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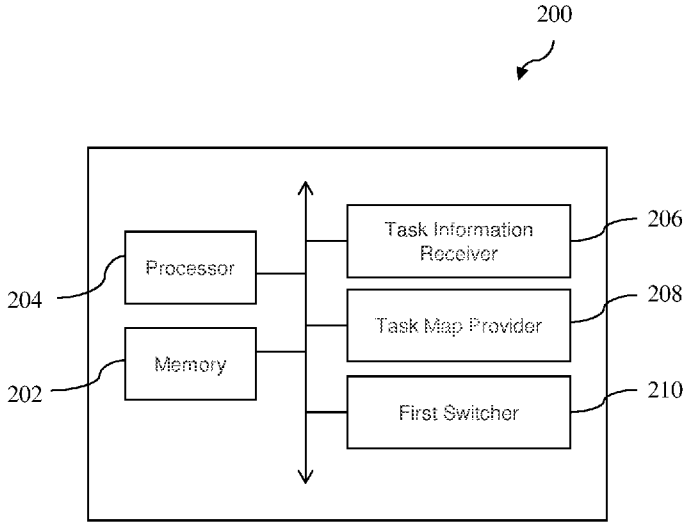


FIG. 2

(57) Abstract: There is provided a method of task management, including: receiving task information including a plurality of task items; providing, at a first state of a state machine, a task map user interface based on the task information, the task map user interface including a map portion, the map portion including a plurality of task elements at a plurality of positions, respectively, thereon, the plurality of task elements corresponding to the plurality of task items, respectively; and switching, in response to a first user input selecting a first switch option with respect to one of the plurality of task elements in the task map user interface and based on the state machine, from the above-mentioned providing, at the first state of the state machine, the task map user interface to providing, at a second state of the state machine, a task detail user interface, the task detail user interface corresponding to the task item corresponding to the selected task element and is configured to provide detailed information relating to the task item corresponding to the selected task element. There is also provided a corresponding system for task management.

WO 2022/035370 A1

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METHOD AND SYSTEM FOR TASK MANAGEMENT

TECHNICAL FIELD

[0001] The present invention generally relates to a method of task management and a system thereof, and more particularly, in relation to utilization of human resources.

BACKGROUND

[0002] Managing and maintaining an enterprise or a certain space (e.g., building, shopping mall, city, critical infrastructure, and so on), including associated services, are becoming extremely complex. For example, managing and maintaining such a space may include emergency response, security, energy and facility related operations. Due to urbanization, business expansions and increased demands for services or service quality, complex monitoring, command, control, maintenance and response needs have raised. Various types of human resources required to deal with these circumstances arise from complex requirements and needs while human resources are limited and costly. For example, human resources may be involved in performing tasks (e.g., services, actions, response or the like) to mitigate or reduce certain effects, risks and so on. Therefore, efficient utilization of human resources has been a major challenge in conventional methods of task management, such as monitoring, command, control, maintenance and/or ground operations and related systems/environments.

[0003] For example, various conventional methods for task management may not enable human resources (e.g., individuals or ground staff) to understand the assigned tasks to be performed in an efficient and/or effective manner, and more particular, when the task information is conveyed or presented to an individual (which may also be referred to as a user) on the individual's portable computing device having a display screen of limited display area (e.g., relatively small display area), resulting in inefficiencies and/or ineffectiveness in task management and utilization of human resources.

[0004] A need therefore exists to provide a method of task management and a system thereof, that seek to overcome, or at least ameliorate, one or more of the deficiencies in conventional methods of task management, such as but not limited to, improving or enhancing efficiency and/or effectiveness in task management and

utilization of human resources. It is against this background that the present invention has been developed.

SUMMARY

[0005] According to a first aspect of the present invention, there is provided a method of task management using at least one processor, the method comprising:

receiving task information comprising a plurality of task items;

providing, at a first state of a state machine, a task map user interface based on the task information, the task map user interface comprising a map portion, the map portion comprising a plurality of task elements at a plurality of positions, respectively, thereon, the plurality of task elements corresponding to the plurality of task items, respectively; and

switching, in response to a first user input selecting a first switch option with respect to one of the plurality of task elements in the task map user interface and based on the state machine, from the above-mentioned providing, at the first state of the state machine, the task map user interface to providing, at a second state of the state machine, a task detail user interface, the task detail user interface corresponding to the task item corresponding to the selected task element and is configured to provide detailed information relating to the task item corresponding to the selected task element.

[0006] According to a second aspect of the present invention, there is provided a system for task management, the system comprising:

a memory; and

at least one processor communicatively coupled to the memory and configured to:

receive task information comprising a plurality of task items;

provide, at a first state of a state machine, a task map user interface based on the task information, the task map user interface comprising a map portion, the map portion comprising a plurality of task elements at a plurality of positions, respectively, thereon, the plurality of task elements corresponding to the plurality of task items, respectively; and

switch, in response to a first user input selecting a first switch option with respect to one of the plurality of task elements in the task map user interface and based on the state machine, from the above-mentioned provide, at the first state of the state machine, the task map user interface to provide, at a second state of the state

machine, a task detail user interface, the task detail user interface corresponding to the task item corresponding to the selected task element and is configured to provide detailed information relating to the task item corresponding to the selected task element.

[0007] According to a third aspect of the present invention, there is provided a network system for task management, the network system comprising:

a plurality of systems, each system being the system for task management as described according to the above-mentioned second aspect of the present invention and is associated with a respective user; and

a task control system configured to communicate with the plurality of systems via a wireless communication network, the task control system comprising:

a memory; and

at least one processor communicatively coupled to the memory and configured to:

transmit, to each of the plurality of systems, task information comprising a plurality of task items.

[0008] According to a fourth aspect of the present invention, there is provided a computer program product, embodied in one or more non-transitory computer-readable storage mediums, comprising instructions executable by at least one processor to perform a method of task management as described according to the above-mentioned first aspect of the present invention.

BRIEF DESCRIPTION OF THE DRAWINGS

[0009] Embodiments of the present invention will be better understood and readily apparent to one of ordinary skill in the art from the following written description, by way of example only, and in conjunction with the drawings, in which:

FIG. 1 depicts a schematic flow diagram illustrating a method of task management, according to various embodiments of the present invention;

FIG. 2 depicts a schematic block diagram of a system for task management, according to various embodiments of the present invention;

FIG. 3 depicts an example portable computing device, which the system as described with respect to FIG. 2 may be embodied as, by way of an example only;

FIG. 4 depicts a schematic block diagram of a network system for distributed task management, according to various embodiments of the present invention;

FIG. 5 depicts a schematic illustration of an example task information, according to various example embodiments of the present invention;

FIG. 6 depicts a schematic illustration of an example task map user interface displayed on a display screen of an example portable computing device (e.g., a smartphone), according to various example embodiments of the present invention;

FIG. 7 depicts a schematic illustration of an example task detail user interface displayed on the display screen of the example portable computing device, according to various example embodiments of the present invention;

FIG. 8 depicts a schematic state transition diagram of an example state machine associated with the method of task management as described hereinbefore with reference to FIG. 1, according to various example embodiments of the present invention;

FIG. 9 depicts another example task detail user interface displayed on a display screen of another example portable computing device, such as a smart watch, according to various example embodiments of the present invention;

FIG. 10 depicts a schematic illustration of another example task detail user interface displayed on the display screen of the example portable computing device, according to various example embodiments of the present invention;

FIG. 11 depicts a schematic illustration of another example task map user interface displayed on the display screen of the example portable computing device, according to various example embodiments of the present invention;

FIG. 12 depicts a schematic illustration of a task list user interface displayed on the display screen of the example portable computing device, according to various example embodiments of the present invention;

FIG. 13 depicts a schematic illustration of an example task map user interface displayed on the display screen of the example portable computing device, according to various example embodiments of the present invention;

FIG. 14 depicts a schematic state transition diagram of an example state machine according to the method of task management as described hereinbefore with reference to FIGs. 12 and 13, according to various example embodiments of the present invention;

FIG. 15 depicts a schematic drawing of a network system for task management, according to various example embodiments of the present invention;

FIG. 16 depicts a schematic illustration of another example task map user interface displayed on the display screen of the example portable computing device, according to various example embodiments of the present invention; and

FIG. 17 depicts a schematic illustration of an event report user interface displayed on the display screen of the example portable computing device, according to various example embodiments of the present invention.

DETAILED DESCRIPTION

[0010] Various embodiments of the present invention relate to a method of task management and a system thereof, and more particularly, in relation to utilization of human resources.

[0011] For example, as described in the background, efficient utilization of human resources has been a major challenge in conventional methods of task management. In this regard, various embodiments of the present invention note that conventional methods of task management may not enable human resources (e.g., individuals or ground staff) to understand the assigned tasks to be performed in an efficient and/or effective manner, and more particularly, when the task information is conveyed or presented to an individual (which may also be referred to as a user) on the individual's portable computing device having a display screen of limited display area (e.g., relatively small display area, for example, significantly smaller than a display screen of a desktop or laptop computer), resulting in inefficiency and/or ineffectiveness in task management and utilization of human resources. Accordingly, various embodiments of the present invention provide a method of task management and a system thereof, that seek to overcome, or at least ameliorate, one or more of the deficiencies in conventional methods of task management, such as but not limited to, improving or enhancing efficiency and/or effectiveness in task management and utilization of human resources.

[0012] FIG. 1 depicts a schematic flow diagram illustrating a method 100 of task management using at least one processor. The method 100 comprising: receiving (at 102) task information comprising a plurality of task items; providing (at 104), at a first state of a state machine, a task map user interface based on the task information, the task map user interface comprising a map portion, the map portion comprising a plurality of task elements at a plurality of positions, respectively, thereon, the plurality of task elements corresponding to the plurality of task items, respectively; and switching (at 106), in response to a first user input selecting a first switch option with

respect to one of the plurality of task elements in the task map user interface and based on the state machine, from the above-mentioned providing, at the first state of the state machine, the task map user interface to providing, at a second state of the state machine, a task detail user interface, the task detail user interface corresponding to the task item corresponding to the selected task element (i.e., corresponding to the task item which corresponds to the selected task element) and is configured to provide detailed information relating to the task item corresponding to the selected task element.

[0013] In various embodiments, in relation to 102, the task information may be received by a portable computing device associated with a user (e.g., a human resource or an individual, such as a ground staff of an enterprise (e.g., an organization or a company). Accordingly, the method 100 of task management may be performed by at least one processor of the portable computing device associated with the user. For example, the task information may be transmitted from a workflow or task assignment system configured to generate the task information, comprising a plurality of task items corresponding to a plurality of tasks assigned to the user, and then transmit (e.g., via any wireless or wired communication network known in the art, such as a cellular or mobile communication network (e.g., 3G, 4G or 5G), Wi-Fi, intranet, and so on) to the portable computing device associated with the user. By way of an example only and without limitation, International patent application no. PCT/SG2017/050535 (WO 2019/083442 A1) filed on 25 October 2017 in the name of HITACHI, LTD. discloses a system for automating both emergency identification and emergency response to minimize response time while optimizing the dispatching of different types of first responders, the system may select a responder in response to the identified emergency situation and may dispatch the selected responder to an area related to the identified emergency situation (e.g., may also be referred to as a system for workflow assignment to generate a workflow for each of one or more individuals to perform at least one of a plurality of tasks), the content of which being hereby incorporated by reference in its entirety for all purposes. In various embodiments, the above-mentioned system disclosed in International patent application no. PCT/SG2017/050535 may be applied to generate a task information, comprising a plurality of task items corresponding to a plurality of tasks assigned to a user. However, it will be appreciated by a person the present invention is not limited to the above-mentioned systems, and any system configured to generate task information including a plurality of task items (corresponding to a plurality of tasks assigned to an individual) may be applied.

[0014] In various embodiments, the portable computing device may be any portable computing device having communication functionality or capability (e.g., based on the above-mentioned wireless communication network) and a display screen configured to display information thereon to a user of the portable computing device, such as in the form of a graphical user interface (GUI), and may also be referred to herein as a mobile computing device, such as but not limited to, a smartphone, a tablet computer, a wearable device (e.g., a smart watch or a head-mounted display (HMD) device) and so on. . It is known that a user interface (UI) is a space or an interface where interactions between humans and machines occur. Typically, the goal of the interactions between a human, often referred to as a user, and a machine at the user interface is the user's control of the machine and its operations (e.g., through user input) and machine feedback (e.g., through program output). A GUI is a type of user interface that enables users to interact with and control software applications executing on a computing system or device, such as a portable computing device, through various user inputs, such as but not limited to, a predetermined touch, gesture and/or motion input made by the user (e.g., a single tap or a short press) on or with respect to an interactive element (or object, such as an interactive button) in the GUI displayed on a display screen or a predetermined voice input made by the user with respect to the GUI.

[0015] In various embodiments, in relation to 104, based on the task information received, a task map user interface may be generated by the portable computing device (i.e., the at least one processor thereof) to provide to the user. In various embodiments, providing the task map user interface may include generating and displaying (or presenting) the task map user interface in the form of a GUI on the display screen of the portable computing device. In various embodiments, the state at which the task map user interface is provided may be referred to as or corresponds to a first state of a state machine (or finite-state machine or finite state automation). In various embodiments, the state machine described herein may be a computation model having a finite number of states and may be configured to change (which may also be referred to as a transition) from one state to another in response to certain input(s). In various embodiments, the state machine may be implemented in hardware and/or software.

[0016] In various embodiments, the map portion may provide a diagrammatic representation of a physical area or region, which simply referred to as a map of a physical area or region, and is not limited to any particular or specific form of diagrammatic representation. In various embodiments, the task map user interface is

not limited to any particular or specific form of presentation for display as long as it is configured with features/elements as described herein with respect to the task map user interface according to various embodiments.

[0017] In various embodiments, in relation to 106, the first user input selecting the first switch option with respect to one of the plurality of task elements in the task map user interface may be any form of user input for selecting the one of the plurality of task elements for triggering (or causing) the switch with respect to the selected task element based on the state machine, such as but not limited to, a predetermined touch, gesture and/or motion input made by the user (e.g., a single tap or a short press) on or with respect to the desired task element displayed on the display screen or a predetermined voice input made by the user with respect to the desired task element, such as corresponding to the first switch option or a name or identity of the desired task element.

[0018] In various embodiments, similarly, providing the task detail user interface may include generating and displaying (or presenting) the task detail user interface in the form of a GUI on the display screen of the portable computing device. In various embodiments, the state at which the task detail user interface is provided may be referred to as or corresponds to the second state of the above-mentioned state machine. In various embodiments, the task detail user interface is not limited to any particular or specific form of presentation for display as long as it is configured with features/elements as described herein with respect to the task detail user interface according to various embodiments. It will also be understood by a person skilled in the art that the detailed information relating to the task item may simply refer to any description of the associated task with sufficient information or details for the user to understand the task required to be perform. The detailed information relating to the task item thus provides more information relating to the associated task than, for example, a summary of the associated task, which may for example only include various task parameters, such as task name and location of the associated task requested to be perform.

[0019] Accordingly, in various embodiments, in relation to 106, the state machine may be configured to switch from the first state to the second state in response to the first user input selecting the first switch option with respect to one of the plurality of task elements in the task map user interface, thereby switching from the above-mentioned providing, at the first state of the state machine, the task map user interface

to the above-mentioned providing, at the second state of the state machine, a task detail user interface.

[0020] Accordingly, based on the task information received, the method 100 of task management according to various embodiments advantageously provides a task map user interface graphically showing locations of the plurality of task items (e.g., corresponding to a plurality of tasks assigned to be performed by a user) and switches (based on the state machine) to the task detail user interface corresponding to the task item which corresponds to the selected task element in response to a user input selecting a desired one of the plurality of task elements. For example, the user is thus able to better understand the locations of the plurality of tasks assigned to be performed by the user, as well as detailed information about relating to the selected task, in an efficiency and/or effective manner, and more particularly, when the task information is conveyed or presented to the user (e.g., a ground staff) on the user's portable computing device having a display screen of limited display area. Accordingly, the method 100 of task management according to various embodiments advantageously facilitates or enables human resources (e.g., individuals or ground staff) to better understand the assigned tasks to be performed in an efficient and/or effective manner, for example, despite the display screen being used having a limited display area, thereby improving or enhancing efficiency and/or effectiveness in task management and utilization of human resources.

[0021] In various embodiments, the method 100 further comprises: switching, in response to a second user input selecting a second switch option with respect to the task detail user interface and based on the state machine, from the above-mentioned providing, at the second state of the state machine, the task detail user interface to the above-mentioned providing, at the first state of the state machine, the task map user interface based on the task information. In various embodiments, similarly, the second user input selecting the second switch option with respect to the task detail user interface may be any form of user input for triggering (or causing) the switch with respect to the task detail user interface based on the state machine, such as but not limited to, a predetermined touch, gesture and/or motion input made by the user (e.g., a single tap or a short press) on or with respect to a first interactive switch element (e.g., a first interactive switch button) in the task detail user interface displayed on the display screen or a predetermined voice input made by the user with respect to the task detail user interface, such as corresponding to the second switch option.

