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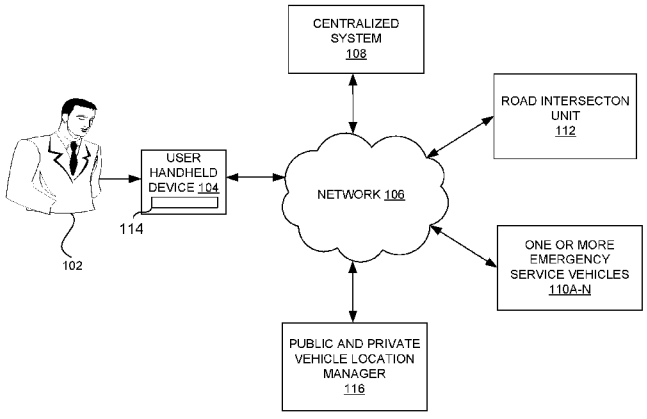

FIG. 1

(57) Abstract: A centralized system (108) for prioritizing traffic signal for one or more emergency service vehicles 110A-N at various road segments of a road intersection is disclosed. The centralized system (108) determines a priority value for an incident based on incident information obtained from a user 102 and a nature of the incident. The centralized system (108) identifies the one or more emergency service vehicle in a close proximity of the user 102. The centralized system (108) further identifies (i) the one or more emergency service vehicles 110A-N present in each of one or more zones over the road intersection and (ii) a high priority zone comprising a high zone priority value from the one or more zones. The centralized system (108) further controls traffic signals based on the high priority zone and a distance between the one or more emergency vehicles (110A-N) and the road intersection.

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CENTRALIZED SYSTEM FOR ROAD TRAFFIC SIGNAL PRIORITIZATION AT ROAD INTERSECTIONS USING EMERGENCY HANDHELD TOOL

BACKGROUND

Technical Field

[0001] The embodiments herein generally relate to controlling of traffic signals and, more particularly, to a method and system for prioritizing one or more emergency service vehicles based on a prioritizing value of an incident, and a zone priority value of one or more sub-zones.

Description of the Related Art

[0002] Typically, one or more emergency service vehicles are mainly depending on vehicle horn, siren and flash signal to inform other vehicles and pedestrians for getting preemption. A conventional traffic controlling system may include a transistor (e.g. the conventional traffic controlling system in the one or more emergency vehicles) and a receiver (e.g. in a road intersection) for getting the preemption. A driver of the one or more emergency vehicles triggers the transistor to communicate with the road intersection to get the preemption. The receiver receives a request from the one or more emergency service vehicles and provides a green signal to a zone where the one or more emergency vehicles are coming. Then the conventional traffic controlling system may back to its normal operations. A zone, at which the one or more emergency service vehicles present, may get an extra duration of green signal. This extra duration leads to traffic congestion on the other side of the road intersection.

[0003] The conventional traffic controlling system fails to take a proper decision when the one or more emergency service vehicles are present on one or more zones of the road intersections. For example, the one or more emergency service vehicles may present in the road intersection (located at the one or more zones e.g., north, south, east, and west). Further, there is no way for identifying a priority of the one or more emergency service vehicles. This leads to traffic congestion because there is no way to find the priority of the one or more emergency service vehicles. Other conventional traffic controlling system typically may include a transistor, a receiver and a computer system. The one or more

emergency service vehicles send signals to the computer system through the transistor. The computer system receives the signals from the one or more emergency service vehicles through the receiver. The computer system changes a traffic signal based on a received signal and pre-allocated priority values assigned to various category of the one or more emergency service vehicles. The traffic controlling system may track a location of the one or more emergency service vehicles in real-time, but fails to change or update priority values of the one or more emergency service vehicles in real-time.

[0004] Existing conventional emergency communication system provides emergency services with severe limitations. In conventional emergency communication system, a user (a caretaker of a patient) sends an emergency service request to an emergency service provider. The emergency service provider connects or provides details of the user to the driver of the one or more emergency service vehicles. The time delay is occurred, when human interaction is involved in the above steps of the conventional emergency communication system. Accordingly, there remains a need for a system and a method to automate the prioritization of the one or more emergency service vehicles at road intersections in an efficient way.

SUMMARY

[0005] In view of the foregoing, an embodiment herein provides a centralized system for prioritizing one or more emergency service vehicles based on a priority value of an incident and a zone priority value of one or more zones. The centralized system includes an incident information obtaining module, a priority value determination module, an emergency service vehicle identification module, an emergency service verification module, a high priority zone identification module and an intersection control module. The incident information obtaining module obtains information related to an incident from one or more users and a location of the one or more users from a user handheld device associated with the one or more users. The priority value determination module determines a priority value for the incident based on a nature of the incident. The emergency service vehicle identification module identifies one or more emergency service vehicles in a close proximity of the user. The emergency service vehicle identification module performs an extended search based on the nature of the incident to identify the one or more emergency service vehicles until the one

or more emergency service vehicles is identified. The emergency service verification module verifies the one or more emergency vehicles reaches to a location of the user in time. The emergency service verification module identifies a distance between the user and the one or more emergency vehicles. The emergency service verification module provides information that comprises a fastest route to the one or more emergency service vehicles based on (i) the distance between the user, and the one or more emergency service vehicles, and (ii) a traffic to reach the location of the user. The emergency service verification module determines a calculated expiry time for the one or more emergency service vehicles to reach the location of the user. The emergency service verification module repeats the extended search process until the one or more emergency vehicles is committed to reach to the location of the user when the calculated expiry time of the one or more emergency service vehicles is expired. The high priority zone identification module identifies the one or more emergency service vehicles present in each of the one or more zones over road intersections. Each of the one or more zones includes one or more sub-zones. The one or more sub-zones include a sub-zone priority value. The sub-zone priority value of the one or more sub-zones is added with a priority value of the one or more emergency service vehicles present at the one or more sub-zones to obtain a zone priority value for each of the one or more zones. The high priority zone identification module identifies a high priority zone that includes a high priority value from the one or more zones. The intersection control module controls traffic signals by calculating a distance between the one or more emergency vehicles and the road intersection. The intersection control module opens a green signal at the road intersection for the one or more emergency vehicles based on (i) the high priority zone and (ii) the distance between the one or more emergency vehicles and the road intersection.

[0006] In one embodiment, the centralized system further includes an intersection normalization module that normalizes the traffic signals at the road intersection after providing the green signal for the high priority zone comprising the one or more emergency service vehicles. The intersection normalization module determines an amount of time that the green signal is opened for the one or more emergency services on the high priority zone and reduces the amount of time consumed in excess by the high priority zone in the subsequent round robin scheduling cycle. In another embodiment, the intersection control module opens the green signal before the one or more emergency vehicles reach the road

intersection.

[0007] In yet another embodiment, the intersection control module generates an alert to the people at the road intersection to notice the sudden change in the course of traffic signal due to an emergency at the road intersection. In yet another embodiment, the centralized system provides an option to an administrator to assign a priority value for the one or more emergency service vehicles at any time. In yet another embodiment, the one or more zones or sub-zones includes public vehicles and private vehicles. The centralized system determines a duration of the green signal based on a sum of priority of public and private vehicles present at the one or more zones or sub-zones at the road intersection when the one or more emergency service vehicles are not present at the one or more zones or sub-zones.

[0008] In one aspect, a method for prioritizing one or more emergency vehicles based on a priority value of an incident and a zone priority value of one or more zones is provided. The method includes the following steps: (a) obtaining information related to an incident from users and a location of the user from a user handheld device associated with the user; (b) determining a priority value for the incident based on a nature of the incident; (c) identifying the one or more emergency service vehicle in a close proximity of the user; (d) verifying whether the one or more emergency service vehicles reaches to the location of the users in time; (e) identifying a distance between the user and the one or more emergency vehicles to provide information that comprises a fastest route to the one or more emergency service vehicles based on (i) the distance between the user and the one or more emergency service vehicles, and (ii) a traffic to reach the location of the user; (f) identifying the one or more emergency service vehicles present in each of the one or more zones over road intersections, wherein each of the one or more zones comprises one or more sub-zones; (g) adding a sub-zone priority value of the one or more sub-zones with a priority value of the one or more emergency service vehicles present at the one or more sub-zones to obtain a zone priority value for each of the one or more zones; (h) identifying a high priority zone comprising a high zone priority value from the one or more zones; (i) controlling traffic signals by (i) calculating a distance between the one or more emergency vehicles and the road intersection, and (ii) opening a green signal at the road intersection for the one or more emergency vehicles based on (i) the high priority zone and (ii) the distance between the one

or more emergency vehicles and the road intersection; and (h) normalizing the traffic signals at road intersection after providing the green signal for the high priority zone comprising the one or more emergency service vehicles by (i) determining an amount of time that the green signal is opened for the one or more emergency services on the high priority zone, and (ii) reducing the amount of time consumed in excess by the high priority zone in the subsequent round robin scheduling cycle.

[0009] In one embodiment, the method further includes the step of determining a calculated expiry time for the one or more emergency service vehicles to reach the user. In another embodiment, the method further includes the step of assigning a priority value for the one or more emergency service vehicles through a driver handheld tool. In yet another embodiment, the method further includes the steps of (i) performing an extended search based on the nature of the incident to identify the one or more emergency service vehicles until the one or more emergency service vehicles is identified, and (b) repeating the extended search process until the one or more emergency vehicles is committed to reach to the location of the user when the calculated expiry time of the one or more emergency service vehicles is expired.

