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(54) Title: SYSTEM AND METHODS FOR GENERATING A SEARCH QUERY

(57) Abstract: A method and system are provided for generating a search query on an electronic device. The method includes receiving a plurality of search elements. Each of the search elements is associated with one of a plurality of visual properties. The method also includes defining a first search criterion by applying a first logical operation to the search elements associated with a first visual property. The method may include defining a second search criterion by applying a second logical operation to the search elements associated with a second visual property and applying an other logical operation to the first and second search criteria.

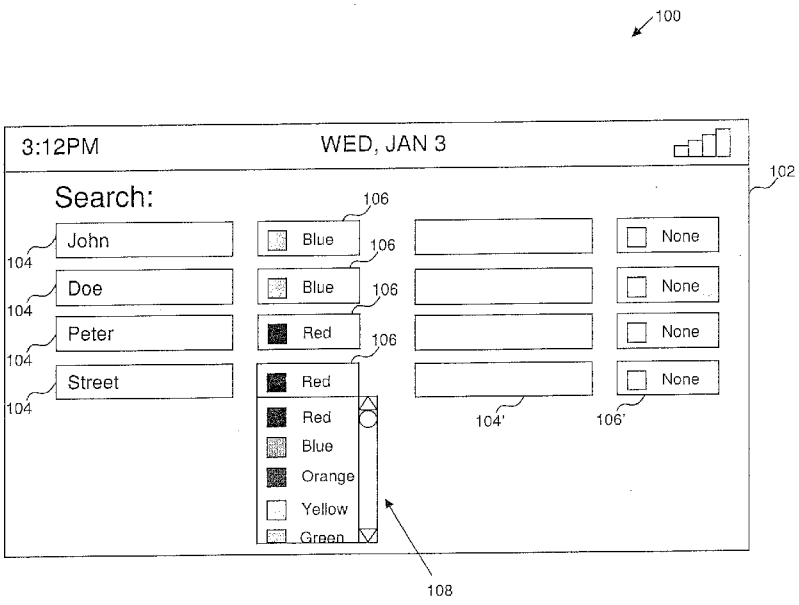


FIG. 1

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SYSTEM AND METHODS FOR GENERATING A SEARCH QUERY

TECHNICAL FIELD

[0001] The following relates generally to generating a search query on an electronic device.

DESCRIPTION OF THE RELATED ART

[0002] Many electronic devices, including mobile devices, can store, access and/or use large amounts of information. For example, information can be stored in word processing documents, text files, web pages, etc., where the information may be arranged in free form text. In other information storage systems, information may be organized into a database of records, each record having discrete fields of information. The information in the discrete fields may include free form text. Examples of information storage systems include email programs, address books, calendar programs, file folder systems, etc. In the example of an address book, a record may include fields such as first and last name, e-mail, phone number, address, etc. As more information becomes available on electronic devices, it may become more difficult to locate a specific file, document, record or other type information of interest to a user.

BRIEF DESCRIPTION OF THE DRAWINGS

[0003] Example embodiments will now be described making reference to the appended drawings wherein:

[0004] FIG. 1 is an example plan view of a display of an electronic device displaying a graphical user interface for inputting search parameters.

[0005] FIG. 2 is an example plan view of a display of an electronic device displaying search results.

[0006] FIG. 3 is an example plan view of a display of an electronic device displaying a text-based user interface for inputting search parameters.

[0007] FIG. 4 is a block diagram of an example of a wireless communication system.

[0008] FIG. 5 is a block diagram of an example of an electronic device.

[0009] FIG. 6 is a plan view of an example electronic device.

[0010] FIG. 7 is a plan view of another example electronic device.

[0011] FIG. 8 is a block diagram of an example configuration of a search query generator application.

[0012] FIG. 9 is a flow diagram of example computer executable instructions for generating a search query.

[0013] FIG. 10 is another example plan view of a display of an electronic device displaying a graphical user interface for inputting search parameters.

[0014] FIG. 11 is another example plan view of a display of an electronic device displaying a text-based user interface for inputting search parameters.

[0015] FIG. 12 is another example plan view of a display of an electronic device displaying a graphical user interface for inputting search parameters.

DETAILED DESCRIPTION

[0016] It will be appreciated that for simplicity and clarity of illustration, where considered appropriate, reference numerals may be repeated among the figures to indicate corresponding or analogous elements. In addition, numerous specific details are set forth in order to provide a thorough understanding of the example embodiments described herein. However, it will be understood by those of ordinary skill in the art that the example embodiments described herein may be practised without these specific details. In other instances, well-known methods, procedures and components have not been described in detail so as not to obscure the example embodiments described herein. Also, the description is not to be considered as limiting the scope of the example embodiments described herein.

[0017] It has been recognized that it may be difficult to locate information available on an electronic device. To address this, the following describes a method, computer readable storage medium and electronic device operable to generate a search query.

[0018] In one example there is provided a method of generating a search query on an electronic device. The method includes receiving a plurality of search elements. Each of the search elements is associated with one of a plurality of visual properties. The method also includes defining a first search criterion by applying a first logical operation to the search elements associated with a first visual property. The method may include defining a second search criterion by applying a second logical operation to the search elements associated with a second visual property and applying an other logical operation to the first and second search criteria. The first and second logical operations may be an AND logical operation

and the other logical operation may be an OR logical operation. The method may also include receiving at least one search element not associated with a visual property, and applying the other logical operation to at least one of the search elements not associated with a visual property and at least one of the first and second search criteria.

[0019] The method may also include obtaining search results, and displaying at least one search result using the visual property associated with at least one of the first and second search criteria that is satisfied by the at least one search result. Each of the search results may be displayed using the visual property associated with at least one of the first and second search criteria that is satisfied by the search result.

[0020] In another example, there is provided a computer readable storage medium for generating a search query on an electronic device. The computer readable storage medium includes computer readable instructions for receiving a plurality of search elements. Each of the search elements is associated with one of a plurality of visual properties. The computer readable storage medium also includes computer readable instructions for defining a first search criterion by applying a first logical operation to the search elements associated with a first visual property. The computer readable storage medium may include computer readable instructions for defining a second search criterion by applying a second logical operation to the search elements associated with a second visual property and applying an other logical operation to the first and second search criteria. The first and second logical operations may be an AND logical operation, and the other logical operation may be an OR logical operation. The computer readable storage medium may also include computer readable instructions for receiving at least one search element not associated with a visual property, and applying the other logical operation to at least one of the search elements not associated with a visual property and at least one of the first and second search criteria.

[0021] The computer readable storage medium may also include computer readable instructions for obtaining search results, and displaying at least one search result using the visual property associated with at least one of the first and second search criteria that is satisfied by the at least one search result. Each of the search results may be displayed using the visual property associated with at least one of the first and second search criteria that is satisfied by the search result.

[0022] In another example, there is provided an electronic device for generating a search query. The electronic device includes a processor coupled to memory. The memory stores computer executable instructions for receiving a plurality of search elements. Each of

the search elements is associated with one of a plurality of visual properties. The memory also stores computer readable instructions for defining a first search criterion by applying a first logical operation to the search elements associated with a first visual property. The memory may store computer readable instructions for defining a second search criterion by applying a second logical operation to the search elements associated with a second visual property and applying an other logical operation to the first and second search criteria. The first and second logical operations may be an AND logical operation, and the other logical operation may be an OR logical operation. The memory may also store computer readable instructions for receiving at least one search element not associated with a visual property, and applying the other logical operation to at least one of the search elements not associated with a visual property and at least one of the first and second search criteria.

[0023] The memory may also store computer readable instructions for obtaining search results, and displaying at least one search result using the visual property associated with at least one of the first and second search criteria that is satisfied by the at least one search result. Each of the search results may be displayed using the visual property associated with at least one of the first and second search criteria that is satisfied by the search result.

[0024] For the method, computer readable storage medium and/or electronic device, the association of at least one of the visual properties with the first, second or other logical operation may be assignable by a user. The association of at least one of the search elements with at least one of the visual properties may be obtained using a graphical user interface. The association of at least one of the search elements with at least one of the visual properties may be also obtained using a text-based user interface. The first, second or other logical operation may be one of an AND logical operation, an OR logical operation, an XOR logical operation, a numerical relationship and a proximity relationship. At least one of the search elements may be associated with a plurality of visual properties. At least one of the visual properties include any one or more of a colour, a pattern and an image. The search elements may be inputted in the form of text, and at least one of the visual properties may include any one or more of a font formatting, a font type and a font size applied to the text.

[0025] Referring to FIG. 1, an example plan view of a display 102 of an electronic device 100 is provided. The display 102 of the electronic device 100 is displaying an example graphical user interface of a search application for receiving search elements from a user. A search element is an input or parameter used in generating a search query. A search element may be represented in various forms, such as a search term, a date, a

numerical value, a property or status, etc. The search query can then be used in performing a search.

[0026] In this example, the graphical user interface includes a plurality of input boxes 104 to receive search elements. For example, a user can select and enter text into an input box 104. The inputted text can serve as a search element (e.g. a search term). Each input box 104 has an adjacent colour input box 106 to associate the search element in input box 104 to a colour selected in the adjacent colour input box 106. For example, the colour can be inputted by selection of a colour listed in a menu 108 which is displayed on selection of a colour input box 106 by the user. Additional input boxes 104' and colour input boxes 102' may be displayed on the display 102 that are not used, and thus have empty or null values.

[0027] Each unique colour can be associated with a logical operation (sometimes referred to as a Boolean operation). Example logical operations include AND, OR and XOR (exclusive OR). The logical operation and search elements associated with the same colour can be used to generate a search criterion. For example, a search criterion can be generated by applying the logical operation associated with a colour to the search elements associated with the same colour. The search query can then be generated by applying a logical operation to all the search criteria.

[0028] In the example of FIG. 1, the search elements received by the electronic device 100 include the search terms "John", "Doe", "Peter" and "Street", which are associated with the colours blue, blue, red and red, respectively. In one example embodiment, every colour, including blue and red, is associated with an AND logical operation. A first search criterion "John" AND "Doe" can be generated by applying the logical operation associated with the colour blue (i.e. AND) to the search elements associated with the colour blue (i.e. "John" and "Doe"). The first search criterion is satisfied if a record contains both terms "John" and "Doe" in any of its fields.

[0029] Similarly, a second search criterion "Peter" AND "Street" can be generated by applying the logical operation associated with the colour red (i.e. AND) to the search elements associated with the colour red (i.e. "Peter" and "Street"). The second search criterion is satisfied if a record contains both terms "Peter" and "Street" in any of its fields.