[0022] Accordingly, in various embodiments, the state machine may be further configured to switch from the second state to the first state in response to the second user input selecting the second switch option with respect to the task detail user interface, thereby switching from the above-mentioned providing, at the second state of the state machine, the task detail user interface to the above-mentioned providing, at the first state of the state machine, the task map user interface. Accordingly, for example, the user may efficiently and conveniently switch back to the task map user interface graphically showing locations of the plurality of task items (e.g., corresponding to a plurality of tasks assigned to be performed by the user) to better understand the assigned task to be performed in an efficient and/or effective manner.

[0023] In various embodiments, the method 100 further comprises: switching, in response to a third user input selecting a third switch option with respect to the task map user interface and based on the state machine, from the above-mentioned providing, at the first state of the state machine, the task map user interface to providing, at a third state of the state machine, a task list user interface based on the task information, the task list user interface comprising a list portion, the list portion comprising a plurality of list elements, the plurality of list elements corresponding to the plurality of task items, respectively.

[0024] In various embodiments, similarly, the third user input selecting the third switch option with respect to the task map user interface may be any form of user input for triggering (or causing) the switch with respect to the task map user interface based on the state machine, such as but not limited to, a predetermined touch, gesture and/or motion input made by the user (e.g., a single tap or a short press) on or with respect to a second interactive switch element (e.g., a second interactive switch button) in the task map user interface displayed on the display screen or a predetermined voice input made by the user with respect to the task map user interface, such as corresponding to the third switch option.

[0025] In various embodiments, similarly, providing the task list user interface may include generating and displaying (or presenting) the task list user interface in the form of a GUI on the display screen of the portable computing device. In various embodiments, the state at which the task list user interface is provided may be referred to as or corresponds to the third state of the above-mentioned state machine. In various embodiments, the task list user interface is not limited to any particular or specific form of presentation for display as long as it is configured with features/elements as

described herein with respect to the task list user interface according to various embodiments.

[0026] Accordingly, in various embodiments, the state machine may be further configured to switch from the first state to the third state in response to the third user input selecting the third switch option with respect to the task map user interface, thereby switching from the above-mentioned providing, at the first state of the state machine, the task map user interface to the above-mentioned providing, at the third state of the state machine, a task list user interface.

[0027] Accordingly, in various embodiments, not only the user is able to better understand the locations of the plurality of tasks assigned to the user (based on the task map user interface) and the detailed information relating to the selected task item (based on the task detail user interface), the user is further able to efficiently and/or effectively grasp or obtain a summary of the plurality of task items (corresponding to the plurality of tasks assigned to the user) (based on the task list user interface), thereby further facilitating or enabling human resources (e.g., individuals or ground staff) to better understand the assigned tasks to be performed in an efficient and/or effective manner, and more particularly, when the task information is conveyed or presented to the user (e.g., a ground staff) on the user's portable computing device having a display screen of limited display area, thus improving or enhancing efficiency and/or effectiveness in task management and utilization of human resources, for example, despite the display screen being used having a limited display area.

[0028] In various embodiments, the method 100 further comprises: switching, in response to a fourth user input selecting a fourth switch option with respect to the task list user interface and based on the state machine, from the above-mentioned providing, at the third state of the state machine, the task list user interface to the above-mentioned providing, at the first state of the state machine, the task map user interface based on the task information. In various embodiments, similarly, the fourth user input selecting the fourth switch option with respect to the task list user interface may be any form of user input for triggering (or causing) the switch with respect to the task list user interface based on the state machine, such as but not limited to, a predetermined touch, gesture and/or motion input made by the user (e.g., a single tap or a short press) on or with respect to a third interactive switch element (e.g., a third interactive switch button) in the task list user interface displayed on the display screen or a predetermined voice

input made by the user with respect to the task list user interface, such as corresponding to the fourth switch option.

[0029] Accordingly, in various embodiments, the state machine may be further configured to switch from the third state to the first state in response to the fourth user input selecting the fourth switch option with respect to the task list user interface, thereby switching from the above-mentioned providing, at the third state of the state machine, the task list user interface to the above-mentioned providing, at the first state of the state machine, a task map user interface.

[0030] In various embodiments, the method 100 further comprises: switching, in response to a fifth user input selecting a fifth switch option with respect to the task detail user interface and based on the state machine, from the above-mentioned providing, at the second state of the state machine, the task detail user interface to providing, at the third state of the state machine, a task list user interface based on the task information, the task list user interface comprising a list portion, the list portion comprising a plurality of list elements, the plurality of list elements corresponding to the plurality of task items, respectively.

[0031] In various embodiments, similarly, the fifth user input selecting the fifth switch option with respect to the task detail user interface may be any form of user input for triggering (or causing) the switch with respect to the task detail user interface based on the state machine, such as but not limited to, a predetermined touch, gesture and/or motion input made by the user (e.g., a single tap or a short press) on or with respect to a fourth interactive switch element (e.g., a fourth interactive switch button) in the task detail user interface displayed on the display screen or a predetermined voice input made by the user with respect to the task detail user interface, such as corresponding to the fifth switch option.

[0032] Accordingly, in various embodiments, the state machine may be further configured to switch from the second state to the third state in response to the fifth user input selecting the fifth switch option with respect to the task detail user interface, thereby switching from the above-mentioned providing, at the second state of the state machine, the task detail user interface to the above-mentioned providing, at the third state of the state machine, the task list user interface.

[0033] In various embodiments, the above-mentioned first and fourth interactive switch elements may be the same switch element (i.e., one interactive switch element). In this regard, the state machine may be further configured to switch from the second

state to the first state in response to the second user input selecting the second switch option with respect to the task detail user interface or switch from the second state to the third state in response to the fifth user input selecting the fifth switch option with respect to the task detail user interface, based on whether the immediate previous state of the state machine. In various embodiments, if the immediate previous state of the state machine is the first state, the state machine may be configured to switch from the second state to back to the first state. On the other hand, if the immediate previous state of the state machine is the third state, the state machine may be configured to switch from the second state to back to the third state.

[0034] In various embodiments, the method 100 further comprises: switching, in response to a sixth user input selecting a sixth switch option with respect to one of the plurality of list elements in the task list user interface and based on the state machine, from the above-mentioned providing, at the third state of the state machine, the task list user interface to providing, at the second state of the state machine, a task detail user interface, the task detail user interface corresponding to the task item corresponding to the selected list element (i.e., corresponding to the task item which corresponds to the selected list element) and is configured to provide detailed information relating to the task item corresponding to the selected list element.

[0035] In various embodiments, the sixth user input selecting the sixth switch option with respect to one of the plurality of list elements in the task list user interface may be any form of user input for selecting the one of the plurality of list elements for triggering (or causing) the switch with respect to the selected list element based on the state machine, such as but not limited to, a predetermined touch, gesture and/or motion input made by the user (e.g., a single tap or a short press) on or with respect to the desired list element displayed on the display screen or a predetermined voice input made by the user with respect to the desired list element, such as corresponding to the sixth switch option or a name or identity of the desired list element.

[0036] In various embodiments, each of the plurality of task items comprises identity information and location information relating to the task item. In various embodiments, each of the plurality of task elements is configured to be at the respective position in the map portion based on the location information relating to the corresponding task item. For example, each of the plurality of task elements may be shown in the map portion of the task map user interface having a label corresponding to the identity information and a position corresponding to the location information. In

various embodiments, the identity information relating to the task item may indicate a name or an identity (e.g., unique name or identity) of the corresponding task. In various embodiments, the location information may indicate the location of the corresponding task is performed or to be performed. It will be appreciated by a person skilled in the art that the identity information and the location information are not limited to any particular or specific data structure or format as long as they serve the function or purpose as described herein according to various embodiments.

[0037] In various embodiments, for each of the plurality of task elements, the position of the task element in the map portion corresponds a location in an area at which a task corresponding to the task item is performed or to be performed.

[0038] In various embodiments, each of the plurality of task items further includes status information relating to the task item. In various embodiments, the status information relating to the task item may indicate a status of the corresponding task, such as but not limited to, not yet started, in progress, completed, problem encountered, and so on, along corresponding time information where appropriate (e.g., start time and completed time). In various embodiments, the method 100 further comprises updating, in response to a seventh user input selecting a first status update option with respect to the task detail user interface, the status information relating to the task item corresponding to the task detail user interface. In various embodiments, similarly, the seventh user input selecting the first status update option with respect to the task detail user interface may be any form of user input for triggering (or causing) the update of the status information relating to the task item, such as but not limited to, a predetermined touch, gesture and/or motion input made by the user (e.g., a single tap or a short press) on or with respect to an interactive first update element (e.g., a first interactive update button) in the task detail user interface displayed on the display screen or a predetermined voice input made by the user with respect to the task detail user interface, such as corresponding to the first status update option. By way of an example only and without limitation, selecting the first status update option may trigger an update of the status information with a record of a time corresponding to a start time of performing the task. In addition, selecting the first status update option again after the update of the status information with the record of the start time may trigger another update of the status information with a record of a time corresponding to a completion time of performing the task.

[0039] In various embodiments, at least one of the plurality of task items comprises a plurality of sub-task items. In various embodiments, the task detail user interface corresponds to one of the above-mentioned at least one of the plurality of task items, and comprises a sub-task portion, the sub-task portion comprising a plurality of sub-task elements corresponding to the plurality of sub-task items, respectively, of the task item (i.e., the above-mentioned one of the at least one of the plurality of task items), each sub-task element configured to provide detailed information relating to the corresponding sub-task item of the task item (i.e., the above-mentioned one of the at least one of the plurality of task items).

[0040] In various embodiments, for each of the above-mentioned at least one of the plurality of task items, the status information relating to the task item comprises a plurality of sub-status information corresponding to the plurality of sub-task items, respectively, of the task item. In various embodiments, the method 100 further comprises updating, in response to an eighth user input selecting a second status update option with respect to one of the plurality of sub-task elements in the task detail user interface, the corresponding sub-status information relating to the selected sub-task element.

[0041] In various embodiments, similarly, the eighth user input selecting the second status update option with respect to one of the plurality of sub-task elements in the task detail user interface may be any form of user input for selecting the one of the plurality of sub-task elements for triggering (e.g., causing) the switch with respect to the selected sub-task element based on the state machine, such as but not limited to, a predetermined touch, gesture and/or motion input made by the user (e.g., a single tap or a short press) on or with respect to a second interactive update element (e.g., a second interactive update button) in the desired sub-task element displayed on the display screen or a predetermined voice input made by the user with respect to the desired sub-task element, such as corresponding to the second status update option or a name or identity of the desired sub-task element. By way of an example only and without limitation, selecting the second status update option may trigger an update of the sub-status information relating to the sub-task item with a record to a completion status and/or a completion time of the corresponding sub-task.

[0042] In various embodiments, the method 100 further comprises transmitting the status information relating to the task item as updated. In various embodiments, the status information relating to the task item as updated may be transmitted (e.g., via a

wireless communication network) to the above-mentioned flow or task assignment system. In various embodiments, the status information may transmit the status information each time the status information (including any of the plurality of sub-status information of the status information) is updated.

[0043] In various embodiments, the task detail user interface comprises a workflow portion, the workflow portion comprises a plurality of workflow elements arranged in a sequential order, each workflow element corresponding to a task item (which corresponds to an assigned task performed or to be performed). In various embodiments, the workflow (a plurality of workflow elements arranged in a sequential order) for an individual may define an order of tasks (or task items) to be performed by the individual. In various embodiments, the workflow may further define or indicate a time for performing each task. In various embodiments, one of the plurality of workflow elements corresponds to the task item corresponding to the task detail user interface (i.e., corresponds to the task item which corresponds to the task detail user interface). As mentioned hereinbefore, International patent application no. PCT/SG2017/050535 discloses a system for workflow assignment configured to generate a workflow for each of one or more individuals to perform at least one of a plurality of tasks. For example, according to various embodiments, such a system for workflow assignment may be applied to generate a workflow comprising a plurality of task items corresponding to a plurality of tasks assigned to a user or to multiple different users.

[0044] In various embodiments, as described hereinbefore, the task information is received by a portable computing device associated with a user, the portable computing device comprising said the above-mentioned at least one processor and a display screen. In various embodiments, the above-mentioned providing, at the first state of the state machine, the task map user interface comprises providing (e.g., generating and displaying), at the portable computing device, the task map user interface for display thereon (the display screen thereof) to the user, and the above-mentioned switching, in response to the first user input selecting the first switch option with respect to the above-mentioned one of the plurality of task elements in the task map user interface and based on the state machine, comprises switching to provide (e.g., generating and displaying), at the portable computing device, the task detail user interface for display thereon (the display screen thereof) to the user.

[0045] In various embodiments, similarly, the above-mentioned switching, in response to the second user input selecting the second switch option with respect to the task detail

user interface and based on the state machine, comprises switching to provide (e.g., generating and displaying), at the portable computing device, the task map user interface based on the task information for display thereon to (the display screen thereof) the user.

[0046] In various embodiments, similarly, the above-mentioned switching, in response to the third user input selecting the third switch option with respect to the task map user interface and based on the state machine, comprises switching to provide (e.g., generating and displaying), at the portable computing device, the task list user interface based on the task information for display thereon (the display screen thereof) to the user.

[0047] In various embodiments, similarly, the above-mentioned switching, in response to the fourth user input selecting the fourth switch option with respect to the task list user interface and based on the state machine, comprises switching to provide (e.g., generating and displaying), at the portable computing device, the task map user interface based on the task information for display thereon (the display screen thereof) to the user.

[0048] In various embodiments, similarly, the above-mentioned switching, in response to the fifth user input selecting the fifth switch option with respect to the task detail user interface and based on the state machine, comprises switching to provide (e.g., generating and displaying), at the portable computing device, the task list user interface based on the task information for display thereon (the display screen thereof) to the user.

[0049] In various embodiments, similarly, the above-mentioned switching, in response to a sixth user input selecting the sixth switch option with respect to one of the plurality of list elements in the task list user interface and based on the state machine, comprises switching to provide, at the third state of the state machine, the task list user interface to providing (e.g., generating and displaying), at the portable computing device, the task detail user interface for display thereon (the display screen thereof) to the user.

[0050] FIG. 2 depicts a schematic block diagram of a system 200 for task management, according to various embodiments of the present invention, such as corresponding to the method 100 of task management as described hereinbefore with reference to FIG. 1, according to various embodiments of the present invention. The system 200 comprises a memory 202, and at least one processor 204 communicatively coupled to the memory 202 and configured to: receive task information comprising a

plurality of task items; provide, at a first state of a state machine, a task map user interface based on the task information, the task map user interface comprising a map portion, the map portion comprising a plurality of task elements at a plurality of positions, respectively, thereon, the plurality of task elements corresponding to the plurality of task items, respectively; and switch, in response to a first user input selecting a first switch option with respect to one of the plurality of task elements in the task map user interface and based on the state machine, from the above-mentioned provide, at the first state of the state machine, the task map user interface to provide, at a second state of the state machine, a task detail user interface, the task detail user interface corresponding to the task item corresponding to the selected task element and is configured to provide detailed information relating to the task item corresponding to the selected task element. It will be appreciated to a person skilled in the art that the system 200 may also be embodied as a device or an apparatus.

[0051] It will be appreciated by a person skilled in the art that the at least one processor 204 may be configured to perform the required functions or operations through set(s) of instructions (e.g., software modules) executable by the at least one processor 204 to perform the required functions or operations. Accordingly, as shown in FIG. 2, the system 200 may further comprise a task information receiver 206 (or a task information receiving module or circuit) 206 configured to receive task information comprising a plurality of task items; a task map provider (or a task map providing module or circuit) 208 configured to provide, at a first state of a state machine, a task map user interface based on the task information, the task map user interface comprising a map portion, the map portion comprising a plurality of task elements at a plurality of positions, respectively, thereon, the plurality of task elements corresponding to the plurality of task items, respectively; and a first switcher (or a first switching module or circuit) 210 configured to switch, in response to a first user input selecting a first switch option with respect to one of the plurality of task elements in the task map user interface and based on the state machine, from the above-mentioned providing, at the first state of the state machine, the task map user interface to providing, at a second state of the state machine, a task detail user interface, the task detail user interface corresponding to the task item corresponding to the selected task element and is configured to provide detailed information relating to the task item corresponding to the selected task element. In various embodiments, the task information receiver 206

may be configured to receive the task information via a wireless signal receiver or a transceiver of the system 200.

