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(54) Title: SUNSHADE CONTROL UNIT FOR A VEHICLE

(57) Abstract: The present subject matter relates to a method for actuating sunshades in a vehicle (100). In one implementation, the method may be implemented in a sunshade control unit (102) for blocking irradiation in the vehicle (100). In said implementation, the method includes receiving inputs relating to status of a parking brake and status of a door lock in the vehicle (100). Further, the method includes actuating, by an electronic control unit (204), a first sunshade (106) and a second sunshade (124) based on the status of the parking brake and the status of the door lock.

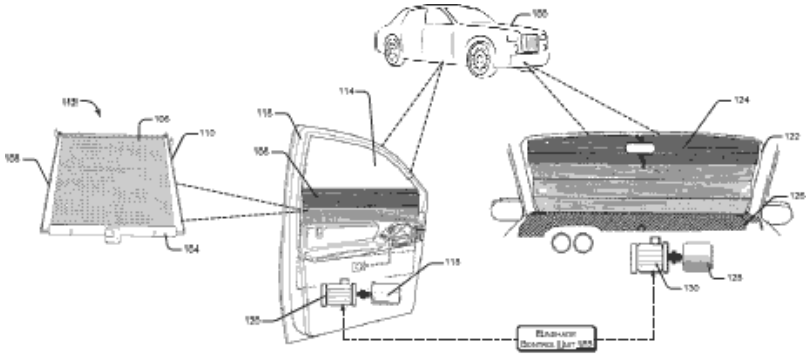

Fig. 1

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FORM 2

THE PATENTS ACT, 1970
(39 of 1970)
&
THE PATENTS RULES, 2003

COMPLETE SPECIFICATION
(See section 10, rule 13)

***1. Title of the invention*:** SUNSHADE CONTROL UNIT FOR A VEHICLE

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3. Preamble to the description

COMPLETE SPECIFICATION

The following specification particularly describes the invention and the manner in which it is to be performed.

TECHNICAL FIELD

[0001] The present subject matter relates, in general, to sunshades and, in particular, to system(s) and method(s) for actuating the sunshades in a vehicle.

BACKGROUND

[0002] There are various internal designs of vehicles to meet different requirements of consumers and therefore each of the internal designs of vehicle may have various devices to provide one or more functionalities, such as maintenance of temperature inside the vehicle.

BRIEF DESCRIPTION OF DRAWINGS

[0003] The detailed description is described with reference to the accompanying figures. In the figures, the left-most digit(s) of a reference number identifies the figure in which the reference number first appears. The same numbers are used throughout the drawings to reference like features and components.

[0004] Fig. 1 illustrates a vehicle implementing a sunshade control unit 102, in accordance with an embodiment of the present subject matter.

[0005] Fig. 2a illustrates a sunshade actuation control environment implementing the sunshade control unit, in accordance with an embodiment of the present subject matter.

[0006] Fig. 2b illustrates a network environment for controlling actuation of the power window unit, in accordance with an embodiment of the present subject matter.

[0007] Fig. 3a illustrates a method for actuating a sunshade in the vehicle, in accordance with an embodiment of the present subject matter.

[0008] Fig. 3b illustrates another method for actuating the sunshade in the vehicle, in accordance with an embodiment of the present subject matter.

[0009] It should be appreciated by those skilled in the art that any block diagrams herein represent conceptual views of illustrative systems embodying the principles of the present subject matter. Similarly, it will be appreciated that any flow charts, flow diagrams, state transition diagrams, pseudo code, and the like represent various processes which may be substantially represented in computer readable medium and so executed by a computer or processor, whether or not such computer or processor is explicitly shown.

DETAILED DESCRIPTION

[0010] Typically, vehicles are commonly left unattended in places exposed to sunshine. For security purposes, windows of the vehicle are usually raised to closed position. In such condition, airflow from outside to interior of the vehicle is restricted. Accordingly, the interior of the vehicle often warms up due to the sunshine incident on the vehicle. As result, temperature inside the vehicle may rise significantly above an ambient temperature, over a period of time. Such temperature rise creates an uncomfortable environment in the interior of the vehicle to a person entering the vehicle.

[0011] Further, heat accumulated due to either temperature rise in the interior of the vehicle or insolation (including ultra violet light) may cause deterioration to internal parts of the vehicle thereby reducing aesthetics of interior of the vehicle. Additionally, few internal parts of the vehicle, such as steering wheel and dashboard panel, may get heated. When these parts are touched by bare hands, heated surface of the internal parts may lead to uncomfortable situations to the driver and passenger of the vehicle.

[0012] In order to prevent temperature rise inside the vehicle due to the incident sunshine, conventionally, substantially opaque material, commonly known as sunshades, is mounted on inner surface of each window in the vehicle. The sunshades may be one of drapery, curtains, window shades, blinds, and similar extra-window devices. Mounting of these sunshades require some effort and time in order to mount the sunshade, particularly where the sunshades are provided with mounting attachments, such as straps, clips and suction cups.

Additionally, it should be ensured that the sunshade should be mounted before all the passengers leave the vehicle, especially when the vehicle needs to be parked in an environment exposed to sunlight. Failing to mount the sunshades on the windows and windshield of the vehicle may allow incident sunlight to enter interior of the vehicle and cause rise in internal temperature of the vehicle.

[0013] The subject matter described herein relates to method(s) for actuating the sunshade in a vehicle. The subject matter also describes a sunshade control unit implementing the described methods. The described methods may be implemented in the vehicle to block irradiation. The described methods may also be implemented in other applications, such as high raised buildings, where irradiation is a common issue. Further, the described methods, on one hand provide to block the irradiation, and on other hand, facilitate actuation of sunshade based on temperature inside and outside the vehicle.

[0014] In one implementation, the method may be implemented in the sunshade control unit, where the method includes receiving inputs relating to status of a parking brake and status of a door lock in the vehicle. For the purpose of ascertaining the status of the parking brake and the status of the door lock in the vehicle, a parking brake sensor and a door lock sensor, respectively, may be coupled to the sunshade control unit. In one example, the parking brake sensor may be mounted on the parking brake of the vehicle and the door lock sensor may be mounted on door latch of each door of the vehicle. The status of the parking brake determined by the parking brake sensor may be one of, but not limiting to, ‘ON’ and ‘OFF’. However, the parking brake sensor may also be configured to transmit signals to the sunshade control unit based on position of the parking brake. For example, value of the signal transmitted by the parking brake sensor to the sunshade control unit may vary when the parking brake is in an inclined position and when the parking brake is in horizontal position, that is, parallel to the floor of the vehicle. In another example, the sunshade control unit may also be configured to analyze value of the signals from the parking brake sensor as either ‘1’ or ‘0’, where the value ‘1’ indicates that the parking brake is ‘ON’ and the

value ‘0’ indicates that the parking brake is ‘OFF’. Further, the status of the door lock may be one of, but not limiting to, ‘Locked’ and ‘Not locked’. Generally, all passenger doors in a vehicle may be in ‘Locked’ state when the driver’s door is in ‘Locked’ state. In such cases, the door lock sensor mounted on a door latch of the driver’s door may suffice. Furthermore, the method may include actuating a first sunshade and a second sunshade in the vehicle, based on the status of the parking brake and the status of the door lock.

[0015] In said implementation, the sunshade control unit (SCU) may include a vehicle state determination (VSD) unit and an electronic control unit (ECU). The SCU may be mounted on dashboard of the vehicle. In one example, the SCU may be a one of, but not limiting to, microprocessor and an integrated circuit. The parking brake sensor and the door lock sensor may be coupled to the VSD unit, where the VSD unit may be configured to receive the inputs relating to status of the parking brake and status of the door lock, respectively. The parking brake sensor and the door lock sensor may continuously transmit signals to the VSD, where the signals correspond to the status of the parking brake and the status of the door lock, respectively. Further, the ECU may be coupled to the VSD, where the ECU may be configured to receive inputs from the VSD and actuate a first sunshade and a second sunshade in the vehicle, based on the status of the parking brake and the status of the door lock. For the purpose of description, sunshades mounted on the windows of the vehicle are herein referred to as the first sunshade(s) and the sunshades mounted on front and rear windshields are herein referred to as the second sunshade(s). In one implementation, the first sunshade and the second sunshade may be actuated in the vehicle, by the ECU, when the status of the parking brake is ‘ON’ and the status of the door lock is ‘Locked’. The status of the parking brake ‘ON’ is indicative that the parking brake is locked and the status of the door lock as ‘Locked’ is indicative that the driver’s door of the vehicle is locked.

[0016] In addition to the status of the parking brake and the status of the door lock, other factors, such as temperature may also be considered for actuating

the sunshades in the vehicle. In one implementation, a first temperature sensor may be electrically coupled to ECU, where the first temperature sensor may be configured to determine temperature inside the vehicle and transmit a first signal to the ECU, where the value associated with the first signal corresponds to the temperature inside the vehicle. In one example, the first temperature sensor may be mounted on the dashboard of the vehicle to sense the temperature inside the vehicle. For the purpose of description, the temperature inside the vehicle is hereinafter referred to as first temperature.

[0017] On receipt of the first signal, the ECU may be configured to determine whether the first temperature is greater than a first threshold temperature. When the first temperature is greater than the first threshold temperature and when the status of parking brake is 'ON' and the status of the door lock is 'Locked', the ECU may be configured to actuate the first sunshade and the second sunshade in the vehicle.