[0030] A search query can then be generated by applying an OR logical operation to the first and second search criterion, resulting in the search query having the logical expression: ("John" AND "Doe") OR ("Peter" AND "Street"). A search performed on a

database of records according to this example search query will return the records that include both terms "John" and "Doe" in any of its fields, includes both terms "Peter" and "Street" in any of its fields, or includes all terms "John", "Doe", "Peter" and "Street" in any of its fields. Therefore, it can be seen that a user can generate a search query of a logical expression by associating search elements (e.g. search terms) with one or more colours, without explicitly inputting a logical expression and without needing to understand the operation of logical expressions. Associating search elements with colours may intuitively suggest a stronger connection or grouping to other search elements of the same colour and suggest a separation from search elements of a different colour. Furthermore, grouping of search elements by colour may intuitively suggest that the search elements associated with the same colour will be operated on or treated in a similar manner. As a result, associating search elements with a colour may be more intuitive to a user for specifying a search query than providing a specific logical expression. Furthermore, associating a search element to a colour can be easier to use and can help a user understand the logic that will be applied by a search query.

[0031] In FIG. 2, an example set of search results is displayed on the display 102 of the electronic device 100. The search results are obtained from performing the search according to the search query generated from the inputs in FIG. 1. In this example, the search results include search results 200a, 200b and 200c (collectively referred to as the search results 200). For example, the search result 200a satisfies the first search criterion "John" AND "Doe" (and thus, the search query), as the full name field includes both terms. Similarly, the search result 200b satisfies the second search criterion "Peter" AND "Street" (and thus, the search query), as the address field includes both terms. The search result 200c satisfies both the first and second search criteria (and thus, the search query), as all the terms "John", "Doe", "Peter" and "Street" are included in a combination of its fields.

[0032] In one example embodiment, one or more search criteria used to generate the search query can also be associated with a colour. For example, the first search criterion "John" AND "Doe" can be associated with the same colour as the logical operation and search elements used in its generation (i.e. blue). Similarly, the second criterion "Peter" AND "Street" can also associated with the same colour as the logical operation and search elements used in generating the second criterion (i.e. red).

[0033] A search result 200 can then be displayed using the colour associated with each search criterion that is satisfied by that particular search result 200. For example, the search result 200a satisfies the first criterion, which is associated with the colour blue and used the

search elements "John" and "Doe". As a result, the terms "John" and "Doe" in the search result 200a can be highlighted in the colour blue. Similarly, the search result 200b satisfies the second criterion, which is associated with the colour red and used the search elements "Peter" and "Smith", and thus, the terms "Peter" and "Smith" in the search result 200b can be highlighted in the colour red. Similarly, the search result 200c satisfies the first and second criterion, and thus, the terms "John" and "Doe" can be highlighted in the colour blue whereas the terms "Peter" and "Smith" can be highlighted in the colour red. This can identify the portions of a search result that satisfy the search query and/or a search criterion incorporated into the search query, thus indicating to a user the relevance of a search result 200 to the search query. Indicating the relevant portions of a search result 200 with respect to the search query may be helpful, especially when a search result 200 is a large record or document such that the relevance is not immediately apparent.

[0034] It will be appreciated that the graphical user interface of FIG. 1 is an example only, and that other graphical user interfaces can be used. For example, the colour input boxes 106 may only display the text description of the colour or only display a graphic/icon in the colour. In other examples, the colour associated with a search element can be indicated by highlighting the text within an input box 104, by highlighting the input box 104 or by inputting the text itself in a colour to be associated with the search element. It will be appreciated that other techniques available to the electronic device 100 can be used to associate a colour to a search element, such as other graphical user interfaces, voice or audio commands, command-line or other text-based user interfaces, etc. It will also be appreciated that a unique colour can be a specific shade of a colour and thus, different shades of a colour can be considered as different colours.

[0035] In another example embodiment, a search element can be associated with a colour using a text-based user interface. In the example of FIG. 3, a display 102 of an electronic device 100 is displaying a text-based interface having a single input box 300. A plurality of search elements can be inputted into the input box 300 by separating search elements using a delimiter, such as a space, comma, semi-colon, etc. In FIG. 3, a space is used to separate search elements and a colour is associated with a search element by appending the text description of the colour to the search element, separated by a backslash "/". Therefore, it can be seen that the text-based user interface of FIG. 3 can associate the same search elements with the same colours (i.e. search terms "John", "Doe", "Peter" and "Street" associated with colours blue, blue, red and red, respectively). The search query, and the search criteria used to generate the search query, can be generated in a similar

manner as described above. As will be discussed, the electronic device 100 can be configured to generate a search query and/or display search results using search elements associated with colours in various ways.

[0036] Examples of applicable electronic devices may include, without limitation, cellular phones, smart-phones, tablet computers, wireless organizers, personal digital assistants, computers, laptops, handheld wireless communication devices, wirelessly enabled notebook computers, portable gaming devices, and the like. Such devices can be commonly referred to as mobile devices due to their portability. It will however be appreciated that the principles described herein are also suitable to other electronic devices, such as for example personal computers (PCs), tabletop computing devices, wall-mounted screens such as kiosks, or any other computing device.

[0037] The electronic device 100 may be a two-way communication device with advanced data communication capabilities including the capability to communicate with other electronic devices or computer systems through a network of transceiver stations. The electronic device may also have the capability to allow voice communication. Depending on the functionality provided by the electronic device, it may be referred to as a data messaging device, a two-way pager, a cellular telephone with data messaging capabilities, a wireless Internet appliance, or a data communication device (with or without telephony capabilities).

[0038] Referring to FIG. 4, an example communication system 400 is shown. The communication system 400, in this example, enables, at least in part, electronic devices 100 to communicate with each other via a wireless network 402. For example, as shown, data 404 may be exchanged between various electronic devices 100. Data 404 that is sent from one electronic device 100 to another electronic device 100 may be transmitted according to a particular messaging or communication medium, protocol, or other mechanism. For example, as shown in FIG. 4, data 404 may be sent over the wireless network 402 via a component of a network infrastructure 406. The network infrastructure 406 can include various systems that may be used by the electronic devices 100 to exchange data 404. For example, a peer-to-peer (P2P) system, a short message service centre (SMSC), an email system (e.g. web-based, enterprise based, or otherwise), a web system (e.g. hosting a website or web service), a host system (e.g. enterprise server), and social networking system may be provided by or within or be otherwise supported or facilitated by the network infrastructure 406. The electronic devices 100 may therefore send data to or receive data from other electronic devices 100 via one or more particular systems with which the

electronic devices 100 are communicable via the wireless network 402 and network infrastructure 406.

[0039] Referring to FIG. 5, a block diagram is provided to aid the reader in understanding an example configuration of an electronic device 100. The electronic device 100 includes a number of components such as a main processor 502 that controls the overall operation of the electronic device 100. Communication functions, including data and voice communications, are performed through a communication subsystem 504. The communication subsystem 504 receives messages from and sends messages to a wireless network 402. In this example of the electronic device 100, the communication subsystem 504 is configured in accordance with the Global System for Mobile Communication (GSM) and General Packet Radio Services (GPRS) standards, which is used worldwide. Other communication configurations that are equally applicable are the 3G and 4G networks such as Enhanced Data-rates for Global Evolution (EDGE), Universal Mobile Telecommunications System (UMTS) and High-Speed Downlink Packet Access (HSDPA), Long Term Evolution (LTE), Worldwide Interoperability for Microwave Access (Wi-Max), etc. New standards are still being defined, but it is believed that they will have similarities to the network behaviour described herein, and it will also be understood by persons skilled in the art that the example described herein are intended to use any other suitable standards that are developed in the future. The wireless link connecting the communication subsystem 504 with the wireless network 402 represents one or more different Radio Frequency (RF) channels, operating according to defined protocols specified for GSM/GPRS communications.

[0040] The main processor 502 also interacts with additional subsystems such as a Random Access Memory (RAM) 506, a flash memory 508, a touch-sensitive display 102, an auxiliary input/output (I/O) subsystem 512, a data port 514, a keyboard 516, a speaker 518, a microphone 520, a GPS receiver 521, short-range communications 522, a camera 523, a accelerometer 525 and other device subsystems 524. Some of the subsystems of the electronic device 100 perform communication-related functions, whereas other subsystems may provide "resident" or on-device functions. By way of example, the display 102 and the keyboard 516 may be used for both communication-related functions, such as entering a text message for transmission over the network 402, and device-resident functions such as a calculator or task list. In one example, the electronic device 100 can include a non touch-sensitive display in place of, or in addition to, the touch-sensitive display 102

[0041] The electronic device 100 can send and receive communication signals over the wireless network 402 after required network registration or activation procedures have been

completed. Network access is associated with a subscriber or user of the electronic device 100. To identify a subscriber, the electronic device 100 may use a subscriber module component or "smart card" 526, such as a Subscriber Identity Module (SIM), a Removable User Identity Module (RUIM) and a Universal Subscriber Identity Module (USIM). In the example shown, a SIM/RUIM/USIM 526 is to be inserted into a SIM/RUIM/USIM interface 528 in order to communicate with a network. Without the component 526, the electronic device 100 is not fully operational for communication with the wireless network 402. Once the SIM/RUIM/USIM 526 is inserted into the SIM/RUIM/USIM interface 528, it is coupled to the main processor 502.

[0042] The electronic device 100 is typically a battery-powered device and includes a battery interface 532 for receiving one or more rechargeable batteries 530. In at least some examples, the battery 530 can be a smart battery with an embedded microprocessor. The battery interface 532 is coupled to a regulator (not shown), which assists the battery 530 in providing power to the electronic device 100. Although current technology makes use of a battery, future technologies such as micro fuel cells may provide the power to the electronic device 100.

[0043] The electronic device 100 also includes an operating system 534 and software components 536 to 546 which are described in more detail below. The operating system 534 and the software components 536 to 546 that are executed by the main processor 502 are typically stored in a persistent store such as the flash memory 508, which may alternatively be a read-only memory (ROM) or similar storage element (not shown). Those skilled in the art will appreciate that portions of the operating system 534 and the software components 536 to 546, such as specific device applications, or parts thereof, may be temporarily loaded into a volatile store such as the RAM 506. Other software components can also be included, as is well known to those skilled in the art.

