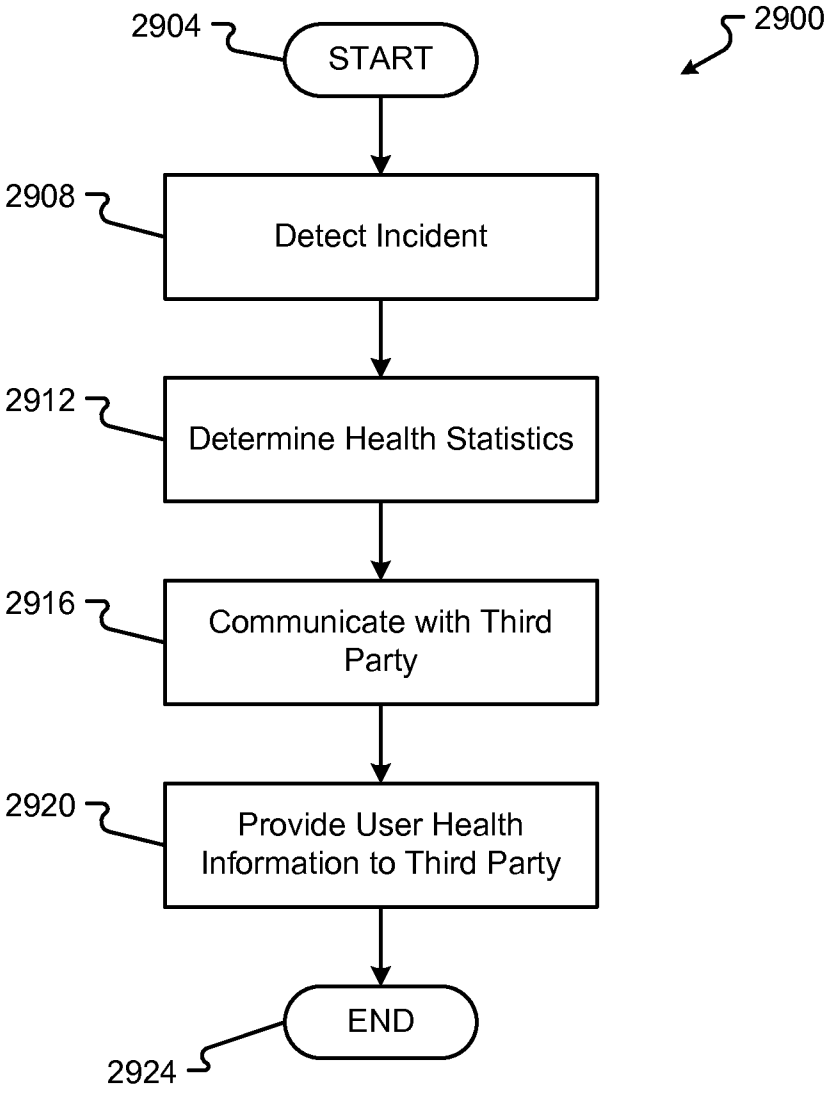

2900
2904
START
2908
Detect Incident
2912
Determine Health Statistics
2916
Communicate with Third Party
2920
Provide User Health Information to Third Party
END
2924

Fig. 29

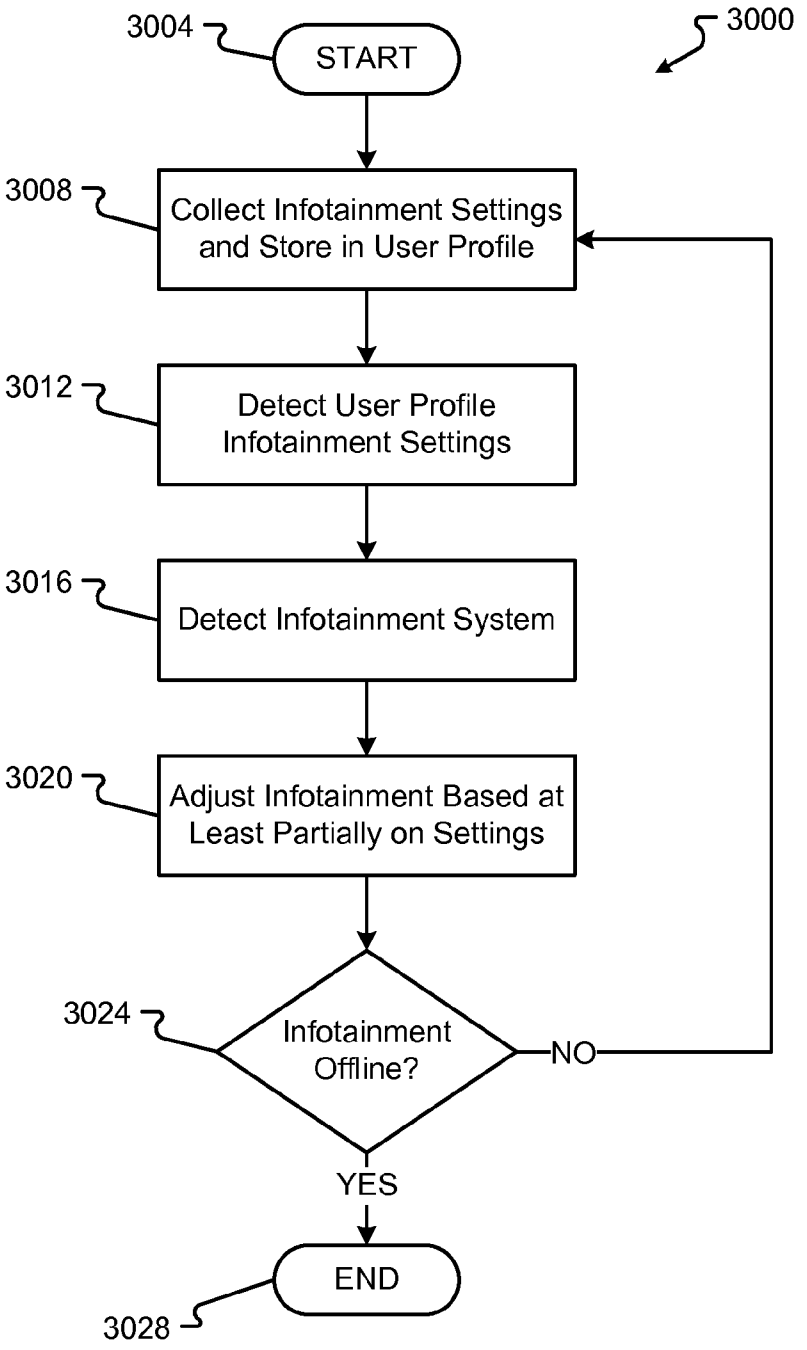

3004
START
3000
3008
Collect Infotainment Settings and Store in User Profile
3012
Detect User Profile Infotainment Settings
3016
Detect Infotainment System
3020
Adjust Infotainment Based at Least Partially on Settings
3024
Infotainment Offline?
NO
YES
END
3028

Fig. 30

CUSTOMIZATION OF VEHICLE CONTROLS AND SETTINGS BASED ON USER PROFILE DATA

CROSS REFERENCE TO RELATED APPLICATIONS

The present application claims the benefits of and priority, under 35 U.S.C. §119(e), to U.S. Provisional Application Ser. Nos. 61/811,981, filed on Apr. 15, 2013, entitled "Functional Specification for a Next Generation Automobile"; 61/865,954, filed on Aug. 14, 2013, entitled "Gesture Control of Vehicle Features"; 61/870,698, filed on Aug. 27, 2013, entitled "Gesture Control and User Profiles Associated with Vehicle Features"; 61/891,217, filed on Oct. 15, 2013, entitled "Gesture Control and User Profiles Associated with Vehicle Features"; 61/904,205, filed on Nov. 14, 2013, entitled "Gesture Control and User Profiles Associated with Vehicle Features"; 61/924,572, filed on Jan. 7, 2014, entitled "Gesture Control and User Profiles Associated with Vehicle Features"; and 61/926,749, filed on Jan. 13, 2014, entitled "Method and System for Providing Infotainment in a Vehicle." The entire disclosures of the applications listed above are hereby incorporated by reference, in their entirety, for all that they teach and for all purposes.

This application is also related to U.S. patent application Ser. No. 13/420,236, filed on Mar. 14, 2012, entitled, "Configurable Vehicle Console"; Ser. No. 13/420,240, filed on Mar. 14, 2012, entitled "Removable, Configurable Vehicle Console"; Ser. No. 13/462,593, filed on May 2, 2012, entitled "Configurable Dash Display"; Ser. No. 13/462,596, filed on May 2, 2012, entitled "Configurable Heads-Up Dash Display"; Ser. No. 13/679,459, filed on Nov. 16, 2012, entitled "Vehicle Comprising Multi-Operating System"; Ser. No. 13/679,234, filed on Nov. 16, 2012, entitled "Gesture Recognition for On-Board Display"; Ser. No. 13/679,412, filed on Nov. 16, 2012, entitled "Vehicle Application Store for Console"; Ser. No. 13/679,857, filed on Nov. 16, 2012, entitled "Sharing Applications/Media Between Car and Phone (Hydroid)"; Ser. No. 13/679,878, filed on Nov. 16, 2012, entitled "In-Cloud Connection for Car Multimedia"; Ser. No. 13/679,875, filed on Nov. 16, 2012, entitled "Music Streaming"; Ser. No. 13/679,676, filed on Nov. 16, 2012, entitled "Control of Device Features Based on Vehicle State"; Ser. No. 13/678,673, filed on Nov. 16, 2012, entitled "Insurance Tracking"; Ser. No. 13/678,691, filed on Nov. 16, 2012, entitled "Law Breaking/Behavior Sensor"; Ser. No. 13/678,699, filed on Nov. 16, 2012, entitled "Etiquette Suggestion"; Ser. No. 13/678,710, filed on Nov. 16, 2012, entitled "Parking Space Finder Based on Parking Meter Data"; Ser. No. 13/678,722, filed on Nov. 16, 2012, entitled "Parking Meter Expired Alert"; Ser. No. 13/678,726, filed on Nov. 16, 2012, entitled "Object Sensing (Pedestrian Avoidance/Accident Avoidance)"; Ser. No. 13/678,735, filed on Nov. 16, 2012, entitled "Proximity Warning Relative to Other Cars"; Ser. No. 13/678,745, filed on Nov. 16, 2012, entitled "Street Side Sensors"; Ser. No. 13/678,753, filed on Nov. 16, 2012, entitled "Car Location"; Ser. No. 13/679,441, filed on Nov. 16, 2012, entitled "Universal Bus in the Car"; Ser. No. 13/679,864, filed on Nov. 16, 2012, entitled "Mobile Hot Spot/Router/Application Share Site or Network"; Ser. No. 13/679,815, filed on Nov. 16, 2012, entitled "Universal Console Chassis for the Car"; Ser. No. 13/679,476, filed on Nov. 16, 2012, entitled "Vehicle Middleware"; Ser. No. 13/679,306, filed on Nov. 16, 2012, entitled "Method and System for Vehicle Data Collection Regarding Traffic"; Ser. No. 13/679,369, filed on Nov. 16, 2012, entitled "Method and System for Vehicle Data Collection"; Ser. No. 13/679,680, filed on Nov. 16, 2012, entitled "Communications Based on Vehicle Diagnostics and Indications"; Ser. No. 13/679,443, filed on Nov. 16, 2012, entitled "Method and System for Maintaining and Reporting Vehicle Occupant Information"; Ser. No. 13/678,762, filed on Nov. 16, 2012, entitled "Behavioral Tracking and Vehicle Applications"; Ser. No. 13/679,292, filed Nov. 16, 2012, entitled "Branding of Electrically Propelled Vehicles Via the Generation of Specific Operating Output"; Ser. No. 13/679,400, filed Nov. 16, 2012, entitled "Vehicle Climate Control"; Ser. No. 13/840,240, filed on Mar. 15, 2013, entitled "Improvements to Controller Area Network Bus"; Ser. No. 13/678,773, filed on Nov. 16, 2012, entitled "Location Information Exchange Between Vehicle and Device"; Ser. No. 13/679,887, filed on Nov. 16, 2012, entitled "In Car Communication Between Devices"; Ser. No. 13/679,842, filed on Nov. 16, 2012, entitled "Configurable Hardware Unit for Car Systems"; Ser. No. 13/679,204, filed on Nov. 16, 2012, entitled "Feature Recognition for Configuring a Vehicle Console and Associated Devices"; Ser. No. 13/679,350, filed on Nov. 16, 2012, entitled "Configurable Vehicle Console"; Ser. No. 13/679,358, filed on Nov. 16, 2012, entitled "Configurable Dash Display"; Ser. No. 13/679,363, filed on Nov. 16, 2012, entitled "Configurable Heads-Up Dash Display"; and Ser. No. 13/679,368, filed on Nov. 16, 2012, entitled "Removable, Configurable Vehicle Console". The entire disclosures of the applications listed above are hereby incorporated by reference, in their entirety, for all that they teach and for all purposes.

BACKGROUND

Whether using private, commercial, or public transport, the movement of people and/or cargo has become a major industry. In today's interconnected world, daily travel is essential to engaging in commerce. Commuting to and from work can account for a significant portion of a traveler's day. As a result, vehicle manufacturers have begun to focus on making this commute, and other journeys, more enjoyable.

Currently, vehicle manufacturers attempt to entice travelers to use a specific conveyance based on any number of features. Most of these features focus on vehicle safety or efficiency. From the addition of safety-restraints, air-bags, and warning systems to more efficient engines, motors, and designs, the vehicle industry has worked to appease the supposed needs of the traveler. Recently, however, vehicle manufactures have shifted their focus to user and passenger comfort as a primary concern. Making an individual more comfortable while traveling instills confidence and pleasure in using a given vehicle, increasing an individual's preference for a given manufacturer and/or vehicle type.

One way to instill comfort in a vehicle is to create an environment within the vehicle similar to that of an individual's home. Integrating features in a vehicle that are associated with comfort found in an individual's home can ease a traveler's transition from home to vehicle. Several manufacturers have added comfort features in vehicles such as the following: leather seats, adaptive and/or personal climate control systems, music and media players, ergonomic controls, and, in some cases, Internet connectivity. However, because these manufacturers have added features to a conveyance, they have built comfort around a vehicle and failed to build a vehicle around comfort.

SUMMARY

There is a need for a vehicle ecosystem, which can integrate both physical and mental comforts, while seamlessly

communicating with current electronic devices to result in a totally intuitive and immersive user experience. These and other needs are addressed by the various aspects, embodiments, and/or configurations of the present disclosure. Also, while the disclosure is presented in terms of exemplary and optional embodiments, it should be appreciated that individual aspects of the disclosure can be separately claimed.

Embodiments include a method, comprising: determining a presence of a user inside a vehicle; determining an identity of the user; receiving input provided by the user, the input having a context associated therewith; and retrieving, based at least partially on the input provided by the user, a virtual personality for presentation to at least one device associated with the vehicle. Aspects of the above method include wherein determining the presence of the user inside the vehicle further comprises: detecting a person via at least one image sensor associated with the vehicle. Aspects of the above method include wherein determining the identity of the user further comprises: identifying facial features associated with the person detected via the at least one image sensor; and determining whether the identified facial features associated with the person match user characteristics stored in a memory. Aspects of the above method include wherein the identified facial features associated with the person do not match the user characteristics stored in the memory, and wherein determining the identity of the user further comprises: prompting the user for identification information; receiving identification information from the user; and storing the identification information received from the user in the memory. Aspects of the above method include wherein the identified facial features associated with the person match the user characteristics stored in the memory, and wherein the virtual personality is retrieved from a user profile associated with the user identified. Aspects of the above method include wherein receiving the input provided by the user further comprises: determining the context of the input, wherein the context corresponds to an emotional state of the user. Aspects of the above method include wherein retrieving the virtual personality for presentation to at least one device further comprises: determining, based at least partially on the context of the input, a content of the virtual personality to suit the emotional state of the user. Aspects of the above method further comprise comparing the determined content of the virtual personality with emotional information in a user profile virtual personality; and generating, when the determined content of the virtual personality differs from the emotional information in the user profile virtual personality, an adjusted user profile virtual personality for presentation, wherein the adjusted user profile includes the content to suit the emotional state of the user. Aspects of the above method further comprise presenting the virtual personality having the content to suit the emotional state of the user, wherein the content of the virtual personality includes an opposite emotional state to the emotional state of the user. Aspects of the above method include wherein the virtual personality includes at least one of an avatar, a voice output, a visual output, a tone, and a volume intensity.

Embodiments include a non-transitory computer readable medium having instructions stored thereon that, when executed by a processor, perform operations comprising the above methods. Embodiments include a device, means, and/or system configured to perform the above methods.

Embodiments include a vehicle control system, comprising a personality module contained in a memory and executed by a processor of the vehicle control system, the personality module configured to determine a presence of a user inside a vehicle; determine an identity of the user, receive input provided by the user, the input having a context associated therewith, and retrieve, based at least partially on the input provided by the user, a virtual personality for presentation to at least one device associated with the vehicle. Aspects of the above system include wherein receiving the input provided by the user further comprises determining the context of the input, wherein the context corresponds to an emotional state of the user, and wherein retrieving the virtual personality for presentation to at least one device further comprises determining, based at least partially on the context of the input, a content of the virtual personality to suit the emotional state of the user.

Embodiments include a method, comprising: referring to a user profile memory associated with a user for vehicle setting information; detecting an identification of at least one area of a building associated with the user; determining that the at least one area of the building includes a configurable comfort setting; and determining, based at least partially on the identification of the at least one area of the building and the vehicle setting information, to adjust the configurable comfort setting of the at least one area of the building. Aspects of the above method further comprise providing an adjustment output to a building comfort control system, wherein the building comfort control system is adapted to control the configurable comfort setting of the at least one area of the building. Aspects of the above method include wherein prior to providing the adjustment output, the method further comprises: determining a presence of the user inside the at least one area of the building, wherein the adjustment output is provided based at least partially on determining the user is present is inside the at least one are of the building. Aspects of the above method include wherein prior to providing the adjustment output, the method further comprises: determining an expected time of arrival corresponding to an expected time the user is to be inside the at least one area of the building, wherein the expected time of arrival is based on one or more of user location data, historical data, and stored preferences, and wherein the adjustment output is provided based at least partially on the expected time of arrival such that the adjustment output is provided prior to or at the expected time of arrival. Aspects of the above method further comprise determining that the user made a change to the adjusted configurable comfort setting; and storing the change made to the adjusted configurable comfort setting in the user profile memory. Aspects of the above method further comprise determining a presence of the user inside a vehicle, and wherein the adjustment output is provided based at least partially on determining the user is present inside the vehicle. Aspects of the above method include wherein prior to referring to the user profile memory the method further comprises: storing, in the user profile memory, information corresponding to areas of a building occupied by the user; collecting vehicle setting data associated with the user, wherein the vehicle setting data includes at least one of vehicle comfort settings and infotainment settings made by the user; and storing the vehicle setting data in the user profile memory. Aspects of the above method include wherein the vehicle setting information includes an interior temperature of a vehicle, and wherein the configurable comfort setting of the at least one area of the building is a temperature associated with the at least one area. Aspects of the above method include wherein the configurable comfort setting of the at least one area of the building is adjusted to match the vehicle setting information in the user profile memory.

Embodiments include a non-transitory computer readable medium having instructions stored thereon that, when executed by a processor, perform operations comprising the

above methods. Embodiments include a device, means, and/or system configured to perform the above methods.

Embodiments include a settings control system, comprising a building automation system configured to refer to a user profile memory associated with a user for vehicle setting information, detect an identification of at least one area of a building associated with the user, determine that the at least one area of the building includes a configurable comfort setting, and determine, based at least partially on the identification of the at least one area of the building and the vehicle setting information, to adjust the configurable comfort setting of the at least one area of the building. Aspects of the above system include wherein the building automation system is contained in a memory and executed by a processor of the settings control system, wherein the building automation system is further configured to provide an adjustment output to a building comfort control system, and wherein the building comfort control system is adapted to control the configurable comfort setting of the at least one area of the building.

Embodiments include a method, comprising: determining a location inside a vehicle associated with a user; determining at least one vehicle control associated with the location inside the vehicle; referring to a user profile memory associated with the user for vehicle control settings; and determining, based at least partially on the vehicle control settings, to adjust the at least one vehicle control associated with the location inside the vehicle. Aspects of the above method further comprise providing an adjustment output to a vehicle control system, wherein the vehicle control system is adapted to control the at least one vehicle control associated with the location inside the vehicle. Aspects of the above method include wherein prior to providing the adjustment output, the method further comprises: determining a presence of the user inside the vehicle, wherein the adjustment output is provided based at least partially on determining the user is present in the location of the vehicle. Aspects of the above method include wherein prior to determining the location inside the vehicle associated with the user the method further comprises: storing, in the user profile memory, information corresponding to locations inside the vehicle occupied by the user; collecting vehicle control setting data associated with the user, wherein the vehicle control setting data includes at least one vehicle control setting made by the user in at least one of the locations inside the vehicle; and storing the vehicle control setting data in the user profile memory. Aspects of the above method include wherein the at least one vehicle control includes one or more vehicle features such as a seat system, a steering control, a foot pedal control, a mirror position, and a display device. Aspects of the above method include wherein the vehicle control settings include at least one of a position, a sensitivity, an angle, and a movement, associated with the one or more vehicle features. Aspects of the above method include wherein determining the presence of the user inside the vehicle further comprises: detecting a person via at least one image sensor associated with the vehicle; identifying facial features associated with the person detected via the at least one image sensor; and determining whether the identified facial features associated with the person match user characteristics stored in a memory. Aspects of the above method include wherein determining the presence of the user inside the vehicle further comprises: detecting a device associated with the user in an area of the vehicle. Aspects of the above method further comprise determining that the user made a change to the adjusted at least one vehicle control; and storing the change made to the adjusted at least one vehicle control in the user profile memory. Aspects of the above method include wherein the at least one vehicle control is adjusted via the adjustment output to match the vehicle control settings in the user profile memory.

Embodiments include a non-transitory computer readable medium having instructions stored thereon that, when executed by a processor, perform operations comprising the above methods. Embodiments include a device, means, and/or system configured to perform the above methods.

Embodiments include a vehicle control system, comprising a profile identification module contained in a memory and executed by a processor of the vehicle control system, the profile identification module configured to determine a location inside a vehicle associated with a user, determine at least one vehicle control associated with the location inside the vehicle, refer to a user profile memory associated with the user for vehicle control settings, and determine, based at least partially on the vehicle control settings, to adjust the at least one vehicle control associated with the location inside the vehicle. Aspects of the above system include wherein the profile identification module is further configured to provide an adjustment output to the vehicle control system, wherein the vehicle control system is adapted to control the at least one vehicle control associated with the location inside the vehicle.

Embodiments include a method, comprising: detecting a presence of at least one user in a vehicle; determining an identity of the at least one user; receiving data associated with the at least one user, wherein the data includes biometric information; detecting a deviation between the received data and an established baseline biometric profile associated with the at least one user; and determining, based at least partially on the detected deviation, to provide an output configured to address the deviation. Aspects of the above method include wherein prior to receiving data associated with the at least one user the method further comprises: determining the baseline biometric profile associated with the at least one user; and storing the determined baseline biometric profile in a user profile memory associated with the at least one user. Aspects of the above method include wherein determining the presence of the at least one user inside the vehicle further comprises: detecting a person via at least one image sensor associated with the vehicle. Aspects of the above method include wherein determining the identity of the at least one user further comprises: identifying facial features associated with the person detected via the at least one image sensor; and determining whether the identified facial features associated with the person match user characteristics stored in a memory. Aspects of the above method include wherein the data associated with the at least one user is provided by a sensor worn by the at least one user. Aspects of the above method include wherein the output configured to address the deviation is provided by the vehicle, and wherein addressing the deviation includes adjusting one or more settings associated with the vehicle. Aspects of the above method include wherein the one or more settings include at least one of a vehicle interior environment, temperature, air composition, oxygen level, sound level, window position, seat position, and lighting level. Aspects of the above method further comprise detecting a vehicle incident via one or more sensors associated with the vehicle; collecting, based at least partially on the detected vehicle incident, the data associated with the at least one user; and sending the established baseline biometric profile and collected data associated with the at least one user to a third party. Aspects of the above method include wherein the data associated with the at least one user is received at a first data rate in the absence of a detected vehicle incident and collected at a higher second data rate upon detecting the vehicle incident. Aspects of the above method include

wherein the collected data associated with the at least one user is sent to the third party in real-time.

Embodiments include a non-transitory computer readable medium having instructions stored thereon that, when executed by a processor, perform operations comprising the above methods. Embodiments include a device, means, and/or system configured to perform the above methods.

Embodiments include a vehicle control system, comprising a profile identification module contained in a memory and executed by a processor of the vehicle control system, the profile identification module configured to detect a presence of at least one user in a vehicle, determine an identity of the at least one user, receive data associated with the at least one user, wherein the data includes biometric information, detect a deviation between the received data and an established baseline biometric profile associated with the at least one user, and determine, based at least partially on the detected deviation, to provide an output configured to address the deviation. Aspects of the above system include wherein prior to receiving data associated with the at least one user the profile identification module is further configured to determine the baseline biometric profile associated with the at least one user, and store the determined baseline biometric profile in a user profile memory associated with the at least one user.

Embodiments include a method, comprising: detecting a user profile associated with a user, the user profile having infotainment information stored therein; detecting at least one infotainment system associated with the user; and determining to adjust a configuration of the at least one infotainment system based at least partially on the infotainment information in the user profile. Aspects of the above method include wherein the at least one infotainment system is a vehicle infotainment system, and wherein prior to detecting the user profile the method further comprises: identifying the user inside a vehicle via one or more sensors associated with the vehicle; and referring, in response to identifying the user, to a memory associated with the identified user, wherein the memory includes the user profile. Aspects of the above method include wherein identifying the user further comprises: receiving identifying characteristics associated with the user via an image sensor or via a signal provided by a device associated with the user; and determining whether the identifying characteristics associated with the user match unique user characteristics stored in a memory, wherein the unique user characteristics are configured to verify an identity of the user. Aspects of the above method include wherein detecting the at least one infotainment system associated with the user is based at least partially on one or more of a proximity of a user and a user device to the at least one infotainment system. Aspects of the above method include wherein determining to adjust the configuration of the at least one infotainment system further comprises: determining the configuration of the at least one infotainment system; and determining whether the infotainment information matches the determined configuration of the at least one infotainment system, wherein the infotainment information includes at least one infotainment setting, preference, content, and power state. Aspects of the above method further comprise providing, when the infotainment information does not match the determined configuration of the at least one infotainment system, an adjustment output configured to adjust the configuration of the at least one infotainment system. Aspects of the above method include wherein determining to adjust the configuration of the at least one infotainment system further comprises: determining an access priority of the user; and determining whether the access priority of the user allows for the adjustment to the configuration of the at least one infotainment system. Aspects of the above method include wherein determining whether the access priority of the user allows for the adjustment to the configuration of the at least one infotainment system further comprises: determining a second access priority of a second user associated with the infotainment system; and comparing the access priority of the user to the second access priority of the second user, wherein the adjustment is allowed when the access priority of the user is greater than the second access priority of the second user, and wherein the adjustment is prevented when the access priority of the user is less than the second access priority of the second user. Aspects of the above method further comprise receiving additional infotainment information via at least one device associated with the user; determining whether the additional infotainment information qualifies as user profile data; and storing, based at least partially on determining that the additional infotainment information qualifies as user profile data, the additional infotainment information in the user profile associated with the user. Aspects of the above method further comprise adjusting the configuration of the at least one infotainment system, wherein adjusting the configuration includes at least one of tuning to a station, setting an infotainment input, selecting a content genre, and recording content for playback to the user.

Embodiments include a non-transitory computer readable medium having instructions stored thereon that, when executed by a processor, perform operations comprising the above methods. Embodiments include a device, means, and/or system configured to perform the above methods.

Embodiments include an infotainment control system, comprising a profile identification module contained in a memory and executed by a processor of the infotainment control system, the profile identification module configured to detect a user profile associated with a user, the user profile having infotainment information stored therein, detect at least one infotainment system associated with the user, and determine to adjust a configuration of the at least one infotainment system based at least partially on the infotainment information in the user profile. Aspects of the above system include wherein the at least one infotainment system is a vehicle infotainment system, and wherein prior to detecting the user profile the profile identification module is further configured to identify the user inside a vehicle via one or more sensors associated with the vehicle, and refer, in response to identifying the user, to a memory associated with the identified user, wherein the memory includes the user profile.

The present disclosure can provide a number of advantages depending on the particular aspect, embodiment, and/or configuration. One advantage includes providing user profiles that include one or more settings, configurations, and information, associated with a user. Among other things, the user profiles described herein may follow a user from vehicle-to-vehicle, from communication device-to-communication device, from building-to-vehicle, vehicle-to-building, and/or combinations thereof. The user profiles can act as a repository for user information. This user information can be used by any number of entities and/or devices in tracking a user, providing an output, manipulating controls of a vehicle, controlling features of a building, and/or adjusting infotainment systems. The user profiles can provide adjustment information for a vehicle features position, sensitivity, and/or operational range. These and other advantages will be apparent from the disclosure.

The phrases "at least one," "one or more," and "and/or" are open-ended expressions that are both conjunctive and disjunctive in operation. For example, each of the expressions "at least one of A, B and C," "at least one of A, B, or C," "one

or more of A, B, and C," "one or more of A, B, or C" and "A, B, and/or C" means A alone, B alone, C alone, A and B together, A and C together, B and C together, or A, B and C together.

The term "a" or "an" entity refers to one or more of that entity. As such, the terms "a" (or "an"), "one or more," and "at least one" can be used interchangeably herein. It is also to be noted that the terms "comprising," "including," and "having" can be used interchangeably.

The term "automatic" and variations thereof, as used herein, refer to any process or operation done without material human input when the process or operation is performed. However, a process or operation can be automatic, even though performance of the process or operation uses material or immaterial human input, if the input is received before the performance of the process or operation. Human input is deemed to be material if such input influences how the process or operation will be performed. Human input that consents to the performance of the process or operation is not deemed to be "material."

The term "automotive navigation system" can refer to a satellite navigation system designed for use in vehicles. It typically uses a GPS navigation device to acquire position data to locate the user on a road in the unit's map database. Using the road database, the unit can give directions to other locations along roads also in its database. Dead reckoning using distance data from sensors attached to the drivetrain, a gyroscope and an accelerometer can be used for greater reliability, as GPS signal loss and/or multipath can occur due to urban canyons or tunnels.

The term "bus" and variations thereof, as used herein, can refer to a subsystem that transfers information and/or data between various components. A bus generally refers to the collection communication hardware interface, interconnects, bus architecture, standard, and/or protocol defining the communication scheme for a communication system and/or communication network. A bus may also refer to a part of a communication hardware that interfaces the communication hardware with the interconnects that connect to other components of the corresponding communication network. The bus may be for a wired network, such as a physical bus, or wireless network, such as part of an antenna or hardware that couples the communication hardware with the antenna. A bus architecture supports a defined format in which information and/or data is arranged when sent and received through a communication network. A protocol may define the format and rules of communication of a bus architecture.

The terms "communication device," "smartphone," and "mobile device," and variations thereof, as used herein, can be used interchangeably and may include any type of device capable of communicating with one or more of another device and/or across a communications network, via a communications protocol, and the like. Exemplary communication devices may include but are not limited to smartphones, handheld computers, laptops, netbooks, notebook computers, subnotebooks, tablet computers, scanners, portable gaming devices, phones, pagers, GPS modules, portable music players, and other Internet-enabled and/or network-connected devices.

A "communication modality" can refer to any protocol- or standard defined or specific communication session or interaction, such as Voice-Over-Internet-Protocol ("VoIP), cellular communications (e.g., IS-95, 1G, 2G, 3G, 3.5G, 4G, 4G/IMT-Advanced standards, 3GPP, WIMAX™, GSM, CDMA, CDMA2000, EDGE, 1xEVDO, iDEN, GPRS, HSPDA, TDMA, UMA, UMTS, ITU-R, and 5G), Bluetooth™, text or instant messaging (e.g., AIM, Blauk, eBuddy, Gadu-Gadu, IBM Lotus Sametime, ICQ, iMessage, IMVU, Lync, MXit, Paltalk, Skype, Tencent QQ, Windows Live Messenger™ or MSN Messenger™, Wireclub, Xfire, and Yahoo! Messenger™), email, Twitter (e.g., tweeting), Digital Service Protocol (DSP), and the like.

The term "communication system" or "communication network" and variations thereof, as used herein, can refer to a collection of communication components capable of one or more of transmission, relay, interconnect, control, or otherwise manipulate information or data from at least one transmitter to at least one receiver. As such, the communication may include a range of systems supporting point-to-point or broadcasting of the information or data. A communication system may refer to the collection individual communication hardware as well as the interconnects associated with and connecting the individual communication hardware. Communication hardware may refer to dedicated communication hardware or may refer a processor coupled with a communication means (i.e., an antenna) and running software capable of using the communication means to send and/or receive a signal within the communication system. Interconnect refers some type of wired or wireless communication link that connects various components, such as communication hardware, within a communication system. A communication network may refer to a specific setup of a communication system with the collection of individual communication hardware and interconnects having some definable network topography. A communication network may include wired and/or wireless network having a pre-set to an ad hoc network structure.

The term "computer-readable medium," as used herein refers to any tangible storage and/or transmission medium that participates in providing instructions to a processor for execution. Such a medium may take many forms, including but not limited to, non-volatile media, volatile media, and transmission media. Non-volatile media includes, for example, non-volatile random access memory (NVRAM), or magnetic or optical disks. Volatile media includes dynamic memory, such as main memory. Common forms of computer-readable media include, for example, a floppy disk, a flexible disk, hard disk, magnetic tape, or any other magnetic medium, magneto-optical medium, a compact disc read only memory (CD-ROM), any other optical medium, punch cards, paper tape, any other physical medium with patterns of holes, a random access memory (RAM), a programmable read only memory (PROM), and erasable programmable read only memory EPROM, a FLASH-EPROM, a solid state medium like a memory card, any other memory chip or cartridge, a carrier wave as described hereinafter, or any other medium from which a computer can read. A digital file attachment to an e-mail or other self-contained information archive or set of archives is considered a distribution medium equivalent to a tangible storage medium. When the computer-readable media is configured as a database, it is to be understood that the database may be any type of database, such as relational, hierarchical, object-oriented, and/or the like. Accordingly, the disclosure is considered to include a tangible storage medium or distribution medium and prior art-recognized equivalents and successor media, in which the software implementations of the present disclosure are stored. It should be noted that any computer readable medium that is not a signal transmission may be considered non-transitory.

The terms dash and dashboard and variations thereof, as used herein, may be used interchangeably and can be any panel and/or area of a vehicle disposed adjacent to an operator, user, and/or passenger. Dashboards may include, but are not limited to, one or more control panel(s), instrument housing(s), head unit(s), indicator(s), gauge(s), meter(s), light(s),

audio equipment, computer(s), screen(s), display(s), HUD unit(s), and graphical user interface(s).

The term "module" as used herein refers to any known or later developed hardware, software, firmware, artificial intelligence, fuzzy logic, or combination of hardware and software that is capable of performing the functionality associated with that element.

The term "desktop" refers to a metaphor used to portray systems. A desktop is generally considered a "surface" that may include pictures, called icons, widgets, folders, etc. that can activate and/or show applications, windows, cabinets, files, folders, documents, and other graphical items. The icons are generally selectable to initiate a task through user interface interaction to allow a user to execute applications and/or conduct other operations.

