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Beaurepaire et al.

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(45) **Date of Patent: Jun. 23, 2015**

(54) **METHODS, APPARATUSES, AND COMPUTER PROGRAM PRODUCTS FOR RETRIEVING VIEWS EXTENDING A USER'S LINE OF SIGHT**

(71) Applicant: **Nokia Technologies OY**, Espoo (FI)

(72) Inventors: **Jerome Beaurepaire**, Berlin (DE); **Maguy Jamain**, Berlin (DE)

(73) Assignee: **Nokia Technologies Oy**, Espoo (FI)

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G01C 21/36	(2006.01)
G06F 3/0481	(2013.01)

(52) **U.S. Cl.**

CPC ***G06F 3/03*** (2013.01); ***G01C 21/3647*** (2013.01); ***G06F 3/04815*** (2013.01); ***G01C 21/3638*** (2013.01); ***G01C 21/3679*** (2013.01)

(58) **Field of Classification Search**

CPC G06F 9/4401; G06F 9/4405; A63F 13/00; A63F 13/005; A63F 2300/203

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See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

6,526,352	B1 *	2/2003	Breed et al.	701/470
6,563,529	B1	5/2003	Jongerius	
8,325,712	B2 *	12/2012	Buckley et al.	370/352
8,489,948	B2 *	7/2013	Hannuksela et al.	714/746
8,519,858	B2 *	8/2013	Tysowski et al.	340/669
8,700,303	B2 *	4/2014	Uusitalo	701/300

(Continued)

FOREIGN PATENT DOCUMENTS

EP	2 270 767 A1	1/2011
JP	2008-241875	10/2008
WO	WO 2014/102455 A2	7/2014

OTHER PUBLICATIONS

Google Maps—Wikipedia, the free encyclopedia; Downloaded at http://en.wikipedia.org/wiki/Google_maps on Jan. 24, 2013; 26 pages.

(Continued)

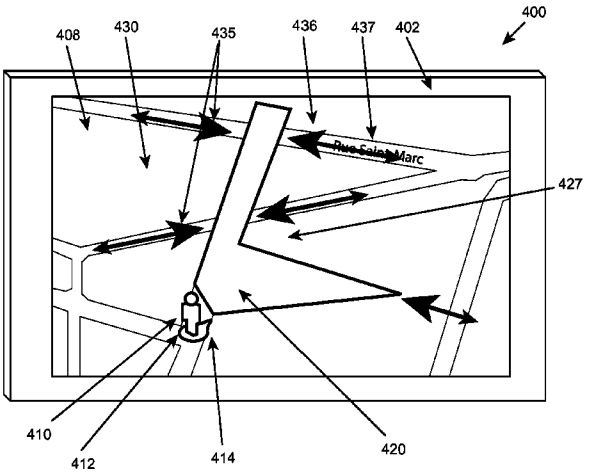
Primary Examiner — McDieunel Marc

(74) *Attorney, Agent, or Firm* — Alston & Bird LLP

(57) **ABSTRACT**

Methods, apparatuses, and computer program products are herein provided for retrieving views extending a user's line of sight. A method includes determining a line of sight based at least in part on a user's location and orientation. The line of sight defines a first portion of a map representing information that is within the user's sight and a second portion of the map representing information that is out of the user's sight. The method further includes determining at least one image associated with at least one location within the second portion of the map. The method further includes causing the image associated with the at least one location to be presented to the user. Corresponding apparatuses and computer program products are also provided.

18 Claims, 14 Drawing Sheets



(56) **References Cited**

U.S. PATENT DOCUMENTS

2008/0066000	A1	3/2008	Ofek et al.	
2009/0063047	A1*	3/2009	Ono	701/211
2010/0125407	A1*	5/2010	Cho et al.	701/201
2011/0093194	A1*	4/2011	Paik et al.	701/208
2011/0190008	A1*	8/2011	Eronen et al.	455/456.3
2011/0246845	A1*	10/2011	Hannuksela et al.	714/746
2011/0283223	A1	11/2011	Vaittinen et al.	
2011/0287811	A1	11/2011	Mattila et al.	
2011/0320116	A1*	12/2011	DeMaio et al.	701/201
2012/0168497	A1*	7/2012	Yach	235/375
2012/0203460	A1*	8/2012	Cho et al.	701/538
2013/0184007	A1*	7/2013	Hategan et al.	455/456.1

OTHER PUBLICATIONS

Google Street View—Wikipedia, the free encyclopedia; Downloaded at http://en.wikipedia.org/wiki/Google_street_view on Jan. 24, 2013; 17 pages.

International Search Report for Application No. PCT/FI2013/051191 dated Jul. 16, 2014.

* cited by examiner

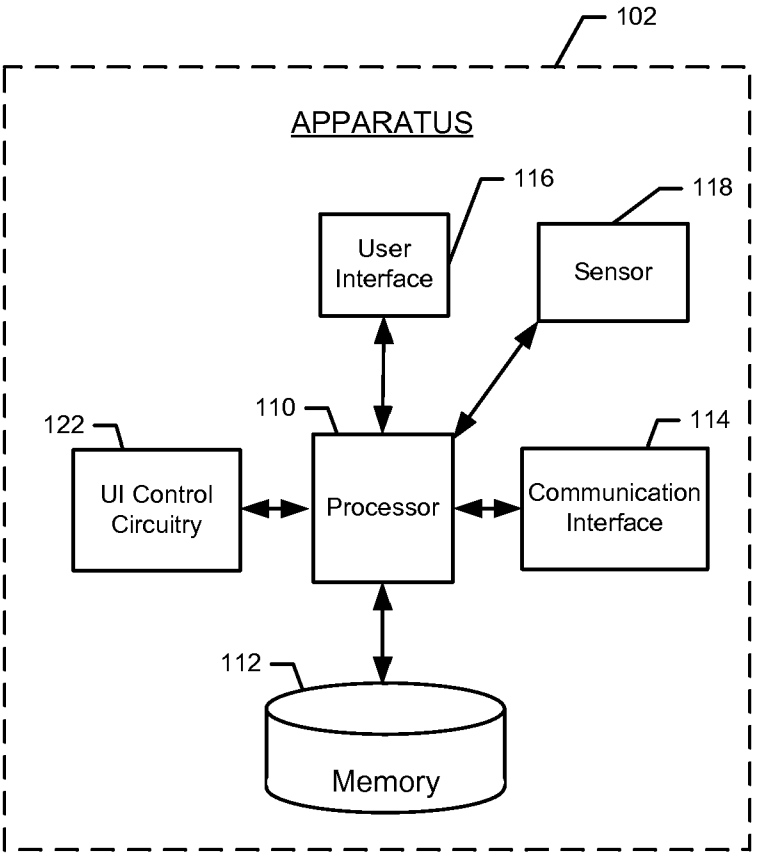

102
APPARATUS
116
User Interface
118
Sensor
110
122
UI Control Circuitry
Processor
114
Communication Interface
112
Memory

FIG. 1

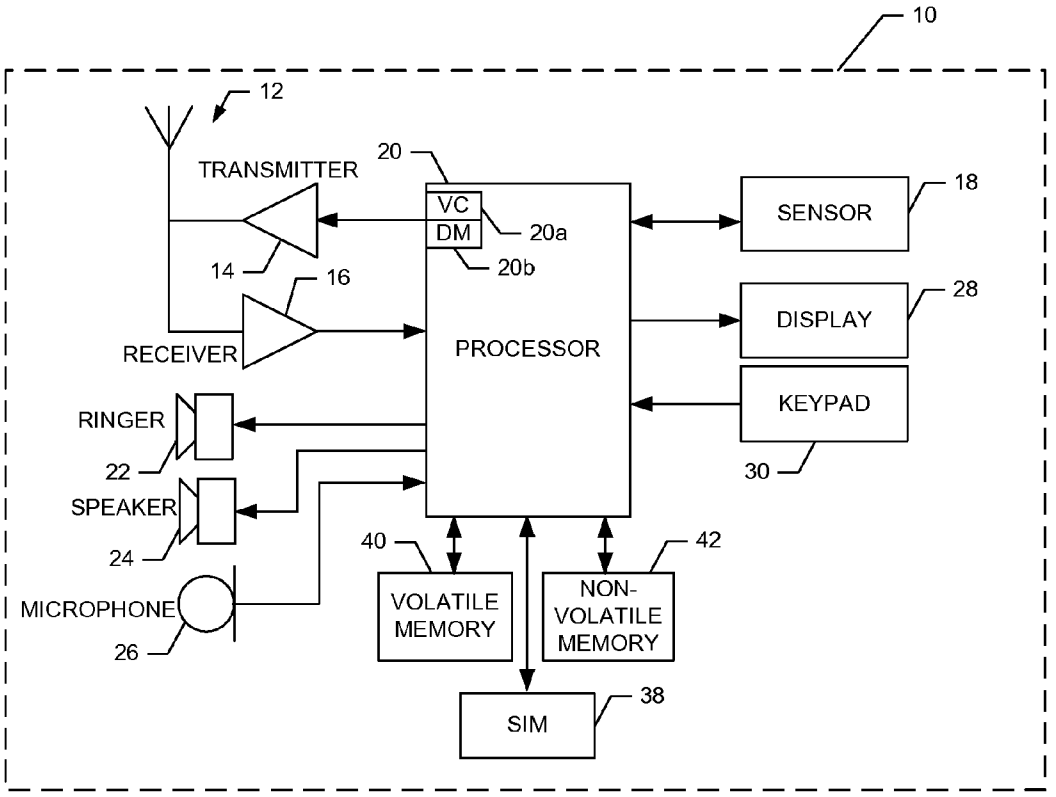

10
12
TRANSMITTER
20
VC
DM
20a
20b
SENSOR
18
14
16
RECEIVER
PROCESSOR
DISPLAY
28
KEYPAD
RINGER
22
30
SPEAKER
24
40
42
MICROPHONE
26
VOLATILE MEMORY
NON-VOLATILE MEMORY
SIM
38