[0044] The subset of software applications 536 that control basic device operations, including data and voice communication applications, may be installed on the electronic device 100 during its manufacture. Software applications may include a message application 538, a device state module 540, a Personal Information Manager (PIM) 542, a connect module 544 and an IT policy module 546. A message application 538 can be any suitable software program that allows a user of the electronic device 100 to send and receive electronic messages, wherein messages are typically stored in the flash memory 508 of the electronic device 100. A device state module 540 provides persistence, i.e. the device state module 540 ensures that important device data is stored in persistent memory, such as the

flash memory 508, so that the data is not lost when the electronic device 100 is turned off or loses power. A PIM 542 includes functionality for organizing and managing data items of interest to the user, such as, but not limited to, e-mail, contacts, calendar events, and voice mails, and may interact with the wireless network 402. A connect module 544 implements the communication protocols that are required for the electronic device 100 to communicate with the wireless infrastructure and any host system, such as an enterprise system, that the electronic device 100 is authorized to interface with. An IT policy module 546 receives IT policy data that encodes the IT policy, and may be responsible for organizing and securing rules such as the "Set Maximum Password Attempts" IT policy.

[0045] Other types of software applications or components 539 can also be installed on the electronic device 100, such as a search query generator 548 or a display search results application 550. These software applications 539 can be pre-installed applications or third party applications, which are added after the manufacture of the electronic device 100. Examples of third party applications include games, calculators, utilities, etc.

[0046] The additional applications 539 can be loaded onto the electronic device 100 through at least one of the wireless network 402, the auxiliary I/O subsystem 512, the data port 514, the short-range communications subsystem 522, or any other suitable device subsystem 524.

[0047] The data port 514 can be any suitable port that enables data communication between the electronic device 100 and another computing device. The data port 514 can be a serial or a parallel port. In some instances, the data port 514 can be a USB port that includes data lines for data transfer and a supply line that can provide a charging current to charge the battery 530 of the electronic device 100.

[0048] For voice communications, received signals are output to the speaker 518, and signals for transmission are generated by the microphone 520. Although voice or audio signal output is accomplished primarily through the speaker 518, the display 102 can also be used to provide additional information such as the identity of a calling party, duration of a voice call, or other voice call related information.

[0049] Referring to FIGS. 6 and 7, one example of an electronic device 100a is shown in FIG. 6 and another example of an electronic device 100b is shown in FIG. 7. It will be appreciated that the numeral "100" will hereinafter refer to any electronic device 100, including the examples 100a and 100b, those examples enumerated above or otherwise. It

will also be appreciated that a similar numbering convention may be used for other general features common between all figures.

[0050] The electronic device 100a shown in FIG. 6 includes a touch-sensitive display 102a and a cursor or positioning device, which in this example is in the form of a trackpad 614a. Trackpad 614a. The trackpad 614a permits multi-directional positioning of a selection indicator or cursor that can be displayed on the touch-sensitive display 102a such that the selection cursor can be moved in an upward, downward, left and right direction, and if desired and/or permitted, in any diagonal direction. A selection cursor may include a box, alteration of an icon or any combination of features that enable the user to identify the currently chosen icon or item. The trackpad 614a in this example is situated on the front face of a housing for electronic device 100a to enable a user to maneuver the trackpad 614a while holding the electronic device 100a in one hand. The trackpad 614a may serve as another input member (in addition to a directional or positioning member) to provide selection inputs to a processor of the electronic device and can preferably be pressed in a direction towards the housing of the electronic device 100a to provide such a selection input. It will be appreciated that the trackpad 614a is only one example of a suitable positioning device. For example, a trackball, touch-sensitive display, OLED, or other input mechanism may equally apply.

[0051] The electronic device 100a in FIG. 6 also includes a programmable convenience button 615a to activate a selection application such as, for example, a calendar or calculator. Further, electronic device 100a also includes an escape or cancel button 616a, a camera button 617a, a menu or option button 624a and a keyboard 620a. The camera button 617a is able to activate photo and video capturing functions, e.g. when pressed in a direction towards the housing. The menu or option button 624a can be used to load a menu or list of options on the display 102 when pressed. In this example, the escape or cancel button 616a, the menu option button 624a, and a keyboard 620a are disposed on the front face of the electronic device housing, while the convenience button 615a and camera button 617a are disposed at the side of the housing. This button placement enables a user to operate these buttons while holding the electronic device 100a in one hand. The keyboard 620a is, in this example, a standard QWERTY keyboard, however, it will be appreciated that reduced QWERTY or virtual keyboards (e.g. as provided by a touch-sensitive display) may equally apply

[0052] It will be appreciated that for the electronic device 100, a wide range of one or more positioning or cursor/view positioning mechanisms such as a touch/track pad, a

positioning wheel, a joystick button, a mouse, a touch-sensitive display, a set of arrow keys, a tablet, an accelerometer (for sensing orientation and/or movements of the electronic device 100 etc.), OLED, or other whether presently known or unknown may be employed. Similarly, any variation of keyboard 620a may be used. It will also be appreciated that the electronic devices 100 shown in FIGS. 6 and 7 are for illustrative purposes only and various other electronic devices 100 are equally applicable to the following examples. Other buttons may also be disposed on the electronic device housing such as colour coded "Answer" and "Ignore" buttons to be used in telephonic communications.

[0053] A front view of an example of the electronic device 100b is shown in FIG. 7. The electronic device 100b includes a touch-sensitive display 102b and a front camera 702. The touch-sensitive display 102b includes a touch-sensitive display area 704 and a touch-sensitive non-display area 706. The touch-sensitive display area 704 serves as the position device to provide an input mechanism in addition to display capabilities. The touch-sensitive non-display area 706 provides a further input mechanism, for example, to control menu options of the electronic device 100b

[0054] Referring to FIG. 8, an example of a configuration for a search query generator 548 is provided. The search query generator 548 can be one of the other software applications 539 of FIG. 5 that can be loaded on the electronic device 100 or as a module incorporated in another application (e.g. part of a search feature of a message application 538, word processor, email program, web browser or any other application that includes search functionality). The search query generator 548 can request details of activity occurring in, or receive inputs from, an input device such as the keyboard 516 or touch-sensitive display 102, for example. The search query generator 548 includes an interface module 800 for providing a user interface and receiving search elements associated with colours inputted through the user interface, a generate query module 802 for generating a search query using the search elements associated with colours, and a mapping module 804 for determining the association of logical operations with a colour. The search query generator 548 can send the generated search query to a software application 539 capable of performing a search using the search query, such as an address book application, for example.

[0055] The search query generator 548 can optionally receive or obtain search results (e.g. from the software application 539 that performs a search using the search query). In an example embodiment, the search query generator 548 also includes an obtain search results module 806 to obtain search results and a display search results module 808 for

displaying the search results using one or more colours associated with search criteria in the search query.

[0056] The interface module 800 generates and provides a user interface, such as the graphical user interface of FIG. 1, to an output device of the electronic device 100, such as the display 102. The user interface obtains or receives a plurality of search elements which are associated with at least one colour, from one or more input devices such as the keyboard 516.

[0057] The generate query module 802 receives the search elements and colour associations of the search elements from the interface module 800 and uses the search elements and colour associations to generate a search query. A search query can be generated by applying a logical operation associated with a colour, to the search elements associated with the same colour. The logical operation associated with a colour can be predetermined by the search query generator 548 and stored in a mapping storage 804. In another example, a user can assign the logical operation associated with each colour using the user interface, and such mapping information can be stored in the mapping storage 804. The search query generated from the generate query module 802 can be sent to a software application 539 for performing a search according to the search query, such as an address book for example.

[0058] As discussed above, the search query generator may optionally include an obtain search results module 806 to obtain search results obtained for performing a search according to the search query. In an example embodiment, the search is performed by the software application 539 and retrieved by the obtain search results module 806. In another example embodiment, the software application 539 or obtain results module 806 can obtain search results from a search engine or other source remote from the electronic device 100, for example, via a web browser. In another example embodiment, the search query generator 548 can have access to the database of information to be searched and the obtain search results module 806 can perform the search according to the search query.

[0059] The display search results module 808 configures the electronic device 100 to display at least one search result using the colour associated with at least one search criterion in the search query that is satisfied by the search result. In an example, the display search results module 808 instructs the software application 539 that performed the search to display each search result using the colours associated with the search criteria that are satisfied by the search result. As illustrated in the example of FIG. 2, displaying search

results using colours associated with the search criteria satisfied by the search result can help identify portions of the search results that may be of most interest to the user.

[0060] It will be appreciated that any module, application or component exemplified herein that executes instructions or operations, such as the search query generator 548, may include or otherwise have access to computer readable media such as storage media, computer storage media, or data storage devices (removable and/or non-removable) such as, for example, magnetic disks, optical disks, or tape. Computer storage media may include volatile and non-volatile, removable and non-removable media implemented in any method or technology for storage of information, such as computer readable instructions, data structures, program modules, or other data, except transitory propagating signals per se. Examples of computer storage media include RAM, ROM, EEPROM, flash memory or other memory technology, CD-ROM, digital versatile disks (DVD) or other optical storage, magnetic cassettes, magnetic tape, magnetic disk storage or other magnetic storage devices, or any other medium which can be used to store the desired information and which can be accessed by an application, module, or both. Any such computer storage media may be part of the electronic device 100 or accessible or connectable thereto. Any application or module herein described may be implemented using computer readable/executable instructions or operations that may be stored or otherwise held by such computer readable media.

[0061] Referring to FIG. 9, an example set of computer executable and/or processor implemented instructions is provided for generating a search query on an electronic device, such as an electronic device 100. At 900, a plurality of search elements is received or obtained. Each of the search elements is associated with at least one colour. At 902, a logical operation associated with each colour is determined. At 904, a search query is generated by applying each logical operation to the search elements associated with the same colour. In an example embodiment, each application of a logical operation to the search elements associated with the same colour generates a search criterion used in the search query.

[0062] The example set of computer executable instructions may optionally include instructions for obtaining and displaying search results. At 906, each search criterion generated at 904 can be associated with the same colour as the logical operation and the search elements that were used to generate it. At 908, one or more search results are obtained from performing a search using the search query. At 910, at least one search

result is displayed using the colour associated with at least one of the search criterion that is satisfied by the search result.

[0063] As noted above, at 900, a plurality of search elements is received or obtained. Each of the search elements is associated with at least one colour. In an example configuration of the search query generator 548, the interface module 800 may implement 900 (FIG. 8). Referring back to the examples of FIGS. 1 and 3, the search elements and their colour associations may be obtained through a graphical or text-based user interface displayed on the display 102 of the electronic device 100.