The term "display" refers to a portion of a physical screen used to display the output of a computer to a user.

The term "displayed image" refers to an image produced on the display. A typical displayed image is a window or desktop. The displayed image may occupy all or a portion of the display.

The term "display orientation" refers to the way in which a rectangular display is oriented for viewing. The two most common types of display orientations are portrait and landscape. In landscape mode, the display is oriented such that the width of the display is greater than the height of the display (such as a 4:3 ratio, which is 4 units wide and 3 units tall, or a 16:9 ratio, which is 16 units wide and 9 units tall). Stated differently, the longer dimension of the display is oriented substantially horizontal in landscape mode while the shorter dimension of the display is oriented substantially vertical. In the portrait mode, by contrast, the display is oriented such that the width of the display is less than the height of the display. Stated differently, the shorter dimension of the display is oriented substantially horizontal in the portrait mode while the longer dimension of the display is oriented substantially vertical. A multi-screen display can have one composite display that encompasses all the screens. The composite display can have different display characteristics based on the various orientations of the device.

The term "electronic address" can refer to any contactable address, including a telephone number, instant message handle, e-mail address, Uniform Resource Locator ("URL"), Global Universal Identifier ("GUID"), Universal Resource Identifier ("URI"), Address of Record ("AOR"), electronic alias in a database, etc., combinations thereof.

The term "gesture" refers to a user action that expresses an intended idea, action, meaning, result, and/or outcome. The user action can include manipulating a device (e.g., opening or closing a device, changing a device orientation, moving a trackball or wheel, etc.), movement of a body part in relation to the device, movement of an implement or tool in relation to the device, audio inputs, etc. A gesture may be made on a device (such as on the screen) or with the device to interact with the device.

The term "gesture capture" refers to a sense or otherwise a detection of an instance and/or type of user gesture. The gesture capture can be received by sensors in three-dimensional space. Further, the gesture capture can occur in one or more areas of a screen, for example, on a touch-sensitive display or a gesture capture region. A gesture region can be on the display, where it may be referred to as a touch sensitive display, or off the display, where it may be referred to as a gesture capture area.

The terms "infotainment" and "infotainment system" may be used interchangeably and can refer to the hardware/software products, data, content, information, and/or systems, which can be built into or added to vehicles to enhance driver and/or passenger experience. Infotainment may provide media and/or multimedia content. An example is information-based media content or programming that also includes entertainment content.

A "multi-screen application" refers to an application that is capable of producing one or more windows that may simultaneously occupy one or more screens. A multi-screen application commonly can operate in single-screen mode in which one or more windows of the application are displayed only on one screen or in multi-screen mode in which one or more windows are displayed simultaneously on multiple screens.

A "single-screen application" refers to an application that is capable of producing one or more windows that may occupy only a single screen at a time.

The terms "online community," "e-community," or "virtual community" can mean a group of people that interact via a computer network, for social, professional, educational, and/or other purposes. The interaction can use a variety of media formats, including wikis, blogs, chat rooms, Internet forums, instant messaging, email, and other forms of electronic media. Many media formats may be used in social software separately and/or in combination, including text-based chat rooms and forums that use voice, video text or avatars.

The term "satellite positioning system receiver" can refer to a wireless receiver or transceiver to receive and/or send location signals from and/or to a satellite positioning system (SPS), such as the Global Positioning System ("GPS") (US), GLONASS (Russia), Galileo positioning system (EU), Compass navigation system (China), and Regional Navigational Satellite System (India).

The term "social network service" may include a service provider that builds online communities of people, who share interests and/or activities, or who are interested in exploring the interests and/or activities of others. Social network services can be network-based and may provide a variety of ways for users to interact, such as e-mail and instant messaging services.

The term "social network" can refer to a network-based social network.

The term "screen," "touch screen," "touchscreen," or "touch-sensitive display" refers to a physical structure that enables the user to interact with the computer by touching areas on the screen and provides information to a user through a display. The touch screen may sense user contact in a number of different ways, such as by a change in an electrical parameter (e.g., resistance or capacitance), acoustic wave variations, infrared radiation proximity detection, light variation detection, and the like. In a resistive touch screen, for example, normally separated conductive and resistive metallic layers in the screen pass an electrical current. When a user touches the screen, the two layers make contact in the contacted location, whereby a change in electrical field is noted and the coordinates of the contacted location calculated. In a capacitive touch screen, a capacitive layer stores electrical charge, which is discharged to the user upon contact with the touch screen, causing a decrease in the charge of the capacitive layer. The decrease is measured, and the contacted location coordinates determined. In a surface acoustic wave touch screen, an acoustic wave is transmitted through the screen, and the acoustic wave is disturbed by user contact. A receiving transducer detects the user contact instance and determines the contacted location coordinates.

The term "window" refers to a, typically rectangular, displayed image on at least part of a display that contains or provides content different from the rest of the screen. The window may obscure the desktop. The dimensions and ori-

entation of the window may be configurable either by another module or by a user. When the window is expanded, the window can occupy substantially all of the display space on a screen or screens.

The terms "determine," "calculate," and "compute," and variations thereof, as used herein, are used interchangeably and include any type of methodology, process, mathematical operation, or technique.

It shall be understood that the term "means," as used herein, shall be given its broadest possible interpretation in accordance with 35 U.S.C., Section 112, Paragraph 6 or other applicable law. Accordingly, a claim incorporating the term "means" shall cover all structures, materials, or acts set forth herein, and all of the equivalents thereof. Further, the structures, materials or acts and the equivalents thereof shall include all those described in the summary of the invention, brief description of the drawings, detailed description, abstract, and claims themselves.

The terms "vehicle," "car," "automobile," and variations thereof may be used interchangeably herein and can refer to a device or structure for transporting animate and/or inanimate or tangible objects (e.g., persons and/or things), such as a self-propelled conveyance. A vehicle as used herein can include any conveyance or model of a conveyance, where the conveyance was originally designed for the purpose of moving one or more tangible objects, such as people, animals, cargo, and the like. The term "vehicle" does not require that a conveyance moves or is capable of movement. Typical vehicles may include but are in no way limited to cars, trucks, motorcycles, busses, automobiles, trains, railed conveyances, boats, ships, marine conveyances, submarine conveyances, airplanes, space craft, flying machines, human-powered conveyances, and the like.

The term "profile," as used herein, can refer to any data structure, data store, and/or database that includes one or more items of information associated with a vehicle, a vehicle system, a device (e.g., a mobile device, laptop, mobile phone, etc.), or a person.

The term "in communication with," as used herein, refers to any coupling, connection, or interaction using electrical signals to exchange information or data, using any system, hardware, software, protocol, or format, regardless of whether the exchange occurs wirelessly or over a wired connection.

The preceding is a simplified summary of the disclosure to provide an understanding of some aspects of the disclosure. This summary is neither an extensive nor exhaustive overview of the disclosure and its various aspects, embodiments, and/or configurations. It is intended neither to identify key or critical elements of the disclosure nor to delineate the scope of the disclosure but to present selected concepts of the disclosure in a simplified form as an introduction to the more detailed description presented below. As will be appreciated, other aspects, embodiments, and/or configurations of the disclosure are possible utilizing, alone or in combination, one or more of the features set forth above or described in detail below.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** depicts an embodiment of a vehicle operating environment;

FIG. **2** is a block diagram of an embodiment of a vehicle system;

FIG. **3** is a block diagram of an embodiment of a vehicle control system environment;

FIG. **4** is a block diagram of an embodiment of a vehicle communications subsystem;

FIG. **5**A is a first block diagram of an embodiment of a vehicle interior environment separated into areas and/or zones;

FIG. **5**B is a second block diagram of an embodiment of a vehicle interior environment separated into areas and/or zones;

FIG. **5**C is a third block diagram of an embodiment of a vehicle interior environment separated into areas and/or zones;

FIG. **6**A depicts an embodiment of a sensor configuration for a vehicle;

FIG. **6**B depicts an embodiment of a sensor configuration for a zone of a vehicle;

FIG. **7**A is a block diagram of an embodiment of interior sensors for a vehicle;

FIG. **7**B is a block diagram of an embodiment of exterior sensors for a vehicle;

FIG. **8**A is a block diagram of an embodiment of a media subsystem for a vehicle;

FIG. **8**B is a block diagram of an embodiment of a user and device interaction subsystem for a vehicle;

FIG. **8**C is a block diagram of an embodiment of a Navigation subsystem for a vehicle;

FIG. **9** is a block diagram of an embodiment of a communications subsystem for a vehicle;

FIG. **10** is a block diagram of an embodiment of a software architecture for the vehicle control system;

FIG. **11**A is a graphical representation of an embodiment of a gesture that a user may perform to provide input to a vehicle control system;

FIG. **11**B is a graphical representation of an embodiment of a gesture that a user may perform to provide input to a vehicle control system;

FIG. **11**C is a graphical representation of an embodiment of a gesture that a user may perform to provide input to a vehicle control system;

FIG. **11**D is a graphical representation of an embodiment of a gesture that a user may perform to provide input to a vehicle control system;

FIG. **11**E is a graphical representation of an embodiment of a gesture that a user may perform to provide input to a vehicle control system;

FIG. **11**F is a graphical representation of an embodiment of a gesture that a user may perform to provide input to a vehicle control system;

FIG. **11**G is a graphical representation of an embodiment of a gesture that a user may perform to provide input to a vehicle control system;

FIG. **11**H is a graphical representation of an embodiment of a gesture that a user may perform to provide input to a vehicle control system;

FIG. **11**I is a graphical representation of an embodiment of a gesture that a user may perform to provide input to a vehicle control system;

FIG. **11**J is a graphical representation of an embodiment of a gesture that a user may perform to provide input to a vehicle control system;

FIG. **11**K is a graphical representation of an embodiment of a gesture that a user may perform to provide input to a vehicle control system;

FIG. **12**A is a diagram of an embodiment of a data structure for storing information about a user of a vehicle;

FIG. **12**B is a diagram of an embodiment of a data structure for storing information about a device associated with or in a vehicle;

FIG. **12**C is a diagram of an embodiment of a data structure for storing information about a system of a vehicle;

FIG. **12**D is a diagram of an embodiment of a data structure for storing information about a vehicle;

FIG. **13** is a flow or process diagram of a method for storing one or more settings associated with a user;

FIG. **14** is a flow or process diagram of a method for establishing one or more settings associated with a user;

FIG. **15** is a flow or process diagram of a method for storing one or more settings associated with a user;

FIG. **16** is a flow or process diagram of a method for storing one or more gestures associated with a user;

FIG. **17** is a flow or process diagram of a method for reacting to a gesture performed by a user;

FIG. **18** is a flow or process diagram of a method for storing health data associated with a user;

FIG. **19** is a flow or process diagram of a method for reacting to a gesture performed by a user;

FIG. **20** is a block diagram of an embodiment of a personality subsystem for a vehicle;

FIG. **21** is a flow or process diagram of a method for presenting a virtual personality to a user of a vehicle;

FIG. **22** is a flow or process diagram of a method for matching a virtual personality to a context of a user;

FIG. **23** is a block diagram of an embodiment of an automation control system;

FIG. **24** is a flow or process diagram of a method for determining and adjusting settings of a building based on user profile information;

FIG. **25** is a flow or process diagram of a method for determining and adjusting settings of a system based on user profile information;

FIG. **26** is a block diagram of an embodiment of a vehicle control setup for a zone of a vehicle;

FIG. **27** is a flow or process diagram of a method for determining and adjusting a vehicle control based on user profile information;

FIG. **28** is a flow or process diagram of a method for providing an output based on health information associated with a user;

FIG. **29** is a flow or process diagram of a method for providing health information associated with a user to a third party; and

FIG. **30** is a flow or process diagram of a method for determining and adjusting infotainment settings associated with an infotainment system.

In the appended figures, similar components and/or features may have the same reference label. Further, various components of the same type may be distinguished by following the reference label by a letter that distinguishes among the similar components. If only the first reference label is used in the specification, the description is applicable to any one of the similar components having the same first reference label irrespective of the second reference letter or label.

DETAILED DESCRIPTION

Presented herein are embodiments of systems, devices, processes, data structures, user interfaces, etc. The embodiments may relate to an automobile and/or an automobile environment. The automobile environment can include systems associated with the automobile and devices or other systems in communication with the automobile and/or automobile systems. Furthermore, the systems can relate to communications systems and/or devices and may be capable of communicating with other devices and/or to an individual or group of individuals. Further, the systems can receive user input in unique ways. The overall design and functionality of the systems provide for an enhanced user experience making the automobile more useful and more efficient. As described herein, the automobile systems may be electrical, mechanical, electro-mechanical, software-based, and/or combinations thereof.

A vehicle environment **100** that may contain a vehicle ecosystem is shown in FIG. **1**. The vehicle environment **100** can contain areas associated with a vehicle or conveyance **104**. The vehicle **104** is shown as a car but can be any type of conveyance. The environment **100** can include at least three zones. A first zone **108** may be inside a vehicle **104**. The zone **108** includes any interior space, trunk space, engine compartment, or other associated space within or associated with the vehicle **104**. The interior zone **108** can be defined by one or more techniques, for example, geo-fencing.

A second zone **112** may be delineated by line **120**. The zone **112** is created by a range of one or more sensors associated with the vehicle **104**. Thus, the area **112** is exemplary of the range of those sensors and what can be detected by those sensors associated with the vehicle **104**. Although sensor range is shown as a fixed and continuous oval, the sensor range may be dynamic and/or discontinuous. For example, a ranging sensor (e.g., radar, lidar, ladar, etc.) may provide a variable range depending on output power, signal characteristics, or environmental conditions (e.g., rain, fog, clear, etc.). The rest of the environment includes all space beyond the range of the sensors and is represented by space **116**. Thus, the environment **100** may have an area **116** that includes all areas beyond the sensor range **112**. The area **116** may include locations of travel that the vehicle **104** may proceed to in the future.

An embodiment of a vehicle system **200** is shown in FIG. **2**. The vehicle system **200** may comprise hardware and/or software that conduct various operations for or with the vehicle **104**. The operations can include, but are not limited to, providing information to the user **216**, receiving input from the user **216**, and controlling the functions or operation of the vehicle **104**, etc. The vehicle system **200** can include a vehicle control system **204**. The vehicle control system **204** can be any type of computing system operable to conduct the operations as described herein. An example of a vehicle control system may be as described in conjunction with FIG. **3**.

The vehicle control system **204** may interact with a memory or storage system **208** that stores system data. System data **208** may be any type of data needed for the vehicle control system **204** to control effectively the vehicle **104**. The system data **208** can represent any type of database or other storage system. Thus, the system data **208** can be a flat file data system, an object-oriented data system, or some other data system that may interface with the vehicle control system **204**.

The vehicle control system **204** may communicate with a device or user interface **212**, **248**. The user interface **212**, **248** may be operable to receive user input either through touch input, on one or more user interface buttons, via voice command, via one or more image sensors, or through a graphical user interface that may include a gesture capture region, as described in conjunction with the other figures provided herein. Further, the symbol **212**, **248** can represent a device that is located or associated with the vehicle **104**. The device **212**, **248** can be a mobile device, including, but not limited to, a mobile telephone, a mobile computer, or other type of computing system or device that is either permanently located in or temporarily associated with, but not necessarily connected to, the vehicle **104**. Thus, the vehicle control system **204** can interface with the device **212**, **248** and leverage the

device's computing capability to provide one or more of the features or functions as described herein.

The device or user interface **212**, **248** can receive input or provide information to a user **216**. The user **216** may thus interact with the vehicle control system **204** through the interface or device **212**, **248**. Further, the device **212**, **248** may include or have access to device data **220** and/or profile data **252**. The device data **220** can be any type of data that is used in conjunction with the device **212**, **248** including, but not limited to, multimedia data, preferences data, device identification information, or other types of data. The profile data **252** can be any type of data associated with at least one user **216** including, but in no way limited to, bioinformatics, medical information, driving history, personal information (e.g., home physical address, business physical address, contact addresses, likes, dislikes, hobbies, size, weight, occupation, business contacts—including physical and/or electronic addresses, personal contacts—including physical and/or electronic addresses, family members, and personal information related thereto, etc.), other user characteristics, advertising information, user settings and feature preferences, travel information, associated vehicle preferences, communication preferences, historical information (e.g., including historical, current, and/or future travel destinations), Internet browsing history, or other types of data. In any event, the data may be stored as device data **220** and/or profile data **252** in a storage system similar to that described in conjunction with FIGS. **12**A through **12**D.

As an example, the profile data **252** may include one or more user profiles. User profiles may be generated based on data gathered from one or more of vehicle preferences (e.g., seat settings, HVAC settings, dash configurations, and the like), recorded settings, geographic location information (e.g., provided by a satellite positioning system (e.g., GPS), Wi-Fi hotspot, cell tower data, etc.), mobile device information (such as mobile device electronic addresses, Internet browsing history and content, application store selections, user settings and enabled and disabled features, and the like), private information (such as user information from a social network, user presence information, user business account, and the like), secure data, biometric information, audio information from on board microphones, video information from on board cameras, Internet browsing history and browsed content using an on board computer and/or the local area network enabled by the vehicle **104**, geographic location information (e.g., a vendor storefront, roadway name, city name, etc.), and the like.

The profile data **252** may include one or more user accounts. User accounts may include access and permissions to one or more settings and/or feature preferences associated with the vehicle **104**, communications, infotainment, content, etc. In one example, a user account may allow access to certain settings for a particular user, while another user account may deny access to the settings for another user, and vice versa. The access controlled by the user account may be based on at least one of a user account priority, role, permission, age, family status, a group priority (e.g., the user account priority of one or more users, etc.), a group age (e.g., the average age of users in the group, a minimum age of the users in the group, a maximum age of the users in the group, and/or combinations thereof, etc.).

For example, a user **216** may be allowed to purchase applications (e.g., software, etc.) for the vehicle **104** and/or a device associated with the vehicle **104** based on information associated with the user account. This user account information may include a preferred payment method, permissions, and/or other account information. As provided herein, the user account information may be part of the user profile and/or other data stored in the profile data **252**.

As another example, an adult user (e.g., a user with an age of 18 years old and/or over, etc.) may be located in an area of a vehicle **104**, such as a rear passenger area. Continuing this example a child user (e.g., a user with an age of 17 years old and/or less, etc.) may be located in the same, or close, area. In this example, the user account information in the profile data **252** associated with both the adult user and the child user may be used by the vehicle **104** in determining whether content is appropriate for the area given the age of the child user. For instance, a graphic movie containing violence (e.g., a movie associated with a mature rating, such as a Motion Picture Association of America (MPAA) rating of "R," "NC-17," etc.) may be suitable to present to a display device associated with the adult user but may not be acceptable to present to the display device if a 12-year old child user may see and/or hear the content of the movie.

The vehicle control system **204** may also communicate with or through a communication network **224**. The communication network **224** can represent any type of wireless and/or wired communication system that may be included within the vehicle **104** or operable to communicate outside the vehicle **104**. Thus, the communication network **224** can include a local area communication capability and a wide area communication capability. For example, the communication network **224** can include a Bluetooth® wireless system, an 802.11x (e.g., 802.11G/802.11N/802.11AC, or the like, wireless system), a CAN bus, an Ethernet network within the vehicle **104**, or other types of communication networks that may function with or be associated with the vehicle **104**. Further, the communication network **224** can also include wide area communication capabilities, including one or more of, but not limited to, a cellular communication capability, satellite telephone communication capability, a wireless wide area network communication capability, or other types of communication capabilities that allow for the vehicle control system **204** to communicate outside the vehicle **104**.

The vehicle control system **204** may communicate through the communication network **224** to a server **228** that may be located in a facility that is not within physical proximity to the vehicle **104**. Thus, the server **228** may represent a cloud computing system or cloud storage that allows the vehicle control system **204** to either gain access to further computing capabilities or to storage at a location outside of the vehicle **104**. The server **228** can include a computer processor and memory and be similar to any computing system as understood to one skilled in the art.

Further, the server **228** may be associated with stored data **232**. The stored data **232** may be stored in any system or by any method, as described in conjunction with system data **208**, device data **220**, and/or profile data **252**. The stored data **232** can include information that may be associated with one or more users **216** or associated with one or more vehicles **104**. The stored data **232**, being stored in a cloud or in a distant facility, may be exchanged among vehicles **104** or may be used by a user **216** in different locations or with different vehicles **104**. Additionally or alternatively, the server may be associated with profile data **252** as provided herein. It is anticipated that the profile data **252** may be accessed across the communication network **224** by one or more components of the system **200**. Similar to the stored data **232**, the profile data **252**, being stored in a cloud or in a distant facility, may be exchanged among vehicles **104** or may be used by a user **216** in different locations or with different vehicles **104**.

The vehicle control system **204** may also communicate with one or more sensors **236**, **242**, which are either associated with the vehicle **104** or communicate with the vehicle **104**. Vehicle sensors **242** may include one or more sensors for providing information to the vehicle control system **204** that determine or provide information about the environment **100** in which the vehicle **104** is operating. Embodiments of these sensors may be as described in conjunction with FIGS. **6**A-**7**B. Non-vehicle sensor **236** can be any type of sensor that is not currently associated with the vehicle **104**. For example, non-vehicle sensor **236** can be sensors in a traffic system operated by a third party that provides data to the vehicle control system **204**. Further, the non-vehicle sensor(s) **236** can be other types of sensors which provide information about the distant environment **116** or other information about the vehicle **104** or the environment **100**. These non-vehicle sensors **236** may be operated by third parties but provide information to the vehicle control system **204**. Examples of information provided by the sensors **236** and that may be used by the vehicle control system **204** may include weather tracking data, traffic data, user health tracking data, vehicle maintenance data, or other types of data, which may provide environmental or other data to the vehicle control system **204**. The vehicle control system **204** may also perform signal processing of signals received from one or more sensors **236**, **242**. Such signal processing may include estimation of a measured parameter from a single sensor, such as multiple measurements of a range state parameter from the vehicle **104** to an obstacle, and/or the estimation, blending, or fusion of a measured state parameter from multiple sensors such as multiple radar sensors or a combination of a ladar/lidar range sensor and a radar sensor. Signal processing of such sensor signal measurements may comprise stochastic signal processing, adaptive signal processing, and/or other signal processing techniques known to those skilled in the art.

The various sensors **236**, **242** may include one or more sensor memory **244**. Embodiments of the sensor memory **244** may be configured to store data collected by the sensors **236**, **242**. For example, a temperature sensor may collect temperature data associated with a vehicle **104**, user **216**, and/or environment, over time. The temperature data may be collected incrementally, in response to a condition, or at specific time periods. In this example, as the temperature data is collected, it may be stored in the sensor memory **244**. In some cases, the data may be stored along with an identification of the sensor and a collection time associated with the data. Among other things, this stored data may include multiple data points and may be used to track changes in sensor measurements over time. As can be appreciated, the sensor memory **244** can represent any type of database or other storage system.

The diagnostic communications module **256** may be configured to receive and transmit diagnostic signals and information associated with the vehicle **104**. Examples of diagnostics signals and information may include, but is in no way limited to, vehicle system warnings, sensor data, vehicle component status, service information, component health, maintenance alerts, recall notifications, predictive analysis, and the like. Embodiments of the diagnostic communications module **256** may handle warning/error signals in a predetermined manner. The signals, for instance, can be presented to one or more of a third party, occupant, vehicle control system **204**, and a service provider (e.g., manufacturer, repair facility, etc.).

Optionally, the diagnostic communications module **256** may be utilized by a third party (i.e., a party other than the user **216**, etc.) in communicating vehicle diagnostic information. For instance, a manufacturer may send a signal to a vehicle **104** to determine a status associated with one or more components associated with the vehicle **104**. In response to receiving the signal, the diagnostic communications module **256** may communicate with the vehicle control system **204** to initiate a diagnostic status check. Once the diagnostic status check is performed, the information may be sent via the diagnostic communications module **256** to the manufacturer. This example may be especially useful in determining whether a component recall should be issued based on the status check responses returned from a certain number of vehicles.

Wired/wireless transceiver/communications ports **260** may be included. The wired/wireless transceiver/communications ports **260** may be included to support communications over wired networks or links, for example with other communication devices, server devices, and/or peripheral devices. Examples of wired/wireless transceiver/communications ports **260** include Ethernet ports, Universal Serial Bus (USB) ports, Institute of Electrical and Electronics Engineers (IEEE) 1594, or other interface ports.

An embodiment of a vehicle control environment **300** including a vehicle control system **204** may be as shown in FIG. **3**. Beyond the vehicle control system **204**, the vehicle control environment **300** can include one or more of, but is not limited to, a power source and/or power control module **316**, a data storage module **320**, user interface(s)/input interface(s) **324**, vehicle subsystems **328**, user interaction subsystems **332**, Global Positioning System (GPS)/Navigation subsystems **336**, sensor(s) and/or sensor subsystems **340**, communication subsystems **344**, media subsystems **348**, and/or device interaction subsystems **352**. The subsystems, modules, components, etc. **316-352** may include hardware, software, firmware, computer readable media, displays, input devices, output devices, etc. or combinations thereof. The system, subsystems, modules, components, etc. **204**, **316-352** may communicate over a network or bus **356**. This communication bus **356** may be bidirectional and perform data communications using any known or future-developed standard or protocol. An example of the communication bus **356** may be as described in conjunction with FIG. **4**.

The vehicle control system **204** can include a processor **304**, memory **308**, and/or an input/output (I/O) module **312**. Thus, the vehicle control system **204** may be a computer system, which can comprise hardware elements that may be electrically coupled. The hardware elements may include one or more central processing units (CPUs) **304**; one or more components of the I/O module **312** including input devices (e.g., a mouse, a keyboard, etc.) and/or one or more output devices (e.g., a display device, a printer, etc.).

The processor **304** may comprise a general purpose programmable processor or controller for executing application programming or instructions. The processor **304** may, optionally, include multiple processor cores, and/or implement multiple virtual processors. Additionally or alternatively, the processor **304** may include multiple physical processors. As a particular example, the processor **304** may comprise a specially configured application specific integrated circuit (ASIC) or other integrated circuit, a digital signal processor, a controller, a hardwired electronic or logic circuit, a programmable logic device or gate array, a special purpose computer, or the like. The processor **304** generally functions to run programming code or instructions implementing various functions of the vehicle control system **204**.

The input/output module **312** and associated ports may be included to support communications over wired or wireless networks or links, for example with other communication

devices, server devices, and/or peripheral devices. Examples of an input/output module **312** include an Ethernet port, a Universal Serial Bus (USB) port, Institute of Electrical and Electronics Engineers (IEEE) 1594, or other interface.

The vehicle control system **204** may also include one or more storage devices **308**. By way of example, storage devices **308** may be disk drives, optical storage devices, solid-state storage devices such as a random access memory ("RAM") and/or a read-only memory ("ROM"), which can be programmable, flash-updateable and/or the like. The vehicle control system **204** may additionally include a computer-readable storage media reader; a communications system (e.g., a modem, a network card (wireless or wired), an infra-red communication device, etc.); and working memory **308**, which may include RAM and ROM devices as described above. The vehicle control system **204** may also include a processing acceleration unit, which can include a digital signal processor (DSP), a special-purpose processor, and/or the like.

The computer-readable storage media reader can further be connected to a computer-readable storage medium, together (and, optionally, in combination with storage device(s)) comprehensively representing remote, local, fixed, and/or removable storage devices plus storage media for temporarily and/or more permanently containing computer-readable information. The communications system may permit data to be exchanged with an external or internal network and/or any other computer or device described herein. Moreover, as disclosed herein, the term "storage medium" may represent one or more devices for storing data, including read only memory (ROM), random access memory (RAM), magnetic RAM, core memory, magnetic disk storage mediums, optical storage mediums, flash memory devices, and/or other machine readable mediums for storing information.

The vehicle control system **204** may also comprise software elements including an operating system and/or other code, as described in conjunction with FIG. **10**. It should be appreciated that alternates to the vehicle control system **204** may have numerous variations from that described herein. For example, customized hardware might also be used and/or particular elements might be implemented in hardware, software (including portable software, such as applets), or both. Further, connection to other computing devices such as network input/output devices may be employed.

The power source and/or power control module **316** can include any type of power source, including, but not limited to, batteries, alternating current sources (from connections to a building power system or power line), solar cell arrays, etc. One or more components or modules may also be included to control the power source or change the characteristics of the provided power signal. Such modules can include one or more of, but is not limited to, power regulators, power filters, alternating current (AC) to direct current (DC) converters, DC to AC converters, receptacles, wiring, other converters, etc. The power source and/or power control module **316** functions to provide the vehicle control system **204** and any other system with power.

The data storage **320** can include any module for storing, retrieving, and/or managing data in one or more data stores and/or databases. The database or data stores may reside on a storage medium local to (and/or resident in) the vehicle control system **204** or in the vehicle **104**. Alternatively, some of the data storage capability may be remote from the vehicle control system **204** or automobile, and in communication (e.g., via a network) to the vehicle control system **204**. The database or data stores may reside in a storage-area network ("SAN") familiar to those skilled in the art. Similarly, any necessary files for performing the functions attributed to the vehicle control system **204** may be stored locally on the respective vehicle control system **204** and/or remotely, as appropriate. The databases or data stores may be a relational database, and the data storage module **320** may be adapted to store, update, and retrieve data in response to specifically-formatted commands. The data storage module **320** may also perform data management functions for any flat file, object oriented, or other type of database or data store.

A first data store that may be part of the vehicle control environment **300** is a profile data store **252** for storing data about user profiles and data associated with the users. A system data store **208** can include data used by the vehicle control system **204** and/or one or more of the components **324-352** to facilitate the functionality described herein. The data stores **208** and/or **252** may be as described in conjunction with FIGS. **1** and/or **12**A-**12**D.

The user interface/input interfaces **324** may be as described herein for providing information or data and/or for receiving input or data from a user. Vehicle systems **328** can include any of the mechanical, electrical, electromechanical, computer, or other systems associated with the function of the vehicle **100**. For example, vehicle systems **328** can include one or more of, but is not limited to, the steering system, the braking system, the engine and engine control systems, the electrical system, the suspension, the drive train, the cruise control system, the radio, the heating, ventilation, air conditioning (HVAC) system, the windows and/or doors, etc. These systems are well known in the art and will not be described further.

Examples of the other systems and subsystems **324-352** may be as described further herein. For example, the user interface(s)/input interface(s) **324** may be as described in FIGS. **2** and **8**B; the vehicle subsystems **328** may be as described in FIG. **6***a* et. seq.; the user interaction subsystem **332** may be as described in conjunction with the user/device interaction subsystem **817** of FIG. **8**B; the Navigation subsystem **336** may be as described in FIGS. **6**A and **8**C; the sensor(s)/sensor subsystem **340** may be as described in FIGS. **7**A and **7**B; the communication subsystem **344** may be as described in FIGS. **2**, **4**, **5**B, **5**C, and **9**; the media subsystem **348** may be as described in FIG. **8**A; and, the device interaction subsystem **352** may be as described in FIG. **2** and in conjunction with the user/device interaction subsystem **817** of FIG. **8**B.

FIG. **4** illustrates an optional communications channel architecture **400** and associated communications components. FIG. **4** illustrates some of the optional components that can be interconnected via the communication channels/zones **404**. Communication channels/zones **404** can carry information on one or more of a wired and/or wireless communications link with, in the illustrated example, there being three communications channels/zones, **408**, **412**, and **416**.

This optional environment **400** can also include an IP router **420**, an operator cluster **424**, one or more storage devices **428**, one or more blades, such as master blade **432**, and computational blades **436** and **440**. Additionally, the communications channels/zones **404** can interconnect one or more displays, such as, remote display 1 **444**, remote display N **448**, and console display **452**. The communications channels/zones **404** also interconnect an access point **456**, a Bluetooth® access point/USB hub **460**, a Femtocell **464**, a storage controller **468**, that is connected to one or more of USB devices **472**, DVDs **476**, or other storage devices **480**. To assist with managing communications within the communication channel, the environment **400** optionally includes a firewall **484** which will be discussed hereinafter in greater

detail. Other components that could also share the communications channel/zones **404** include GPS **488**, media controller **492**, which is connected to one or more media sources **496**, and one or more subsystems, such as subsystem switches **498**.

Optionally, the communications channels/zones **404** can be viewed as an I/O network or bus where the communications channels are carried on the same physical media. Optionally, the communication channels **404** can be split amongst one or more physical media and/or combined with one or more wireless communications protocols. Optionally, the communications channels **404** can be based on wireless protocols with no physical media interconnecting the various elements described herein.

The environment **400** shown in FIG. **4** can include a collection of blade processors that are housed in a "crate." The crate can have a PC-style backplane connector **408** and a backplane Ethernet **408** that allows the various blades to communicate with one another using, for example, an Ethernet.

Various other functional elements illustrated in FIG. **4** can be integrated into this crate architecture with, as discussed hereinafter, various zones utilized for security. Optionally, as illustrated in FIG. **4**, the backplane **404**/**408** can have two separate Ethernet zones that may or may not be on the same communications channel. Optionally, the zones exist on a single communications channel on the I/O network/bus **408**. Optionally, the zones are actually on different communications channels, e.g., **412**, **416**; however, the implementation is not restricted to any particular type of configuration. Rather, as illustrated in FIG. **4**, there can be a red zone **417** and a green zone **413**, and the I/O backplane on the network/bus **408** that enables standard I/O operations. This backplane or I/O network/bus **408** also optionally can provide power distribution to the various modules and blades illustrated in FIG. **4**. The red and green Ethernet zones, **417** and **413** respectively, can be implemented as Ethernet switches, with one on each side of the firewall **484**. Two Ethernets (untrusted and trusted) are not connected in accordance with an optional embodiment. Optionally, the connector geometry for the firewall can be different for the Ethernet zones than for the blades that are a part of the system.

The red zone **417** only needs to go from the modular connector to the input side of the backplane connector of the firewall **484**. While FIG. **4** indicates that there are five external red zone connectors to the firewall **484**, provisions can be made for any number of ports with the connections being made at the access point **456**, the Bluetooth® access point (combo controller) **460**, Femtocell **464**, storage controller **468**, and/or firewall **484**. Optionally, the external port connections can be made through a manufacturer configurable modular connector panel, and one or more of the red zone Ethernet ports could be available through a customer supplied crate which allows, for example, wired Ethernet connections from a bring-your-own-device (BYOD) to the firewall **484**.

The green zone **413** goes from the output side of the firewall **484** and generally defines the trusted Ethernet. The Ethernet on the backplane **408** essentially implements an Ethernet switch for the entire system, defining the Ethernet backbone of the vehicle **104**. All other modules, e.g., blades, etc., can connect to a standard backplane bus and the trusted Ethernet. Some number of switch ports can be reserved to connect to an output modular connector panel to distribute the Ethernet throughout the vehicle **104**, e.g., connecting such elements as the console display **452**, remote displays **444**, **448**, GPS **488**, etc. Optionally, only trusted components, either provided or approved by the manufacturer after testing, can be attached to the green zone **413**, which is by definition in the trusted Ethernet environment.

Optionally, the environment **400**, shown in FIG. **4**, utilizes IPv6 over Ethernet connections wherever possible. Using, for example, the Broadcom single-twisted pair Ethernet technology, wiring harnesses are simplified and data transmission speeds are maximized. However, while the Broadcom single-twisted pair Ethernet technology can be used, in general, systems and methods can work comparably well with any type of well-known Ethernet technology or other comparable communications technology.