[0018] Further, a second temperature sensor may also be coupled to the ECU, where the second temperature sensor is configured to sense temperature outside the vehicle and transmit a second signal to the ECU, where the value associated with the second signal corresponds to a temperature outside the vehicle. In one example, the second temperature sensor may be mounted on either a front fender panel or rear fender panel to sense the temperature outside the vehicle. For the purpose of description, the temperature outside the vehicle is hereinafter referred to as second temperature.

[0019] On receipt of the second signal from the second temperature sensor, the ECU may be configured to determine whether the second temperature is greater than a second threshold temperature. When the second temperature is greater than the second threshold temperature and when the status of parking brake is 'ON' and the status of the door lock is 'Locked', the ECU may be configured to actuate the first sunshade and the second sunshade in the vehicle.

[0020] The first threshold temperature and the second threshold temperatures may be set in the ECU. However, based on a season, the respective

threshold temperatures may be changed. Further, the ECU may be electrically coupled to a battery of the vehicle, so that the ECU may function even when the vehicle is in switched off condition. In such arrangement, the first sunshade and the second sunshade may be automatically actuated to block irradiation, in absence of a user inside the vehicle and when a certain threshold temperature is reached. The phrase 'user' may include the driver, the owner, or the passenger(s) of the vehicle. Such system(s) or method(s) therefore eliminate the requirement of a person to actuate the sunshades in the vehicle. That is, even when the vehicle is parked in a sunlight exposed environment, the passengers of the vehicle may leave the vehicle without taking any necessary precautions for maintaining the internal temperature of the vehicle.

[0021] In order to manually actuate the first sunshade and the second sunshade in the vehicle, a switch or a knob may be provided on the dashboard of the vehicle. When the driver or the passenger is inside the vehicle, the switch or knob may be operated to actuate the first sunshade and the second sunshade. In one example, the switch or the knob may help to selectively actuate a sunshade from among all the sunshades in the vehicle. However, such manual actuation may be possible when the driver or the passenger inside the vehicle is aware of the switch or the knob provided for that purpose.

[0022] In cases where the driver or owner of the vehicle is away from the vehicle, the driver or the owner may be allowed to remotely actuate the first sunshade and the second sunshade in the vehicle. In one implementation, when it is determined by the ECU that the first temperature is greater than the first threshold temperature, the ECU may be configured to communicate a message to driver's or the owner's personal device. On receipt of such message, the driver or the owner of the vehicle may communicate, from their personal device, to the ECU, with instructions to actuate the first sunshade and the second sunshade. Due to such remote actuation of the first sunshade and the second sunshade, the passenger or child or pet animal left inside the vehicle may be prevented from being exposed to temperature rise inside the vehicle. Further, the instructions from

the personal device may also subsequently actuate a blower inside the vehicle to maintain the first temperature within a comfortable range. In one example, the instructions from the personal device may include a blower speed, so that the blower is actuated to operate at that speed. However, if the ECU does not receive a reply to its communication, for a predetermined time interval, the ECU may be configured to automatically actuate the first sunshade and the second sunshade, and subsequently actuate the blower to operate on minimum speed.

[0023] In one implementation, a door position determination sensor may be coupled to the VSD unit, where the door position determination unit may be adapted to determine the status of the driver's door of the vehicle and transmit a signal to the VSD unit corresponding to the status of the driver's door. In one example, the status of the driver's door may be one of 'Open' and 'Closed'. When the status of the driver's door is 'Open' and if the ECU has ascertained that either the first temperature or the second temperature is above their respective threshold temperatures, the ECU may be configured to communicate the status of the driver's door and value of the determined temperature to the driver's or owner's personal device. On receipt of such information, if the driver or the owner of the vehicle is within a surrounding of the vehicle, the driver or the owner may lock the driver's door using a remote locking button. However, if the ECU does not receive a reply to its communication, for the predetermined time interval, the ECU may be configured to transmit a signal to the door lock sensor mounted on the door latch of the driver's door. On receipt of such signal, the door lock sensor may be configured to lock the driver's door and transmit the 'Locked' status to the ECU. Thereafter, the ECU may actuate the first sunshade and the second sunshade in the vehicle. The driver or the owner of the vehicle may unlock the door by using his/her remote locking key, when he/she arrives near the vehicle.

[0024] In said implementation, a key sensor may also be coupled to the VSD unit, where the key sensor is adapted to determine a status of the key in the vehicle. The key may be one of a mechanical key and an electronic key. The mechanical key may be understood as the key that is inserted into a key slot in the

vehicle and the electronic key may be understood as a remote key. The statuses ascertained by the key sensor may be one of ‘IGNITION ON’, ‘IGNITION OFF’, ‘KEY ON’, and ‘KEY OFF’. In case of mechanical key, the ‘KEY ON’ status is indicative that the mechanical key is in the key slot, the ‘IGNITION ON’ status is indicative that the mechanical key is in the engine’s ignition ON position, the ‘IGNITION OFF’ status is indicative that the mechanical key is in engine’s ignition OFF position, and the ‘KEY OFF’ status is indicative that the mechanical key is out of the key slot. It may be understood that the engine’s ignition ON position and engine’s ignition OFF position are marking made on periphery on the key slot to keep the engine’s ignition ON and OFF respectively.

[0025] Further, with the electronic key, the vehicle may be started only when the electronic key is inside the vehicle. In case of the electronic key, the ‘KEY ON’ status is indicative that the key is inside the vehicle, the ‘IGNITION ON’ status is indicative that the engine’s ignition is ON, the ‘IGNITION OFF’ status is indicative that the engine’s ignition is OFF, and the ‘KEY OFF’ status is indicative that the key is not inside the vehicle. When it is needed to automatically actuate the sunshades in the vehicle, the ECU may be configured to actuate the first sunshade and the second sunshade in the vehicle when the status of the key in the vehicle is ‘KEY OFF’ and when the status of the parking brake is ‘ON’ and the status of the door lock is ‘Locked’.

[0026] Although the description herein is with respect to system(s) and method(s) for actuating sunshades in the vehicle, it will be appreciated that the application of sunshades in vehicle is only for the purpose of explanation and should not be construed as a limitation. The described method(s) may also be implemented in high raised buildings, for blocking irradiation, albeit with few variations in the system(s) and method(s) described herein.

[0027] These and other aspects of the present subject matter would be described in a greater detail in conjunction with the following figures. It should be noted that the description and figures merely illustrate the principles of the present subject matter.

[0028] Fig. 1 illustrates a vehicle 100 implementing a sunshade control unit 102, in accordance with an embodiment of the present subject matter. In one implementation, the sunshade control unit (SCU) 102 may be mounted on a dashboard of the vehicle 100. A first set of sunshades may be mounted on inner panel of each door of the vehicle 100. Each sunshade, from among the first set of sunshades, may include a housing 104 for accommodating a screen 106 and two guide rail attached to the housing 104, where a first guide rail 108 is attached at a first end of the housing 104 and a second guide rail 110 may be attached at a second end of the housing 104. The first guide rail 108 and the second guide rail 110 may be adapted to guide the screen 106 to open condition 112. The open condition 112 of the screen 106 may be understood as a condition of the sunshade, when the screen 106 covers a window 114 present on a door 116. In the open condition 112 of the screen 106, sunlight incident on the vehicle 100 may be prevented from entering into the interior of the vehicle 100. The screen 106 may be one of a, but not limited to, nylon sheets, foil glued on flexible cardboard, and Mylar.

[0029] Based on the material of the screen 106, the screen 106 may either be rolled inside the housing 104 or may be folded in a zig-zag fashion in the housing 104. In such cases, the screen 106 may either be unrolled to the open condition 112 or stretched to the open condition 112, respectively. Although the Fig. 1 illustrates the housing 104 mounted on a bottom periphery of the window 114, it will be understood that the housing 104 may be mounted on a top periphery of the window 114 as well. In any case, the housing 104 may be mounted inside the inner panel of the vehicle 100, so that the housing 104 is not visible to the passengers of the vehicle 100, thereby retaining the aesthetics of the vehicle 100.

[0030] For the purpose of moving the screen 106 from a closed condition to the open condition 112, the housing 104 may be mechanically coupled to a first gear 118 which is in turn mechanically coupled to a first motor 120. Further, the first motor 120 may be electrically coupled to the SCU 102 for receiving electrical

supply from the SCU 102 when it is needed to actuate the sunshade in the vehicle. In one implementation, a second set of sunshades may be adapted to prevent incident sunlight from entering the interior of the vehicle through a windshield 122 and a rear window (not shown). The Fig. 1 illustrates another screen 124 of a sunshade mounted on the windshield 122 of the vehicle 100, where a housing the sunshade, such as the housing 104, is mounted in the dashboard 126 and where the sunshade is mechanically coupled to a second gear 128. Further the second gear 128 may be mechanically coupled to a second motor 130 which is in turn electrically coupled to the SCU 102 for actuating the sunshade mounted on the windshield 122.