[0064] At 902, a logical operation associated with each colour is determined. In an example configuration of the search query generator 548, the generate query module 802 may implement 902 by accessing the mapping storage 804 (FIG. 8). In an example, the logical operations associated with a colour are predetermined (e.g. all colours are associated with an AND logical operation). In another example, the logical operations associated with a colour can be customized, (e.g. by a user through additional settings provided in a user interface). For example, the search query generator 548 can be configured to associate an AND logical operation with the colour blue, and an XOR logical operation with the colour red such that the search elements and associated colour information provided in FIG. 1 results in the generation of a search query having the logical expression: ("John" AND "Doe") OR ("Peter" XOR "Street"). It will be appreciated that any one of a variety of logical operations can be associated with any one of a variety of colours.

[0065] At 904, a search query is generated by applying each logical operation to the search elements associated with the same colour. In an example configuration of the search query generator 548, the generate query module 802 may implement 904 (FIG. 8). Each application of the logical operation to the search elements associated with the same colour generates a search criterion that is used in the search query. In the example of FIG. 1, a first search criterion "John" AND "Doe" is generated from the logical operation and search elements associated with the colour blue and a second search criterion "Peter" AND "Street" is generated from the logical operation and search elements associated with the colour red. The first and second criteria are then used in the search query by applying an OR logical operation to the first and second search criterion. It will be appreciated that the logical operation applied to the search criteria is not limited to the OR logical operation, as used in the examples above, and can be any one of a number of other logical operations. The logical operation applied to the search criterion may also be predetermined by the search

query generator 548 or other component of the electronic device 100, and/or customizable by a user.

[0066] In another embodiment, a search element can be associated with more than one colour. Referring to FIG. 10, another example embodiment of a graphical user interface of the search query generator 548 is provided. In this example, each input box 104, and thus each search element, can be associated with up to two colours since two colour input boxes 106 can be selected for each input box 104. It will be appreciated that other user interfaces can be configured to associate any number of colours to a search element.

[0067] In the example of FIG. 10, the search elements and colour associations received by the electronic device 100 are the same as the example in FIG. 1, except that the search element "John" is associated with two colours, blue and red. As a result, an example search query generated by the search query generator 548 is the logical expression: ("John" AND "Doe") OR ("Peter" AND "Street" AND "John"). This logical expression is equivalent to "John" AND ("Doe" OR ("Peter" AND "Street")). Therefore, it can be seen that by enabling a search element to be associated with more than one colour, the search query generator 548 can generate search queries having logical expressions that are equivalent to more complicated logical expressions, which may have multiple levels of logical operations and search criterion.

[0068] It will be also be appreciated that a variety of user interfaces can be implemented to associate more than one colour to a search result. In FIG. 11, an example text-based user interface and corresponding input is shown to provide the same search elements and colour associations as shown in FIG. 10. In this example, the text-based user interface has a single input box 300 for receiving the search elements and colour associations. More than one colour can be associated with a search result by appending multiple colours to a search element, separated by further a delimiter, such as the backslash "/".

[0069] In another example, one or more search results may be associated with no colours. A search result that is not associated with a colour will not be grouped with other search elements that are associated with a colour. Referring to the example in FIG. 12, the search elements and colour associations received by the electronic device 100 are the same as in the example in FIG. 1, except that an additional search element "Jane" is provided that is not associated with a colour. In this example, the first criterion "John" AND "Doe" and second criterion "Peter" AND "Street" can be generated as previously described. The search query can be generated by applying an "OR" logical operation to all the search criteria, as

well as any search element not associated with a colour. As a result, an example search query generated from the inputs provided in FIG. 12 is the logical expression: ("John" AND "Doe") OR ("Peter" AND "Street") OR "Jane".

[0070] Referring back to FIG. 9, at 906, each search criterion generated at 904 is associated with the same colour as the logical operation and the search elements that were used to generate it. In an example configuration of the search query generator 548, the generate query module 802 may implement 906 while performing 904 (FIG. 8).

[0071] At 908, one or more search results are obtained from performing a search using the search query. In an example configuration of the search query generator 548, the obtain search results module 806 may implement 908 (FIG. 8).

[0072] At 910, at least one search result is displayed using the colour associated with at least one of the search criteria that is satisfied by the search result. In an example configuration of the search query generator 548, the display search results module 808 may implement 910 (FIG. 8). It will be appreciated that the colour associated with a search criterion can be incorporated into the display of a search result in any suitable way that makes the colour visible, including highlighting portions of a search result that satisfies a search criterion. The highlighted portions of a search result can use the colour associated with the search criterion that is satisfied by the search result, as shown in FIG. 2, for example.

[0073] It will be appreciated that a search element can be associated with other visual properties other than colour. Each visual property can be associated with a logical operation. A search query can be generated by applying each logical operation to the search elements associated with the same visual property, each application of the logical operation to the search elements generating a search criterion. Similarly, each search criterion can be associated with the same visual property associated with the logical operation and the search elements used to generate the search criterion. After obtaining search results from performing a search using the search query, at least one search result can be displayed using the visual property associated with at least one of the search criterion that is satisfied by the search result.

[0074] In an example, search elements may be associated with different patterns (e.g. plaid, striped, polka dot, etc.), shapes (e.g. triangle, square, hexagon, etc.) or images (e.g. different character faces), which may be especially advantageous if the display 102 of the

electronic device 100 is operating in a black and white or grey scale mode. Each pattern or image can be associated with a logical operation. In another example, when search elements are inputted as text, visual properties can include different font formatting (e.g. bold, italic, underline, etc.), font types (e.g. Arial, Courier New, Times New Roman, etc.) and/or font sizes applied to the text.

[0075] It will be appreciated that a logical operation can include AND, OR and XOR logical operations, as well as any other relational operations that can be evaluated by the electronic device 100. For example, when search elements associated with the same colour include a numerical value, a logical operation can include "greater than", "less than", "equal to" and other numerical relationships. In another example, when the search elements associated with the same colour include search terms or text, a logical operation can include "within a specific number of words from each other", "within the same paragraph", "within the same sentence" and other proximity relationships between search elements that can be evaluated by the electronic device 100.

[0076] It will also be appreciated that the search query can be used to search any suitable form of information, including information within a single document or across multiple documents (e.g. word processing document(s), text file(s), web page(s), etc.). The search query can also be used to search information storage systems, where information may be organized into a database of records, each record having discrete fields of information. Examples of information storage systems that can be searched include email programs, address books, calendar programs, file folder systems, etc.

[0077] It will be appreciated that the examples and corresponding diagrams used herein are for illustrative purposes only. Different configurations and terminology can be used without departing from the principles expressed herein. For instance, components and modules can be added, deleted, modified, or arranged with differing connections without departing from these principles.

[0078] The steps or operations in the flow charts and diagrams described herein are just for example. There may be many variations to these steps or operations without departing from the spirit of the invention or inventions. For instance, the steps may be performed in a differing order, or steps may be added, deleted, or modified.

[0079] Although the above has been described with reference to certain specific examples, various modifications thereof will be apparent to those skilled in the art as outlined in the appended claims.

Claims:

1. A method of generating a search query on an electronic device, comprising:

receiving a plurality of search elements, each of the search elements being associated with one of a plurality of visual properties; and

defining a first search criterion by applying a first logical operation to the search elements associated with a first visual property.

2. The method of claim 1, further comprising:

defining a second search criterion by applying a second logical operation to the search elements associated with a second visual property; and

applying an other logical operation to the first and second search criteria.

3. The method of claim 2, wherein the first and second logical operations are an AND logical operation, and the other logical operation is an OR logical operation.

4. The method of claim 2 or claim 3 further comprising:

receiving at least one search element not associated with a visual property; and

applying the other logical operation to at least one of the search elements not associated with a visual property and at least one of the first and second search criteria.

5. The method of any one of claims 2 to 4, further comprising:

obtaining search results; and

displaying at least one search result using the visual property associated with at least one of the first and second search criteria that is satisfied by the at least one search result.

6. The method of claim 5, wherein each of the search results is displayed using the visual property associated with at least one of the first and second search criteria that is satisfied by the search result.

7. The method of any one of claims 2 to 6, wherein the association of at least one of the visual properties with the first, second or other logical operation is assignable by a user.

8. The method of any one of claims 2 to 7, wherein the first, second or other logical operation is one of: an AND logical operation, an OR logical operation, an XOR logical operation, a numerical relationship and a proximity relationship

9. The method of any one of claims 1 to 8, wherein the association of at least one of the search elements with at least one of the visual properties is obtained using a graphical user interface.

10. The method of any one of claims 1 to 9, wherein the association of at least one of the search elements with at least one of the visual properties is obtained using a text-based user interface.

11. The method of any one of claims 1 to 10, wherein at least one of the search elements is associated with a plurality of visual properties.

12. The method of any one of claims 1 to 11, wherein at least one of the visual properties comprises any one or more of: a colour, a pattern and an image.

13. The method of any one of claims 1 to 12, wherein at least one of the search elements is inputted in the form of text, and at least one of the visual properties comprises any one or more of: a font formatting, a font type and a font size applied to the text.

14. A computer readable storage medium for generating a search query on an electronic device, comprising computer executable instructions that when executed by a processor cause the processor to perform the method according to any one of claims 1 to 13.

15. An electronic device for generating a search query, comprising a processor coupled to memory, the memory storing computer executable instructions that when executed by the processor cause the processor to perform the method according to any one of claims 1 to 13.