FIG. 2

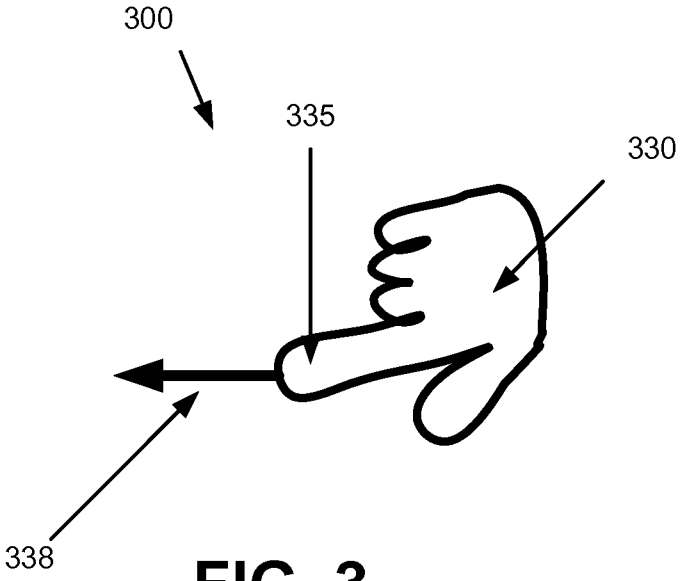


FIG. 3

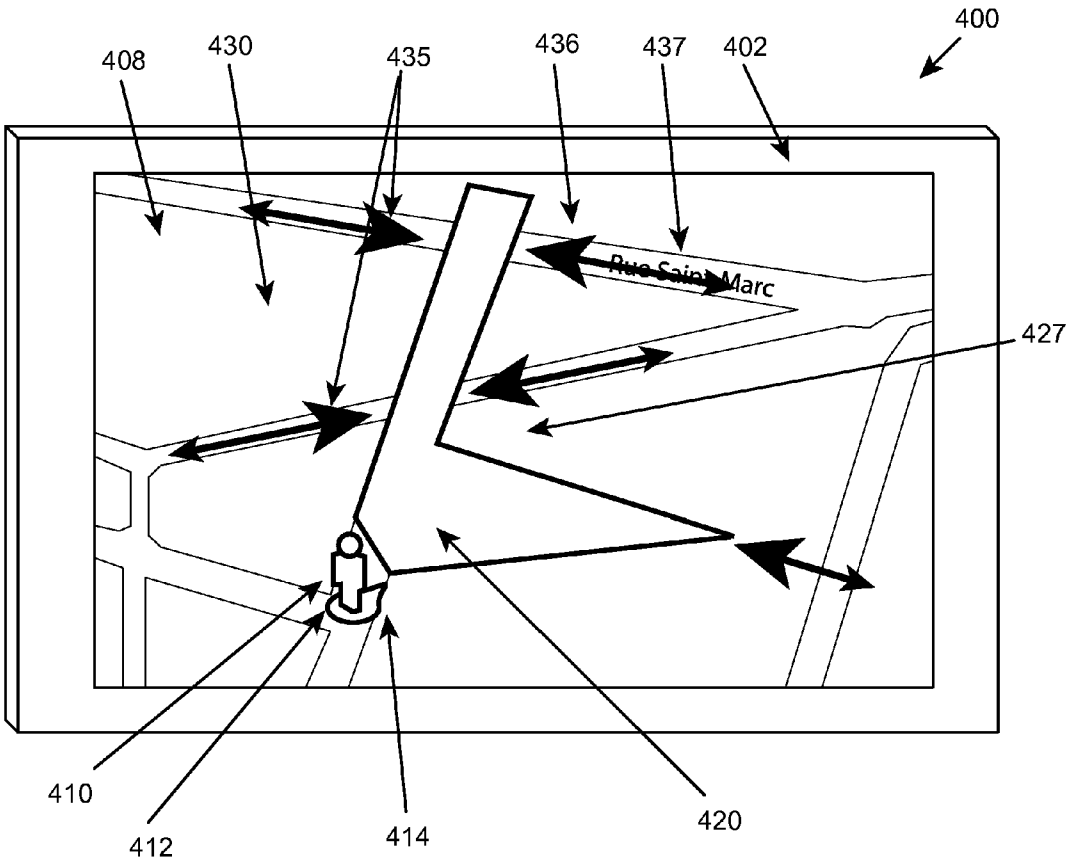


FIG. 4

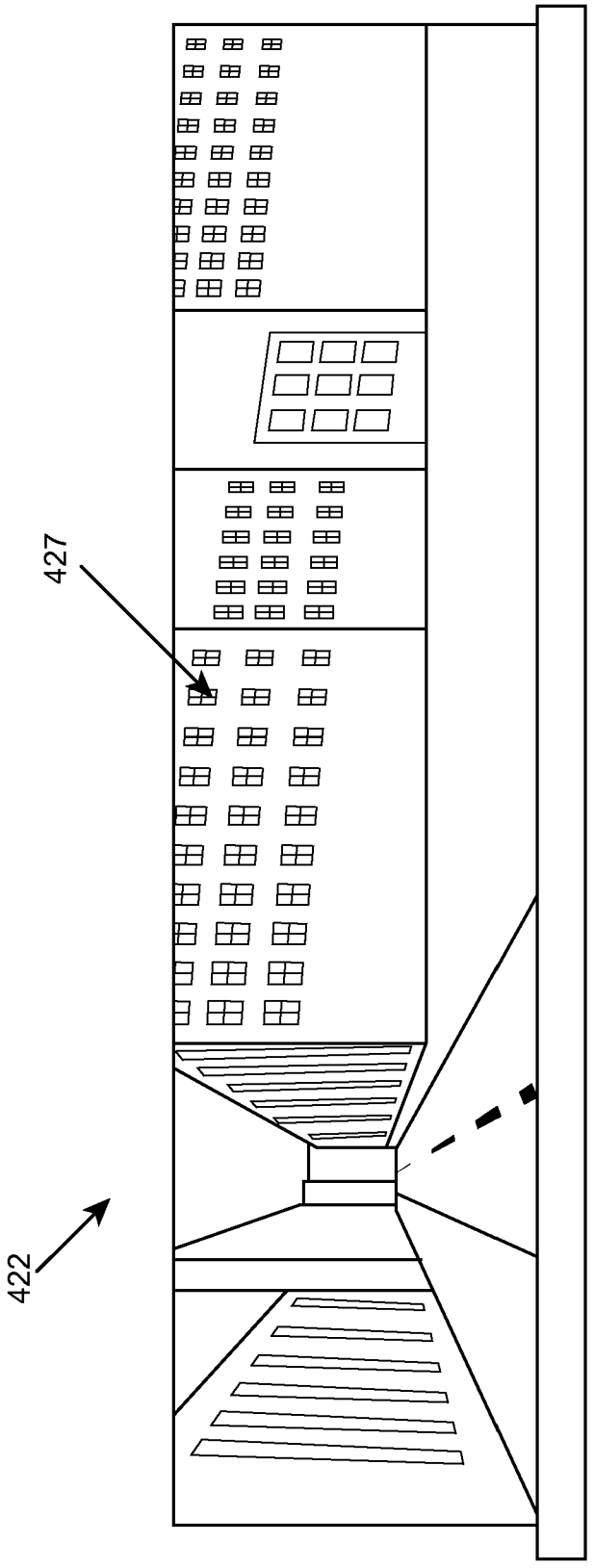


FIG. 5

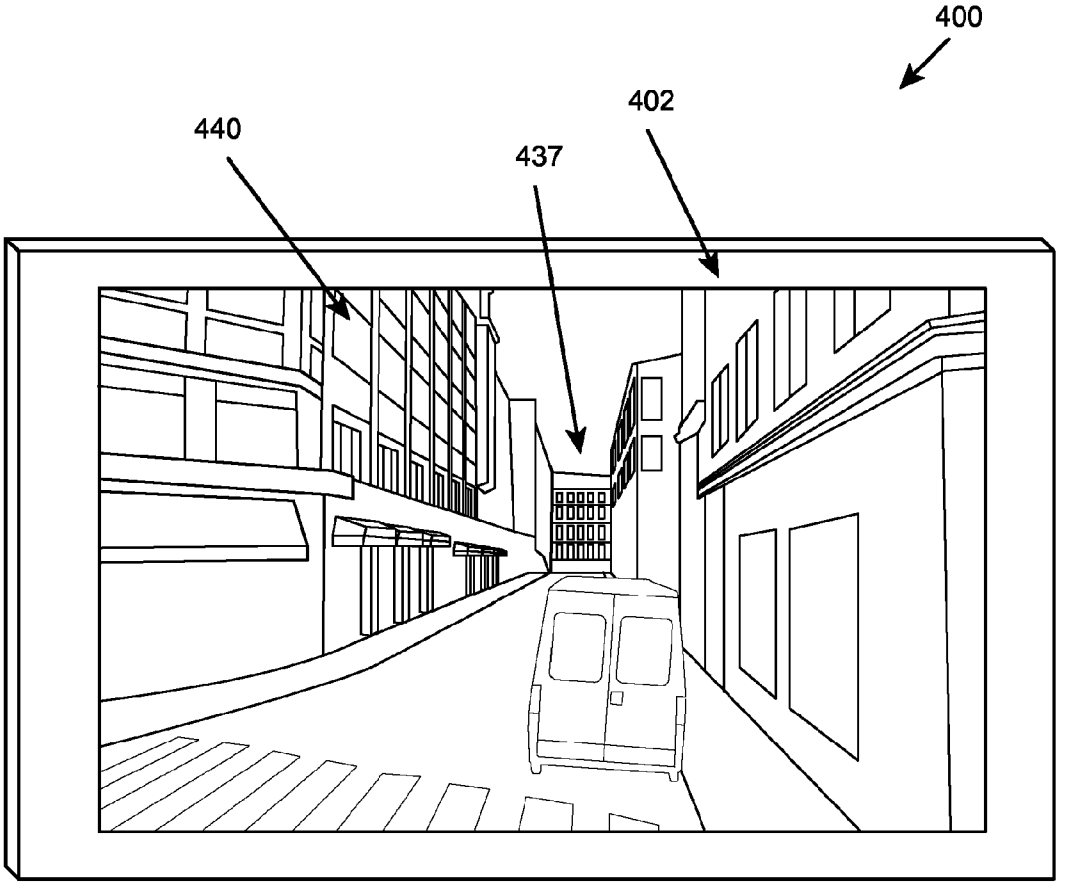


FIG. 6

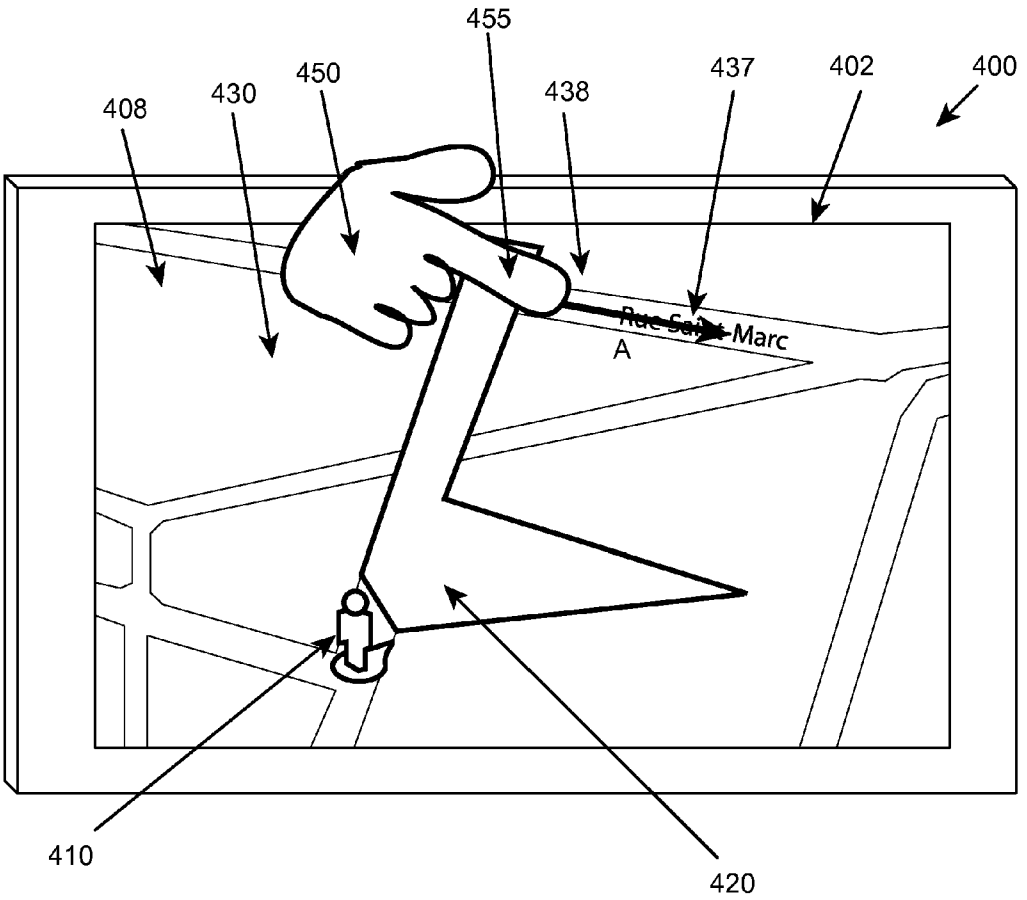


FIG. 7

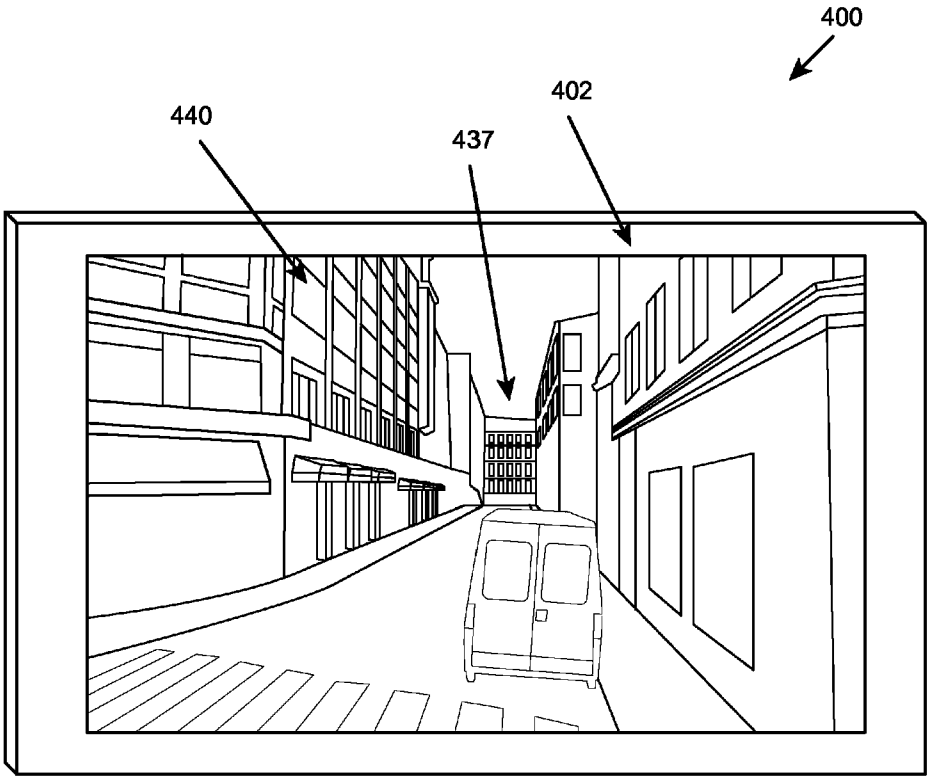


FIG. 8

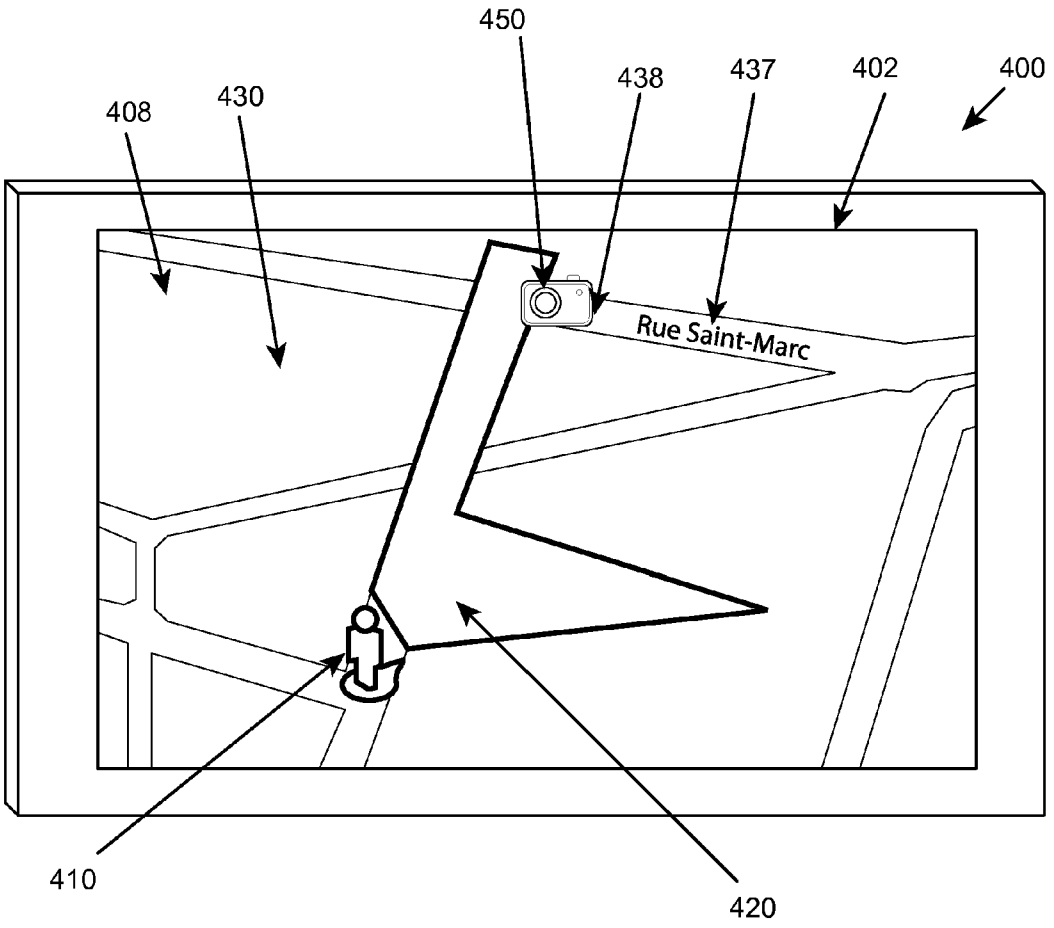


FIG. 9

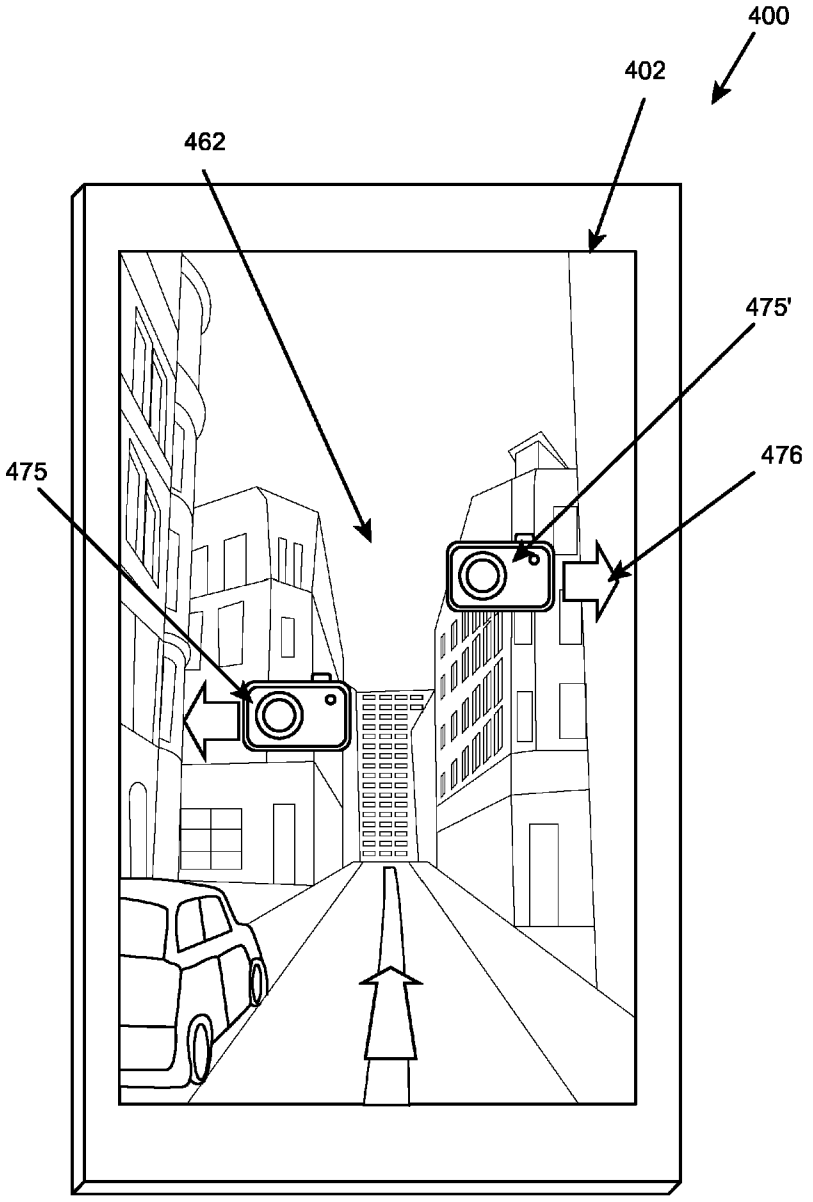


FIG. 10

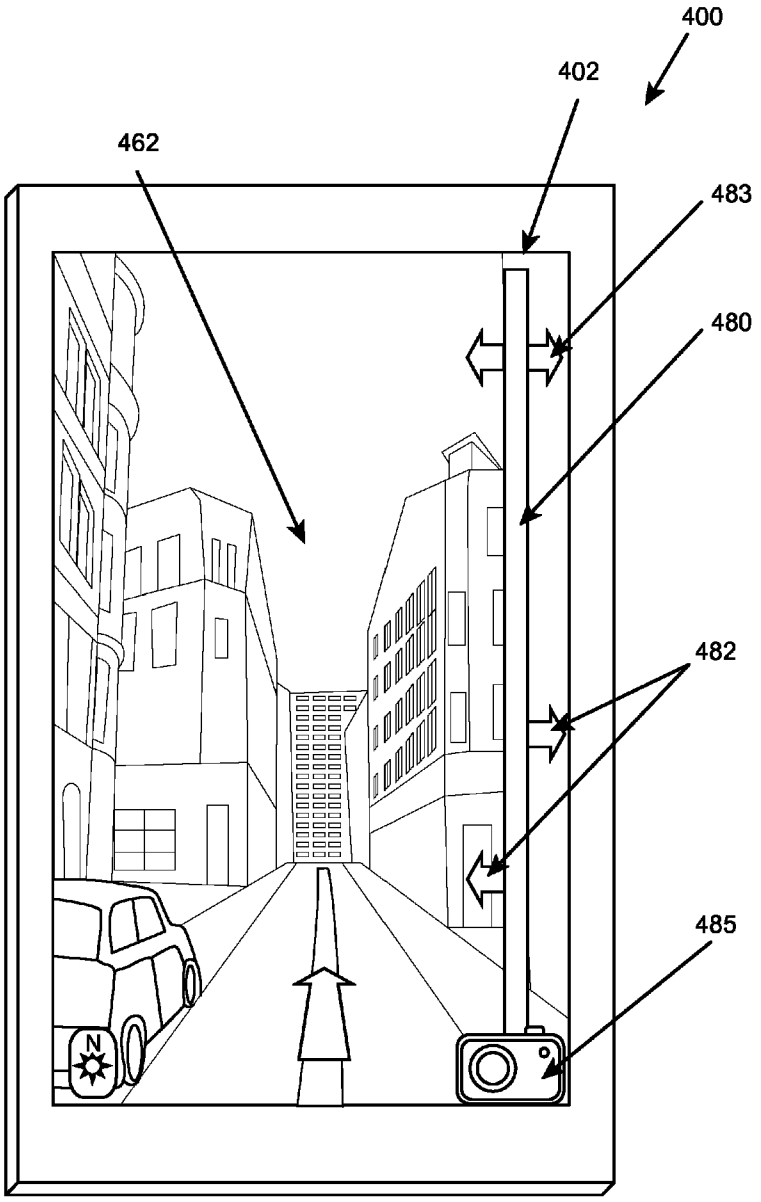


FIG. 11

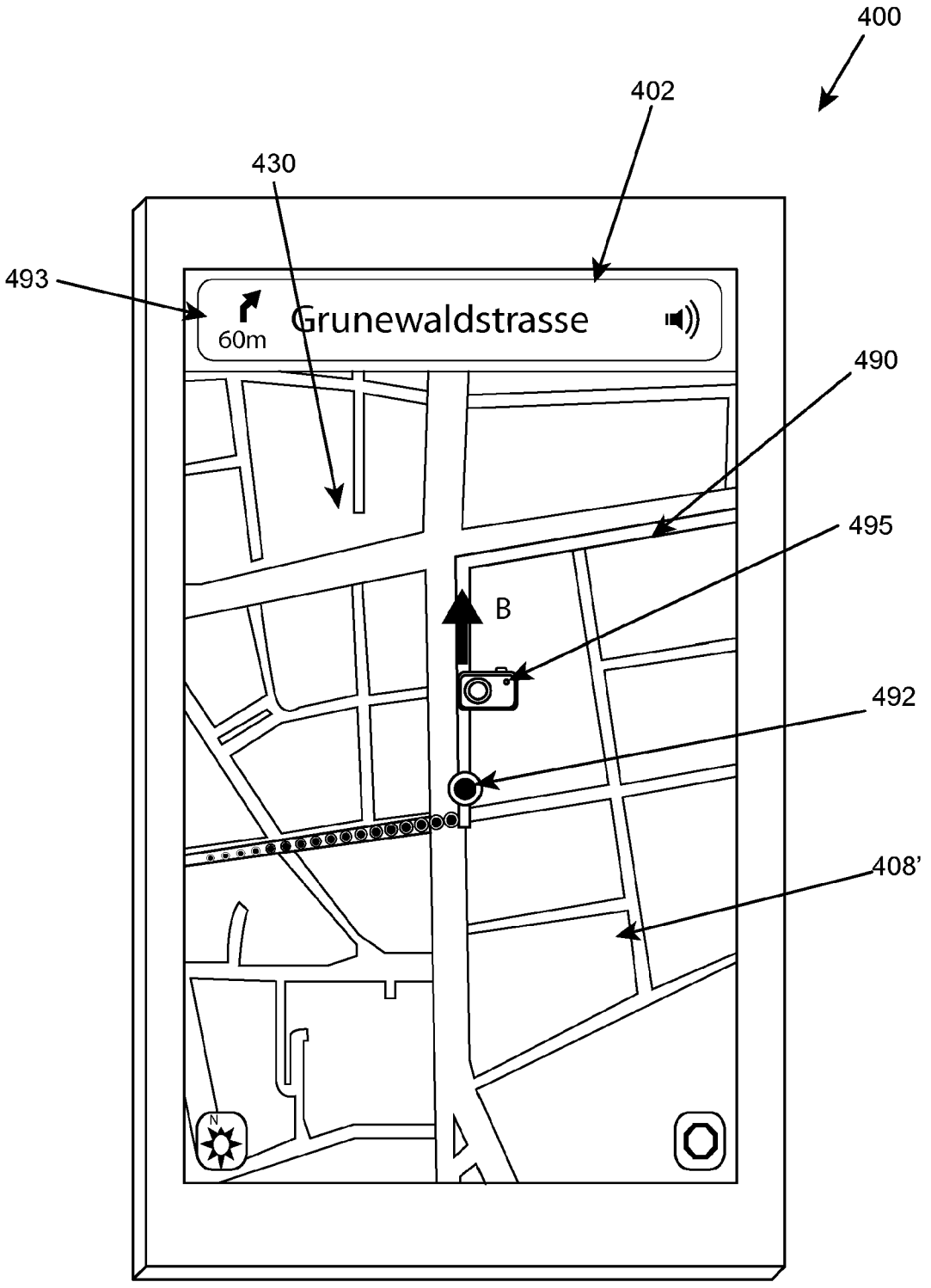


FIG. 12

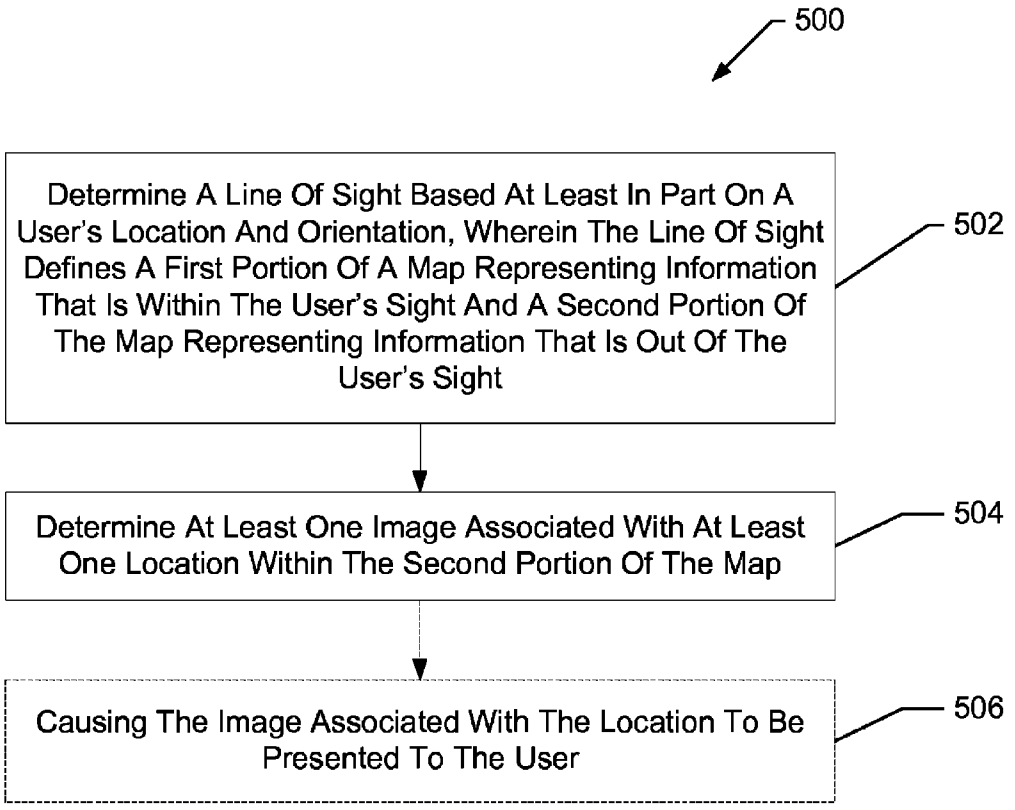

500
Determine A Line Of Sight Based At Least In Part On A User's Location And Orientation, Wherein The Line Of Sight Defines A First Portion Of A Map Representing Information That Is Within The User's Sight And A Second Portion Of The Map Representing Information That Is Out Of The User's Sight
502
Determine At Least One Image Associated With At Least One Location Within The Second Portion Of The Map
504
Causing The Image Associated With The Location To Be Presented To The User
506

FIG. 13

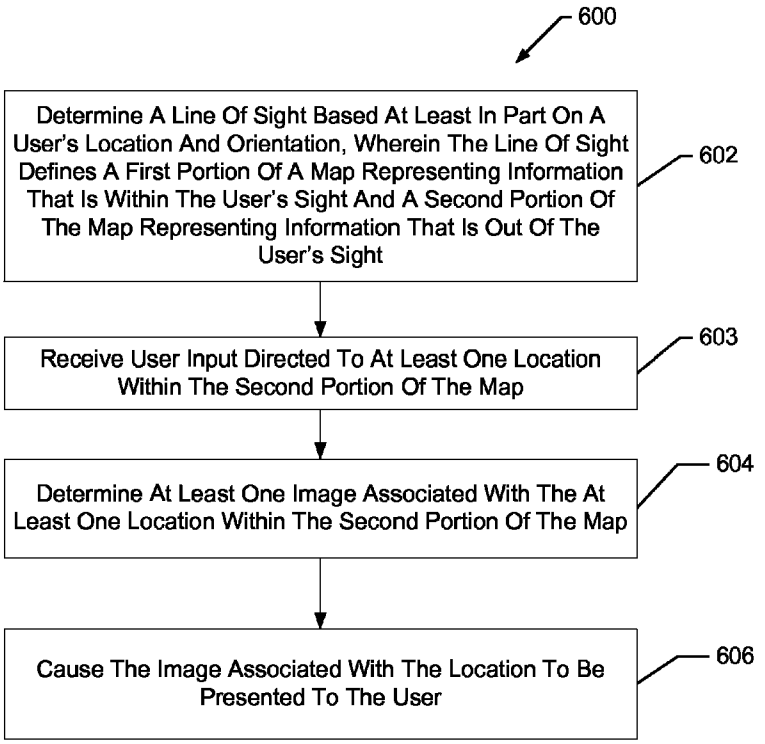

600
Determine A Line Of Sight Based At Least In Part On A User's Location And Orientation, Wherein The Line Of Sight Defines A First Portion Of A Map Representing Information That Is Within The User's Sight And A Second Portion Of The Map Representing Information That Is Out Of The User's Sight
602
Receive User Input Directed To At Least One Location Within The Second Portion Of The Map
603
Determine At Least One Image Associated With The At Least One Location Within The Second Portion Of The Map
604
Cause The Image Associated With The Location To Be Presented To The User
606

FIG. 14

METHODS, APPARATUSES, AND COMPUTER PROGRAM PRODUCTS FOR RETRIEVING VIEWS EXTENDING A USER'S LINE OF SIGHT

TECHNOLOGICAL FIELD

An example embodiment of the present invention relates generally to user interface technology and, more particularly, relates to methods, apparatuses, and computer program products for retrieving views extending a user's line of sight.

BACKGROUND

The modern communications era has brought about a tremendous expansion of wireline and wireless networks. Wireless and mobile networking technologies have addressed related consumer demands, while providing more flexibility and immediacy of information transfer. Concurrent with the expansion of networking technologies, an expansion in computing power has resulted in development of affordable computing devices capable of taking advantage of services made possible by modern networking technologies. This expansion in computing power has led to a reduction in the size of computing devices and given rise to a new generation of mobile devices that are capable of performing functionality that only a few years ago required processing power that could be provided only by the most advanced desktop computers. Consequently, mobile computing devices having a small form factor have become ubiquitous and are used to access network applications and services by consumers of all socioeconomic backgrounds.

BRIEF SUMMARY