[0031] Fig. 2a illustrates a sunshade actuation control environment 200 implementing the sunshade control unit (SCU) 102, in accordance with an embodiment of the present subject matter. In one implementation, the SCU 102 may include a vehicle state determination (VSD) unit 202 and an electronic control unit (ECU) 204 coupled to the VSD unit 202. In said implementation, the VSD unit 202 may be adapted to receive inputs relating to status of a parking brake and status of a door lock in the vehicle 100. The ECU 204 may be adapted to receive the inputs relating to status the parking brake and status of the door lock from the VSD unit 202 and actuate the first set of sunshades and the second set of sunshades. For the purpose of convenience in description, the first set of sunshades are hereinafter commonly referred to as a first sunshade 106 (alternately referred to as screen 106) and the second set of sunshades are hereinafter commonly referred to as second sunshade 124 (alternately referred to as another screen 124).

[0032] The VSD unit 202 may receive the status of the parking brake from a parking brake sensor 206, where the parking brake sensor 206 may be mounted on the parking brake in the vehicle 100. The parking brake sensor 206 may be coupled to the VSD unit 202 to ascertain the status of the parking brake in the vehicle 100 and transmit a signal to the VSD unit 202, where the value of the signal corresponds to status of the parking brake in the vehicle 100. In one

example, the status of the parking brake may be one of, but not limiting to, ‘ON’ and ‘OFF’. In this example, the signal corresponding to the ‘ON’ and ‘OFF’ status may have a value of ‘1’ and ‘0’ respectively. In another example, the parking brake sensor 206 may determine position of the parking brake in the vehicle 100 and may transmit signals to the VSD unit 202, where the signals indicate the position of the parking brake. That is, when the parking brake is actuated in the vehicle 100, the parking brake is inclined at an angle to the floor of the vehicle 100 and the parking brake is substantially parallel to the floor of the vehicle 100 when the parking brake is not actuated. In such condition, the parking brake sensor 206 may send appropriate signals and the VSD unit 202 may be configured to determine the position of the parking brake from the signals.

[0033] Further, a door position determination sensor 208 may be coupled to the VSD unit 202, where the door position determination sensor 208 is adapted to determine the status of the driver’s door in the vehicle 100 and transmit a signal to the VSD unit 202 corresponding to the status of the driver’s door. The status of the driver’s door determined by the door position determination sensor 208 may be one of, but not limiting to, ‘Open’ and ‘Closed’. In one example, the door position determination sensor 208 may be mounted on a door sill of the driver’s door in the vehicle 100.

[0034] Furthermore, the VSD unit 202 may receive inputs relating to status of the door lock from a door lock sensor 210, where the door lock sensor 210 is mounted on a door latch of a door lock of the vehicle 100. The door lock sensor 210 may be coupled to the VSD unit 202 to ascertain the status of the door lock and transmit a signal to the VSD unit 202 corresponding to status of the door lock. In one example, the status of the door lock may be one of, but not limiting to, ‘Locked’ and ‘Not locked’. In this implementation, the ECU 204 may be configured to actuate the first sunshade 106 and the second sunshade 124 when the status of the parking brake is ‘ON’ and the status of the door lock is ‘Locked’. The status of parking brake ‘ON’ is indicative that the parking brake is locked and

the status of door lock ‘Locked’ is indicative that the driver’s door of the vehicle (100) is locked.

[0035] In one implementation, a key sensor 212 may be coupled to the VSD unit 202, where the key sensor 212 is adapted to determine a status of key in the vehicle 100 and transmit a signal to the VSD unit 202 corresponding to the status of the key. In one example, the status of the key may be one of, but not limiting to, ‘KEY ON’, ‘IGNITION ON’, ‘IGNITION OFF’, and ‘KEY OFF’. The key may be one of a mechanical key and an electronic key. In case of a mechanical key, the key sensor 212 may be coupled to the key slot in the vehicle 100, such that the key sensor 212 is able to sense position of the mechanical key in the key slot. The key slot may be understood as a slot provided in the dashboard of the vehicle 100 to receive a key for starting the vehicle 100. The status of the mechanical key ‘KEY ON’ is indicative that the mechanical key in inserted into the key slot, the status of the mechanical key ‘IGNITION ON’ indicates that the engine’s ignition is ON, the status of the mechanical key ‘IGNITION OFF’ indicates that the engine’s ignition is OFF, and the status of the mechanical key ‘KEY OFF’ indicates that the mechanical key is not present in the key slot.

[0036] The electronic key, commonly referred to as a smart key, is a device which activates a receiver in the vehicle 100 by transmitting signals to the receiver. The vehicle 100 may be started only when the electronic key is inside the vehicle 100. In case of the electronic key, the status ‘KEY ON’ indicates that the electronic key is inside the vehicle 100, the status ‘IGNITION ON’ indicates that the engine’s ignition is ON, the status ‘IGNITION OFF’ indicates that the engine’s ignition is OFF, and the status ‘KEY OFF’ indicates that the electronic key is not inside the vehicle 100. In one implementation, the ECU 204 may be configured to actuate the first sunshade 106 and the second sunshade 124 when the status of the key in the vehicle 100 is ‘KEY OFF’ and when the status of the parking brake is ‘ON’ and the status of the door lock is ‘Locked’.

[0037] In one implementation, the sunshade actuation control environment 200 may further include a first temperature sensor 214 and a second temperature sensor 216. The first temperature sensor 214 may be mounted inside the vehicle 100 to sense the temperature inside the vehicle. For the purpose of description, the temperature inside the vehicle 100 is hereinafter referred to as first temperature. In one example, the first temperature sensor 214 may be mounted on the dashboard of the vehicle 100. In another example, the first temperature sensor 214 may be mounted on the roof of the vehicle 100. Further, the first temperature sensor 214 may be coupled to the ECU 204, where the first temperature sensor 100 is configured to transmit a first signal to the ECU 204, where the value associated with the first signal corresponds to the first temperature inside the vehicle 100. On receipt of the first signal, the ECU 204 may be configured to ascertain, from the first signal, if the first temperature is greater than a first threshold temperature. Thereafter, the ECU 204 may actuate the first sunshade 106 and the second sunshade 124 when the first temperature is greater than the first threshold temperature and when the status of the parking brake is 'ON' and the status of the door lock is 'Locked'.

[0038] Further, the second temperature sensor 216 may be mounted on fender panel of the vehicle 100 to sense the temperature outside the vehicle 100. For the purpose of description, the temperature outside the vehicle 100 is hereinafter referred to as second temperature. Further, the second temperature sensor 216 may be coupled to the ECU 204, where the second temperature sensor 216 is configured to transmit a second signal to the ECU 204, where the value associated with the second signal corresponds to the second temperature outside the vehicle 100. On receipt of the second signal, the ECU 204 may be configured to ascertain, from the second signal, if the second temperature is greater than a second threshold temperature. Thereafter, the ECU 204 may actuate the first sunshade 106 and the second sunshade 124 when the second temperature is greater than the first threshold temperature and when the status of the parking brake is 'ON' and the status of the door lock is 'Locked'.

[0039] In one example, the first temperature sensor 214 and the second temperature sensor 216 may generate analog signals, where value associated with the analog signals corresponds to the respective temperatures. In such condition, individual analog-to-digital converters (not shown) may be coupled between the temperatures sensors and the ECU 204, where the analog-to-digital converter is adapted to convert the analog signals to digital signals, and thereafter transmit the digital signals to the ECU 204.

[0040] In one implementation, the sunshade control environment 200 may further include a power window unit 218, where the power window unit 218 is configured to actuate all windows in the vehicle 100 to 'closed condition'. In said implementation, the ECU 204 may be electrically coupled to the power window unit 218 in the vehicle 100. The power window unit 218 may be connected to each of the windows in the vehicle 100, so that when the power window unit 218 is actuated, all the windows in the vehicle 100 may be raised to the closed condition. When the status of the key in the vehicle 100 is 'KEY OFF' and when the status of the parking brake is 'ON' and the status of the door lock is 'Locked', the ECU 204 may be configured to actuate the power window unit 220 to the closed condition, prior to actuating the first sunshade 106 and the second sunshade 124. Due to such actuation of the sunshades in the vehicle 100, the sunlight incident on the vehicle 100 may be prevented from entering the interior of the vehicle. Owing to such prevention of sunlight, the first temperature inside the vehicle 100 may be reduced and maintained at substantially low values.

[0041] In another implementation, the sunshade actuation control environment 200 may include one or more light sensors (not shown), where each of the one or more light sensors may be mounted on the periphery of the vehicle 100 such that the light sensors are able to sense the sunlight incident on the vehicle 100. In said implementation, the one or more light sensors may be coupled to the ECU 204, where the one or more light sensors are adapted to transmit signals to the ECU 204 when the sunlight is incident on the vehicle 100. Further, in this implementation, the ECU 204 may be coupled to a timer in the vehicle 100.

The timer may be understood as a machine installed in the vehicle 100 to indicate the time to the passengers of the vehicle 100. On receipt of such signals from the one or more light sensors, the ECU 204 may be configured to check the time at that instant. Subsequently, the ECU 204 may be configured to actuate the first sunshade 106 and the second sunshade 124 when the time is within a predetermined time period, provided that the status of the parking brake is 'ON' and the status of the door lock is 'Locked'. The predetermined time period may be understood as a time period that is set in the ECU 204 for controlling the actuation of the first sunshade 106 and the second sunshade 124. For example, the ECU 204 be configured to not actuate the sunshades when the time is within a range 6pm to 6am. That is, the ECU 204 may be configured not to actuate the sunshades at night. Such actuation of the sunshades based on sensing presence of sunlight would protect the interior of the vehicle 100 from being exposed to sunlight and thereby minimize temperature rise inside the vehicle 100. In addition, since the time during the day is checked by the ECU 204 prior to actuation of the sunshades, battery power during night time may be conserved.