[0010] These and other aspects of the embodiments herein will be better appreciated and understood when considered in intersection with the following description and the accompanying drawings. It should be understood, however, that the following descriptions, while indicating preferred embodiments and numerous specific details thereof, are given by way of illustration and not of limitation. Many changes and modifications may be made within the scope of the embodiments herein without departing from the spirit thereof, and the embodiments herein include all such modifications.

BRIEF DESCRIPTION OF THE DRAWINGS

[0011] The embodiments herein will be better understood from the following detailed description with reference to the drawings, in which:

[0012] FIG. 1 illustrates a schematic illustration of a system that prioritizes road traffic signal for one or more emergency service vehicles at road intersection according to an embodiment herein;

[0013] FIG. 2 illustrates an exploded view of the centralized system of FIG. 1 according to an embodiment herein;

[0014] FIG. 3 illustrates an exemplary view of one or more zones on the road intersections according to an embodiment herein;

[0015] FIG. 4 illustrates user interface views of an emergency handheld tool according to an embodiment herein;

[0016] FIG. 5 illustrates a user interface view of a sample priority of each incident assigned in the centralized system of FIG. 1 according to an embodiment herein;

[0017] FIG.6 illustrates a block diagram of a road intersection unit of the system of FIG. 1 according to an embodiment herein;

[0018] FIG. 7 illustrates an exemplary view of assigning a custom defined priority value for the one or more emergency vehicles using the centralized system of FIG. 1 according to an embodiment herein;

[0019] FIG. 8 is a flow diagram that illustrates a method for prioritizing a road traffic signal at the road intersection according to an embodiment herein; and

[0020] FIG. 9 a schematic diagram of a controller used in accordance with the embodiment herein.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

[0021] The embodiments herein and the various features and advantageous details thereof are explained more fully with reference to the non-limiting embodiments that are illustrated in the accompanying drawings and detailed in the following description. Descriptions of well-known components and processing techniques are omitted so as to not unnecessarily obscure the embodiments herein. The examples used herein are intended merely to facilitate an understanding of ways in which the embodiments herein may be practiced and to further enable those of skill in the art to practice the embodiments herein. Accordingly, the examples should not be construed as limiting the scope of the embodiments herein.

[0022] As mentioned, there remains a need for a system and a method to prioritize one or more emergency service vehicles at road intersection in an efficient way. The

embodiments herein achieve this by providing a centralized system that prioritizes a road traffic signal at road intersections for the one or more emergency service vehicles. Referring now to the drawings, and more particularly to FIGS. 1 through 9, where similar reference characters denote corresponding features consistently throughout the figures, there are shown preferred embodiments.

[0023] FIG. 1 illustrates a schematic illustration of a system that prioritizes road traffic signal for one or more emergency service vehicles at road intersection according to an embodiment herein. The system includes a user 102, a user handheld device 104, a network 106, a centralized system 108, one or more emergency service vehicles 110A-N, a road intersection unit 112, an emergency handheld tool 114, and a public and private vehicle location manager 116. In one embodiment, the emergency handheld tool 114 is installed in the user handheld device 104. In another embodiment, the emergency handheld tool 114 is installed in the centralized system 108. The user 102 sends an emergency service request to the centralized system 108 using the user handheld device 104 through the network 106. In one embodiment, the user 102 and the user handheld device 104 may be one or more. In another embodiment, the user 102 sends the emergency service request to the centralized system 108 using a phone call. The network 106 may be a wireless network, local area network (LAN) or wide area network (WAN) etc. The centralized system 108 identifies/obtains incident information from the user 102 and a location of the user 102 through the user handheld device 104 when the emergency service request is received from the user 102. The centralized system 108 performs an extended search to identify the one or more emergency service vehicles 110A-N based on the location of the user 102. The one or more emergency service vehicles 110A-N may be an ambulance, a fire engine or a police vehicle. The one or more emergency service vehicles 110A-N includes a driver handheld device, which may be operated by a driver of the one or more emergency service vehicles 110A-N. In an embodiment, the driver handheld device may a part of the one or more emergency service vehicles 110A-N. The driver handheld device includes the emergency handheld tool 114. The driver may send an emergency service request to the centralized system 108 through the driver handheld device. The centralized system 108 detects a location of the one or more emergency service vehicles 110A-N and the location of the user 102 / driver, from whom an emergency service request is received. In one embodiment, the

emergency handheld tool 114 sends the location of the one or more emergency service vehicles 110A-N to the centralized system 108 through the network 106 or any other network. The centralized system 108 allocates the one or more emergency service vehicles 110A-N that is in close proximity to the user 102 / the driver. The centralized system 108 verifies whether the one or more emergency service vehicles 110A-N reaches to the user 102 in time or not. The centralized system 108 assigns a priority value to the one or more emergency service vehicles 110A-N based on a nature of the incident, which is handled by the one or more emergency service vehicles 110A-N. In one embodiment, the driver of an emergency service vehicle 110 may change a priority value of the emergency service vehicle 110 during journey based on the nature of the incident handled by the emergency service vehicle 110. The priority values for the incident may be defined by the decision makers (e.g. an administrator) of the concerned authority. The centralized system 108 further identifies a high priority zone based on the one or more emergency service vehicles 110A-N present in each of one or more zones. The centralized system 108 controls traffic signals by calculating a distance between the one or more emergency vehicles and the road intersection. The centralized system 108 sends a control input to open a green signal at the road intersection for the one or more emergency vehicles based on (i) the high priority zone and (ii) the distance between the one or more emergency vehicles and the road intersection. The road intersection unit 112 controls a road traffic signal based on the control input that includes information to open or close a green signal based on the high priority zone which is having high priority value received from the centralized system 108. In an embodiment, the high priority zone is identified by of the centralized system 108. In an embodiment, the road intersection unit 112 includes the traffic signal controller. The centralized system 108 may provide an input to a traffic signal controller. In another embodiment, the traffic signal controller acts as the road intersection unit 112. The road intersection unit 112 provides a green signal to the high priority value zone. The public and private vehicle location manager 116 receives location information of public and private vehicles at each side of the road intersection. The public and private vehicle location manager 116 can (i) receive, (ii) store, (iii) update, (iv) delete location information of connected public and private vehicles. The public and private vehicle location manager 116 provides location information of the public and private vehicles to the centralized system 108. The centralized system 108 allocates

priority values for to the public and private vehicles (public vehicles has high priority then private vehicles). For example, we can provide priority value "1" for each vehicle and maybe higher priority value for transit vehicles such as buses if required. The centralized system 108 adjusts the duration of the green signal for each sides of the road intersection in real time. The centralized system 108 adjusts the duration of the green signal based on the priority of the public and private vehicles present at various zones and sub-zones of an intersection when there is no one or more emergency service vehicles 110A-N at each side of the road intersection (When an emergency vehicle is present at any zones or sub-zone of the centralized system 108, the priority values of public and private vehicles are not considered).

[0024] FIG. 2 illustrates an exploded view of the centralized system 108 of FIG. 1 according to an embodiment herein. The centralized system 108 includes a database 202, an incident information obtaining module 204, a priority value determination module 206, an emergency service vehicle identification module 208, an emergency service verification module 210, a high priority zone identification module 212, an intersection control module 214, and an intersection normalization module 216. The incident information obtaining module 204 obtains information related to an incident from one or more users and a location of the one or more users through the user handheld device 104. The priority value determination module 206 determines a priority value for the incident. The priority value determination module 206 determines the priority value based on a nature of the incident. The priority value determination module changes the priority value of emergency vehicle in real-time depending up on the speed, traffic, case and distance of the emergency movement. The emergency service vehicle identification module 208 identifies the one or more emergency service vehicles 110A-N in a close proximity of the user 102. The emergency service vehicle identification module 208 performs an extended search based on the nature of incident to identify the one or more emergency service vehicles 110A-N until the one or more emergency service vehicles 110A-N is identified. The emergency service verification module 210 verifies the one or more emergency service vehicles 110A-N reached to the user 102 in time. The emergency service verification module (210) identifies a distance between the user 102 and the one or more emergency vehicles (110A-N). The emergency service verification module 210 provides information associated with the user 102 to the one or more emergency service vehicles 110A-N including a fastest route based on (i) the distance

between the user 102 and or more emergency service vehicles 110A-N and (ii) a traffic to reach the location of the user 102. The emergency service verification module 210 determines a calculated expiry time for the one or more emergency service vehicles 110A-N to reach the location of the user 102. The emergency service verification module 210 repeats the extended search process until the one or more emergency vehicles 110A-N is committed to reach to the location of the user when the calculated expiry time of the one or more emergency service vehicles 110A-N is expired.

[0025] The high priority zone identification module 212 identifies the one or more emergency service vehicles 110A-N present in each of the one or more zones over road intersections. In an embodiment, the high priority zone identification module 212 identifies the highest priority value of the highest priority vehicle in each of the one or more zones over road intersections. Each of the one or more zones includes one or more sub-zones. The one or more sub-zones include a sub-zone priority value. The sub-zone priority value of the one or more sub-zones is added with a priority value of the one or more emergency service vehicles 110A-N present at the one or more sub-zones to obtain a zone priority value for each of the one or more zones. The high priority zone identification module 212 identifies a high priority zone that includes a high priority value from the one or more zones. The high priority value of a zone can be determined by the highest priority emergency vehicle present in each zone of a junction or by the sum of priorities of total emergency vehicles present on each zone of the junction at the instance, which is decided by the decision makers of the concerned authority. The intersection control module 214 controls traffic signals by calculating a distance between the one or more emergency vehicles 110A-N and the road intersection. The intersection control module 214 opens a green signal at the road intersection for the one or more emergency vehicles 110A-N based on (i) the high priority zone and (ii) the distance between the one or more emergency vehicles 110A-N and the road intersection. The intersection control module 214 opens the green signal in a bit advance of the one or more emergency vehicles 110A-N reaches the road intersection. The intersection control module 214 generates an alert to the people to notice the sudden change in the course of the traffic signal due to an emergency at the road intersection.