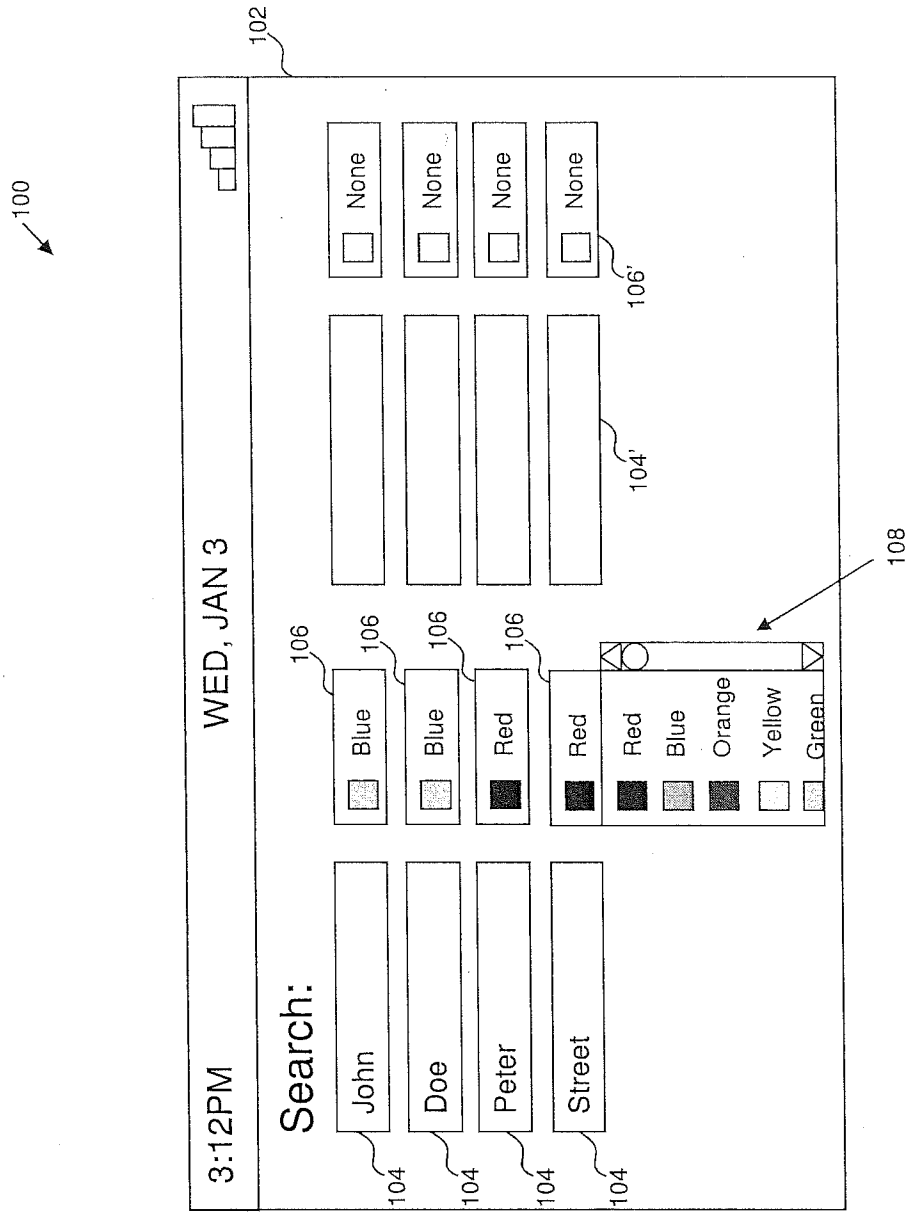

100
102
3:12PM
WED, JAN 3
Search:
John
Doe
Peter
Street
104
104
104
104
Blue
Blue
Red
Red
106
106
106
106
None
None
None
None
106'
104'
108
Red
Blue
Orange
Yellow
Green

FIG. 1

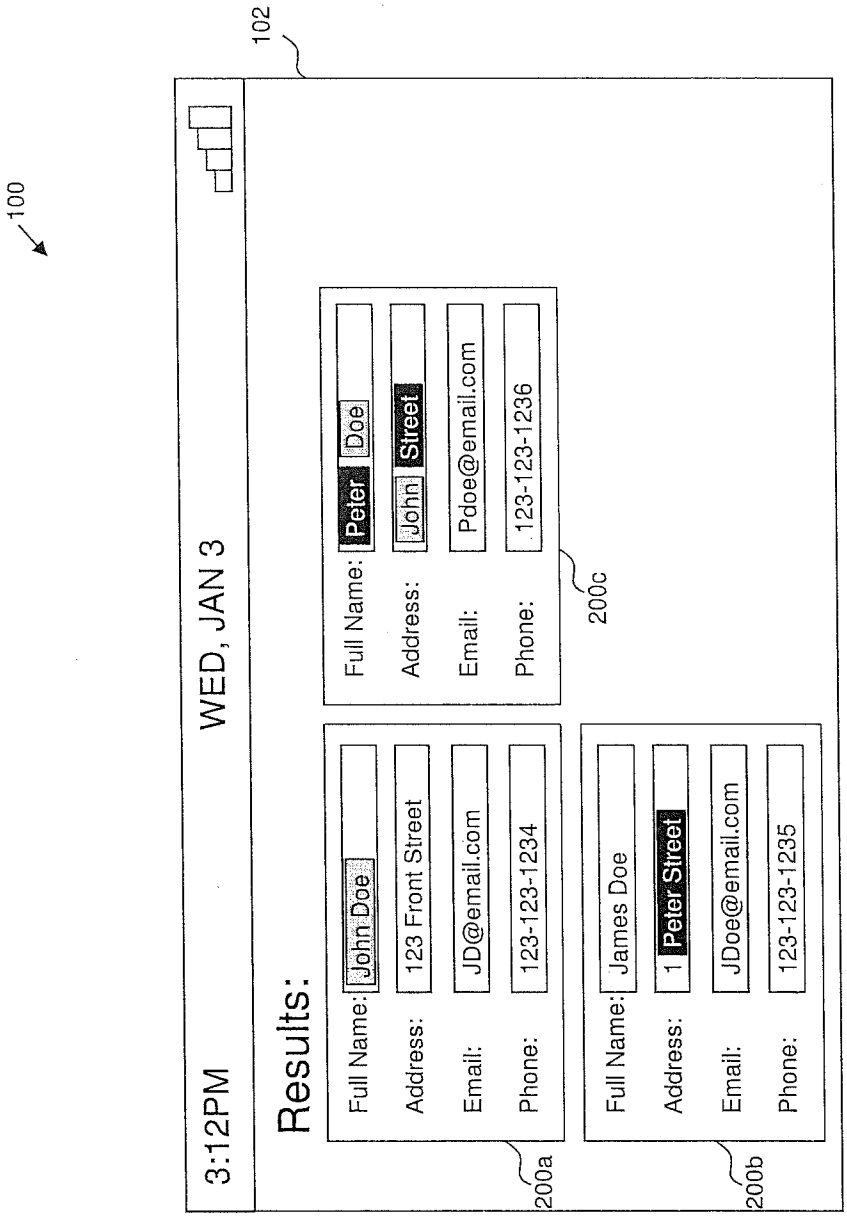

100
102
3:12PM
WED, JAN 3
Results:
Full Name: John Doe
Address: 123 Front Street
Email: JD@email.com
Phone: 123-123-1234
200a
Full Name: James Doe
Address: 1 Peter Street
Email: JDoe@email.com
Phone: 123-123-1235
200b
Full Name: Peter Doe
Address: John Street
Email: Pdoe@email.com
Phone: 123-123-1236
200c