As illustrated in FIG. **4** the I/O network/bus **408** is a split-bus concept that contains three independent bus structures:

The red zone **417**—the untrusted Ethernet environment. This zone **417** may be used to connect network devices and customer provided devices to the vehicle information system with these devices being on the untrusted side of the firewall **484**.

The green zone **413**—the trusted Ethernet environment, this zone **413** can be used to connect manufacturer certified devices such as GPS units, remote displays, subsystem switches, and the like, to the vehicle network **404**. Manufacturer certified devices can be implemented by vendors that allow the vehicle software system to validate whether or not a device is certified to operate with the vehicle **100**. Optionally, only certified devices are allowed to connect to the trusted side of the network.

The I/O bus **409**—the I/O bus may be used to provide power and data transmission to bus-based devices such as the vehicle solid state drive, the media controller blade **492**, the computational blades **436**, **440**, and the like.

As an example, the split-bus structure can have the following minimum configuration:

Two slots for the red zone Ethernet;

One slot for built-in LTE/WiMax access **420** from the car to other network resources such as the cloud/Internet;

One slot for user devices or bring-your-own device access, this slot can implement, for example, WiFi, Bluetooth®, and/or USB connectivity **456**, which can be provided in, for example, the customer crate;

One slot for combined red zone and green zone Ethernet, this slot can be reserved for the firewall controller;

Two slots for computational blades. Here the two computation blades are illustratively as shown the optional master blade and the multimedia blade or controller **492** which can be provided as standard equipment; and

The expansion controller that allows the I/O bus to be extended and provides additional Ethernet switch ports for one or more of the red or green zones, which may require that the basic green zone Ethernet switch implementation will support additional ports beyond the initial three that are needed for the basic exemplary system.

It should be possible to build 8 or 16 or more Ethernet switches that allow for the expansion with existing component(s) in a straight-forward manner.

The red zone **417** can be implemented as an 8-port Ethernet switch that has three actual bus ports within the crate with the remaining five ports being available on the customer crate. The crate implements red zone slots for the firewall controller **484**, the combo controller which includes WiFi, Bluetooth®, USB hub (**456**, **460**) and the IP router **420**.

The firewall controller **484** can have a dedicated slot that bridges the red zone **417**, green zone **413**, and uses the I/O bus for power connections. In accordance with an optional low cost implementation, the firewall **484** can be implemented by a dummy module that simply bridges the red zone **417** and the green zone **413** without necessarily providing any firewall

functionality. The combo controller **460** that includes the WiFi, Bluetooth®, and USB hub can be provided for consumer device connections. This controller can also implement the IPv6 (un-routable) protocol to insure that all information is packetized for transmission via IP over the Ethernet in the I/O network/bus **408**.

The combo controller **460** with the USB hub can have ports in the customer crate. The combo controller **460** can implement USB discovery functions and packetizes the information for transmission via IP over Ethernet. The combo controller **460** can also facilitate installation of the correct USB driver for the discovered device, such as a BYOD from the user. The combo controller **460** and USB hub can then map the USB address to a "local" IPv6 address for interaction with one or more of the computational blades which is generally going to be the media controller **492**.

The IP router **420** can implement Internet access through a manufacturer provided service. This service can allow, for example, a manufacturer to offer value-added services to be integrated into the vehicle information systems. The existence of the manufacturer provided Internet access can also allow the "e-Call" function and other vehicle data recorder functions to be implemented. IP router **420** also allows, for example, WiMax, 4G LTE, and other connections to the Internet through a service provider that can be, for example, contracted by the manufacturer. Internally, the IP router **420** can allow cellular handset connections to the Internet through a Femtocell **464** that is part of the IP router implementation. The IP router **420**, with the Femtocell **464**, can also allow a cone of silence functionality to be implemented. The IP router **420** can be an optional component for a vehicle provided by, for example, the manufacturer, a dealer, or installed by a user. In the absence of the IP router **420**, it is possible to connect a consumer handheld device to the I/O network/bus **408** using, for example, either WiFi or Bluetooth® **456**, **460**. While functionality may be somewhat reduced when using a handheld device instead of a built-in Ethernet connection, systems and methods of this invention can also work utilizing this consumer handheld device which then connects to the Internet via, for example, WiMax, 4G, 4G LTE, or the like.

FIGS. **5**A-**5**C show configurations of a vehicle **104**. In general, a vehicle **104** may provide functionality based at least partially on one or more areas, zones, and distances, associated with the vehicle **104**. Non-limiting examples of this functionality are provided herein below.

An arrangement or configuration for sensors within a vehicle **104** is as shown in FIG. **5**A. The sensor arrangement **500** can include one or more areas **508** within the vehicle. An area can be a larger part of the environment inside or outside of the vehicle **104**. Thus, area one **508**A may include the area within the trunk space or engine space of the vehicle **104** and/or the front passenger compartment. Area two **508**B may include a portion of the interior space **108** (e.g., a passenger compartment, etc.) of the vehicle **104**. The area N, **508**N, may include the trunk space or rear compartment area, when included within the vehicle **104**. The interior space **108** may also be divided into other areas. Thus, one area may be associated with the front passenger's and driver's seats, a second area may be associated with the middle passengers' seats, and a third area may be associated with a rear passenger's seat. Each area **508** may include one or more sensors that are positioned or operate to provide environmental information about that area **508**.

Each area **508** may be further separated into one or more zones **512** within the area **508**. For example, area 1 **508**A may be separated into zone A **512**A, and zone B **512**B. Each zone **512** may be associated with a particular portion of the interior occupied by a passenger. For example, zone A **512**A may be associated with a driver. Zone B **512**B, may be associated with a front passenger. Each zone **512** may include one or more sensors that are positioned or configured to collect information about the environment or ecosystem associated with that zone or person.

A passenger area **508**B may include more than two zones as described in conjunction with area **508**A. For example, area **508**B may include three zones, **512**C, **512**D, and **512**E. These three separate zones **512**C, **512**D, and **512**E may be associated with three passenger seats typically found in the rear passenger area of a vehicle **104**. An area **508**N and may include a single zone **512**N as there may be no separate passenger areas but may include a single trunk area within the vehicle **104**. The number of zones **512** is unlimited within the areas as the areas are also unlimited inside the vehicle **104**. Further, it should be noted that there may be one or areas **508** or zones **512** that may be located outside the vehicle **104** that may have a specific set of sensors associated therewith.

Optionally, each area/access point **508**, **456**, **516**, **520**, and/or zone **512**, associated with a vehicle **104**, may comprise one or more sensors to determine a presence of a user **216** and/or device **212**, **248** in and/or adjacent to each area **508**, **456**, **516**, **520**, and/or zone **512**. The sensors may include vehicle sensors **242** and/or non-vehicle sensors **236** as described herein. It is anticipated that the sensors may be configured to communicate with a vehicle control system **204** and/or the diagnostic communications module **256**. Additionally or alternatively, the sensors may communicate with a device **212**, **248**. The communication of sensors with the vehicle **104** may initiate and/or terminate the control of device **212**, **248** features. For example, a vehicle operator may be located in a second outside area **520** associated with a vehicle **104**. As the operator approaches the first outside area **516**, associated with the vehicle **104**, the vehicle control system **204** may determine to control features associated with one or more device **212**, **248** and diagnostic communications module **256**.

Optionally, the location of the device **212**, **248** relative to the vehicle **104** may determine vehicle functionality and/or features to be provided and/or restricted to a user **216**. By way of example, a device **212**, **248** associated with a user **216** may be located at a second outside area **520** from the vehicle **104**. In this case, and based at least partially on the distance of the device **212**, **248** from the vehicle **104** (e.g., provided by detecting the device **212**, **248** at or beyond the second outside area **520**) the vehicle **104** may lock one or more features (e.g., ignition access, vehicle access, communications ability, etc.) associated with the vehicle **104**. Optionally, the vehicle **104** may provide an alert based on the distance of the device **212**, **248** from the vehicle **104**. Continuing the example above, once the device **212**, **248** reaches the first outside area **516** of the vehicle **104** at least one of the vehicle features may be unlocked. For instance, by reaching the first outside area **516**, the vehicle **104** may unlock a door of the vehicle **104**. In some cases, when the device is detected to be inside the vehicle **104**, the various sensors **236**, **242** may determine that the user **216** is in an area **508** and/or zone **512**. As is further described herein, features of the vehicle **104**, device **212**, **248**, and/or other components may be controlled based on rules stored in a memory.

FIG. **5**B illustrates optional internal vehicle communications between one or more of the vehicle and one or more devices or between devices. Various communications can occur utilizing one or more Bluetooth®, NFC, WiFi, mobile hot spot, point-to-point communications, point-to-multipoint other point communications, an ad hoc network, or in general

any known communications protocol over any known communications media or media-types.

Optionally, various types of internal vehicle communications can be facilitated using an access point **456** that utilizes one or more of Bluetooth®, NFC, WiFi, wireless Ethernet, mobile hot spot technology, or the like. Upon being connected with, and optionally authenticated to the access point **456**, the connected device is able to communicate with one or more of the vehicle and one or more other devices that are connected to the access point **456**. The type of connection to the access point **456** can be based on, for example, the zone **512**, in which the device is located.

The user may identify their zone **512** in conjunction with an authentication procedure to the access point **456**. For example, a driver in zone A **512**A, upon authenticating to the access point **456**, can cause the access point **456** to send a query to the device asking the device user in which zone **512** they are located. As discussed hereinafter, the zone **512** the user device is located in may have an impact on the type of communications, available bandwidth, the types of other devices or vehicle systems or subsystems the device could communicate with, and the like. As a brief introduction, internal communications with zone A **512**A may be given preferential treatment over those communications originating from area 2 **508**B, which could have in itself, preferential treatment over communications originating within area N **508**N.

Moreover, the device in zone A **512**A can include profile information that governs the other devices that are allowed to connect to the access point **456** and what those devices have access to, how they can communicate, how much bandwidth they are allocated, and the like. While, optionally, the device associated with zone A **512**A will be considered the "master" controller of the profile that governs the internal vehicle communications, it should be appreciated that this was arbitrarily chosen since it is assumed that there will always be a driver in a car that is present in zone A **512**A. However, it should be appreciated the driver in zone A **512**A, for example, may not have a communications device in which case a device associated with one of the other areas or zones, such as zone B **512**B, area 2 **508**B, or area N **508**N could also be associated with or control this master profile.

Optionally, various devices located within the various zones **512** can connect using, for example, ports provided by access point **456** or Bluetooth® access point/USB hub **460** as illustrated in FIG. **4**. Similarly, the device(s) could connect utilizing the Femtocell **464** and optionally be directly connected via, for example, a standard Ethernet port.

As discussed, each one of the areas, area 1 **508**A, area 2 **508**B, and area N **508**N, can each have associated therewith a profile that governs, for example, how many and what types of devices can connect from that area **508**, bandwidth allocated to that area **508**, the types of media or content available to device(s) within that area **508**, the interconnection of devices within that area **508** or between areas **508**, or, in general, can control any aspect of communication of an associated device with any one or more other associated devices/vehicle systems within the vehicle **104**.

Optionally, area 2 **508**B devices can be provided with full access to multimedia and infotainment available within the vehicle **104**, however, devices in area 2 **508**B may be restricted from any access to vehicle functions. Only devices in area 1 **508**A may be able to access vehicle control functions such as when "parents" are located in area 1 **508**A and the children are located in area 2 **508**B. Optionally, devices found in zone E **512**E of area 2 **508**B may be able to access limited vehicle control functionality such as climate control within area 2. Similarly, devices in area N **508**N may be able to control climate features within zone N **512**N.

As will be appreciated, profiles can be established that allow management of communications within each of the areas **508**, and further optionally within each of the zones **512**. The profile can be granular in nature controlling not only what type of devices can connect within each zone **512**, but how those devices can communicate with other devices and/or the vehicle and types of information that can be communicated.

To assist with identifying a location of a device within a zone **512**, a number of different techniques can be utilized. One optional technique involves one or more of the vehicle sensors detecting the presence of an individual within one of the zones **512**. Upon detection of an individual in a zone **512**, communications subsystems **344** and the access point **456** can cooperate to not only associate the device within the zone **512** with the access point **456** but to also determine the location of the device within an area, and optionally within a zone **512**. Once the device is established within a zone **512**, a profile associated with the vehicle **104** can store information identifying that device and/or a person and optionally associating it with a particular zone **512** as a default. As discussed, there can be a master profile optionally associated with the device in zone A **512**A, this master profile can govern communications with the communications subsystems **340** and where communications within vehicle **104** are to occur.

Some optional profiles are illustrated below where the Master Profile governs other device connectivity:

Master Profile:

Area 1 508A	Area 2 508B	Area N 508N	Other
All Communications	Allow Access to Infotainment	No Access	Master Profile acts as Firewall and Router
All Vehicle Controls	Allow Area 2 Climate Control		

Secondary Profile (e.g., device in Zone B **512**B, Area 1 **508**A)

Area 1 508A	Area 2 508B	Area N 508N	Other
All Communications	Allow Access to Infotainment	Allow Access to Infotainment	Master Profile acts as Firewall and Router
All Vehicle Controls	Allow Area 2 Climate Control	Allow Area 2 Climate Control	

Secondary Profile, Option 2

Area 1 508A	Area 2 508B	Area N 508N	Other
All Communications	Allow Access to Infotainment, Internet	Allow Access to Infotainment	
All Vehicle Controls Except Driver-centric Controls	Allow Area 2 Climate Control	Allow Area 2 Climate Control	

Some optional profiles are illustrated below where the Area/Zone governs device connectivity:

Area 2 **508**B Profile:

Area 1 508A	Area 2 508B	Area N 508N	Other
No Communications with Area 1 Devices	Allow Access to Infotainment, Allow Access to Other Area 2 or Zone N Devices, Internet		
No Vehicle Controls	Allow Area 2 Climate Control		

Area N **508**N Profile:

Area 1 508A	Area 2 508B	Area N 508N	Other
Communications with Area 1, Zone B Device		Allow Access to Infotainment, Allow Access to Other Area N or Zone N Devices	
No Vehicle Controls		Allow Area N Climate Control	

Area 2 **508**B Profile:

Area 1 508A	Area 2 508B	Area N 508N	Other
Media Sharing with Area 1, Zone B and Vehicle	Allow Access to Infotainment, Allow Access to Other Area 2 or Zone N Devices, Internet and Femtocell		
No Vehicle Controls			

Optionally, a user's device, such as a SmartPhone, can store in, for example a profile, with which zone **512** the user's device is associated. Then, assuming the user sits in the same zone **512** and area **508** as previously, the user's device can re-establish the same communications protocols with the access point **456** as were previously established.

In addition or in the alternative, the areas **508** and zones **512** can have associated therewith restrictions as to which one or more other user's devices with which users' devices can connect. For example, a first user's device can connect with any other user device in area 2 **508**B or area N **508**N, however is restricted from connecting with a user device in area 1 **508**A, zone A **512**A. However, the first user device may be able to communicate with another user's device that is located in area 1 **508**A, zone B **512**B. These communications can include any type of standard communications such as sharing content, exchanging messages, forwarding or sharing multimedia or infotainment, or in general can include any communications that would ordinarily be available between two devices and/or the vehicle and vehicle systems. As discussed, there may be restrictions on the type of communications that can be sent to the device in area 1 **508**A, zone A **512**A. For example, the user's device in area 1 **508**A, zone A **512**A may be restricted from receiving one or more of text messages, multimedia, infotainment, or in general anything that can be envisioned as a potential distraction to the driver. Moreover, it should be appreciated that the communications between the various devices and the various zones **512** need not necessarily occur with the assistance of access point **456**, but the communications could also occur directly between the device(s).

FIG. **5**C outlines optional internal vehicle communications between one or more of the vehicle and one or more devices. More specifically, FIG. **5**C illustrates an example of vehicle communications where the vehicle **104** is equipped with the necessary transceivers to provide a mobile hot spot functionality to any user device(s) therein, such as user devices **248**A and **248**N.

Optionally, and as discussed above, one or more user devices can connect to the access point **456**. This access point **456** is equipped to handle communications routing to not only the communication network/buses **224** for intra-vehicle communications, but optionally can also communicate with, for example, the Internet or the cloud, in cooperation with transceiver **260**. Optionally included is a firewall **484** that has the capability of not only blocking certain types of content, such as a malicious content, but can also operate to exclude certain type of communications from emanating from the vehicle **104** and transceiver **260**. As will be appreciated, various profiles could be established in the firewall **484** that controls not only the type of communications that can be received at the vehicle **104**, but the type of communications that can be sent from the vehicle **104**.

The transceiver **260** can be any type of well-known wireless transceiver that communicates using a known communications protocol such as WiMax, 4G, 4G LTE, 3G, or the like. The user devices can communicate via, for example, WiFi link **248** with the access point **456**, with the transceiver **260** providing Internet connectivity to the various user devices. As will be appreciated, there may need to be an account associated with transceiver **260** with a wireless carrier to provide data and/or voice connectivity to enable the user devices to communicate with the Internet. Typically, the account is established on a month-to-month basis with an associated fee but could also be performed based on the amount of data to be transmitted, received, or in any other manner.

Moreover, one or more of the user's devices and access point **456** can maintain profile information that governs how the user's devices are able to communicate with other devices, and optionally the Internet. Optionally, a profile can exist that only allows the user's devices to communicate with other user's devices and/or the vehicle, multimedia and/or the vehicle infotainment system, and may not be allowed access to the Internet via transceiver **260**. The profile can stipulate that the user's device could connect to the Internet via transceiver **260** for a specified period of time and/or up to a certain amount of data usage. The user's device can have full access to the Internet via transceiver **260** with no limit on time or data usage which would reduce the data usage of the user's device since it is connected via WiFi to the access point **456**, but however, would increase the data usage by transceiver **260**, and therefore, shift the billing for that data usage to the transceiver **260** instead of the user's device. Still further, and as previously discussed, the various profiles may stipulate which user's device has priority for use of the bandwidth provided by the transceiver **260**. For example, a user's device located area 1 **508**A, zone A **512**A may be given preferential routing treatment of data above that of a user's device in zone N **512**N. In this manner, for example, a driver would be given priority for Internet access above that of the passengers. This could become important, for example, when the driver is trying to obtain traffic or direction information or, for example, when the vehicle is performing a download to update various software features.

As will be appreciated, the optional firewall **484** can cooperate with the access point **456** and the various profiles that area **508** associated with the various devices within the vehicle **104** and can fully implement communications restric-

tions, control bandwidth limits, Internet accessibility, malicious software blocking, and the like. Moreover, the optional firewall **484** can be accessed by an administrator with one or more of these configuration settings edited through an administrator's control panel. For example, in a scenario where parents are always in area 1 **508**A, it may be appropriate to give all of the user's devices in area 1 **508**A full access to the Internet utilizing transceiver **260**, however, while restricting access and/or bandwidth to any other user devices within the vehicle **104**. As the user's device and profile would be known by the firewall **484**, upon the user's device being associated with the access point **456**, the firewall **484** and transceiver **260** can be configured to allow communications in accordance with the stored profile.

A set of sensors or vehicle components **600** associated with the vehicle **104** may be as shown in FIG. **6**A. The vehicle **104** can include, among many other components common to vehicles, wheels **607**, a power source **609** (such as an engine, motor, or energy storage system (e.g., battery or capacitive energy storage system)), a manual or automatic transmission **612**, a manual or automatic transmission gear controller **616**, a power controller **620** (such as a throttle), a vehicle control system **204**, the display device **212**, a braking system **636**, a steering wheel **640**, a power source activation/deactivation switch **644** (e.g., an ignition), an occupant seating system **648**, a wireless signal receiver **653** to receive wireless signals from signal sources such as roadside beacons and other electronic roadside devices, and a satellite positioning system receiver **657** (e.g., a Global Positioning System ("GPS") (US), GLONASS (Russia), Galileo positioning system (EU), Compass navigation system (China), and Regional Navigational Satellite System (India) receiver), driverless systems (e.g., cruise control systems, automatic steering systems, automatic braking systems, etc.).

The vehicle **104** can include a number of sensors in wireless or wired communication with the vehicle control system **204** and/or display device **212**, **248** to collect sensed information regarding the vehicle state, configuration, and/or operation. Exemplary sensors may include one or more of, but are not limited to, wheel state sensor **660** to sense one or more of vehicle speed, acceleration, deceleration, wheel rotation, wheel speed (e.g., wheel revolutions-per-minute), wheel slip, and the like, a power source energy output sensor **664** to sense a power output of the power source **609** by measuring one or more of current engine speed (e.g., revolutions-per-minute), energy input and/or output (e.g., voltage, current, fuel consumption, and torque) (e.g., turbine speed sensor, input speed sensor, crankshaft position sensor, manifold absolute pressure sensor, mass flow sensor, and the like), and the like, a switch state sensor **668** to determine a current activation or deactivation state of the power source activation/deactivation switch **644**, a transmission setting sensor **670** to determine a current setting of the transmission (e.g., gear selection or setting), a gear controller sensor **672** to determine a current setting of the gear controller **616**, a power controller sensor **674** to determine a current setting of the power controller **620**, a brake sensor **676** to determine a current state (braking or non-braking) of the braking system **636**, a seating system sensor **678** to determine a seat setting and current weight of seated occupant, if any) in a selected seat of the seating system **648**, exterior and interior sound receivers **690** and **692** (e.g., a microphone, sonar, and other type of acoustic-to-electric transducer or sensor) to receive and convert sound waves into an equivalent analog or digital signal. Examples of other sensors (not shown) that may be employed include safety system state sensors to determine a current state of a vehicular safety system (e.g., air bag setting (deployed or undeployed) and/or seat belt setting (engaged or not engaged)), light setting sensor (e.g., current headlight, emergency light, brake light, parking light, fog light, interior or passenger compartment light, and/or tail light state (on or off)), brake control (e.g., pedal) setting sensor, accelerator pedal setting or angle sensor, clutch pedal setting sensor, emergency brake pedal setting sensor, door setting (e.g., open, closed, locked or unlocked) sensor, engine temperature sensor, passenger compartment or cabin temperature sensor, window setting (open or closed) sensor, one or more interior-facing or exterior-facing cameras or other imaging sensors (which commonly convert an optical image into an electronic signal but may include other devices for detection objects such as an electromagnetic radiation emitter/receiver that emits electromagnetic radiation and receives electromagnetic waves reflected by the object) to sense objects, such as other vehicles and pedestrians and optionally determine the distance, trajectory and speed of such objects, in the vicinity or path of the vehicle, odometer reading sensor, trip mileage reading sensor, wind speed sensor, radar transmitter/receiver output, brake wear sensor, steering/torque sensor, oxygen sensor, ambient lighting sensor, vision system sensor, ranging sensor, parking sensor, heating, venting, and air conditioning (HVAC) sensor, water sensor, air-fuel ratio meter, blind spot monitor, hall effect sensor, microphone, radio frequency (RF) sensor, infrared (IR) sensor, vehicle control system sensors, wireless network sensor (e.g., Wi-Fi and/or Bluetooth® sensor), cellular data sensor, and other sensors either future-developed or known to those of skill in the vehicle art.

In the depicted vehicle embodiment, the various sensors can be in communication with the display device **212**, **248** and vehicle control system **204** via signal carrier network **224**. As noted, the signal carrier network **224** can be a network of signal conductors, a wireless network (e.g., a radio frequency, microwave, or infrared communication system using a communications protocol, such as Wi-Fi), or a combination thereof. The vehicle control system **204** may also provide signal processing of one or more sensors, sensor fusion of similar and/or dissimilar sensors, signal smoothing in the case of erroneous "wild point" signals, and/or sensor fault detection. For example, ranging measurements provided by one or more RF sensors may be combined with ranging measurements from one or more IR sensors to determine one fused estimate of vehicle range to an obstacle target.

The control system **204** may receive and read sensor signals, such as wheel and engine speed signals, as a digital input comprising, for example, a pulse width modulated (PWM) signal. The processor **304** can be configured, for example, to read each of the signals into a port configured as a counter or configured to generate an interrupt on receipt of a pulse, such that the processor **304** can determine, for example, the engine speed in revolutions per minute (RPM) and the speed of the vehicle in miles per hour (MPH) and/or kilometers per hour (KPH). One skilled in the art will recognize that the two signals can be received from existing sensors in a vehicle comprising a tachometer and a speedometer, respectively. Alternatively, the current engine speed and vehicle speed can be received in a communication packet as numeric values from a conventional dashboard subsystem comprising a tachometer and a speedometer. The transmission speed sensor signal can be similarly received as a digital input comprising a signal coupled to a counter or interrupt signal of the processor **304** or received as a value in a communication packet on a network or port interface from an existing subsystem of the vehicle **104**. The ignition sensor signal can be configured as a digital input, wherein a HIGH value represents that the ignition is on and a LOW value represents that

the ignition is OFF. Three bits of the port interface can be configured as a digital input to receive the gear shift position signal, representing eight possible gear shift positions. Alternatively, the gear shift position signal can be received in a communication packet as a numeric value on the port interface. The throttle position signal can be received as an analog input value, typically in the range 0-5 volts. Alternatively, the throttle position signal can be received in a communication packet as a numeric value on the port interface. The output of other sensors can be processed in a similar fashion.

Other sensors may be included and positioned in the interior space **108** of the vehicle **104**. Generally, these interior sensors obtain data about the health of the driver and/or passenger(s), data about the safety of the driver and/or passenger(s), and/or data about the comfort of the driver and/or passenger(s). The health data sensors can include sensors in the steering wheel that can measure various health telemetry for the person (e.g., heart rate, temperature, blood pressure, blood presence, blood composition, etc.). Sensors in the seats may also provide for health telemetry (e.g., presence of liquid, weight, weight shifts, etc.). Infrared sensors could detect a person's temperature; optical sensors can determine a person's position and whether the person has become unconscious. Other health sensors are possible and included herein.

Safety sensors can measure whether the person is acting safely. Optical sensors can determine a person's position and focus. If the person stops looking at the road ahead, the optical sensor can detect the lack of focus. Sensors in the seats may detect if a person is leaning forward or may be injured by a seat belt in a collision. Other sensors can detect that the driver has at least one hand on a steering wheel. Other safety sensors are possible and contemplated as if included herein.

Comfort sensors can collect information about a person's comfort. Temperature sensors may detect a temperature of the interior cabin. Moisture sensors can determine a relative humidity. Audio sensors can detect loud sounds or other distractions. Audio sensors may also receive input from a person through voice data. Other comfort sensors are possible and contemplated as if included herein.

FIG. **6**B shows an interior sensor configuration for one or more zones **512** of a vehicle **104** optionally. Optionally, the areas **508** and/or zones **512** of a vehicle **104** may include sensors that are configured to collect information associated with the interior **108** of a vehicle **104**. In particular, the various sensors may collect environmental information, user information, and safety information, to name a few. Embodiments of these sensors may be as described in conjunction with FIGS. **7**A-**8**B.

Optionally, the sensors may include one or more of optical, or image, sensors **622**A-B (e.g., cameras, etc.), motion sensors **624**A-B (e.g., utilizing RF, IR, and/or other sound/image sensing, etc.), steering wheel user sensors **642** (e.g., heart rate, temperature, blood pressure, sweat, health, etc.), seat sensors **677** (e.g., weight, load cell, moisture, electrical, force transducer, etc.), safety restraint sensors **679** (e.g., seatbelt, airbag, load cell, force transducer, etc.), interior sound receivers **692**A-B, environmental sensors **694** (e.g., temperature, humidity, air, oxygen, etc.), and the like.

The image sensors **622**A-B may be used alone or in combination to identify objects, users **216**, and/or other features, inside the vehicle **104**. Optionally, a first image sensor **622**A may be located in a different position within a vehicle **104** from a second image sensor **622**B. When used in combination, the image sensors **622**A-B may combine captured images to form, among other things, stereo and/or three-dimensional (3D) images. The stereo images can be recorded and/or used to determine depth associated with objects and/or users **216** in a vehicle **104**. Optionally, the image sensors **622**A-B used in combination may determine the complex geometry associated with identifying characteristics of a user **216**. For instance, the image sensors **622**A-B may be used to determine dimensions between various features of a user's face (e.g., the depth/distance from a user's nose to a user's cheeks, a linear distance between the center of a user's eyes, and more). These dimensions may be used to verify, record, and even modify characteristics that serve to identify a user **216**. As can be appreciated, utilizing stereo images can allow for a user **216** to provide complex gestures in a 3D space of the vehicle **104**. These gestures may be interpreted via one or more of the subsystems as disclosed herein. Optionally, the image sensors **622**A-B may be used to determine movement associated with objects and/or users **216** within the vehicle **104**. It should be appreciated that the number of image sensors used in a vehicle **104** may be increased to provide greater dimensional accuracy and/or views of a detected image in the vehicle **104**.

The vehicle **104** may include one or more motion sensors **624**A-B. These motion sensors **624**A-B may detect motion and/or movement of objects inside the vehicle **104**. Optionally, the motion sensors **624**A-B may be used alone or in combination to detect movement. For example, a user **216** may be operating a vehicle **104** (e.g., while driving, etc.) when a passenger in the rear of the vehicle **104** unbuckles a safety belt and proceeds to move about the vehicle **104**. In this example, the movement of the passenger could be detected by the motion sensors **624**A-B. Optionally, the user **216** could be alerted of this movement by one or more of the devices **212**, **248** in the vehicle **104**. In another example, a passenger may attempt to reach for one of the vehicle control features (e.g., the steering wheel **640**, the console, icons displayed on the head unit and/or device **212**, **248**, etc.). In this case, the movement (i.e., reaching) of the passenger may be detected by the motion sensors **624**A-B. Optionally, the path, trajectory, anticipated path, and/or some other direction of movement/motion may be determined using the motion sensors **624**A-B. In response to detecting the movement and/or the direction associated with the movement, the passenger may be prevented from interfacing with and/or accessing at least some of the vehicle control features (e.g., the features represented by icons may be hidden from a user interface, the features may be locked from use by the passenger, combinations thereof, etc.). As can be appreciated, the user **216** may be alerted of the movement/motion such that the user **216** can act to prevent the passenger from interfering with the vehicle **104** controls. Optionally, the number of motion sensors in a vehicle **104**, or areas of a vehicle **104**, may be increased to increase an accuracy associated with motion detected in the vehicle **104**.

The interior sound receivers **692**A-B may include, but are not limited to, microphones and other types of acoustic-to-electric transducers or sensors. Optionally, the interior sound receivers **692**A-B may be configured to receive and convert sound waves into an equivalent analog or digital signal. The interior sound receivers **692**A-B may serve to determine one or more locations associated with various sounds in the vehicle **104**. The location of the sounds may be determined based on a comparison of volume levels, intensity, and the like, between sounds detected by two or more interior sound receivers **692**A-B. For instance, a first interior sound receiver **692**A may be located in a first area of the vehicle **104** and a second interior sound receiver **692**B may be located in a second area of the vehicle **104**. If a sound is detected at a first volume level by the first interior sound receiver **692**A and a

second, higher, volume level by the second interior sound receiver **692**B in the second area of the vehicle **104**, the sound may be determined to be closer to the second area of the vehicle **104**. As can be appreciated, the number of sound receivers used in a vehicle **104** may be increased (e.g., more than two, etc.) to increase measurement accuracy surrounding sound detection and location, or source, of the sound (e.g., via triangulation, etc.).

Seat sensors **677** may be included in the vehicle **104**. The seat sensors **677** may be associated with each seat and/or zone **512** in the vehicle **104**. Optionally, the seat sensors **677** may provide health telemetry and/or identification via one or more of load cells, force transducers, weight sensors, moisture detection sensor, electrical conductivity/resistance sensor, and the like. For example, the seat sensors **677** may determine that a user **216** weighs 180 lbs. This value may be compared to user data stored in memory to determine whether a match exists between the detected weight and a user **216** associated with the vehicle **104**. In another example, if the seat sensors **677** detect that a user **216** is fidgeting, or moving, in a seemingly uncontrollable manner, the system may determine that the user **216** has suffered a nervous and/or muscular system issue (e.g., seizure, etc.). The vehicle control system **204** may then cause the vehicle **104** to slow down and in addition or alternatively the automobile controller **8104** (described below) can safely take control of the vehicle **104** and bring the vehicle **104** to a stop in a safe location (e.g., out of traffic, off a freeway, etc).

Health telemetry and other data may be collected via the steering wheel user sensors **642**. Optionally, the steering wheel user sensors **642** may collect heart rate, temperature, blood pressure, and the like, associated with a user **216** via at least one contact disposed on or about the steering wheel **640**.

The safety restraint sensors **679** may be employed to determine a state associated with one or more safety restraint devices in a vehicle **104**. The state associated with one or more safety restraint devices may serve to indicate a force observed at the safety restraint device, a state of activity (e.g., retracted, extended, various ranges of extension and/or retraction, deployment, buckled, unbuckled, etc.), damage to the safety restraint device, and more.

Environmental sensors **694**, including one or more of temperature, humidity, air, oxygen, carbon monoxide, smoke, and other environmental condition sensors may be used in a vehicle **104**. These environmental sensors **694** may be used to collect data relating to the safety, comfort, and/or condition of the interior space **108** of the vehicle **104**. Among other things, the data collected by the environmental sensors **694** may be used by the vehicle control system **204** to alter functions of a vehicle. The environment may correspond to an interior space **108** of a vehicle **104** and/or specific areas **508** and/or zones **512** of the vehicle **104**. It should be appreciate that an environment may correspond to a user **216**. For example, a low oxygen environment may be detected by the environmental sensors **694** and associated with a user **216** who is operating the vehicle **104** in a particular zone **512**. In response to detecting the low oxygen environment, at least one of the subsystems of the vehicle **104**, as provided herein, may alter the environment, especially in the particular zone **512**, to increase the amount of oxygen in the zone **512**. Additionally or alternatively, the environmental sensors **694** may be used to report conditions associated with a vehicle (e.g., fire detected, low oxygen, low humidity, high carbon monoxide, etc.). The conditions may be reported to a user **216** and/or a third party via at least one communications module as provided herein.

Among other things, the sensors as disclosed herein may communicate with each other, with devices **212**, **248**, and/or with the vehicle control system **204** via the signal carrier network **224**. Additionally or alternatively, the sensors disclosed herein may serve to provide data relevant to more than one category of sensor information including, but not limited to, combinations of environmental information, user information, and safety information to name a few.

FIGS. **7**A-**7**B show block diagrams of various sensors that may be associated with a vehicle **104**. Although depicted as interior and exterior sensors, it should be appreciated that any of the one or more of the sensors shown may be used in both the interior space **108** and the exterior space of the vehicle **104**. Moreover, sensors having the same symbol or name may include the same, or substantially the same, functionality as those sensors described elsewhere in the present disclosure. Further, although the various sensors are depicted in conjunction with specific groups (e.g., environmental **708**, **708**E, user interface **712**, safety **716**, **716**E, etc.) the sensors should not be limited to the groups in which they appear. In other words, the sensors may be associated with other groups or combinations of groups and/or disassociated from one or more of the groups shown. The sensors as disclosed herein may communicate with each other, the devices **212**, **248**, and/or the vehicle control system **204** via one or more communications channel(s) **356**.

FIG. **7**A is a block diagram of an embodiment of interior sensors **340** for a vehicle **104** is provided. The interior sensors **340** may be arranged into one or more groups, based at least partially on the function of the interior sensors **340**. The interior space **108** of a vehicle **104** may include an environmental group **708**, a user interface group **712**, and a safety group **716**. Additionally or alternatively, there may be sensors associated with various devices inside the vehicle (e.g., devices **212**, **248**, smart phones, tablets, mobile computers, etc.)