[0026] The driver of the emergency service vehicle 110 sends a request to the centralized system 108. In another embodiment, the driver of the emergency service vehicle

110 may change the priority value of the emergency vehicle 110 through the driver handheld device. The centralized system 108 provides an option to administrator to change/assign priority values of each of the one or more emergency service vehicles 110A-N at any time. This process is carried manually by the administrator (e.g. officers) and called as "green corridor". In the green corridor, using the centralized system 108, the administrator can activate the green corridor by over writing all other conditions and inputs from the other users and the one or more emergency service vehicles 110A-N. The one or more emergency service vehicles 110A-N associated with green corridor are considered as the top priority in its route. The centralized system 108 may identify a pre-defined route of the particular emergency service vehicles and provide a green signal in before the one or more emergency service vehicles 110A-N reaches the road intersection.

[0027] The intersection normalization module 216 normalizes the traffic signals at the road intersection after providing the green signal for the high priority zone comprising the one or more emergency service vehicles 110A-N. The intersection normalization module 216 determines an amount of time consumed by the one or more emergency service vehicles 110A-N on the high priority zone and particular excess time is reduced for the subsequent round robin scheduling cycles. The normalization process may not be needed, when (a) public and private vehicles are considered for prioritizing the traffic signal and (b) the centralized system 108 receives the location information of private/public vehicles. In an embodiment, the normalization process may not be effective when the traffic signals are switched according to the traffic intensity in the incident. The history records of supplemented green signal time changes due to the one or more emergency service vehicle preemption is required for normalization process. The history records may be stored in the traffic signal controller of the road intersection unit 112 or the centralized system 108. The database 202 is capable of recording the location information of the emergency cases reported. The centralized system 108 analyses reported information and can generate reports on the emergency requirements of various regions.

[0028] FIG. 3 illustrates an exemplary view of one or more zones on the road intersections according to an embodiment herein. The one or more zones include a north zone 302, an east zone 304, a south zone 306 and a west zone 308. The dimensions of the one or more zones may vary from small as 1 meter to close as to the next road intersection.

The centralized system 108 is capable of changing the dimensions of the one or more zones in real time. Each of the one or more zones includes one or more sub-zones. In one embodiment, the number sub-zones may vary based on probability/frequency of multiple occurrence of the one or more emergency vehicles 110A-N from multiple directions and traffic intensity of respective road intersection. The dimensions of the sub zones may vary. The north zone 302 includes a north sub-zone1 310 and a north sub-zone2 312. The east zone 304 includes east sub-zone1 314, and east sub-zone2 316. The south zone 306 includes a south sub-zone1 318, and a south sub-zone2 320. The west zone 308 includes a west sub-zone1 322, and a west sub-zone2 324. Each of the one or more sub-zones includes a sub-zone priority value. The objective of the one or more sub-zones is provided priority to the one or more emergency service vehicles 110A-N when the one or more emergency service vehicles 110A-N arrives close to the road intersection. The number of sub-zones in a zone of the road intersection and their respective priorities values are assigned based on the traffic conditions of that specific road intersection.

[0029] The identification of the one or more emergency service vehicles 110A-N inside the one or more zones (e.g. 302, 304, 306 and 308) are performed by a sub-system installed in the emergency service vehicle or centralized system 108. The sub-system may be a hardware device or a handheld device, which can collect the location information of the one or more emergency service vehicles 110A-N. The sub-system includes may communicate information to the centralized system 108 through the network 106. The user handheld device 104 obtains a current location information of the user 102 and communicates the location information of the user 102 to centralized system 108. The sub-zone priority value of the one or more sub-zones is added with priority value of the one or more emergency service vehicles 110A-N present at one or more sub-zones to obtain a priority value for each of the one or more zones. The centralized system 108 identifies the high priority zone that includes the high priority value. The priority value of the one or more emergency service vehicles 110A-N may be assigned by the centralized system 108 based on the nature of the incident that is handled by the one or more emergency vehicles 110A-N. The centralized system 108 assigns the priority value for the one or more emergency service vehicles 110A-N when the one or more emergency service vehicles 110A-N responds to the incident. The centralized system 108 determines which zone has to be provided with the green signal and

pass information to the sub-system. In one embodiment, the sub-system is installed in the road intersection unit 112.

[0030] FIG. 4 illustrates user interface views of an emergency handheld tool 114 according to an embodiment herein. The user interface views include a user registration field 402, an emergency vehicle selection field 404, and report incident field 406. The user registration field 402 includes an option to enter a name, a designation, an address and an ID proof of the user 102. The emergency vehicle selection field 404 includes an option to select an ambulance, a fire engine, a police vehicle or special armed forces etc. The user 102 needs to select any one of the emergency service vehicles based on a nature of the incident. The report incident field 406 includes an option to select fire in the building, a drowning, hit & run, rape attempt, criminal spotted or terrorist spotted etc. The user 102 selects any one of the above-mentioned incidents suitable to the user 102.

[0031] FIG. 5 illustrates a user interface view of a sample priority of each incident assigned in the centralized system 108 of FIG. 1 according to an embodiment herein. The user interface view includes a list of incidents with a priority value 502, which is reported by the user 102, and a list of emergency service vehicles 504 that is assigned for a task.

[0032] FIG.6 illustrates a block diagram of a road intersection unit 112 of the system of FIG. 1 according to an embodiment herein. The road intersection unit 112 identifies the presence of emergency service vehicle 110 in the one or more zones associated with the road intersection. If emergency service vehicles 110A-N are identified in the one or more zones over the road intersections, the centralized system 108 adds sub-zone priority values of the one or more sub-zones with a priority value of the one or more emergency service vehicles 110A-N present at the one or more sub-zones to obtain a zone priority value for the one or more zones. The centralized system 108 provides a control input that includes information to open or close a green signal based on the high priority zone which is having high priority value received to the road intersection unit 112. The centralized system 108 may be installed in the road intersection unit 112. The road intersection unit 112 includes a router 602, a traffic signal controller 604, a switching circuit 606, one or more relays 608A-C and one or more traffic signals 610A-C. The input of the centralized system 108 is received by the traffic signal controller 604 through the router 602. The traffic signal controller 604 triggers the switching circuit 606. The switching circuit 606 controls/initiates the one or more relays

608A-C based on the input of the centralized system 108. The one or more relays 608A-C act as a switch, which is used to ON/OFF the traffic signal based on the input of the centralized system 108. The centralized system 108 normalizes traffic control process after the priority process is completed in order to reduce traffic congestion on other zones. The high priority zone value of each zone is compared to identify a high priority zone and a green signal is provided for the high priority zone (i.e. the north zone, the south zone, the east zone and the west zone) based on the highest priority value.

[0033] FIG. 7 illustrates an exemplary view of assigning a custom defined priority value for the one or more emergency vehicles 110A-N using the centralized system 108 of FIG. 1 according to an embodiment herein. The user interface view of the centralized system 108 includes a user interface 702, a predefined priority value 704, and a custom defined priority values set by the administrative users 706. The administrator (e.g. the officers in the operation centre) of the centralized system 108 changes the pre-defined priority values of the emergency vehicle 110A-N. The centralized system 108 assigns a priority value for the one more emergency service vehicles 110A-N based on the nature of an incident handling by the one or more emergency service vehicles 110A-N. The driver of the emergency service vehicle 110 requests for a specific priority value depending upon the incident handled by the one or more emergency service vehicles 110A-N. The centralized system 108 assigns a set of priority values to the one or more emergency service vehicles 110A-N (e.g. a priority value 1 for all police vehicles, 2 for ambulances and 3 for fire engines). In one embodiment, the centralized system 108 assigns specific priority value for the one or more emergency vehicles based on the predefined priority value of the incident. The administrator (e.g. the officers in the operation centre) of the centralized system 108 may change/assign priority values of each the one or more emergency service vehicles 110A-N. The priority values assigned by the centralized system are known as the predefined priority values 704. The administrator in centralized system 108 may change the predefined priority values 704 of each emergency service vehicles in real-time. The administrator changes the predefined priority value 704 to the custom defined priority values 708. The centralized system 108 triggers the road intersection unit 112 installed in the specific traffic intersection. The road intersection unit 112 provides input through the input port of the traffic signal controller 604, hence the traffic signal controller turns the traffic signal to green accordingly. In one

embodiment, the centralized system 108 directly provides an input to the traffic signal controller.

[0034] FIG. 8 is a flow diagram that illustrates a method for prioritizing a road traffic signal at the road intersection unit according to an embodiment herein. At step 802, incident information of the user 102 and a location is obtained using the user handheld device 104. At step 804, a priority value of the incident is determined based on a nature of the incident. At 806, the one or more emergency service vehicles 110A-N in a close proximity of the user 102 are identified. At 808, an extended search is performed until the system identifies the one or more emergency service vehicles 110A-N. At 810, the one or more emergency service vehicles 110A-N are verified whether the emergency service vehicles are reached to the user 102 in time or not. At step 812, the one or more emergency service vehicles 110A-N present in one or more sub-zones over road intersections are identified. At step 814, a zone with high priority is determined. At step 816, traffic is controlled based on the zone with high priority. At step 818, traffic is normalized by providing a green signal for sides compromised of the one or more emergency service vehicles 110A-N.

