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(54) **SYSTEM AND METHOD FOR IDENTIFYING A LOCATION OF INTEREST TO BE NAMED BY A USER**

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(58) **Field of Classification Search** 707/724
See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

5,493,677	A	2/1996	Balogh et al.
6,122,361	A	9/2000	Gupta
6,275,707	B1	8/2001	Reed et al.
6,360,101	B1	3/2002	Irvin
6,374,179	B1	4/2002	Smith et al.
6,411,724	B1	6/2002	Vaithilingam et al.
6,546,257	B1	4/2003	Stewart
6,629,104	B1	9/2003	Parulski et al.
6,668,173	B2	12/2003	Greene
6,681,107	B2	1/2004	Jenkins et al.
6,714,791	B2	3/2004	Friedman
6,804,684	B2	10/2004	Stubler et al.
6,831,598	B2	12/2004	Saint-Hilaire et al.
6,850,188	B1	2/2005	Lee et al.
6,885,874	B2	4/2005	Grube et al.
6,920,328	B2	7/2005	Wollrab
6,922,723	B1	7/2005	Sharp et al.
6,947,834	B2	9/2005	Duckeck
6,952,181	B2	10/2005	Karr et al.
6,957,076	B2	10/2005	Hunzinger
6,975,941	B1	12/2005	Lau et al.
6,999,777	B1	2/2006	Ganesh
7,283,827	B2	10/2007	Meadows et al.
7,353,034	B2	4/2008	Haney
2002/0042278	A1	4/2002	Crockett et al.
2002/0052207	A1	5/2002	Hunzinger
2002/0115446	A1	8/2002	Boss et al.
2002/0123373	A1	9/2002	Kirbas et al.
2004/0027624	A1	2/2004	Parulski et al.
2004/0133605	A1	7/2004	Chang et al.
2004/0174434	A1	9/2004	Walker et al.
2004/0194025	A1	9/2004	Hubert et al.
2004/0205482	A1	10/2004	Basu et al.
2004/0248591	A1	12/2004	Fish

(Continued)

FOREIGN PATENT DOCUMENTS

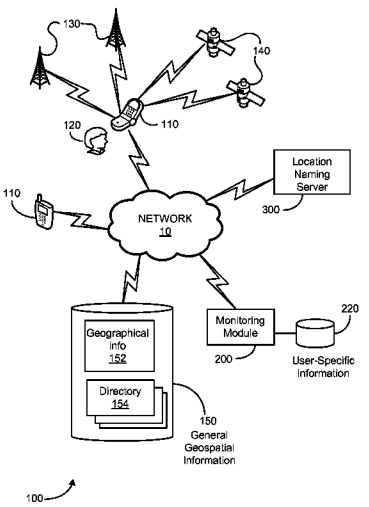
JP	10-271375	10/1998

Primary Examiner — Truong Vo

(57) **ABSTRACT**

An apparatus for identifying a location for naming includes a monitoring module that is configured to monitor actions taken by a user via a mobile communication device and to monitor a location of the mobile communication device when an action is taken by the user and at predetermined time intervals. The apparatus also includes a data store for storing user-specific location information and user-specific action information associated with the location monitored by the monitoring module and a location naming module that is configured to calculate a relevance rating of the location based on the user-specific action information associated with the location and on the user-specific location information, and to prompt the user to name the location based on its relevance rating.

36 Claims, 7 Drawing Sheets



U.S. PATENT DOCUMENTS

2005/0050043	A1	3/2005	Pyhalammi et al.	
2005/0091276	A1	4/2005	Brunswig et al.	
2005/0192030	A1	9/2005	Asthana et al.	
2005/0208954	A1	9/2005	Jerome et al.	
2005/0234922	A1	10/2005	Parekh et al.	
2005/0261822	A1	11/2005	Wako	
2005/0288036	A1	12/2005	Brewer et al.	
2006/0015925	A1	1/2006	Logan	
2007/0067098	A1	3/2007	Zelentsov	
2007/0143281	A1 *	6/2007	Smirin et al.	707/5
2007/0288164	A1 *	12/2007	Gordon et al.	701/213
2008/0139244	A1	6/2008	Vau et al.	