The environmental group **708** may comprise sensors configured to collect data relating to the internal environment of a vehicle **104**. It is anticipated that the environment of the vehicle **104** may be subdivided into areas **508** and zones **512** in an interior space **108** of a vehicle **104**. In this case, each area **508** and/or zone **512** may include one or more of the environmental sensors. Examples of environmental sensors associated with the environmental group **708** may include, but are not limited to, oxygen/air sensors **724**, temperature sensors **728**, humidity sensors **732**, light/photo sensors **736**, and more. The oxygen/air sensors **724** may be configured to detect a quality of the air in the interior space **108** of the vehicle **104** (e.g., ratios and/or types of gasses comprising the air inside the vehicle **104**, dangerous gas levels, safe gas levels, etc.). Temperature sensors **728** may be configured to detect temperature readings of one or more objects, users **216**, and/or areas **508** of a vehicle **104**. Humidity sensors **732** may detect an amount of water vapor present in the air inside the vehicle **104**. The light/photo sensors **736** can detect an amount of light present in the vehicle **104**. Further, the light/photo sensors **736** may be configured to detect various levels of light intensity associated with light in the vehicle **104**.

The user interface group **712** may comprise sensors configured to collect data relating to one or more users **216** in a vehicle **104**. As can be appreciated, the user interface group **712** may include sensors that are configured to collect data from users **216** in one or more areas **508** and zones **512** of the vehicle **104**. For example, each area **508** and/or zone **512** of the vehicle **104** may include one or more of the sensors in the user interface group **712**. Examples of user interface sensors associated with the user interface group **712** may include, but are not limited to, infrared sensors **740**, motion sensors **744**,

weight sensors **748**, wireless network sensors **752**, biometric sensors **756**, camera (or image) sensors **760**, audio sensors **764**, and more.

Infrared sensors **740** may be used to measure IR light irradiating from at least one surface, user **216**, or other object in the vehicle **104**. Among other things, the Infrared sensors **740** may be used to measure temperatures, form images (especially in low light conditions), identify users **216**, and even detect motion in the vehicle **104**.

The motion sensors **744** may be similar to the motion detectors **624**A-B, as described in conjunction with FIG. **6**B. Weight sensors **748** may be employed to collect data relating to objects and/or users **216** in various areas **508** of the vehicle **104**. In some cases, the weight sensors **748** may be included in the seats and/or floor of a vehicle **104**.

Optionally, the vehicle **104** may include a wireless network sensor **752**. This sensor **752** may be configured to detect one or more wireless network(s) inside the vehicle **104**. Examples of wireless networks may include, but are not limited to, wireless communications utilizing Bluetooth®, Wi-Fi™, ZigBee, IEEE 802.11, and other wireless technology standards. For example, a mobile hotspot may be detected inside the vehicle **104** via the wireless network sensor **752**. In this case, the vehicle **104** may determine to utilize and/or share the mobile hotspot detected via/with one or more other devices **212**, **248** and/or components associated with the vehicle **104**.

Biometric sensors **756** may be employed to identify and/or record characteristics associated with a user **216**. It is anticipated that biometric sensors **756** can include at least one of image sensors, IR sensors, fingerprint readers, weight sensors, load cells, force transducers, heart rate monitors, blood pressure monitors, and the like as provided herein.

The camera sensors **760** may be similar to image sensors **622**A-B, as described in conjunction with FIG. **6**B. Optionally, the camera sensors may record still images, video, and/or combinations thereof. The audio sensors **764** may be similar to the interior sound receivers **692**A-B, as described in conjunction with FIGS. **6**A-**6**B. The audio sensors may be configured to receive audio input from a user **216** of the vehicle **104**. The audio input from a user **216** may correspond to voice commands, conversations detected in the vehicle **104**, phone calls made in the vehicle **104**, and/or other audible expressions made in the vehicle **104**.

The safety group **716** may comprise sensors configured to collect data relating to the safety of a user **216** and/or one or more components of a vehicle **104**. The vehicle **104** may be subdivided into areas **508** and/or zones **512** in an interior space **108** of a vehicle **104** where each area **508** and/or zone **512** may include one or more of the safety sensors provided herein. Examples of safety sensors associated with the safety group **716** may include, but are not limited to, force sensors **768**, mechanical motion sensors **772**, orientation sensors **776**, restraint sensors **780**, and more.

The force sensors **768** may include one or more sensors inside the vehicle **104** configured to detect a force observed in the vehicle **104**. One example of a force sensor **768** may include a force transducer that converts measured forces (e.g., force, weight, pressure, etc.) into output signals.

Mechanical motion sensors **772** may correspond to encoders, accelerometers, damped masses, and the like. Optionally, the mechanical motion sensors **772** may be adapted to measure the force of gravity (i.e., G-force) as observed inside the vehicle **104**. Measuring the G-force observed inside a vehicle **104** can provide valuable information related to a vehicle's acceleration, deceleration, collisions, and/or forces that may have been suffered by one or more users **216** in the vehicle **104**. As can be appreciated, the mechanical motion sensors **772** can be located in an interior space **108** or an exterior of the vehicle **104**.

Orientation sensors **776** can include accelerometers, gyroscopes, magnetic sensors, and the like that are configured to detect an orientation associated with the vehicle **104**. Similar to the mechanical motion sensors **772**, the orientation sensors **776** can be located in an interior space **108** or an exterior of the vehicle **104**.

The restraint sensors **780** may be similar to the safety restraint sensors **679** as described in conjunction with FIGS. **6**A-**6**B. These sensors **780** may correspond to sensors associated with one or more restraint devices and/or systems in a vehicle **104**. Seatbelts and airbags are examples of restraint devices and/or systems. As can be appreciated, the restraint devices and/or systems may be associated with one or more sensors that are configured to detect a state of the device/system. The state may include extension, engagement, retraction, disengagement, deployment, and/or other electrical or mechanical conditions associated with the device/system.

The associated device sensors **720** can include any sensors that are associated with a device **212**, **248** in the vehicle **104**. As previously stated, typical devices **212**, **248** may include smart phones, tablets, laptops, mobile computers, and the like. It is anticipated that the various sensors associated with these devices **212**, **248** can be employed by the vehicle control system **204**. For example, a typical smart phone can include, an image sensor, an IR sensor, audio sensor, gyroscope, accelerometer, wireless network sensor, fingerprint reader, and more. It is an aspect of the present disclosure that one or more of these associated device sensors **720** may be used by one or more subsystems of the vehicle system **200**.

In FIG. **7**B, a block diagram of an embodiment of exterior sensors **340** for a vehicle **104** is shown. The exterior sensors may include sensors that are identical, or substantially similar, to those previously disclosed in conjunction with the interior sensors of FIG. **7**A. Optionally, the exterior sensors **340** may be configured to collect data relating to one or more conditions, objects, users **216**, and other events that are external to the interior space **108** of the vehicle **104**. For instance, the oxygen/air sensors **724** may measure a quality and/or composition of the air outside of a vehicle **104**. As another example, the motion sensors **744** may detect motion outside of a vehicle **104**.

The external environmental group **708**E may comprise sensors configured to collect data relating to the external environment of a vehicle **104**. In addition to including one or more of the sensors previously described, the external environmental group **708**E may include additional sensors, such as, vehicle sensors **750**, biological sensors, and wireless signal sensors **758**. Vehicle sensors **750** can detect vehicles that are in an environment surrounding the vehicle **104**. For example, the vehicle sensors **750** may detect vehicles in a first outside area **516**, a second outside area **520**, and/or combinations of the first and second outside areas **516**, **520**. Optionally, the vehicle sensors **750** may include one or more of RF sensors, IR sensors, image sensors, and the like to detect vehicles, people, hazards, etc. that are in an environment exterior to the vehicle **104**. Additionally or alternatively, the vehicle sensors **750** can provide distance/directional information relating to a distance (e.g., distance from the vehicle **104** to the detected object) and/or a direction (e.g., direction of travel, etc.) associated with the detected object.

The biological sensors **754** may determine whether one or more biological entities (e.g., an animal, a person, a user **216**, etc.) is in an external environment of the vehicle **104**. Additionally or alternatively, the biological sensors **754** may pro-

vide distance information relating to a distance of the biological entity from the vehicle **104**. Biological sensors **754** may include at least one of RF sensors, IR sensors, image sensors and the like that are configured to detect biological entities. For example, an IR sensor may be used to determine that an object, or biological entity, has a specific temperature, temperature pattern, or heat signature. Continuing this example, a comparison of the determined heat signature may be compared to known heat signatures associated with recognized biological entities (e.g., based on shape, locations of temperature, and combinations thereof, etc.) to determine whether the heat signature is associated with a biological entity or an inanimate, or non-biological, object.

The wireless signal sensors **758** may include one or more sensors configured to receive wireless signals from signal sources such as Wi-Fi™ hotspots, cell towers, roadside beacons, other electronic roadside devices, and satellite positioning systems. Optionally, the wireless signal sensors **758** may detect wireless signals from one or more of a mobile phone, mobile computer, keyless entry device, RFID device, near field communications (NFC) device, and the like.

The external safety group **716**E may comprise sensors configured to collect data relating to the safety of a user **216** and/or one or more components of a vehicle **104**. Examples of safety sensors associated with the external safety group **716**E may include, but are not limited to, force sensors **768**, mechanical motion sensors **772**, orientation sensors **776**, vehicle body sensors **782**, and more. Optionally, the exterior safety sensors **716**E may be configured to collect data relating to one or more conditions, objects, vehicle components, and other events that are external to the vehicle **104**. For instance, the force sensors **768** in the external safety group **716**E may detect and/or record force information associated with the outside of a vehicle **104**. For instance, if an object strikes the exterior of the vehicle **104**, the force sensors **768** from the exterior safety group **716**E may determine a magnitude, location, and/or time associated with the strike.

The vehicle **104** may include a number of vehicle body sensors **782**. The vehicle body sensors **782** may be configured to measure characteristics associated with the body (e.g., body panels, components, chassis, windows, etc.) of a vehicle **104**. For example, two vehicle body sensors **782**, including a first body sensor and a second body sensor, may be located at some distance apart. Continuing this example, the first body sensor may be configured to send an electrical signal across the body of the vehicle **104** to the second body sensor, or vice versa. Upon receiving the electrical signal from the first body sensor, the second body sensor may record a detected current, voltage, resistance, and/or combinations thereof associated with the received electrical signal. Values (e.g., current, voltage, resistance, etc.) for the sent and received electrical signal may be stored in a memory. These values can be compared to determine whether subsequent electrical signals sent and received between vehicle body sensors **782** deviate from the stored values. When the subsequent signal values deviate from the stored values, the difference may serve to indicate damage and/or loss of a body component. Additionally or alternatively, the deviation may indicate a problem with the vehicle body sensors **782**. The vehicle body sensors **782** may communicate with each other, a vehicle control system **204**, and/or systems of the vehicle system **200** via a communications channel **356**. Although described using electrical signals, it should be appreciated that alternative embodiments of the vehicle body sensors **782** may use sound waves and/or light to perform a similar function.

FIG. **8**A is a block diagram of an embodiment of a media controller subsystem **348** for a vehicle **104**. The media controller subsystem **348** may include, but is not limited to, a media controller **804**, a media processor **808**, a match engine **812**, an audio processor **816**, a speech synthesis module **820**, a network transceiver **824**, a signal processing module **828**, memory **832**, and a language database **836**. Optionally, the media controller subsystem **348** may be configured as a dedicated blade that implements the media-related functionality of the system **200**. Additionally or alternatively, the media controller subsystem **348** can provide voice input, voice output, library functions for multimedia, and display control for various areas **508** and/or zones **512** of the vehicle **104**.

Optionally, the media controller subsystem **348** may include a local IP address (e.g., IPv4, IPv6, combinations thereof, etc.) and even a routable, global unicast address. The routable, global unicast address may allow for direct addressing of the media controller subsystem **348** for streaming data from Internet resources (e.g., cloud storage, user accounts, etc.). It is anticipated, that the media controller subsystem **348** can provide multimedia via at least one Internet connection, or wireless network communications module, associated with the vehicle **104**. Moreover, the media controller subsystem **348** may be configured to service multiple independent clients simultaneously.

The media processor **808** may comprise a general purpose programmable processor or controller for executing application programming or instructions related to the media subsystem **348**. The media processor **808** may include multiple processor cores, and/or implement multiple virtual processors. Optionally, the media processor **808** may include multiple physical processors. By way of example, the media processor **808** may comprise a specially configured application specific integrated circuit (ASIC) or other integrated circuit, a digital signal processor, a controller, a hardwired electronic or logic circuit, a programmable logic device or gate array, a special purpose computer, or the like. The media processor **808** generally functions to run programming code or instructions implementing various functions of the media controller **804**.

The match engine **812** can receive input from one or more components of the vehicle system **800** and perform matching functions. Optionally, the match engine **812** may receive audio input provided via a microphone **886** of the system **800**. The audio input may be provided to the media controller subsystem **348** where the audio input can be decoded and matched, via the match engine **812**, to one or more functions available to the vehicle **104**. Similar matching operations may be performed by the match engine **812** relating to video input received via one or more image sensors, cameras **878**, and the like.

The media controller subsystem **348** may include a speech synthesis module **820** configured to provide audio output to one or more speakers **880**, or audio output devices, associated with the vehicle **104**. Optionally, the speech synthesis module **820** may be configured to provide audio output based at least partially on the matching functions performed by the match engine **812**.

As can be appreciated, the coding/decoding, the analysis of audio input/output, and/or other operations associated with the match engine **812** and speech synthesis module **820**, may be performed by the media processor **808** and/or a dedicated audio processor **816**. The audio processor **816** may comprise a general purpose programmable processor or controller for executing application programming or instructions related to audio processing. Further, the audio processor **816** may be similar to the media processor **808** described herein.

The network transceiver **824** can include any device configured to transmit and receive analog and/or digital signals.

Optionally, the media controller subsystem **348** may utilize a network transceiver **824** in one or more communication networks associated with the vehicle **104** to receive and transmit signals via the communications channel **356**. Additionally or alternatively, the network transceiver **824** may accept requests from one or more devices **212**, **248** to access the media controller subsystem **348**. One example of the communication network is a local-area network (LAN). As can be appreciated, the functionality associated with the network transceiver **824** may be built into at least one other component of the vehicle **104** (e.g., a network interface card, communications module, etc.).

The signal processing module **828** may be configured to alter audio/multimedia signals received from one or more input sources (e.g., microphones **886**, etc.) via the communications channel **356**. Among other things, the signal processing module **828** may alter the signals received electrically, mathematically, combinations thereof, and the like.

The media controller **804** may also include memory **832** for use in connection with the execution of application programming or instructions by the media processor **808**, and for the temporary or long term storage of program instructions and/or data. As examples, the memory **832** may comprise RAM, DRAM, SDRAM, or other solid state memory.

The language database **836** may include the data and/or libraries for one or more languages, as are used to provide the language functionality as provided herein. In one case, the language database **836** may be loaded on the media controller **804** at the point of manufacture. Optionally, the language database **836** can be modified, updated, and/or otherwise changed to alter the data stored therein. For instance, additional languages may be supported by adding the language data to the language database **836**. In some cases, this addition of languages can be performed via accessing administrative functions on the media controller **804** and loading the new language modules via wired (e.g., USB, etc.) or wireless communication. In some cases, the administrative functions may be available via a vehicle console device **248**, a user device **212**, **248**, and/or other mobile computing device that is authorized to access administrative functions (e.g., based at least partially on the device's address, identification, etc.).

One or more video controllers **840** may be provided for controlling the video operation of the devices **212**, **248**, **882** associated with the vehicle. Optionally, the video controller **840** may include a display controller for controlling the operation of touch sensitive screens, including input (touch sensing) and output (display) functions. Video data may include data received in a stream and unpacked by a processor and loaded into a display buffer. In this example, the processor and video controller **840** can optimize the display based on the characteristics of a screen of a display device **212**, **248**, **882**. The functions of a touch screen controller may be incorporated into other components, such as a media processor **808** or display subsystem.

The audio controller **844** can provide control of the audio entertainment system (e.g., radio, subscription music service, multimedia entertainment, etc.), and other audio associated with the vehicle **104** (e.g., navigation systems, vehicle comfort systems, convenience systems, etc.). Optionally, the audio controller **844** may be configured to translate digital signals to analog signals and vice versa. As can be appreciated, the audio controller **844** may include device drivers that allow the audio controller **844** to communicate with other components of the system **800** (e.g., processors **816**, **808**, audio I/O **874**, and the like).

The system **800** may include a profile identification module **848** to determine whether a user profile is associated with the vehicle **104**. Among other things, the profile identification module **848** may receive requests from a user **216**, or device **212**, **228**, **248**, to access a profile stored in a profile database **856** or profile data **252**. Additionally or alternatively, the profile identification module **848** may request profile information from a user **216** and/or a device **212**, **228**, **248**, to access a profile stored in a profile database **856** or profile data **252**. In any event, the profile identification module **848** may be configured to create, modify, retrieve, and/or store user profiles in the profile database **856** and/or profile data **252**. The profile identification module **848** may include rules for profile identification, profile information retrieval, creation, modification, and/or control of components in the system **800**.

By way of example, a user **216** may enter the vehicle **104** with a smart phone or other device **212**. In response to determining that a user **216** is inside the vehicle **104**, the profile identification module **848** may determine that a user profile is associated with the user's smart phone **212**. As another example, the system **800** may receive information about a user **216** (e.g., from a camera **878**, microphone **886**, etc.), and, in response to receiving the user information, the profile identification module **848** may refer to the profile database **856** to determine whether the user information matches a user profile stored in the database **856**. It is anticipated that the profile identification module **848** may communicate with the other components of the system to load one or more preferences, settings, and/or conditions based on the user profile. Further, the profile identification module **848** may be configured to control components of the system **800** based on user profile information.

Optionally, data storage **852** may be provided. Like the memory **832**, the data storage **852** may comprise a solid state memory device or devices. Alternatively or in addition, the data storage **852** may comprise a hard disk drive or other random access memory. Similar to the data storage **852**, the profile database **856** may comprise a solid state memory device or devices.

An input/output module **860** and associated ports may be included to support communications over wired networks or links, for example with other communication devices, server devices, and/or peripheral devices. Examples of an input/output module **860** include an Ethernet port, a Universal Serial Bus (USB) port, CAN Bus, Institute of Electrical and Electronics Engineers (IEEE) 1594, or other interface. Users may bring their own devices (e.g., Bring Your Own Device (BYOD), device **212**, etc.) into the vehicle **104** for use with the various systems disclosed. Although most BYOD devices can connect to the vehicle systems (e.g., the media controller subsystem **348**, etc.) via wireless communications protocols (e.g., Wi-Fi™, Bluetooth®, etc.) many devices may require a direct connection via USB, or similar. In any event, the input/output module **860** can provide the necessary connection of one or more devices to the vehicle systems described herein.

A video input/output interface **864** can be included to receive and transmit video signals between the various components in the system **800**. Optionally, the video input/output interface **864** can operate with compressed and uncompressed video signals. The video input/output interface **864** can support high data rates associated with image capture devices. Additionally or alternatively, the video input/output interface **864** may convert analog video signals to digital signals.

The infotainment system **870** may include information media content and/or entertainment content, informational devices, entertainment devices, and the associated programming therefor. Optionally, the infotainment system **870** may

be configured to handle the control of one or more components of the system **800** including, but in no way limited to, radio, streaming audio/video devices, audio devices **880**, **882**, **886**, video devices **878**, **882**, travel devices (e.g., GPS, navigational systems, etc.), wireless communication devices, network devices, and the like. Further, the infotainment system **870** can provide the functionality associated with other infotainment features as provided herein.

An audio input/output interface **874** can be included to provide analog audio to an interconnected speaker **880** or other device, and to receive analog audio input from a connected microphone **886** or other device. As an example, the audio input/output interface **874** may comprise an associated amplifier and analog to digital converter. Alternatively or in addition, the devices **212**, **248** can include integrated audio input/output devices **880**, **886** and/or an audio jack for interconnecting an external speaker **880** or microphone **886**. For example, an integrated speaker **880** and an integrated microphone **886** can be provided, to support near talk, voice commands, spoken information exchange, and/or speaker phone operations.

Among other things, the system **800** may include devices that are part of the vehicle **104** and/or part of a device **212**, **248** that is associated with the vehicle **104**. For instance, these devices may be configured to capture images, display images, capture sound, and present sound. Optionally, the system **800** may include at least one of image sensors/cameras **878**, display devices **882**, audio input devices/microphones **886**, and audio output devices/speakers **880**. The cameras **878** can be included for capturing still and/or video images. Alternatively or in addition, image sensors **878** can include a scanner or code reader. An image sensor/camera **878** can include or be associated with additional elements, such as a flash or other light source. In some cases, the display device **882** may include an audio input device and/or an audio output device in addition to providing video functions. For instance, the display device **882** may be a console, monitor, a tablet computing device, and/or some other mobile computing device.

FIG. **8**B is a block diagram of an embodiment of a user/device interaction subsystem **817** in a vehicle system **800**. The user/device interaction subsystem **817** may comprise hardware and/or software that conduct various operations for or with the vehicle **104**. For instance, the user/device interaction subsystem **817** may include at least one user interaction subsystem **332** and device interaction subsystem **352** as previously described. These operations may include, but are not limited to, providing information to the user **216**, receiving input from the user **216**, and controlling the functions or operation of the vehicle **104**, etc. Among other things, the user/device interaction subsystem **817** may include a computing system operable to conduct the operations as described herein.

Optionally, the user/device interaction subsystem **817** can include one or more of the components and modules provided herein. For instance, the user/device interaction subsystem **817** can include one or more of a video input/output interface **864**, an audio input/output interface **874**, a sensor module **814**, a device interaction module **818**, a user identification module **822**, a vehicle control module **826**, an environmental control module **830**, and a gesture control module **834**. The user/device interaction subsystem **817** may be in communication with other devices, modules, and components of the system **800** via the communications channel **356**.

The user/device interaction subsystem **817** may be configured to receive input from a user **216** and/or device via one or more components of the system. By way of example, a user **216** may provide input to the user/device interaction subsystem **817** via wearable devices **802**, **806**, **810**, video input (e.g., via at least one image sensor/camera **878**, etc.) audio input (e.g., via the microphone, audio input source, etc.), gestures (e.g., via at least one image sensor **878**, motion sensor **888**, etc.), device input (e.g., via a device **212**, **248** associated with the user, etc.), combinations thereof, and the like.

The wearable devices **802**, **806**, **810** can include heart rate monitors, blood pressure monitors, glucose monitors, pedometers, movement sensors, wearable computers, and the like. Examples of wearable computers may be worn by a user **216** and configured to measure user activity, determine energy spent based on the measured activity, track user sleep habits, determine user oxygen levels, monitor heart rate, provide alarm functions, and more. It is anticipated that the wearable devices **802**, **806**, **810** can communicate with the user/device interaction subsystem **817** via wireless communications channels or direct connection (e.g., where the device docks, or connects, with a USB port or similar interface of the vehicle **104**).

A sensor module **814** may be configured to receive and/or interpret input provided by one or more sensors in the vehicle **104**. In some cases, the sensors may be associated with one or more user devices (e.g., wearable devices **802**, **806**, **810**, smart phones **212**, mobile computing devices **212**, **248**, and the like). Optionally, the sensors may be associated with the vehicle **104**, as described in conjunction with FIGS. **6**A-**7**B.

The device interaction module **818** may communicate with the various devices as provided herein. Optionally, the device interaction module **818** can provide content, information, data, and/or media associated with the various subsystems of the vehicle system **800** to one or more devices **212**, **248**, **802**, **806**, **810**, **882**, etc. Additionally or alternatively, the device interaction module **818** may receive content, information, data, and/or media associated with the various devices provided herein.

The user identification module **822** may be configured to identify a user **216** associated with the vehicle **104**. The identification may be based on user profile information that is stored in profile data **252**. For instance, the user identification module **822** may receive characteristic information about a user **216** via a device, a camera, and/or some other input. The received characteristics may be compared to data stored in the profile data **252**. Where the characteristics match, the user **216** is identified. As can be appreciated, where the characteristics do not match a user profile, the user identification module **822** may communicate with other subsystems in the vehicle **104** to obtain and/or record profile information about the user **216**. This information may be stored in a memory and/or the profile data storage **252**.

The vehicle control module **826** may be configured to control settings, features, and/or the functionality of a vehicle **104**. In some cases, the vehicle control module **826** can communicate with the vehicle control system **204** to control critical functions (e.g., driving system controls, braking, accelerating, etc.) and/or noncritical functions (e.g., driving signals, indicator/hazard lights, mirror controls, window actuation, etc.) based at least partially on user/device input received by the user/device interaction subsystem **817**.

The environmental control module **830** may be configured to control settings, features, and/or other conditions associated with the environment, especially the interior environment, of a vehicle **104**. Optionally, the environmental control module **830** may communicate with the climate control system (e.g. changing cabin temperatures, fan speeds, air direction, etc.), oxygen and/or air quality control system (e.g., increase/decrease oxygen in the environment, etc.), interior

lighting (e.g., changing intensity of lighting, color of lighting, etc.), an occupant seating system **648** (e.g., adjusting seat position, firmness, height, etc.), steering wheel **640** (e.g., position adjustment, etc.), infotainment/entertainment system (e.g., adjust volume levels, display intensity adjustment, change content, etc.), and/or other systems associated with the vehicle environment. Additionally or alternatively, these systems can provide input, setpoints, and/or responses, to the environmental control module **830**. As can be appreciated, the environmental control module **830** may control the environment based at least partially on user/device input received by the user/device interaction subsystem **817**.

The gesture control module **834** is configured to interpret gestures provided by a user **216** in the vehicle **104**. Optionally, the gesture control module **834** may provide control signals to one or more of the vehicle systems **300** disclosed herein. For example, a user **216** may provide gestures to control the environment, critical and/or noncritical vehicle functions, the infotainment system, communications, networking, and more. Optionally, gestures may be provided by a user **216** and detected via one or more of the sensors as described in conjunction with FIGS. **6**B-**7**A. As another example, one or more motion sensors **888** may receive gesture input from a user **216** and provide the gesture input to the gesture control module **834**. Continuing this example, the gesture input is interpreted by the gesture control module **834**. This interpretation may include comparing the gesture input to gestures stored in a memory. The gestures stored in memory may include one or more functions and/or controls mapped to specific gestures. When a match is determined between the detected gesture input and the stored gesture information, the gesture control module **834** can provide a control signal to any of the systems/subsystems as disclosed herein.

FIG. **8**C illustrates a GPS/Navigation subsystem(s) **336**. The Navigation subsystem(s) **336** can be any present or future-built navigation system that may use location data, for example, from the Global Positioning System (GPS), to provide navigation information or control the vehicle **104**. The Navigation subsystem(s) **336** can include several components or modules, such as, one or more of, but not limited to, a GPS Antenna/receiver **892**, a location module **896**, a maps database **8100**, an automobile controller **8104**, a vehicle systems transceiver **8108**, a traffic controller **8112**, a network traffic transceiver **8116**, a vehicle-to-vehicle transceiver **8120**, a traffic information database **8124**, etc. Generally, the several components or modules **892**-**8124** may be hardware, software, firmware, computer readable media, or combinations thereof.

A GPS Antenna/receiver **892** can be any antenna, GPS puck, and/or receiver capable of receiving signals from a GPS satellite or other navigation system, as mentioned hereinbefore. The signals may be demodulated, converted, interpreted, etc. by the GPS Antenna/receiver **892** and provided to the location module **896**. Thus, the GPS Antenna/receiver **892** may convert the time signals from the GPS system and provide a location (e.g., coordinates on a map) to the location module **896**. Alternatively, the location module **896** can interpret the time signals into coordinates or other location information.

The location module **896** can be the controller of the satellite navigation system designed for use in automobiles. The location module **896** can acquire position data, as from the GPS Antenna/receiver **892**, to locate the user or vehicle **104** on a road in the unit's map database **8100**. Using the road database **8100**, the location module **896** can give directions to other locations along roads also in the database **8100**. When a GPS signal is not available, the location module **896** may apply dead reckoning to estimate distance data from sensors **242** including one or more of, but not limited to, a speed sensor attached to the drive train of the vehicle **104**, a gyroscope, an accelerometer, etc. GPS signal loss and/or multipath can occur due to urban canyons, tunnels, and other obstructions. Additionally or alternatively, the location module **896** may use known locations of Wi-Fi hotspots, cell tower data, etc. to determine the position of the vehicle **104**, such as by using time difference of arrival (TDOA) and/or frequency difference of arrival (FDOA) techniques.

The maps database **8100** can include any hardware and/or software to store information about maps, geographical information system information, location information, etc. The maps database **8100** can include any data definition or other structure to store the information. Generally, the maps database **8100** can include a road database that may include one or more vector maps of areas of interest. Street names, street numbers, house numbers, and other information can be encoded as geographic coordinates so that the user can find some desired destination by street address. Points of interest (waypoints) can also be stored with their geographic coordinates. For example, a point of interest may include speed cameras, fuel stations, public parking, and "parked here" (or "you parked here") information. The map database contents can be produced or updated by a server connected through a wireless system in communication with the Internet, even as the vehicle **104** is driven along existing streets, yielding an up-to-date map.

An automobile controller **8104** can be any hardware and/or software that can receive instructions from the location module **896** or the traffic controller **8112** and operate the vehicle **104**. The automobile controller **8104** receives this information and data from the sensors **242** to operate the vehicle **104** without driver input. Thus, the automobile controller **8104** can drive the vehicle **104** along a route provided by the location module **896**. The route may be adjusted by information sent from the traffic controller **8112**. Discrete and real-time driving can occur with data from the sensors **242**. To operate the vehicle **104**, the automobile controller **8104** can communicate with a vehicle systems transceiver **8108**.

The vehicle systems transceiver **8108** can be any present or future-developed device that can comprise a transmitter and/or a receiver, which may be combined and can share common circuitry or a single housing. The vehicle systems transceiver **8108** may communicate or instruct one or more of the vehicle control subsystems **328**. For example, the vehicle systems transceiver **8108** may send steering commands, as received from the automobile controller **8104**, to an electronic steering system, to adjust the steering of the vehicle **100** in real time. The automobile controller **8104** can determine the effect of the commands based on received sensor data **242** and can adjust the commands as need be. The vehicle systems transceiver **8108** can also communicate with the braking system, the engine and drive train to speed or slow the car, the signals (e.g., turn signals and brake lights), the headlights, the windshield wipers, etc. Any of these communications may occur over the components or function as described in conjunction with FIG. **4**.

A traffic controller **8112** can be any hardware and/or software that can communicate with an automated traffic system and adjust the function of the vehicle **104** based on instructions from the automated traffic system. An automated traffic system is a system that manages the traffic in a given area. This automated traffic system can instruct cars to drive in certain lanes, instruct cars to raise or lower their speed, instruct a car to change their route of travel, instruct cars to

communicate with other cars, etc. To perform these functions, the traffic controller **8112** may register the vehicle **104** with the automated traffic system and then provide other information including the route of travel. The automated traffic system can return registration information and any required instructions. The communications between the automated traffic system and the traffic controller **8112** may be received and sent through a network traffic transceiver **8116**.

The network traffic transceiver **8116** can be any present or future-developed device that can comprise a transmitter and/or a receiver, which may be combined and can share common circuitry or a single housing. The network traffic transceiver **8116** may communicate with the automated traffic system using any known or future-developed, protocol, standard, frequency, bandwidth range, etc. The network traffic transceiver **8116** enables the sending of information between the traffic controller **8112** and the automated traffic system.

The traffic controller **8112** can also communicate with another vehicle, which may be in physical proximity (i.e., within range of a wireless signal), using the vehicle-to-vehicle transceiver **8120**. As with the network traffic transceiver **8116**, the vehicle-to-vehicle transceiver **8120** can be any present or future-developed device that can comprise a transmitter and/or a receiver, which may be combined and can share common circuitry or a single housing. Generally, the vehicle-to-vehicle transceiver **8120** enables communication between the vehicle **104** and any other vehicle. These communications allow the vehicle **104** to receive traffic or safety information, control or be controlled by another vehicle, establish an alternative communication path to communicate with the automated traffic system, establish a node including two or more vehicle that can function as a unit, etc. The vehicle-to-vehicle transceiver **8120** may communicate with the other vehicles using any known or future-developed, protocol standard, frequency, bandwidth range, etc.

The traffic controller **8112** can control functions of the automobile controller **8104** and communicate with the location module **896**. The location module **896** can provide current location information and route information that the traffic controller **8112** may then provide to the automated traffic system. The traffic controller **8112** may receive route adjustments from the automated traffic system that are then sent to the location module **896** to change the route. Further, the traffic controller **8112** can also send driving instructions to the automobile controller **8104** to change the driving characteristics of the vehicle **104**. For example, the traffic controller **8112** can instruct the automobile controller **8104** to accelerate or decelerate to a different speed, change lanes, or perform another driving maneuver. The traffic controller **8112** can also manage vehicle-to-vehicle communications and store information about the communications or other information in the traffic information database **8124**.

The traffic information database **8124** can be any type of database, such as relational, hierarchical, object-oriented, and/or the like. The traffic information database **8124** may reside on a storage medium local to (and/or resident in) the vehicle control system **204** or in the vehicle **104**. The traffic information database **8124** may be adapted to store, update, and retrieve information about communications with other vehicles or any active instructions from the automated traffic system. This information may be used by the traffic controller **8112** to instruct or adjust the performance of driving maneuvers.

FIG. **9** illustrates an optional communications architecture where, the host device **908** may include one more routing profiles, permission modules, and rules that control how communications within the vehicle **104** are to occur. This communications architecture can be used in conjunction with the routing tables, rules and permissions associated with access point **456** and optional firewall **484**, or can be in lieu thereof. For example, the host device **908** acts as a mobile hot spot to one or more other devices within vehicle **104**, such as, other device 1 **912**, other device 2 **916**, other device 3 **920**, and other device N **924**. Optionally, one or more of the other devices **912** can communicate directly with the host device **908** which then provides Internet access to those devices **912** via the device **908**. The host device **908** can act as a mobile hot spot for any one or more of the other devices **912**, which may not need to communicate over the network/communications buses **224/404**, but could instead connect directly to the host device **908** via, for example, NFC, Bluetooth®, WiFi, or the like. When the device **908** is acting as the host device, the device **908** can include one or more routing profiles, permissions, rules modules, and can also act as a firewall for the various inter and intra vehicle communications.

As will be appreciated, there could be alternative host devices, such as, host **904** which could also act as, for example, a co-host in association with device **908**. Optionally, one or more of the routing profile, permission information, and rules could be shared between the co-host devices **904**, **908**, both of those devices being usable for Internet access for one or more of the other devices, **912-924**. As will be appreciated, the other devices **912-924** need not necessarily connect to one or more of host device **908** and the other device **904** via a direct communications link, but could also interface with those devices **904**, **908** utilizing the network/communications buses **224/404** associated with the vehicle **100**. As previously discussed, one or more of the other devices can connect to the network/communications buses **224/404** utilizing the various networks and/or buses discussed herein which would therefore enable, for example, regulation of the various communications based on the Ethernet zone that the other device **912** is associated with.