FIG. 2

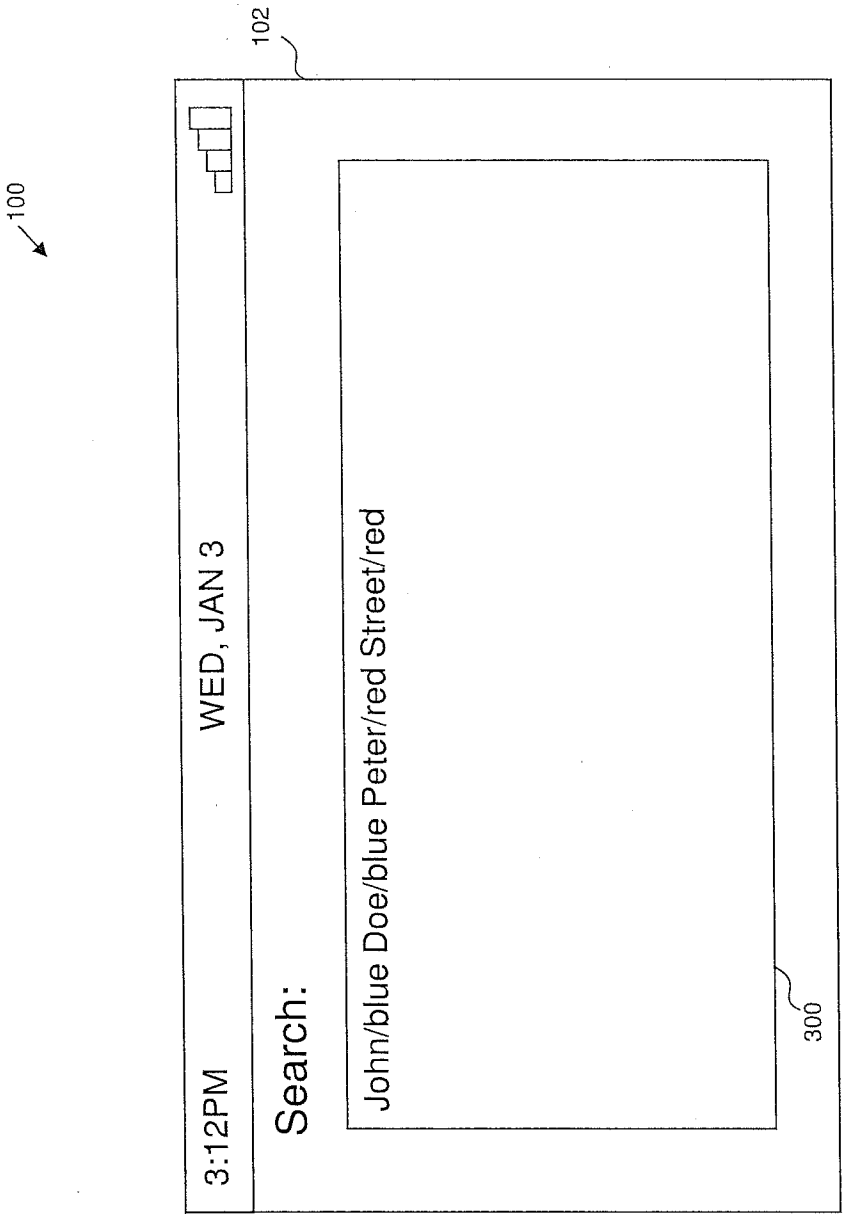

100
102
3:12PM
WED, JAN 3
Search:
John/blue Doe/blue Peter/red Street/red
300

FIG. 3

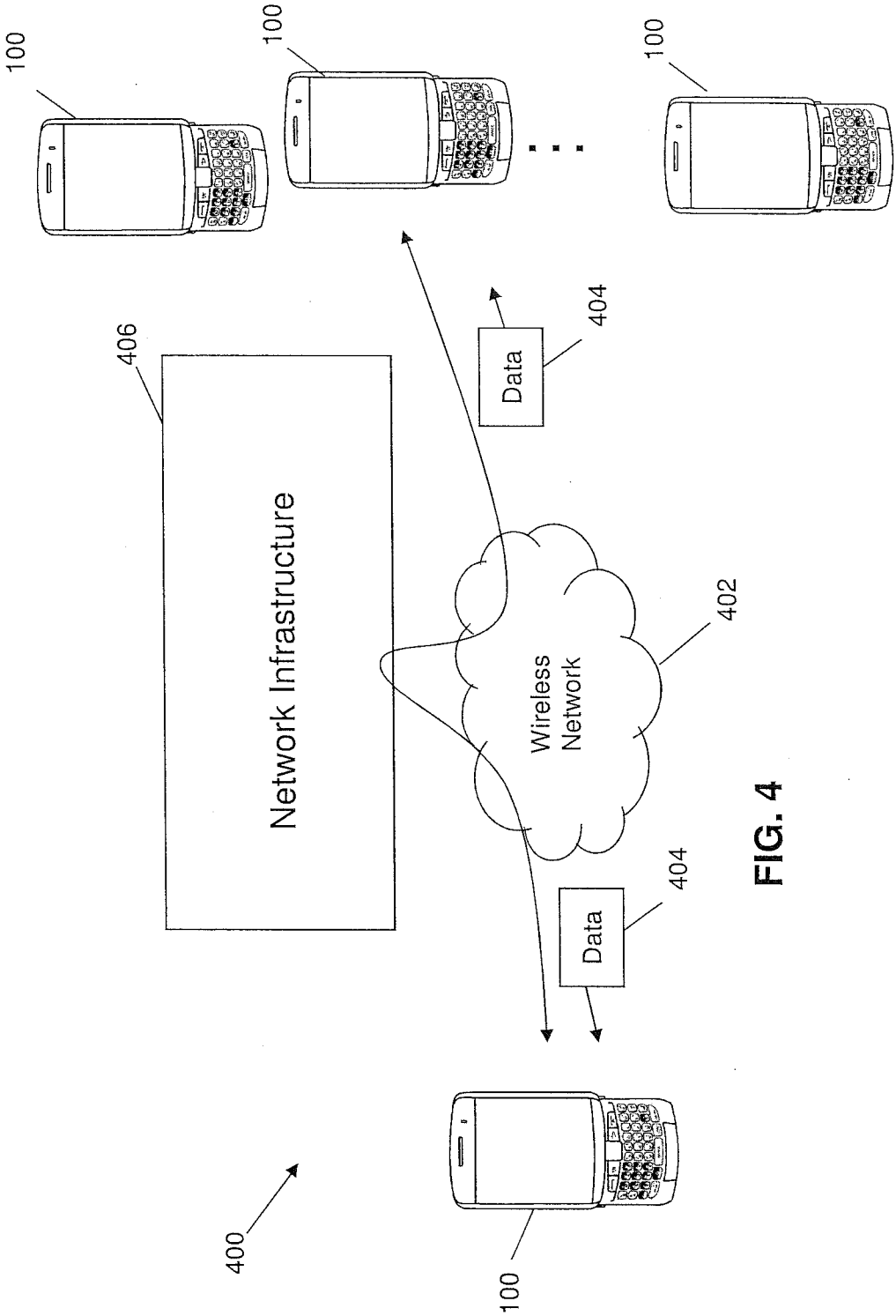

100
100
100
404
Data
406
Network Infrastructure
Wireless Network
402
404
Data
400
100

FIG. 4

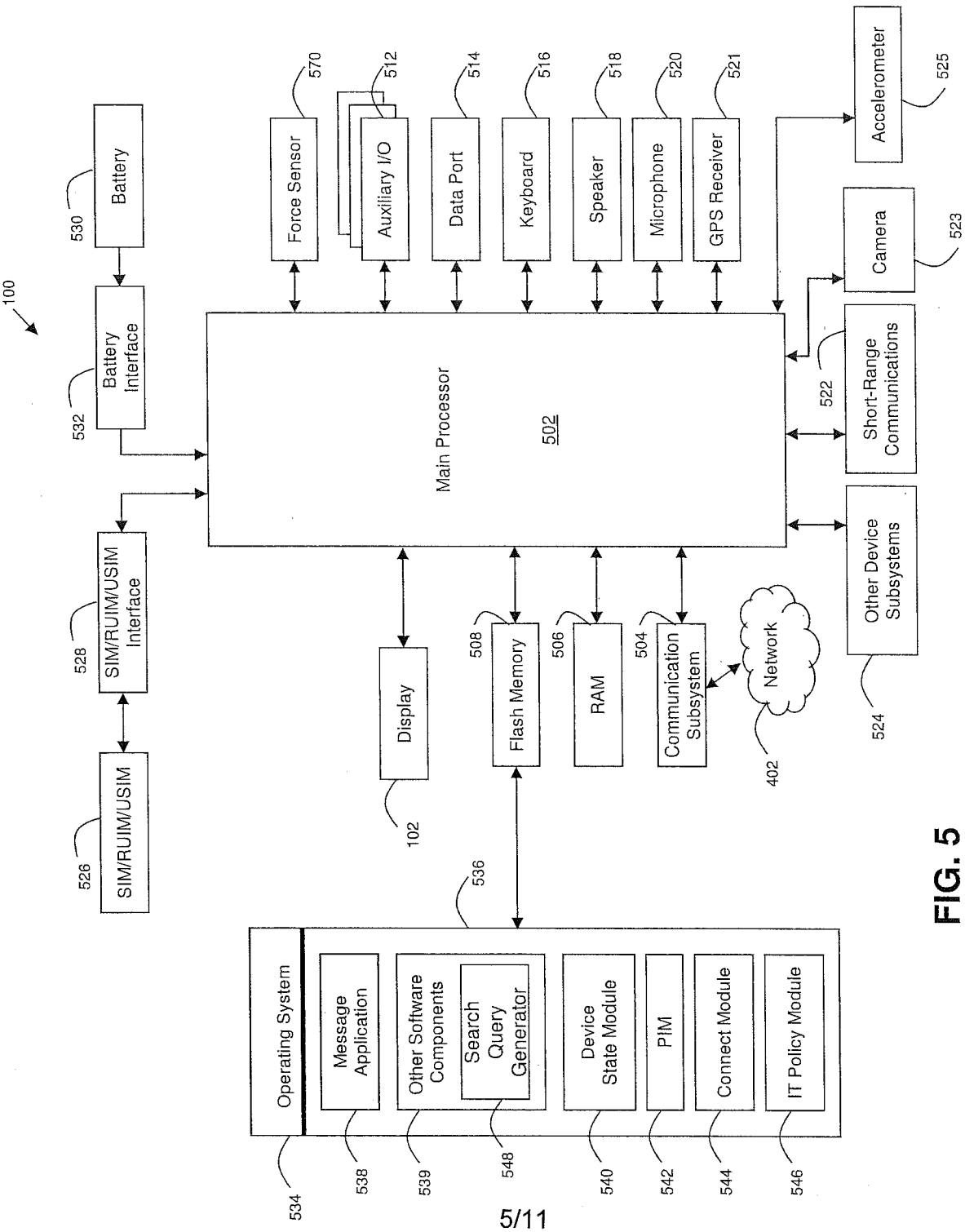

100
Battery
530
Battery Interface
532
SIM/RUIM/USIM Interface
528
SIM/RUIM/USIM
526
Force Sensor
570
Auxiliary I/O
512
Data Port
514
Keyboard
516
Speaker
518
Microphone
520
GPS Receiver
521
Accelerometer
525
Camera
523
Short-Range Communications
522
Other Device Subsystems
524
Main Processor
502
Display
102
Flash Memory
508
RAM
506
Communication Subsystem
504
Network
402
536
Operating System
534
Message Application
538
Other Software Components
539
Search Query Generator
548
Device State Module
540
PIM
542
Connect Module
544
IT Policy Module
546