* cited by examiner

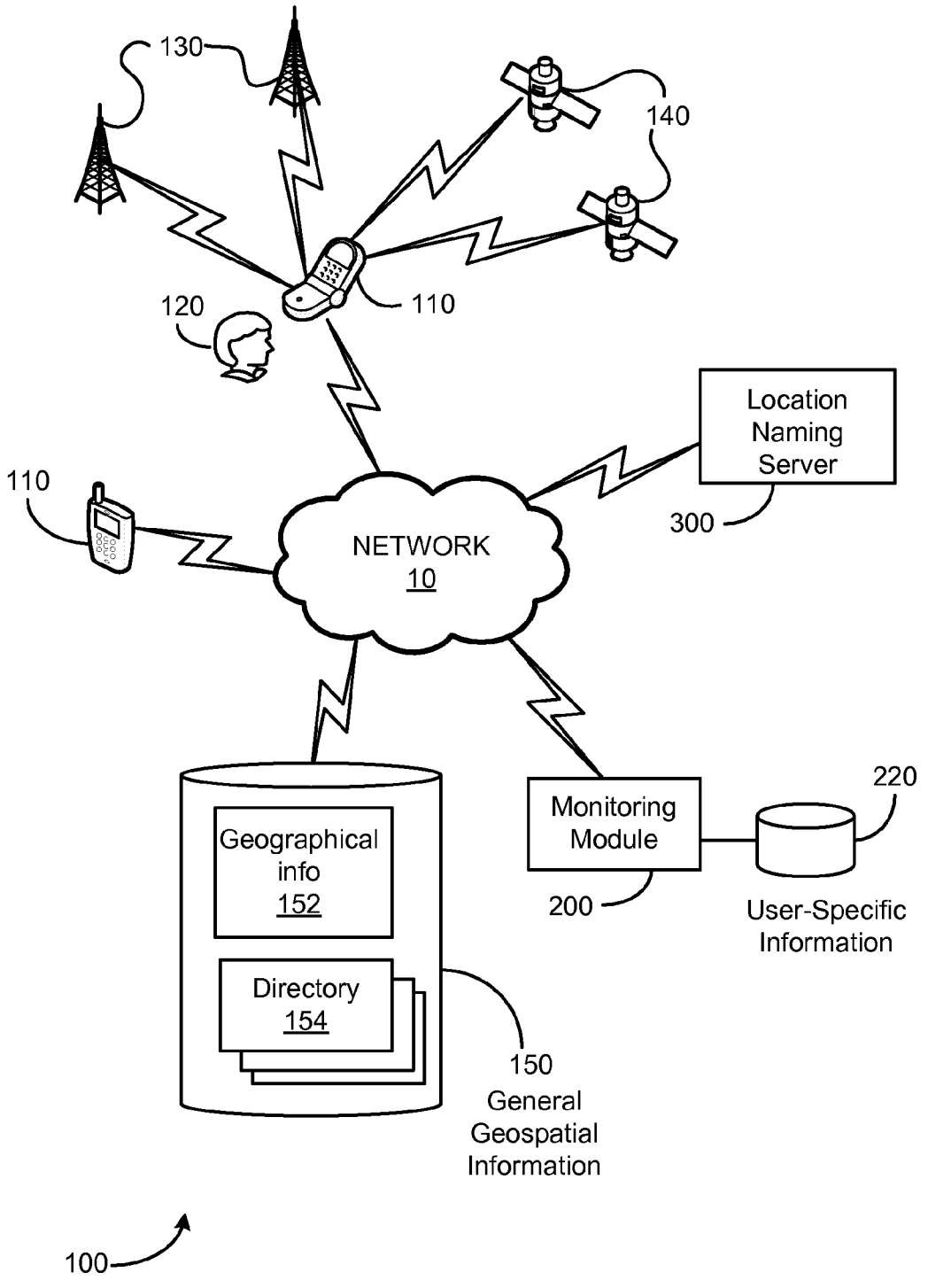

130
140
120
110
110
Location
Naming
Server
300
NETWORK
10
Geographical
info
152
Directory
154
150
General
Geospatial
Information
Monitoring
Module
200
220
User-Specific
Information
100

FIG. 1

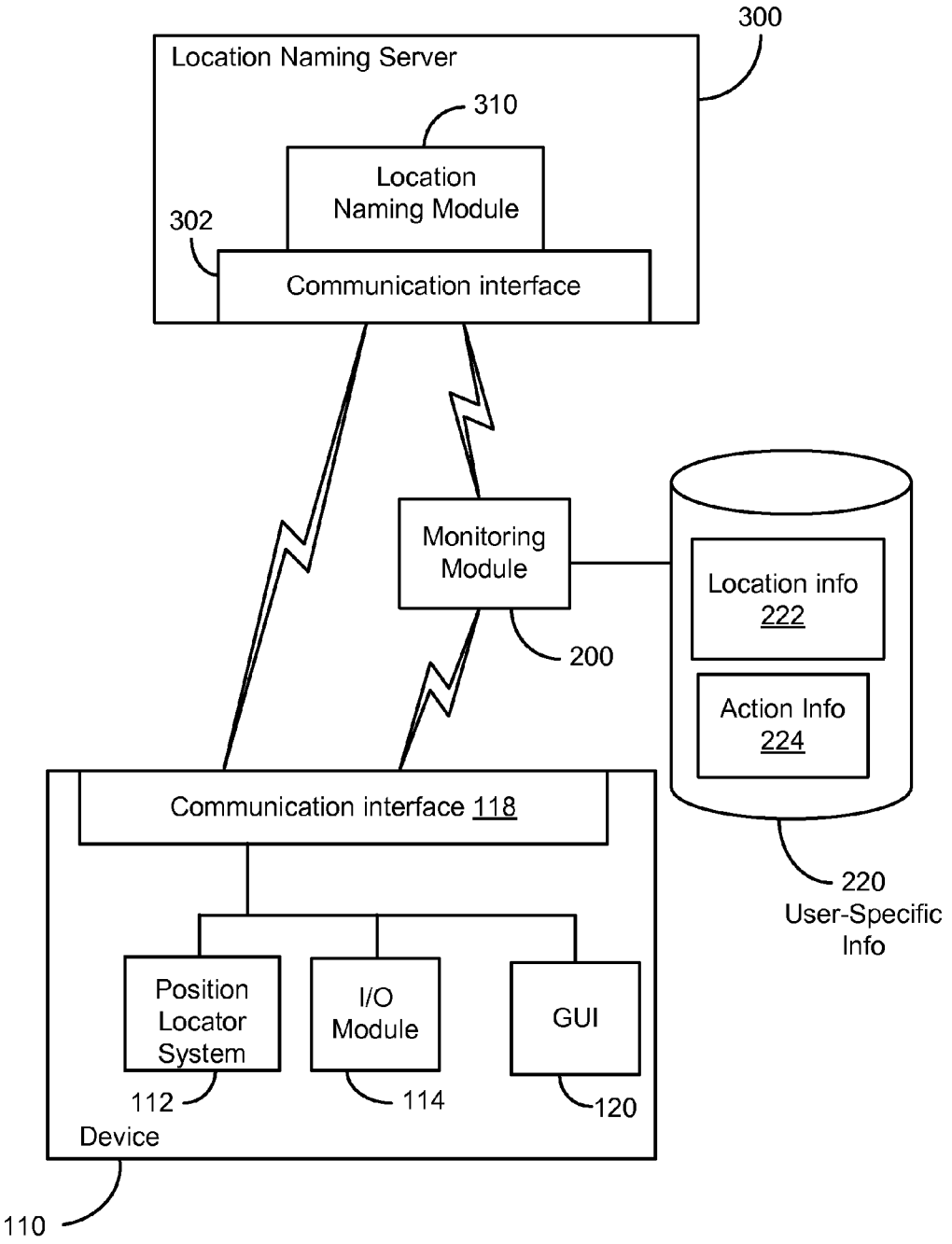

300
Location Naming Server
310
Location
Naming Module
302
Communication interface
Monitoring
Module
200
Location info
222
Action Info
224
220
User-Specific
Info
Communication interface 118
Position
Locator
System
112
I/O
Module
114
GUI
120
Device
110