With increased computing function and decreased form factor, mobile computing devices may provide many different useful functions. For example, mobile computing devices may be useful for navigation purposes. Additionally, some mobile computing devices may present images to the user.

In some cases, a user may wish to view possible destinations or locations without having to actually travel to those destinations or locations. As such, some embodiments of the present invention seek to provide retrieval of images associated with locations that are currently out of the user's sight. Additionally, in some embodiments, a user-friendly interface is contemplated that enables the user to quickly view images associated with the location. In such a manner, the user may view the image and determine if they wish to travel to that location.

Thus, some example embodiments of the present invention provide for retrieving views extending a user's line of sight. In one example embodiment, a method includes determining a line of sight based at least in part on a user's location and orientation. The line of sight defines a first portion of a map representing information that is within the user's sight and a second portion of the map representing information that is out of the user's sight. The method further includes determining at least one image associated with at least one location within the second portion of the map. In some embodiments, the method further includes causing the image associated with the location to be presented to the user.

In some embodiments, the method further includes receiving user input directed to the at least one location within the second portion of the map. Additionally, the method further includes, in response to receiving the user input, causing the image associated with the location to be presented to the user.

Additionally, in some embodiments, the method comprises receiving user input directed to the at least one location within the second portion of the map by receiving user input comprising a slide gesture.

In some embodiments, the method further includes causing presentation of the line of sight on the map. Additionally, in some embodiments, the method further includes receiving user input directed to the at least one location within the second portion of the map. Additionally, the method may further include, in response to receiving the user input, causing the image associated with the location to be presented to the user. Additionally, in some embodiments, the method may further include causing presentation of an icon relative to the location within the second portion of the map. Additionally, in some embodiments, the method may further include receiving user input directed to the icon and, in response to receiving the user input, causing the image associated with the location to be presented to the user.

In some embodiments, the method may further include causing presentation of a slide relative to the first portion of the map. Additionally, a portion of the slide may be associated with the at least one location within the second portion of the map. In some embodiments, the method may further include receiving user input directed to at least a portion of the slide and, in response to receiving the user input, causing the image associated with the location to be presented to the user.