[0042] Fig. 2b illustrates a network environment 250 for controlling actuation of the power window unit 220, in accordance with an embodiment of the present subject matter. In one implementation, the ECU 204 may be communicatively coupled to a radio-frequency (RF) trans-receiver 252. In said implementation, the RF trans-receiver 252 may be communicatively connected to one or more user devices 254-1, 254-2, …, 254-N, hereinafter commonly referred to as user device(s) 254, through a network 256, where the network 256 is a wireless network. The user devices 254 may be implemented as, but are not limited to, hand-held devices, laptops or other portable computers, tablet computers, mobile phones, PDAs, Smartphones, and the like. As described earlier, the ECU 204 may be configured to actuate the power window unit 220 when the status of the key in the vehicle 100 is 'KEY OFF' and when the status of the parking brake is 'ON' and the status of the door lock is 'Locked'.

[0043] In one implementation, a human detecting sensor 258 may be coupled to the ECU 204, where the human detecting sensor 258 is configured to detect presence of human being inside the vehicle 100. The human detecting sensor 258 may be mounted on the roof of the vehicle 100. The human detecting sensor 258, generally, determines the presence of a human being, based on movement inside the vehicle. Once the power window unit 220 is actuated by the ECU 204, the human detecting sensor 258 may be activated to continuously sense the presence of human being inside the vehicle 100. This is because, once the power window unit 220 is actuated, all windows in the vehicle 100 may be raised to the closed position. In such situation, the human being present inside the vehicle 100 may experience a suffocating environment due to lack of exchange of air. Additionally, a substantially high temperature inside the vehicle 100 may not provide comfort to the human being inside the vehicle 100. Although the description herein describes function of the human detecting sensor 258 with respect to human being, it will be appreciated that the human detecting sensor 258 may also sense the presence of a pet animal inside the vehicle 100.

[0044] In such situations, the human detecting sensor 258 may sense the presence of the human being inside the vehicle 100 and transmit a signal to the ECU 204. On receipt of such signal from the human detecting sensor 258, the ECU 204 may be configured to communicate the presence of human being inside the vehicle 100 to the user device(s) 254 through the RF trans-receiver 252. In one example, the presence of human being inside the vehicle 100 may be communicated to the user device 254 by a short-message-service (SMS). For the purpose of communication between the SCU 102 and the user device(s) 254, a tailor-made application may be installed in the user device(s) 254 to receive inputs from the ECU 204, where the input may be in form of, but not limiting to, a warning signal, a warning message, or an audio alert. On receipt of such inputs from the ECU 204, the user may be allowed to remotely actuate a blower unit 260 in the vehicle 100. For the purpose, an actuation switch of the blower unit 260 may be coupled to the ECU 204. The user may be understood as the driver or the owner of the vehicle 100.

[0045] In one implementation, the user may either reply to the SMS with an instruction or send a coded instruction through the tailor-made application, to the ECU 204, for starting the blower unit 260 in the vehicle 100. The reply SMS from the user device 254 may be received by the RF trans-receiver 252 and may thereafter be communicated to the ECU 204 to actuate the blower unit 260. The blower unit 260 may include a blower which is used for exchanging air from outside the vehicle 100 to interior of the vehicle 100. In doing so, it causes a heat transfer from the inside of the vehicle 100 to the outside. Therefore, with actuation of the blower unit 260, the first temperature inside the vehicle 100 may be maintained at an appropriate temperature. Further, the instruction from the user device 254 to the ECU 204 may include a value of speed of the blower. In such condition, the ECU 204 may accordingly actuate the blower unit 260.

[0046] The phrase 'human being' used hereinabove includes an adult and a child. In case the human being inside the vehicle 100 is an adult, then that person may choose to manually actuate the sunshades in the vehicle 100. For the purpose of manual actuation, a switch or a knob may be provided on the dashboard of the vehicle 100, where the switch or the knob aids in actuation of the sunshades in the vehicle. Alternately, if the key is left inside the vehicle 100, the person may switch ON the air-conditioner or blower unit 260 manually. However, the above two choices to the person inside the vehicle 100 may be useful if the person is aware of the switch or the knob or blower unit's 260 switch inside the vehicle 100. In such condition, if the user is in the surrounding of the vehicle 100, on receipt of the information from the ECU 204, the user may rush to the vehicle 100 to unlock the driver's door and help the person come out of the vehicle 100.

[0047] In case where the human being inside the vehicle 100 is a child, who is not aware of any switch or knob inside the vehicle 100, the user may either arrive at the vehicle 100 to bring the child out of the vehicle 100 or remotely actuate the blower unit 260 with a moderate blower speed. It may be understood that a similar case may prevail if a pet animal is inside the vehicle 100 at the time of receiving the information in the user device 254 by the ECU 204. Therefore,

the presence of the human detecting sensor 258 ensures safety of the child during temperature rise inside the vehicle 100.

[0048] Fig. 3a and Fig. 3b illustrates methods 300 and 350, respectively, for actuating a sunshade in the vehicle 100, in accordance with an embodiment of the present subject matter. The order in which the method is described is not intended to be construed as a limitation, and any number of the described method blocks can be combined in any order to implement the methods 300 and 350, or an alternative method. Additionally, individual blocks may be deleted from the methods without departing from the spirit and scope of the subject matter described herein. Furthermore, the methods 300 and 350 may be implemented in any suitable hardware. Although the methods 300 and 350 are explained with reference to the sunshade control unit 102, it will be understood that the methods may be implemented in one or more microprocessors or integrated circuits to perform the actuation of the first sunshade 106 and the second sunshade 124, without departing from the scope of the present subject matter.

[0049] Referring to method 300, at block 302, a first temperature inside a vehicle 100 may be determined. In one implementation, a first temperature sensor 214 may be mounted inside the vehicle 100, where the first temperature sensor 214 is configured to sense the first temperature inside the vehicle 100. In one example, the first temperature sensor 214 may be mounted on the dashboard of the vehicle 100. In said implementation, the first temperature sensor 214 may be coupled to an electronic control unit (ECU) 204 of a sunshade control unit (SCU) 102.

[0050] At block 304, a first signal may be transmitted from the first temperature sensor 214 to ECU 204, where the value associated with the first signal corresponds to the first temperature. In one implementation, the first temperature sensor 214 may generate analog signals, where value of the analog signals corresponds to the first temperature. Further, a first analog-to-digital converter may be coupled between the first temperature sensor 214 and the ECU 204 to convert the analog signals to digital signals.

[0051] At block 306, it may be determined whether the first temperature is greater than a first threshold temperature. In one implementation, the ECU 204 may be configured to determine, from the first signal, whether the first temperature is greater than the first threshold temperature. In one example, the first threshold temperature may be set in the ECU 204, where the first threshold temperature may be changed based on a season.

[0052] At block 306, if it is ascertained that the first temperature is greater than the first threshold temperature, then the method 300 may branch to ('YES' branch) block 308.

[0053] At block 310, a second temperature outside the vehicle 100 may be determined. In one implementation, a second temperature sensor 216 may be mounted on fender panel of the vehicle 100, where the second temperature sensor 216 is configured to sense the temperature outside the vehicle 100.

[0054] At block 312, a second signal may be transmitted from the second temperature sensor 216 to the ECU 204, where the value associated with the second signal corresponds to the second temperature. In one implementation, the second temperature sensor 216 may generate analog signals, where value of the analog signals corresponds to the second temperature. Further, a second analog-to-digital converter may be coupled between the second temperature sensor 216 and the ECU 204 to convert the analog signals to digital signals.

[0055] At block 314, it may be determined whether the second temperature is greater than a second threshold temperature. In one implementation, the ECU 204 may be configured to determine, from the second signal, whether the second temperature is greater than the second threshold temperature. In one implementation, the second threshold temperature may also be set in the ECU 204 based on the season.

[0056] At block 314, if it is ascertained that the second temperature is greater than the second threshold temperature, then the method 300 may branch to ('YES' branch) block 308.

[0057] As can be gathered from the above, the block 306 and the block 312 branches to block 314. Hence, it may be understood that the first temperature sensor 214 and the second temperature sensor 216 may continuously sense the inside temperature and the outside temperature, respectively, and transmit the determined temperature to the ECU 204. Accordingly, when either of the temperatures is above the respective threshold temperature, the ECU 204 may be configured to perform further operations which are described below.

[0058] At block 308, it may be ascertained if status of parking brake of the vehicle 100 is "ON". In one implementation, a parking brake sensor 206 may be may be coupled to a vehicle state determination (VSD) unit 202, where the parking brake sensor 206 is configured to determine the status of the parking brake and transmit a signal to the VSD unit 202 corresponding to the status of the parking brake. The parking brake sensor 206 may be mounted on the parking brake of the vehicle. In one example, the status may be one of, but not limiting to, 'ON' and 'OFF'.

[0059] At block 306, if it is ascertained that the first temperature is not greater than the first threshold temperature, the method 300 branches to ('NO' branch) block 316.