FIG. 2A

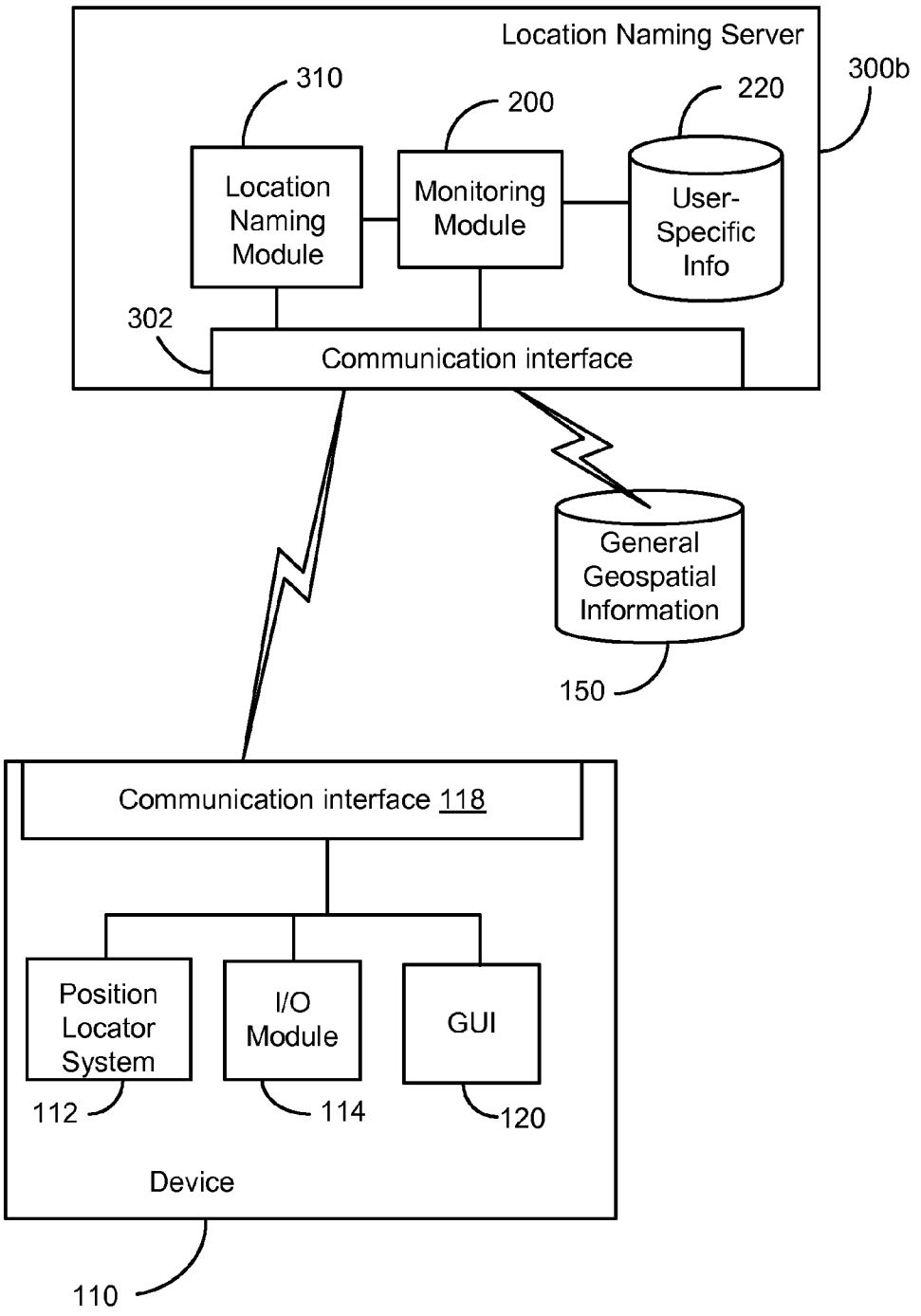

Location Naming Server
300b
310
200
220
Location Naming Module
Monitoring Module
User-Specific Info
302
Communication interface
General Geospatial Information
150
Communication interface 118
Position Locator System
I/O Module
GUI
112
114
120
Device
110

FIG. 2B

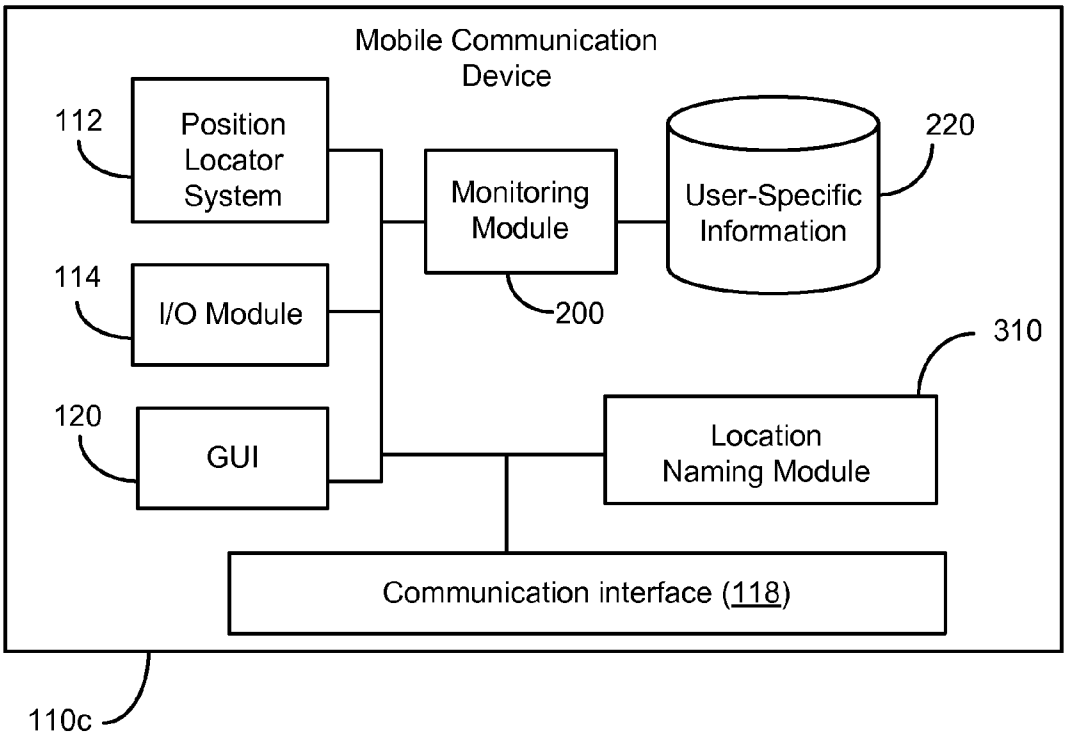

Mobile Communication Device
112
Position Locator System
114
I/O Module
120
GUI
Monitoring Module
200
User-Specific Information
220
310
Location Naming Module
Communication interface (118)
110c