An embodiment of one or more modules that may be associated with the vehicle control system **204** may be as shown in FIG. **10**. The modules can include a communication subsystem interface **1008** in communication with an operating system **1004**. The communications may pass through a firewall **1044**. The firewall **1044** can be any software that can control the incoming and outgoing communications by analyzing the data packets and determining whether the packets should be allowed through the firewall, based on applied rule set. A firewall **1044** can establish a "barrier" between a trusted, secure internal network and another network (e.g., the Internet) that is not assumed to be secure and trusted.

In some situations, the firewall **1044** may establish security zones that are implemented by running system services and/or applications in restricted user groups and accounts. A set of configuration files and callbacks may then be linked to an IP table firewall. The IP table firewall can be configured to notify a custom filter application at any of the layers of the Ethernet packet. The different users/group rights to access the system may include: system users, which may have exclusive right over all device firewall rules and running software; a big-brother user, which may have access to on board device (OBD) control data and may be able to communicate with the vehicle subsystem **328** and may be able to alter the parameters in the vehicle control system **204**; a dealer user, which can have rights to read OBD data for diagnostics and repairs; a dashboard user, which can have rights to launch dashboard applications and/or authenticate guest users and change their permissions to trusted/friend/family, and can read but cannot write into OBD diagnostic data; a world wide web (WWW) data user, which can have HTTP rights to respond to HTTP

requests (the HTTP requests also can target different user data, but may be filtered by default user accounts); a guest user, which may have no rights; a family/friend user, which may have rights to play media from the media subsystem **348** and/or to stream media to the media subsystem **348**.

The operating system **1004** can be a collection of software that manages computer hardware resources and provides common services for applications and other programs. The operating system **1004** may schedule time-sharing for efficient use of the system. For hardware functions, such as input, output, and memory allocation, the operating system **1004** can act as an intermediary between applications or programs and the computer hardware. Examples of operating systems that may be deployed as operating system **1004** include Android, BSD, iOS, Linux, OS X, QNX, Microsoft Windows, Windows Phone, IBM z/OS, etc.

The operating system **1004** can include one or more submodules. For example, a desktop manager **1012** can manage one or more graphical user interfaces (GUI) in a desktop environment. Desktop GUIs can help the user to easily access and edit files. A command-line interface (CLI) may be used if full control over the operating system (OS) **1004** is required. The desktop manager **1012** is described further hereinafter.

A kernel **1028** can be a computer program that manages input/output requests from software and translates them into data processing instructions for the processor **304** and other components of the vehicle control system **204**. The kernel **1028** is the fundamental component of the operating system **1004** that can execute many of the functions associated with the OS **1004**.

The kernel **1028** can include other software functions, including, but not limited to, driver(s) **1056**, communication software **1052**, and/or Internet Protocol software **1048**. A driver **1056** can be any computer program that operates or controls a particular type of device that is attached to a vehicle control system **204**. A driver **1056** can communicate with the device through the bus **356** or communications subsystem **1008** to which the hardware connects. When a calling program invokes a routine in the driver **1056**, the driver **1056** may issue one or more commands to the device. Once the device sends data back to the driver **1056**, the driver **1056** may invoke routines in the original calling program. Drivers can be hardware-dependent and operating-system-specific. Driver(s) **1056** can provide the interrupt handling required for any necessary asynchronous time-dependent hardware interface.

The IP module **1048** can conduct any IP addressing, which may include the assignment of IP addresses and associated parameters to host interfaces. The address space may include networks and sub-networks. The IP module **1048** can perform the designation of network or routing prefixes and may conduct IP routing, which transports packets across network boundaries. Thus, the IP module **1048** may perform all functions required for IP multicast operations.

The communications module **1052** may conduct all functions for communicating over other systems or using other protocols not serviced by the IP module **1048**. Thus, the communications module **1052** can manage multicast operations over other busses or networks not serviced by the IP module **1048**. Further, the communications module **1052** may perform or manage communications to one or more devices, systems, data stores, services, etc. that are in communication with the vehicle control system **204** or other subsystems through the firewall **1044**. Thus, the communications module **1052** can conduct communications through the communication subsystem interface **1008**.

A file system **1016** may be any data handling software that can control how data is stored and retrieved. The file system **1016** can separate the stored data into individual pieces, and giving each piece a name, can easily separate and identify the pieces of data. Each piece of data may be considered a "file". The file system **1016** can construct data structure and logic rules used to manage the information and the identifiers for the information. The structure and logic rules can be considered a "file system."

A device discovery daemon **1020** may be a computer program that runs as a background process that can discover new devices that connect with the network **356** or communication subsystem **1008** or devices that disconnect from the network **356** or communication subsystem **1008**. The device discovery daemon **1020** can ping the network **356** (the local subnet) when the vehicle **104** starts, when a vehicle door opens or closes, or upon the occurrence of other events. Additionally or alternatively, the device discovery daemon **1020** may force Bluetooth®, USB, and/or wireless detection. For each device that responds to the ping, the device discovery daemon **1020** can populate the system data **208** with device information and capabilities, using any of one or more protocols, including one or more of, but not limited to, IPv6 Hop-by-Hop Option (HOPOPT), Internet Control Message Protocol (ICMP), Internet Group Management Protocol (IGMP), Gateway-to-Gateway Protocol (GGP), Internet Protocol (IP), Internet Stream Protocol (ST), Transmission Control Protocol (TCP), Exterior Gateway Protocol (EGP), CHAOS, User Datagram Protocol (UDP), etc.

For example, the device discovery daemon **1020** can determine device capabilities based on the opened ports the device exposes. If a camera exposes port **80**, then the device discovery daemon **1020** can determine that the camera is using a Hypertext Transfer Protocol (HTTP). Alternatively, if a device is supporting Universal Plug and Play (UPnP), the system data **208** can include more information, for example, a camera control universal resource locator (URL), a camera zoom URL, etc. When a scan stops, the device discovery daemon **1020** can trigger a dashboard refresh to ensure the user interface reflects the new devices on the desktop.

A desktop manager **1012** may be a computer program that manages the user interface of the vehicle control system **204**. The desktop environment may be designed to be customizable and allow the definition of the desktop configuration look-and-feel for a wide range of appliances or devices from computer desktops, mobile devices, computer tablets, etc. Launcher(s), panels, desktop areas, the desktop background, notifications, panes, etc., can be configured from a dashboard configuration file managed by the desktop manager **1012**. The graphical elements in which the desktop manager **1012** controls can include launchers, the desktop, notification bars, etc.

The desktop may be an area of the display where the applications are running. The desktop can have a custom background. Further, the desktop may be divided into two or more areas. For example, the desktop may be divided into an upper half of a display and a lower half of the display. Each application can be configured to run in a portion of the desktop. Extended settings can be added to the desktop configuration file, such that, some objects may be displayed over the whole desktop or in custom size out of the context of the divided areas.

The notification bar may be a part of a bar display system, which may provide notifications by displaying, for example, icons and/or pop-up windows that may be associated with sound notifications. The notification mechanism can be designed for separate plug-ins, which run in separate processes and may subscribe to a system Intelligent Input Bus (IBUS)/D-BUS event service. The icons on the notifications bar can be accompanied with application short-cuts to asso-

ciated applications, for example, a Bluetooth® manager, a USB manager, radio volume and or tone control, a security firewall, etc.

The desktop manager **1012** may include a windows manager **1032**, an application launcher **1036**, and/or a panel launcher **1040**. Each of these components can control a different aspect of the user interface. The desktop manager **1012** can use a root window to create panels that can include functionality for one or more of, but not limited to: launching applications, managing applications, providing notifications, etc.

The windows manager **1032** may be software that controls the placement and appearance of windows within a graphical user interface presented to the user. Generally, the windows manager **1032** can provide the desktop environment used by the vehicle control system **204**. The windows manager **1032** can communicate with the kernel **1028** to interface with the graphical system that provides the user interface(s) and supports the graphics hardware, pointing devices, keyboard, touch-sensitive screens, etc. The windows manager **1032** may be a tiling window manager (i.e., a window manager with an organization of the screen into mutually non-overlapping frames, as opposed to a coordinate-based stacking of overlapping objects (windows) that attempts to fully emulate the desktop metaphor). The windows manager **1032** may read and store configuration files, in the system data **208**, which can control the position of the application windows at precise positions.

An application manager **1036** can control the function of any application over the lifetime of the process. The process or application can be launched from a panel launcher **1040** or from a remote console. The application manager **1036** can intercept the process name and may take appropriate action to manage that process. If the process is not running, the application manager **1036** can load the process and may bring the process to a foreground in a display. The application manager **1036** may also notify the windows manager **1032** to bring the associated window(s) to a top of a window stack for the display. When a process starts from a shell or a notification out of the context of the desktop, the application manager **1036** can scan files to match the process name with the entry name provided. When a match is found, the application manager **1036** can configure the process according to a settings file.

In some situations, the application manager **1036** may restrict an application as singleton (i.e., restricts the instantiation of a class to one object). If an application is already running and the application manager **1036** is asked to run the application again, the application manager **1036** can bring the running process to a foreground on a display. There can be a notification event exchange between the windows manager **1032** and the application manager **1036** for activating the appropriate window for the foreground process. Once an application is launched, the application may not be terminated or killed. The application can be sent to the background, except, possibly, for some applications (e.g., media player, Bluetooth®, notifications, etc.), which may be given a lowest process priority.

The panel launcher **1040** can be a widget configured to be placed along a portion of the display. The panel launcher **1040** may be built from desktop files from a desktop folder. The desktop folder location can be configured by a configuration file stored in system data **208**. The panel launcher **1040** can allow for the launching or executing of applications or processes by receiving inputs from a user interface to launch programs.

A desktop plugin **1024** may be a software component that allows for customization of the desktop or software interface through the initiation of plug-in applications.

One or more gestures used to interface with the vehicle control system **204** may be as described in conjunction with FIG. **11**A through **11**K. FIGS. **11**A through **11**H depict various graphical representations of gesture inputs that may be recognized by the devices **212**, **248**. The gestures may be performed not only by a user's body part, such as a digit, but also by other devices, such as a stylus, that may be sensed by the contact sensing portion(s) of a screen associated with the device **212**, **248**. In general, gestures are interpreted differently, based on where the gestures are performed (either directly on a display or in a gesture capture region). For example, gestures in a display may be directed to a desktop or application, and gestures in a gesture capture region may be interpreted as for the system.

With reference to FIGS. **11**A-**11**H, a first type of gesture, a touch gesture **1120**, is substantially stationary on a portion (e.g., a screen, a display, etc.) of a device **212**, **248** for a selected length of time. A circle **1128** represents a touch or other contact type received at particular location of a contact sensing portion of the screen. The circle **1128** may include a border **1132**, the thickness of which indicates a length of time that the contact is held substantially stationary at the contact location. For instance, a tap **1120** (or short press) has a thinner border **1132**A than the border **1132**B for a long press **1124** (or for a normal press). The long press **1124** may involve a contact that remains substantially stationary on the screen for longer time period than that of a tap **1120**. As will be appreciated, differently defined gestures may be registered depending upon the length of time that the touch remains stationary prior to contact cessation or movement on the screen.

With reference to FIG. **11**C, a drag gesture **1100** on the screen is an initial contact (represented by circle **1128**) with contact movement **1136** in a selected direction. The initial contact **1128** may remain stationary on the screen for a certain amount of time represented by the border **1132**. The drag gesture typically requires the user to contact an icon, window, or other displayed image at a first location followed by movement of the contact in a drag direction to a new second location desired for the selected displayed image. The contact movement need not be in a straight line but have any path of movement so long as the contact is substantially continuous from the first to the second locations.

With reference to FIG. **11**D, a flick gesture **1104** on the screen is an initial contact (represented by circle **1128**) with truncated contact movement **1136** (relative to a drag gesture) in a selected direction. A flick may have a higher exit velocity for the last movement in the gesture compared to the drag gesture. The flick gesture can, for instance, be a finger snap following initial contact. Compared to a drag gesture, a flick gesture generally does not require continual contact with the screen from the first location of a displayed image to a predetermined second location. The contacted displayed image is moved by the flick gesture in the direction of the flick gesture to the predetermined second location. Although both gestures commonly can move a displayed image from a first location to a second location, the temporal duration and distance of travel of the contact on the screen is generally less for a flick than for a drag gesture.

With reference to FIG. **11**E, a pinch gesture **1108** on the screen is depicted. The pinch gesture **1108** may be initiated by a first contact **1128**A to the screen by, for example, a first digit and a second contact **1128**B to the screen by, for example, a second digit. The first and second contacts **1128**A,B may be detected by a common contact sensing portion of a common

screen, by different contact sensing portions of a common screen, or by different contact sensing portions of different screens. The first contact **1128**A is held for a first amount of time, as represented by the border **1132**A, and the second contact **1128**B is held for a second amount of time, as represented by the border **1132**B. The first and second amounts of time are generally substantially the same, and the first and second contacts **1128**A,B generally occur substantially simultaneously. The first and second contacts **1128**A,B generally also include corresponding first and second contact movements **1136**A,B, respectively. The first and second contact movements **1136**A,B are generally in opposing directions. Stated another way, the first contact movement **1136**A is towards the second contact **1136**B, and the second contact movement **1136**B is towards the first contact **1136**A. More simply stated, the pinch gesture **1108** may be accomplished by a user's digits touching the screen in a pinching motion.

With reference to FIG. **11**F, a spread gesture **1110** on the screen is depicted. The spread gesture **1110** may be initiated by a first contact **1128**A to the screen by, for example, a first digit, and a second contact **1128**B to the screen by, for example, a second digit. The first and second contacts **1128**A,B may be detected by a common contact sensing portion of a common screen, by different contact sensing portions of a common screen, or by different contact sensing portions of different screens. The first contact **1128**A is held for a first amount of time, as represented by the border **1132**A, and the second contact **1128**B is held for a second amount of time, as represented by the border **1132**B. The first and second amounts of time are generally substantially the same, and the first and second contacts **1128**A,B generally occur substantially simultaneously. The first and second contacts **1128**A,B generally also include corresponding first and second contact movements **1136**A,B, respectively. The first and second contact movements **1136**A,B are generally in an opposing direction. Stated another way, the first and second contact movements **1136**A,B are away from the first and second contacts **1128**A,B. More simply stated, the spread gesture **1110** may be accomplished by a user's digits touching the screen in a spreading motion.

The above gestures may be combined in any manner, such as those shown by FIGS. **11**G and **11**H, to produce a determined functional result. For example, in FIG. **11**G a tap gesture **1120** is combined with a drag or flick gesture **1112** in a direction away from the tap gesture **1120**. In FIG. **11**H, a tap gesture **1120** is combined with a drag or flick gesture **1116** in a direction towards the tap gesture **1120**.

The functional result of receiving a gesture can vary depending on a number of factors, including a state of the vehicle **104**, display, or screen of a device, a context associated with the gesture, or sensed location of the gesture, etc. The state of the vehicle **104** commonly refers to one or more of a configuration of the vehicle **104**, a display orientation, and user and other inputs received by the vehicle **104**. Context commonly refers to one or more of the particular application(s) selected by the gesture and the portion(s) of the application currently executing, whether the application is a single- or multi-screen application, and whether the application is a multi-screen application displaying one or more windows. A sensed location of the gesture commonly refers to whether the sensed set(s) of gesture location coordinates are on a touch sensitive display or a gesture capture region of a device **212**, **248**, whether the sensed set(s) of gesture location coordinates are associated with a common or different display, or screen, or device **212**, **248**, and/or what portion of the gesture capture region contains the sensed set(s) of gesture location coordinates.

A tap, when received by a touch sensitive display of a device **212**, **248**, can be used, for instance, to select an icon to initiate or terminate execution of a corresponding application, to maximize or minimize a window, to reorder windows in a stack, and/or to provide user input such as by keyboard display or other displayed image. A drag, when received by a touch sensitive display of a device **212**, **248**, can be used, for instance, to relocate an icon or window to a desired location within a display, to reorder a stack on a display, or to span both displays (such that the selected window occupies a portion of each display simultaneously). A flick, when received by a touch sensitive display of a device **212**, **248** or a gesture capture region, can be used to relocate a window from a first display to a second display or to span both displays (such that the selected window occupies a portion of each display simultaneously). Unlike the drag gesture, however, the flick gesture is generally not used to move the displayed image to a specific user-selected location but to a default location that is not configurable by the user.

The pinch gesture, when received by a touch sensitive display or a gesture capture region of a device **212**, **248**, can be used to minimize or otherwise increase the displayed area or size of a window (typically when received entirely by a common display), to switch windows displayed at the top of the stack on each display to the top of the stack of the other display (typically when received by different displays or screens), or to display an application manager (a "pop-up window" that displays the windows in the stack). The spread gesture, when received by a touch sensitive display or a gesture capture region of a device **212**, **248**, can be used to maximize or otherwise decrease the displayed area or size of a window, to switch windows displayed at the top of the stack on each display to the top of the stack of the other display (typically when received by different displays or screens), or to display an application manager (typically when received by an off-screen gesture capture region on the same or different screens).

The combined gestures of FIG. **11**G, when received by a common display capture region in a common display or screen of a device **212**, **248**, can be used to hold a first window location constant for a display receiving the gesture while reordering a second window location to include a window in the display receiving the gesture. The combined gestures of FIG. **11**H, when received by different display capture regions in a common display or screen of a device **212**, **248** or in different displays or screens of one more devices **212**, **248**, can be used to hold a first window location for a display receiving the tap part of the gesture while reordering a second window location to include a window in the display receiving the flick or drag gesture. Although specific gestures and gesture capture regions in the preceding examples have been associated with corresponding sets of functional results, it is to be appreciated that these associations can be redefined in any manner to produce differing associations between gestures and/or gesture capture regions and/or functional results.

Gestures that may be completed in three-dimensional space and not on a touch sensitive screen or gesture capture region of a device **212**, **248** may be as shown in FIGS. **11**I-**11**K. The gestures may be completed in an area where a sensor, such as an optical sensor, infrared sensor, or other type of sensor, may detect the gesture. For example, the gesture **1140** in FIG. **11**I may be executed by a person when the person opens their hand **1164** and moves their hand in a back and forth direction **1148** as a gesture **1140** to complete some function with the vehicle **104**. For example gesture **1140** may change the station of the radio in the vehicle **104**. The sensors **242** may both determine the configuration of the hand **1164**

and the vector of the movement. The vector and hand configuration can be interpreted to mean certain things to the vehicle control system **204** and produce different results.

In another example of a gesture **1152** in FIG. **11**J, a user may configure their hand **1164** to extend two fingers and move the hand **1164** in an up and down operation **1156**. This gesture **1152** may control the volume of the radio or some other function. For instance, this gesture **1152** may be configured to place the vehicle in a "valet" mode to, among other things, restrict access to certain features associated with the vehicle. Again, the sensors **242** may determine how the person has configured their hand **1164**, and the vector of the movement. In another example of a gesture **1160** shown in FIG. **11**K, a user may extend their middle three fingers at an angle that is substantially 45° for vertical from straight vertical and circle the hand in a counter-clockwise motion **1166**. This gesture **1160** may cause the automobile to change the heat setting or do some other function. As can be understood by one skilled in the art, the configurations of the hand and the types of movement are variable. Thus, the user may configure the hand **1164** in any way imaginable and may also move that hand **1164** in any direction with any vector in three-dimensional space.

The gestures **1140**, **1152**, **1160**, as shown in FIGS. **11**I-**11**K, may occur in a predetermined volume of space within the vehicle **104**. For example, a sensor may be configured to identify such gestures **1140**, **1152**, **1160** between the front passenger's and front driver's seats over a console area within the passenger compartment of the vehicle **104**. The gestures **1140**, **1152**, **1160** may be made within area 1 **508**A between zones A **512**A and B **512**B. However, there may be other areas **508** where a user may use certain gestures, where sensors **242** may be able to determine a certain function is desired. Gestures that may be similar but used in different areas within the vehicle **104** may cause different functions to be performed. For example, the gesture **1140** in FIG. **11**I, if used in zone E **512**E, may change the heat provided in zone E **512**E, but may change the station of a radio if used in zone A **512**A and/or zone B **512**B. Further, the gestures may be made with other body parts or, for example, different expressions of a person's face and may be used to control functions in the vehicle **104**. Also, the user may use two hands in some circumstances or do other types of physical movements that can cause different reactions in the vehicle **104**.

FIGS. **12**A-**12**D show various embodiments of a data structure **1200** to store different settings. The data structure **1200** may include one or more of data files or data objects **1204**, **1250**, **1270**, **1280**. Thus, the data structure **1200** may represent different types of databases or data storage, for example, object-oriented data bases, flat file data structures, relational database, or other types of data storage arrangements. Embodiments of the data structure **1200** disclosed herein may be separate, combined, and/or distributed. As indicated in FIGS. **12**A-**12**D, there may be more or fewer portions in the data structure **1200**, as represented by ellipses **1244**. Further, there may be more or fewer files in the data structure **1200**, as represented by ellipses **1248**.

Referring to FIG. **12**A, a first data structure is shown. The data file **1204** may include several portions **1208**-**1242** representing different types of data. Each of these types of data may be associated with a user, as shown in portion **1208**.

There may be one or more user records **1240** and associated data stored within the data file **1204**. As provided herein, the user can be any person that uses or rides within the vehicle or conveyance **104**. The user may be identified in portion **1212**. For the vehicle **104**, the user may include a set of one or more features that may identify the user. These features may be the physical characteristics of the person that may be identified by facial recognition or some other type of system. In other situations, the user may provide a unique code to the vehicle control system **204** or provide some other type of data that allows the vehicle control system **204** to identify the user. The features or characteristics of the user are then stored in portion **1212**.

Each user, identified in portion **1208**, may have a different set of settings for each area **508** and/or each zone **512** within the vehicle **104**. Thus, each set of settings may also be associated with a predetermined zone **512** or area **508**. The zone **512** is stored in portion **1220**, and the area **508** is stored in portion **1216**.

One or more settings may be stored in portion **1224**. These settings **1224** may be the configurations of different functions within the vehicle **104** that are specified by or for that user. For example, the settings **1224** may be the position of a seat, the position of a steering wheel, the position of accelerator and/or brake pedals, positions of mirrors, a heating/cooling setting, a radio setting, a cruise control setting, or some other type of setting associated with the vehicle **104**. Further, in vehicles adapted to have a configurable console or a configurable dash or heads-up display, the settings **1224** may also provide for how that heads-up display, dash, or console are configured for this particular user.

Each setting **1224** may be associated with a different area **508** or zone **512**. Thus, there may be more settings **1224** for when the user is the driver and in zone A **512**A, **512**A, of area 1, **508**A. However, there may be similar settings **1224** among the different zones **512** or areas **508** as shown in portion **1224**. For example, the heating or radio settings for the user may be similar in every zone **512**.

The sensors **242** within the vehicle **104** may be able to either obtain or track health data in portion **1228**. Health data **1228** may include any type of physical characteristic associated with the user. For example, a heart rate, a blood pressure, a temperature, or other types of heath data may be obtained and stored in portion **1228**. The user may have this health data tracked over a period of time to allow for statistical analysis of the user's health while operating the vehicle **104**. In this way, if some function of the user's health deviates from a norm (e.g., a baseline measurement, average measurements taken over time, and the like), the vehicle **104** may be able to determine there is a problem with the person and react to that data.

One or more gestures may be stored in portion **1232**. Thus, the gestures used and described in conjunction FIG. **11**A through **11**K may be configurable. These gestures may be determined or created by the user and stored in portion **1132**. A user may have different gestures for each zone **512** or area **508** within the vehicle. The gestures that do certain things while driving may do other things while in a different area **508** of the vehicle **104**. Thus, the user may use a first set of gestures while driving and a second set while a passenger. Further, one or more users may share gestures as shown in portion **1232**. Each driver may have a common set of gestures that they use in zone A **512**A, **512**A. Each of these gestures may be determined or captured and then stored with their characteristics (e.g., vector, position of gesture, etc.) in portion **1232**.

One or more sets of safety parameters may be stored in portion **1236**. Safety parameters **1236** may be common operating characteristics for this driver/passenger or for all drivers/passengers that if deviated from may determine there is a problem with the driver/passenger or the vehicle **104**. For example, a certain route may be taken repeatedly and an average speed or mean speed may be determined. If the mean

speed deviates by some number of standard deviations, a problem with the vehicle **104** or the user may be determined. In another example, the health characteristics or driving experience of the user may be determined. If the user drives in a certain position where their head occupies a certain portion of three-dimensional space within the vehicle **104**, the vehicle control system **204** may determine that the safety parameter includes the users face or head being within this certain portion of the vehicle interior space. If the user's head deviates from that interior space for some amount of time, the vehicle control system **204** can determine that something is wrong with the driver and change the function or operation of the vehicle **104** to assist the driver. This may happen, for example, when a user falls asleep at the wheel. If the user's head droops and no longer occupies a certain three dimensional space, the vehicle control system **204** can determine that the driver has fallen asleep and may take control of the operation of the vehicle **204** and the automobile controller **8104** may steer the vehicle **204** to the side of the road. In other examples, if the user's reaction time is too slow or some other safety parameter is not nominal, the vehicle control system **204** may determine that the user is inebriated or having some other medical problem. The vehicle control system **204** may then assume control of the vehicle to ensure that the driver is safe.

Information corresponding to a user and/or a user profile may be stored in the profile information portion **1238**. For example, the profile information **1238** may include data relating to at least one of current data, historical data, a user preference, user habit, user routine, observation, location data (e.g., programmed and/or requested destinations, locations of parking, routes traveled, average driving time, etc.), social media connections, contacts, brand recognition (e.g., determined via one or more sensors associated with the vehicle **104**, a device **212**, **248**, etc.), audible recording data, text data, email data, political affiliation, preferred retail locations/sites (e.g., physical locations, web-based locations, etc.), recent purchases, behavior associated with the aforementioned data, and the like. The data in the profile information portion **1238** may be stored in one or more of the data structures **1200** provided herein. As can be appreciated, these one or more data structures may be stored in one or more memory locations. Examples of various memory locations are described in conjunction with FIG. **2**.

One or more additional data fields may be stored in the linked data portion **1242** as data and/or locations of data. The linked data **1242** may include at least one of pointers, addresses, location identification, data source information, and other information corresponding to additional data associated with the data structure **1200**. Optionally, the linked data portion **1242** may refer to data stored outside of a particular data structure **1200**. For example, the linked data portion **1242** may include a link/locator to the external data. Continuing this example, the link/locator may be resolved (e.g., via one or more of the methods and/or systems provided herein, etc.) to access the data stored outside of the data structure **1200**. Additionally or alternatively, the linked data portion **1242** may include information configured to link the data objects **1204** to other data files or data objects **1250**, **1270**, **1280**. For instance, the data object **1204** relating to a user may be linked to at least one of a device data object **1250**, a vehicle system data object **1270**, and a vehicle data object **1280**, to name a few.

An embodiment of a data structure **1200** to store information associated with one or more devices is shown in FIG. **12**B. The data file **1250** may include several portions **1216**-**1262** representing different types of data. Each of these types of data may be associated with a device, as shown in portion **1252**.

There may be one or more device records **1250** and associated data stored within the data file **1250**. As provided herein, the device may be any device that is associated with the vehicle **104**. For example, a device may be associated with a vehicle **104** when that device is physically located within the interior space **108** of the vehicle **104**. As another example, a device may be associated with a vehicle **104** when the device registers with the vehicle **104**. Registration may include pairing the device with the vehicle **104** and/or one or more of the vehicle systems (e.g., as provided in FIG. **3**). In some cases, the registration of a device with a vehicle **104** may be performed manually and/or automatically. An example of automatic registration may include detecting, via one or more of the vehicle systems, that a device is inside the vehicle **104**. Upon detecting that the device is inside the vehicle **104**, the vehicle system may identify the device and determine whether the device is or should be registered. Registration may be performed outside of a vehicle **104** via providing a unique code to the vehicle **104** and/or at least one of the vehicle systems.

The device may be identified in portion **1256**. Among other things, the device identification may be based on the hardware associated with the device (e.g., Media Access Control (MAC) address, Burned-In Address (BIA), Ethernet Hardware Address (EHA), physical address, hardware address, and the like).

Optionally, a device may be associated with one or more users. For example, a tablet and/or graphical user interface (GUI) associated with the vehicle **104** may be used by multiple members of a family. For instance, the GUI may be located in a particular area **508** and/or zone **512** of the vehicle **104**. Continuing this example, when a family member is located in the particular area **508** and/or zone **512**, the device may include various settings, features, priorities, capabilities, and the like, based on an identification of the family member. The user may be identified in portion **1254**. For the device, the user identification portion **1254** may include a set of one or more features that may identify a particular user. These features may be the physical characteristics of the person that may be identified by facial recognition, or some other type of system, associated with the device and/or the vehicle **104**. Optionally, the user may provide a unique code to the device, or provide some other type of data, that allows the device to identify the user. The features or characteristics of the user are then stored in portion **1254**.

Each device identified in the device identification portion **1256** may have a different set of settings for each area **508** and/or each zone **512**, and/or each user of the device. Thus, each set of settings may also be associated with a predetermined zone **512**, area **508**, and/or user. The zone **512** is stored in portion **1220** and the area **508** is stored in portion **1216**.

One or more settings may be stored in portion **1224**. These settings **1224** may be similar and/or identical to those previously described. Further, the settings **1224** may also provide for how a device is configured for a particular user. Each setting **1224** may be associated with a different area **508** or zone **512**. Thus, there may be more restrictive settings **1224** (e.g., restricted multimedia, texting, limited access to device functions, and the like) for the device when the user is the driver and in zone A **512**A, **512**A, of area **1**, **508**A. However, when the user is in another zone **512** or area **508**, for example, where the user is not operating a vehicle **104**, the settings **1224** may provide unrestricted access to one or more features of the device (e.g., allowing texting, multimedia, etc.).

Optionally, the capabilities of a device may be stored in portion **1258**. Examples of device capabilities may include, but are not limited to, a communications ability (e.g., via wireless network, EDGE, 3G, 4G, LTE, wired, Bluetooth®, Near Field Communications (NFC), Infrared (IR), etc.), hardware associated with the device (e.g., cameras, gyroscopes, accelerometers, touch interface, processor, memory, display, etc.), software (e.g., installed, available, revision, release date, etc.), firmware (e.g., type, revision, etc.), operating system, system status, and the like. Optionally, the various capabilities associated with a device may be controlled by one or more of the vehicle systems provided herein. Among other things, this control allows the vehicle **104** to leverage the power and features of various devices to collect, transmit, and/or receive data.

One or more priorities may be stored in portion **1260**. The priority may correspond to a value, or combination of values, configured to determine how a device interacts with the vehicle **104** and/or its various systems. The priority may be based on a location of the device (e.g., as stored in portions **1216**, **1220**). A default priority can be associated with each area **508** and/or zone **512** of a vehicle **104**. For example, the default priority associated with a device found in zone 1 **512**A of area 1 **508**A (e.g., a vehicle operator position) may be set higher than an (or the highest of any) alternative zone **512** or area **508** of the vehicle **104**. Continuing this example, the vehicle **104** may determine that, although other devices are found in the vehicle, the device, having the highest priority, controls features associated with the vehicle **104**. These features may include vehicle control features, critical and/or non-critical systems, communications, and the like. Additionally or alternatively, the priority may be based on a particular user associated with the device. Optionally, the priority may be used to determine which device will control a particular signal in the event of a conflict.

Registration data may be stored in portion **1262**. As described above, when a particular device registers with a vehicle **104**, data related to the registration may be stored in the registration data portion **1262**. Such data may include, but is not limited to, registration information, registration codes, initial registration time, expiration of registration, registration timers, and the like. Optionally, one or more systems of the vehicle **104** may refer to the registration data portion **1262** to determine whether a device has been previously registered with the vehicle **104**. As shown in FIG. **12**B, User 4 of Device 2 has not been registered. In this case, the registration data field **1262**, for this user, may be empty, contain a null value, or other information/indication that there is no current registration information associated with the user.

Additionally or alternatively, the data structure **1200** may include a profile information portion **1238** and/or a linked data portion **1242**. Although the profile information portion **1238** and/or the linked data portion **1242** may include different information from that described above, it should be appreciated that the portions **1238**, **1242** may be similar, or identical, to those as previously disclosed.

An embodiment of a data structure **1200** to store information associated with one or more vehicle systems is shown in FIG. **12**C. The data file **1270** may include several portions **1216-1279** representing different types of data. Each of these types of data may be associated with a vehicle system, as shown in portion **1272**.

There may be one or more system records **1270** and associated data stored within the data file **1270**. As provided herein, the vehicle systems may be any system and/or subsystem that is associated with the vehicle **104**. Examples of various systems are described in conjunction with FIG. **3** and other related figures (e.g., systems **324-352**, etc.). One example of a system associated with the vehicle **104** is the vehicle control system **204**. Other systems may include communications subsystems **344**, vehicle subsystems **328**, and media subsystems **348**, to name a few. It should be appreciated that the various systems may be associated with the interior space **108** and/or the exterior of the vehicle **104**.

Each system may include one or more components. The components may be identified in portion **1274**. Identification of the one or more components may be based on hardware associated with the component. This identification may include hardware addresses similar to those described in conjunction with the devices of FIG. **12**B. Additionally or alternatively, a component can be identified by one or more signals sent via the component. Such signals may include an Internet Protocol (IP), or similar, address as part of the signal. Optionally, the signal may identify the component sending the signal via one or more of a header, a footer, a payload, and/or an identifier associated with the signal (e.g., a packet of a signal, etc.).

Each system and/or component may include priority type information in portion **1276**. Among other things, the priority type information stored in portion **1276** may be used by the various methods and systems provided herein to differentiate between critical and non-critical systems. Non-limiting examples of critical systems may correspond to those systems used to control the vehicle **104**, such as, steering control, engine control, throttle control, braking control, and/or navigation informational control (e.g., speed measurement, fuel measurement, etc.) Non-critical systems may include other systems that are not directly related to the control of the vehicle **104**. By way of example, non-critical systems may include media presentation, wireless communications, comfort settings systems (e.g., climate control, seat position, seat warmers, etc.), and the like. Although examples of critical and/or non-critical systems are provided above, it should be appreciated that the priority type of a system may change (e.g., from critical to non-critical, from non-critical to critical, etc.) depending on the scenario. For instance, although the interior climate control system may be classified as a non-critical system at a first point in time, it may be subsequently classified as a critical system when a temperature inside/outside of the vehicle **104** is measured at a dangerous level (e.g., sub-zero Fahrenheit, greater than 90-degrees Fahrenheit, etc.). As such, the priority type may be associated with temperature conditions, air quality, times of the day, condition of the vehicle **104**, and the like.

Each system may be associated with a particular area **508** and/or zone **512** of a vehicle **104**. Among other things, the location of a system may be used to assess a state of the system and/or provide how the system interacts with one or more users of the vehicle **104**. As can be appreciated each system may have a different set of settings for each area **508** and/or each zone **512**, and/or each user of the system. Thus, each set of settings may also be associated with a predetermined zone **512**, area **508**, system, and/or user. The zone **512** is stored in portion **1220** and the area **508** is stored in portion **1216**.

One or more settings may be stored in portion **1224**. These settings **1224** may be similar and/or identical to those previously described. Further, the settings **1224** may also provide for how a system is configured for a particular user. Each setting **1224** may be associated with a different area **508** or zone **512**. For instance, a climate control system may be associated with more than one area **508** and/or zone **512**. As such, a first user seated in zone 1 **512**A of area 1 **508**A may store settings related to the climate control of that zone **512**A

that are different from other users and/or zones **512** of the vehicle **104**. Optionally, the settings may not be dependent on a user. For instance, specific areas **508** and/or zones **512** of a vehicle **104** may include different, default, or the same settings based on the information stored in portion **1224**.