[0060] Similarly, at block 314, if is ascertained that the second temperature is not greater than the second threshold temperature, the method 300 branches to ('NO' branch) block 316.

[0061] At block 316, the operation may be declined. In one implementation, the ECU 204 may not proceed to further steps if respective conditions are not satisfied at blocks 306 and block 314. However, it may be understood that the first temperature sensor 214 and the second temperature 216 may continuously sense the inside and the outside temperatures, respectively. If there a change in the temperatures to satisfy the conditions described in the blocks 306 or block 314, the ECU 204 may operate on further steps, based on the satisfied conditions.

[0062] At block 308, if it is ascertained that the status of the parking brake is ‘ON’, the method 300 branches to (‘YES branch) block 318. Else, the method branches to (‘NO’ branch) block 316.

[0063] At block 318, it may be ascertained whether status of the driver’s door of the vehicle 100 is ‘Locked’. In one implementation, a door lock sensor 210 maybe coupled to the VSD unit 202, where the door lock sensor 210 is adapted to determine the status of the driver’s door of the vehicle 100 and transmit a signal to the VSD unit 202 corresponding to the status of the driver’s door. In one example, the door lock sensor 210 may be mounted on a door latch of the driver’s door of the vehicle 100. The status of the driver’s door may be one of ‘Locked’ and ‘Not locked’.

[0064] In one implementation, a key sensor 212 may also be coupled to the VSD unit 202, where the key sensor 212 is adapted to determine a status of the key in the vehicle 100 and transmit a signal to the VSD unit 202 corresponding to the status of the key in the vehicle 100. In one example, the key sensor 212 may be mounted on a key slot in the vehicle 100 to determine status of key in the vehicle 100. The key may either be a mechanical key or an electronic key. The status of the key determined by the key sensor 212 may be one of ‘IGNITION ON’, ‘IGNITUION OFF’, ‘KEY ON’, and ‘KEY OFF’. The status of the key ‘IGNITION ON’ is indicative that the engine ignition is ON, the status of the key ‘IGNITION OFF’ is indicative that the engine ignition is OFF, the status of the key ‘KEY ON’ is indicative that the key is in the key slot, and the status of the key ‘KEY OFF’ is indicative that the key is not in the key slot.

[0065] At block 318, if it is ascertained that the status of driver’s door is ‘Locked’, the method 300 may branch to (‘YES’ branch) block 320. Else, the method 300 may branch to (‘NO’ branch) block 316. In one example, the method 300 may branch to (‘YES’ branch) block 320 when it is ascertained that the status of driver’s door is ‘Locked’ and when the status of the key is ‘KEY OFF’.

[0066] At block 320, sunshades may be actuated in the vehicle 100. In one implementation, a first sunshade 106 and a second sunshade 124 may be actuated

in the vehicle 100 when the status of the parking brake is ‘ON’ and the status of driver’s door is ‘Locked’ and status of the key is ‘KEY OFF’. For the purpose of description, a first set of sunshades are commonly referred to as the first sunshade 106. Each sunshade from among the first set of sunshades may be mounted on one window from among all the windows in the vehicle 100. Similarly, a second set of sunshades are commonly referred to as the second sunshade 124. Each sunshade from among the second set of sunshade may be mounted on a windshield of the vehicle 100 and a rear window in the vehicle 100.

[0067] In one implementation, when it is ascertained that the status of driver’s door is ‘Locked’ and status of the key is ‘KEY OFF’, the ECU 204 may be configured to actuate a power window unit 220 in the vehicle 100. The power window unit 220 may be coupled to each of the windows in the vehicle 100, where actuation of the power window unit 220 causes each of the windows in the vehicle 100 to raise to closed position.

[0068] Referring to method 350, at block 352, a state of the key in the vehicle 100 may be determined. In one implementation, key sensor 212 may be coupled to the VSD unit 202, where the key sensor is adapted to determine the state of the key in the vehicle 100 and transmit a signal to the VSD unit 202 corresponding to the state of the key in the vehicle 100. As described earlier, the state of the key may be one of ‘IGNITION ON’, ‘IGNITION OFF’, ‘KEY ON’, and ‘KEY OFF’. In case of a mechanical key, the status ‘KEY OFF’ may be indicative that the mechanical key is not present in the key slot, and in case of electronic key, the status ‘KEY OFF’ may be indicative that the electronic key is not present inside the vehicle 100.

[0069] At block 354, it may be ascertained whether the status of the key is ‘KEY OFF’. In one implementation, the VSD unit 202 may be adapted to receive inputs from the key sensor 212. Further, the ECU 204 may be coupled to the VSD unit 202, where the ECU 204 is adapted to receive inputs from the VSD unit 202.

[0070] At block 354, if it is ascertained that the status of the key is ‘KEY OFF’, the method 350 branches to (‘YES’ branch) block 356.

[0071] At block 356, status of the door lock in the vehicle 100 may be determined. In one implementation, a door lock sensor 210 may be mounted on a door latch of the driver's door of the vehicle 100. The door lock sensor 210 may be coupled to the VSD unit 202, where the door lock sensor 210 may be adapted to determine the status of the door lock in the vehicle 100 and transmit a signal to the VSD unit 202 corresponding to the status of the door lock. In one example, the status of the door lock may be one of 'Locked' and 'Not locked'. In said implementation, the VSD unit 202 may be adapted to receive inputs relating to the status of the door lock from the door lock sensor 210.

[0072] At block 358, if it is ascertained that the status of the driver's door of the vehicle 100 is 'Locked', the method 350 branches to ('YES' branch) block 360.

[0073] At block 360, presence of human inside the vehicle 100 may be determined. In one implementation, a human detecting sensor 258 may be mounted inside the vehicle 100, where the human detecting sensor 258 is configured to determine the presence of human being inside the vehicle 100. The human detecting sensor 258 may be coupled to the ECU 204, so that a corresponding signal may be transmitted to the ECU 204 when presence of human being is ascertained inside the vehicle 100. The phrase human being, here, includes an adult and a child. However, the human detecting sensor 258 may also ascertain the presence of pet animals inside the vehicle 100.

[0074] At block 360, if presence of human being is ascertained, the method 350 branches to ('YES' branch) block 362.

[0075] At block 362, the presence of human being inside the vehicle 100 may be communicated to a user device. In one implementation, the vehicle 100 may include a power window unit 220, where the power window unit 220 is electrically coupled to each of the windows in the vehicle 100. In said implementation, the power window unit 220 may also be coupled to the ECU 204. In addition, a radio-frequency (RF) trans-receiver 252 may be communicatively coupled to the ECU 204, where the RF trans-receiver 252 is further

communicatively connected to one or more user device(s) 254-1, 254-2,…, 254-N, hereinafter commonly referred to as user device(s) 254, through a network 256. In one example, the network 256 may be a wireless network.

[0076] When presence of human being inside the vehicle 100 is ascertained by the human detecting sensor 258, a corresponding signal may be transmitted to the ECU 204. On receipt of such signal, the ECU 204 may be configured to communicate the presence of the human being inside the vehicle to the user device 254, through the RF trans-receiver 252. A suitable application may be installed in the user device 254 to stay in communication with the RF trans-receiver 252. The application may also help a user in conveying message/instructions easily to the RF trans-receiver 252. In such a case, when the RF trans-receiver 252 is actuated, a message may be communicated to the user device 254. The message may indicate the presence of human inside the vehicle 100, to the user. The user may either be the driver or the owner of the vehicle 100.

[0077] In another implementation, the power window unit 220 may be actuated and simultaneously a message may be communicated to the user device 254. In such cases, on receipt of the message, the user may reply to the message with a predefined instruction. Further, on receipt of the instruction from the user device 254, the ECU 204 may be configured to actuate a blower unit 260 in the vehicle 100. In both the cases described hereinabove, the sunshades in the vehicle 100 may be actuated, so that sunlight incident on the vehicle 100 is prevented from entering into the vehicle 100.

[0078] Although the disclosed subject matter has been described in language specific to structural features and/ or methods, it is to be understood that the appended claims are not necessarily limited to the specific features or methods described. Rather, the specific features and methods are disclosed as implementations for actuating sunshades in the vehicle.

I/We claim:

1. A method for actuating sunshades (106, 124) in a vehicle (100), the method comprising:

receiving inputs relating to status of a parking brake and status of a door lock in the vehicle (100); and

actuating, by an electronic control unit (ECU) (204), a first sunshade (106) and a second sunshade (124) in the vehicle (100) based on the status of the parking brake and the status of the door lock.

2. The method as claimed in claim 1, wherein the actuation of the first sunshade (106) and the second sunshade (124), by the ECU (204), is performed when the status of the parking brake is 'ON' and the status of the door lock is 'Locked', wherein the status of parking brake 'ON' is indicative that the parking brake is locked and the status of door lock as 'Locked' is indicative that the driver's door of the vehicle (100) is locked.

3. The method as claimed in claim 1, wherein the method comprises:

determining, by a first temperature sensor (214), a first temperature inside the vehicle (100);

transmitting a first signal from the first temperature sensor (214) to the ECU (204), wherein value associated with the first signal corresponds to the first temperature;

ascertaining, by the ECU (204), whether the first temperature is greater than a first threshold temperature; and

actuating, by the ECU (204), the first sunshade (106) and the second sunshade (124) in the vehicle (100), when it is ascertained that the first temperature is greater than the first threshold temperature and when the status of parking brake is 'ON' and the status of the door lock is 'Locked'.