FIG. 2C

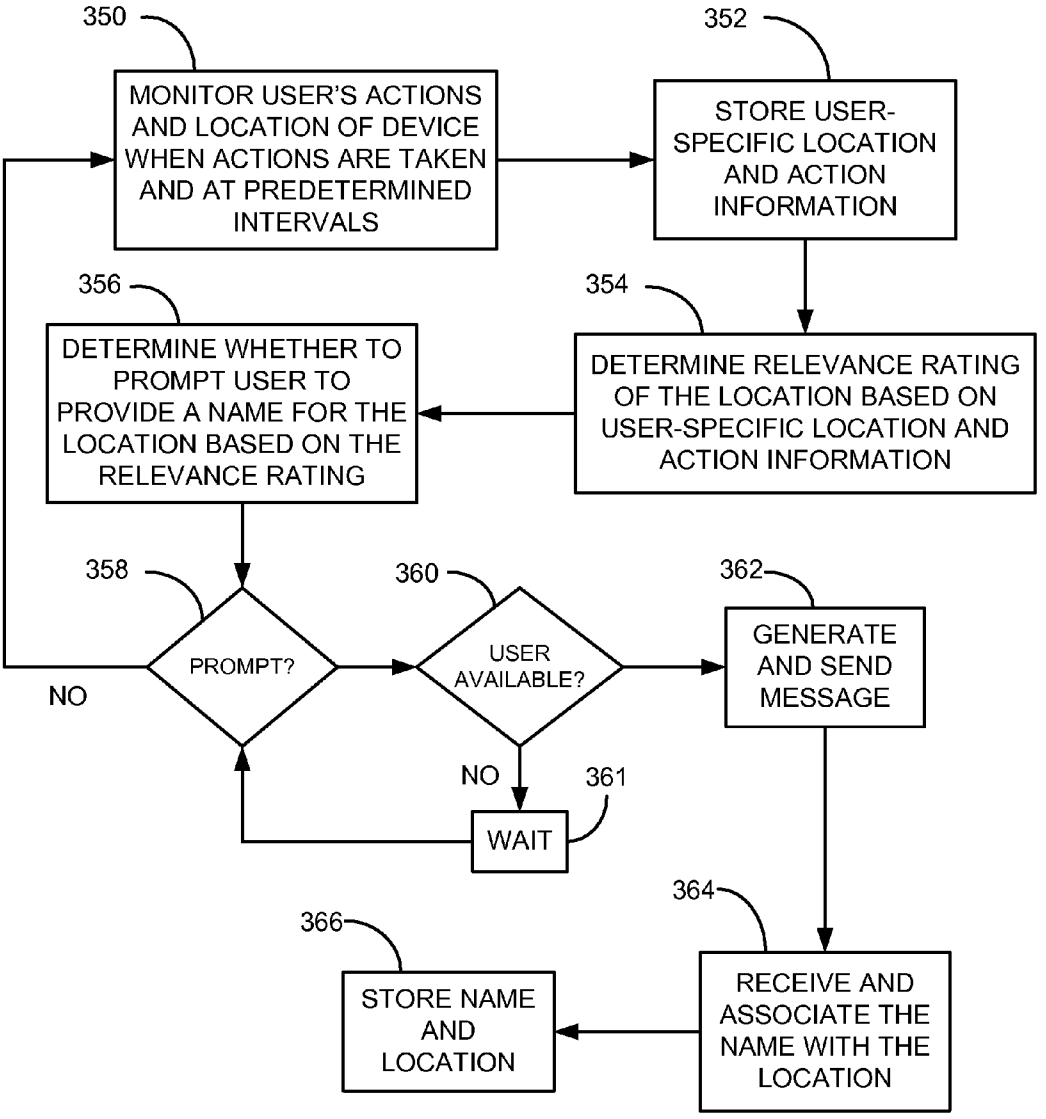

350
MONITOR USER'S ACTIONS AND LOCATION OF DEVICE WHEN ACTIONS ARE TAKEN AND AT PREDETERMINED INTERVALS
352
STORE USER-SPECIFIC LOCATION AND ACTION INFORMATION
354
DETERMINE RELEVANCE RATING OF THE LOCATION BASED ON USER-SPECIFIC LOCATION AND ACTION INFORMATION
356
DETERMINE WHETHER TO PROMPT USER TO PROVIDE A NAME FOR THE LOCATION BASED ON THE RELEVANCE RATING
358
PROMPT?
NO
360
USER AVAILABLE?
NO
361
WAIT
362
GENERATE AND SEND MESSAGE
364
RECEIVE AND ASSOCIATE THE NAME WITH THE LOCATION
366
STORE NAME AND LOCATION