In some embodiments, the method may further include determining the line of sight by determining the line of sight based at least in part on an object within the user's sight.

In some embodiments, the method may further include causing presentation of a route on the map. At least a portion of the route may be associated with the location within the second portion of the map. Additionally, the method may include causing presentation of an icon on the portion of the route associated with the location. Moreover, in some embodiments, the method may include receiving user input directed to the icon and, in response to receiving the user input, causing the image associated with the location to be presented to the user.

In some embodiments, the icon may be configured to slide along the route. Additionally, the method may include receiving user input by receiving user input defining a slide gesture with the icon extending from the portion of the route.

In another example embodiment, an apparatus comprises at least one processor and at least one memory storing computer program code with the at least one memory and stored computer program code being configured, with the at least one processor, to cause the apparatus to determine a line of sight based at least in part on a user's location and orientation. The line of sight defines a first portion of a map representing information that is within the user's sight and a second portion of the map representing information that is out of the user's sight. The at least one memory and stored computer program code are configured, with the at least one processor, to further cause the apparatus to determine at least one image associated with at least one location within the second portion of the map. In some embodiments, the at least one memory and stored computer program code are configured, with the at least one processor, to further cause the apparatus to cause the image associated with the location to be presented to the user.

In another example embodiment, a computer program product is provided. The computer program product of this example embodiment includes at least one computer-readable storage medium having computer-readable program instructions stored therein. The program instructions of this example embodiment comprise program instructions configured to cause an apparatus to perform a method including

determining a line of sight based at least in part on a user's location and orientation. The line of sight defines a first portion of a map representing information that is within the user's sight and a second portion of the map representing information that is out of the user's sight. The method further includes determining at least one image associated with at least one location within the second portion of the map. In some embodiments, the method further includes causing the image associated with the location to be presented to the user.