4. The method as claimed in claim 1, wherein the method comprises:

determining, by a second temperature sensor (216), a second temperature outside the vehicle (100);

transmitting a second signal from the second temperature sensor (216) to the ECU (204), wherein value associated with the second signal corresponds to the second temperature;

ascertaining, by the ECU (204), whether the second temperature is greater than a second threshold temperature; and

actuating the first sunshade (106) and the second sunshade (124) in the vehicle (100), when it is ascertained that the second temperature is greater than the second threshold temperature and when the status of parking brake is 'ON' and the status of the door lock is 'Locked'.

5. The method as claimed in claim 1, wherein the method comprises:

determining, by a key sensor (212), a status of key in the vehicle (100);

transmitting, by the key sensor (212), a signal to the ECU (204) corresponding to the status of the key in the vehicle (100), wherein the status of the key is one of 'IGNITION ON', 'IGNITION OFF', 'KEY ON', and 'KEY OFF', and wherein the status of the key 'IGNITION ON' is indicative that the engine ignition is ON, the status of the key 'IGNITION OFF' is indicative that the engine ignition is OFF, the status of the key 'KEY ON' is indicative that the key is in the key slot, and the status of the key 'KEY OFF' is indicative that the key is not in the key slot.

6. The method as claimed in claim 5, wherein the actuation of the first sunshade (106) and the second sunshade (124) is performed, by the ECU (204), when the status of the key is "KEY OFF" and when the status of parking brake is 'ON' and the status of the door lock is 'Locked'.

7. The method as claimed in claim 1, wherein the method comprises:

determining whether the status of the door lock in the vehicle (100) is in ‘Locked’;

ascertaining presence of a human being inside the vehicle (102) when it is determined that the status of the door is ‘Locked’; and

communicating the presence of the human being inside the vehicle (100) to a plurality of user devices (254), when the presence of the human being inside the vehicle (100) is ascertained.

8. The method as claimed in claim 7, wherein the communication to the plurality of user device (254) is performed through a radio-frequency (RF) trans-receiver (252).

9. The method as claimed in claimed 7, wherein a user device (254), from among the plurality of user devices (254), is one of a hand-held device, tablet computer, mobile phone, personal digital assistant (PDA), and a Smartphone.

10. A sunshade control unit (102) for actuating sunshades (106, 124) in a vehicle (100), the sunshade control unit (102) comprising:

a vehicle state determination (VSD) unit (202), wherein the vehicle state determination unit (202) is adapted to receive inputs relating to status of a parking brake and status of a door lock in the vehicle (100);

an electronic control unit (ECU) (204) coupled to the vehicle state determination unit (202), wherein the ECU (204) is adapted to:

receive the inputs relating to status of the parking brake and status of the door lock from the vehicle state determination unit (202); and

actuate a first sunshade (106) and a second sunshade (124), based on the status of the parking brake and the status of the door lock, for blocking irradiation in the vehicle (100).

11. The sunshade control unit (102) as claimed in claim 10, wherein the ECU is adapted to actuate the first sunshade (106) and the second sunshade (124) when status of the parking brake is ‘ON’ and status of the door lock is ‘Locked’, wherein the status of the parking brake ‘ON’ is indicative that the parking brake is locked and the status of the door lock as ‘Locked’ is indicative that the driver’s door of the vehicle (100) is locked.

12. The sunshade control unit (102) as claimed in claim 10, wherein a first temperature sensor (214) is coupled to the ECU (204), and wherein the first temperature sensor (214) is mounted inside the vehicle (100) to transmit a first signal to the ECU (204), wherein the value associated with the first signal corresponds to a first temperature inside the vehicle, and wherein the ECU (204) is adapted to:

ascertain, from the first signal, if the first temperature is greater than a first threshold temperature; and

actuate the first sunshade (106) and the second sunshade (124) when it is ascertained that the first temperature is greater than a first threshold temperature and when the status of the parking brake is ‘ON’ and the status of the door lock is ‘Locked’.

13. The sunshade control unit (102) as claimed in claim 10, wherein a second temperature sensor (216) is coupled to the ECU (204), and wherein the second temperature sensor (216) is mounted on the vehicle (100) to transmit a second signal to the ECU (204), wherein the value associated with the second signal corresponds to a second temperature outside the vehicle, and wherein the ECU (204) is adapted to:

ascertain, from the second signal, if the second temperature is greater than a second threshold temperature; and

actuate the first sunshade (106) and the second sunshade (124) when it is ascertained that the second temperature is greater than a second

threshold temperature and when the status of the parking brake is ‘ON’ and the status of the door lock is ‘Locked’.

14. The sunshade control unit (102) as claimed in claim 10, wherein the VSD unit (202) receives inputs relating to status of the parking brake from a parking brake sensor (206), and wherein the parking brake sensor (206) is mounted on the parking brake in the vehicle (100).

15. The sunshade control unit (102) as claimed in claim 10, wherein the VSD unit (202) receives inputs relating to status of the door lock from a door lock sensor (210), and wherein the door lock sensor (210) is mounted on a door latch of a door of the vehicle (100).

16. The sunshade control unit (102) as claimed in claim 10, wherein one or more light sensors are coupled to the ECU (204), wherein the one or more light sensors are adapted to:

sense sunlight incident on the vehicle (100); and

transmit a signal to the ECU (204) for actuating the first sunshade (106) and the second sunshade (124).

17. The sunshade control unit (102) as claimed in claim 10, wherein a door position determination sensor (208) is coupled to the VSD unit (202), and wherein the door position determination sensor (208) is adapted to:

determine a status of the driver’s door in the vehicle (100); and

transmit a signal to the VSD unit (202) corresponding to the status of the driver’s door, wherein the status of the driver’s door is one of ‘Open’ and ‘Closed’.

18. The sunshade control unit (102) as claimed in claim 10, wherein a key sensor (212) is coupled to the VSD unit (202), and wherein the key sensor (212) is adapted to:

determine a status of key in the vehicle (100);

transmit a signal to the VSD (202) corresponding to the status of the key in the vehicle (100), wherein the status of the key is one of 'IGNITION ON', 'IGNITION OFF', 'KEY ON', and 'KEY OFF', and wherein the status of the key 'IGNITION ON' is indicative that the engine ignition is ON, the status of the key 'IGNITION OFF' is indicative that the engine ignition is OFF, the status of the key 'KEY ON' is indicative that the key is in the key slot, and the status of the key 'KEY OFF' is indicative that the key is not in the key slot.

19. The sunshade control unit (102) as claimed in claim 18, wherein the ECU (204) actuates the first sunshade (106) and the second sunshade (124) when the status of the key is "KEY OFF" and when the status of the parking brake is 'ON' and the status of the door lock is 'Locked'.

20. The sunshade control unit (102) as claimed in claim 18, wherein the key is one of a mechanical key and an electronic key.

21. The sunshade control unit (102) as claimed in claim 10, wherein a human detector sensor (258) is coupled to the ECU (204), and wherein the human detector sensor (258) is mounted inside the vehicle (100), to:

ascertain presence of a human being inside the vehicle (100) when the status of the door lock in the vehicle is 'Locked'; and

transmit a signal to the ECU (204), wherein the ECU (204) actuates a blower unit (260) when presence of the human being is ascertained inside the vehicle (100).

22. The sunshade control unit (102) as claimed in claim 21, wherein the ECU (204) communicates the presence of the human being inside the vehicle (100) to a user device (254).

23. The sunshade control unit (102) as claimed in claim 22, wherein the ECU (204) is coupled to the user device (254) through a radio-frequency (RF) trans-receiver (252), wherein the RF trans-receiver (252) is adapted to:

receive signals from the ECU (204) relating to presence of human being inside the vehicle (100); and

communicate presence of the human being inside the vehicle (100) to the user device (254), through a network (256).

24. The sunshade control unit (102) as claimed in claim 23, wherein the RF trans-receiver (252) is adapted to:

receive inputs from the user device (254), wherein the inputs comprises instructions to the ECU (204); and

transmit the inputs to the ECU (204), wherein the ECU (204), on receipt of the inputs from the RF trans-receiver (252), actuates the blower unit (260) in the vehicle (100), based on the instructions.

25. The sunshade control unit (102) as claimed in one of claims 22 to 24, wherein the user device (254) is one of a hand-held device, tablet computer, mobile phone, personal digital assistant (PDA), and a Smartphone.

26. The sunshade control unit (102) as claimed in claim 10, wherein the first sunshade (106) is mounted on at least one door of the vehicle (100), and wherein a first motor (120) is coupled to the sunshade control unit (102) for actuating the first sunshade (106).

27. The sunshade control unit (102) as claimed in claim 10, wherein the second sunshade (124) is mounted on windshield (122) of the vehicle

(100), and wherein a second motor (130) is coupled to the sunshade control unit (102) for actuating the second sunshade (124).