[0052] It will be appreciated by a person skilled in the art that the above-mentioned modules are not necessarily separate modules, and two or more modules may be realized by or implemented as one functional module (e.g., a circuit or a software program) as desired or as appropriate without deviating from the scope of the present invention. For example, two or more of the task information receiver 206, the task map provider 208, and the first switcher 210 may be realized (e.g., compiled together) as one executable software program (e.g., software application or simply referred to as an "app"), which for example may be stored in the memory 202 and executable by the at least one processor 204 to perform the functions/operations as described herein according to various embodiments.

[0053] In various embodiments, the system 200 corresponds to the method 100 as described hereinbefore with reference to FIG. 1, therefore, various functions or operations configured to be performed by the least one processor 204 may correspond to various steps of the method 100 described hereinbefore according to various embodiments, and thus need not be repeated with respect to the system 200 for clarity and conciseness. In other words, various embodiments described herein in context of the methods are analogously valid for the respective systems (e.g., which may also be embodied as devices), and vice versa.

[0054] For example, in various embodiments, the memory 202 may have stored therein the task information receiver 206, the task map provider 208, and/or the first switcher 210, which respectively correspond to various steps of the method 100 as described hereinbefore according to various embodiments, which are executable by the at least one processor 204 to perform the corresponding functions/operations as described herein.

[0055] A computing system, a controller, a microcontroller or any other system providing a processing capability may be provided according to various embodiments in the present disclosure. Such a system may be taken to include one or more processors and one or more computer-readable storage mediums. For example, the system 200 described hereinbefore may include a processor (or controller) 204 and a computer-readable storage medium (or memory) 202 which are for example used in various processing carried out therein as described herein. A memory or computer-readable storage medium used in various embodiments may be a volatile memory, for example

a DRAM (Dynamic Random Access Memory) or a non-volatile memory, for example a PROM (Programmable Read Only Memory), an EPROM (Erasable PROM), EEPROM (Electrically Erasable PROM), or a flash memory, e.g., a floating gate memory, a charge trapping memory, an MRAM (Magnetoresistive Random Access Memory) or a PCRAM (Phase Change Random Access Memory).

[0056] In various embodiments, a "circuit" may be understood as any kind of a logic implementing entity, which may be special purpose circuitry or a processor executing software stored in a memory, firmware, or any combination thereof. Thus, in an embodiment, a "circuit" may be a hard-wired logic circuit or a programmable logic circuit such as a programmable processor, e.g., a microprocessor (e.g., a Complex Instruction Set Computer (CISC) processor or a Reduced Instruction Set Computer (RISC) processor). A "circuit" may also be a processor executing software, e.g., any kind of computer program, e.g., a computer program using a virtual machine code, e.g., Java. Any other kind of implementation of the respective functions which will be described in more detail below may also be understood as a "circuit" in accordance with various alternative embodiments. Similarly, a "module" may be a portion of a system according to various embodiments in the present invention and may encompass a "circuit" as above, or may be understood to be any kind of a logic-implementing entity therefrom.

[0057] Some portions of the present disclosure are explicitly or implicitly presented in terms of algorithms and functional or symbolic representations of operations on data within a computer memory. These algorithmic descriptions and functional or symbolic representations are the means used by those skilled in the data processing arts to convey most effectively the substance of their work to others skilled in the art. An algorithm is here, and generally, conceived to be a self-consistent sequence of steps leading to a desired result. The steps are those requiring physical manipulations of physical quantities, such as electrical, magnetic or optical signals capable of being stored, transferred, combined, compared, and otherwise manipulated.

[0058] Unless specifically stated otherwise, and as apparent from the following, it will be appreciated that throughout the present specification, discussions utilizing terms such as "receiving", "providing", "switching", "updating", "transmitting", "selecting", "generating" or the like, refer to the actions and processes of a computer system, or similar electronic device, that manipulates and transforms data represented as physical quantities within the computer system into other data similarly represented as physical

quantities within the computer system or other information storage, transmission or display devices.

[0059] The present specification also discloses a system (e.g., which may also be embodied as a device or an apparatus) for performing the operations/functions of the methods described herein. Such a system may be specially constructed for the required purposes, or may comprise a general purpose computer or other device selectively activated or reconfigured by a computer program stored in the computer. The algorithms presented herein are not inherently related to any particular computer or other apparatus. Various general-purpose machines may be used with computer programs in accordance with the teachings herein. Alternatively, the construction of more specialized apparatus to perform the required method steps may be appropriate.

[0060] In addition, the present specification also at least implicitly discloses a computer program or software/functional module, in that it would be apparent to the person skilled in the art that the individual steps of the methods described herein may be put into effect by computer code. The computer program is not intended to be limited to any particular programming language and implementation thereof. It will be appreciated that a variety of programming languages and coding thereof may be used to implement the teachings of the disclosure contained herein. Moreover, the computer program is not intended to be limited to any particular control flow. There are many other variants of the computer program, which can use different control flows without departing from the spirit or scope of the invention. It will be appreciated by a person skilled in the art that various modules described herein (e.g., the task information receiver 206, the task map provider 208, and/or the first switcher 210) may be software module(s) realized by computer program(s) or set(s) of instructions executable by a computer processor to perform the required functions, or may be hardware module(s) being functional hardware unit(s) designed to perform the required functions. It will also be appreciated that a combination of hardware and software modules may be implemented.

[0061] Furthermore, two or more of the steps of a computer program/module or method described herein may be performed in parallel rather than sequentially. Such a computer program may be stored on any computer readable medium. The computer readable medium may include storage devices such as magnetic or optical disks, memory chips, or other storage devices suitable for interfacing with a general purpose computer. The computer program when loaded and executed on such a general-purpose

computer effectively results in an apparatus that implements the steps of the methods described herein.

[0062] In various embodiments, there is provided a computer program product, embodied in one or more computer-readable storage mediums (non-transitory computer-readable storage medium), comprising instructions (e.g., the task information receiver 206, the task map provider 208, and/or the first switcher 210) executable by one or more computer processors to perform a method 100 of task management as described hereinbefore with reference to FIG. 1. Accordingly, various computer programs or modules described herein may be stored in a computer program product receivable by a system therein, such as the system 200 as shown in FIG. 2, for execution by at least one processor 204 of the system 200 to perform the required or desired functions.

[0063] The software or functional modules described herein may also be implemented as hardware modules. More particularly, in the hardware sense, a module is a functional hardware unit designed for use with other components or modules. For example, a module may be implemented using discrete electronic components, or it can form a portion of an entire electronic circuit such as an Application Specific Integrated Circuit (ASIC). Numerous other possibilities exist. Those skilled in the art will appreciate that the software or functional module(s) described herein can also be implemented as a combination of hardware and software modules.

[0064] In various embodiments, the system 200 may be realized by any portable computer system having communication functionality or capability and a display screen, (e.g., the portable or mobile computing device as mentioned hereinbefore, such as but not limited to, a smartphone, a tablet computer, a wearable device (e.g., a smart watch or a head-mounted display (HMD) device) and so on) including at least one processor and a memory, such as a portable or mobile computing device 300 as schematically shown in FIG. 3 as an example only and without limitation. Various methods/steps or functional modules (e.g., the task information receiver 206, the task map provider 208, and/or the first switcher 210) may be implemented as software, such as a computer program being executed within the portable computing device 300, and instructing the portable computing device 300 (in particular, at least one processor therein) to conduct the methods/functions of various embodiments described herein. As mentioned hereinbefore, the display screen of the portable computing device may

have a limited display area (e.g., a relatively small display area, for example, significantly smaller than a display screen of a desktop or laptop computer).

[0065] The portable computing device 300 may comprise a processor module 302, an input module such as a keypad 304 and an output module such as a display screen 306. It can be appreciated by a person skilled in the art that the display screen 306 may be a touch-sensitive display screen, and thus may also constitute an input module being in addition to, or instead of, the keypad 304. That is, it can be appreciated by a person skilled in the art that the keypad 304 may be omitted from the portable computing device 300 as desired or as appropriate. The processor module 302 is coupled to a first communication unit 308 for communication with a cellular network 310. The first communication unit 308 can include but is not limited to a subscriber identity module (SIM) card loading bay. The cellular network 310 can, for example, be a 3G, 4G or 5G network. The processor module 302 may further be coupled to a second communication unit 312 for connection to a local area network 314. For example, the connection can enable wired/wireless communication and/or access to, e.g., the Internet or other network systems such as Local Area Network (LAN), Wireless Personal Area Network (WPAN) or Wide Area Network (WAN). The second communication unit 312 may include but is not limited to a wireless network card or an Ethernet network cable port. The processor module 302 in the example includes a processor 316, a Random Access Memory (RAM) 318 and a Read Only Memory (ROM) 320. The processor module 302 also includes a number of Input/Output (I/O) interfaces, for example I/O interface 322 to the display screen 306, and I/O interface 324 to the keypad 304. The components of the processor module 302 typically communicate via an interconnected bus 326 and in a manner known to the person skilled in the relevant art. Various software or application programs (or may simply be referred to herein as "apps") may be pre-installed in a memory of the mobile communication device 300 or may be transferred to a memory of the mobile communication device 300 by reading a memory card having stored therein the application programs or by downloading wirelessly from an application server (e.g., an online app store).

[0066] FIG. 4 depicts a schematic block diagram of a network system 400 for distributed task management according to various embodiments of the present invention. The network system 400 comprises a plurality of systems 200, each system 200 being the system 200 for task management as described hereinbefore as described

with reference to FIG. 2 and is associated with a respective user; and a task control system 401 configured to communicate with the plurality of systems 200 via a wired or wireless communication network, the task control system 401 comprising: a memory 402; and at least one processor 404 communicatively coupled to the memory 402 and configured to transmit, to each of the plurality of systems 200, task information comprising a plurality of task items. The task information for the respective user may then be conveyed or presented to the respective user, at the portable computing device of the respective user, in the manner as described hereinbefore according to various embodiments of the present invention. In various embodiments, the task control system 401 may be further configured to receive status information relating to one or more of the plurality of task items as updated as described herein according to various embodiments from one or more of the plurality of systems 200. In various embodiments, the task control system 401 may be or correspond to the system for workflow assignment as described in International patent application no. PCT/SG2017/050535.

[0067] It will be appreciated by a person skilled in the art that the terminology used herein is for the purpose of describing various embodiments only and is not intended to be limiting of the present invention. As used herein, the singular forms "a", "an" and "the" are intended to include the plural forms as well, unless the context clearly indicates otherwise. It will be further understood that the terms "comprises" and/or "comprising," when used in this specification, specify the presence of stated features, integers, steps, operations, elements, and/or components, but do not preclude the presence or addition of one or more other features, integers, steps, operations, elements, components, and/or groups thereof.

[0068] Any reference to an element or a feature herein using a designation such as “first,” “second,” and so forth does not limit the quantity or order of such elements or features. For example, such designations are used herein as a convenient method of distinguishing between two or more elements or instances of an element. Thus, a reference to first and second elements does not mean that only two elements can be employed, or that the first element must precede the second element. In addition, a phrase referring to “at least one of” a list of items refers to any single item therein or any combination of two or more items therein.

[0069] In order that the present invention may be readily understood and put into practical effect, various example embodiments of the present invention will be

described hereinafter by way of examples only and not limitations. It will be appreciated by a person skilled in the art that the present invention may, however, be embodied in various different forms or configurations and should not be construed as limited to the example embodiments set forth hereinafter. Rather, these example embodiments are provided so that this disclosure will be thorough and complete, and will fully convey the scope of the present invention to those skilled in the art. In particular, for better understanding of the present invention and without limitation or loss of generality, various example embodiments of the present invention will now be described with respect to various user inputs, each being in the form of a predetermined touch, gesture and/or motion input (e.g., a single tap) made by a user on or with respect to an interactive element (e.g., an interactive button) in a graphical user interface (GUI) displayed on a display screen of a portable computing device associated with the user for triggering an action or event (e.g., a switch, an update and so on). However, as described hereinbefore, the present invention is not limited to such a specific form of user input for trigging an action or event (although it may be preferred according to various example embodiments), and other forms of user inputs known in the art may also be applied, such as but not limited to, a predetermined voice input.

[0070] As described in the background, managing and maintaining an enterprise or a certain space (e.g., building, shopping mall, city, critical infrastructure, and so on), including associated services, are becoming extremely complex. For example, managing and maintaining such a space may include emergency response, security, energy and facility related operations. Due to urbanization, business expansions and increased demands for services or service quality, complex monitoring, command, control, maintenance and response needs have raised. Various types of human resources required to deal with these circumstances arise from complex requirements and needs while human resources are limited and costly. For example, human resources may be involved in performing tasks (e.g., services, actions, response or the like) to mitigate or reduce certain effects, risks and so on. Therefore, efficient utilization of human resources has been a major challenge in conventional methods of task management, such as monitoring, command, control, maintenance and/or ground operations and related systems/environments.

[0071] For example, various conventional methods for task management may not enable human resources to understand the assigned task(s) to be performed in an

efficient and/or effective manner, resulting in inefficiencies and/or ineffectiveness in task management and utilization of human resources.

[0072] Accordingly, various example embodiments of the present invention provide a method of task management and a system thereof, that seek to overcome, or at least ameliorate, one or more of the deficiencies in conventional methods of task management, such as but not limited to, improving or enhancing efficiency and/or effectiveness in task management and utilization of human resources.

[0073] For example, various example embodiments note that management staff (e.g., a management officer) in a command center (or operation control center) may need to understand the type of events (or actionable events) (e.g., incidents, accidents, alerts, and so on) that are happening and the locations of such events. Based on the event(s) detected or identified, for example, the command center (which may include an task control system (or automated dispatching system), such as in the form of the task or workflow assignment system as described hereinbefore according to various embodiments) may dispatch an appropriate staff (e.g., a ground staff) to attend to or address the event(s). In this regard, various example embodiments note that it is advantageous for the dispatched staff to better understand the assigned tasks to be performed in an efficient and/or effective manner, and more particularly, when the task information is conveyed or presented to the staff on the staff's portable computing device having a display screen of limited display area. In various example embodiments, the method of task management advantageously enables or facilitates the dispatched staff to understand the assigned task(s) in detail and the report of the status of the task(s) to the command center.

[0074] Accordingly, in various example embodiments, a method of task management is provided that facilitates or enables a dispatched staff to better understand the assigned tasks based on providing the assigned tasks on a map, providing a list of the assigned tasks and providing detailed information relating to the assigned tasks efficiently and effectively, and more particularly, in view of the dispatched staff's portable computing device having a display screen of limited display area. Furthermore, in various example embodiments, the method enables the dispatched staff to report the status or evidence of the completion of each task efficiently. Accordingly, in various example embodiments, the method is particularly configured to cater or accommodate for display or presentation of task information on a small display screen (e.g., significantly smaller than a display screen of a desktop or laptop

computer) of a portable computing device, such as a smartphone, a smart watch and a HMD device, in an effective and efficient manner.

[0075] Accordingly, various example embodiments provide a method of task management configured to provide detailed information relating to a task (displayed on a display screen of a portable computing device associated with a user (e.g., a dispatched staff)) when the task (e.g., corresponding to the "task element" described hereinbefore according to various embodiments) is tapped on the map (e.g., corresponding to the "map portion" described hereinbefore according to various embodiments). Accordingly, based on the task information received, the method of task management according to various example embodiments advantageously provides a task map user interface graphically showing locations of the plurality of task items (e.g., corresponding to a plurality of tasks assigned to be performed by a user) and switches (based on the state machine) to the task detail user interface corresponding to the task item which corresponds to the selected task element in response to a user input selecting a desired one of the plurality of task elements. For example, the user is thus able to better understand the locations of the plurality of tasks assigned to be performed by the user, as well as detailed information about relating to the selected task, in an efficiency and/or effective manner, and more particularly, when the task information is conveyed or presented to the user on the user's portable computing device having a display screen of limited display area. Accordingly, the method of task management according to various example embodiments advantageously facilitates or enables human resources to better understand the assigned tasks to be performed in an efficient and/or effective manner, for example, despite the display screen being used having a limited display area, thereby improving or enhancing efficiency and/or effectiveness in task management and utilization of human resources.

[0076] In various example embodiments, a method of task management is configured to provide detailed information related to a task when the task (e.g., corresponding to the "task element" described hereinbefore according to various embodiments) is tapped on the map (e.g., corresponding to the "map portion" described hereinbefore according to various embodiments) in a task map user interface or when the task (e.g., corresponding to the "list element" described hereinbefore according to various embodiments) is tapped on the task list (e.g., corresponding to the "list portion" described hereinbefore according to various embodiments) in a task list user interface. Accordingly, not only the user is able to better understand the locations of the plurality

of tasks assigned to the user (based on the task map user interface) and the detailed information relating to the selected task item (based on the task detail user interface), the user is further able to efficiently and/or effectively grasp or obtain a summary of the plurality of task items (corresponding to the plurality of tasks assigned to the user) (based on the task list user interface), thereby further facilitating or enabling human resources to better understand the assigned tasks to be performed in an efficient and/or effective manner, and more particularly, when the task information is conveyed or presented to the user (e.g., a ground staff) on the user's portable computing device having a display screen of limited display area, thus improving or enhancing efficiency and/or effectiveness in task management and utilization of human resources, for example, despite the display screen being used having a limited display area.