The various systems and/or components may be able to obtain or track health status data of the systems and/or components in portion **1278**. The health status **1278** may include any type of information related to a state of the systems. For instance, an operational condition, manufacturing date, update status, revision information, time in operation, fault status, state of damage detected, inaccurate data reporting, and other types of component/system health status data may be obtained and stored in portion **1278**.

Each component and/or system may be configured to communicate with users, systems, servers, vehicles, third parties, and/or other endpoints via one or more communication type. At least one communication ability and/or type associated with a system may be stored in the communication type portion **1279**. Optionally, the communication types contained in this portion **1279** may be ordered in a preferential order of communication types. For instance, a system may be configured to preferably communicate via a wired communication protocol over one or more wired communication channels (e.g., due to information transfer speeds, reliability, and the like). However, in this instance, if the one or more wired communication channels fail, the system may transfer information via an alternative communication protocol and channel (e.g., a wireless communication protocol and wireless communication channel, etc.). Among other things, the methods and systems provided herein may take advantage of the information stored in the communication type portion **1279** to open available communication channels in the event of a communication channel failure, listen on other ports for information transmitted from the systems, provide a reliability rating based on the number of redundant communication types for each component, and more. Optionally, a component or system may be restricted from communicating via a particular communication type (e.g., based on rules, traffic, critical/non-critical priority type, and the like). In this example, the component or system may be forced by the vehicle control system **204** to use an alternate communication type where available, cease communications, or store communications for later transfer.

Additionally or alternatively, the data structure **1200** may include a profile information portion **1238** and/or a linked data portion **1242**. Although the profile information portion **1238** and/or the linked data portion **1242** may include different information from that described above, it should be appreciated that the portions **1238**, **1242** may be similar, or identical, to those as previously disclosed.

Referring now to FIG. **12**D, a data structure **1200** is shown optionally. The data file **1280** may include several portions **1216-1286** representing different types of data. Each of these types of data may be associated with a vehicle, as shown in portion **1282**.

There may be one or more vehicle records **1280** and associated data stored within the data file **1282**. As provided herein, the vehicle **104** can be any vehicle or conveyance **104** as provided herein. The vehicle **104** may be identified in portion **1282**. Additionally or alternatively, the vehicle **104** may be identified by one or more systems and/or subsystems. The various systems of a vehicle **104** may be identified in portion **1284**. For example, various features or characteristics of the vehicle **104** and/or its systems may be stored in portion **1284**. Optionally, the vehicle **104** may be identified via a unique code or some other type of data that allows the vehicle **104** to be identified.

Each system may be associated with a particular area **508** and/or zone **512** of a vehicle **104**. Among other things, the location of a system may be used to assess a state of the system and/or provide how the system interacts with one or more users of the vehicle **104**. As can be appreciated each system may have a different set of settings for each area **508** and/or each zone **512**, and/or each user of the system. Thus, each set of settings may also be associated with a predetermined zone **512**, area **508**, system, and/or user. The zone **512** is stored in portion **1220** and the area **508** is stored in portion **1216**.

One or more settings may be stored in portion **1224**. These settings **1224** may be similar and/or identical to those previously described. Further, the settings **1224** may also provide for how a vehicle and/or its systems are configured for one or more users. Each setting **1224** may be associated with a different area **508** or zone **512**. Optionally, the settings may not be dependent on a particular user. For instance, specific areas **508** and/or zones **512** of a vehicle **104** may include different, default, or the same settings based on the information stored in portion **1224**.

The various systems and/or components may be able to obtain or track health status data of the systems and/or components in portion **1278**. The health status **1278** may include any type of information related to a state of the systems. For instance, an operational condition, manufacturing date, update status, revision information, time in operation, fault status, state of damage detected, inaccurate data reporting, and other types of component/system health status data may be obtained and stored in portion **1278**.

One or more warnings may be stored in portion **1286**. The warnings data **1286** may include warning generated by the vehicle **104**, systems of the vehicle **104**, manufacturer of the vehicle, federal agency, third party, and/or a user associated with the vehicle. For example, several components of the vehicle may provide health status information (e.g., stored in portion **1278**) that, when considered together, may suggest that the vehicle **104** has suffered some type of damage and/or failure. Recognition of this damage and/or failure may be stored in the warnings data portion **1286**. The data in portion **1286** may be communicated to one or more parties (e.g., a manufacturer, maintenance facility, user, etc.). In another example, a manufacturer may issue a recall notification for a specific vehicle **104**, system of a vehicle **104**, and/or a component of a vehicle **104**. It is anticipated that the recall notification may be stored in the warning data field **1286**. Continuing this example, the recall notification may then be communicated to the user of the vehicle **104** notifying the user of the recall issued by the manufacturer.

Additionally or alternatively, the data structure **1200** may include a profile information portion **1238** and/or a linked data portion **1242**. Although the profile information portion **1238** and/or the linked data portion **1242** may include different information from that described above, it should be appreciated that the portions **1238**, **1242** may be similar, or identical, to those as previously disclosed.

An embodiment of a method **1300** for storing settings for a user **216** associated with vehicle **104** is shown in FIG. **13**. While a general order for the steps of the method **1300** is shown in FIG. **13**, the method **1300** can include more or fewer steps or can arrange the order of the steps differently than those shown in FIG. **13**. Generally, the method **1300** starts with a start operation **1304** and ends with an end operation **1336**. The method **1300** can be executed as a set of computer-

executable instructions executed by a computer system and encoded or stored on a computer readable medium. Hereinafter, the method **1300** shall be explained with reference to the systems, components, modules, software, data structures, user interfaces, etc. described in conjunction with FIGS. **1-12**.

A person may enter the vehicle space **108**. One or more sensors **242** may then identify that a person is sitting within the vehicle **104**, in step **1308**. For example, sensors **242** in a seat, may determine that some new amount of weight has been registered. The amount of weight may fall within predetermined parameters (e.g., over a threshold, in a specific range, etc.). This weight may then be determined to be a person by one or more optical or other sensors **242**. The vehicle control system **204** may then determine that a person is in a certain zone **512** or area **508**. For example, the sensors **242** may send signals to the vehicle controls system **204** that an event has occurred. This information may be sent to the vehicle control system processor **304** to determine the zone **512** and area **508** where the event occurred. Further, the vehicle control system **204** may then identify the person, in step **1312**.

The vehicle control system **204** can receive the information from the sensors **242** and use that information to search the database **1200** that may be stored within the system data **208**. The sensor data may be compared to ID characteristics **1212** to determine if the person has already been identified. The vehicle control system **204** may also send the characteristic data from the sensors to the communication network **224** to a server **228** to compare the sensor data to stored data **232** that may be stored in a cloud system. The person's features can be compared to stored features **1212** to determine if the person in the vehicle **104** can be identified.

If the person has been identified previously and their characteristics stored in portion **1212**, the method **1300** proceeds YES to step **1316** where that person may be identified. In identifying a person, the information associated with that person **1240** may be retrieved and provided to the vehicle control system **204** for further action. If a person cannot be identified by finding their sensor characteristics in portion **1212**, the method **1300** proceeds NO to step **1320**. In step **1320**, the vehicle control system **204**, using an application, may create a new record in table **1200** for the user. This new record may store a user identifier and their characteristics **1212**. It may also store the area **508** and zone **512** in data portions **1216** and **1220**. The new record may then be capable of receiving new settings data for this particular user. In this way, the vehicle **104** can automatically identify or characterize a person so that settings may be established for the person in the vehicle **104**.

The input module **312** may then determine if settings are to be stored, in step **1324**. Settings might be any configuration of the vehicle **104** that may be associated with the user. The determination may be made after receiving a user input from the user. For example, the user may make a selection on a touch sensitive display indicating that settings currently made are to be stored. In other situations, a period of time may elapse after the user has made a configuration. After determining that the user is finished making changes to the settings, based on the length of the period of time since the setting was established, the vehicle control system **204** can save the setting. Thus, the vehicle control system **204** can make settings automatically based on reaching a steady state for settings for user.

The vehicle control system **204** may then store the settings for the person, in step **1328**. The user interaction subsystem **332** can make a new entry for the user **1208** in data structure **1204**. The new entry may be either a new user or a new settings listed in **1224**. The settings may be stored based on the area **508** and zone **512**. As explained previously, the settings can be any kind of configuration of the vehicle **104** that may be associated with the user in that area **508** and the zone **512**.

The settings may also be stored in cloud storage, in step **1332**. Thus, the vehicle control system **204** can send the new settings to the server **228** to be stored in storage **232**. In this way, these new settings may be ported to other vehicles for the user. Further, the settings in storage system **232** may be retrieved, if local storage does not include the settings in storage system **208**.

Additionally or alternatively, the settings may be stored in profile data **252**. As provided herein, the profile data **252** may be associated with one or more devices **212**, **248**, servers **228**, vehicle control systems **204**, and the like. Optionally, the settings in profile data **252** may be retrieved in response to conditions. For instance, the settings may be retrieved from at least one source having the profile data if local storage does not include the settings in storage system **208**. As another example, a user **216** may wish to transfer settings stored in profile data **252** to the system data **208**. In any event, the retrieval and transfer of settings may be performed automatically via one or more devices **204**, **212**, **248**, associated with the vehicle **104**.

An embodiment of a method **1400** to configure the vehicle **104** based on stored settings is shown in FIG. **14**. A general order for the steps of the method **1400** is shown in FIG. **14**. Generally, the method **1400** starts with a start operation **1404** and ends with an end operation **1428**. The method **1400** can include more or fewer steps or can arrange the order of the steps differently than those shown in FIG. **14**. The method **1400** can be executed as a set of computer-executable instructions executed by a computer system and encoded or stored on a computer readable medium. Hereinafter, the method **1400** shall be explained with reference to the systems, components, modules, software, data structures, user interfaces, etc. described in conjunction with FIGS. **1-13**.

The vehicle control system **204** can determine if a person is in a zone **512** or area **508**, in step **1408**. This determination may be made by receiving data from one or more sensors **242**. The vehicle **104** can use facial recognition, weight sensors, heat sensors, or other sensors to determine whether a person is occupying a certain zone **512**.

Using the information from the sensors **242**, the vehicle control system **204** can identify the person, in step **1412**. The vehicle control system **204** can obtain characteristics for the user currently occupying the zone **512** and compare those characteristics to the identifying features in portion **1212** of data structure **1204**. Thus, the settings in portion **1224** may be retrieved by identifying the correct zone **512**, area **508**, and characteristics for the user.

The vehicle control system **204** can first determine if there are settings associated with the identified person for that zone **512** and/or area **508**, in step **1416**. After identifying the user by matching characteristics with the features in portion **1212**, the vehicle control system **204** can determine if there are settings for the user for the area **1216** and zone **1220** the user currently occupies. If there are settings, then the vehicle control system **204** can make the determination that there are settings in portion **1224**, and the vehicle control system **204** may then read and retrieve those settings, in step **1420**. The settings may be then used to configure or react to the presence of the user, in step **1424**. Thus, these settings may be obtained to change the configuration of the vehicle **104**, for example, how the position of the seats or mirrors are set, how the dash,

console, or heads up display is configured, how the heat or cooling is configured, how the radio is configured, or how other different configurations are made.

Embodiments of a method **1500** for storing settings in cloud storage are shown in FIG. **15**. A general order for the steps of the method **1500** is shown in FIG. **15**. Generally, the method **1500** starts with a start operation **1504** and ends with an end operation **1540**. The method **1500** can include more or fewer steps or can arrange the order of the steps differently than those shown in FIG. **15**. The method **1500** can be executed as a set of computer-executable instructions executed by a computer system and encoded or stored on a computer readable medium. Hereinafter, the method **1500** shall be explained with reference to the systems, components, modules, software, data structures, user interfaces, etc. described in conjunction with FIGS. **1-14**.

The vehicle control system **204** can determine if a person is in a zone **512** or area **508**, in step **1508**. As explained previously, the vehicle control system **204** can receive vehicle sensor data from vehicle sensors **242** that show a person has occupied a zone **512** or an area **508** of the vehicle **104**. Using the vehicle sensor data, the vehicle control system **204** can determine characteristics of the person, in step **1512**. These characteristics are compared to the features in portion **1212** of the data structure **1204**. From this comparison, the vehicle control system **204** can determine if the person is identified within the data structure **1204**, in step **1516**. If there is a comparison and the person can be identified, the method **1500** proceeds YES to step **1520**. However, if the person cannot be identified, the method **1500** proceeds NO, to step **1524**.

In step **1520**, the person is identified in portion **1208** by the successful comparison of the characteristics and the features. It should be noted that there may be a degree of variability between the characteristics and the features in portion **1212**. Thus, the comparison may not be an exact comparison but may use methods known in the art to make a statistically significant comparison between the characteristics received from the sensors **242** and the features stored in portion **1212**. In step **1524**, the characteristics received from sensors **242** are used to characterize the person. In this way, the received characteristics may be used as an ID, in portion **1212**, for a new entry for a new user in portion **1208**.

The user may make one or more settings for the vehicle **104**. The vehicle control system **204** may determine if the settings are to be stored, in step **1528**. If the settings are to be stored, the method **1500** proceeds YES to step **1536**. If the settings are not to be stored or if there are no settings to be stored, the method **1500** proceeds NO to step **1532**. In step **1532**, the vehicle control system **204** can retrieve the settings in the portion **1224** of the data structure **1204**. Retrieval of the settings may be as described in conjunction with FIG. **14**. If settings are to be stored, the vehicle control system **204** can send those settings to server **228** to be stored in data storage **232**, in step **1536**. Data storage **232** acts as cloud storage that can be used to retrieve information on the settings from other vehicles or from other sources. Thus, the cloud storage **232** allows for permanent and more robust storage of user preferences for the settings of the vehicle **104**.

An embodiment of a method **1600** for storing gestures associated with the user is shown in FIG. **16**. A general order for the steps of the method **1600** is shown in FIG. **16**. Generally, the method **1600** starts with a start operation **1604** and ends with an end operation **1640**. The method **1600** can include more or fewer steps or can arrange the order of the steps differently than those shown in FIG. **16**. The method **1600** can be executed as a set of computer-executable instructions executed by a computer system and encoded or stored on a computer readable medium. Hereinafter, the method **1600** shall be explained with reference to the systems, components, modules, software, data structures, user interfaces, etc. described in conjunction with FIGS. **1-15**.

Vehicle control system **204** may receive sensor data from sensors **242** to determine a person is occupying a zone **512** in an area **508** of the vehicle **104**, in step **1608**. The sensor data may provide characteristics for the person, in step **1612**. The vehicle control system **204** may then use the characteristics to determine if the person can be identified, in step **1616**. The vehicle control system **204** may compare the characteristics to the features in portion **1212** for the people having been recognized and having data associated therewith. If a comparison is made between the characteristics and the features in portion **1212**, the person can be identified, and the method **1600** proceeds YES to step **1620**. If there is no comparison, the method **1600** may proceed NO to step **1624**. In step **1620**, the person may be identified by the vehicle control system **204**. Thus, the person's features and associated data record **1240** may be determined and the user identified in portion **1208**. If the person is not identified, the vehicle control system **204** can characterize the person in step **1624** by establishing a new record in data structure **1204** using the characteristics, received from the sensors **242**, for the features in portion **1212**.

Thereinafter, the vehicle control system **204** may determine if gestures are to be stored and associated with the user, in step **1628**. The vehicle control system **204** may receive user input on a touch sensitive display or some other type of gesture capture region which acknowledges that the user wishes to store one or more gestures. Thus, the user may create their own gestures such as those described in conjunction with FIGS. **11A-11K**. These gestures may then be characterized and stored in data structure **1204**. If there are gestures to be stored, the method **1600** proceeds YES to step **1636**. If gestures are not to be stored the method **1600** may proceed NO to step **1632**.

In step **1632**, the vehicle control system **204** can retrieve current gestures from portion **1232**, which are associated with user **1240**. These gestures may be used then to configure how the vehicle **104** will react if a gesture is received. If gestures are to be stored, the vehicle control system **204** may store characteristics, in step **1636**, as received from sensor **242** or from one more user interface inputs. These characteristics may then be used to create the stored gestures **1232**, in data structure **1204**. The characteristics may include what the gesture looks like or appears and also what affect the gesture should have. This information may then be used to change the configuration or operation of the vehicle **104** based on the gesture if it is received at a later time.

An embodiment of a method **1700** for receiving a gesture and configuring the vehicle **104** based on the gesture may be as provided in FIG. **17**. A general order for the steps of the method **1700** is shown in FIG. **17**. Generally, the method **1700** starts with a start operation **1704** and ends with an end operation **1728**. The method **1700** can include more or fewer steps or can arrange the order of the steps differently than those shown in FIG. **17**. The method **1700** can be executed as a set of computer-executable instructions executed by a computer system and encoded or stored on a computer readable medium. Hereinafter, the method **1700** shall be explained with reference to the systems, components, modules, software, data structures, user interfaces, etc. described in conjunction with FIGS. **1-16**.

A vehicle control system **204** can receive sensor data from vehicle sensors **242**. The vehicle sensor data can be used by the vehicle control system **204** to determine that a person is in

a zone **512** or area **508**, in step **1708**. The vehicle sensor data may then be used to compare against feature characteristics **1212** to identify a person, in step **1712**. The vehicle control system **204** thereinafter may receive a gesture, in step **1716**. The gesture may be perceived by vehicle sensors **242** or received in a gesture capture region. The gesture may be as described in conjunction with FIGS. **11A-11K**. Upon receiving the gesture, the vehicle control system **204** can compare the gesture to gesture characteristics in portion **1232**, in step **1720**. The comparison may be made so that a statistically significant coorelation between the sensor data or gesture data and the gesture characteristic **1232** is made. Upon identifying the gesture, the vehicle control system **204** can configure the vehicle **104** and/or react to the gesture, in step **1724**. The configuration or reaction to the gesture may be as prescribed in the gesture characteristic **1232**.

An embodiment of a method **1800** for storing health data may be as shown in FIG. **18**. A general order for the steps of the method **1800** is shown in FIG. **18**. Generally, the method **1800** starts with a start operation **1804** and ends with an end operation **1844**. The method **1800** can include more or fewer steps or can arrange the order of the steps differently than those shown in FIG. **18**. The method **1800** can be executed as a set of computer-executable instructions executed by a computer system and encoded or stored on a computer readable medium. Hereinafter, the method **1800** shall be explained with reference to the systems, components, modules, software, data structures, user interfaces, etc. described in conjunction with FIGS. **1-17**.

Vehicle control system **204** can receive sensor data from sensors **242**. The sensor data may be used to determine that a person is in a zone **512** or area **508**, in step **1808**. The sensor data may then be used to determine characteristics of the person, in step **1812**. From the characteristics, the vehicle control system **204** can determine if a person may be identified in data structure **1204**, in step **1816**. If it is determined that the person can be identified in step **1816**, the method **1800** proceeds YES to step **1820**. If the person cannot be identified, the method **1800** proceeds NO to step **1824**. A person may be identified by matching the characteristics of a person from the sensor data to the features shown in portion **1212**. If these comparisons are statistically significant, the person may be identified in portion **1208**, in step **1820**. However, if the person is not identified in portion **1208**, the vehicle control system **204** can characterize the person using the vehicle sensor data, in step **1824**. In this way, the vehicle control system **204** can create a new record for a new user in data structure **1204**.

Thereinafter, the vehicle control system **204** may receive health and/or safety data from the vehicle sensors **242**, in step **1828**. The vehicle control system **204** can determine if the health or safety data is to be stored, in step **1832**. The determination is made as to whether or not there is sufficient health data or safety parameters, in portion **1228** and **1236**, to provide a reasonable baseline data pattern for the user **1240**. If there is data to be received and stored, the vehicle control system **204** can store the data for the person in portions **1228** and **1236** of the data structure **1204**, in step **1832**.

The vehicle control system **204** may then wait a period of time, in step **1836**. The period of time may be any amount of time from seconds to minutes to days. Thereinafter, the vehicle control system **204** can receive new data from vehicle sensors **242**, in step **1828**. Thus, the vehicle control system **204** can receive data periodically and update or continue to refine the health data and safety parameters in data structure **1204**. Thereinafter, the vehicle control system **204** may optionally store the health and safety data in cloud storage **232** by sending it through the communication network **224** to the server **228**, in step **1840**.

An embodiment of a method **1900** for monitoring the health of a user may be as shown in FIG. **19**. A general order for the steps of the method **1900** is shown in FIG. **19**. Generally, the method **1900** starts with a start operation **1904** and ends with an end operation **1928**. The method **1900** can include more or fewer steps or can arrange the order of the steps differently than those shown in FIG. **19**. The method **1900** can be executed as a set of computer-executable instructions executed by a computer system and encoded or stored on a computer readable medium. Hereinafter, the method **1900** shall be explained with reference to the systems, components, modules, software, data structures, user interfaces, etc. described in conjunction with FIGS. **1-18**.

The vehicle control system **204** can receive health data from sensors **242**. The health data may be received in step **1908**. The vehicle control system **204** may then compare the received health data to stored health parameters in portion **1228** or portion **1236**, in step **1912**. The comparison may check if there is statistically significant separation or disagreement between the received health data and the stored health data. Thus, the vehicle control system **204** can make a health comparison of the user based on a baseline of health data previously stored. A statistically significant comparison may include determining if there are any parameters more than three standard deviations from the average or norm, any parameter that is increasing or decreasing over a period of eight different measurements, a measurement that is more than two standard deviations from the norm more than three measurements consecutively, or other types of statistical comparisons.

If the vehicle control system **204** determines that measured health parameter does deviate from the norm, the vehicle control system **204** can determine whether the health data is within acceptable limits, in step **1916**. If the health data is within acceptable limits, the method **1900** proceeds YES back to receiving new health data, in step **1908**. In this way, the health data is periodically or continually monitored to ensure that the driver is in a healthy state and able to operate the vehicle. If the health data is not within acceptable parameters, the method **1900** may proceed NO to step **1924** where the vehicle control system **204** may react to the change in the health data. The reaction may include any measure to provide for the safety of the user, such as stopping the vehicle, beginning to drive the vehicle, driving the vehicle to a new location, such as a hospital, waking the driver with an alarm or other noise, or performing some other function that may help maintain the health or safety of the user.

The health data received may be a reaction from the driver. For example, the driver may call for help or ask the vehicle for assistance. For example, the driver or passenger may say that they are having a medical emergency and ask the car to perform some function to help. The function to help may include driving the person to a hospital or stopping the car and calling for emergency assistance.

FIG. **20** is a block diagram of an embodiment of a personality subsystem **2000** for a vehicle **104**. The personality subsystem **2000** may include a personality module **2004**, a personality matching module **2008**, a personality data memory **2028**, and a memory **2032**. The subsystems, modules, components, etc. **2004-2028** may communicate over a network or bus **356**. This communication bus **356** may be bidirectional and perform data communications using any known or future-developed standard or protocol. An example of the communication bus **356** may be as described in conjunction with

FIG. **4**. As one example of the communication, the personality module **2004** and/or the personality matching module **2008**, aside from communicating with each other, may communicate with profile data **252**, vehicle sensors **242**, and/or non-vehicle sensors via the communication bus **356**.

The personality module **2004** may be configured to present a virtual personality to a user **216** associated with a vehicle **104** via one or more displays, screens, speakers, and/or devices, associated with the vehicle **104**. As can be appreciated, the virtual personality may be presented to a user **216** in at least one of an audible, visual, and tactile form. The personality module **2004** may be configured to interact with one or more users **216** of a vehicle **104**. In some cases, input may be received and interpreted by the personality module **2004**. Input corresponding to personality information may be stored in the personality data memory **2028** and/or memory **2032**. Additionally or alternatively, virtual personalities created by the personality module **2004** may be stored in the personality data memory **2028**. As can be appreciate, the stored virtual personalities may be retrieved from at least one personality module **2004** for presentation to a user **216**.

The personality matching module **2008** may include a matching engine **2012** and rules **2016** for matching a virtual personality with a personality of a user **216**. The rules can include behavior rules **2020** and preferences **2024**. Among other things, behavior rules **2020** may be used by the matching engine **2012** to interpret a user's **216** behavior observed via the vehicle and/or non-vehicle sensors **242**, **236**. Behavior rules **2020** may include instructions on detecting a context associated with a behavior of the user **216**. For instance, the context may correspond to an emotional state of the user **216**. Preferences **2024** can be associated with a user **216** and may include data relating to one or more of preferred virtual personalities, the presentation of a virtual personality, timing associated with the presentation of a virtual personality, permissions and access to information, and the like.

The personality matching module **2008** may communicate with a user profile stored in profile data memory **252**. The user profile may have a corresponding user interface or personality defined or configured by the user **216**. In some embodiments, the virtual personality can be an animated character that follows the user from vehicle-to-vehicle and/or from communication device-to-communication device. In other words, the virtual personality may include at least one of artificial intelligence, virtual traits, voice, tone, behavior, and predictive behavior based on a defined personality. In some embodiments, this virtual personality may be refined and/or modified over time to match suit a personality of a user **216**. Suiting the personality of the user **216** may include matching a personality to the user **216** based on a context associated with the personality of the user **216**. This matching may include providing a personality that mirrors and/or tempers the personality of the user **216**. For example, in the case where a user **216** is determined to have an impulsive personality, the virtual personality may be configured to present a more rational virtual personality (e.g., providing more non-impulsive, or rational, responses, etc.). As can be appreciated, if the user **216** is determined to have an analytical personality, the virtual personality may be configured to provide impulsive responses and behavioral output. Additionally or alternatively, the virtual personality may be configured to match a personality to what a user **216** desires by monitoring input made by a user **216** (e.g., voice commands, content, context, etc.). In some cases, a user **216** may wish to interface with a virtual personality that is identical to the personality of the user **216**. This desire may be determined by the one or more vehicle sensors recording user responses, interactions with a virtual personality, spoken tone, and/or context to refine the virtual personality to meet the preferences of the user **216**. Additionally or alternatively, the profile matching module **2008** may refer to preferences **2024** to determine the virtual personality desired by the user **216**. The profile matching module **2008** may refer to a personality data memory **2028** for stored virtual personalities (e.g., standard virtual personalities, user-defined virtual personalities, etc.). In some cases, the profile matching module **2008** may refer to a user profile associated with a user **216** (e.g., stored in a profile data memory **252**, etc.).

As provided herein, a user profile may be created, modified, stored, copied, transferred, and/or transported. Additionally, the user profile can be accessed by one or more devices. In some cases, the user profile may be copied from one user to another user, transferred from one memory to another memory, and/or transported from one vehicle to another vehicle, to name a few. A user profile can be stored in a memory associated with a user and may include one or more data records. For example, the user profile may be stored in at least one data file or data object of a data structure **1200** as previously described in conjunction with FIGS. **12**A-**12**D.

User profiles can be compiled and/or modified based on a number of factors and/or information/input received by one or more sensors (e.g., vehicle sensors **242**, non-vehicle sensors **236**, etc.). In some embodiments, these sensors can be associated with a user **216**, a user device **212**, and/or a vehicle **104**. The sensors may include at least one of environmental sensors **708**, user interface sensors **712**, associated device sensors **720**, and the like. In one example, the associated device sensors **720** can include any sensors of a mobile device (e.g., a smart phone, tablet, mobile computer, etc.) that is connected, either wired or wirelessly, to a vehicle **104** and/or vehicle control system **204**.

Information received by the one or more sensors may include inquiries made and/or input provided by a user (e.g., web browsing history, stored data cookies, voice commands, gesture input, intelligent personal assistant history, knowledge navigator, etc.), geographic location data (e.g., satellite positioning system, Wi-Fi hotspot, cell tower data, indoor positioning system, etc.) associated with a user **216** and/or a vehicle **104**, and the like. In some cases, the information may be evaluated to determine whether the received information qualifies as user profile data. This evaluation may include referring to rules stored in a memory and/or comparing terms in the received information to a list of key terms associated with user profile data.

An embodiment of a method **2100** for presenting a virtual personality to a user **216** of a vehicle **104** is shown in FIG. **21**. A general order for the steps of the method **2100** is shown in FIG. **21**. Generally, the method **2100** starts with a start operation **2104** and ends with an end operation **2132**. The method **2100** can include more or fewer steps or can arrange the order of the steps differently than those shown in FIG. **21**. The method **2100** can be executed as a set of computer-executable instructions executed by a computer system and encoded or stored on a computer readable medium. One example of the computer readable medium may include, but is not limited to, the memory **2032** described in conjunction with the personality subsystem **2000** of FIG. **20**. Hereinafter, the method **2100** shall be explained with reference to the systems, components, modules, software, data structures, user interfaces, etc. described in conjunction with FIGS. **1**-**20**.

The method **2100** begins at step **2104** and proceeds when a user **216** is detected (step **2108**). This detection and/or identification may be based on information received from the user **216**. For example, a user **216** may be recognized based on

information detected by at least one image sensor, such as the camera sensors **760** of a vehicle **104**. Where a user **216** is recognized, a user profile associated with the user **216** can be accessed and/or modified.

In some embodiments, the detection step of the method **2100** may include an identification of the user **216**. This identification may be based on a facial recognition of the user **216**. For instance, the user identification module **822** may collect facial recognition information from a user **216** associated with the vehicle **104**. Facial recognition information may be collected from one or more of sites, sources, cameras **878**, user profile data **252**, vehicle user **216** data, vehicle passenger data, and/or other sensors. The collection of facial recognition information may include recording information via one or more sensors (e.g., vehicle sensors **242**, non-vehicle sensors **236**, etc.). These one or more sensors may be associated with a vehicle **104**. In one example, the one or more sensors may include at least one image sensor, such as a camera **878**. Continuing this example, the cameras **878** may be positioned inside and/or outside of a vehicle **104**. As can be appreciated, facial recognition information can be collected from one or more users **216** inside the vehicle **104** and/or from one or more users **216** outside the vehicle **104**.

Facial recognition information may include facial features, and information about facial features, that can identify a user **216**. For instance, the facial features can include measurement information that defines a position and/or arrangement of the facial features. In some cases, one or more sensors may be used to determine a measurement between at least one of the facial features of a user **216**. Typical facial features can include, but are not limited to, at least one eye, eyebrow, nose, nostril, cavity, socket, tooth, bone, mouth, lip, chin, ear, hairline, forehead, facial hair, mole, birthmark, scar, and/or other distinguishing mark associated with the face of a user **216**. The collected facial recognition information can be stored in a memory and may include pointers to a memory. These pointers can be stored in one or more other memory locations.

The recognition of facial features may include comparing identified facial features associated with a user **216** with one or more identification characteristics stored in a memory. The one or more identification characteristics can be stored in a memory of a social networking site, facial recognition data memory, profile data memory **252** and/or other memory location. When the at least some of the identified facial features match at least one identification characteristic stored in the memory, a successful match, or facial recognition, may be determined. The more identified facial features that match the identification characteristics, the more successful the facial recognition. In other words, the facial recognition may be associated with a confidence level, or accuracy rating. This rating may be based on the number of features that are determined to match.

In the event that a user **216** is detected, the method **2100** continues by determining whether a user profile associated with the detected user **216** is available and/or accessible (step **2112**). This determination may be based on a positive (e.g., matching) facial recognition of the user **216** during the detection step. Where a user **216** is identified, the personality module **2004** may communicate with the profile data memory **252** to access a user profile associated with the identified user **216**. In some cases, a user **216** may not be identified, and as such, the user profile associated with that user **216** cannot be retrieved or accessed from memory.

Next, the method **2100** may continue by determining whether any virtual personality information is stored in the accessed user profile (step **2116**). The virtual personality information may include, but is not limited to, at least one of a virtual personality, a personality type of the user, personality preferences, and virtual personality presentation information. The virtual personality may include one or more of an avatar, a voice output, a visual output, a tone, and a volume intensity. If the user profile includes a virtual personality, the personality module **2004** may retrieve and/or access the virtual personality from the user profile for use in the vehicle **104**.

Once the virtual personality is retrieved, and/or accessed, the virtual personality may be presented to the user **216**. In some cases, presenting the virtual personality to a user **216** may include altering one or more features of the vehicle **104**. For instance, one or more features of the vehicle **104** may be altered to change a mood associated with the virtual personality. Continuing this example, the personality module **2004** may communicate with the vehicle control system **204** to change an internal lighting, an infotainment setting, a temperature, an oxygen level, an air composition, a comfort setting, a seat position, a transmission setting (e.g., automatic to manual, paddle shifting, and more), a navigation output, etc., and/or combinations thereof. In presenting the virtual personality the method **2100** may include interacting with the user **216**. One example of interaction may include asking the user **216** questions. Another example may include providing comments to the user **216**. The user **216** may respond to the questions and/or comments by providing visual, audible, and/or touch input responses. The personality module **2004** can respond to the user **216** based on a tone, context, and/or volume associated with the user **216** responses.

In the event that no virtual personality is associated with the user profile in step **2116**, the method **2100** may continue by generating a virtual personality to suit the user **216** (step **2136**). The virtual personality may be generated by the personality module **2004** in conjunction with the personality matching module **2008**. For example, the personality matching module **2008** may receive user input via a user profile associated with the user **216**, voice input, visual input, tactile input, manual input, etc., and/or combinations thereof. Continuing this example, the matching engine **2012** may determine a virtual personality that suits the user input received. In some cases, suiting the virtual personality to a user **216** may be based at least partially on rules **2016**. If it is determined from the user input that the user **216** is agitated (e.g., angry, frustrated, annoyed, has little patience, is shouting, making fast sharp gestures, frowning, etc.), the matching engine **2012** may determine that a virtual personality should be generated to reduce the user's **216** agitation (e.g., the virtual personality may be generated as an opposite personality to that determined with the user **216**). Additionally or alternatively, if it is determined (e.g., via the personality matching module **2008**, etc.) from the user input that the user **216** is happy (e.g., whistling, singing, smiling, waving, is talking softly, etc.), the matching engine **2012** may determine that the virtual personality should be generated to match the user's **216** happiness. In any event, the virtual personality is generated by the personality module **2004** in communication with the personality matching module **2008**. The method **2100** can then present the generated virtual personality in step **2124**, as previously described.

If no user profile is associated with the user **216** in step **2112**, or if the user profile cannot be accessed, the method **2100** may continue by providing a standard virtual personality to the user (step **2140**). In some embodiments, while the standard virtual personality is provided to a user **216**, and as profile data is collected, the standard virtual personality may be refined to suit the user **216**. The standard virtual personality may include a virtual personality stored in a memory (e.g.,

personality data memory **2028**, memory **2032**, etc.). This standard virtual personality can be created by at least one of a user **216**, company, group, institution, personality module **2004**, etc. The method **2100** may continue to present the personality at step **2124** or proceed at step **2144**.

The method **2100** continues by collecting profile data associated with the user **216** (step **2144**). In some embodiments, collecting profile data may include determining whether any of the information received qualifies as user profile data. In one embodiment, this determination may be made by the profile identification module **848**. For instance, the profile identification module **848** may refer to rules stored in a memory to determine whether a match exists between at least some of the received information and matching information corresponding to user profile and/or virtual personality data. Matching information may include keywords, key terms, input types, context-sensitive data, match indicators, etc., and combinations thereof.