Dated **08 October 2014**

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To,
The Controller of Patents
The Patent Office at **Chennai**

ABSTRACT

SUNSHADE CONTROL UNIT FOR A VEHICLE

The present subject matter relates to a method for actuating sunshades in a vehicle (100). In one implementation, the method may be implemented in a sunshade control unit (102) for blocking irradiation in the vehicle (100). In said implementation, the method includes receiving inputs relating to status of a parking brake and status of a door lock in the vehicle (100). Further, the method includes actuating, by an electronic control unit (204), a first sunshade (106) and a second sunshade (124) based on the status of the parking brake and the status of the door lock.

< To be published with Fig. 3a >

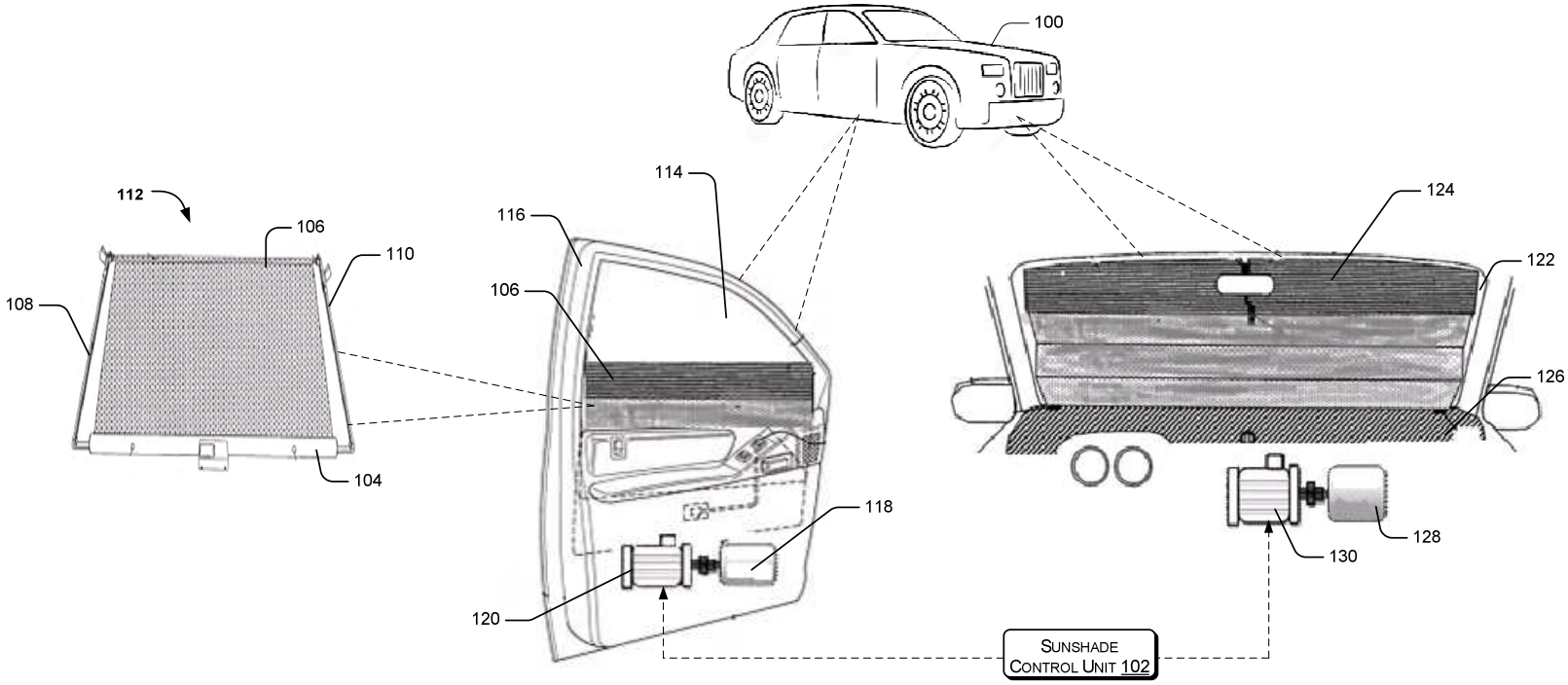

Fig. 1

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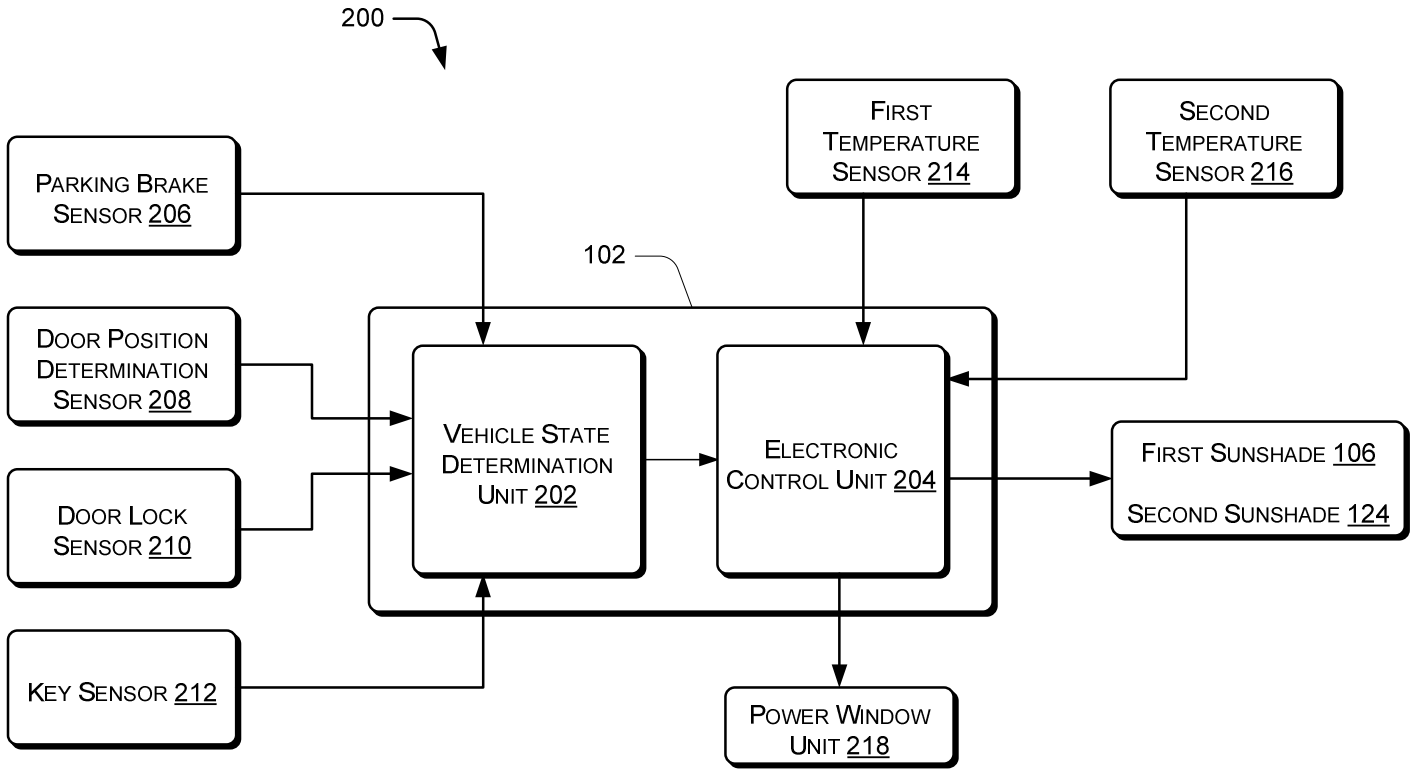