[0035] The one or more sub-zones include public and private vehicles. The public and private vehicles are considering for effectively prioritizing traffic signals with the one or more zones and one or more sub zones, which mean the centralized system 108, can use information of a location tracking device of handheld users for effectively prioritizing traffic signals with the one or more zones and sub zones. The centralized system 108 receives location information of the public and private vehicles through the public and private vehicle location manager 116. The public and private vehicle location manager 116 may receive the location information directly from the location tracking devices fixed with the public and private vehicles, the handheld device 104 of the user 102 or the mobile service providers or aggregators such as Google, etc. The centralized system 108 determines a duration of the green signal based on the sum of priority of public and private vehicles present at each of the one or more zones and the one or more sub-zones at the road intersection when the one or more emergency service vehicles 110A-N are not present at the one or more sub-zones.. The centralized system 108 receives the location information of the public and private vehicles from the public and private vehicle location manager 116. The centralized system 108 assign priority for the public and private vehicles in which public vehicle such a transit buses may

have slightly higher priority. The centralized system also identifies the public and private vehicle present at various zones and sub-zones of a road intersection. The centralized system 108 adjusts the duration of the green signal for each sides of the road intersection in real time. The centralized system 108 adjusts the duration of the green signal based on the priority of the public and private vehicles when there is no one or more emergency service vehicles 110A-N at each side of a road intersection. The system is useful for the administrator (e.g., officer) to effectively distribute the emergency services in different locations and hence reduce the response time during a disaster.

[0036] A representative hardware environment for practicing the embodiments herein is depicted in FIG. 9. This schematic drawing illustrates a hardware configuration of the centralized system 108 in accordance with the embodiments herein. The centralized system 108 comprises at least one processor or central processing unit (CPU) 10. The CPUs 10 are interconnected via system bus 12 to various devices such as a random-access memory (RAM) 14, read-only memory (ROM) 16, and an input/output (I/O) adapter 18. The I/O adapter 18 can connect to peripheral devices, such as disk units 11 and tape drives 13, or other program storage devices that are readable by the system. The centralized system 108 can read the inventive instructions on the program storage devices and follow these instructions to execute the methodology of the embodiments herein.

[0037] The system further includes a user interface adapter 19 that connects a keyboard 15, mouse 17, speaker 24, microphone 22, and/or other user interface devices such as a touch screen device (not shown) to the bus 12 to gather user input. Additionally, a communication adapter 20 connects the bus 12 to a data processing network 25, and a display adapter 21 connects the bus 12 to a display device 23 which may be embodied as an output device such as a monitor, printer, or transmitter, for example.

[0038] The centralized system 108 further includes a user interface adapter 19 that connects a keyboard 15, mouse 17, speaker 24, microphone 22, and/or other user interface devices such as a touch screen device (not shown) or a remote control to the bus 12 to gather user input. Additionally, a communication adapter 20 connects the bus 12 to a data processing network 25, and a display adapter 21 connects the bus 12 to a display device 23 which may be embodied as an output device such as a monitor, printer, or transmitter, for example.

[0039] The foregoing description of the specific embodiments will so fully reveal the general nature of the embodiments herein that others can, by applying current knowledge, readily modify and/or adapt for various applications such specific embodiments without departing from the generic concept, and, therefore, such adaptations and modifications should and are intended to be comprehended within the meaning and range of equivalents of the disclosed embodiments. It is to be understood that the phraseology or terminology employed herein is for the purpose of description and not of limitation. Therefore, while the embodiments herein have been described in terms of preferred embodiments, those skilled in the art will recognize that the embodiments herein can be practiced with various types of modifications within the spirit and scope of the appended claims.

CLAIMS

I/We claim:

1. A centralized system (108) for prioritizing one or more emergency service vehicles (110A-N) based on a priority value of an incident and a zone priority value of one or more zones, comprising:

(a) an incident information obtaining module (204) that obtains information related to an incident from one or more users and a location of said one or more users from a user handheld device (104) associated with said one or more users;

(b) a priority value determination module (206) that determines a priority value for said incident based on a nature of said incident;

(c) an emergency service vehicle identification module (208) that identifies one or more emergency service vehicles (110A-N) in a close proximity of a user (102), wherein said emergency service vehicle identification module (208) performs an extended search based on said nature of said incident to identify said one or more emergency service vehicles (110A-N) until said one or more emergency service vehicles (110A-N) is identified;

(d) an emergency service verification module (210) that verifies whether said one or more emergency vehicles (110A-N) reaches to a location of said user (102) in time, wherein said emergency service verification module (210) identifies a distance between said user (102) and said one or more emergency vehicles (110A-N), wherein said emergency service verification module (210) provides information that comprises a fastest route to said one or more emergency service vehicles (110A-N) based on (i) said distance between said user (102) and said one or more emergency service vehicles (110A-N), and (ii) a traffic to reach said location of said user (102), wherein said emergency service verification module (210) determines a calculated expiry time for said one or more emergency service vehicles (110A-N) to reach said location of said user (102), wherein said emergency service verification module (210) repeats said extended search process until said one or more emergency vehicles is committed to reach to said location of said user (102) when said calculated expiry time of said one or more emergency service vehicles (110A-N) is expired;

(e) a high priority zone identification module (212) that identifies said one or more emergency service vehicles (110A-N) present in each of said one or more zones over road intersections, wherein each of said one or more zones comprises one or more sub-zones,

wherein said one or more sub-zones comprises a sub-zone priority value, wherein said sub-zone priority value of said one or more sub-zones is added with a priority value of said one or more emergency service vehicles (110A-N) present at said one or more sub-zones to obtain a high priority value for each of said one or more zones, wherein said high priority zone identification module (212) identifies a high priority zone comprising a high zone priority value from said one or more zones; and

(f) an intersection control module (214) that controls traffic signals by (i) calculating a distance between said one or more emergency vehicles (110A-N) and said road intersection, and (ii) opening a green signal at said road intersection for said one or more emergency vehicles (110A-N) based on (i) said high priority zone and (ii) said distance between said one or more emergency vehicles (110A-N) and said road intersection.

2. The centralized system (108) as claimed in claim 1, wherein centralized system (108) further comprising an intersection normalization module (216) that normalizes said traffic signals at said road intersection after providing said green signal for said high priority zone comprising said one or more emergency service vehicles (110A-N), wherein said intersection normalization module (216) determines an amount of time that said green signal is opened for said one or more emergency services (110A-N) on a said high priority zone and reduces the amount of time consumed in excess by said high priority zone in the subsequent round robin scheduling cycle.

3. The centralized system (108) as claimed in claim 1, wherein said intersection control module (214) opens said green signal before said one or more emergency vehicles (110A-N) reaches said road intersection.

4. The centralized system (108) as claimed in claim 1, wherein said intersection control module (214) generates an alert to the people at said road intersection to notice the sudden change in the course of traffic signal due to an emergency at said road intersection.

5. The centralized system (108) as claimed in claim 1, wherein said centralized system 108 provides an option to an administrator to assign a priority value for said one or more emergency service vehicles (110A-N).

6. The centralized system (108) as claimed in claim 1, wherein said one or more sub-zones comprises public vehicles and private vehicles, wherein said centralized system (108) determines a duration of said green signal based on a sum of priority of public and private vehicles present at each of said one or more sub-zones at said road intersection when said one or more emergency service vehicles (110A-N) are not present at said one or more sub-zones.

7. A method for prioritizing one or more emergency vehicles (110A-N) based on a priority value of an incident and a zone priority value of one or more zones, comprising:

obtaining information related to an incident from a user (102) and a location of said user (102) from a user handheld device (104) associated with said user;

determining a priority value for said incident based on a nature of said incident;

identifying one or more emergency service vehicles (110A-N) in a close proximity of a user (102);

verifying whether said one or more emergency service vehicles (110A-N) reaches to a location of said user (102) in time;

identifying a distance between said user (102) and said one or more emergency vehicles (110A-N) to provide information that comprises a fastest route to said one or more emergency service vehicles (110A-N) based on (i) said distance between said user (102) and one or more emergency service vehicles (110A-N), and (ii) a traffic to reach said location of said user (102);

identifying said one or more emergency service vehicles (110A-N) present in each of said one or more zones over road intersections, wherein each of said one or more zones comprises one or more sub-zones;

adding a sub-zone priority value of said one or more sub-zones with a priority value of said one or more emergency service vehicles (110A-N) present at said one or more sub-zones to obtain a zone priority value for each of said one or more zones;

identifying a high priority zone comprising a high zone priority value from said one or more zones;

controlling traffic signals by (i) calculating a distance between said one or more emergency vehicles (110A-N) and said road intersection, and (ii) opening a green signal at said road intersection for said one or more emergency vehicles (110A-N) based on (i) said high priority zone and (ii) said distance between said one or more emergency vehicles (110A-N) and said road intersection; and

normalizing said traffic signals at road intersection after providing said green signal for said high priority zone that comprising said one or more emergency service vehicles (110A-N) by (i) determining an amount of time that said green signal is opened for said one or more emergency services (110A-N) on said high priority zone, and (ii) reducing the amount of time consumed in excess by said high priority zone in the subsequent round robin scheduling cycle.

8. The method as claimed in claim 7, wherein said method further comprises the step of determining a calculated expiry time for said one or more emergency service vehicles (110A-N) to reach said location of said user (102).

9. The method as claimed in claim 8, wherein said method further comprises the step of assigning a priority value for said one or more emergency service vehicles through a driver handheld tool.

10. The method as claimed in claim 8, wherein said method further comprises the step of

performing an extended search based on said nature of said incident to identify said one or more emergency service vehicles (110A-N) until said one or more emergency service vehicles (110A-N) is identified; and

repeating said extended search process until said one or more emergency vehicles is committed to reach to said location of said user (102) when said calculated expiry time of said one or more emergency service vehicles (110A-N) is expired.