Next, the method **2100** may proceed by refining the virtual personality (step **2148**). Refining the virtual personality, may include using data to custom suit the virtual personality to a user **216** (e.g., based at least partially on rules **2016**). This custom suiting operation may be similar, if not identical, to suiting the virtual personality to the user **216** as described in conjunction with step **2136**. For instance, the data collected in step **2144** may be used by the personality matching module **2004** in altering the virtual personality to suit the user **216**. Continuing this example, as the user **216** continues to provide more information and/or input, the virtual personality may be refined to best suit the user **216**. In some embodiments, the virtual personality may be refined while the virtual personality is being presented to a user **216**. The virtual personality may be refined in real-time (e.g., as the input is happening, is provided, etc.) and/or near-real-time (e.g., as the input is happening including any system and/or communication delays, etc.). Additionally or alternatively, as the virtual personality is altered, the altered personality may be presented to the user in real-time and/or near-real-time. Additionally or alternatively, the virtual personality may be refined (e.g., altered) when the user **216** is not being presented the virtual personality. In other words, the virtual personality may be refined in non-real-time (e.g., when the virtual personality is not being used, etc.). As provided herein, a standard personality and/or a virtual personality associated with a user **216** can be refined. The method **2100** continues at step **2124** by presenting the virtual personality and/or refined virtual personality.

The method **2100** continues by determining whether the user **216** is still present (step **2128**). In some embodiments, the presence of a user **216** may include an existing association of the user **216** with a vehicle **104**. For instance, the user **216** may be associated with the vehicle **104**, although the user **216** may not be physically located inside the vehicle **104**. An example of this association may include when the user steps outside of the vehicle **104** (e.g., to maintain the vehicle **104**, refuel, temporarily visit a location outside of the vehicle **104**, etc.). The detection and/or determination of whether a user **216** is present may include one or more of the detection steps described in conjunction with step **2108**. Additionally or alternatively, determining whether a user **216** is present may include determining whether the user **216** is physically inside the vehicle **104**. For example, a user **216** may be determined to be present inside a vehicle **140** based on information detected by at least one image sensor, such as the camera sensors **760** of the vehicle **104**. In any event, when a user **216** can no longer be detected by at least one sensor (e.g., vehicle sensors **242**, non-vehicle sensors **236**, etc.) associated with the vehicle **104**, the user **216** may be determined as not being present. If the user **216** is determined to still be present, the method **2100** may continue by collecting more profile data (step **2144**). If the user is determined not to be present, the method **2100** ends at step **2132**.

In one example, a virtual personality may be represented by an avatar. The avatar may be an intelligent assistant, a virtual assistant, and/or an intelligent virtual assistant as described in application PCT/US14/34194, filed on Apr. 15, 2014, entitled "Intelligent Vehicle for Assisting Vehicle Occupants and Incorporating Vehicle Crate for Blade Processors", which is hereby incorporated herein by reference, in its entirety, for all that it teaches and for all purposes. The avatar may be presented as a theme, color, specific sound output, other user preference, etc., and/or combinations thereof. For instance, the avatar may be configured as one or more icons, figures, colors, and/or themes that are configured to represent the virtual personality.

In some embodiments the avatar may be configured to follow a user **216** from vehicle-to-vehicle and/or from communication device-to-communication device. The avatar may be stored in the user profile associated with a user **216**. The user profile may be accessed, as provided herein, via one or more vehicle **104** and/or device **212**, **248**. Avatars may be synchronized, or synced, between vehicles **104** and/or communication devices **212**, **248**. The synchronization can include a communication of the avatar from one vehicle to another vehicle. The synchronization can include a communication of the avatar from one device **212** to another device **248**. Additionally or alternatively, the avatar may be stored in profile data **252** (e.g., in the user profile) accessible across a communication network **224**. One example of profile data **252** located across a network **224** may include a cloud-based system (e.g., a server **228** and profile data memory **252**). In yet another example, a vehicle **104** may include an avatar associated with a user **216**. In this example, the vehicle **104** may synchronize with another vehicle, a device **212**, **248**, and/or a building automation system **2304**. As part of the synchronization communication, the vehicle **104** may transfer the avatar associated with the user **216**. As can be appreciated, this operation may be performed in reverse (e.g., the other vehicle, device **212**, **248**, and/or building automation system **2304** may transfer the avatar associated with the user **216** to the vehicle **104** as part of the synchronization communication).

An embodiment of a method **2200** for matching a virtual personality to a context of a user **216** of a vehicle **104** is shown in FIG. **22**. A general order for the steps of the method **2200** is shown in FIG. **22**. Generally, the method **2200** starts with a start operation **2204** and ends with an end operation **2232**. The method **2200** can include more or fewer steps or can arrange the order of the steps differently than those shown in FIG. **22**. The method **2200** can be executed as a set of computer-executable instructions executed by a computer system and encoded or stored on a computer readable medium. One example of the computer readable medium may include, but is not limited to, the memory **2032** described in conjunction with the personality subsystem **2000** of FIG. **20**. Hereinafter, the method **2200** shall be explained with reference to the systems, components, modules, software, data structures, user interfaces, etc. described in conjunction with FIGS. **1-21**.

The method **2200** begins at step **2204** and proceeds when user input is received from a user **216** (step **2208**). User input can be received by the one or more sensors (e.g., vehicle sensors **242**, non-vehicle sensors **236**, etc.) associated with the vehicle, as previously described. Additionally or alterna-

tively, the user input may be received by the personality module **2004** and/or the personality matching module **2008**. User input may include input provided from one or more users **216**. In one embodiment, where two or more users **216** provide input, a group user input may be received by the modules **2004**/**2008**.

The method **2200** continues by determining a context of the user input received (step **2212**). As previously described in conjunction with FIG. **20**, a context may include an emotional state of the user **216**. Context may be determined via the personality matching module **2008** based at least partially on rules **2016** stored in memory. In some embodiments, determining the context of the user input may correspond to determining at least one other user-related consideration. For example, the personality matching module **2008** may refer to at least one of a schedule, email, text message, phone call, search engine result, etc., and other content related to the user **216**. In some embodiments, determining the context of the user input may correspond to determining at least one non-user consideration. Non-user considerations may include, but are not limited to at least one of, environment (e.g., temperature, humidity, air composition, oxygen level, etc.), weather (e.g., rain, sun, snow, etc.), calendar, traffic, unemployment rate, stock market value, economic index, social unrest, and the like. For instance, a user **216** may be quiet, with a neutral, or sad, expression inside a vehicle **104**. In this example, an image sensor (e.g., camera **878**, etc.) may detect the facial expressions of the user **216**, while an audio sensor (e.g., microphone **886**, etc.) may detect audio output, or lack thereof, from the user **216**. The personality matching module **2008** may communicate with other systems (e.g., a device **212**, **248**, etc.) associated with the vehicle **104** to check the user's **216** email, messages, calls, and/or schedule. Continuing this example, the personality matching module **2008** may communicate across a network **224** to determine at least one non-user considerations, such as a low employment rate and/or a severe drop in stock market value. Alone, or together, this input and information may define the context of the user input.

In some cases, determining a context associated with the user input may include determining a context of a group user input (e.g., two or more users **216**, etc.). Determining group user context may include detecting whether any of the users in the group of users have an avatar in user profile data **252**. In some cases, two or more users **216** may have avatars that have been created based on profile information associated with the two or more users **216**. In other words, each user **216** may have an avatar in user profile data **252**, corresponding to that individual user **216**.

Next, the method **2200** proceeds by determining whether the determined context matches a virtual personality of the user **216** (step **2216**). This match can be based on rules **2016** stored in memory. As provided herein, a context of user input may match a virtual personality when the virtual personality is suited to the user **216** based at least partially on the context of the user input provided by the user **216**. In some cases, matching a context of the user input may include providing a virtual personality having an opposite context. For instance, a user **216** may provide input having a context determined to be "sad," and a virtual personality identified as "happy" (e.g., having a "happy" or opposite context) may match the "sad" user input context. Additionally or alternatively, a user **216** may provide input having a context determined to be "happy," and a virtual personality identified as "happy" may match the "happy" user input context. In any event, the match is similar to the suiting the virtual personality as described in conjunction with FIG. **21** (e.g., steps **2136** and **2148**). In the event that a match is determined, the method **2200** continues by presenting the matching virtual personality to the user **216** (step **2224**).

In embodiments where two or more users **216** have avatars in profile data **252**, the context matching may determine whether the avatar of at least one of the two or more users **216** matches an avatar of another user **216** of the two or more users **216**. The context matching operation may include determining whether at least one theme, color, specific sound output, other user preference, etc., and/or combinations thereof, of the avatars match. In the event that a match is determined, the method **2200** may continue by presenting the matching avatar to the user **216** (step **2224**).

If a virtual personality does not match the context of the user input, the method **2200** may continue by altering and/or generating a virtual personality to match the context (step **2220**). Altering and/or generating a virtual personality to match the context is similar, if not identical, to the refining of and/or generating the virtual personality as described in conjunction with FIG. **21** (e.g., step **2148** and step **2136**, respectively). Once a matching virtual personality has been refined and/or generated, the method **2200** continues by presenting the matching virtual personality to the user **216** (step **2224**). As can be appreciated, presenting the matching virtual personality in step **2228** may be similar, if not identical to, the presentation of the virtual personality as described in conjunction with FIG. **21**. Additionally or alternatively, the output provided by the matching virtual personality may be in the form of at least one avatar, voice output, visual output, tone, and volume intensity, and configured to suit the user **216**.

In another embodiment, if no direct or exact match is determined to exist between the avatars from the group user input, the method **2200** may continue by generating a group avatar that represents two or more users **216** in the group of two or more users (step **2220**). This group avatar may include at least one common setting and/or preference shared between the avatars of the group of users **216**. For example, a brother and sister may be seated in a passenger area (e.g., area 2 **508**B) of a vehicle **104**. The brother may like rock music and dark colors (e.g., stored in the brother's user profile), while the sister may like pop music and pastel colors (e.g., stored in the sister's user profile). As provided above, a group avatar may be created to appeal to both users (e.g., without alienating at least one user **216**). The group avatar may include secondary and/or tertiary settings and/or preferences associated with the brother and sister's user profiles to find common themes, preferences, settings, etc. In this example, both the brother and sister may like country music (but not necessarily prefer it over other kinds of music). Moreover, the brother and sister may like greyscale color schemes (but they may not prefer them). In this example, the group avatar generated for the group of users **216** (e.g., the brother and sister) for presentation to the passenger area of the vehicle **104** can include greyscale color schemes and may even suggest and/or present country music to the passenger area. When a group avatar is generated, the method **2200** continues by presenting the group avatar to the group of users **216** (step **2224**).

The method **2200** continues by determining whether the user **216** is still present (step **2228**). In some embodiments, the presence of a user **216** may include an existing association of the user **216** with a vehicle **104**. For instance, the user **216** may be associated with the vehicle **104**, although the user **216** may not be physically located inside the vehicle **104**. An example of this association may include when the user steps outside of the vehicle **104** (e.g., to maintain the vehicle **104**, refuel, temporarily visit a location outside of the vehicle **104**, etc.). The detection and/or determination of whether a user

216 is present may include one or more of the detection steps described in conjunction with step 2108 of FIG. 21. Additionally or alternatively, determining whether a user 216 is present may include determining whether the user 216 is physically inside the vehicle 104. For example, a user 216 may be determined to be present inside a vehicle 140 based on information detected by at least one image sensor, such as the camera sensors 760 of the vehicle 104. In any event, when a user 216 can no longer be detected by at least one sensor (e.g., vehicle sensors 242, non-vehicle sensors 236, etc.) associated with the vehicle 104, the user 216 may be determined as not being present. If the user 216 is determined to still be present, the method 2200 may continue to receive user input at step 2208. If the user is determined not to be present, the method 2200 ends at step 2232.

FIG. 23 is a block diagram of an embodiment of an automation control system 2300. The automation control system 2300 may include a building automation system 2304 having at least one of an HVAC module 2308, an energy module 2312, a security module 2316, an infotainment module 2320, a utilities module 2324, and more. The subsystems, modules, components, etc. 212, 216, 252, 2304 may communicate over a network or bus 356 and/or a communication network 224. The communication bus 356 may be bidirectional and perform data communications using any known or future-developed standard or protocol. An example of the communication bus 356 may be as described in conjunction with FIG. 4. As one example of the communication, the building automation system 2304 may communicate with vehicles 104, devices 212, 248, profile data 252, vehicle sensors 242, and/or non-vehicle sensors 235 via the communication bus 356 and/or the communication network 224. Additionally or alternatively, the building automation system 2304 may communicate across a communication network 224 with at least one of an emergency agency 2328, energy provider 2332, security provider 2336, group 2340, and company 2344.

For example, building automation systems 2304 may communicate with a user profile to predictively adjust climate and other settings based on user 216 settings associated with a vehicle 104. The user profile may be stored in at least one profile data memory 252. A user 216 may set the inside cabin temperature of a vehicle 104 to a specific value (e.g., 72 degrees Fahrenheit, etc.). Based on this temperature setting, the building automation system 2304 may share the temperatures setting for one or more areas of a home, office, and/or other environmentally controlled space. The building automation system 2304 may be configured to analyze the behavior of a user 216 associated with a vehicle 104. The behavioral analysis of a user's preferred temperature settings may include a consideration of ambient temperature, environmental factors, and/or solar radiation in determining shared settings.

As provided above, the building automation system 2304 may determine preferred building (e.g., rooms, areas, spaces, etc., associated with the building) temperatures of a user 216 based on information stored in a user profile. For example, the building automation system 2304 may refer to vehicle temperatures set by a user 216 and stored in the user profile. Based on the vehicle temperatures stored in the user profile, the building automation system 2304 may adjust certain areas of a home to match the vehicle temperatures. In some embodiments, the building automation system 2304 may determine that areas of the building may be adjusted based on a combination of the vehicle temperatures, time of day, recorded images and/or sounds from the vehicle, and mood of the user, as provided herein.

The HVAC module 2308 may be configured to control HVAC settings associated with one or more areas of a building. The one or more areas described herein may include, but are not limited to, rooms, floors, cubicles, an entire building space, subdivisions thereof, and/or the like. Among other things, the HVAC module 2308 can monitor at least one HVAC system and control an operation of the HVAC system based on at least one input, such as, setpoints, timers, schedules, building area temperatures, building area humidity, user profile information, and more. In any event, the HVAC module 2308 may determine an actual state (e.g., an actual temperature, humidity, pressure, etc.) of one or more areas of a building, compare the actual state with a target state (e.g., a desired or goal temperature, humidity, pressure, etc.) of the one or more areas of the building, and regulate the HVAC system at least partially in response to the comparison.

The energy module 2312 can be configured to control and/or monitor at least one energy feature and/or setting associated with one or more areas of a building. Energy features and/or settings can include, but is in no way limited to, lighting, powered circuits, ionization devices, communications equipment, and/or the like. In some cases, power to the energy features and/or a power setting of the energy features may be controlled by the energy module 2312. For example, when a user 216 is not present in one or more areas of a building, the energy of the one or more areas may be "turned off," disabled, and/or at least partially limited. Continuing this example, when a user 216 is no longer present in a room of a home, the lighting may be turned off in that room. Presence of the user 216 can be detected in a number of ways. For instance, one or more motion sensors, image sensors, signal detectors, etc. may be used in the building to detect the presence of a user 216. The presence of the user 216 can include an identification of a particular user 216. This identification may include referring to a user profile associated with the detected user 216.

The security module 2316 may be configured to control and/or monitor at least one security system, security component, and/or state thereof. Security systems may include any type of security service equipment associated with one or more areas of a building. Security systems may be residential, commercial, and/or externally monitored (e.g., by a security provider 2332, etc.). The security systems may include one or more surveillance components, locking elements, alarm features, and communication features. In some cases, a security event may be detected by the security system and reported (e.g., via a communication feature such as a phone line, wireless signal, etc.) to a security provider 2336 and/or an emergency agency 2328 (e.g., police, fire, emergency medical service (EMS), and/or governmental agency, etc.). Additionally or alternatively, the security module can activate, deactivate, monitor, and/or otherwise control the security system of a building.

The infotainment module 2320 can be configured to communicate with one or more infotainment devices associated with one or more areas of a building. Infotainment systems associated with the one or more areas of a building may include, but are not limited to, radios (e.g., analog, digital, and/or satellite, etc.), home entertainment systems, streaming content players, intercom systems, cable boxes, satellite boxes, set-top boxes (STB), digital video recorders, background music systems, emergency alert system (EAS) devices, over-the-air receiver, speakers, etc. Among other things, the infotainment module 2320 may control a state of the infotainment systems, such as power state (e.g., on, off, standby, etc.), recording content (e.g., content selection, tuning, etc.), playing content (e.g., speed of playback, volume

output, etc.), receiving content, presenting content, scheduling the receiving and/or presentation of content, and the like. Additionally or alternatively, the infotainment module **2320** may monitor the state of the infotainment systems.

Similar to the energy module **2312**, the utilities module **2324** can be configured to control and/or monitor at least one utility feature and/or setting associated with one or more areas of a building. Utility features and/or settings can include, but is in no way limited to, electricity, water, gas, telephone, Internet access, etc. In some cases, the utility features may be "turned off," disabled, and/or at least partially disabled. For example, when a user **216** is not present in one or more areas of a building, the utilities of the one or more areas may be controlled as provided above. Continuing this example, when a user **216** is no longer present in a room of a home, the Internet access may be turned off, or limited, in that room. In some cases, the utilities module **2324** may turn off, and/or limit, utilities, in response to detecting an emergency condition and/or security event. For instance, a criminal may have forcefully entered a home at night with the intent to commit a felony therein. In this case, the utilities module **2324** may limit, or turn off, one or more utilities associated with the home to prevent the unlawful use by the criminal. As another example, a gas leak may be detected in the home. In this instance, the utilities module **2324** may shut off the gas supplied to the home.

In any of the aforementioned modules **2308-2324**, a presence of the user **216** may be used by the modules **2308-2324** to control and/or monitor their respective features and/or settings. The presence of the user **216** can be detected in a number of ways. For instance, one or more motion sensors, image sensors, signal detectors, etc. may be used in the building to detect the presence of a user **216**. The presence of the user **216** can include an identification of a particular user **216**. This identification may include referring to a user profile associated with the detected user **216**.

In some embodiments, the building automation system **2304** may be controlled and/or monitored by one or more of the user **216**, an emergency agency **2328**, an energy provider **2332**, a security provider **2336**, a group **2340**, and a company **2344**. For example, an emergency agency **2328** may need access to the one or more areas of the building. In this case, the emergency agency **2328** (e.g., police) may communicate with the building automation system **2304** and deactivate, and/or override, a security system (e.g., via the security module **2316**). Similarly, in the event of a fire, the emergency agency **2328** (e.g., fire department, etc.) may shut off one or more utilities, such as gas (e.g., via the utilities module **2324**). As another example, an owner of one or more areas of a building may have a contract with an energy provider **2332** to limit HVAC output during peak energy usage periods. In this example, the energy provider **2332** may communicate with the building automation system **2304** and turn off, or limit, an HVAC output via the HVAC module **2308**. Additionally or alternatively, the energy provider **2332** may throttle an energy usage of the owner by communicating with the energy module **2312**, and directing the energy module **2312** to limit, or turn off, power in the one or more areas of the building. The group can represent any other entity not represented by one or more of the other agencies **2328**, providers **2332**, **2336**, or company **2344**. The company **2344** can include an owner (or group of owners) of the one or more areas of the building, a business, and/or an entity recognized by a locality to serve others and/or conduct business.

An embodiment of a method **2400** for determining and adjusting settings of one or more areas of a building based at least partially on user profile information may be as shown in FIG. **24**. A general order for the steps of the method **2400** is shown in FIG. **24**. Generally, the method **2400** starts with a start operation **2404** and ends with an end operation **2420**. The method **2400** can include more or fewer steps or can arrange the order of the steps differently than those shown in FIG. **24**. The method **2400** can be executed as a set of computer-executable instructions executed by a computer system and encoded or stored on a computer readable medium. Hereinafter, the method **2400** shall be explained with reference to the systems, components, modules, software, data structures, user interfaces, etc. described in conjunction with FIGS. **1-23**.

The method **2400** begins at step **2404** and continues by storing one or more areas of a building associated with a user **216** in a user profile (**2408**). The user profile may be associated with the user **216**. In some of the many embodiments described herein the user profile may be specific to only one user **216**. As a user **216** moves about a building, information corresponding to the movement of the user **216** may be collected. This information may be provided by location information associated with a device **212** of user **216**. For instance, the device **212** may determine a physical location of the device using one or more of an SPS, Wi-Fi hotspot, cell tower data, indoor positioning system, and the like. Additionally or alternatively, the location of a user **216** may be determined from position information collected by one or more sensors associated with the building. These sensors may include at least one of image sensors, motion sensors, signal detectors (e.g., key card readers, electronic key station, wireless communication signal detector, etc.) and the like. In one embodiment, a user **216** can be associated with one or more areas of a building via data entered into the user profile corresponding to associated areas. This data may be entered by a user **216**, an administrator, a manager, a building owner, and/or some other entity.

It is anticipated that the one or more areas of the building associated with the user **216** can be stored (in user profile associated with the user) in the profile data memory **252**. The profile data memory **252** can be found on a device **212**, a vehicle **104**, attached to a communication network **224**, and/or some other location.

Next, the method **2400** continues by collecting comfort and/or infotainment information associated with the user **216** (step **2412**). In some cases, the infotainment information may correspond to the infotainment settings of a vehicle **104** and/or one or more areas of a building, that are associated with a user **216**. Infotainment settings may include, but are not limited to, preferred radio stations, content applications, listening content, viewing content, content playback settings (e.g., volume, speed, quality, etc.), genres, content consumption habits (e.g., including listening times, associated content, trends, etc.), recording preferences, and/or the like. The comfort information may correspond to one or more comfort settings of the user **216**. Comfort settings can include, but are in no way limited to, at least one preference such as lighting, temperature, air composition, humidity, oxygen levels, background music/noise, etc.

Similar to the building area information, this collected comfort and/or infotainment information may be stored in the user profile associated with the user **216**. The comfort and/or infotainment information can be stored (in user profile associated with the user) in the profile data memory **252**. The profile data memory **252** can be found on a device **212**, a vehicle **104**, attached to a communication network **224**, and/or some other location (e.g., associated with a building, etc.).

The method **2400** proceeds by using the collected and/or stored information to adjust settings based on the stored infor-

mation (step **2416**). For instance, the building automation system **2304** can alter at least one setting of one or more areas of the building to match information stored in the user profile associated with a user **216**. In other words, the settings of a building may be adjusted to match the settings of a vehicle **104** associated with a user **216**. Additionally or alternatively, a vehicle **104** may adjust the settings of the vehicle **104** based on information stored in the user profile associated with the user **216**. In other words, the settings of a vehicle **104** may be adjusted to match the settings of one or more areas of a building associated with a user **216**. The method **2400** ends at step **2420**.

An embodiment of a method **2500** for determining and adjusting settings of a system based on user profile information is shown in FIG. **25**. A general order for the steps of the method **2500** is shown in FIG. **25**. Generally, the method **2500** starts with a start operation **2504** and ends with an end operation **2536**. The method **2500** can include more or fewer steps or can arrange the order of the steps differently than those shown in FIG. **25**. The method **2500** can be executed as a set of computer-executable instructions executed by a computer system and encoded or stored on a computer readable medium. Hereinafter, the method **2500** shall be explained with reference to the systems, components, modules, software, data structures, user interfaces, etc. described in conjunction with FIGS. **1-24**.

The method **2500** begins at step **2504** and proceeds by detecting the presence of setting information in a user profile associated with a user **216** (step **2508**). The presence of setting information may be provided via the user profile reporting the setting information to at least one of the vehicle **104** and/or the building automation system **2304**. In some embodiments, the detection of the setting information may be made by the building automation system **2304** detecting a user profile and reading at least one data record of the user profile, the data record containing the setting information. The user profile may be detected in response to identifying a user **216**. For example, a user **216** may register with a building automation system **2304**. As part of the registration, the user **216** may provide access to at least a portion of the user profile associated with the user **216** via the building automation system **2304**. The building automation system **2304** may be configured to retrieve the setting information from the user profile on a periodic basis. Additionally or alternatively, the building automation system **2304** may be configured to retrieve the setting information from the user profile based on detecting the presence of a user **216** (e.g., in one or more areas of a building and/or a vehicle **104**).

The method **2500** may continue by determining user areas associated with the building (step **2512**). This determination may be made by referring to a data location of the user profile stored in the profile data memory **252**. In one embodiment, the user areas may correspond to the one or more areas of a building associated with the user **216** as described in conjunction with FIG. **24**. For example, the user areas may be a space where a user **216** works, lives, and/or plays. User areas can be determined from location information associated with the user **216** and a time the user **216** spends in the user area. As can be appreciated, various thresholds may be set for an area/space to qualify as a user area. For instance, a user **216** may be required to spend a minimum amount of time in a space or area for that space or area to qualify as a user area. Additionally or alternatively, a frequency associated with the time a user **216** spends in a space or area can qualify the space or area as a user area. By way of example, a user **216** may visit a space every day for a week, this frequency may qualify the space as a user area associated with that user **216**. In some cases, the user areas may be associated with a work personality, home personality, and/or other rating/rank.

Next, the method **2500** continues by determining whether a user **216** is present in the user area (step **2516**). Presence of a user **216** may include actual physical presence, anticipated presence (e.g., expected time of arrival, based on historical data, planned presence, etc.), and/or a programmed presence (e.g., set by one or more administrative preferences, user-configured, and/or the like) in at least one area of the building. The presence of the user **216** may be determined by one or more sensors of the building, a device **212**, etc., as described above. If the user **216** is not determined to be present, the method **2500** ends at step **2536**.

In the event that the user is determined to be present in the user area, the method **2500** proceeds by adjusting at least one setting of the building based on the settings information in the user profile (step **2520**). The adjustment may be caused by the building automation system **2304** providing an adjustment output to one or more components (e.g., building comfort control systems, modules, etc.) associated with the one or more areas of the building. Adjusting settings may correspond to changing at least one setting of comfort and/or infotainment settings. For instance, a radio may be tuned to a specific station, the lighting may be adjusted to a certain level, the temperature in a home, or area of the home, may be changed, and/or the like. The settings may be adjusted to match the settings stored in the user profile. In some cases, the adjustments may include a scaling factor to compensate for differences between vehicle settings and building settings.

The method **2500** may continue by determining whether a user **216** changes settings after the settings have been adjusted via the building automation system **2304** (step **2524**). For example, a user **216** may change a temperature after the temperature is adjusted via the building automation system **2304**. This change may occur where vehicle settings may differ slightly from building settings. Continuing this example, the user **216** may have the inside cabin temperature of a vehicle **104** set to 74 degrees Fahrenheit. When the user **216** is present in the user area of the building, the building automation system **2304** may adjust the user area to match the 74 degrees Fahrenheit. In this example, the user may reduce the user area temperature to 72 degrees after it has been set at 74 degrees Fahrenheit by the building automation system **2304**. This user **216** change may indicate that there is a comfort difference in the settings. The comfort difference may be stored in the user profile of the user **216** and used in subsequent matching operations performed by the building automation system **2304** (step **2528**). Among other things, the comfort difference may be used to fine-tune, or refine, the matching of settings adjustments provided herein. If no settings have been adjusted, the method **2500** ends at step **2536**.

In the event that the settings have been adjusted by the user **216**, and the user **216** change, or comfort difference, is stored in the user profile associated with the user **216**, the method **2500** may continue by adjusting the vehicle settings to match the settings of the building automation system **2304**. Similar to refining the adjustment matching provided in conjunction with the description of steps **2524** and **2528**, the method **2500** may determine whether the user **216** makes any changes to the vehicle settings in response to the settings being adjusted by the vehicle **104** based on the building automation system **2304** settings stored in the user profile associated with the user. The method ends at step **2536**.

Referring to FIG. **26**, a block diagram of an embodiment of a vehicle control setup for at least one zone **512** of a vehicle **104** is shown. In some embodiments, the sensitivity, dimension, and even location of typical vehicle controls may be

adjusted according to a preference and/or ability of a user **216**. It is anticipated that vehicle control functionality (e.g., including sensitivity, and/or placement, etc.) may be adjusted and stored with a user profile. As can be appreciated, this vehicle control functionality can follow a user **216** from one vehicle **104** to another vehicle **104**.

As shown in FIG. **26**, the interior space **108** of a vehicle **104** is shown having one or more controls, actuators, systems, and components, etc. For example, the vehicle **104** may include at least one feature of vehicle **104** including, but not limited to, a speed control pedal **2608**, steering wheel **640**, occupant seating system **648**, and other features **2604**, to name a few. These features may each have a feature origin **2628** connecting a positional reference datum **2632** with a feature positional reference **2636**. In other words, the position of at least one of the features may be adjusted in reference to the reference datum **2632** and feature origin **2628** associated with the at least one feature. Additionally or alternatively, the feature origin **2628** of each feature may be adjusted according to one or more feature ranges **2612**, **2616**, **2624**. The feature origin may be moved relative to a base origin **2620**. At least one feature may be moved, and/or positioned, in one or more directions including, but not limited to, a forward direction **2606** (e.g., away from a user **216** in some cases), a backward direction **2610** (e.g., toward a user **216** in some cases), an upward direction **2614** (e.g., away from the base origin **2620**), and/or a downward direction **2618** (e.g., toward the base origin **2620**). The directions may include side-to-side positioning (e.g., leftward direction and rightward direction, with reference to a user **216** and/or the base origin **2620**).

In some embodiments, at least one feature may be adjusted according to angular measurements. These angular adjustments can include an angle **2640**, **2644**, **2648**, **2652** between at least one reference datum **2632** and the feature positional reference **2636** of the at least one feature. For example, a user **216** may have configured a vehicle **104** to include control settings having a position of a steering wheel **640** in a steering positional range **2616** and at a steering wheel angle **2648**. The origin **2628** of the steering wheel **640** may be adjusted in an upward direction **2614** or downward direction **2618** to adjust a height of the steering wheel **640** in the interior space **108** of the vehicle **104**. As another example, the occupant seating system **648** may be adjusted for various positions. These various positions can include a height of the occupant seating system **648** (e.g., as measured from the base origin **2620** across a seating positional range **2624**), a forward/backward position, and a seating angle **2640**, to name a few. As can be appreciated, the occupant seating system may include lumbar support adjustments, side-to-side settings, seat base angles, and more. As yet another example, the position of one or more control pedals **2608** may be adjusted according to orientation and/or angle. For instance, a user **216** may have configured a vehicle **104** to include control settings having a position of the control pedal **2608** in a pedal positional range **2612** and at a pedal angle **2644**. The origin **2628** of the control pedal **2608** may be adjusted in an upward direction **2614** or downward direction **2618** to adjust a height of the control pedal **2608** in the interior space **108** of the vehicle **104**. Additionally or alternatively, a side-to-side position of the control pedal **2608** may be set.

In some embodiments, the feature ranges **2612**, **2616**, may include an operational range. For instance, the steering wheel **640** may have an angular operational range corresponding to the rotation of a steering wheel **640** about an axis. Additionally or alternatively, the control pedal **2608** may include an operational range within the control pedal range **2612**. The operational range can correspond to an amount of movement of the feature **640**, **2608** within the range **2612**, **2616**. In some embodiments, the operational range can include a sensitivity associated with the movement in the range. The sensitivity may be set to limit and/or restrict movement of the feature **640**, **2608** within the operational range. It is anticipated that this restriction may be adjusted between various levels to provide greater or lesser operational force as required from a user **216**.

For instance a user **216** may wish to have sensitive controls in a vehicle **104**. In this example, the restriction associated with the sensitivity may be reduced from a default, or mid-level, value to allow less restrictive movement of the feature. Continuing this example, a default value of sensitivity associated with the control pedal **2608** may require 3-4 pounds of force to overcome the restriction and move the control pedal **2608** in the operational range of the feature **2608**. Increasing the sensitivity may include reducing the restriction to require less than 3-4 pounds of force (e.g., 4 ounces of force, 1 pound of force, 2 pounds of force, and/or values in between these forces, etc.). In some cases (e.g., where the user **216** may have a "heavy" foot), the sensitivity of the features may be decreased from the default value (e.g., by increasing the restrictive force required to move the feature **2608**). This restriction and sensitivity may apply to the steering wheel **640** and/or other features of the vehicle **104**.

Other features **2604**, including, but not limited to, mirrors, cameras, sensors, microphones, speakers, and/or controls/instruments may be adjusted/set in a similar, if not identical, manner to that described above.

An embodiment of a method **2700** for determining and adjusting a vehicle feature control based on user profile information is shown in FIG. **27**. A general order for the steps of the method **2700** is shown in FIG. **27**. Generally, the method **2700** starts with a start operation **2704** and ends with an end operation **2724**. The method **2700** can include more or fewer steps or can arrange the order of the steps differently than those shown in FIG. **27**. The method **2700** can be executed as a set of computer-executable instructions executed by a computer system and encoded or stored on a computer readable medium. Hereinafter, the method **2700** shall be explained with reference to the systems, components, modules, software, data structures, user interfaces, etc. described in conjunction with FIGS. **1-26**.

The method **2700** begins at step **2704** and proceeds by recording settings of vehicle controls, or features, in a user profile associated with the user **216** (step **2708**). Recording settings may include at least one of collecting settings information and storing settings information associated with the features of a vehicle **104**. In some cases, these settings may have been preset and/or configured by a user **216**. In one embodiment, the settings may be predefined, or default, settings configured by a manufacturer of the vehicle **104**. In some embodiments, the profile identification module **848** may be configured to perform one or more of the steps as provided herein. When recording the settings, the profile identification module **848** may communicate with one or more components of the vehicle **104** to determine a position, angle, and/or other measurement of the features of the vehicle **104** as described above in conjunction with FIG. **26**.

The profile identification module **848** may communicate with the various features of the vehicle **104**, including vehicle sensors **242**, to determine a sensitivity associated with at least one feature (e.g., vehicle controls, etc.) of the vehicle **104** (step **2712**). Sensitivity can include at least one of movement restriction, movement range, operational range, and other control related aspects of the features, as described above.

The method **2700** continues by detecting vehicle feature information stored in a user profile associated with a user **216** of the vehicle **104** (step **2716**). In some embodiments, the detection of the vehicle feature setting information may be made by the profile identification module **848** detecting a user profile and reading at least one data record of the user profile, the data record containing the vehicle feature setting information. The user profile may be detected in response to identifying a user **216** as provided herein. For example, a user **216** may register with a vehicle **104**. As part of the registration, the user **216** may provide access to at least a portion of the user profile associated with the user **216** via the one or more components of the vehicle **104**. The one or more components of the vehicle **104** may be configured to retrieve the vehicle feature setting information from the user profile on a periodic basis. Additionally or alternatively, the one or more components of the vehicle **104** (e.g., the profile identification module **848**, etc.) may be configured to retrieve the setting information from the user profile based on detecting the presence of a user **216** (e.g., in one or more areas of a vehicle **104**). The detection and/or determination of whether a user **216** is present may include one or more of the detection steps described in conjunction with step **2108**. Additionally or alternatively, determining whether a user **216** is present may include determining whether the user **216** is physically inside the vehicle **104**. For example, a user **216** may be determined to be present inside a vehicle **140** based on information detected by at least one image sensor, such as the camera sensors **760** of the vehicle **104**.