[0077] By way of an example only and without limitation, FIG. 5 depicts a schematic illustration of an example task information (or task data) which may be received in the method of task management according to various example embodiments of the present invention. As shown, the example task information may include a plurality of task items (e.g., three task items "A1", "A2", and "A3" are shown, corresponding to three assigned tasks to a user). Each of the plurality of task items may include identity information (e.g., a name or a number identifying the task item) and location information relating to the task item. In various example embodiments, each task item may further include status information relating to the task item. In various example embodiments, each task item may further include task category information, time information, priority information, detailed information relating to the task item. For example, the identity information may indicate a name or an identity (e.g., unique name or identity) of the task, the location information may indicate the location of the task is performed or to be performed, the status information may indicate a status of the task, the category information may indicate a type or category of the task, the time information may indicate the estimated time (e.g., travelling time and working/executing time) it may take to complete the task, the priority information may indicate a priority of the task, and the detailed information may indicate the detailed information of the task and/or detailed information of the sub-tasks of the tasks.

[0078] In various example embodiments, for example if a task item (or task) is complex, the task item may be divided into multiple sub-task items (or multiple sub-tasks), each sub-task item having sub-status information relating to a status of the corresponding sub-task. In various example embodiments, it is preferable for the user

to use a portable computing device (which may also be referred to as mobile computing device), such as a smartphone, a smart watch or a HMD device from the perspective of portability. In this regard, various example embodiments note that it is difficult to show the desired useful or relevant information of the assigned tasks on a single page layout because the portable computing device has a relatively small display screen (i.e., having a limited display area) compared to, for example, the display screen of a desktop or laptop computer. Accordingly, various example embodiments provide a method of task management based multiple switchable GUIs (Graphical User Interfaces), such as corresponding to the task map user interface, the task detail user interface and the task list user interface as described hereinbefore according to various embodiments, which together facilitates or enables a user to better understand the plurality of tasks assigned to the user in an efficient and/or effective manner, despite the display screen being used having a limited display area, thus improving or enhancing efficiency and/or effectiveness in task management and utilization of human resources.

[0079] By way of an example only and without limitation, FIG. 6 depicts a schematic illustration of a task map user interface 601 (e.g., corresponding to the task map user interface as described hereinbefore according to various embodiments) provided or displayed on a display screen of an example portable computing device (e.g., a smartphone), according to various example embodiments of the present invention. As shown, in the example, the assigned tasks "A1" 602a, "A2" 602b and "A3" 602c (e.g., corresponding to the plurality of task elements at a plurality of positions as described hereinbefore according to various embodiments) are displayed on a map portion of the task map user interface 601. In various example embodiments, each assigned task may be generated or configured on the map portion based on the location information relating to the task. Each assigned task may be further generated or configured based on the identity information relating to the task, such as in the form of a circular object having a label corresponding to the identity information as illustrated in FIG. 6. In various example embodiments, if there are numerous tasks (e.g., more than a predetermined number of tasks) assigned to a user, the physical area being covered by the map portion of the task map user interface 601 may be adjusted automatically so as to include or display up to a predetermined number of tasks (e.g., up to a predetermined number of two or three tasks) and following the user's current task (i.e., the tasks in the predetermined number of tasks at least include the user's current task (currently being performed or attended to)).

[0080] By way of an example only and without limitation, FIG. 7 depicts a schematic illustration of an example task detail user interface 701 (e.g., corresponding to the task detail user interface as described hereinbefore according to various embodiments) provided or displayed on a display screen of the example portable computing device, according to various example embodiments of the present invention. As shown, the task detail user interface 701 comprises a task detail portion 702 and a sub-task portion including a plurality of sub-task elements 703a, 703b, and 703c (corresponding to a plurality sub-tasks of the task). In various example embodiments, when one of tasks on the task map user interface 601 is tapped, the task map user interface 601 is switch or transitioned to the task detail user interface 701 to provide or display the task information corresponding to the selected task (i.e., which was tapped). For example, the task detail portion 702 may provide or display detailed information relating to the selected task. Similarly, each sub-task element 703a, 703b, and 703c may provide or display detailed information relating to the corresponding sub-task element.

[0081] In various example embodiments, the task detail user interface 701 may include a first interactive update element (e.g., a first interactive update button) 704, such as in the form of a "Mark Start" button, configured to trigger an update of the status information, such as recording or reporting the start of the task. In various example embodiments, the plurality of sub-task elements 703a, 703b, and 703c may include a plurality of second update elements 705a, 705b, and 705c, respectively, such as in the form of checkboxes, configured to trigger an update of the corresponding sub-task status information, such as recording or reporting the completion time of the corresponding sub-task. For example, when the check box of a subtask is tapped, the completion time 706 may be recorded and/or displayed. If there are multiple sub-tasks which cannot all be displayed in the display screen at once due to the limited display area, the user may scroll the task detail user interface 701 to view the remaining sub-tasks. When a first interactive switch element (e.g., a first interactive switch button 707, such as a back button,) (e.g., corresponding to the first interactive switch element as described hereinbefore according to various embodiments) is tapped, task map user interface 601 may be displayed again. In various example embodiments, the status information of the task information may be updated by each status update triggered by the user, and the status information as updated (e.g., each update) may be transmitted to the task control system at the command center so that the command center is aware of the status of the tasks assigned.

[0082] Accordingly, the method of task management according to various example embodiments advantageously facilitates or enables human resources to better understand the assigned tasks to be performed in an efficient and/or effective manner, such as being able to understand the detailed information relating to a task shown in a task map user interface in an efficient and effective manner, despite the display screen being used having a limited display area.

[0083] FIG. 8 depicts a schematic state transition diagram of an example state machine 800 associated with the method of task management as described hereinbefore with reference to FIGs. 6 and 7, configured to change (or transition) from one state to another in response to certain input(s). In particular, FIG. 8 illustrates the state transition associated with the example state machine 800 based on various inputs shown. The example state machine 800 may include two states, namely, a first state 801 corresponding to the state in which the task map user interface 601 is provided and a second state 802 corresponding to the state in which the task detail user interface 701 is provided. As described hereinbefore, when a task is tapped in the task map user interface 601 at the first state 801, the state changes to the second state 802 of providing the task detail user interface 701. When the first interactive switch button 707 is tapped in the task detail user interface 701 at the second state 802, the state changes to the first state 801 of providing the task map user interface 601.

[0084] By way of an example only and without limitation, FIG. 9 depicts another example task detail user interface 901 (e.g., corresponding to the task detail user interface as described hereinbefore according to various embodiments) provided or displayed on a display screen of another example portable computing device, such as a smart watch, according to various example embodiments of the present invention. In this regard, smart watch has an even smaller display screen than that of a smartphone, hence readable information on the display screen is further limited. In this regard, according to various example embodiments, in the example task detail user screen 901, for example, only the detailed information relating to one sub-task at a time may be displayed on the display screen, for example, a sub-task 902a. In various example embodiments, other sub-tasks such as 902b and 902c may be switched to be displayed in turn on the display screen based on a predetermined user input, such as a predetermined touch, gesture and/or motion input (e.g., a flick motion). For example, based on another user input (e.g., a single tap), the current sub-task may be treated as completed and the next sub-task may be displayed on the display screen.

[0085] By way of an example only and without limitation, FIG. 10 depicts a schematic illustration of another example task detail user interface 1001 (e.g., corresponding to the task detail user interface as described hereinbefore according to various embodiments) provided or displayed on the display screen of the example portable computing device, according to various example embodiments of the present invention. The task detail user interface 1001 may be the same as the task detail user interface 701 as described hereinbefore according to various example embodiments, except that the task detail user interface 1001 further includes a workflow portion (e.g., corresponding to the workflow portion as described hereinbefore according to various embodiments). For example, in the case of an actionable event such as an incident, different types of human resources may be assigned to attend to the incident in a sequential order. In such a scenario, workflow information may be provided in the workflow portion indicating or showing the sequence of tasks, which may be helpful for the user (e.g., the dispatched staff) to understand better the situation. In FIG. 10, for example, three workflow items 1001a, 1001b and 1001c (corresponding to three tasks assigned) are shown in a sequential order. For example, the user of the portable computing device may thus understand the sequence of the tasks. For example, in FIG. 10, and the user may understand that the previous task 1001a is completed (e.g., indicated by a first predetermined format or style such as being filled with grey colour) and the user's assigned task 1001b may be indicated by a second predetermined format or style such as with a bold outline.

[0086] By way of an example only and without limitation, FIG. 11 depicts a schematic illustration of another example task map user interface 1101 (e.g., corresponding to the task map user interface as described hereinbefore according to various embodiments) provided or displayed on the display screen of the example portable computing device, according to various example embodiments of the present invention. The example task map user interface 1101 may be the same as the example task map user interface 601 as described hereinbefore or the example task map user interface 1301 as will be described later below according to various example embodiments, except that the task detail user interface 1101 further includes a route indication from one task to the immediate next task amongst the tasks. In particular, by connecting immediate adjacent tasks on the map portion with a route indication, such as in the form of an arrow 1101a or 1101b, the user is able to better understand the

sequence of the tasks. It is also helpful to show the result of route search when the user taps the route indication.

[0087] By way of an example only and without limitation, FIG. 12 depicts a schematic illustration of a task list user interface 1201 (e.g., corresponding to the task list user interface as described hereinbefore according to various embodiments) provided or displayed on a display screen of the example portable computing device (e.g., a smartphone), according to various example embodiments of the present invention. As shown in FIG. 12, the task list user interface 1201 comprises a plurality of list elements 1202a, 1202b, 1202c corresponding to a plurality of task items, respectively, displayed in the form of a list. In various example embodiments, the plurality of list elements 1202a, 1202b, 1202c may be generated based on the plurality of task items included in the task information, such as shown in FIG. 5. In various example embodiments, the task list user interface 1201 may further comprise a third interactive switch element (e.g., a third interactive switch button 1203, such as a "MAP" button) (e.g., corresponding to the third interactive switch element as described hereinbefore according to various embodiments).

[0088] By way of an example only and without limitation, FIG. 13 depicts a schematic illustration of an example task map user interface 1301 (e.g., corresponding to the task map user interface as described hereinbefore according to various embodiments) provided or displayed on the display screen of the example portable computing device, according to various example embodiments of the present invention. The task map user interface 1301 may be the same as the example task map user interface 601 as described hereinbefore according to various example embodiments, except that the task map user interface 1301 further comprises a second interactive switch element (e.g., a second interactive switch button 1303, such as a "LIST" button) (e.g., corresponding to the second interactive switch element as described hereinbefore according to various embodiments).

[0089] FIG. 14 depicts a schematic state transition diagram of an example state machine 1400 according to the method of task management as described hereinbefore with reference to FIGs 12 and 13, configured to change (or transition) from one state to another in response to certain input(s). In particular, FIG. 14 illustrates the state transition associated with the example state machine 1400 based on various inputs shown. The example state machine 1400 may include three states, namely, a first state 1401 (e.g., corresponding to the first state 801) corresponding to the state in which the

task map user interface 1301 is provided, a second state 1402 (e.g., corresponding to the second state 802) corresponding to the state in which the task detail user interface 701 is provided, and a third state 1403 corresponding to the state in which the task list user interface 1201 is provided. Similarly, as described hereinbefore, when a task is tapped in the task map user interface 1301 at the first state 1401, the state changes to the second state 1402 of providing the task detail user interface 701 corresponding to the selected task. When the first interactive switch button 707 in the task detail user interface 701 is tapped at the second state 1402, the state changes to the first state 1401 of providing the task map user interface 1301. Furthermore, when a task is tapped in the task list user interface 1201 in the third state 1403, the state changes to the second state 1402 of providing the task detail user interface 701 corresponding to the selected task. When the first interactive switch button 707 in the task detail user interface 701 is tapped at the second state 1402, the state changes to the third state 1403 of providing the task list user interface 1201. When the second interactive switch button 1303 in the task map user interface 1301 is tapped at the first state 1401, the state changes to the third state 1403 of providing the task list user interface 1201. When the third interactive switch button 1203 in the task list user interface 1201 is tapped at the third state, the state changes to the first state 1401 of providing the task map user interface 1301. In various example embodiments, in relation to the first interactive switch button 707 in the task detail user interface 701, to realize the above-mentioned transitions, the state machine 1400 may be further configured to switch from the second state 1402 to the first state 1401 or switch from the second state 1402 to the third state 1403, based on whether the immediate previous state of the state machine 1400. In various example embodiments, if the immediate previous state of the state machine 1400 is the first state 1401, the state machine 1400 may be configured to switch from the second state 1402 to back to the first state 1401. On the other hand, if the immediate previous state of the state machine 1400 is the third state 1403, the state machine 1400 may be configured to switch from the second state 1402 to back to the third state 1403.

[0090] Accordingly, not only the user is able to better understand the locations of the plurality of tasks assigned to the user (based on the task map user interface 1301) and the detailed information relating to the selected task (based on the task detail user interface 707), the user is further able to efficiently and/or effectively grasp or obtain a summary of the plurality of tasks (corresponding to the plurality of tasks assigned to the user) (based on the task list user interface 1201), thereby further facilitating or

enabling human resources to better understand the assigned tasks in an efficient and/or effective manner, for example, despite the display screen being used having a limited display area, thus improving or enhancing efficiency and/or effectiveness in task management and utilization of human resources.

[0091] FIG. 15 depicts a schematic drawing of a network system 1500 for task management according to various example embodiments of the present invention. The network system 1500 comprises a plurality of systems 1502, each system being the system for task management (e.g., corresponding to the system 200 as shown in FIGs. 2 and 4) as described hereinbefore according to various example embodiments and is associated with a respective user 1503; and a task control system (or automatic dispatching system) 1501 (e.g., corresponding to the system for task or workflow assignment mentioned hereinbefore) configured to communicate with the plurality of systems 1502 via a wired or wireless communication network. The task control system 1501 comprises: a memory; and at least one processor communicatively coupled to the memory and configured to transmit, to each of the plurality of systems 1502, task information comprising a plurality of task items. The task information for the respective user may then be conveyed or presented to the respective user, at the system (e.g., portable computing device) of the respective user, in the manner as described hereinbefore according to various example embodiments of the present invention. For example, the network system 1500 may comprise the task control system (e.g., automatic dispatching system) 1501 may be in a command center and the plurality of systems 1502 in the form of portable computing devices associated with a plurality of users (e.g., ground staff or dispatched staff) 1503, respectively. The task control system 1501 may be configured to communicate task information to the plurality of portable computing devices 1502 associated with the plurality of users 1503 to inform or notify the plurality of users 1503 of their assigned tasks required to be performed.

[0092] By way of an example only and without limitation, FIG. 16 depicts a schematic illustration of another example task map user interface 1601 displayed on the display screen of the example portable computing device, according to various example embodiments of the present invention. The example task map user interface 1601 may be the same as the example task map user interface 601 or the example task map user interface 1301, except that the example task map user interface 1601 further comprises one or more task elements corresponding one or more task items assigned to another user (e.g., another staff). For example, in FIG. 16, task elements 602a, 602b, 602c may

correspond to tasks assigned to a first user (e.g., a first staff) and task elements 1601a, 1601b may correspond to tasks assigned to a second user (e.g., a second staff). Accordingly, in the display screen of the portable computing device associated with the first user, the first user may not only see his/her own tasks but also see another user's tasks. In various example embodiments, the other user's tasks may be displayed constantly or the visibility may be switched (e.g., on or off) by an interactive element or button.

[0093] By way of an example only and without limitation, FIG. 17 depicts a schematic illustration of an event report user interface 1701 displayed on the display screen of the example portable computing device, according to various example embodiments of the present invention. In various example embodiments, the event report user interface 1701 may be configured to facilitate or enable a user to report any actionable events (e.g., incidents, accidents, alerts, and so on) in the form of an event report to the task control system 1501 in the command center. For example, the event report user interface 1701 may include an event type field, a priority field, a high alert check box (e.g., panic alert), a title field, a description field, and media upload options (e.g., picture, video, sound and so on) and so on. For example, based on such an event report information, the task control system 1501 and/or the management staff in the command center may determine the tasks required to handle or resolve the incident and assign tasks to one or more individuals or ground staff to attend to the incident by transmitting corresponding task information including task items to one or more portable computing devices associated with the one or more individuals.

[0094] In various example embodiments, based on updated status information received (or the lack of an updated status information) from a user, if an assigned task has taken shorter or longer than expected to complete, the task control system 1501 and/or the management staff in the command center may change or modify the assignment of the task, such as to a different individual or to additional individual(s). In this regard, the task control system 1501 may update the task information or generate new task information and send it to the relevant individual(s) to carry out. By way of an example only and without limitation, this may apply to cases where the transit time changes due to unexpected events such as traffic congestions.