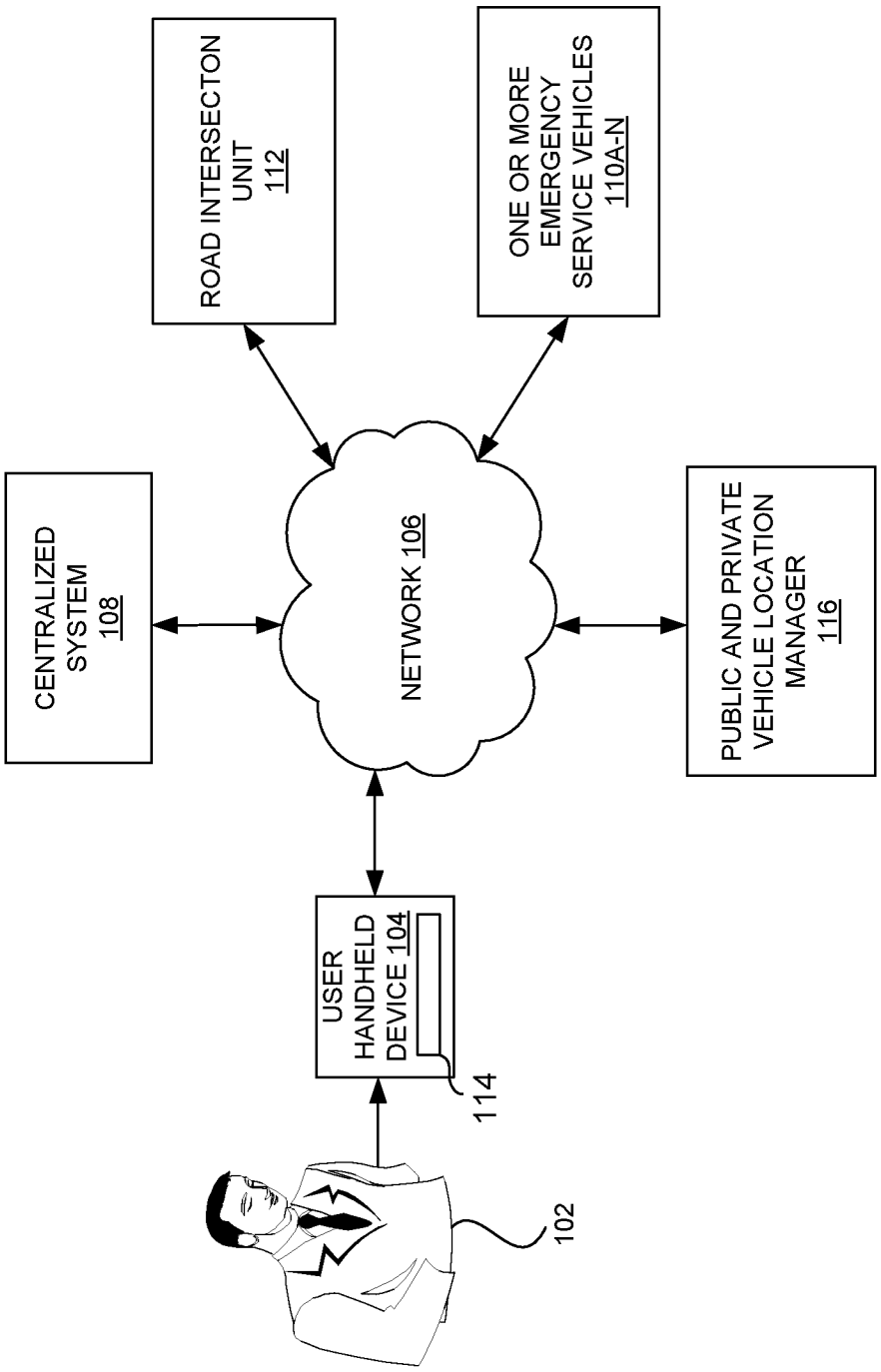
ROAD INTERSECTON UNIT 112
ONE OR MORE EMERGENCY SERVICE VEHICLES 110A-N
CENTRALIZED SYSTEM 108
NETWORK 106
PUBLIC AND PRIVATE VEHICLE LOCATION MANAGER 116
USER HANDHELD DEVICE 104
114
102

FIG. 1

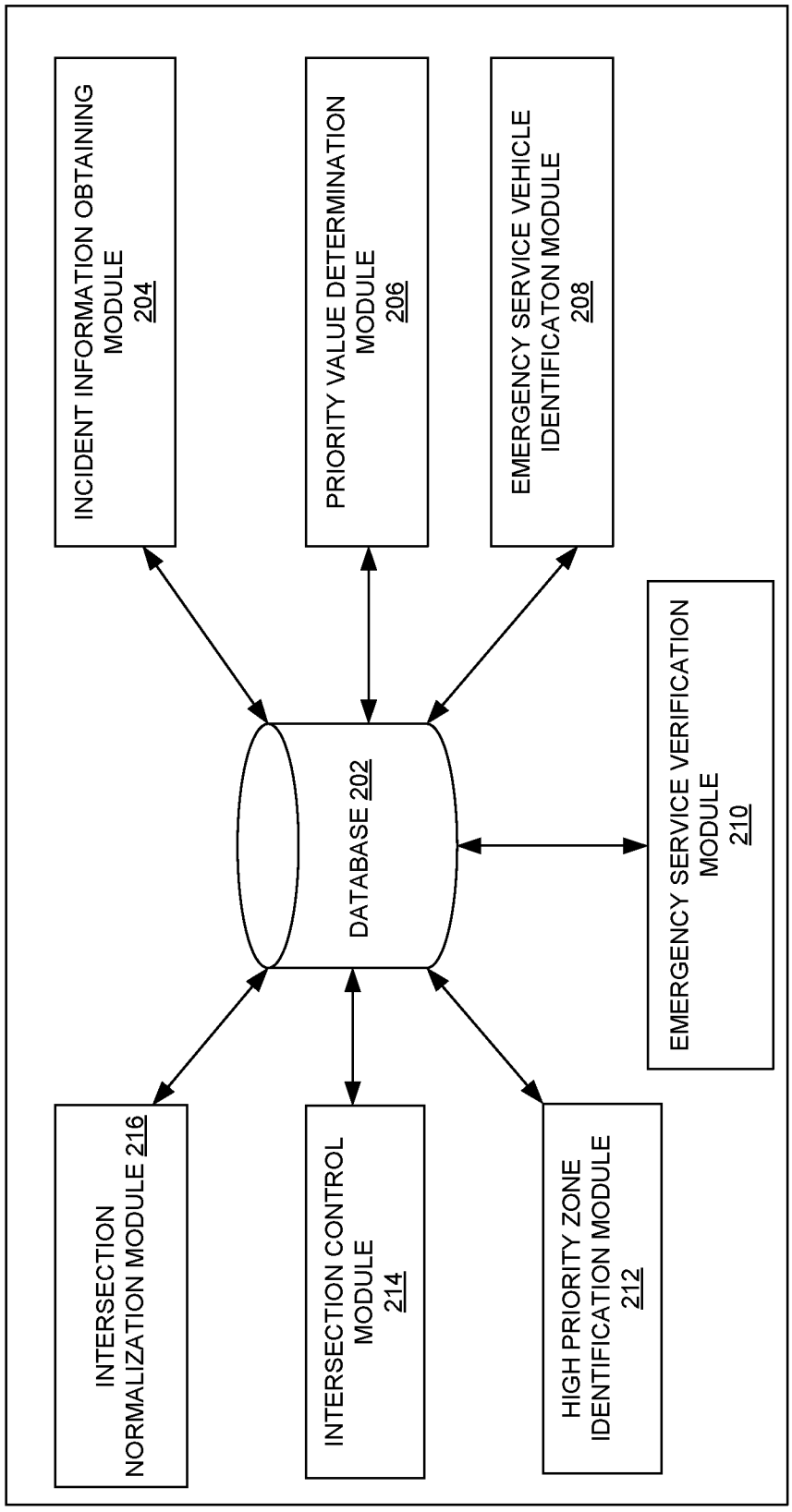
INCIDENT INFORMATION OBTAINING MODULE 204
PRIORITY VALUE DETERMINATION MODULE 206
EMERGENCY SERVICE VEHICLE IDENTIFICATON MODULE 208
DATABASE 202
EMERGENCY SERVICE VERIFICATION MODULE 210
INTERSECTION NORMALIZATION MODULE 216
INTERSECTION CONTROL MODULE 214
HIGH PRIORITY ZONE IDENTIFICATION MODULE 212