In another example embodiment, an apparatus is provided. The apparatus comprises means for determining a line of sight based at least in part on a user's location and orientation. The line of sight defines a first portion of a map representing information that is within the user's sight and a second portion of the map representing information that is out of the user's sight. The apparatus further comprises means for determining at least one image associated with at least one location within the second portion of the map. In some embodiments, the apparatus further comprises means for causing the image associated with the location to be presented to the user.

BRIEF DESCRIPTION OF THE DRAWINGS

Having thus described some embodiments of the invention in general terms, reference will now be made to the accompanying drawings, which are not necessarily drawn to scale, and wherein:

FIG. **1** illustrates a block diagram of an apparatus according to an example embodiment of the present invention;

FIG. **2** is a schematic block diagram of a mobile terminal according to an example embodiment of the present invention;

FIG. **3** illustrates an example user input of a slide gesture that may be received by an apparatus that may embody, for example, the apparatus shown in FIG. **1**, in accordance with an example embodiment of the present invention described herein;

FIG. **4** illustrates an example apparatus, such as the apparatus shown in FIG. **1**, with a map being presented on a display, wherein a line of sight of a user is presented, in accordance with an example embodiment of the present invention described herein;

FIG. **5** illustrates an image being presented on the apparatus shown in FIG. **4**, wherein the image represents information within a user's sight and corresponds to a first portion of the map shown in FIG. **4**, in accordance with an example embodiment of the present invention described herein;

FIG. **6** illustrates an example image being presented on the apparatus shown in FIG. **4**, wherein the image is associated with a location within a second portion of the map shown in FIG. **4** that is out of the user's sight, in accordance with an example embodiment of the present invention described herein;

FIG. **7** illustrates another example map being presented on the apparatus shown in FIG. **4**, wherein user input is directed to a location on the map, in accordance with an example embodiment of the present invention described herein;

FIG. **8** illustrates an example image being presented on the apparatus shown in FIG. **4**, wherein the image is associated with the location in which the user input of FIG. **7** was directed, in accordance with an example embodiment of the present invention described herein;

FIG. **9** illustrates another example map being presented on the apparatus shown in FIG. **4**, wherein an icon is being presented relative to a location on the map, in accordance with an example embodiment of the present invention described herein;

FIG. **10** illustrates an image being presented on the apparatus shown in FIG. **4**, wherein the image is representative of a view from a location, and wherein icons are presented on the image, in accordance with an example embodiment of the present invention described herein;

FIG. **11** illustrates the image shown in FIG. **10**, wherein a slide is presented on the image, in accordance with an example embodiment of the present invention described herein;

FIG. **12** illustrates another example map being presented on the apparatus shown in FIG. **4**, wherein a route and an icon are presented on the map, in accordance with an example embodiment of the present invention described herein;

FIG. **13** illustrates a flowchart according to an example method for retrieving views extending a user's line of sight, in accordance with an example embodiment of the present invention described herein; and

FIG. **14** illustrates a flowchart according to another example method for retrieving views extending a user's line of sight, in accordance with an example embodiment of the present invention described herein.

DETAILED DESCRIPTION

Some embodiments of the present invention will now be described more fully hereinafter with reference to the accompanying drawings, in which some, but not all embodiments of the invention are shown. Indeed, the invention may be embodied in many different forms and should not be construed as limited to the embodiments set forth herein; rather, these embodiments are provided so that this disclosure will satisfy applicable legal requirements. Like reference numerals refer to like elements throughout.

As used herein, the terms "data," "content," "information" and similar terms may be used interchangeably to refer to singular or plural data capable of being transmitted, received, displayed and/or stored in accordance with various example embodiments. Thus, use of any such terms should not be taken to limit the spirit and scope of the disclosure.

The term "computer-readable medium" as used herein refers to any medium configured to participate in providing information to a processor, including instructions for execution. Such a medium may take many forms, including, but not limited to a non-transitory computer-readable storage medium (e.g., non-volatile media, volatile media), and transmission media. Transmission media include, for example, coaxial cables, copper wire, fiber optic cables, and carrier waves that travel through space without wires or cables, such as acoustic waves and electromagnetic waves, including radio, optical and infrared waves. Signals include man-made transient variations in amplitude, frequency, phase, polarization or other physical properties transmitted through the transmission media. Examples of non-transitory computer-readable media include a magnetic computer readable medium (e.g., a floppy disk, hard disk, magnetic tape, any other magnetic medium), an optical computer readable medium (e.g., a compact disc read only memory (CD-ROM), a digital versatile disc (DVD), a Blu-Ray disc, or the like), a random access memory (RAM), a programmable read only memory (PROM), an erasable programmable read only memory (EPROM), a FLASH-EPROM, or any other non-transitory medium from which a computer can read. The term computer-readable storage medium is used herein to refer to any computer-readable medium except transmission media. However, it will be appreciated that where embodiments are described to use a computer-readable storage medium, other

types of computer-readable mediums may be substituted for or used in addition to the computer-readable storage medium in alternative embodiments.

Additionally, as used herein, the term 'circuitry' refers to (a) hardware-only circuit implementations (e.g., implementations in analog circuitry and/or digital circuitry); (b) combinations of circuits and computer program product(s) comprising software and/or firmware instructions stored on one or more computer readable memories that work together to cause an apparatus to perform one or more functions described herein; and (c) circuits, such as, for example, a microprocessor(s) or a portion of a microprocessor(s), that require software or firmware for operation even if the software or firmware is not physically present. This definition of 'circuitry' applies to all uses of this term herein, including in any claims. As a further example, as used herein, the term 'circuitry' also includes an implementation comprising one or more processors and/or portion(s) thereof and accompanying software and/or firmware. As another example, the term 'circuitry' as used herein also includes, for example, a baseband integrated circuit or applications processor integrated circuit for a mobile phone or a similar integrated circuit in a server, a cellular network device, other network device, and/or other computing device.

FIG. **1** illustrates a block diagram of an apparatus **102** configured for retrieving views extending a user's line of sight according to an example embodiment. It will be appreciated that the apparatus **102** is provided as an example of one embodiment and should not be construed to narrow the scope or spirit of the invention in any way. In this regard, the scope of the disclosure encompasses many potential embodiments in addition to those illustrated and described herein. As such, while FIG. **1** illustrates one example of a configuration of an apparatus for performing operations and operational routing, other configurations may also be used to implement embodiments of the present invention.

The apparatus **102** may be embodied as either a fixed device or a mobile device such as a desktop computer, laptop computer, mobile terminal, mobile computer, mobile phone, mobile communication device, game device, digital camera/camcorder, audio/video player, television device, radio receiver, digital video recorder, positioning device, a chipset, a computing device comprising a chipset, any combination thereof, and/or the like. In this regard, the apparatus **102** may comprise any computing device that comprises or is in operative communication with a user interface (e.g., a touch display capable of displaying a graphical user interface). In some example embodiments, the apparatus **102** is embodied as a mobile computing device, such as the mobile terminal illustrated in FIG. **2**.

In this regard, FIG. **2** illustrates a block diagram of a mobile terminal **10** representative of one example embodiment of an apparatus **102**. It should be understood, however, that the mobile terminal **10** illustrated and hereinafter described is merely illustrative of one type of apparatus **102** that may implement and/or benefit from various example embodiments of the invention and, therefore, should not be taken to limit the scope of the disclosure. While several embodiments of the electronic device are illustrated and will be hereinafter described for purposes of example, other types of electronic devices, such as mobile telephones, mobile computers, personal digital assistants (PDAs), pagers, laptop computers, desktop computers, gaming devices, positioning devices, tablet computers, televisions, e-papers, and other types of electronic systems, may employ various embodiments of the invention.

As shown, the mobile terminal **10** may include an antenna **12** (or multiple antennas **12**) in communication with a transmitter **14** and a receiver **16**. The mobile terminal **10** may also include a processor **20** configured to provide signals to and receive signals from the transmitter and receiver, respectively. The processor **20** may, for example, be embodied as various means including circuitry, one or more microprocessors with accompanying digital signal processor(s), one or more processor(s) without an accompanying digital signal processor, one or more coprocessors, one or more multi-core processors, one or more controllers, processing circuitry, one or more computers, various other processing elements including integrated circuits such as, for example, an ASIC (application specific integrated circuit) or FPGA (field programmable gate array), or some combination thereof. Accordingly, although illustrated in FIG. **2** as a single processor, in some embodiments the processor **20** comprises a plurality of processors. These signals sent and received by the processor **20** may include signaling information in accordance with an air interface standard of an applicable cellular system, and/or any number of different wireline or wireless networking techniques, comprising but not limited to Wi-Fi, wireless local access network (WLAN) techniques such as Institute of Electrical and Electronics Engineers (IEEE) 802.11, 802.16, and/or the like. In addition, these signals may include speech data, user generated data, user requested data, and/or the like. In this regard, the mobile terminal may be capable of operating with one or more air interface standards, communication protocols, modulation types, access types, and/or the like. More particularly, the mobile terminal may be capable of operating in accordance with various first generation (1G), second generation (2G), 2.5G, third-generation (3G) communication protocols, fourth-generation (4G) communication protocols, Internet Protocol Multimedia Subsystem (IMS) communication protocols (e.g., session initiation protocol (SIP)), and/or the like. For example, the mobile terminal may be capable of operating in accordance with 2G wireless communication protocols IS-136 (Time Division Multiple Access (TDMA)), Global System for Mobile communications (GSM), IS-95 (Code Division Multiple Access (CDMA)), and/or the like. Also, for example, the mobile terminal may be capable of operating in accordance with 2.5G wireless communication protocols General Packet Radio Service (GPRS), Enhanced Data GSM Environment (EDGE), and/or the like. Further, for example, the mobile terminal may be capable of operating in accordance with 3G wireless communication protocols such as Universal Mobile Telecommunications System (UMTS), Code Division Multiple Access 2000 (CDMA2000), Wideband Code Division Multiple Access (WCDMA), Time Division-Synchronous Code Division Multiple Access (TD-SCDMA), and/or the like. The mobile terminal may be additionally capable of operating in accordance with 3.9G wireless communication protocols such as Long Term Evolution (LTE) or Evolved Universal Terrestrial Radio Access Network (E-UTRAN) and/or the like. Additionally, for example, the mobile terminal may be capable of operating in accordance with fourth-generation (4G) wireless communication protocols and/or the like as well as similar wireless communication protocols that may be developed in the future.

Some Narrow-band Advanced Mobile Phone System (NAMPS), as well as Total Access Communication System (TACS), mobile terminals may also benefit from embodiments of this invention, as should dual or higher mode phones (e.g., digital/analog or TDMA/CDMA/analog phones). Additionally, the mobile terminal **10** may be capable of communicating according to Wi-Fi, Near Field Communications

(NFC), BlueTooth, Worldwide Interoperability for Microwave Access (WiMAX) or other proximity-based communications protocols.

It is understood that the processor **20** may comprise circuitry for implementing audio/video and logic functions of the mobile terminal **10**. For example, the processor **20** may comprise a digital signal processor device, a microprocessor device, an analog-to-digital converter, a digital-to-analog converter, and/or the like. Control and signal processing functions of the mobile terminal may be allocated between these devices according to their respective capabilities. The processor may additionally comprise an internal voice coder (VC) **20***a*, an internal data modem (DM) **20***b*, and/or the like. Further, the processor may comprise functionality to operate one or more software programs, which may be stored in memory. For example, the processor **20** may be capable of operating a connectivity program, such as a web browser. The connectivity program may allow the mobile terminal **10** to transmit and receive web content, such as location-based content, according to a protocol, such as Wireless Application Protocol (WAP), hypertext transfer protocol (HTTP), and/or the like. The mobile terminal **10** may be capable of using a Transmission Control Protocol/Internet Protocol (TCP/IP) to transmit and receive web content across the internet or other networks.