FIG. 3

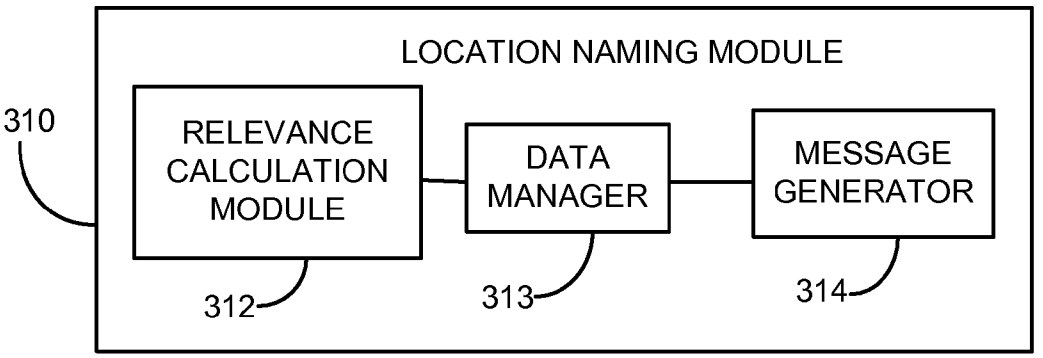

LOCATION NAMING MODULE
310
RELEVANCE CALCULATION MODULE
DATA MANAGER
MESSAGE GENERATOR
312
313
314

FIG. 4

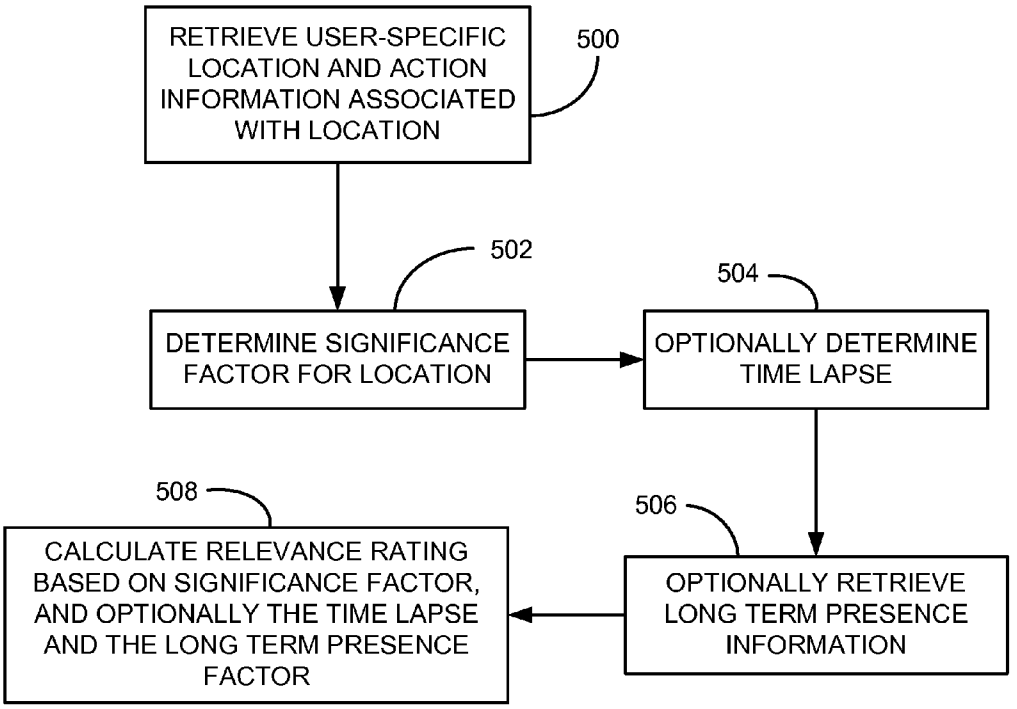

RETRIEVE USER-SPECIFIC LOCATION AND ACTION INFORMATION ASSOCIATED WITH LOCATION
500
DETERMINE SIGNIFICANCE FACTOR FOR LOCATION
502
OPTIONALLY DETERMINE TIME LAPSE
504
OPTIONALLY RETRIEVE LONG TERM PRESENCE INFORMATION
506
CALCULATE RELEVANCE RATING BASED ON SIGNIFICANCE FACTOR, AND OPTIONALLY THE TIME LAPSE AND THE LONG TERM PRESENCE FACTOR
508

FIG. 5

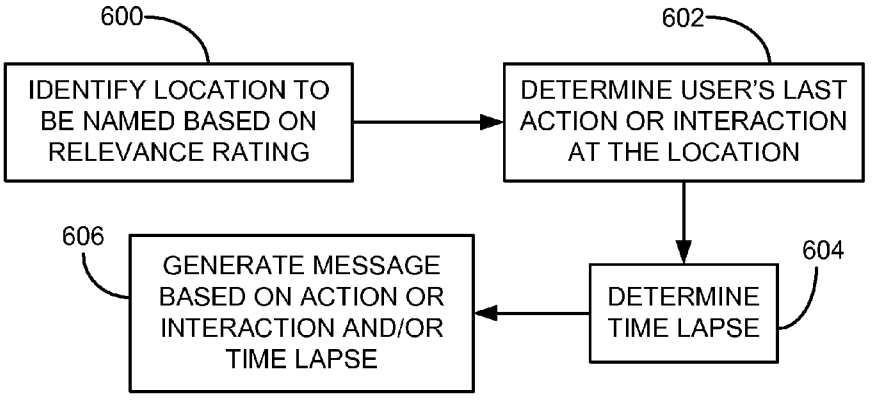

IDENTIFY LOCATION TO BE NAMED BASED ON RELEVANCE RATING
600
DETERMINE USER'S LAST ACTION OR INTERACTION AT THE LOCATION
602
DETERMINE TIME LAPSE
604
GENERATE MESSAGE BASED ON ACTION OR INTERACTION AND/OR TIME LAPSE
606

FIG. 6

SYSTEM AND METHOD FOR IDENTIFYING A LOCATION OF INTEREST TO BE NAMED BY A USER

CROSS-REFERENCE TO RELATED APPLICATIONS

The present invention is related to co-pending U.S. patent application Ser. No. 11/425,650, entitled "METHOD AND SYSTEM FOR PROVIDING A DESCRIPTOR FOR A LOCATION TO A RECIPIENT", and to co-pending U.S. patent application Ser. No. 11/425,623, entitled "SYSTEM AND METHOD FOR NAMING A LOCATION BASED ON USER-SPECIFIC INFORMATION", both filed on Jun. 21, 2006, and assigned to the assignee of the present application and herein incorporated by reference.

BACKGROUND

Handheld electronic devices, such as personal digital assistants (PDAs), mobile phones, digital cameras, and the like, offer mobility and a variety of services to their respective users. They are typically configured to transmit and receive data to and from other devices via a wired or wireless connection. Most mobile phones, for example, can provide Internet access, maintain a personal address book, provide messaging capabilities, capture digital images, as well as place phone calls.

Many devices, in particular mobile phones, can identify their respective locations within a certain range depending on the device and location identifying technique. Some devices can use a sophisticated position determining system, such as a Global Positioning System (GPS). The GPS is a satellite-based radio navigation system that uses signals from three or four satellites to compute the current latitude, longitude and elevation of a GPS receiver in the device anywhere on earth down to within a few meters. Other devices can use a location identifying technique based on which base station is servicing the device, that is, the location of the device is within a range of the base station from which a call is made. Other devices can use location identifying techniques based on triangulation between the device and at least two base stations.

The device's location, typically represented by geospatial coordinates, can be used in a variety of ways. For example, geographical information systems (GISs) exist that map geospatial coordinates to street addresses or location names. The street address or name corresponding to the geospatial coordinates can be associated with an image captured by the device at the location and stored as metadata. The metadata can then be used to categorize the image or to remind the user of the location of where the image was captured.