FIG. 2

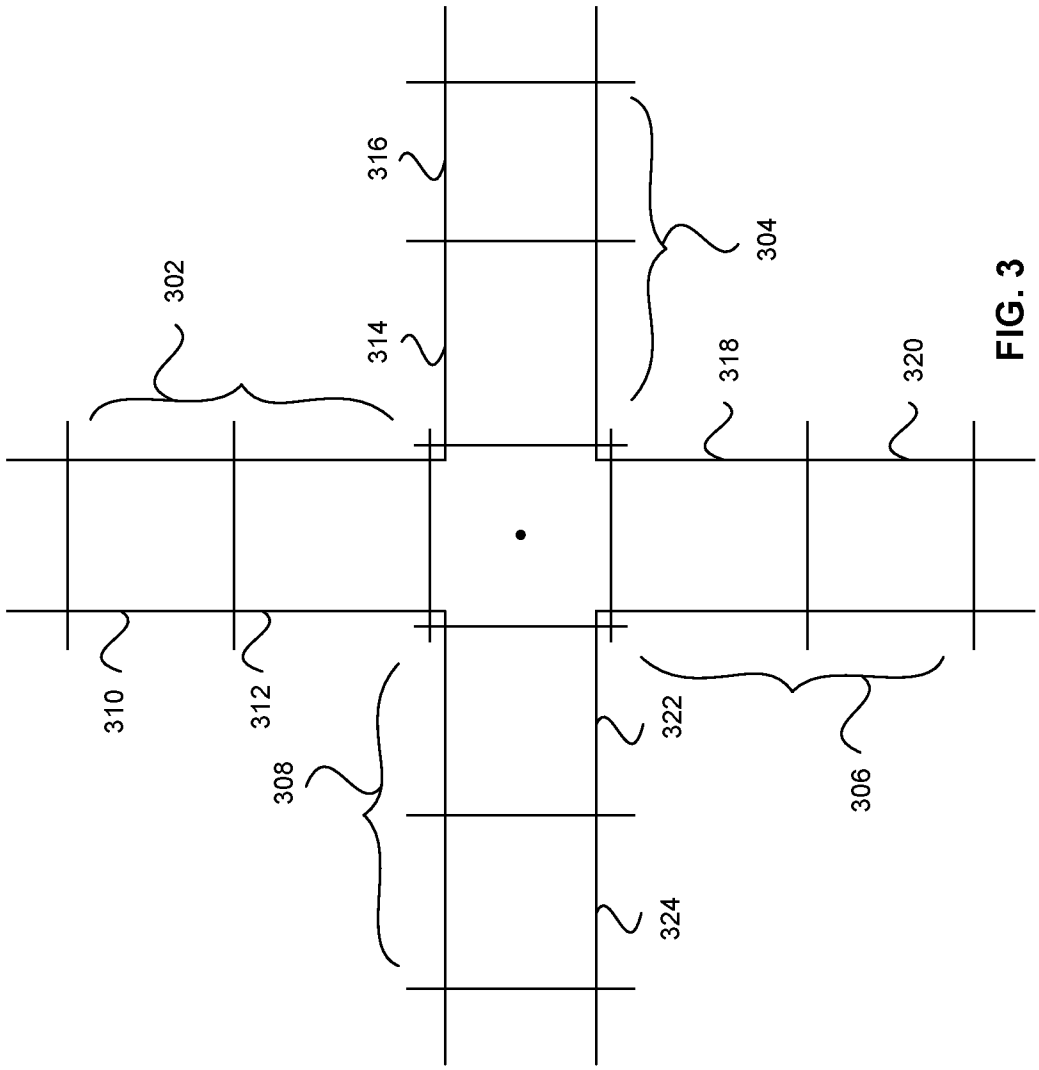

FIG. 3

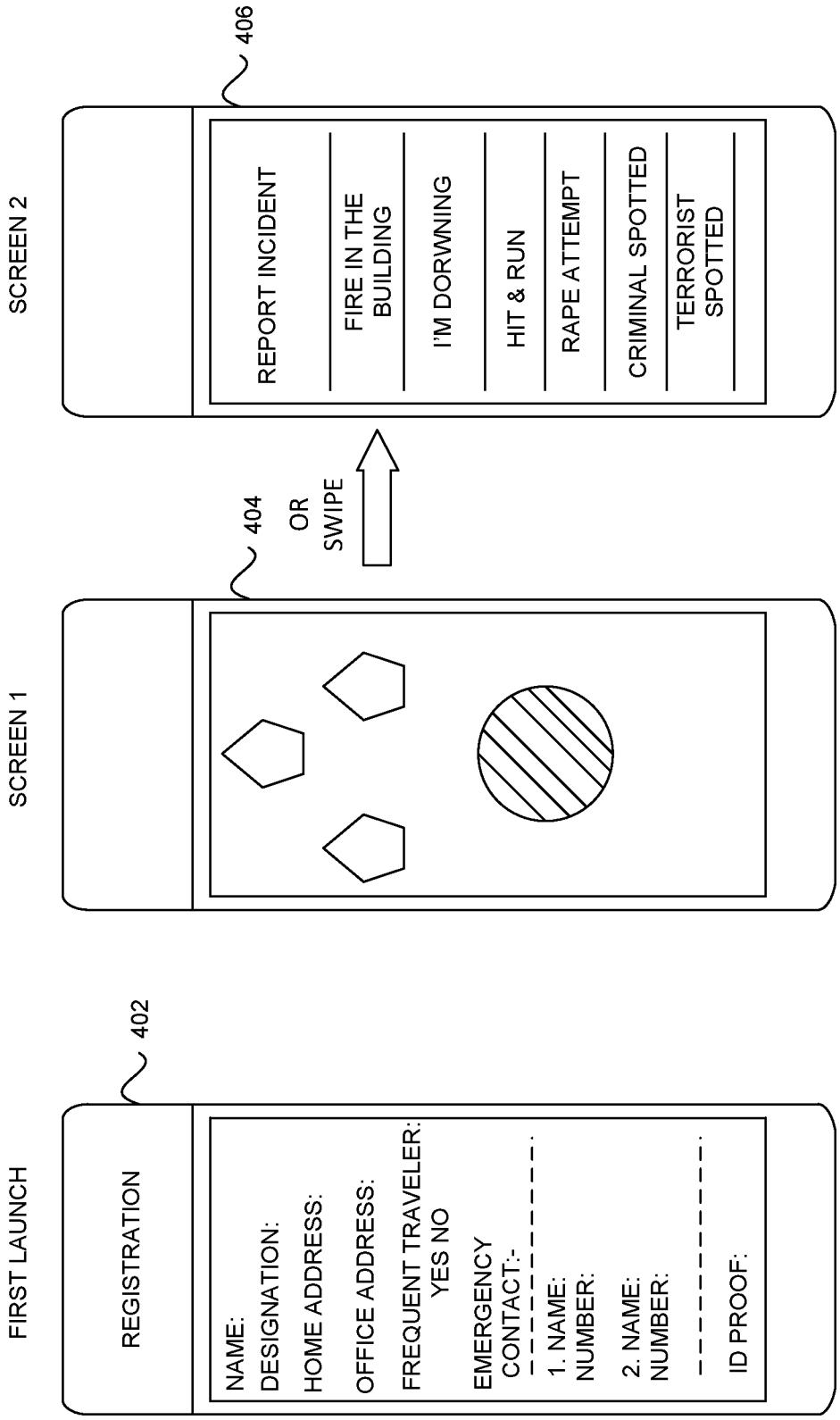
FIRST LAUNCH
REGISTRATION
NAME:
DESIGNATION:
HOME ADDRESS:
OFFICE ADDRESS:
FREQUENT TRAVELER:
YES NO
EMERGENCY
CONTACT:-
1. NAME:
NUMBER:
2. NAME:
NUMBER:
ID PROOF:
402
SCREEN 1
404
OR
SWIPE
SCREEN 2
406
REPORT INCIDENT
FIRE IN THE BUILDING
I'M DORWNING
HIT & RUN
RAPE ATTEMPT
CRIMINAL SPOTTED
TERRORIST SPOTTED

FIG. 4

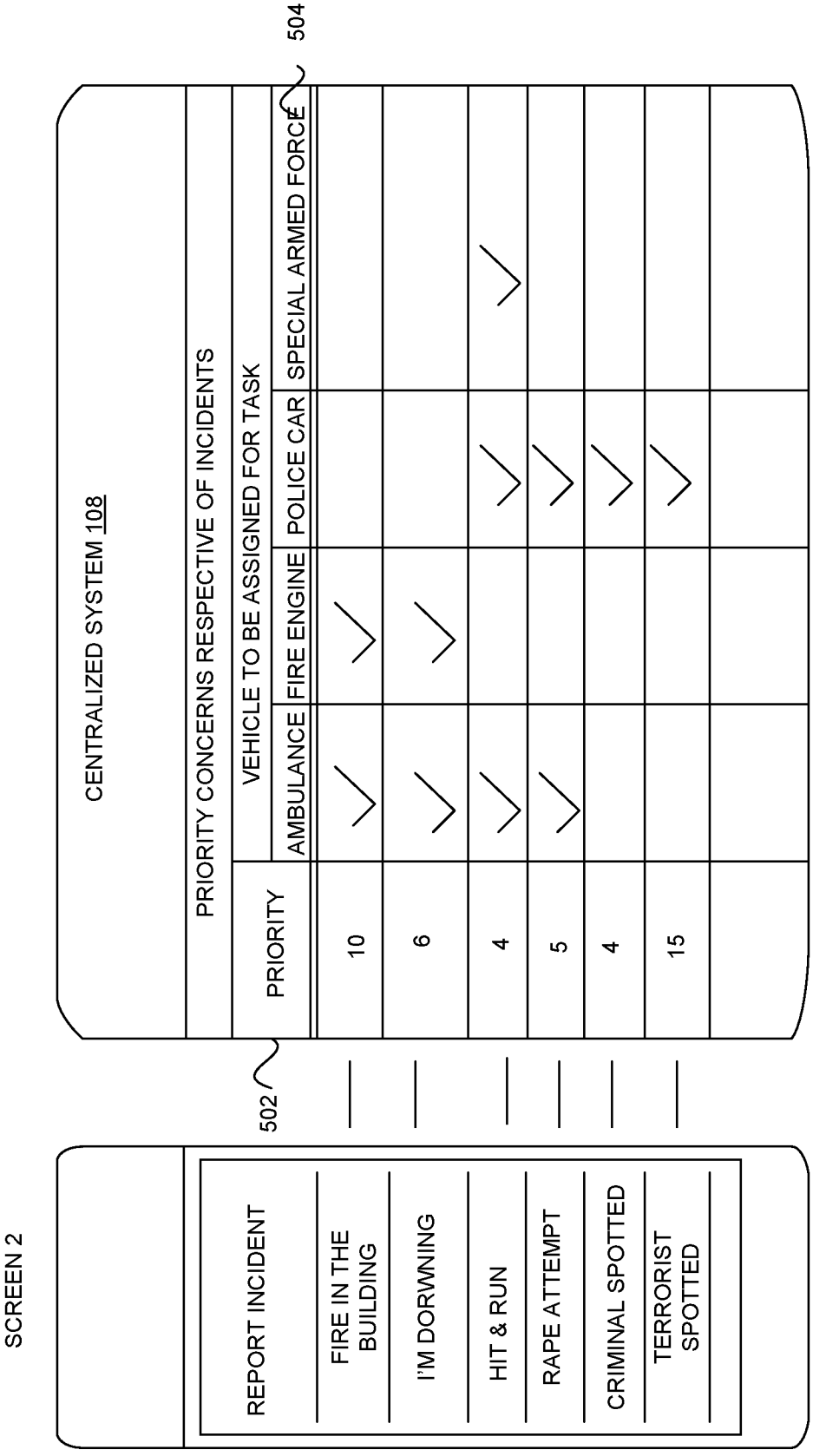
SCREEN 2
REPORT INCIDENT
FIRE IN THE BUILDING
I'M DORWNING
HIT & RUN
RAPE ATTEMPT
CRIMINAL SPOTTED
TERRORIST SPOTTED
502
CENTRALIZED SYSTEM 108
PRIORITY CONCERNS RESPECTIVE OF INCIDENTS
VEHICLE TO BE ASSIGNED FOR TASK
504
PRIORITY
AMBULANCE
FIRE ENGINE
POLICE CAR
SPECIAL ARMED FORCE
10
6
4
5
4
15