FIG. 5

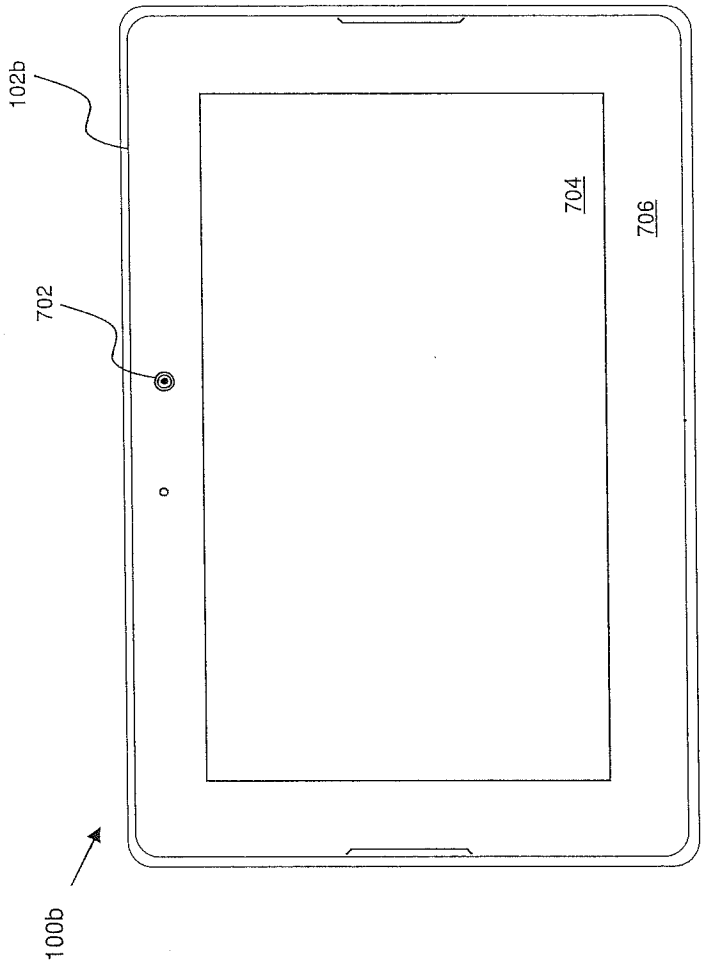


FIG. 7

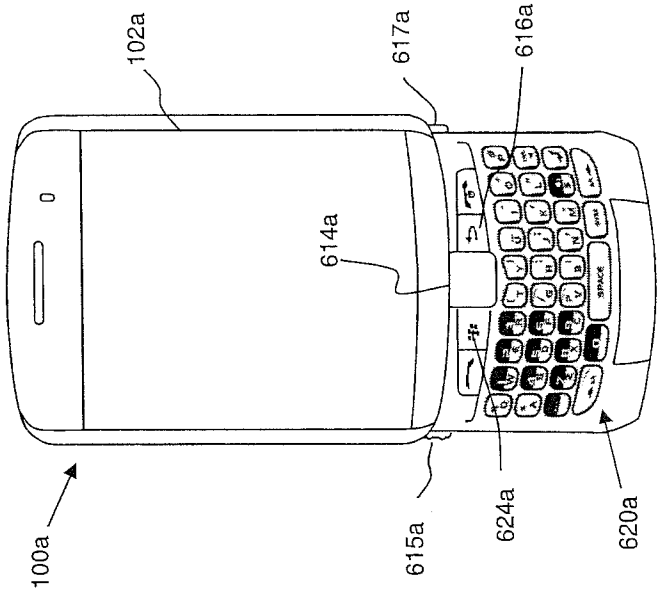


FIG. 6

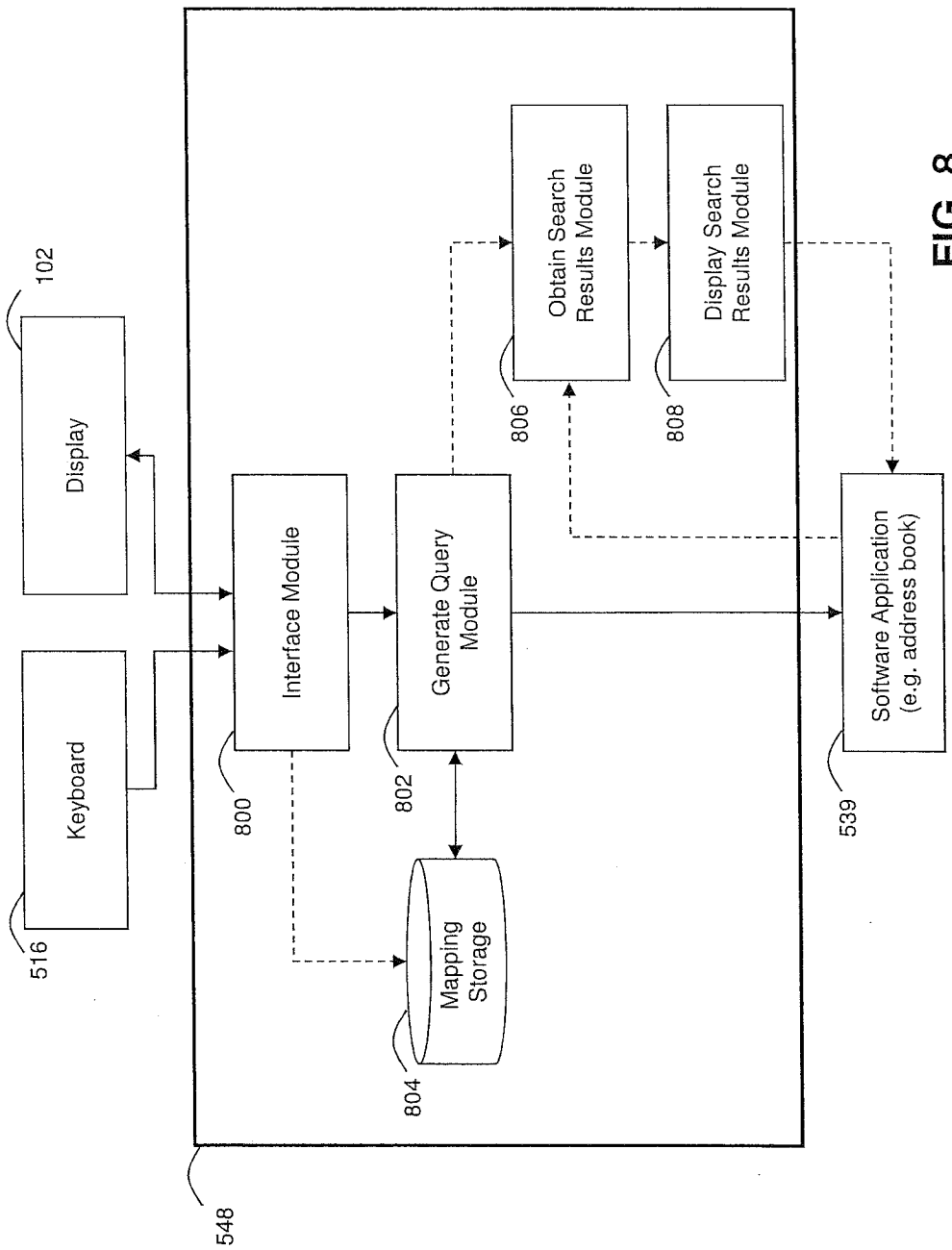

102
Display
516
Keyboard
548
Interface Module
800
Generate Query Module
802
Mapping Storage
804
Obtain Search Results Module
806
Display Search Results Module
808
Software Application (e.g. address book)
539

FIG. 8

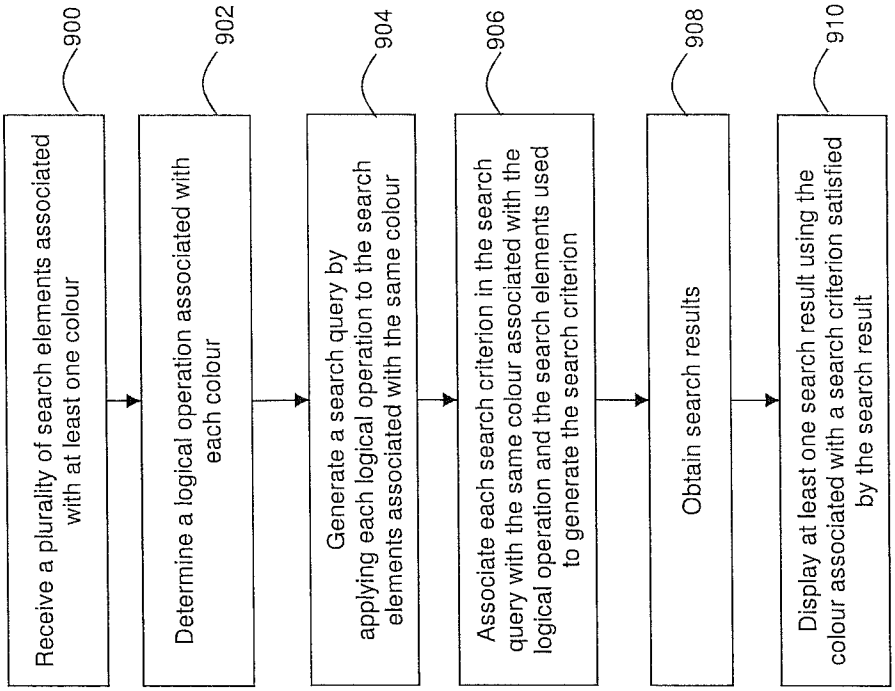

900
Receive a plurality of search elements associated with at least one colour
902
Determine a logical operation associated with each colour
904
Generate a search query by applying each logical operation to the search elements associated with the same colour
906
Associate each search criterion in the search query with the same colour associated with the logical operation and the search elements used to generate the search criterion
908
Obtain search results
910
Display at least one search result using the colour associated with a search criterion satisfied by the search result

FIG. 9

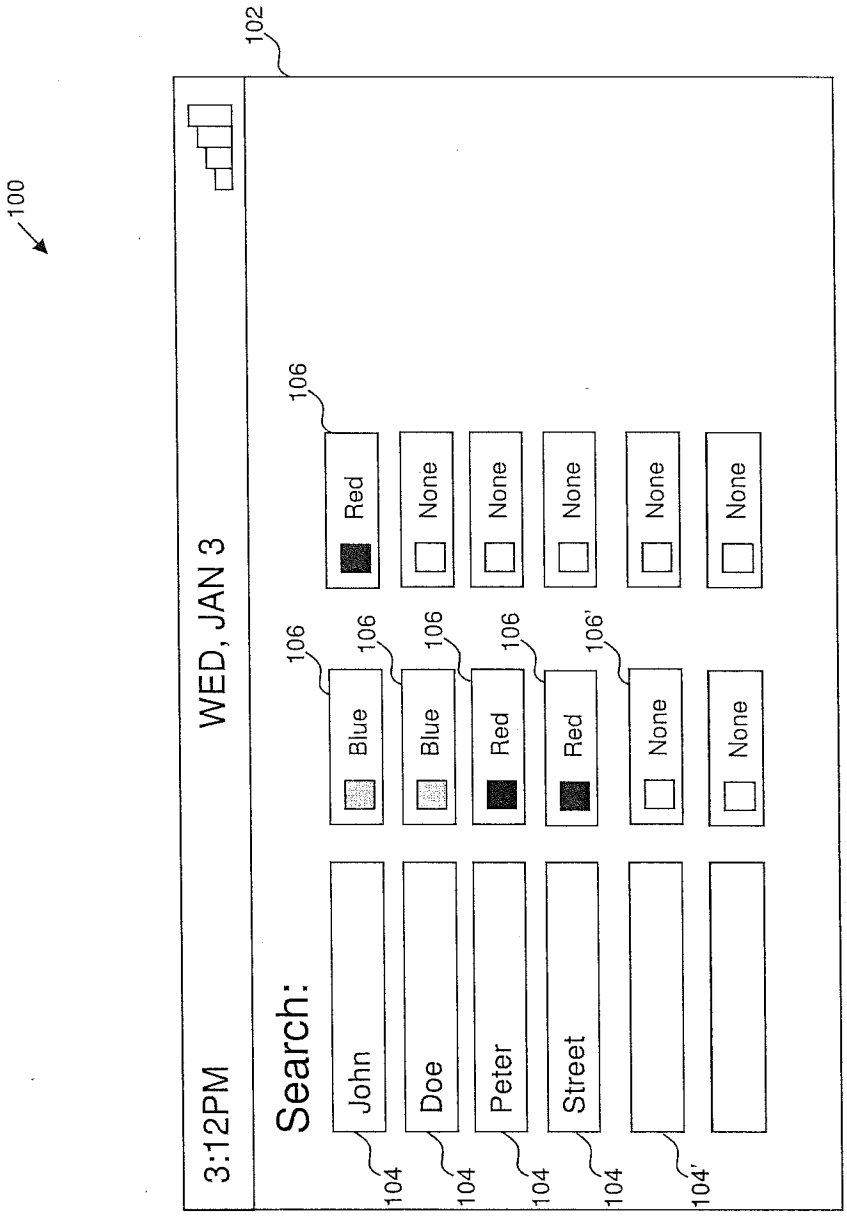

100
102
3:12PM
WED, JAN 3
Search:
John
Doe
Peter
Street
104
104
104
104
104'
Blue
Blue
Red
Red
None
None
None
None
None
None
106
106
106
106
106'
106
106
106
106
106
106