Alternatively, or in addition, the user can associate other information with a location. The other information can be a description of, or a personalized name for, the location. For example, the user can provide a name of a location based on a favorite store, e.g., "Charbucks," at or near that location, or based on a description of an event, e.g., "café where I had lunch with Sally." In this manner, the location name can be personalized and relevant to the user.

Typically, the user can provide a name of a location when the user captures an image or visits the location. Nevertheless, unless the user is prompted to name the location, the user can easily forget, or be too distracted, to provide a name at the time the picture is taken or at the time of the visit. If the user attempts to name the location later, he may have problems remembering the location, and even if the user remembers the location, he may have difficulties specifying it accurately to the device so that it can be used as metadata. On the other hand, if the device prompts the user to name a location every time an image is captured or at every location visited, the user can easily be overwhelmed with prompts to name locations that are of no interest to the user.

SUMMARY

Accordingly, an apparatus and method for identifying a location of interest for a user to name are described. According to one exemplary embodiment, the apparatus includes a monitoring module configured to monitor actions taken by a user via a mobile communication device and to monitor a location of the mobile communication device when an action is taken by the user and at predetermined time intervals, and a data store for storing user-specific location information and user-specific action information associated with the location monitored by the monitoring module. The apparatus also includes a location naming module. According to aspects of one embodiment, the location naming module is configured to calculate a relevance rating of the location based on the user-specific action information associated with the location and on the user-specific location information, and to prompt the user to name the location based on its relevance rating.

According to another exemplary embodiment, a method of identifying a location to be named includes monitoring actions taken by a user via a mobile communication device, and a location of the mobile communication device when an action is taken by the user and at predetermined time intervals and storing user-specific location information and user-specific action information associated with the location monitored in a data store. The method further includes determining a relevance rating of the location based on the user-specific location information and user-specific action information associated with the location, and prompting the user to provide a name for the location based on the relevance rating.

BRIEF DESCRIPTION OF THE DRAWINGS

The accompanying drawings provide visual representations which will be used to more fully describe the representative embodiments disclosed here and can be used by those skilled in the art to better understand the representative embodiments and their inherent advantages. In these drawings, like reference numerals identify corresponding elements, and:

FIG. **1** is a block diagram illustrating an exemplary location naming system according to an exemplary embodiment;

FIG. **2**A-**2**C are more detailed block diagrams illustrating the location naming system according to several exemplary embodiments;

FIG. **3** is a flow diagram illustrating an exemplary process for identifying a location for naming according to an exemplary embodiment;

FIG. **4** is a block diagram illustrating an exemplary location naming module according to an exemplary embodiment;

FIG. **5** is a flow diagram illustrating an exemplary process for determining a relevancy rating for a location according to an exemplary embodiment; and

FIG. **6** is a flow diagram illustrating an exemplary process for generating a message according to an exemplary embodiment.

DETAILED DESCRIPTION

Various aspects will now be described in connection with exemplary embodiments, including certain aspects described

in terms of sequences of actions that can be performed by elements of a computing device or system. For example, it will be recognized that in each of the embodiments, at least some of the various actions can be performed by specialized circuits or circuitry (e.g., discrete and/or integrated logic gates interconnected to perform a specialized function), by program instructions being executed by one or more processors, or by a combination of both. Thus, the various aspects can be embodied in many different forms, and all such forms are contemplated to be within the scope of what is described.

According to an exemplary embodiment, a location of potential interest to a user of a mobile communication device is identified based on the user's presence at or near the location and a history of actions performed or taken by the user using the device at or near the location. Actions performed by the user can include interactions with other users using the device. The user's presence at or near the location can be quantified by the number of times the user visits the location and the amount of time the user spends at or near the location. For example, a location may be one of interest if the user is moving in a certain direction and stops for a while or backs up and moves in or around the location. Likewise, if the user stops and spends an amount of time at or near the location, e.g., as in a store or in a restaurant, the location may be of interest.

The history of actions and interactions at or near a location can also be indicative of the location's relevance to the user. For example, if the user has stopped and taken an action, e.g., captured pictures, at or near the location on previous occasions, then the likelihood that the location is one of relative importance increases. Similarly, if the user has initiated several interactions, e.g., phone calls, at or near the location, the relative importance of the location can increase.

According to one embodiment, a location's relevance can be based on the number of times the user performs an action, e.g., captures an image, or an interaction with another user, e.g., initiates a phone call or sends a text message, using the mobile communication device, and on the number of times the user has visited the location and the amount of time the user has spent in the location during a predetermined time interval. The user is then prompted to name those locations that are of highest potential relevance to the user. In this manner, the user is not prompted to name every location visited by the user or every location where the user has performed an action/interaction.

According to one embodiment, the user is prompted to name a location at or near the time the location is identified as one of potential interest so that the user can provide an appropriate name. According to an exemplary embodiment, the prompt can include a message that describes the location based on when the user was last at or near the location and what actions/interactions were taken at or near the location such that the user can decide whether the location is in fact one of interest and deserving of a name. The user can be prompted while the user is using the mobile communication device or within a period of time after the user has performed an action/interaction using the device. When the user provides a name for a location, the name can then be associated with the location and stored so that the name can be retrieved when the user returns to the location.

FIG. **1** is a block diagram illustrating an exemplary arrangement for a location naming system **100** according to an exemplary embodiment. One or more network-enabled mobile communication devices **110**, such as a digital camera/phone, PDA, laptop or the like, are in communication with a location naming server **300** over a network **10**. A data store **150** includes general geospatial information relating to a plurality of locations and is accessed by the device **11 0** or the location naming server **300** over the network **10**. The general geospatial information **150** is typically public information that can include geographical information **152** that maps the geospatial coordinates to street names and building names and one or more directories **154** that provide other information associated with street addresses.

According to an exemplary embodiment, the system **100** includes means for monitoring actions taken by a user and via a mobile communication device and for monitoring a location of the mobile communication device when an action is taken by the user and at predetermined time intervals, such as a monitoring module **200** that is in communication with the devices **110** and with the location naming server **300** over the network **10**. In an exemplary embodiment, the monitoring module **200** is configured to collect information relating to a user's presence at or near a location, and a history of actions, including interactions, by the user **120** using the device **11 0** at or near the location. The system further includes means for storing user-specific location information and user-specific action information associated with the location monitored by the monitoring module, such as the monitoring module **200**, which is configured to store and manage the collected information in a data store **220**.