[0095] It will be appreciated by a person skilled in the art that the system for task management described herein according to various embodiments is not limited to a smartphone, a smart watch or a HMD device, and may be applied to any portable

computing system having communication functionality or capability and a display screen, such as but not limited to, a tablet, a car navigation system, a compact projector and so on. It will also be appreciated by a person skilled in the art that various user inputs to the GUIs are not limited to tap, flick, click or voice/sound. For example, in various example embodiments, screen or display transition may also be automatically executed without tap or flick such as by judging or detecting surrounding circumstances or situation using a sensor or a camera.

[0096] While embodiments of the invention have been particularly shown and described with reference to specific embodiments, it should be understood by those skilled in the art that various changes in form and detail may be made therein without departing from the spirit and scope of the invention as defined by the appended claims. The scope of the invention is thus indicated by the appended claims and all changes which come within the meaning and range of equivalency of the claims are therefore intended to be embraced.

CLAIMS

What is claimed is:

1. A method of task management using at least one processor, the method comprising:

receiving task information comprising a plurality of task items;

providing, at a first state of a state machine, a task map user interface based on the task information, the task map user interface comprising a map portion, the map portion comprising a plurality of task elements at a plurality of positions, respectively, thereon, the plurality of task elements corresponding to the plurality of task items, respectively; and

switching, in response to a first user input selecting a first switch option with respect to one of the plurality of task elements in the task map user interface and based on the state machine, from said providing, at the first state of the state machine, the task map user interface to providing, at a second state of the state machine, a task detail user interface, the task detail user interface corresponding to the task item corresponding to the selected task element and is configured to provide detailed information relating to the task item corresponding to the selected task element.

2. The method according to claim 1, further comprising:

switching, in response to a second user input selecting a second switch option with respect to the task detail user interface and based on the state machine, from said providing, at the second state of the state machine, the task detail user interface to said providing, at the first state of the state machine, the task map user interface based on the task information.

3. The method according to claim 1 or 2, further comprising:

switching, in response to a third user input selecting a third switch option with respect to the task map user interface and based on the state machine, from said providing, at the first state of the state machine, the task map user interface to providing, at a third state of the state machine, a task list user interface based on the task information, the task list user interface comprising a list portion, the list portion

comprising a plurality of list elements, the plurality of list elements corresponding to the plurality of task items, respectively.

4. The method according to claim 3, further comprising:

switching, in response to a fourth user input selecting a fourth switch option with respect to the task list user interface and based on the state machine, from said providing, at the third state of the state machine, the task list user interface to said providing, at the first state of the state machine, the task map user interface based on the task information.

5. The method according to claim 1 or 2, further comprising:

switching, in response to a fifth user input selecting a fifth switch option with respect to the task detail user interface and based on the state machine, from said providing, at the second state of the state machine, the task detail user interface to providing, at a third state of the state machine, a task list user interface based on the task information, the task list user interface comprising a list portion, the list portion comprising a plurality of list elements, the plurality of list elements corresponding to the plurality of task items, respectively.

6. The method according to claim 5, further comprising:

switching, in response to a sixth user input selecting a sixth switch option with respect to one of the plurality of list elements in the task list user interface and based on the state machine, from said providing, at the third state of the state machine, the task list user interface to providing, at the second state of the state machine, a task detail user interface, the task detail user interface corresponding to the task item corresponding to the selected list element and is configured to provide detailed information relating to the task item corresponding to the selected list element.

7. The method according to any one of claims 3 to 6, wherein

each of the plurality of task items comprises identity information and location information relating to the task item, and

each of the plurality of task elements is configured at the respective position in the map portion based on the location information relating to the corresponding task item.

8. The method according to claim 7, wherein

for each of the plurality of task elements, the position of the task element in the map portion corresponds a location in an area at which a task corresponding to the task item is performed or to be performed.

9. The method according to claim 7 or 8, wherein

each of the plurality of task items further includes status information relating to the task item, and

the method further comprises updating, in response to a seventh user input selecting a first status update option with respect to the task detail user interface, the status information relating to the task item corresponding to the task detail user interface.

10. The method according to claim 9, wherein

at least one of the plurality of task items comprises a plurality of sub-task items, and

the task detail user interface corresponds to one of said at least one of the plurality of task items, and comprises a sub-task portion, the sub-task portion comprising a plurality of sub-task elements corresponding to the plurality of sub-task items, respectively, of the task item, each sub-task element configured to provide detailed information relating to the corresponding sub-task item of the task item.

11. The method according to claim 10, wherein

for each of said at least one of the plurality of task items, the status information relating to the task item comprises a plurality of sub-status information corresponding to the plurality of sub-task items, respectively, of the task item, and

the method further comprising:

updating, in response to an eighth user input selecting a second status update option with respect to one of the plurality of sub-task elements in the task detail user interface, the corresponding sub-status information relating to the selected sub-task element.

12. The method according to any one of claims 9 to 11, further comprising:

transmitting the status information relating to the task item as updated.

13. The method according to any one of claims 7 to 12, wherein

the task detail user interface comprises a workflow portion, the workflow portion comprises a plurality of workflow elements arranged in a sequential order, each workflow element corresponding to a task item, and

one of the plurality of workflow elements corresponds to the task item corresponding to the task detail user interface.

14. The method according to any one of claims 1 to 13, wherein

the task information is received by a portable computing device associated with a user, the portable computing device comprising said at least one processor and a display screen,

said providing, at the first state of the state machine, the task map user interface comprises providing, at the display screen of the portable computing device, the task map user interface for display thereon to the user, and

said switching, in response to the first user input selecting the first switch option with respect to said one of the plurality of task elements in the task map user interface and based on the state machine, comprises switching to provide, at the display screen of the portable computing device, the task detail user interface for display thereon to the user.

15. A system for task management, the system comprising:

a memory; and

at least one processor communicatively coupled to the memory and configured to:

receive task information comprising a plurality of task items;

provide, at a first state of a state machine, a task map user interface based on the task information, the task map user interface comprising a map portion, the map portion comprising a plurality of task elements at a plurality of positions, respectively, thereon, the plurality of task elements corresponding to the plurality of task items, respectively; and

switch, in response to a first user input selecting a first switch option with respect to one of the plurality of task elements in the task map user interface and

based on the state machine, from said provide, at the first state of the state machine, the task map user interface to provide, at a second state of the state machine, a task detail user interface, the task detail user interface corresponding to the task item corresponding to the selected task element and is configured to provide detailed information relating to the task item corresponding to the selected task element.

16. The system according to claim 15, wherein the at least one processor is further configured to:

switch, in response to a second user input selecting a second switch option with respect to the task detail user interface and based on the state machine, from said providing, at the second state of the state machine, the task detail user interface to said providing, at the first state of the state machine, the task map user interface based on the task information.

17. The system according to claim 15 or 16, wherein the at least one processor is further configured to:

switch, in response to a third user input selecting a third switch option with respect to the task map user interface and based on the state machine, from said provide, at the first state of the state machine, the task map user interface to provide, at a third state of the state machine, a task list user interface based on the task information, the task list user interface comprising a list portion, the list portion comprising a plurality of list elements, the plurality of list elements corresponding to the plurality of task items, respectively.

18. The system according to claim 17, wherein the at least one processor is further configured to:

switch, in response to a fourth user input selecting a fourth switch option with respect to the task list user interface and based on the state machine, from said provide, at the third state of the state machine, the task list user interface to said provide, at the first state of the state machine, the task map user interface based on the task information.

19. The system according to claim 15 or 16, wherein the at least one processor is further configured to:

switch, in response to a fifth user input selecting a fifth switch option with respect to the task detail user interface and based on the state machine, from said provide, at the second state of the state machine, the task detail user interface to provide, at a third state of the state machine, a task list user interface based on the task information, the task list user interface comprising a list portion, the list portion comprising a plurality of list elements, the plurality of list elements corresponding to the plurality of task items, respectively.

20. The system according to claim 19, wherein the at least one processor is further configured to:

switch, in response to a sixth user input selecting a sixth switch option with respect to one of the plurality of list elements in the task list user interface and based on the state machine, from said provide, at the third state of the state machine, the task list user interface to provide, at the second state of the state machine, a task detail user interface, the task detail user interface corresponding to the task item corresponding to the selected list element and is configured to provide detailed information relating to the task item corresponding to the selected list element.

21. A network system for distributed task management, the network system comprising:

a plurality of systems, each system being the system for task management according to any one of claims 15 to 20 and is associated with a respective user; and

a task control system configured to communicate with the plurality of systems via a wireless communication network, the task control system comprising:

a memory; and

at least one processor communicatively coupled to the memory and configured to:

transmit, to each of the plurality of systems, task information comprising a plurality of task items.

22. A computer program product, embodied in one or more non-transitory computer-readable storage mediums, comprising instructions executable by at least one processor to perform a method of task management according to any one of claims 1 to 14.

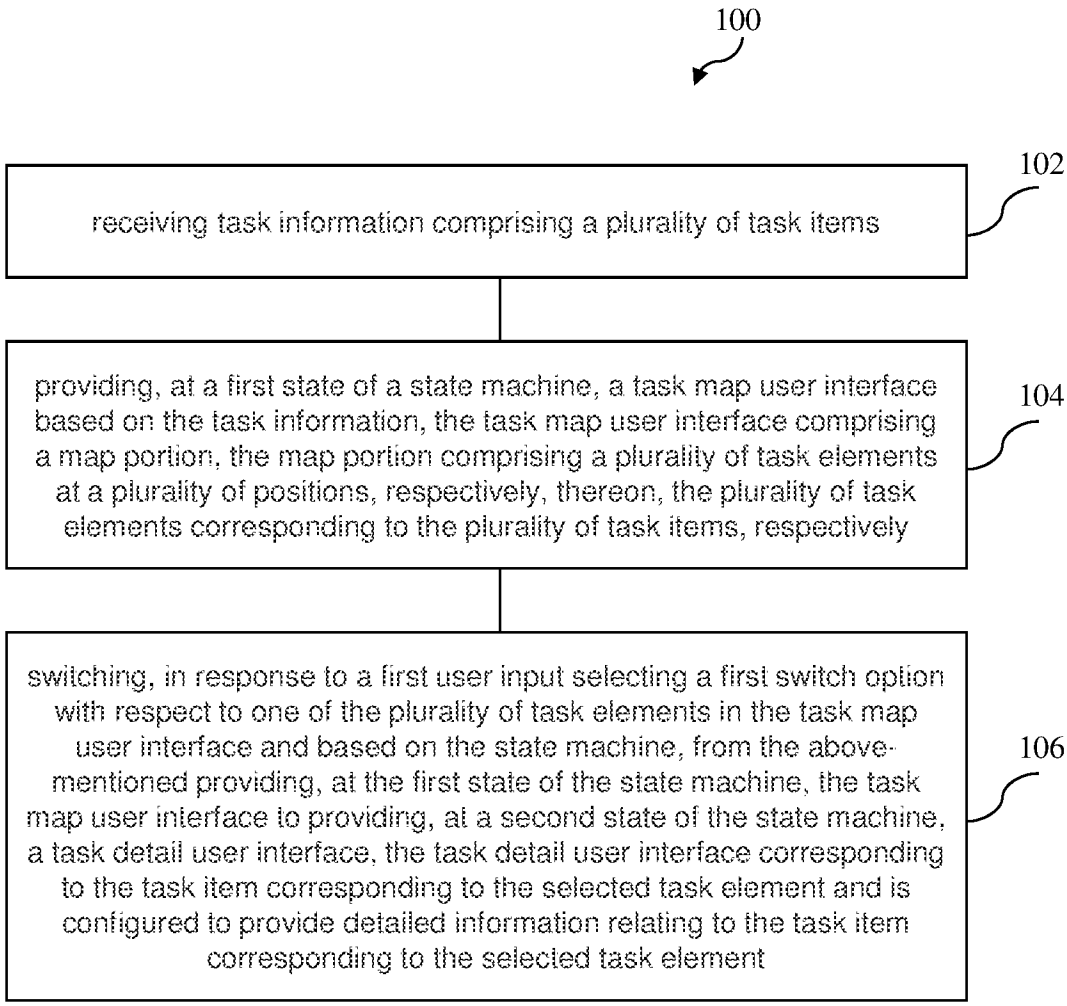

100
receiving task information comprising a plurality of task items
102
providing, at a first state of a state machine, a task map user interface based on the task information, the task map user interface comprising a map portion, the map portion comprising a plurality of task elements at a plurality of positions, respectively, thereon, the plurality of task elements corresponding to the plurality of task items, respectively
104
switching, in response to a first user input selecting a first switch option with respect to one of the plurality of task elements in the task map user interface and based on the state machine, from the above-mentioned providing, at the first state of the state machine, the task map user interface to providing, at a second state of the state machine, a task detail user interface, the task detail user interface corresponding to the task item corresponding to the selected task element and is configured to provide detailed information relating to the task item corresponding to the selected task element
106