Next, the method **2700** may proceed by adjusting the vehicle features (e.g., controls, settings, etc.) to match the settings stored in the user profile associated with the user **216** (step **2720**). In some cases, the adjustments may include a scaling factor to compensate for differences between vehicle settings stored for a particular vehicle **104** and the settings of another vehicle. The vehicle features may be adjusted based on the presence of a user **216** in a vehicle **104**. Presence of a user **216** may include actual physical presence, anticipated presence (e.g., expected time of arrival, based on historical data, planned presence, etc.), and/or a programmed presence (e.g., set by one or more administrative preferences, user-configured, and/or the like) in the vehicle **104**. The presence of the user **216** may be determined by one or more sensors of the vehicle **104**, a device **212**, etc., as described above. If the user **216** is not determined to be present, or if the adjustments have been made to the features of the vehicle **104**, the method **2700** ends at step **2724**.

Referring now to FIGS. **28** and **29**, methods concerning the health of a user **216** and various outputs are provided. The methods **2800**, **2900** may utilize one or more sensors to measure heart rate, weight, vital signs, etc. The measurements collected by these sensors may be used to detect heart attack, seizures, and the like associated with a user **216**, and in certain situations provide action to the vehicle **104**. For example, the various sensors (e.g., user interface **712**, non-vehicle sensors **236**, vehicle sensors **242**, and/or other sensors, etc.) may communicate with the vehicle control system to stop the vehicle **104**, pull over to the shoulder, notify hospitals nearby (e.g., EMS, police, fire departments, etc.). Examples of these sensors may include, but are not limited to, vehicle sensors **242**, non-vehicle sensors **236**, associated device sensors **720**, sensors associated with a user's device **212**, **248** (e.g., cell phone, tablet, smart-phone, etc.), wearable sensors and/or devices (e.g., heart rate monitors, health monitors, Fitbit® health and/or activity sensors, oxygen level sensors, diabetes sensors, etc.), and the like.

The sensors may at least one of detect, record, and track resting heart rate, maximum heart rate, aerobic heart rate. For example, if a user's heart rate moves into a resting heart rate, the vehicle **104** may respond by altering oxygen levels, providing haptic feedback, etc. In one embodiment, health statistics, vitals, and/or other user **216** information may be sent to a third party (e.g., police, emergency responders, doctors, etc.). This example may be especially useful in the event of an accident where vital statistics are of the utmost importance in providing healthcare assistance and/or emergency aid to those involved in an accident.

An embodiment of a method **2800** for providing an output based on health information associated with a user **216** is shown in FIG. **28**. A general order for the steps of the method **2800** is shown in FIG. **28**. Generally, the method **2800** starts with a start operation **2804** and ends with an end operation **2824**. The method **2800** can include more or fewer steps or can arrange the order of the steps differently than those shown in FIG. **28**. The method **2800** can be executed as a set of computer-executable instructions executed by a computer system and encoded or stored on a computer readable medium. Hereinafter, the method **2800** shall be explained with reference to the systems, components, modules, software, data structures, user interfaces, etc. described in conjunction with FIGS. **1-27**.

The method **2800** begins at step **2804** and proceeds by recording data about a user **216** (step **2808**). The data may include, but is not limited to, one or more health data, such as heart rate, oxygen levels, glucose levels, blood composition, weight, movement, eye dilation, eye movement, gaze direction, speech pattern, temperature, breathing rate, voluntary body movements (e.g., coughing, spitting, vomiting, etc.), involuntary bodily movements (e.g., sneezing, seizures, twitching, ticks, etc.), skin color changes (e.g., due to lack of blood, lack of oxygen, abundance of blood, sickness, etc.). In some embodiments, the health data may be stored in a user profile associated with a user **216**.

Next, the method **2800** may continue by establishing baseline health levels of a user **216** associated with a vehicle **104** (step **2812**). The baseline health levels may be established using the health data recorded in step **2808**. Additionally or alternatively, the baseline health levels may be established by monitoring the recorded health data of a user **216** over a period of time. As can be appreciated, this recorded health data may be averaged and/or analyzed to remove statistical health outliers. In other words, if at least some of the measured data does not generally fit with previous and/or subsequent health measurements, that data may be discarded as an outlier. In one embodiment, the baseline health levels may be established by prompting a user **216** to provide baseline health levels. The vehicle **104** may present one or more prompts to a user **216** to collect the health data, while the user **216** is determined to be at a state of average health. The baseline health levels may be used by the profile identification module **848** to create a baseline biometric profile of the user **216**. This baseline biometric profile may be stored in a user profile associated with the user **216**.

The method **2800** may proceed by determining whether there is any deviation between the established baseline health levels of a user **216** and a current state of health associated with the user **216** (step **2816**). In some embodiments, the sensors may collect health data of user **216** periodically or continually. This health data may be used to detect a state of health associated with the user **216** at any given point in time. Additionally or alternatively, the health data associated with a user **216** may be tracked during travel and/or for a length of time that the user **216** is associated with a vehicle **104**.

The method **2800** continues by providing an output based at least partially on any deviation in health data determined in step **2816** (step **2820**). In some cases, a graphical output of a user's health during travel may be output via the profile identification module **848**. For example, a user **216** may have multiple routes to a specific location, but it may be determined that one of the routes provides a greater level of stress (e.g., based on the tracked health data) than other routes. In some embodiments, multiple routes may be provided to a user **216** (e.g., via a GPS device, navigation system, etc.) for comparison and/or selection, based on tracked health data (e.g., user stress, emotion, etc.).

In some embodiments, the output provided may adjust one or more settings of a vehicle **104**. For example, the output may be configured to adjust at least one of the vehicle interior environment, temperature, air composition, oxygen level, sound level, window position, seat position, and lighting level. As another example, the output may be configured to adjust a position and/or sensitivity of features of the vehicle **104**. This example may be especially useful when a user **216** has lost the ability to accurately control a portion of the user's **216** body (e.g., due to a stroke and/or seizure etc.). For instance, the sensitivity associated with a feature of the vehicle **104** may be decreased, and as such small movements from the user **216** would not translate into large movements of the vehicle **104**.

In another example, the method **2800** may provide an output that directs the vehicle control system **204** to control at least one aspect of the vehicle **104**. For instance, the vehicle control system **204** may maneuver a vehicle **104** into a safe area from a potentially harmful area. In some cases, the vehicle control system **204** can shut off power to the vehicle **104**, activate emergency lights, notify others, and more. The method **2800** ends at step **2824**.

An embodiment of a method **2900** for providing health information associated with a user **216** to a third party is shown in FIG. **29**. A general order for the steps of the method **2900** is shown in FIG. **29**. Generally, the method **2900** starts with a start operation **2904** and ends with an end operation **2924**. The method **2900** can include more or fewer steps or can arrange the order of the steps differently than those shown in FIG. **29**. The method **2900** can be executed as a set of computer-executable instructions executed by a computer system and encoded or stored on a computer readable medium. Hereinafter, the method **2900** shall be explained with reference to the systems, components, modules, software, data structures, user interfaces, etc. described in conjunction with FIGS. **1-28**.

The method **2900** begins at step **2904** and proceeds by detecting an incident (step **2908**). In some cases, the incident may act as a trigger to collect and/or determine health data and/or statistics associated with one or more user **216** of a vehicle **104**. An incident may correspond to one or more conditions detected by the vehicle and/or non-vehicle sensors **242**, **236**. For instance, an impact, or collision, may be detected by the vehicle body sensors **762**, orientation sensors **776**, mechanical motion sensors **772**, force sensors **768**, and/or other safety sensors **716**, **716**E associated with the interior and/or exterior of the vehicle **104**. Additionally or alternatively, an incident may correspond to a health condition associated with a user **216**. For example, a user **216** may suffer from a heart attack in which case, the user's heart rate would deviate from established baseline levels. This deviation may qualify as an incident that can be detected by the various sensors of the vehicle **104**.

Next, the method **2900** may proceed by determining the health data and/or statistics of one or more users **216** associated with the vehicle **104** (step **2912**). This determination may be made in response to detecting the incident from step **2908**. Similar to the health data collection described above, the health data and/or statistics may be made by the various sensors provided herein. In some embodiments, the health data may be collected at a greater rate of speed, or sampling rate (e.g., samples per minute, samples per second, etc.), in response to detecting the incident. Additionally or alternatively, the health data may collected from the users **216** of a vehicle **104**, and if no health issues are detected (e.g., over a predetermined period of measurement time) then the health data collection may return to a normal sampling rate.

The method **2900** continues by communicating with at least one third party (step **2916**). The communication may include a message, text message, email, phone call, emergency signal, etc., and/or combinations thereof. In some cases, the communication may be made by the transceiver **260** of the vehicle **104**. In one embodiment, the communication may be made by at least one device **212**, **248** associated with a user **216** and/or a vehicle **104**. For instance, the communication may be made by a mobile phone of a user **216**. The third party can be a loved one, a friend, a company, a group, an emergency service (e.g., police, fire, EMS, etc.), or other entity.

The communication may include the collected health data associated with one or more users **216** of the vehicle **104** and/or an identification of the one or more users **216** (step **2920**). The identification may be provided based, on device **212** identification, user **216** identification via facial recognition (e.g., as described above), and/or user **216** registration with a vehicle **104**. In some embodiments, the communication may provide health data in real-time (e.g., as the health data is collected, etc.), near-real-time (e.g., as the health data is collected including any system and/or communication delays, etc.), and/or in non-real-time (e.g., after the data is collected, etc.). The method **2900** ends at step **2924**.

FIG. **30** provides adjusting an infotainment system **870** based on infotainment information stored in memory. In some embodiments, the infotainment system **870** of a vehicle **104** can record and/or track infotainment information, such as a user's **216** music preferences, favorite morning show, content, genres, and/or the like. The infotainment system **870** can automatically record one or more shows based at least partially on this infotainment information. For example, the user **216** may select and consume content recorded by the infotainment system **870** at any time. The infotainment information and/or any preferences associated therewith may be stored in a user profile associated with the user **216**, as disclosed herein. In another example, the infotainment system **870** may know what the user **216** has been watching in the home. In this example, if the user leaves the home to go shopping (e.g., during a football game, etc.), the infotainment system **870** may already be tuned to a station playing the football game. In some embodiments, the infotainment system **870** may communicate with, or receive communications from, a cable provider, STB, satellite provider, or other content consumption service provider.

Continuing the example provided above, a user **216** may be watching a game, television show, listening to a radio, or consuming some other content while at home. At least one device (e.g., TV, set-top box, smart-phone, tablet, computer, etc.) associated with the user **216** may record this information to memory (e.g., locally or remotely on the cloud). In some cases this memory may be associated with a user profile of the user **216**. When the user **216** moves from home to a vehicle **104**, or vice versa, the infotainment system **870** may access the user profile to determine recent entertainment consump-

tion (e.g., consumed by the user **216**, etc.). The infotainment system **870** may then tune at least one infotainment component to present a source of entertainment that at least partially matches the entertainment consumption recorded in the user profile.

An embodiment of a method **3000** for determining and adjusting infotainment settings associated with an infotainment system is shown in FIG. **30**. A general order for the steps of the method **3000** is shown in FIG. **30**. Generally, the method **3000** starts with a start operation **3004** and ends with an end operation **3028**. The method **3000** can include more or fewer steps or can arrange the order of the steps differently than those shown in FIG. **30**. The method **3000** can be executed as a set of computer-executable instructions executed by a computer system and encoded or stored on a computer readable medium. Hereinafter, the method **3000** shall be explained with reference to the systems, components, modules, software, data structures, user interfaces, etc. described in conjunction with FIGS. **1-29**.

The method **3000** begins at step **3004** and proceeds by collecting infotainment information (step **3008**). In some embodiments, the infotainment information may include infotainment settings. As provided above, the infotainment settings may include, but are not limited to, preferred radio stations, content applications, listening content, viewing content, content playback settings (e.g., volume, speed, quality, etc.), genres, content consumption habits (e.g., including listening times, associated content, trends, etc.), recording preferences, and/or the like. This infotainment information may be stored in a user profile associated with a user **216**. In one embodiment, the user profile may be stored in a profile data memory **252** that can be found on a device **212**, in a vehicle **104**, attached to a communication network **224**, on the cloud (e.g., a server **228**, etc.) and/or some other location.

Next, the method **3000** may continue when user profile infotainment settings are detected (step **3012**). Detecting the presence of infotainment information may be provided via the user profile reporting the infotainment information to at least one of the vehicle **104** and/or the infotainment system **870**. In some embodiments, the detection of the infotainment information may be made by the infotainment system **870** detecting a user profile and reading at least one data record of the user profile, the data record containing the infotainment information. The user profile may be detected in response to identifying a user **216**. For example, a user **216** may register with an infotainment system **870**. As part of the registration, the user **216** may provide access to at least a portion of the user profile associated with the user **216** via the infotainment system **870**. The infotainment system **870** may be configured to retrieve the setting information from the user profile on a periodic basis. Additionally or alternatively, the infotainment system **870** may be configured to retrieve the setting information from the user profile based on detecting the presence of a user **216** (e.g., in one or more areas of a building and/or a vehicle **104**).

The method **3000** may continue by detecting an available infotainment system **870** (step **3016**). In some embodiments the infotainment system **870** may be associated with a vehicle **104**, a home, a building, or other location. For example, a profile identification module can detect one or more infotainment system **870** that has been registered with a device **212** and/or user **216**. The vehicle **104** may detect an available infotainment system **870** based on a communication with across a bus **356** or communication network **224**. The detection of an available infotainment system **870** may be provided via device discovery on a network (e.g., wired and/or wireless). Additionally or alternatively, the detection may include determining a configuration of the infotainment system **870**. Configurations may include settings, preferences, content, tuners, power state, associated users **216** and/or devices **212**, **248**, access priorities, and/or the like.

The method **3000** proceeds by using the collected and/or stored infotainment information to adjust settings based on the infotainment information (step **3020**). For instance, the infotainment system **870** can alter at least one setting of one or more components of the infotainment system **870** to match information stored in the user profile associated with a user **216**. In other words, the settings of an infotainment system **870** may be adjusted to match the settings of an infotainment system of a building, another vehicle **104**, or other device **212** associated with a user **216**.

In some cases, the adjustment of one or more settings associated with the infotainment system **870** may be allowed, denied, and/or limited based on one or more access priorities. Users **216** may have an access priority assigned by the infotainment system **870**. High access priorities have precedence to access of the infotainment system **870** over lower access priorities. For example, a parent may have a high access priority (e.g., AP1), and a child may have a lower access priority (e.g., AP3) when compared to the parent's access priority. In the event that an access conflict arises (e.g., where the child wishes to play music via the infotainment system **870** while the parent is currently playing content via the infotainment system **870**, the access priority serves to deny access to the child (e.g., because the parent's access priority is greater than, or a higher priority, than the child's access priority). In determining the ability to adjust infotainment settings, the access priorities may be compared by the infotainment system **870**.

The method **3000** continues by determining whether the infotainment system **870** is online or offline (step **3000**). An infotainment system **870** may be turned off, or may have no communications ability in which case, the infotainment system **870** would be determined to be offline. The determination may be made by the vehicle control system **204**, media subsystems **348**, a device **212**, **248**, and/or other systems of the vehicle **104**. If it is determined that the infotainment system **870** is online, or not offline, the method **3000** may continue at step **3008** by continuing to collect infotainment information for the user profile associated with a user **216**. In the event that the infotainment system **870** is determined to be offline, the method **3000** ends at step **3028**.

It should be appreciated that the user profiles as described herein can be associated with a single user **216**. In some embodiments, each user profile may be unique to the user **216** with whom the user profile is associated. Additionally or alternatively, one or more user profiles associated with one or more users **216** may be stored in a profile data memory **252**. In some cases, the one or more user profiles may be stored in the profile data memory separately from one another. In other words, the one or more user profiles may be stored according to an identification of a unique user **216** associated with each user profile.

The exemplary systems and methods of this disclosure have been described in relation to configurable vehicle consoles and associated devices. However, to avoid unnecessarily obscuring the present disclosure, the preceding description omits a number of known structures and devices. This omission is not to be construed as a limitation of the scopes of the claims. Specific details are set forth to provide an understanding of the present disclosure. It should however be appreciated that the present disclosure may be practiced in a variety of ways beyond the specific detail set forth herein.

Furthermore, while the exemplary aspects, embodiments, options, and/or configurations illustrated herein show the various components of the system collocated, certain components of the system can be located remotely, at distant portions of a distributed network, such as a LAN and/or the Internet, or within a dedicated system. Thus, it should be appreciated, that the components of the system can be combined in to one or more devices, such as a Personal Computer (PC), laptop, netbook, smart phone, Personal Digital Assistant (PDA), tablet, etc., or collocated on a particular node of a distributed network, such as an analog and/or digital telecommunications network, a packet-switch network, or a circuit-switched network. It will be appreciated from the preceding description, and for reasons of computational efficiency, that the components of the system can be arranged at any location within a distributed network of components without affecting the operation of the system. For example, the various components can be located in a switch such as a PBX and media server, gateway, in one or more communications devices, at one or more users' premises, or some combination thereof. Similarly, one or more functional portions of the system could be distributed between a telecommunications device(s) and an associated computing device.

Furthermore, it should be appreciated that the various links connecting the elements can be wired or wireless links, or any combination thereof, or any other known or later developed element(s) that is capable of supplying and/or communicating data to and from the connected elements. These wired or wireless links can also be secure links and may be capable of communicating encrypted information. Transmission media used as links, for example, can be any suitable carrier for electrical signals, including coaxial cables, copper wire and fiber optics, and may take the form of acoustic or light waves, such as those generated during radio-wave and infra-red data communications.

Also, while the flowcharts have been discussed and illustrated in relation to a particular sequence of events, it should be appreciated that changes, additions, and omissions to this sequence can occur without materially affecting the operation of the disclosed embodiments, configuration, and aspects.

A number of variations and modifications of the disclosure can be used. It would be possible to provide for some features of the disclosure without providing others.

It should be appreciated that the various processing modules (e.g., processors, vehicle systems, vehicle subsystems, modules, etc.), for example, can perform, monitor, and/or control critical and non-critical tasks, functions, and operations, such as interaction with and/or monitoring and/or control of critical and non-critical on board sensors and vehicle operations (e.g., engine, transmission, throttle, brake power assist/brake lock-up, electronic suspension, traction and stability control, parallel parking assistance, occupant protection systems, power steering assistance, self-diagnostics, event data recorders, steer-by-wire and/or brake-by-wire operations, vehicle-to-vehicle interactions, vehicle-to-infrastructure interactions, partial and/or full automation, telematics, navigation/SPS, multimedia systems, audio systems, rear seat entertainment systems, game consoles, tuners (SDR), heads-up display, night vision, lane departure warning, adaptive cruise control, adaptive headlights, collision warning, blind spot sensors, park/reverse assistance, tire pressure monitoring, traffic signal recognition, vehicle tracking (e.g., LoJack™) dashboard/instrument cluster, lights, seats, climate control, voice recognition, remote keyless entry, security alarm systems, and wiper/window control). Processing modules can be enclosed in an advanced EMI-shielded enclosure containing multiple expansion modules. Processing modules can have a "black box" or flight data recorder technology, containing an event (or driving history) recorder (containing operational information collected from vehicle on board sensors and provided by nearby or roadside signal transmitters), a crash survivable memory unit, an integrated controller and circuitry board, and network interfaces.

Critical system controller(s) can control, monitor, and/or operate critical systems. Critical systems may include one or more of (depending on the particular vehicle) monitoring, controlling, operating the ECU, TCU, door settings, window settings, blind spot monitor, monitoring, controlling, operating the safety equipment (e.g., airbag deployment control unit, collision sensor, nearby object sensing system, seat belt control unit, sensors for setting the seat belt, etc.), monitoring and/or controlling certain critical sensors such as the power source controller and energy output sensor, engine temperature, oil pressure sensing, hydraulic pressure sensors, sensors for headlight and other lights (e.g., emergency light, brake light, parking light, fog light, interior or passenger compartment light, and/or tail light state (on or off)), vehicle control system sensors, wireless network sensor (e.g., Wi-Fi and/or Bluetooth sensors, etc.), cellular data sensor, and/or steering/torque sensor, controlling the operation of the engine (e.g., ignition, etc.), head light control unit, power steering, display panel, switch state control unit, power control unit, and/or brake control unit, and/or issuing alerts to a user and/or remote monitoring entity of potential problems with a vehicle operation.

Non-critical system controller(s) can control, monitor, and/or operate non-critical systems. Non-critical systems may include one or more of (depending on the particular vehicle) monitoring, controlling, operating a non-critical system, emissions control, seating system controller and sensor, infotainment/entertainment system, monitoring certain non-critical sensors such as ambient (outdoor) weather readings (e.g., temperature, precipitation, wind speed, and the like), odometer reading sensor, trip mileage reading sensor, road condition sensors (e.g., wet, icy, etc.), radar transmitter/receiver output, brake wear sensor, oxygen sensor, ambient lighting sensor, vision system sensor, ranging sensor, parking sensor, heating, venting, and air conditioning (HVAC) system and sensor, water sensor, air-fuel ratio meter, hall effect sensor, microphone, radio frequency (RF) sensor, and/or infrared (IR) sensor.

It is an aspect of the present disclosure that one or more of the non-critical components and/or systems provided herein may become critical components and/or systems, and/or vice versa, depending on a context associated with the vehicle.

Optionally, the systems and methods of this disclosure can be implemented in conjunction with a special purpose computer, a programmed microprocessor or microcontroller and peripheral integrated circuit element(s), an ASIC or other integrated circuit, a digital signal processor, a hard-wired electronic or logic circuit such as discrete element circuit, a programmable logic device or gate array such as PLD, PLA, FPGA, PAL, special purpose computer, any comparable means, or the like. In general, any device(s) or means capable of implementing the methodology illustrated herein can be used to implement the various aspects of this disclosure. Exemplary hardware that can be used for the disclosed embodiments, configurations and aspects includes computers, handheld devices, telephones (e.g., cellular, Internet enabled, digital, analog, hybrids, and others), and other hardware known in the art. Some of these devices include processors (e.g., a single or multiple microprocessors), memory, nonvolatile storage, input devices, and output devices. Furthermore, alternative software implementations including,

but not limited to, distributed processing or component/object distributed processing, parallel processing, or virtual machine processing can also be constructed to implement the methods described herein.

In yet another embodiment, the disclosed methods may be readily implemented in conjunction with software using object or object-oriented software development environments that provide portable source code that can be used on a variety of computer or workstation platforms. Alternatively, the disclosed system may be implemented partially or fully in hardware using standard logic circuits or VLSI design. Whether software or hardware is used to implement the systems in accordance with this disclosure is dependent on the speed and/or efficiency requirements of the system, the particular function, and the particular software or hardware systems or microprocessor or microcomputer systems being utilized.

In yet another embodiment, the disclosed methods may be partially implemented in software that can be stored on a storage medium, executed on programmed general-purpose computer with the cooperation of a controller and memory, a special purpose computer, a microprocessor, or the like. In these instances, the systems and methods of this disclosure can be implemented as program embedded on personal computer such as an applet, JAVA® or CGI script, as a resource residing on a server or computer workstation, as a routine embedded in a dedicated measurement system, system component, or the like. The system can also be implemented by physically incorporating the system and/or method into a software and/or hardware system.

Although the present disclosure describes components and functions implemented in the aspects, embodiments, and/or configurations with reference to particular standards and protocols, the aspects, embodiments, and/or configurations are not limited to such standards and protocols. Other similar standards and protocols not mentioned herein are in existence and are considered to be included in the present disclosure. Moreover, the standards and protocols mentioned herein and other similar standards and protocols not mentioned herein are periodically superseded by faster or more effective equivalents having essentially the same functions. Such replacement standards and protocols having the same functions are considered equivalents included in the present disclosure.

The present disclosure, in various aspects, embodiments, and/or configurations, includes components, methods, processes, systems and/or apparatus substantially as depicted and described herein, including various aspects, embodiments, configurations embodiments, subcombinations, and/or subsets thereof. Those of skill in the art will understand how to make and use the disclosed aspects, embodiments, and/or configurations after understanding the present disclosure. The present disclosure, in various aspects, embodiments, and/or configurations, includes providing devices and processes in the absence of items not depicted and/or described herein or in various aspects, embodiments, and/or configurations hereof, including in the absence of such items as may have been used in previous devices or processes, e.g., for improving performance, achieving ease and\or reducing cost of implementation.

The foregoing discussion has been presented for purposes of illustration and description. The foregoing is not intended to limit the disclosure to the form or forms disclosed herein. In the foregoing Detailed Description for example, various features of the disclosure are grouped together in one or more aspects, embodiments, and/or configurations for the purpose of streamlining the disclosure. The features of the aspects, embodiments, and/or configurations of the disclosure may be combined in alternate aspects, embodiments, and/or configurations other than those discussed above. This method of disclosure is not to be interpreted as reflecting an intention that the claims require more features than are expressly recited in each claim. Rather, as the following claims reflect, inventive aspects lie in less than all features of a single foregoing disclosed aspect, embodiment, and/or configuration. Thus, the following claims are hereby incorporated into this Detailed Description, with each claim standing on its own as a separate preferred embodiment of the disclosure.

Moreover, though the description has included description of one or more aspects, embodiments, and/or configurations and certain variations and modifications, other variations, combinations, and modifications are within the scope of the disclosure, e.g., as may be within the skill and knowledge of those in the art, after understanding the present disclosure. It is intended to obtain rights which include alternative aspects, embodiments, and/or configurations to the extent permitted, including alternate, interchangeable and/or equivalent structures, functions, ranges or steps to those claimed, whether or not such alternate, interchangeable and/or equivalent structures, functions, ranges or steps are disclosed herein, and without intending to publicly dedicate any patentable subject matter.

This application is also related to PCT Patent Application Nos. PCT/US14/34092, filed on Apr. 15, 2014, entitled, "Building Profiles Associated with Vehicle Users"; PCT/US14/34099, filed on Apr. 15, 2014, entitled "Access and Portability of User Profiles Stored as Templates"; PCT/US14/34087 filed on Apr. 15, 2014, entitled "User Interface and Virtual Personality Presentation Based on User Profile"; PCT/US14/34088, filed on Apr. 15, 2014, entitled "Creating Targeted Advertising Profiles Based on User Behavior"; PCT/US14/34232, filed on Apr. 15, 2014, entitled "Behavior Modification via Altered Map Routes Based on User Profile Information"; PCT/US14/34098, filed on Apr. 15, 2014, entitled "Vehicle Location-Based Home Automation Triggers"; PCT/US14/34108, filed on Apr. 15, 2014, entitled "Vehicle Initiated Communications with Third Parties via Virtual Personalities"; PCT/US14/34101, filed on Apr. 15, 2014, entitled "Vehicle Intruder Alert Detection and Indication"; PCT/US14/34103, filed on Apr. 15, 2014, entitled "Driver Facts Behavior Information Storage System"; PCT/US14/34114, filed on Apr. 15, 2014, entitled "Synchronization Between Vehicle and User Device Calendar"; PCT/US14/34125, filed on Apr. 15, 2014, entitled "User Gesture Control of Vehicle Features"; PCT/US14/34254, filed on Apr. 15, 2014, entitled "Central Network for the Automated Control of Vehicular Traffic"; and PCT/US14/34194, filed on Apr. 15, 2014, entitled "Vehicle-Based Multimode Discovery". The entire disclosures of the applications listed above are hereby incorporated by reference, in their entirety, for all that they teach and for all purposes.

Examples of the processors as described herein may include, but are not limited to, at least one of Qualcomm® Snapdragon® 800 and 801, Qualcomm® Snapdragon® 610 and 615 with 4G LTE Integration and 64-bit computing, Apple® A7 processor with 64-bit architecture, Apple® M7 motion coprocessors, Samsung® Exynos® series, the Intel® Core™ family of processors, the Intel® Xeon® family of processors, the Intel® Atom™ family of processors, the Intel Itanium® family of processors, Intel® Core® i5-4670K and i7-4770K 22 nm Haswell, Intel® Core® i5-3570K 22 nm Ivy Bridge, the AMD® FX™ family of processors, AMD® FX-4300, FX-6300, and FX-8350 32 nm Vishera, AMD® Kaveri processors, Texas Instruments® Jacinto C6000™

automotive infotainment processors, Texas Instruments® OMAP™ automotive-grade mobile processors, ARM® Cortex™-M processors, ARM® Cortex-A and ARM926EJ-S™ processors, other industry-equivalent processors, and may perform computational functions using any known or future-developed standard, instruction set, libraries, and/or architecture.

What is claimed is:

1. A method, comprising:

determining a location inside a vehicle associated with a user;

determining at least one vehicle control associated with the location inside the vehicle;

determining a presence of the user inside the vehicle, wherein determining the presence of the user comprises detecting a device associated with the user in an area of the vehicle;

referring to a user profile memory associated with the user for vehicle control settings;

determining, based at least partially on the vehicle control settings, to adjust the at least one vehicle control associated with the location inside the vehicle; and

providing an adjustment output to a vehicle control system, wherein the adjustment output is provided based at least partially on determining the user is present in the location inside the vehicle, wherein the vehicle control system is adapted to control the at least one vehicle control associated with the location inside the vehicle.

2. The method of claim **1**, wherein prior to determining the location inside the vehicle associated with the user the method further comprises:

storing, in the user profile memory, information corresponding to locations inside the vehicle occupied by the user;

collecting vehicle control setting data associated with the user, wherein the vehicle control setting data includes at least one vehicle control setting made by the user in at least one of the locations inside the vehicle; and

storing the vehicle control setting data in the user profile memory.

3. The method of claim **1**, wherein the at least one vehicle control includes one or more vehicle features such as a seat system, a steering control, a foot pedal control, a mirror position, and a display device.

4. The method of claim **3**, wherein the vehicle control settings include at least one of a position, a sensitivity, an angle, and a movement, associated with the one or more vehicle features.

5. The method of claim **1**, wherein determining the presence of the user inside the vehicle further comprises:

detecting a person via at least one image sensor associated with the vehicle;

identifying facial features associated with the person detected via the at least one image sensor; and

determining whether the identified facial features associated with the person match user characteristics stored in a memory.

6. The method of claim **1**, further comprising:

determining that the user made a change to the adjusted at least one vehicle control; and

storing the change made to the adjusted at least one vehicle control in the user profile memory.

7. A method, comprising:

determining a location inside a vehicle associated with a user;

determining at least one vehicle control associated with the location inside the vehicle;

referring to a user profile memory associated with the user for vehicle control settings;

determining, based at least partially on the vehicle control settings, to adjust the at least one vehicle control associated with the location inside the vehicle; and

providing an adjustment output to a vehicle control system, wherein the vehicle control system is adapted to control the at least one vehicle control associated with the location inside the vehicle, wherein the at least one vehicle control is adjusted via the adjustment output to match the vehicle control settings in the user profile memory.

8. A non-transitory computer readable medium having instructions stored thereon that, when executed by a processor, perform a method comprising:

determining a location inside a vehicle associated with a user;

determining at least one vehicle control associated with the location inside the vehicle;

referring to a user profile memory associated with the user for vehicle control settings;

determining, based at least partially on the vehicle control settings, to adjust the at least one vehicle control associated with the location inside the vehicle; and

providing an adjustment output to a vehicle control system, wherein the vehicle control system is adapted to control the at least one vehicle control associated with the location inside the vehicle, wherein the at least one vehicle control is adjusted via the adjustment output to match the vehicle control settings in the user profile memory.

9. The non-transitory computer readable medium of claim **8**, wherein prior to providing the adjustment output, the method further comprises:

determining a presence of the user inside the vehicle, wherein the adjustment output is provided based at least partially on determining the user is present in the location of the vehicle.

10. The non-transitory computer readable medium of claim **8**, wherein prior to determining the location inside the vehicle associated with the user the method further comprises:

storing, in the user profile memory, information corresponding to locations inside the vehicle occupied by the user;

collecting vehicle control setting data associated with the user, wherein the vehicle control setting data includes at least one vehicle control setting made by the user in at least one of the locations inside the vehicle; and

storing the vehicle control setting data in the user profile memory.

11. The non-transitory computer readable medium of claim **8**, wherein the at least one vehicle control includes one or more vehicle features such as a seat system, a steering control, a foot pedal control, a mirror position, and a display device, and wherein the vehicle control settings include at least one of a position, a sensitivity, an angle, and a movement, associated with the one or more vehicle features.

12. The non-transitory computer readable medium of claim **9**, wherein determining the presence of the user inside the vehicle further comprises:

detecting a person via at least one image sensor associated with the vehicle;

identifying facial features associated with the person detected via the at least one image sensor; and

determining whether the identified facial features associated with the person match user characteristics stored in a memory.

13. The non-transitory computer readable medium of claim 8, wherein the method further comprises:

determining that the user made a change to the adjusted at least one vehicle control; and

storing the change made to the adjusted at least one vehicle control in the user profile memory.

14. A vehicle control system, comprising:

a profile identification module contained in a memory and executed by a processor of the vehicle control system, the profile identification module configured to determine a location inside a vehicle associated with a user, determine at least one vehicle control associated with the location inside the vehicle, refer to a user profile memory associated with the user for vehicle control settings, and determine, based at least partially on the vehicle control settings, to adjust the at least one vehicle control associated with the location inside the vehicle, provide an adjustment output to the vehicle control system, wherein the vehicle control system is adapted to control the at leasst one vehicle control associated with the location inside the vehicle, wherein the at least one vehicle control is adjusted via the adjustment output to match the vehicle control settings in the user profile memory.

15. The vehicle control system of claim 14, wherein prior to providing the adjustment output, the profile identification module is further configured to determine a presence of the user inside the vehicle, wherein the adjustment output is provided based at least partially on determining the user is present in the location of the vehicle.

16. The vehicle control system of claim 14, wherein prior to determining the location inside the vehicle associated with the user the profile identification module is further configured to store, in the user profile memory, information corresponding to locations inside the vehicle occupied by the user, collect vehicle control setting data associated with the user, wherein the vehicle control setting data includes at least one vehicle control setting made by the user in at least one of the locations inside the vehicle, and store the vehicle control setting data in the user profile memory.

17. The vehicle control system of claim 14, wherein the at least one vehicle control includes one or more vehicle features such as a seat system, a steering control, a foot pedal control, a mirror position, and a display device, and wherein the vehicle control settings include at least one of a position, a sensitivity, an angle, and a movement, associated with the one or more vehicle features.

18. The vehicle control system of claim 15, wherein, in determining the presence of the user inside the vehicle, the user the profile identification module is further configured to detect a person via at least one image sensor associated with the vehicle, identify facial features associated with the person detected via the at least one image sensor, and determine whether the identified facial features associated with the person match user characteristics stored in a memory.

19. The vehicle control system of claim 14, wherein the profile identification module is further configured to determine that the user made a change to the adjusted at least one vehicle control, and store the change made to the adjusted at least one vehicle control in the user profile memory.

20. The vehicle control system of claim 14, wherein the profile identification module is further configured to determine a presence of the user inside the vehicle based at least partially on detecting a device associated with the user in an area of the vehicle, and wherein the adjustment output is provided based at least partially on determining the user is present in the location inside the vehicle.

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UNITED STATES PATENT AND TRADEMARK OFFICE

CERTIFICATE OF CORRECTION

PATENT NO. : 9,147,296 B2
APPLICATION NO. : 14/253204
DATED : September 29, 2015
INVENTOR(S) : Christopher P. Ricci

It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

In the Claims

Claim 14, column 97, line 20, replace “leasst” with --least--.

Signed and Sealed this
Fifteenth Day of March, 2016

Michelle K. Lee

Michelle K. Lee
Director of the United States Patent and Trademark Office

Ford Ex. 1001