FIG. **2**A is a more detailed block diagram of the location naming system **100** according to an exemplary embodiment. Each device **110** includes circuitry that can track a position of the device **110**. For example, the device **110** can include a position locator system **112** that tracks the position of the device **110**. The position locator system **112** can be the well known global positioning system (GPS) that utilizes satellites **140** (FIG. **1**) to determine the device's longitudinal and latitudinal position. Alternatively, the position locator system **112** can be configured to utilize one or more base stations **130** within communication range to determine the device's location. Each mobile communication device **110** also includes circuitry for communicating with the location naming server **300** and monitoring module **200**. For example, the device **110** can include a communication interface **118** coupled to a user interface **120** and input/output (I/O) module **114** that allows the user **120** to use the device **110** to communicate with the server **300** over a wireless network **10** using one or more communication protocols.

The monitoring module **200** can be a personal computer or other device capable of collecting, storing and managing data. The monitoring module **200** can include a communication interface (not shown) to receive and transmit data over the network **10**. In one embodiment, the monitoring module **200** monitors actions taken by the user **120** using the mobile communication device **11 0** and monitors the location of the device **110** when actions are taken by the user and at predetermined time intervals. In one embodiment, the monitoring module **200** is configured to collect and maintain user-specific action information **224** that includes the number of times the user **120** performs an action and/or interaction using the device **110** at or near the location during a first predetermined time interval, e.g., one (1) hour. Predetermined time intervals, such as the first predetermined time interval, can include a time period over which the relevance of a location is determined. Such time intervals can be configured by an administrator or user of the system **100**, or be set as a default in the various components of the system **100** that determines the relevance of a location. In addition, the monitoring module **200** is configured to collect and maintain user-specific location information **222** that includes short-term presence information including the number of times the user **120** is present at or near the location during the first predetermined time

interval and/or the amount of time the user is present at or near the location during the first predetermined time interval. The user-specific location information **222** and the user-specific action information **224** are stored in the data store **220**.

The location naming server **300** can be a personal computer or other device capable of processing data. The location naming server **300** includes a communication interface **302** to transmit and receive data over the network **10**. In one embodiment, the location naming server **300** is configured to retrieve user-specific information from the data store **220** over the network **10** via the monitoring module **200**.

The system **100** further includes means for prompting the user to name the location based on the user-specific action information associated with the location and on the user-specific location information. For example, according to an exemplary embodiment, the location naming server **300** includes a location naming module **310** which is communicatively coupled to the communication interface **302**. The location naming module **310** is configured to determine a relevance rating of a location based on the user-specific action information associated with the location and on the user-specific location information. In one embodiment, the location naming module **310** prompts the user **120** to name the location based on its relevance rating.

The system **100** illustrated in FIG. **1** and FIG. **2**A is but one exemplary arrangement. In this arrangement, a "thin" mobile communication device **110** can be accommodated because the user-specific location information **222** and action information **224** can be stored remotely and the functionality of the monitoring module **200** and the location naming module **310** can be included in separate servers. Other arrangements can be designed by those skilled in the art. For example, in one embodiment shown in FIG. **2**B, the functionality of the monitoring module **200** and the data store **220** can be included in the location naming server **300***b* so that the location naming server **300***b* securely manages the user-specific information **220**.

In another embodiment, shown in FIG. **2**C, the mobile communication device **110***c* can perform the functions of the location naming module **310** and the monitoring module **200**, and store the user-specific information **220** internally in the device memory (not shown). In this arrangement, the location naming server **300** is not required. Variations of these embodiments may be utilized and structural and functional modifications may be made without departing from the scope of the present disclosure. For example, the functionality of monitoring module **200** can be integrated with that of the mobile communication device **110** and can be configured to transmit the user-specific location information **222** and user-specific action information **224** to the location naming module **310**, which stores and manages the information in the data store **220**. In this example, the location naming module **310**, instead of the monitoring module **200**, can manage the information in the data store **220**.

FIG. **3** is a flow diagram illustrating an exemplary process for identifying a location for naming according to one embodiment. Referring to FIGS. **1**, **2**A-**2**C and FIG. **3**, the exemplary process begins when the monitoring module **200** monitors actions taken by the user **120** via the mobile communication device **110** and the location of the mobile communication device when the action is taken by the user **120** and at predetermined time intervals (block **350**). In one embodiment, a location can be a contiguous region, e.g., a 25 meters by 25 meters square, where different locations do not overlap and where a plurality of contiguous locations define an entire geographical region of interest. The location can be represented by a set of geospatial coordinates, and the user's position can be identified by geospatial coordinates generated by the position locator system **112** in the device **110** or provided by the user **120** via the I/O module **114**. The geospatial coordinates of the user/device **110** can be used to identify at least one position at or near the location through the geographical information **202**.

In one embodiment, the monitoring module **200** monitors the device's location and collects the user-specific location information **222** by querying the position locator system **112** in the device **110** at a fixed time interval. For example, the monitoring module **200** can collect the user-specific location information **222** every **30** seconds. In another embodiment, the monitoring module **200** can collect the information **222** at a time interval proportional to a velocity of the mobile communication device **110**. For example, the time interval can be the **80** divided by the device's velocity. The monitoring module **200** can monitor the user's actions and collect the user-specific action information **224** by querying the position locator system **112** in the device **110** when the user performs an action, e.g., takes a picture, or initiates an interaction, e.g., makes a call or sends a message.

According to an exemplary embodiment, the monitoring module **200** monitors the user's actions and keeps track of the number of times the user **120** performs an action and/or interaction using the device **110** at or near the location during a first predetermined time interval, e.g., one (1) hour. In addition, the monitoring module **200** monitors the device's position and keeps track of the number of times the user **120** is present at or near the location during the first predetermined time interval and/or the amount of time the user is present at or near the location during the first predetermined time interval. This information, referred to above as the user-specific action information **224** and user-specific location information **222**, respectively, is stored in the data store **220** (block **352**).

According to an exemplary embodiment, a relevance calculation module **312** in the location naming module **310**, shown in FIG. **4**, determines a relevance rating for the location based on the user-specific location information **222** and the user-specific action information **224** associated with the location (block **354**). According to an exemplary embodiment, the relevance calculation module **312** (or, perhaps, the location naming module **310** itself) can maintain a dynamic list of potentially relevant locations based on the relevance rating for which the user exhibits nonzero short-term presence over the first predetermined interval. With such an arrangement, the user-specific location information **222**, including the user's short-term presence information, can be updated at predetermined intervals, (e.g., every 30 seconds), and the user-specific action information **224** can be updated whenever an action (or interaction) using the device **110** takes place.