FIG. 1

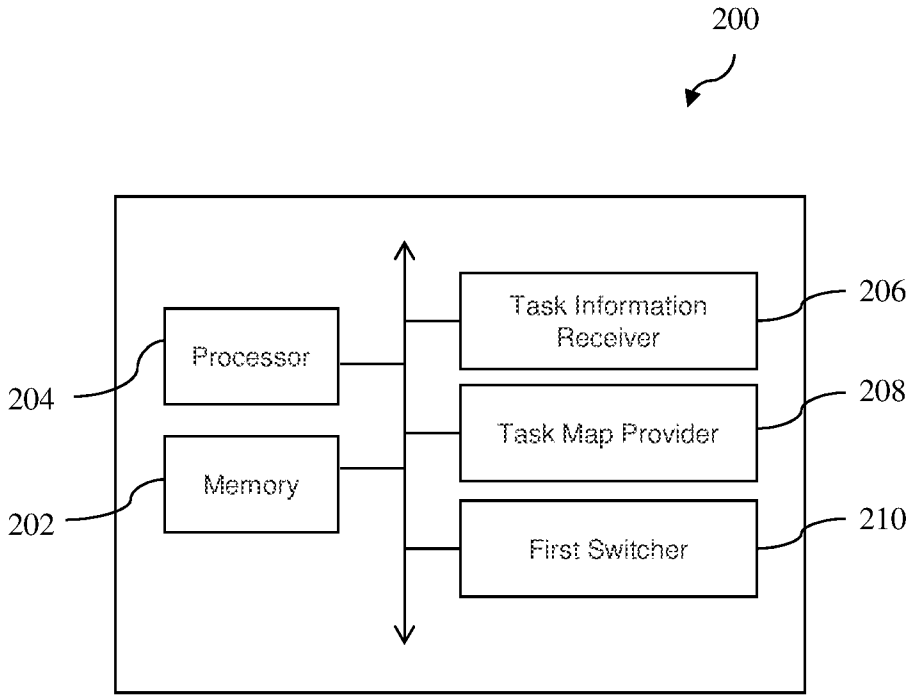

200
Processor
Memory
Task Information Receiver
Task Map Provider
First Switcher
204
202
206
208
210

FIG. 2

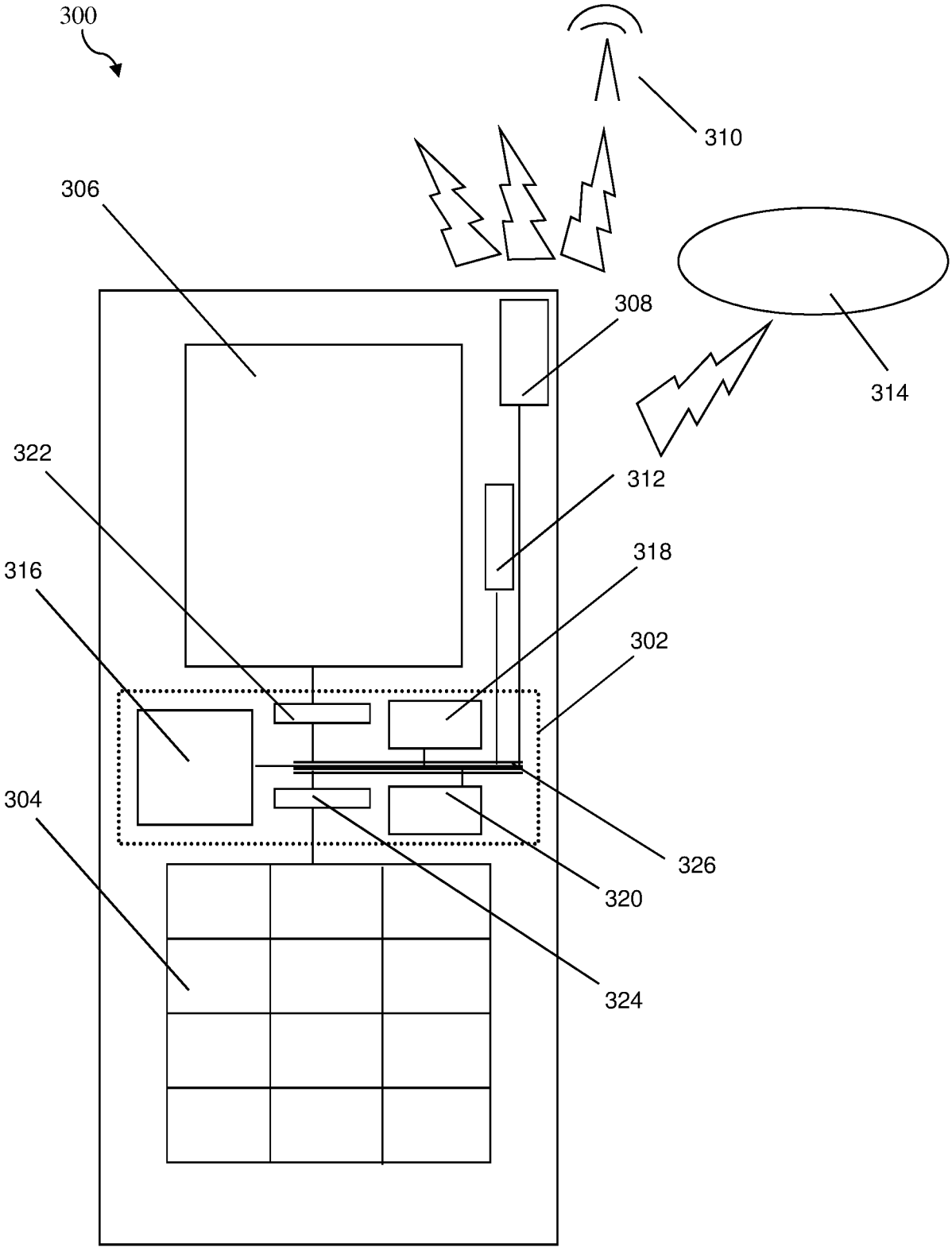


FIG. 3

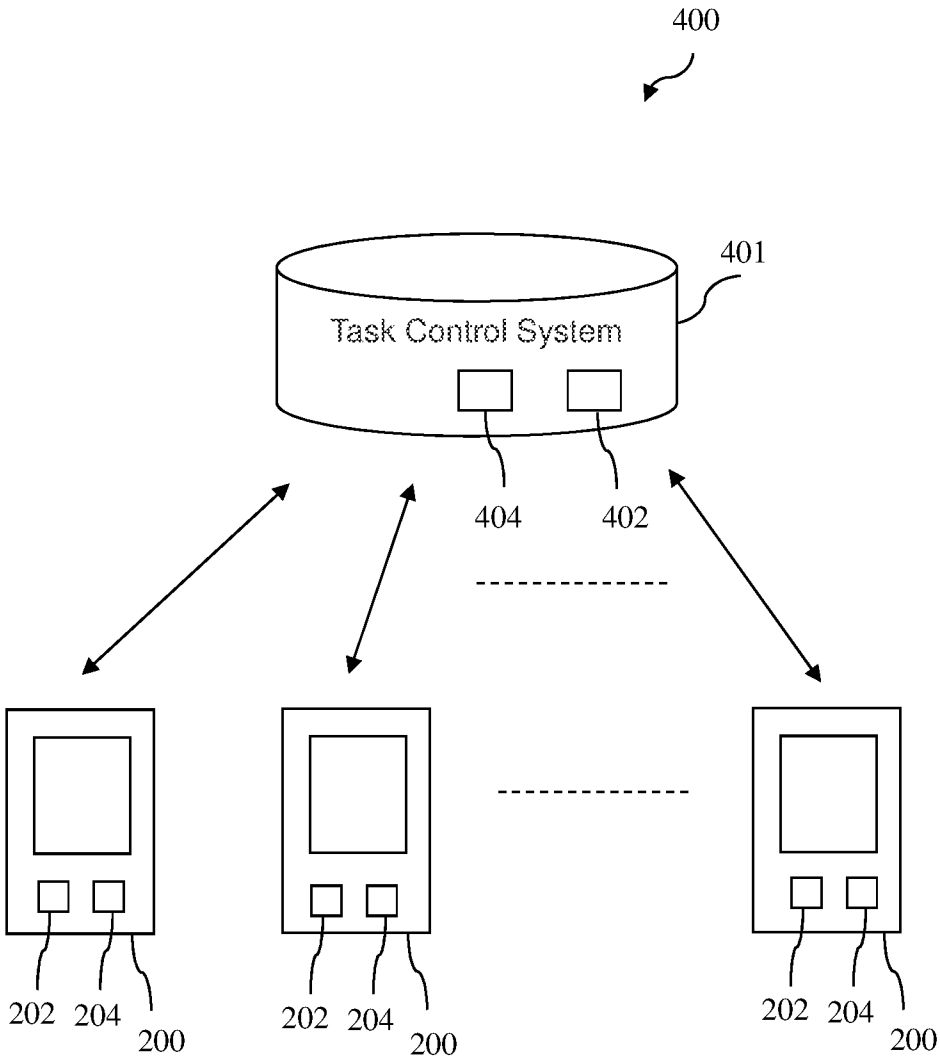

400
401
Task Control System
404
402
202
204
200
202
204
200
202
204
200

FIG. 4

No	Event and task	Location	Time	Priority	Detail	Status
A1	Health emergency	Latitude: 1.367165350 Longitude: 103.801163323 Altitude : 11.52	Travel: 8 Work: 21	Critical	Sub task 1: xxxxx Sub task 2: yyyyyy Sub task 3: zzzzz	Completed Completed Completed
A2	Health emergency	Latitude: 1.367165198 Longitude: 103.801163462 Altitude : 24.31	Travel: 12 Work: 15	Critical	Sub task 1: xxxxx Sub task 2: yyyyyy Sub task 3: zzzzz	In Progress New New
A3	Health emergency	Latitude: 1.367165402 Longitude: 103.801163305 Altitude : 9.78	Travel: 9 Work: 35	Critical	Sub task 1: xxxxx Sub task 2: yyyyyy Sub task 3: zzzzz	New New New

FIG. 5

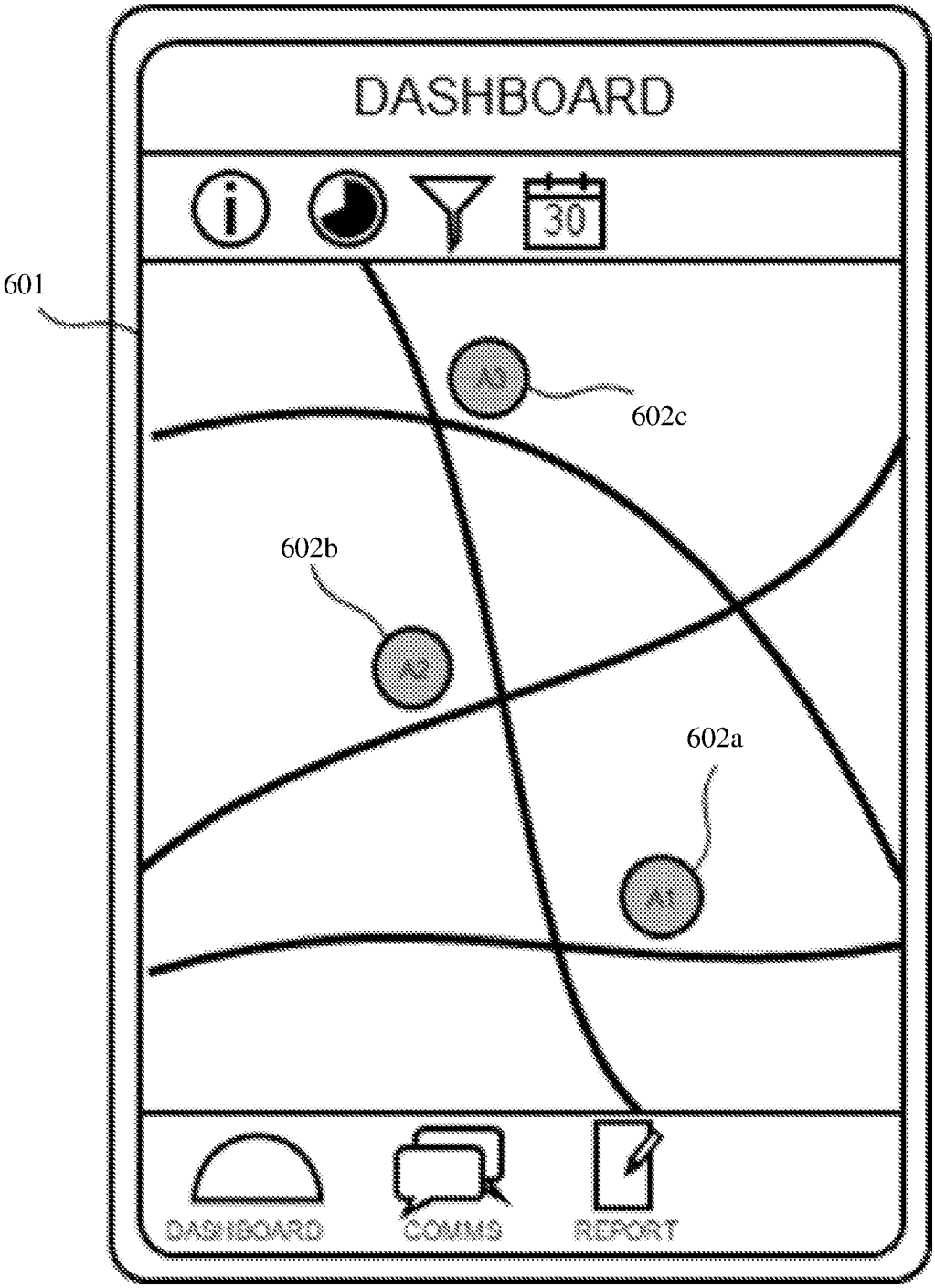


FIG. 6

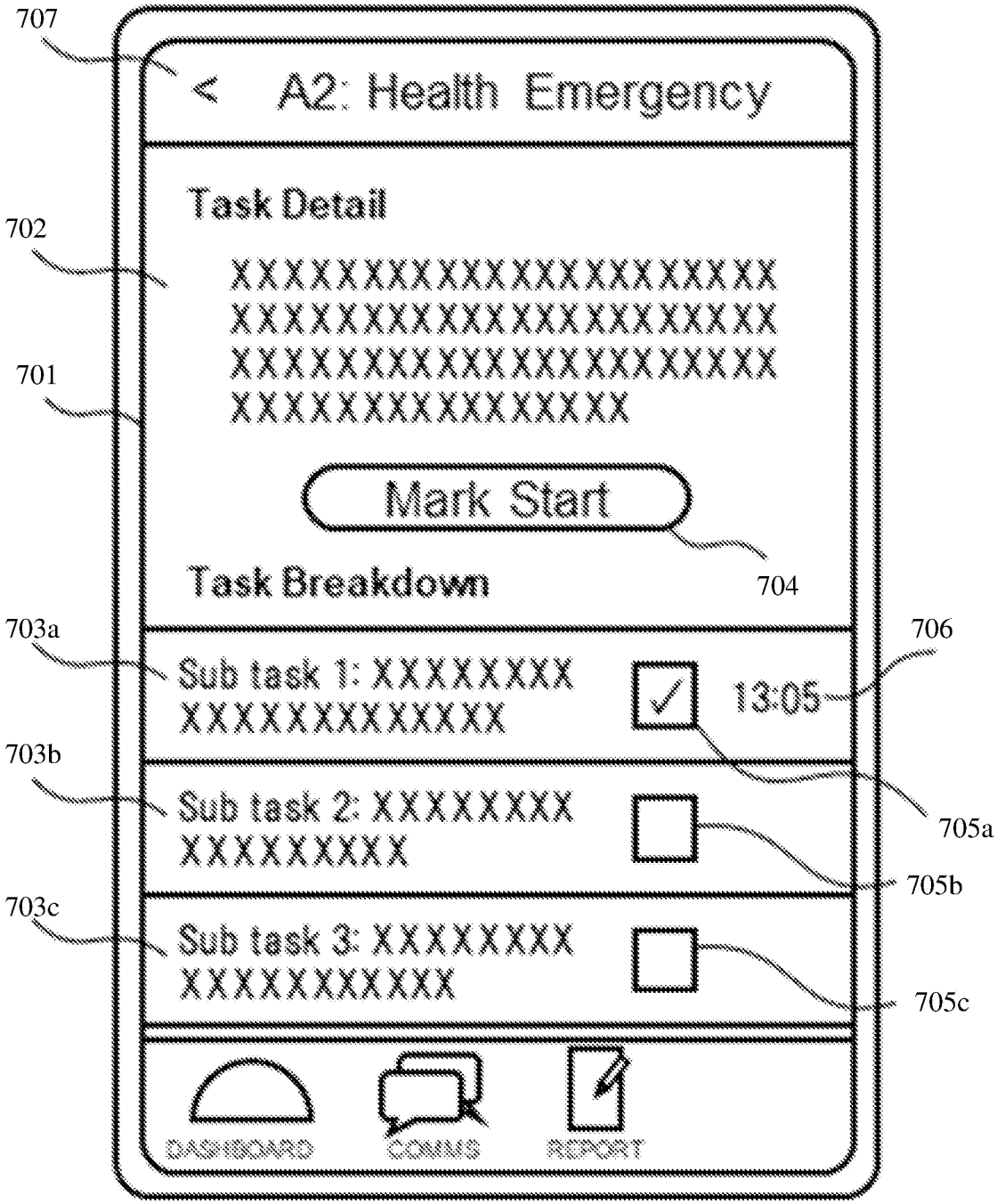

707
< A2: Health Emergency
Task Detail
702
XXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXX
701
Mark Start
704
Task Breakdown
703a
Sub task 1: XXXXXXXX
XXXXXXXXXXXX
706
13:05
705a
703b
Sub task 2: XXXXXXXX
XXXXXXXXX
705b
703c
Sub task 3: XXXXXXXX
XXXXXXXXXXX
705c
DASHBOARD
COMMS
REPORT