The mobile terminal **10** may also comprise a user interface including, for example, an earphone or speaker **24**, a ringer **22**, a microphone **26**, a display **28**, a user input interface, and/or the like, which may be operationally coupled to the processor **20**. In this regard, the processor **20** may comprise user interface circuitry configured to control at least some functions of one or more elements of the user interface, such as, for example, the speaker **24**, the ringer **22**, the microphone **26**, the display **28**, and/or the like. The processor **20** and/or user interface circuitry comprising the processor **20** may be configured to control one or more functions of one or more elements of the user interface through computer program instructions (e.g., software and/or firmware) stored on a memory accessible to the processor **20** (e.g., volatile memory **40**, non-volatile memory **42**, and/or the like). Although not shown, the mobile terminal may comprise a battery for powering various circuits related to the mobile terminal, for example, a circuit to provide mechanical vibration as a detectable output. The display **28** of the mobile terminal may be of any type appropriate for the electronic device in question with some examples including a plasma display panel (PDP), a liquid crystal display (LCD), a light-emitting diode (LED), an organic light-emitting diode display (OLED), a projector, a holographic display or the like. The display **28** may, for example, comprise a three-dimensional touch display, examples of which will be described further herein below. The user input interface may comprise devices allowing the mobile terminal to receive data, such as a keypad **30**, a touch display (e.g., some example embodiments wherein the display **28** is configured as a touch display), a joystick (not shown), sensor **18**, and/or other input device. In embodiments including a keypad, the keypad may comprise numeric (0-9) and related keys (#, *), and/or other keys for operating the mobile terminal **10**. Alternatively or additionally, the keypad **30** may include a conventional QWERTY keypad arrangement.

The mobile terminal **10** may comprise memory, such as a subscriber identity module (SIM) **38**, a removable user identity module (R-UIM), and/or the like, which may store information elements related to a mobile subscriber. In addition to the SIM, the mobile terminal may comprise other removable and/or fixed memory. The mobile terminal **10** may include volatile memory **40** and/or non-volatile memory **42**. For example, volatile memory **40** may include Random Access Memory (RAM) including dynamic and/or static RAM, on-chip or off-chip cache memory, and/or the like. Non-volatile memory **42**, which may be embedded and/or removable, may include, for example, read-only memory, flash memory, magnetic storage devices (e.g., hard disks, floppy disk drives, magnetic tape, etc.), optical disc drives and/or media, non-volatile random access memory (NVRAM), and/or the like. Like volatile memory **40** non-volatile memory **42** may include a cache area for temporary storage of data. The memories may store one or more software programs, instructions, pieces of information, data, and/or the like which may be used by the mobile terminal for performing functions of the mobile terminal. For example, the memories may comprise an identifier, such as an international mobile equipment identification (IMEI) code, capable of uniquely identifying the mobile terminal **10**.

Returning to FIG. **1**, in an example embodiment, the apparatus **102** includes various means for performing the various functions herein described. These means may comprise one or more of a processor **110**, memory **112**, communication interface **114**, user interface **116**, sensor **118**, or user interface (UI) control circuitry **122**. The means of the apparatus **102** as described herein may be embodied as, for example, circuitry, hardware elements (e.g., a suitably programmed processor, combinational logic circuit, and/or the like), a computer program product comprising computer-readable program instructions (e.g., software or firmware) stored on a computer-readable medium (e.g. memory **112**) that is executable by a suitably configured processing device (e.g., the processor **110**), or some combination thereof.

In some example embodiments, one or more of the means illustrated in FIG. **1** may be embodied as a chip or chip set. In other words, the apparatus **102** may comprise one or more physical packages (e.g., chips) including materials, components and/or wires on a structural assembly (e.g., a baseboard). The structural assembly may provide physical strength, conservation of size, and/or limitation of electrical interaction for component circuitry included thereon. In this regard, the processor **110**, memory **112**, communication interface **114**, sensor **118**, and/or UI control circuitry **122** may be embodied as a chip or chip set. The apparatus **102** may therefore, in some cases, be configured to or may comprise component(s) configured to implement embodiments of the present invention on a single chip or as a single "system on a chip." As such, in some cases, a chip or chipset may constitute means for performing one or more operations for providing the functionalities described herein and/or for enabling user interface navigation with respect to the functionalities and/or services described herein.

The processor **110** may, for example, be embodied as various means including one or more microprocessors with accompanying digital signal processor(s), one or more processor(s) without an accompanying digital signal processor, one or more coprocessors, one or more multi-core processors, one or more controllers, processing circuitry, one or more computers, various other processing elements including integrated circuits such as, for example, an ASIC or FPGA, one or more other types of hardware processors, or some combination thereof. Accordingly, although illustrated in FIG. **1** as a single processor, in some embodiments the processor **110** comprises a plurality of processors. The plurality of processors may be in operative communication with each other and may be collectively configured to perform one or more functionalities of the apparatus **102** as described herein. The plurality of processors may be embodied on a single computing

device or distributed across a plurality of computing devices collectively configured to function as the apparatus **102**. In embodiments wherein the apparatus **102** is embodied as a mobile terminal **10**, the processor **110** may be embodied as or comprise the processor **20** (shown in FIG. **2**). In some example embodiments, the processor **110** is configured to execute instructions stored in the memory **112** or otherwise accessible to the processor **110**. These instructions, when executed by the processor **110**, may cause the apparatus **102** to perform one or more of the functionalities of the apparatus **102** as described herein. As such, whether configured by hardware or software methods, or by a combination thereof, the processor **110** may comprise an entity capable of performing operations according to embodiments of the present invention while configured accordingly. Thus, for example, when the processor **110** is embodied as an ASIC, FPGA or the like, the processor **110** may comprise specifically configured hardware for conducting one or more operations described herein. Alternatively, as another example, when the processor **110** is embodied as an executor of instructions, such as may be stored in the memory **112**, the instructions may specifically configure the processor **110** to perform one or more algorithms and operations described herein.

The memory **112** may comprise, for example, volatile memory, non-volatile memory, or some combination thereof. In this regard, the memory **112** may comprise a non-transitory computer-readable storage medium. Although illustrated in FIG. **1** as a single memory, the memory **112** may comprise a plurality of memories. The plurality of memories may be embodied on a single computing device or may be distributed across a plurality of computing devices collectively configured to function as the apparatus **102**. In various example embodiments, the memory **112** may comprise a hard disk, random access memory, cache memory, flash memory, a compact disc read only memory (CD-ROM), digital versatile disc read only memory (DVD-ROM), an optical disc, circuitry configured to store information, or some combination thereof. In embodiments wherein the apparatus **102** is embodied as a mobile terminal **10**, the memory **112** may comprise the volatile memory **40** and/or the non-volatile memory **42** (shown in FIG. **2**). The memory **112** may be configured to store information, data, applications, instructions, or the like for enabling the apparatus **102** to carry out various functions in accordance with various example embodiments. For example, in some example embodiments, the memory **112** is configured to buffer input data for processing by the processor **110**. Additionally or alternatively, the memory **112** may be configured to store program instructions for execution by the processor **110**. The memory **112** may store information in the form of static and/or dynamic information. The stored information may include, for example, images, content, media content, user data, application data, and/or the like. This stored information may be stored and/or used by the UI control circuitry **122** during the course of performing its functionalities.

The communication interface **114** may be embodied as any device or means embodied in circuitry, hardware, a computer program product comprising computer readable program instructions stored on a computer readable medium (e.g., the memory **112**) and executed by a processing device (e.g., the processor **110**), or a combination thereof that is configured to receive and/or transmit data from/to another computing device. In some example embodiments, the communication interface **114** is at least partially embodied as or otherwise controlled by the processor **110**. In this regard, the communication interface **114** may be in communication with the processor **110**, such as via a bus. The communication interface **114** may include, for example, an antenna, a transmitter, a receiver, a transceiver and/or supporting hardware or software for enabling communications with one or more remote computing devices. In embodiments wherein the apparatus **102** is embodied as a mobile terminal **10**, the communication interface **114** may be embodied as or comprise the transmitter **14** and receiver **16** (shown in FIG. **2**). The communication interface **114** may be configured to receive and/or transmit data using any protocol that may be used for communications between computing devices. In this regard, the communication interface **114** may be configured to receive and/or transmit data using any protocol that may be used for transmission of data over a wireless network, wireline network, some combination thereof, or the like by which the apparatus **102** and one or more computing devices may be in communication. As an example, the communication interface **114** may be configured to receive and/or otherwise access content (e.g., web page content, streaming media content, and/or the like) over a network from a server or other content source. Additionally or alternatively, the communication interface **114** may be configured to support communications in accordance with any proximity-based protocol including, for example, Wi-Fi, NFC, BlueTooth, WiMAX or the like. The communication interface **114** may additionally be in communication with the memory **112**, user interface **116**, sensor **118**, and/or UI control circuitry **122**, such as via a bus.

The sensor **118** may be in communication with the processor **110** and/or UI control circuitry **122**. In some embodiments, the sensor **118** may be configured to sense and/or detect input. Additionally, in some embodiments, the sensor **118** may be configured to detect or sense the orientation and/or location of the apparatus **102** and/or the user of the apparatus **102**. In embodiments wherein the apparatus **102** is embodied as a mobile terminal **10**, the sensor **118** may be embodied as or comprise the sensor **18** (shown in FIG. **2**). In some embodiments, the processor **110** and/or UI control circuitry **122** may be configured to receive input from the sensor **118** and determine the orientation and/or location of the apparatus **102** and/or the user of the apparatus **102**. In some embodiments, the sensor **118** may comprise at least one of a global positioning system (GPS), a pressure sensor, a proximity sensor, a light sensor, an accelerometer, or a gyroscope.

The user interface **116** may be in communication with the processor **110** to receive an indication of a user input and/or to provide an audible, visual, mechanical, or other output to a user. As such, the user interface **116** may include, for example, a keyboard, a mouse, a joystick, a display, a touchscreen display, a microphone, a speaker, and/or other input/output mechanisms. In some embodiments, a display may refer to display on a screen, on a wall, on glasses (e.g., near-eye-display), in the air, etc. In embodiments wherein the apparatus **102** is embodied as a mobile terminal **10**, the user interface **116** may be embodied as or comprise the display **28** and keypad **30** (shown in FIG. **2**). The user interface **116** may be in communication with the memory **112**, communication interface **114**, sensor **118**, and/or UI control circuitry **122**, such as via a bus.

The UI control circuitry **122** may be embodied as various means, such as circuitry, hardware, a computer program product comprising computer readable program instructions stored on a computer readable medium (e.g., the memory **112**) and executed by a processing device (e.g., the processor **110**), or some combination thereof and, in some embodiments, is embodied as or otherwise controlled by the processor **110**. In some example embodiments wherein the UI control circuitry **122** is embodied separately from the processor **110**, the UI control circuitry **122** may be in communication

with the processor **110**. The UI control circuitry **122** may further be in communication with one or more of the memory **112**, communication interface **114**, sensor **118**, or user interface **116**, such as via a bus.

The UI control circuitry **122** may be configured to receive user input from a user interface **116**, such as a touch display (e.g., touchscreen). The user input or signal may carry positional information indicative of the user input. In this regard, the position may comprise a position of the user input in a two-dimensional space, which may be relative to the surface of the touch display user interface. For example, the position may comprise a coordinate position relative to a two-dimensional coordinate system (e.g., an X and Y axis), such that the position may be determined. Accordingly, the UI control circuitry **122** may determine a position of the user input such as for determining a portion of the display to which the user input correlates.

The touch display may also be configured to enable the detection of a hovering gesture input. A hovering gesture input may comprise a gesture input to the touch display without making physical contact with a surface of the touch display, such as a gesture made in a space some distance above/in front of the surface of the touch display. As an example, the touch display may comprise a capacitive touch display, which may be configured to enable detection of capacitance of a finger or other input object by which a gesture may be made without physically contacting a display surface. As another example, the touch display may be configured to enable detection of a hovering gesture input through use of acoustic wave touch sensor technology, electromagnetic touch sensing technology, near field imaging technology, optical sensing technology, infrared proximity sensing technology, some combination thereof, or the like.

The apparatus **102** may be configured to receive input on a display (e.g., user interface **116**). In some embodiments, such as in an instance when the user interface **116** comprises a touch display, the user input may be in the form of a gesture on or near the display. An example of a gesture is shown in FIG. **3**, though other gestures are contemplated by some embodiments of the present invention.

FIG. **3** illustrates an example user input **300** for a touch screen display (e.g., user interface **116**). In the depicted embodiment, a user **330** positions their finger **335** on the display to indicate a location (e.g., the user's finger **335** may define a start position). Then, the user **330** may slide their finger **335** in a direction, such as along arrow **338**. Such an input may be referred to as a "slide" gesture. In some embodiments, the "slide" gesture may comprise a first user input that includes the indication of a location on the display and a second user input that includes the movement of the user's fingers away from the location.