FIG. 5

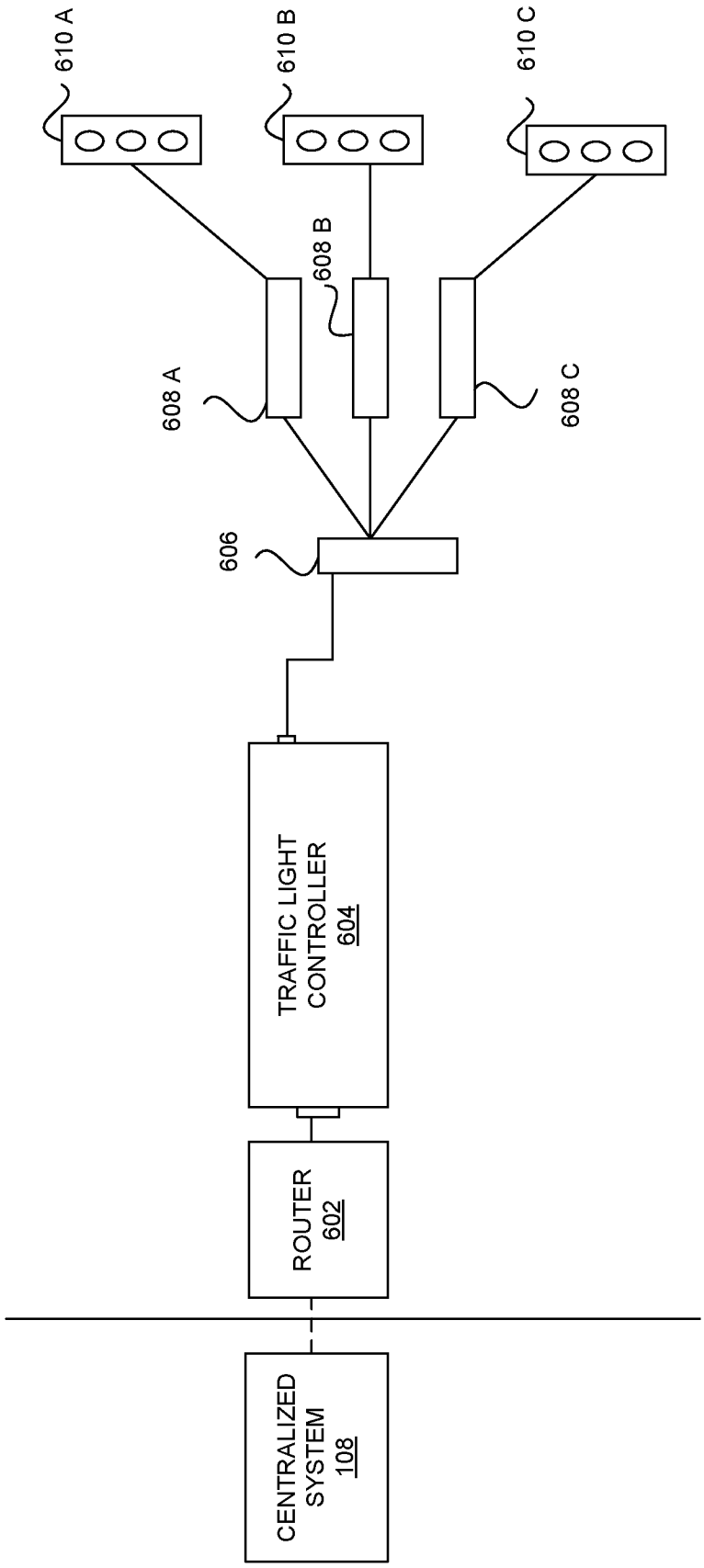
610 A
610 B
610 C
608 B
608 A
608 C
606
TRAFFIC LIGHT CONTROLLER 604
ROUTER 602
CENTRALIZED SYSTEM 108

FIG. 6

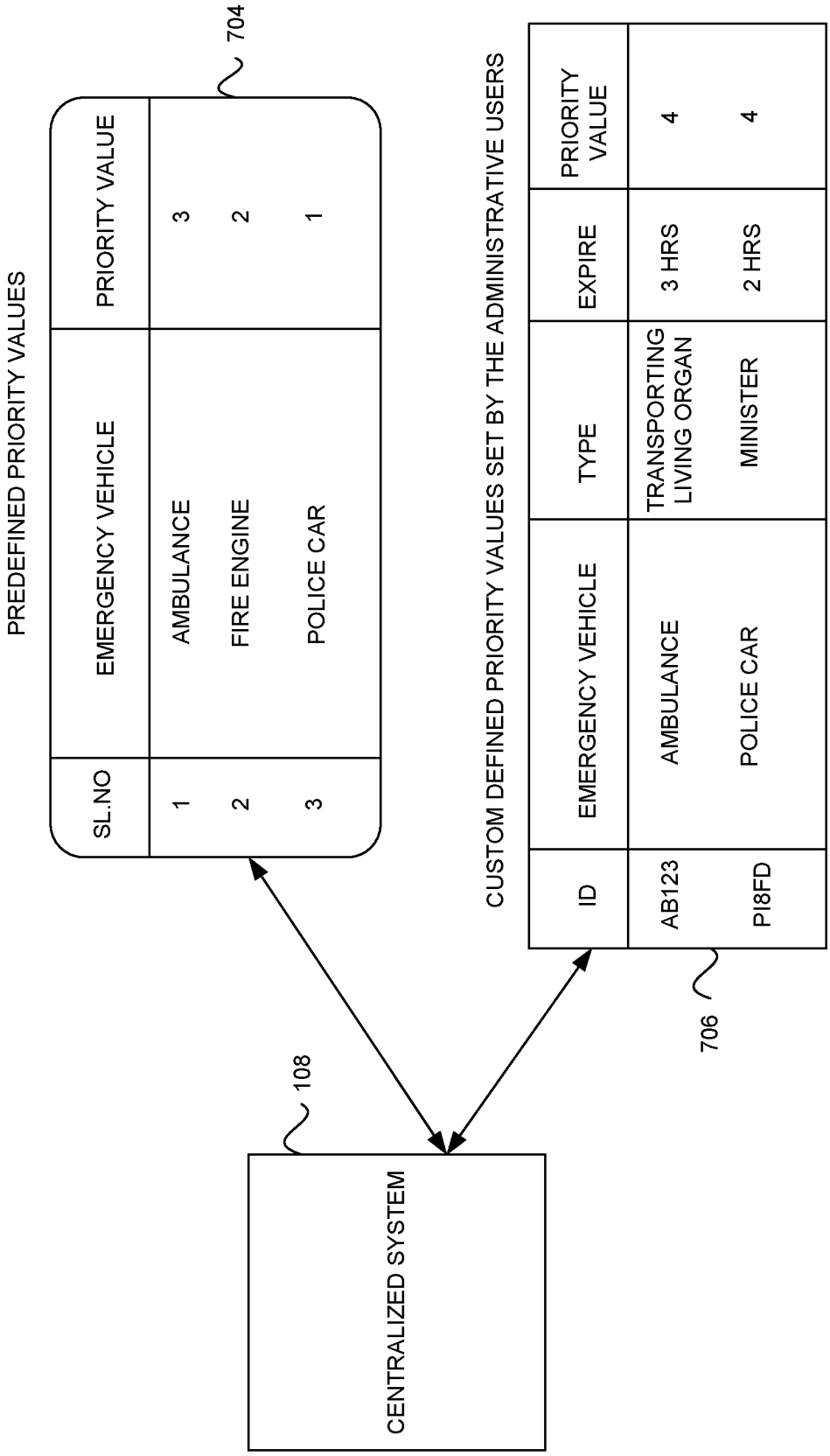
PREDEFINED PRIORITY VALUES
704
SL.NO
EMERGENCY VEHICLE
PRIORITY VALUE
1
AMBULANCE
3
2
FIRE ENGINE
2
3
POLICE CAR
1
CUSTOM DEFINED PRIORITY VALUES SET BY THE ADMINISTRATIVE USERS
ID
EMERGENCY VEHICLE
TYPE
EXPIRE
PRIORITY VALUE
AB123
AMBULANCE
TRANSPORTING LIVING ORGAN
3 HRS
4
PI8FD
POLICE CAR
MINISTER
2 HRS
4
706
108
CENTRALIZED SYSTEM