FIG. 7

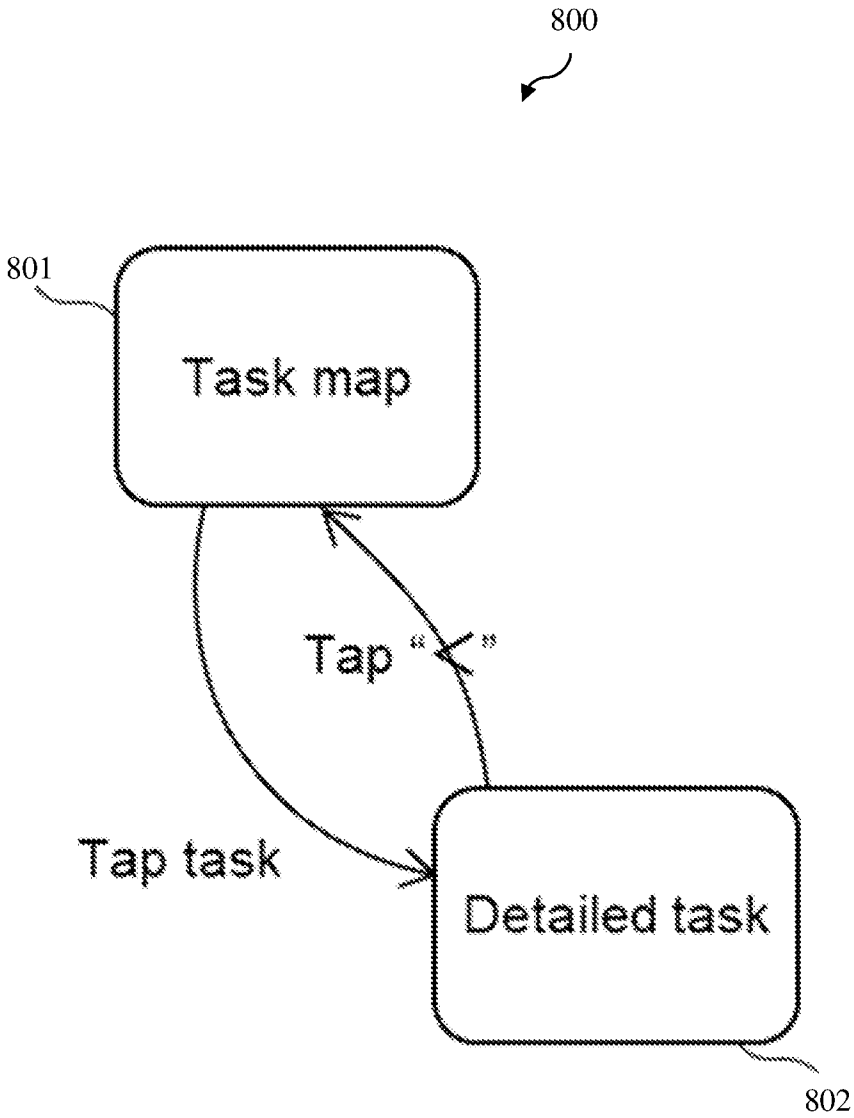


FIG. 8

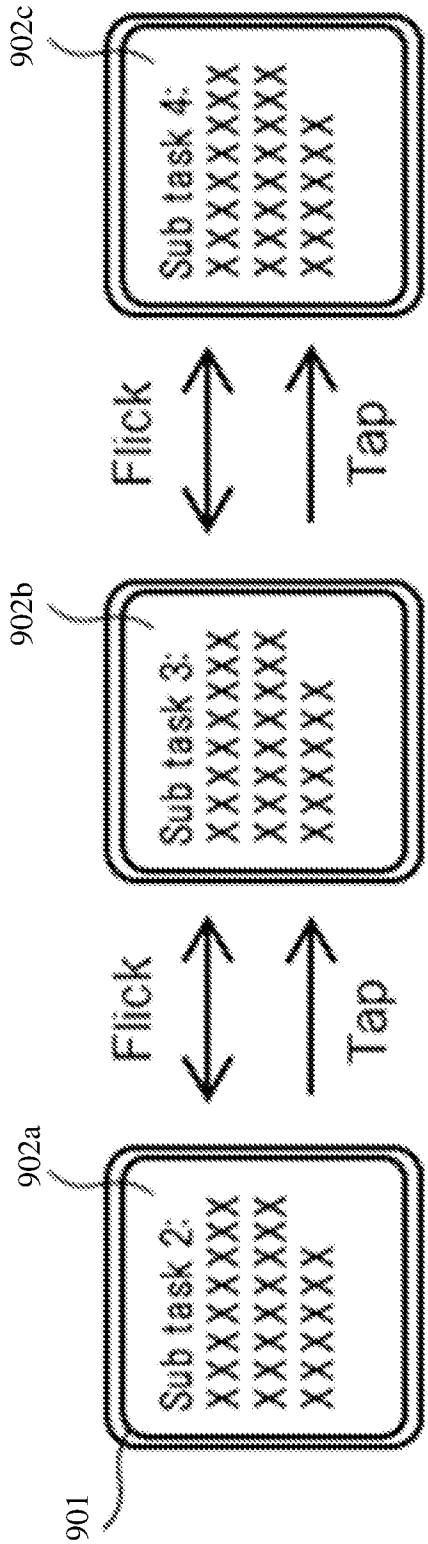

901
902a
Sub task 2:
XXXXXXXX
XXXXXXXX
XXXXXX
Flick
Tap
902b
Sub task 3:
XXXXXXXX
XXXXXXXX
XXXXXX
Flick
Tap
902c
Sub task 4:
XXXXXXXX
XXXXXXXX
XXXXXX

FIG. 9

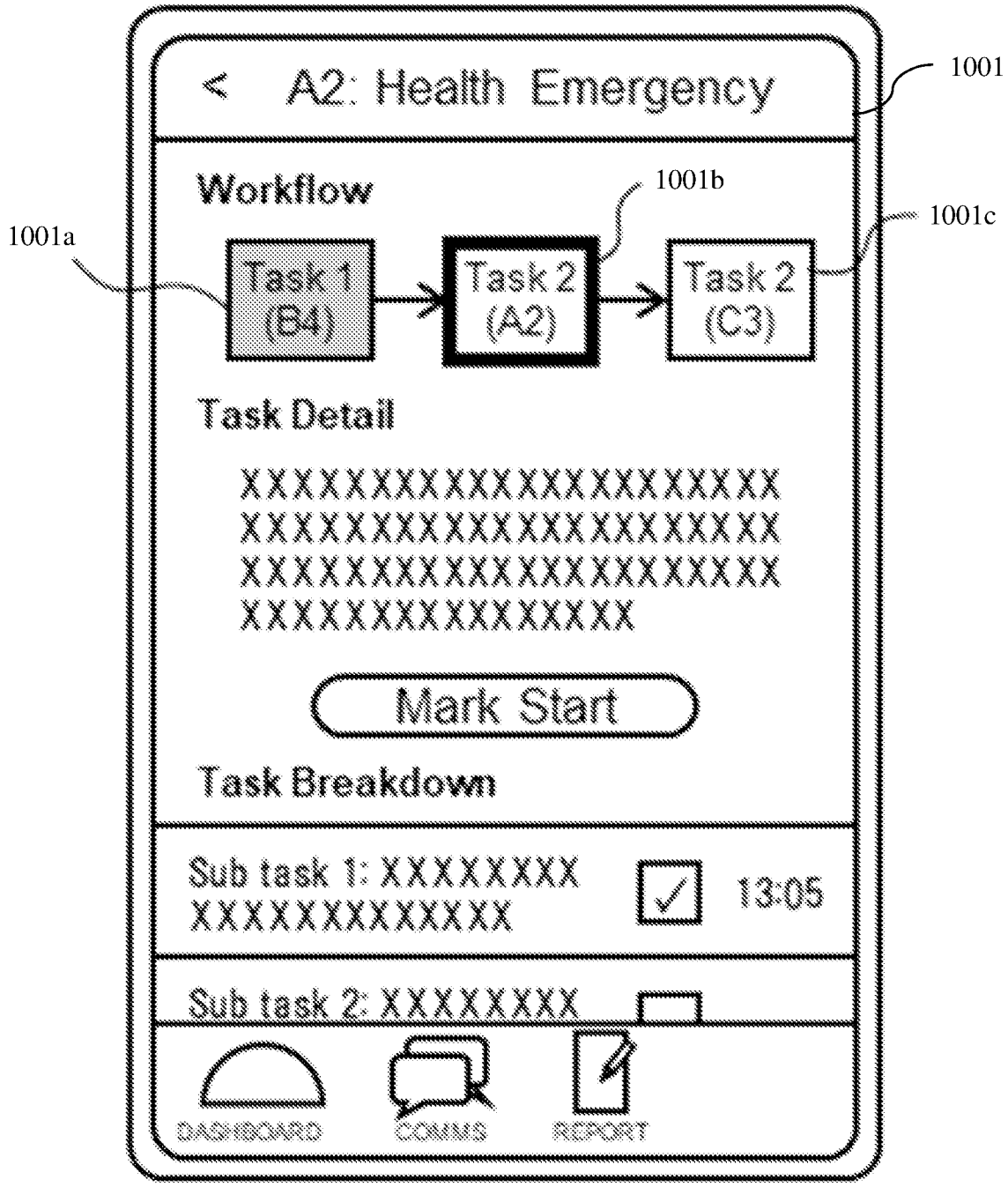

< A2: Health Emergency
1001
Workflow
1001b
1001c
1001a
Task 1 (E4)
Task 2 (A2)
Task 2 (C3)
Task Detail
XXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXX
Mark Start
Task Breakdown
Sub task 1: XXXXXXXX
XXXXXXXXXXXX
13:05
Sub task 2: XXXXXXXX
DASHBOARD
COMMS
REPORT

FIG. 10

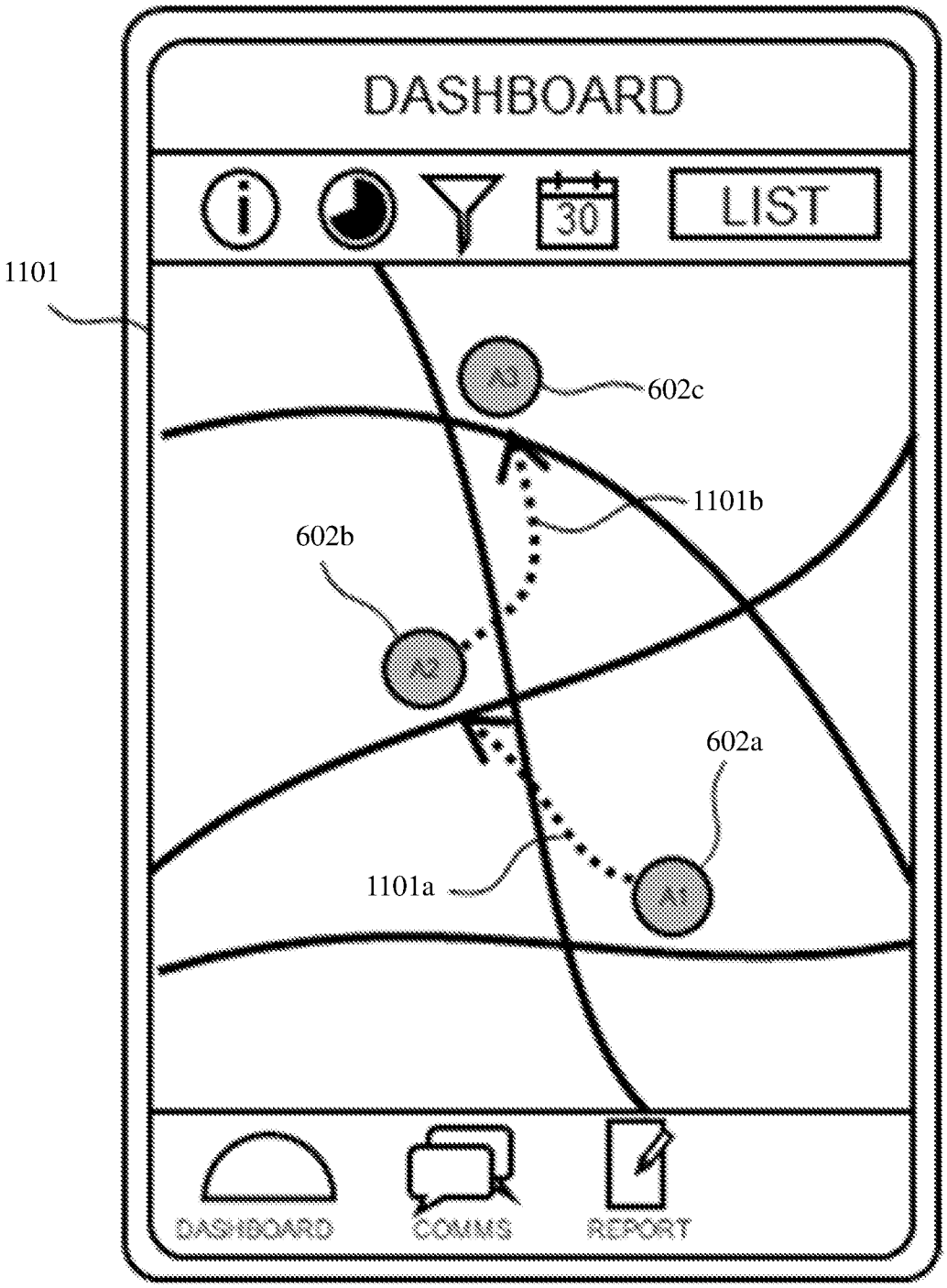

DASHBOARD
30
LIST
1101
602c
1101b
602b
602a
1101a
DASHBOARD
COMMS
REPORT

FIG. 11

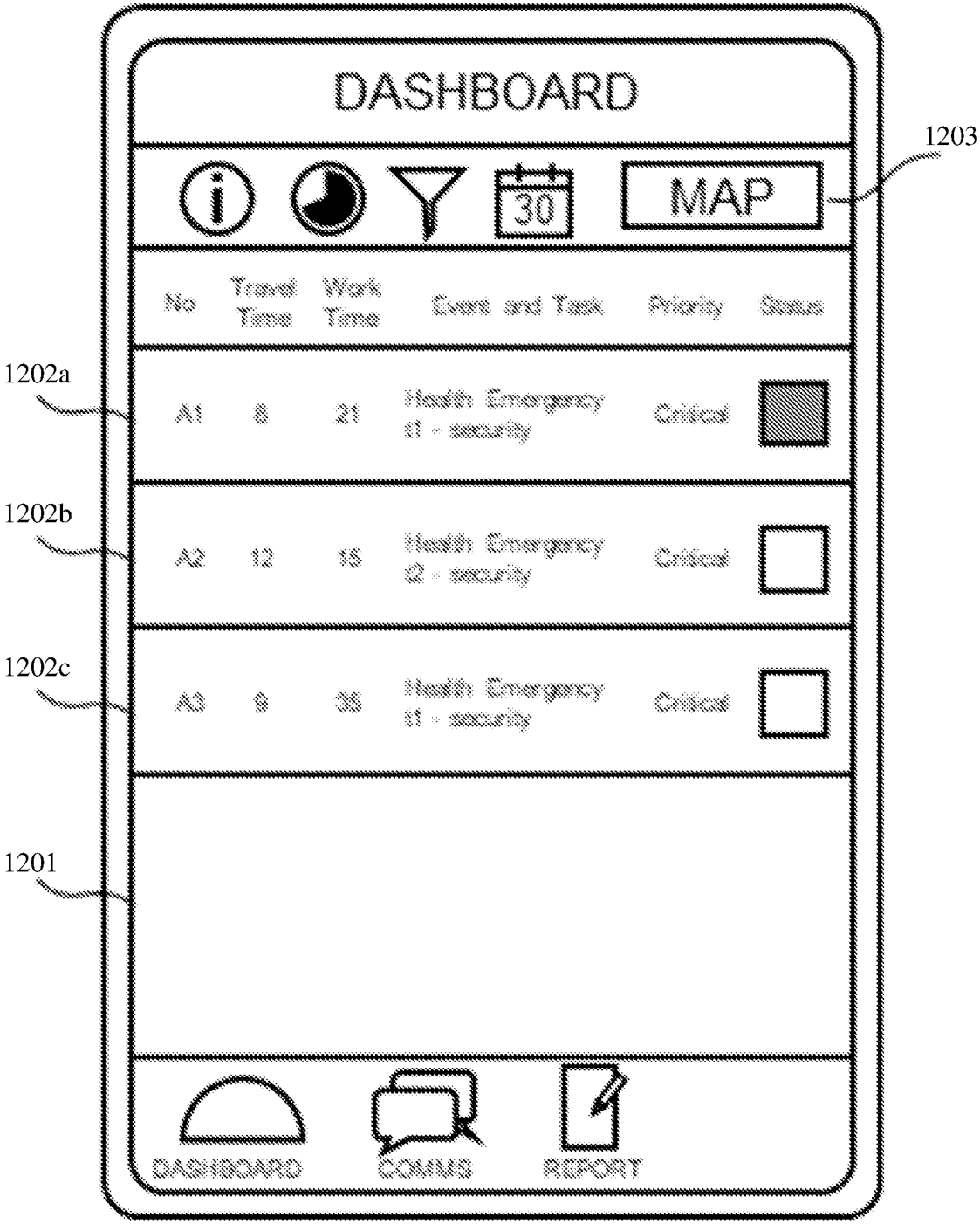

DASHBOARD
MAP
30
No
Travel Time
Work Time
Event and Task
Priority
Status
A1
8
21
Health Emergency
t1 - security
Critical
A2
12
15
Health Emergency
t2 - security
Critical
A3
9
35
Health Emergency
t1 - security
Critical
DASHBOARD
COMMS
REPORT
1201
1202a
1202b
1202c
1203