As noted above, the apparatus **102** may be configured to perform operations. Indeed, in some embodiments, the apparatus **102** may be configured to function as a navigation system that provides geographical and/or travel information for a user, such as provide directions to the user. In some embodiments, the apparatus **102** may be configured to cause calculation of a route in a map. For example, the user may input a starting location and/or a destination. Then, based on available map data (e.g., from a server or local database), the apparatus **102** may be configured to calculate a route between the starting location and the destination. Along these lines, in some embodiments, the apparatus **102** may be configured to cause presentation of the map, such as on the user interface **116**. Moreover, in some embodiments, the apparatus **102** may be configured to cause presentation of a calculated route on the map.

Considering the usefulness of the above noted navigation features and the ability of users to carry mobile computing devices (e.g., apparatus **102**), users may now rely on their mobile computing devices to get where they need to go. Moreover, such mobile computing devices (e.g., apparatus **102**) may be carried with the user and may be used, as noted herein, for additional functions, such as viewing images. In some cases, while using the mobile computing device, the user may wish to view images of locations that may be out of sight. In such a manner, the user may determine if they want to travel to and/or see that location in person.

As such, example embodiments of the present invention seek to provide for retrieving views extending a user's line of sight. The images associated with each view can be presented to the user, often being presented in response to a quick and easy user input.

In such a regard, in some embodiments, the apparatus **102**, such as through the processor **110**, sensor **118**, and/or communication interface **114**, may be configured to determine the user's location. For example, in some embodiments, the apparatus **102** may comprise a global positioning system (GPS) (e.g., sensor **118**) that is configured to determine the user's location. Additionally or alternatively, the apparatus **102** may be configured to send a signal to a server or other device that may determine the location of the apparatus **102** (and, thus, the user). Though the above description provides some examples of how the apparatus **102** may determine a user's location, some embodiments of the present invention contemplate other ways to determine a user's location.

Additionally, in some embodiments, the apparatus **102**, such as through the processor **110**, sensor **118**, and/or communication interface **114**, may be configured to determine a user's orientation. For example, in some embodiments, the apparatus may comprise an accelerometer and/or gyroscope (e.g., sensor **118**) that is configured to determine the orientation of the apparatus **102** (and, in some cases, the user). Additionally or alternatively, in some embodiments, other features of the apparatus **102** may be used to help determine the user's orientation. For example, the apparatus **102** may comprises a light sensor (e.g., sensor **118**) that may determine the orientation of the apparatus **102** with respect to the user. Then, based on the orientation of the apparatus **102** with respect to the user, the apparatus **102** may determine the user's orientation. Though the above description provides some examples of how the apparatus **102** may determine a user's orientation, some embodiments of the present invention contemplate other ways to determine a user's orientation.

In some embodiments, the apparatus **102**, such as through the processor **110**, sensor **118**, and/or communication interface **114**, may be configured to determine the user's sight, such as information that is within the user's sight. In some embodiments, the apparatus **102** may be configured to determine the user's sight based at least in part on the user's location and the user's orientation. For example, the apparatus **102** may be configured to use the user's location and orientation to determine the current location of the user and which way the user is facing. From there, the apparatus **102** may be configured to determine what information (e.g., objects, buildings, roads, landmarks, etc.) is within the user's sight. In some embodiments, the apparatus **102** may determine what information is within the user's sight based in part on a pre-determined sight distance of the user that represents how far the user can see. Additionally, in some embodiments, the pre-determined sight distance may be affected by factors such as age of the user, sight characteristics of the user, time of day, and weather (e.g., fog, rain, etc.).

Additionally, in some embodiments, the apparatus **102**, such as through the processor **110**, may be configured to determine a first portion of a map representing information that is within the user's sight. For example, based on the user's location and orientation, the apparatus **102** may be configured to determine an area on a map that represents the user's sight. Additionally, in some embodiments, the apparatus **102**, such as through the processor **110**, may be configured to determine a second portion of a map representing information that is out of the user's sight.

In such a regard, in some embodiments, the apparatus **102**, such as through the processor **110**, may be configured to determine a line of sight based at least in part on the user's location and orientation. The line of sight may define the first portion of the map representing information that is within the user's sight and the second portion of the map representing information that is out of the user's sight.

Additionally, in some embodiments, the apparatus **102**, such as through the processor **110**, UI control circuitry **122**, and/or user interface **116**, may be configured to cause presentation of the line of sight on the map. For example, with reference to FIG. **4**, an apparatus **400** (e.g., apparatus **102**) may present a map **408** on a display **402**. Additionally, the user **410** of the apparatus **400** may be represented. Along these lines, the user's location **412** and orientation **414** (e.g., as represented by the direction of the arrow) may also be presented on the map **408**. Based on this information, as described herein, the apparatus **400** the may determine the line of sight that is defined by a first portion of the map representing information that is within the user's sight **420** and a second portion of the map representing information that is out of the user's sight **430**. In the depicted embodiment, the first portion **420** is highlighted on the map **408**. Indeed, with reference to FIG. **5**, the first portion **420** may be representative of information the user can actually see (e.g., the image **422** represents the user's sight).

Along these lines, in some embodiments, the apparatus **102**, such as through the processor **110**, may be configured to determine the user's sight based on at least one object within the user's sight. Along these lines, in some embodiments, the apparatus **102** may be configured to determine the user's sight based on a three-dimensional model of information within the user's sight. For example, the apparatus **102** may be configured to determine the user's sight based on a three-dimensional model of a portion of a city that is within the user's sight. Such a three-dimensional model may be pre-stored or accessed, such as via a server. In such a manner, objects that are within the user's sight and affect the user's sight (such as a large building that blocks a portion of the user's sight) may be accounted for. For example, with reference to FIG. **5**, a large building **427** may block part of the user's sight. As such, with reference to FIG. **4**, the line of sight as represented in the first portion **420** may be modified to account for the large building **427**. Though the above description details that a large building may block the user's sight, some embodiments of the present invention contemplate that other objects (e.g., statues, mountains, trees, etc.) may block the user's sight and, thus, may modify the first portion of the map according to those objects.

As noted herein, a user may wish to easily and quickly view images of locations that are currently not visible to the user. In such a regard, in some embodiments, the apparatus **102**, such as through the processor **110**, may be configured to determine at least one image associated with at least one location within the second portion of the map. In such embodiments, the apparatus **102** may determine (e.g., retrieve) images that represent information that is out of the user's sight. In some embodiments, the apparatus **102** may be configured to retrieve these images from a server, such as a cloud.

With reference to FIG. **4**, examples of possible locations for images associated with the second portion of the map **430** are represented as views **435**. Such views may be associated with images that represent what the user would see if the user was in that location and oriented accordingly.

In some embodiments, the apparatus **102**, such as through the processor **110**, the UI control circuitry **122**, and/or the user interface **116**, may be configured to cause the image associated with the location to be presented to the user. For example, with reference to FIG. **4**, area **436** represents a possible view down a street called "Rue Saint-Marc" **437**. With reference to FIG. **6**, the apparatus **400** may cause an image **440** of the street "Rue Saint-Marc" **437** to be presented to the user on the display **402**. In such a manner, the user may quickly see an image of "Rue Saint-Marc" **437** and determine if they want to travel to that street.

In some embodiments, the apparatus **102**, such as through the user interface **116**, UI control circuitry **122**, and/or sensor **118**, may be configured to receive user input directed to the at least one location within the second portion of the map. Additionally, in some embodiments, in response to receiving the user input, the apparatus **102**, such as through the user interface **116**, may be configured to cause the image associated with the at least one location to be presented to the user. For example, with reference to FIG. **7**, the user **450** may position their finger **455** on a location **438** on the map **408** within the second portion **430**. Then, the user **450** may slide their finger **455** in a direction, such as along arrow A (e.g., down the street "Rue Saint-Marc" **437**). In such a manner, the user **450** may perform a slide gesture. Then, in response to receiving the user input, with reference to FIG. **8**, the apparatus **400** may cause the image **440** of the street "Rue Saint-Marc" **437** to be presented to the user on the display **402**. In such a manner, the user may provide user input and quickly see an image of "Rue Saint-Marc" **437** and determine if they want to travel to that street.

In some embodiments, the apparatus **102**, such as through the processor **110**, may be configured to determine the at least one image based on the location indicated and the direction of the user input. For example, with reference to FIG. **7**, the apparatus **400** may recognize that the user **450** performed a slide gesture down the street "Rue Saint-Marc" **437** that originated at location **438** and, accordingly, determine the image **440** (shown in FIG. **8**) showing a view of the street "Rue Saint-Marc" **437** from that location **438**. Though the above described embodiment details a slide gesture as an example user input, some embodiments of the present invention contemplate other user inputs (e.g., point gesture, swipe gesture, reverse pinch gesture, etc.).

In some embodiments, the apparatus **102**, such as through the processor **110**, user interface **116**, and/or UI control circuitry **122**, may be configured to cause presentation of an icon on the map relative to the location within the second portion of the map. For example, with reference to FIG. **9**, the apparatus **400** may present an icon **450** (e.g., a camera) relative to a location **438**. The icon, in some embodiments, may represent a possible image that is available for presentation to the user.

Additionally, in some embodiments, the apparatus **102**, such as through the user interface **116**, UI control circuitry **122**, and/or sensor **118**, may be configured to receive user input directed to the icon. Then, in some embodiments, the apparatus **102**, such as through the processor **110**, may be configured to, in response to receiving the user input directed to the icon, cause the image associated with the location to be

presented to the user. For example, a user may provide user input (e.g., a point gesture) directed to the icon **450**. Then, in response to receiving the user input, with reference to FIG. **8**, the apparatus **400** may cause the image **440** of the street "Rue Saint-Marc" **437** to be presented to the user on the display **402**.

Additionally, in some embodiments, the apparatus **102**, such as through the processor **110**, user interface **116**, and/or UI control circuitry **122**, may be configured to cause presentation of an image representing information currently within the user's sight (e.g., the current user line of sight). Alternatively, in some embodiments, the image may represent a view that is not currently visible to the user (such as may be presented in response to receiving user input directed to a location, such as described above). Additionally, in some embodiments, the apparatus **102**, such as through the processor **110**, user interface **116**, and/or UI control circuitry **122**, may be configured to cause presentation of at least one icon on the image, wherein the icon represents a location within the second portion of the map that is out of the user's sight and a corresponding second image associated with that location. In such a manner, the user may provide user input to the icon on the image to view the second image. For example, with reference to FIG. **10**, the apparatus **400** may present an image **462** of a street. Additionally, the apparatus **400** may present a first icon **475** that represents a second location (and corresponding second image) and a second icon **475'** that represents a third location (and corresponding third image). Thus, if the user desires to view the second image, they can provide user input to the first icon **475**. Likewise, if the user desires to view the third image, they can provide user input to the second icon **475'**. Additionally, in some embodiments, the apparatus **400** may present an arrow **476** that provides an additional indication as to the available image for the user (e.g., a direction that the third image extends along).

Moreover, in some embodiments, the apparatus **102** may be configured to cause more than one icon to be presented at different positions on the image (and with respect to each other) to provide further information. For example, as shown in FIG. **10**, the second icon **475'** is positioned higher on the display **402** than the first icon **475** to represent that the third image is further away from the user than the second image.

In some embodiments, the apparatus **102**, such as through the processor **110**, user interface **116**, and/or UI control circuitry **122**, may be configured to cause presentation of a slide on an image presented to the user. Additionally, a portion of the slide may be associated with the at least one location within the second portion of the map. In such a regard, portions of the slide may be associated with available images. For example, with reference to FIG. **11**, the apparatus **400** may present a slide **480** along an image **462** that shows a view down a street. Additionally, an icon **485** (e.g., camera icon) may be presented on the slide **480**. Moreover, the slide **480** may include a plurality of arrows **482** that represent available locations and corresponding images for presentation to the user.

In some embodiments, the slide may be presented with additional features. In some cases, the additional features may provide indications to the user. For example, in some embodiments, the slide may extend along the user's sight on the map such that the end of the slide corresponds to the end of the user's sight. For example, with reference to FIG. **11**, the slide **480** extends to the top of the display **402**, which may correspond to the edge of the user's current sight (e.g., how far the user can see down the street in the image **462**).