Fig. 2a

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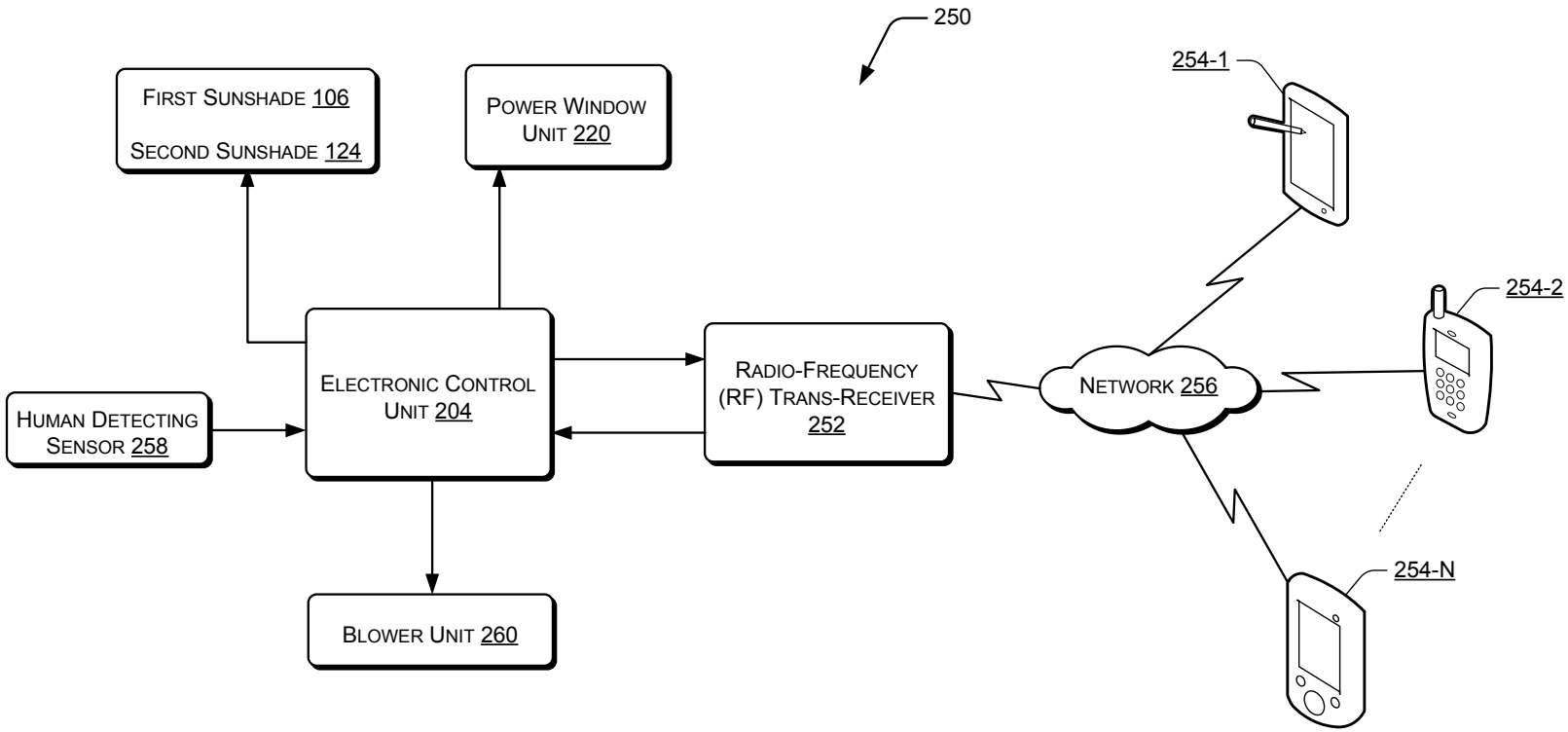

Fig. 2b

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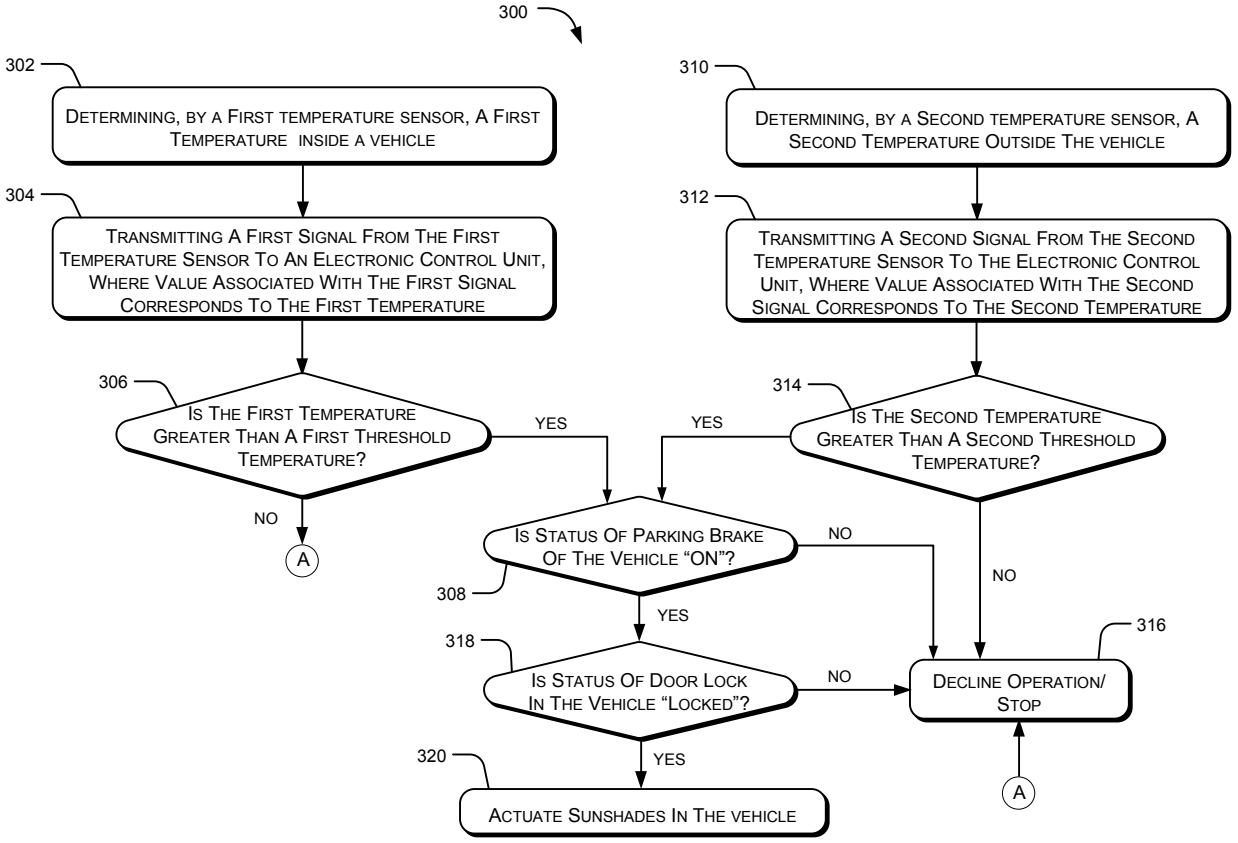

Fig. 3a

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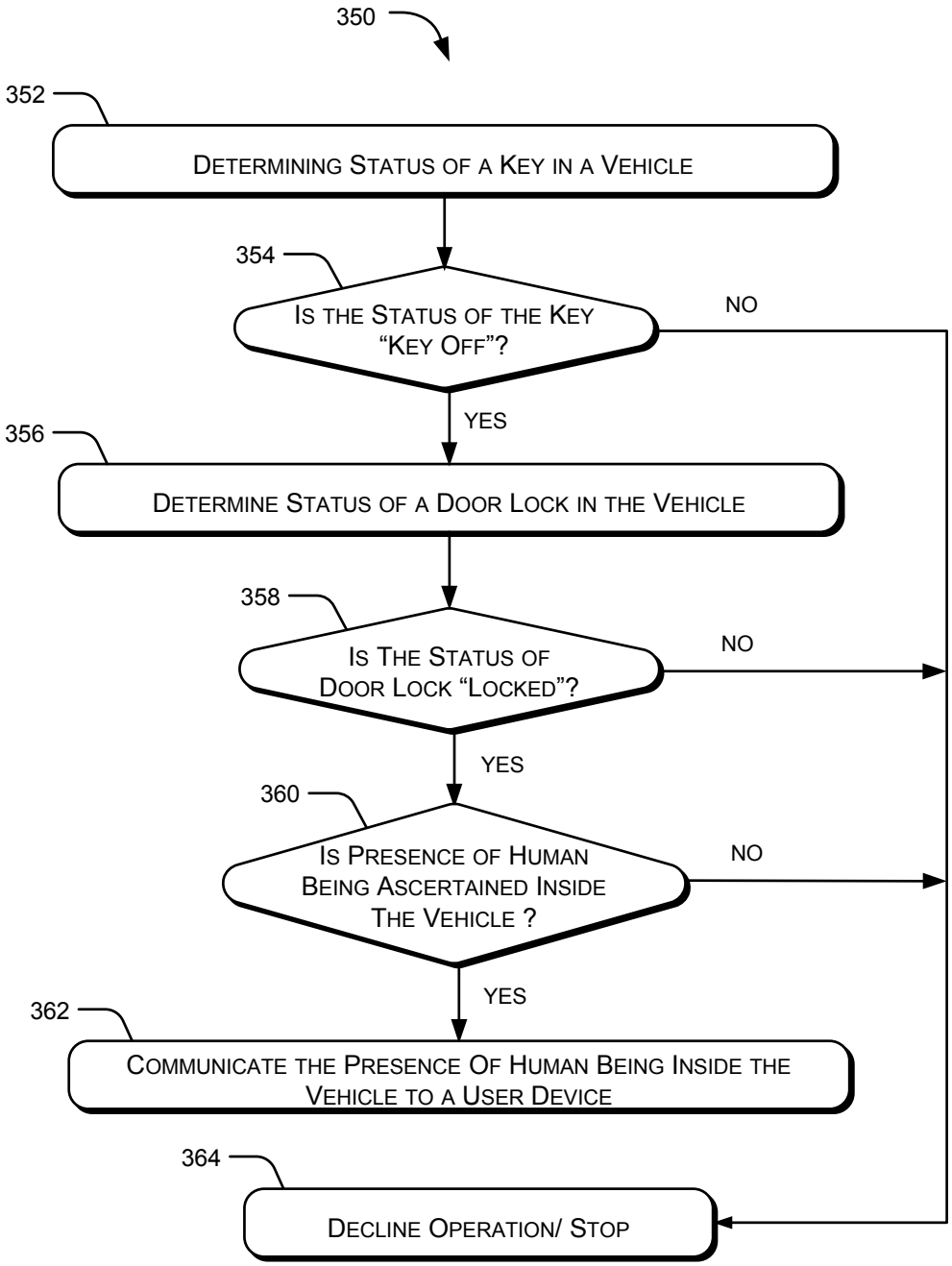

Fig. 3b

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