FIG. 12

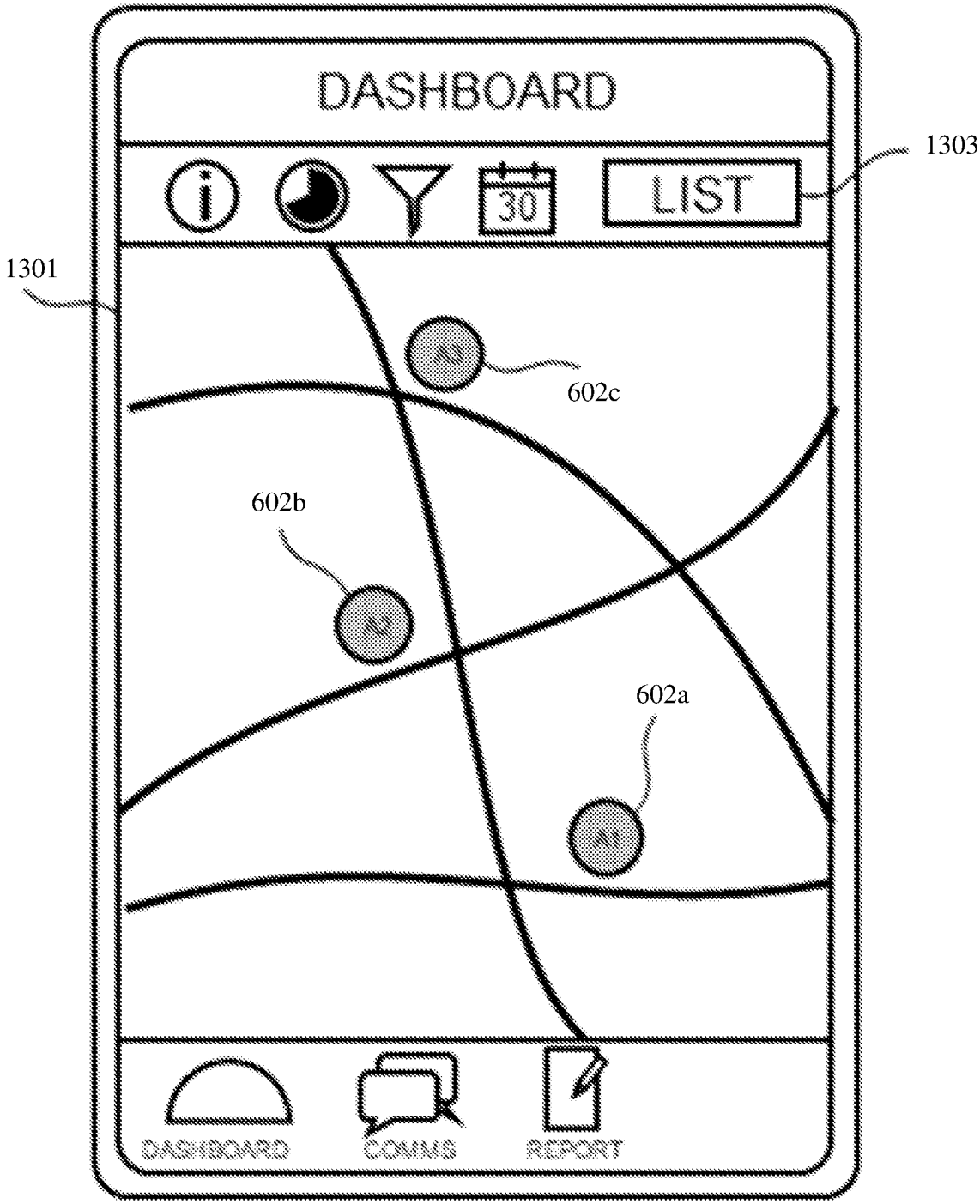

DASHBOARD
30
LIST
1303
1301
602c
602b
602a
DASHBOARD
COUNS
REPORT

FIG. 13

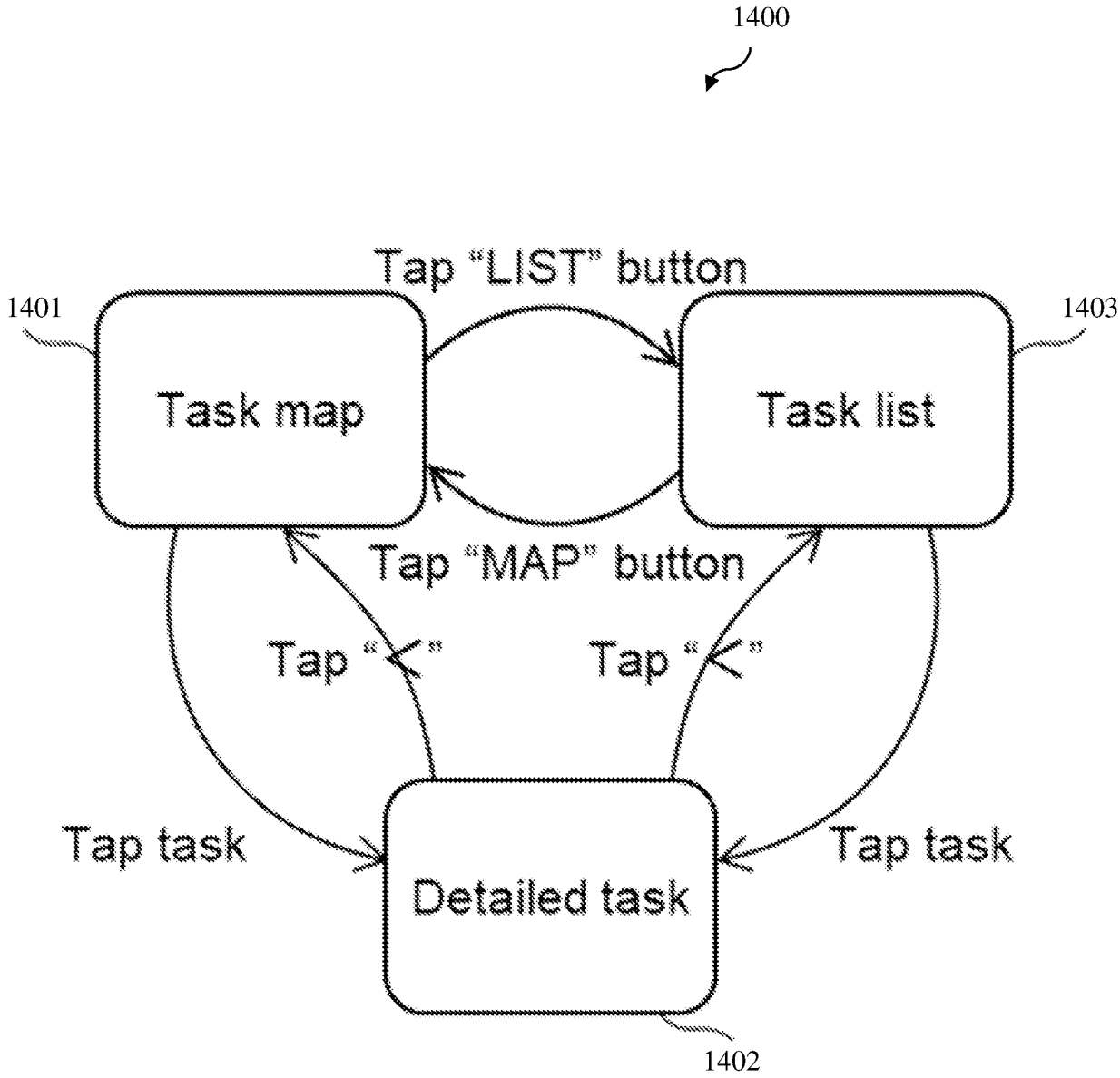

1400
Tap "LIST" button
1401
1403
Task map
Task list
Tap "MAP" button
Tap "
"
Tap "
"
Tap task
Tap task
Detailed task
1402

FIG. 14

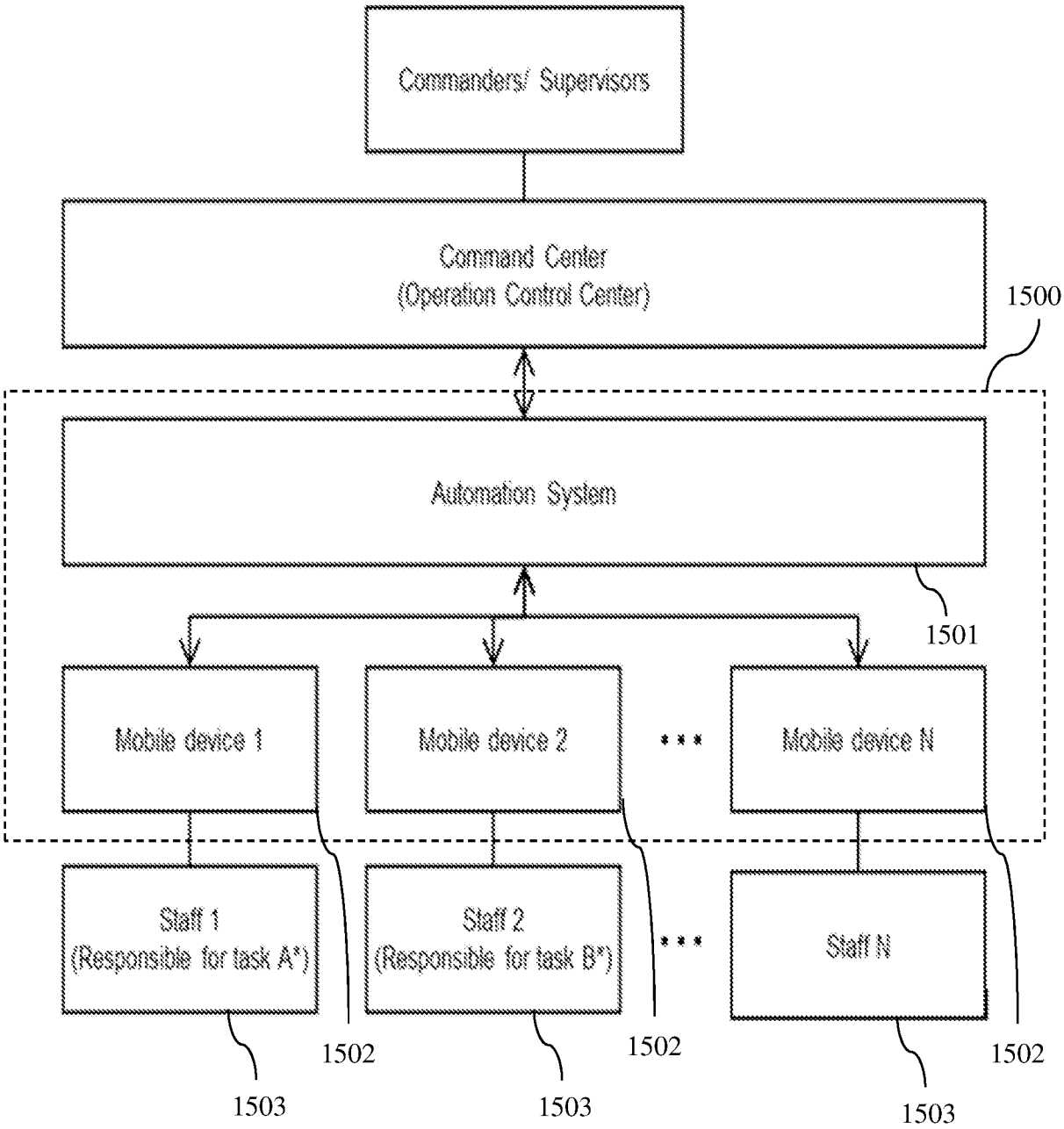

Commanders/ Supervisors
Command Center
(Operation Control Center)
1500
Automation System
1501
Mobile device 1
Mobile device 2
Mobile device N
Staff 1
(Responsible for task A*)
Staff 2
(Responsible for task B*)
Staff N
1502
1502
1502
1503
1503
1503

FIG. 15

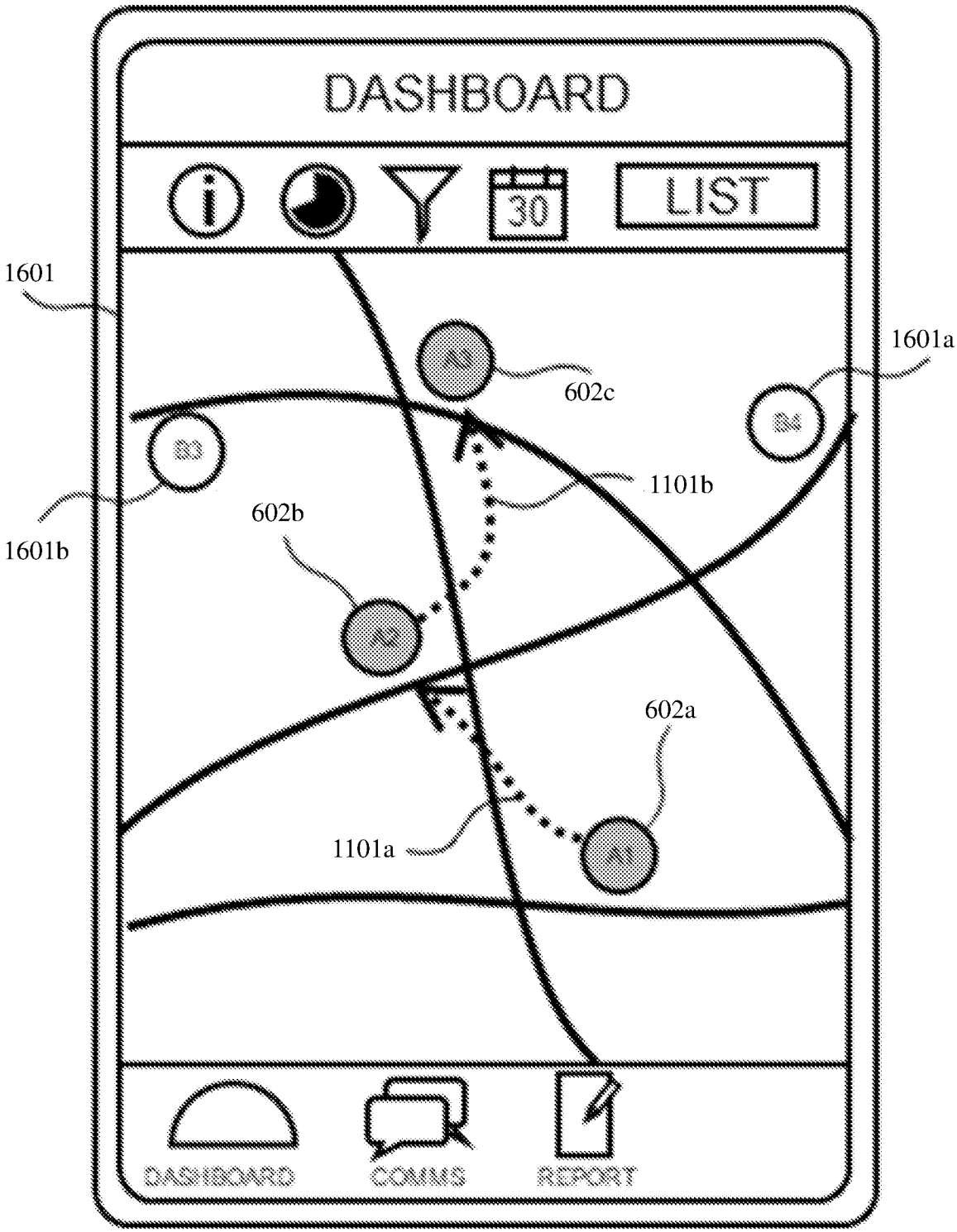

DASHBOARD
30
LIST
1601
1601a
602c
1101b
602b
1601b
602a
1101a
DASHBOARD
COMMS
REPORT

FIG. 16


REPORT
1701
TYPE
PRIORITY
Panic
Incident Title
Description
Upload
+
Cam
Mic
SUBMIT
DASHBOARD
COMMS
REPORT

FIG. 17

INTERNATIONAL SEARCH REPORT

International application No.
PCT/SG2020/050466

A. CLASSIFICATION OF SUBJECT MATTER

G06Q 10/06 (2012.01) ***G06F 3/048 (2013.01)***

According to International Patent Classification (IPC)

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

G06Q, G06F

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

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

FAMPAT, Internet: map, 地图, geographic, 地理, task, mission, assignment, 任务, event, incident, emergency, 事件, 紧急, manage, 管理, detail, 细节, 详情, 细节, particulars, state, mode, 模式, 状态, status and other related terms

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	CN 104463447 A (CLOUD COMPUTING INDUSTRIAL TECHNOLOGY INNOVATION ET AL.) 25 March 2015 Paras. [0019]-[0023], [0034], [0055]-[0061], Fig. 3 of the original non-English language document (a machine translation is enclosed **only** for your reference)	1-22
X	CN 102968681 A (SHANGHAI NANXIAO FIRE PROTECTION ENGINEERING EQUIPMENT) 13 March 2013 Paras. [0033]-[0037], [0065]-[0071], Fig. 6 of the original non-English language document (a machine translation is enclosed **only** for your reference)	1-22
X	KR 10-2017-0130962 (KOREA ELECTRONICS & TELECOMMUNICATIONS RESEARCH INSTITUTE) 29 November 2017 Pgs. 3-5, Fig. 2 of the machine translation	1-22

☒ Further documents are listed in the continuation of Box C. ☒ See patent family annex.

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"P" document published prior to the international filing date but later than the priority date claimed

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"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
04/11/2020 *(day/month/year)*	*20/11/2020* *(day/month/year)*

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/SG2020/050466

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	CN 102289736 A (BEIJING GLOBAL SAFETY TECHNOLOGY) 21 December 2011 Paras. [0010], [0026]-[0028], [0039]-[0041], [0052]-[0054], Fig. 6 of the original non-English language document (a machine translation is enclosed **only** for your reference)	1-22
A	CN 110930059 A (SICHUAN JUMIN TECHNOLOGY) 27 March 2020 Whole document of the original non-English language document (a machine translation is enclosed **only** for your reference)	

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/SG2020/050466

Note: This Annex lists known patent family members relating to the patent documents cited in this International Search Report. This Authority is in no way liable for these particulars which are merely given for the purpose of information.

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
CN 104463447 A	25/03/2015	NONE	
CN 102968681 A	13/03/2013	NONE	
KR 10-2017-0130962	29/11/2017	NONE	
CN 102289736 A	21/12/2011	NONE	
CN 110930059 A	27/03/2020	NONE	