FIG. 7

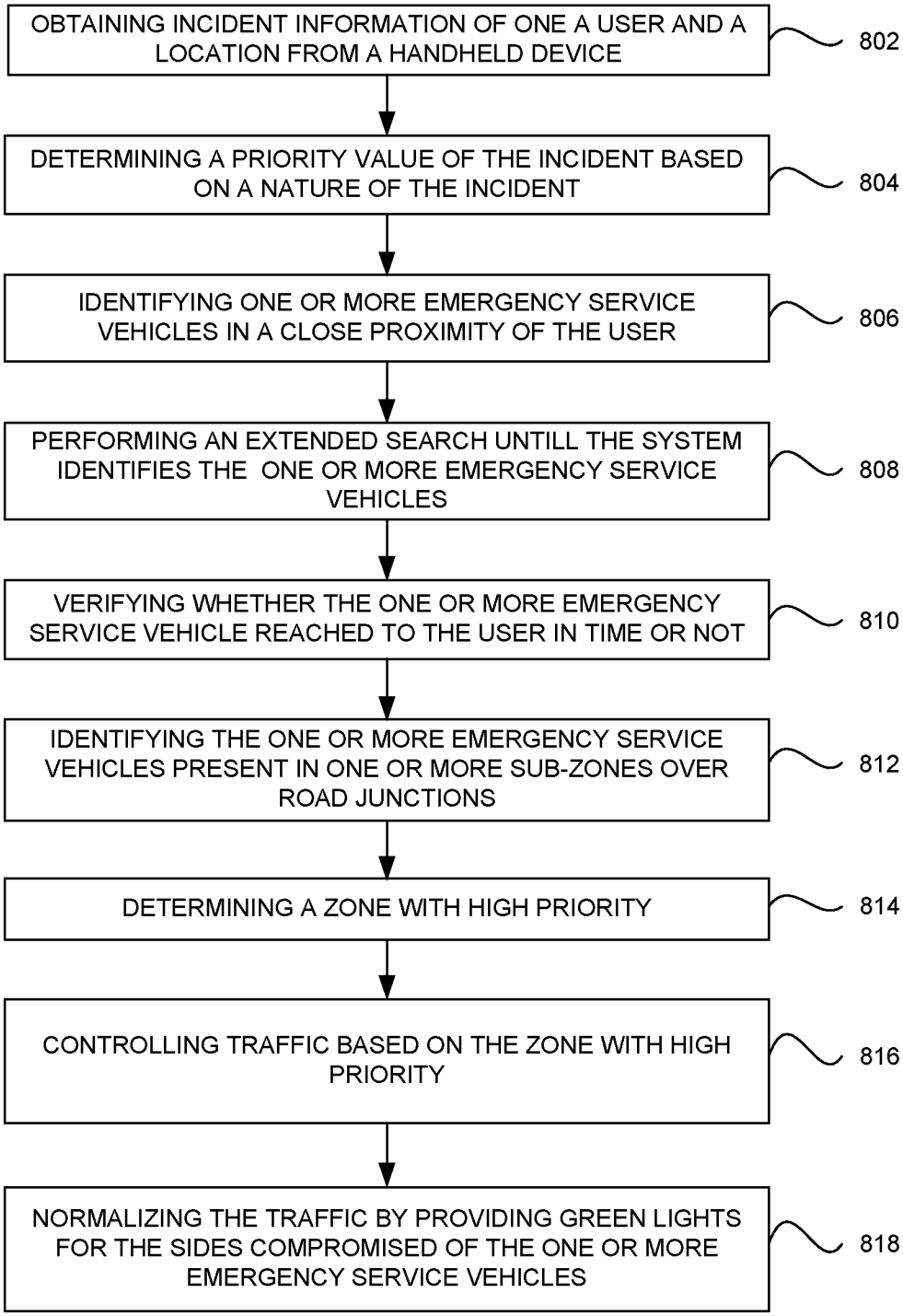
OBTAINING INCIDENT INFORMATION OF ONE A USER AND A LOCATION FROM A HANDHELD DEVICE
802
DETERMINING A PRIORITY VALUE OF THE INCIDENT BASED ON A NATURE OF THE INCIDENT
804
IDENTIFYING ONE OR MORE EMERGENCY SERVICE VEHICLES IN A CLOSE PROXIMITY OF THE USER
806
PERFORMING AN EXTENDED SEARCH UNTILL THE SYSTEM IDENTIFIES THE ONE OR MORE EMERGENCY SERVICE VEHICLES
808
VERIFYING WHETHER THE ONE OR MORE EMERGENCY SERVICE VEHICLE REACHED TO THE USER IN TIME OR NOT
810
IDENTIFYING THE ONE OR MORE EMERGENCY SERVICE VEHICLES PRESENT IN ONE OR MORE SUB-ZONES OVER ROAD JUNCTIONS
812
DETERMINING A ZONE WITH HIGH PRIORITY
814
CONTROLLING TRAFFIC BASED ON THE ZONE WITH HIGH PRIORITY
816
NORMALIZING THE TRAFFIC BY PROVIDING GREEN LIGHTS FOR THE SIDES COMPROMISED OF THE ONE OR MORE EMERGENCY SERVICE VEHICLES
818

FIG. 8

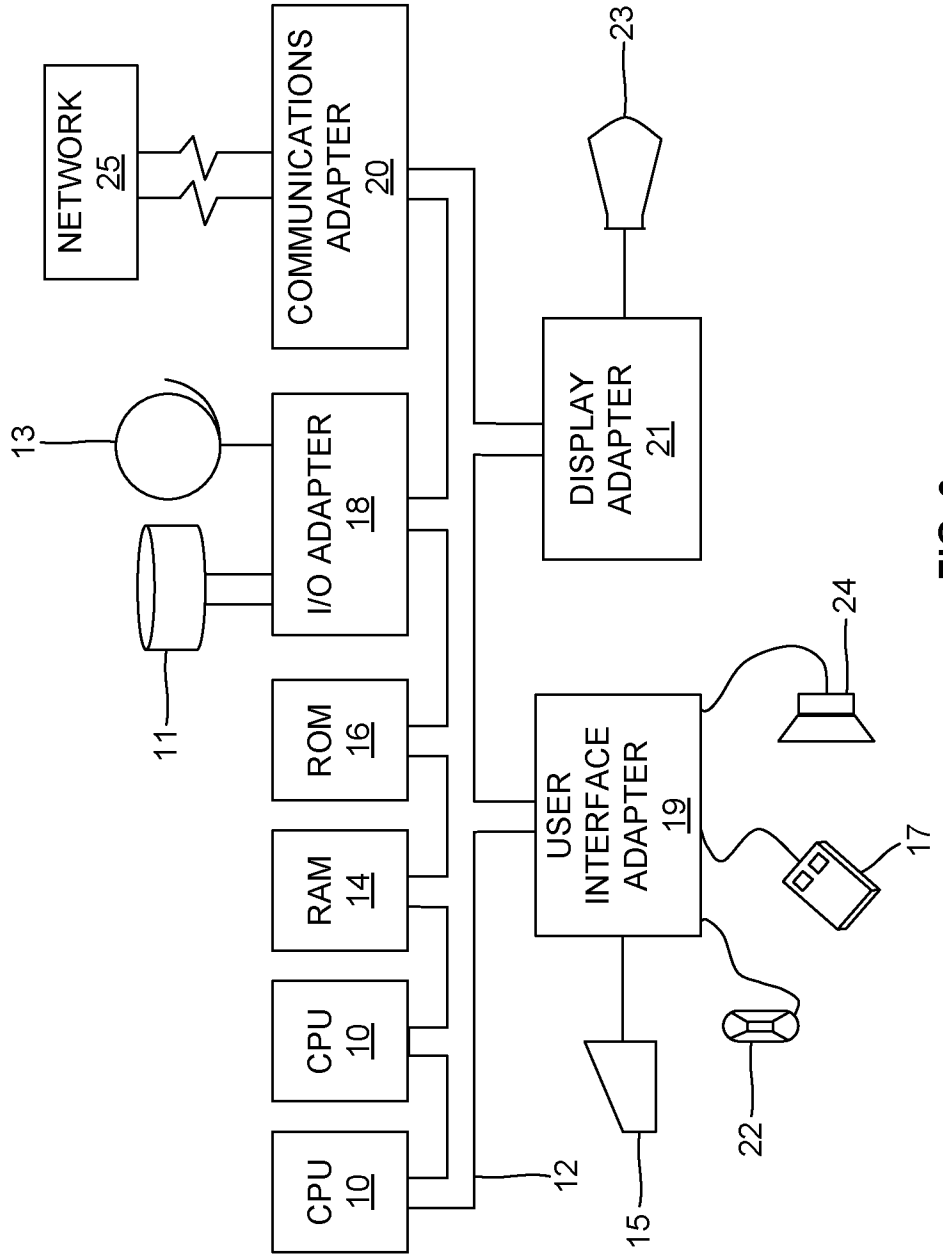
NETWORK 25
COMMUNICATIONS ADAPTER 20
23
13
I/O ADAPTER 18
DISPLAY ADAPTER 21
11
ROM 16
24
USER INTERFACE ADAPTER 19
RAM 14
17
CPU 10
CPU 10
12
15
22

FIG. 9