As such, in some embodiments, the apparatus **102**, such as through the processor **110**, user interface **116**, and/or UI control circuitry **122**, may be configured to receive user input directed to at least a portion of the slide and, in response, to receiving the user input, cause the image associated with the location to be presented to the user. For example, with reference to FIG. **11**, a user may provide user input to the icon **485** and "translate" the icon **485** along the slide **480** until it reaches an arrow (e.g., arrow **483**). As used herein, an icon can "translate" on the display, for example, by moving with a user's finger across the display. Additionally, in some embodiments, the user may further "translate" the icon **485** to the right (e.g., along arrow **483**) to indicate that the user desires to see the image associated with that location (and orientation). In response, the apparatus **400**, may present the associated image.

Likewise, in some embodiments, the apparatus **102**, such as through the processor **110**, user interface **116**, and/or UI control circuitry **122**, may be configured to cause presentation of a slide relative to a first portion of the map. Additionally, a portion of the slide may be associated with the at least one location within the second portion of the map. In such a regard, portions of the slide may be associated with available images. For example, a slide may be presented proximate a first portion of the map and configured to enable a user to provide user input to portions of the slide to cause images. Then, in response to the user input, the image associated with the corresponding portion of the slide may be presented to the user.

In some embodiments, the apparatus **102**, such as through the processor **110**, user interface **116**, and/or UI control circuitry **122**, may be configured to cause presentation of a route on a map. In some cases, the route may correspond to a navigational route for the user to follow for directions between, for example, a starting point and a destination. In some embodiments, at least a portion of the route may be associated with the location within the second portion of the map representing information out of the user's sight. In such a regard, at least a portion of the route may correspond to a location with an available image for presentation to a user.

In some embodiments, the apparatus **102**, such as through the processor **110**, user interface **116**, and/or UI control circuitry **122**, may be configured to cause presentation of an icon on the portion of the route associated with the location. In such a regard, the icon may represent an available image that may be presented to the user. Additionally, the apparatus **102**, such as through the processor **110**, user interface **116**, and/or UI control circuitry **122**, may be configured to receive user input directed to the icon and, in response, cause the image associated with the location to be presented to the user. For example, with reference to FIG. **12**, the apparatus **400** may present a map **408'** on a display **402**. Additionally, a route **490** may be presented along the map **408'**. In some cases, the current location of the user **492** may also be presented (e.g., represented by the green circle). Further, in some embodiments, the apparatus **400** may present other information useful for navigation, such as information **493** regarding an upcoming turn. An icon **495** may also be presented on a portion of the route **490** associated with a location that has an associated image. In such an embodiment, the user may provide user input to the icon **495** to cause the image associated with the location along the route to be presented.

Additionally, in some embodiments, the icon may be configured to "translate" along the route. In such an embodiment, the apparatus **102**, such as through the processor **110**, user interface **116**, and/or UI control circuitry **122**, may be configured to receive user input defining a slide gesture with the icon extending from the portion of the route. Thus, the slide gesture may define the location (and, in some cases, the

orientation) and, thus, the associated image may be presented to the user. For example, with reference to FIG. **12**, the icon **495** may be configured to "translate" along the route **490** such that the user may determine the location in which an associated image is desired to be presented.

Embodiments of the present invention provide methods, apparatus and computer program products for retrieving views extending a user's line of sight. Various examples of the operations performed in accordance with embodiments of the present invention will now be provided with reference to FIGS. **13-14**.

FIG. **13** illustrates a flowchart according to an example method for retrieving views extending a user's line of sight according to an example embodiment **500**. The operations illustrated in and described with respect to FIG. **13** may, for example, be performed by, with the assistance of, and/or under the control of one or more of the processor **110**, memory **112**, communication interface **114**, sensor **118**, user interface **116**, or UI control circuitry **122**. Operation **502** may comprise determining a line of sight based at least in part on a user's location and orientation, wherein the line of sight defines a first portion of a map representing information that is within the user's sight and a second portion of the map representing information that is out of the user's sight. The processor **110**, communication interface **114**, and/or sensor **118**, may, for example, provide means for performing operation **502**. Operation **504** may comprise determining at least one image associated with at least one location within the second portion of the map. The processor **110** and/or communication interface **114** may, for example, provide means for performing operation **504**. In some embodiments, operation **506** may comprise causing the image associated with the location to be presented to the user. The processor **110**, user interface **116**, and/or UI control circuitry **122**, may, for example, provide means for performing operation **506**.

FIG. **14** illustrates a flowchart according to another example method for retrieving views extending a user's line of sight according to an example embodiment **600**. The operations illustrated in and described with respect to FIG. **14** may, for example, be performed by, with the assistance of, and/or under the control of one or more of the processor **110**, memory **112**, communication interface **114**, sensor **118**, user interface **116**, or UI control circuitry **122**. Operation **602** may comprise determining a line of sight based at least in part on a user's location and orientation, wherein the line of sight defines a first portion of a map representing information that is within the user's sight and a second portion of the map representing information that is out of the user's sight. The processor **110**, communication interface **114**, and/or sensor **118**, may, for example, provide means for performing operation **602**. Operation **603** may comprise receiving user input directed to at least one location within the second portion of the map. The processor **110**, user interface **116**, and/or UI control circuitry **122**, may, for example, provide means for performing operation **603**. Operation **604** may comprise determining at least one image associated with the at least one location within the second portion of the map. The processor **110** and/or communication interface **114** may, for example, provide means for performing operation **604**. Operation **606** may comprise causing the image associated with the location to be presented to the user. The processor **110**, user interface **116**, and/or UI control circuitry **122**, may, for example, provide means for performing operation **606**.

FIGS. **13-14** each illustrate a flowchart of a system, method, and computer program product according to an example embodiment. It will be understood that each block of the flowcharts, and combinations of blocks in the flowcharts, may be implemented by various means, such as hardware and/or a computer program product comprising one or more computer-readable mediums having computer readable program instructions stored thereon. For example, one or more of the procedures described herein may be embodied by computer program instructions of a computer program product. In this regard, the computer program product(s) which embody the procedures described herein may be stored by one or more memory devices of a mobile terminal, server, or other computing device (for example, in the memory **112**) and executed by a processor in the computing device (for example, by the processor **110**). In some embodiments, the computer program instructions comprising the computer program product(s) which embody the procedures described above may be stored by memory devices of a plurality of computing devices. As will be appreciated, any such computer program product may be loaded onto a computer or other programmable apparatus (for example, an apparatus **102**) to produce a machine, such that the computer program product including the instructions which execute on the computer or other programmable apparatus creates means for implementing the functions specified in the flowchart block(s). Further, the computer program product may comprise one or more computer-readable memories on which the computer program instructions may be stored such that the one or more computer-readable memories can direct a computer or other programmable apparatus to function in a particular manner, such that the computer program product comprises an article of manufacture which implements the function specified in the flowchart block(s). The computer program instructions of one or more computer program products may also be loaded onto a computer or other programmable apparatus (for example, an apparatus **102**) to cause a series of operations to be performed on the computer or other programmable apparatus to produce a computer-implemented process such that the instructions which execute on the computer or other programmable apparatus implement the functions specified in the flowchart block(s).

Accordingly, blocks of the flowcharts support combinations of means for performing the specified functions. It will also be understood that one or more blocks of the flowcharts, and combinations of blocks in the flowcharts, may be implemented by special purpose hardware-based computer systems which perform the specified functions, or combinations of special purpose hardware and computer program product(s).

The above described functions may be carried out in many ways. For example, any suitable means for carrying out each of the functions described above may be employed to carry out embodiments of the invention. In one embodiment, a suitably configured processor (for example, the processor **110**) may provide all or a portion of the elements. In another embodiment, all or a portion of the elements may be configured by and operate under control of a computer program product. The computer program product for performing the methods of an example embodiment of the invention includes a computer-readable storage medium (for example, the memory **112**), such as the non-volatile storage medium, and computer-readable program code portions, such as a series of computer instructions, embodied in the computer-readable storage medium.

Many modifications and other embodiments of the inventions set forth herein will come to mind to one skilled in the art to which these inventions pertain having the benefit of the teachings presented in the foregoing descriptions and the associated drawings. Therefore, it is to be understood that the embodiments of the invention are not to be limited to the

specific embodiments disclosed and that modifications and other embodiments are intended to be included within the scope of the invention. Moreover, although the foregoing descriptions and the associated drawings describe example embodiments in the context of certain example combinations of elements and/or functions, it should be appreciated that different combinations of elements and/or functions may be provided by alternative embodiments without departing from the scope of the invention. In this regard, for example, different combinations of elements and/or functions than those explicitly described above are also contemplated within the scope of the invention. Although specific terms are employed herein, they are used in a generic and descriptive sense only and not for purposes of limitation.

What is claimed is:

1. A method comprising:

determining, by a processor, a line of sight based at least in part on a user's location and orientation, wherein the line of sight defines a first portion of a map representing information that is within the user's sight and a second portion of the map representing information that is out of the user's sight and associated with at least one potential view of the user if the user were at a different location within the first portion of the map;

determining at least one image associated with at least one location within the second portion of the map;

receiving user input directed to the at least one location within the second portion of the map; and

causing, in response to receiving the user input, the at least one image associated with the at least one location to be presented to the user.

2. The method according to claim **1**, wherein receiving user input directed to the at least one location within the second portion of the map comprises receiving user input comprising a slide gesture.

3. The method according to claim **1** further comprising causing presentation of the line of sight on the map.

4. The method according to claim **3** further comprising receiving user input directed to the at least one location within the second portion of the map and, in response to receiving the user input, causing the image associated with the location to be presented to the user.

5. The method according to claim **3** further comprising causing presentation of an icon relative to the location within the second portion of the map.

6. The method according to claim **5** further comprising receiving user input directed to the icon and, in response to receiving the user input, causing the image associated with the location to be presented to the user.

7. The method according to claim **3** further comprising causing presentation of a slide relative to the first portion of the map, wherein a portion of the slide is associated with the at least one location within the second portion of the map.

8. The method according to claim **7** further comprising receiving user input directed to at least a portion of the slide and, in response to receiving the user input, causing the image associated with the location to be presented to the user.

9. The method according to claim **1**, wherein determining the line of sight comprises determining the line of sight based at least in part on an object within the user's sight.

10. The method according to claim **1** further comprising causing presentation of a route on the map, wherein at least a portion of the route is associated with the location within the second portion of the map, and causing presentation of an icon on the portion of the route associated with the location.

11. The method according to claim **10** further comprising receiving user input directed to the icon and, in response to receiving the user input, causing the image associated with the location to be presented to the user.

12. The method according to claim **11**, wherein the icon is configured to slide along the route, wherein receiving user input comprises receiving user input defining a slide gesture with the icon extending from the portion of the route.

13. The method of claim **1**, further comprising determining the user's location and orientation.

14. An apparatus comprising a processor and a memory including computer program code, the memory and the computer program code configured to, with the processor, cause the apparatus to:

determine a line of sight based at least in part on a user's location and orientation, wherein the line of sight defines a first portion of a map representing information that is within the user's sight and a second portion of the map representing information that is out of the user's sight and associated with at least one potential view of the user if the user were at a different location within the first portion of the map;

determine at least one image associated with at least one location within the second portion of the map;

receive user input directed to the at least one location within the second portion of the map; and

cause, in response to receiving the user input, the at least one image associated with the at least one location to be presented to the user.

15. The apparatus of claim **14**, wherein the memory and the computer program code are further configured to, with the processor, cause the apparatus to receive user input directed to the at least one location within the second portion of the map by receiving user input comprising a slide gesture.

16. The apparatus of claim **14**, wherein the memory and the computer program code are further configured to, with the processor, cause the apparatus to determine the user's location and orientation.

17. Computer program product comprising a non-transitory computer readable medium having program code portions stored thereon, the program code portions being a computer readable medium and configured when said program product is run on a computer or network device, to:

determine a line of sight based at least in part on a user's location and orientation, wherein the line of sight defines a first portion of a map representing information that is within the user's sight and a second portion of the map representing information that is out of the user's sight and associated with at least one potential view of the user if the user were at a different location within the first portion of the map;

determine at least one image associated with at least one location within the second portion of the map;

receive user input directed to the at least one location within the second portion of the map; and

cause, in response to receiving the user input, the at least one image associated with the at least one location to be presented to the user.

18. The computer program product of claim **17**, wherein the program code portions are further configured, when said program product is run on a computer or network device, to determine the user's location and orientation.

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