FIG. 10

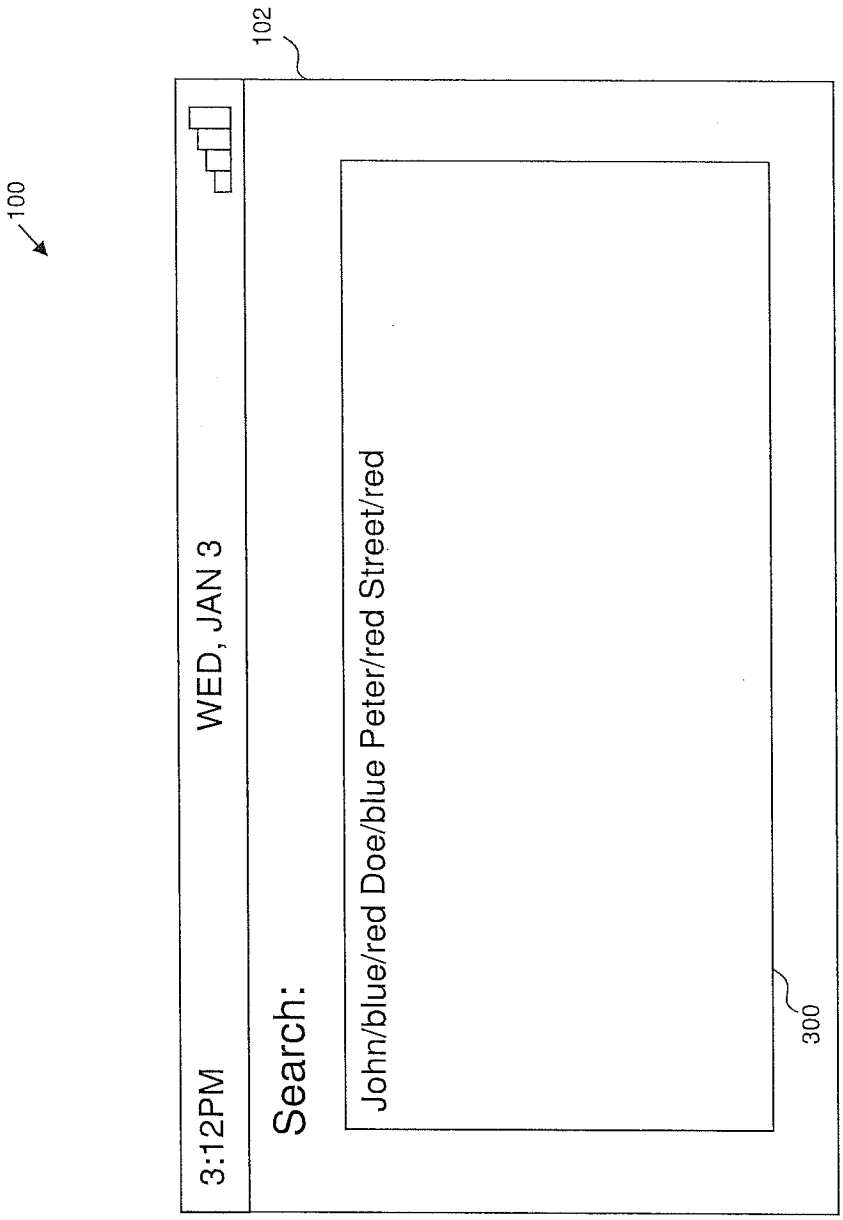

100
102
3:12PM
WED, JAN 3
Search:
John/blue/red Doe/blue Peter/red Street/red
300

FIG. 11

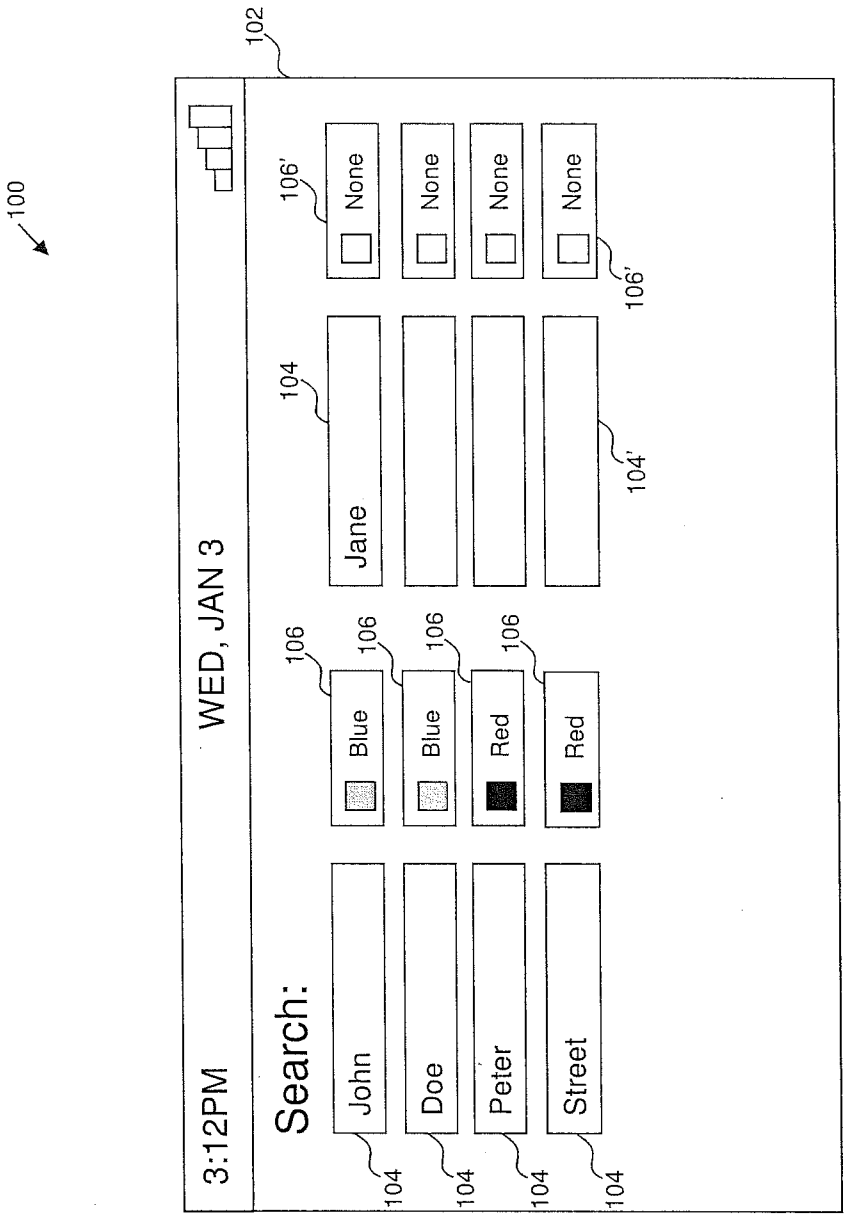

100
102
3:12PM
WED, JAN 3
Search:
John
Doe
Peter
Street
104
Blue
Blue
Red
Red
106
Jane
104'
None
None
None
None
106'

FIG. 12

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CA2012/050709

A. CLASSIFICATION OF SUBJECT MATTER
IPC: ***G06F 17/30*** (2006.01)
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC: ***G06F 17/30*** (2006.01)

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

Electronic database(s) consulted during the international search (name of database(s) and, where practicable, search terms used)
Databases: WEST, INTELLECT, TOTAL PATENT, IEEE-XPLORE
Search Strategy: Create search elements from IPC and Key words
IPC: *G06F 17/30* (2006.01)
Search Key words: generating a search query, GUI or graphical user interface, search elements/ search terms/ search inputs/ search parameters, mapping modules/storage, logical operation, Boolean, search criteria, visual property or characteristics or visual representation, search result.

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 2011/076919 A1 (Cohen et al.) 30 June 2011 (30-06-2011) Whole document	1-15
A	US 2012/0066201 A1 (Suman et al.) 15 March 2012 (15-03-2012) Whole document	1-15
A	US 2005/0004911 A1 (Goldberg et al.) 6 January 2005 (06-01-2005) abstract, para. [0014]	1-15
A	US 2003/0172061 A1 (Krupin et al.) 11 September2003 (11-09-2003) abstract, para. [0027]-[0033]	1-15

[ ] Further documents are listed in the continuation of Box C.

[X] See patent family annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

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

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"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
10 June 2013 (10.06.2013)	02 July 2013 (02-07-2013)

Name and mailing address of the ISA/CA	Authorized officer
Canadian Intellectual Property Office Place du Portage I, C114 - 1st Floor, Box PCT 50 Victoria Street Gatineau, Quebec K1A 0C9 Facsimile No.: 001-819-953-2476	Adel El Hamad (819) 934-2194

Patent Document Cited in Search Report	Publication Date	Patent Family Member(s)	Publication Date
WO2011/076919A1	30 June 2011 (30-06-2011)	EP2517125A1	31 October 2012 (31-10-2012)
		US2012/0324395A1	20 December 2012 (20-12-2012)
US2012/0066201A1	15 March 2012 (15-03-2012)	None	
US2005/0004911A1	06 January 2005 (06-01-2005)	US2005/0004911A1	06 January 2005 (06-01-2005)
		US7383513B2	03 June 2008 (03-06-2008)
US2003/0172061A1	11 September 2003 (11-09-2003)	AU2003212463A1	16 September 2003 (16-09-2003)
		US6751611B2	15 June 2004 (15-06-2004)
		US2004/0059729A1	25 March 2004 (25-03-2004)
		WO03/075186A1	12 September 2003 (12-09-2003)