FIG. **5** is a flowchart illustrating an exemplary process for determining the relevance rating for the location according to one embodiment. The process begins when the relevance calculation module **312** retrieves the user-specific location **222** and user-specific action **224** information associated with the location from the data store **220** (block **500**). In one embodiment, the information **222**, **224** can be retrieved via the monitoring module **200**. In another embodiment, a data manager **313** in the location naming module **310**, shown in FIG. **4**, can retrieve the information **222**, **224** directly from the data store **220**.

Once the information **222**, **224** is retrieved, the relevance calculation module **312** can determine a significance factor of the location (block **502**). In one embodiment, the significance factor increases as the user-specific location information **222** increases and as the user-specific action information **224**

increases. Accordingly, the significance factor of a location increases as the number of times the user is present at or near the location during the first predetermined time interval and/or as the amount of time the user is present at or near the location increases. In addition, the significance factor increases as the number of times the user performs an action and/or interaction with another user using the device **11 0** at or near the location during the first predetermined time interval increases.

In one embodiment, the significance factor can be a weighted calculation based on the user-specific location information **222** and the user-specific action information **224**. In this embodiment, a highest weight can be applied to the number of actions performed, e.g., the number of image capture events, and a lowest weighting to the user-specific location information **222**, i.e., the number of times and/or the amount of time the user is present at or near the location during the first predetermined time interval ($N_{present}$). For example, the user-specific action information **224**, can be split into its subcomponents corresponding to the number of actions, $N_{actions}$, and the number of interactions, $N_{interactions}$, and the significance factor, S, of the location can be determined by the following weighted sum:

$$S=20(N_{actions})+5\ (N_{interactions})+1\ (N_{present}) \quad \text{Equation (1)}$$

In this embodiment, the higher weighting for the number of actions reflects an assumption that when actions are taken at a particular location, the probability that the location is interesting to the user **120** is high. Similarly, the lowest weighting for the location information reflects the assumption that the user's presence at or near a location is not necessarily indicative of the location's relevance to the user **120**. In other embodiments, the weighting can be adjusted to reflect different assumptions regarding the user's behavior.

According to one embodiment, the location's relevance rating can be calculated based on the significance factor alone (block **508**). In one embodiment, the relevance rating is directly proportional to the significance factor, i.e., it increases as the significance factor of the location increases.

According to another embodiment, the location relevance rating can be affected by other factors, such as a user's long-term presence information and the amount of time that has passed since the user's last visit to the location. In one embodiment, the relevance calculation module **312** can determine a time lapse between the current time and the last time the user was present at or near the location (block **504**) and retrieve the number of times the user **120** was present at or near the location during a second predetermined time interval that is greater than the first predetermined time interval (block **506**). In one embodiment, the second predetermined time interval can be a long term period relative to the first predetermined time interval, which is a short term period. For example, the long term period can be one (1) month or one (1) year, while the short term period can be one (1) hour.

According to this embodiment, the relevance rating of the location can be calculated from the significance factor, the time lapse (t_{lapse}) and/or the long term presence information ($N_{long\ term}$) (block **508**). In one embodiment, the relevance rating is directly proportional to the significance factor, and inversely proportional to the time lapse and to the long term presence information. That is, the relevance rating decreases as either or both of the time lapse and the long term presence information increases. In one embodiment, the relevance rating, R, can be calculated using the following equation:

$$R=S[(1+t_{lapse})\ (\log\ (2+N_{long\ term}))]^{1} \quad \text{Equation (2)}$$

The inverse relationship reflects the assumption that as the amount of time increases between the current time and the last time the user **120** was present at or near the location, the relevancy of the location to the user **120** decreases. Similarly, as the number of times the user **120** is present at or near the location over a long term period increases, the more likely that the location is a routine destination and not one of particular interest to the user **120**.

Referring again to FIG. **3**, once the relevance rating of the location is determined (block **354**), the location naming module **310** determines, based on the relevance rating, whether to prompt the user **120** to provide a name for the location (block **356**). In one embodiment, the location naming module **310** compares the relevance rating of the location to a threshold value, and if the relevance rating is greater than or equal to the threshold value, the user **120** will be prompted. For example, if the relevance rating is based on the significance factor only, and the significance factor is calculated according to the weighting in Equation (1) above, then when the threshold value is set at 10, a single action (weighted at 20), or two (2) interactions, or 10 presence observations will result in the relevance rating exceeding the threshold.

If the location naming module **310** determines that the user **120** should not be prompted to name the location (block **358**) because, for example, the relevance rating does not exceed the threshold value, the process returns to the monitoring the user's actions and the device's location (block **350**). Otherwise, the location naming module **310** determines that the user **120** should be prompted to name the location. In one embodiment, the location naming module **310** first determines whether the user **120** is available to receive the prompt (block **360**). In one embodiment, the user **120** is available when she is actively using the mobile communication device **110** or has recently used the device **110** within a specified time period, e.g., 10 seconds. In one embodiment, the location naming module **310** can call the monitoring module **200** to make this determination. If the user **120** is using or has recently used the device **110**, e.g. taking pictures or sending messages to others, the location naming module **310** can send a message to the user during use or immediately after the user **120** has stopped actively using the device **110** (block **362**). Otherwise, the location naming module **310** can wait until the user **120** is available (block **361**).

In an exemplary embodiment, the message describes the location based on the user's most recent actions at or near the location and/or a time when the user **120** was last present at or near the location, and prompts the user **120** to name the location. In one embodiment, the location naming module **310** can call a message generator **314**, shown in FIG. **4**, to compose the message. FIG. **6** is a flowchart illustrating an exemplary process for composing the message according to one embodiment. The message generator **314** identifies the location to be named based on the relevance rating (block **600**) and then determines the user's last action and/or interaction at or near the location (block **602**). In one embodiment, the message generator **314** retrieves the user-specific action information **224** from the data store **224** directly using the data manager **313**, or via the monitoring module **200**. The message generator **314** then determines a time lapse between the current time and the last time the user **120** was present at or near the location (block **604**). In addition, the message generator **314** can also retrieve general geospatial information **150** from the network **10** to describe the location.

After collecting this information, the message generator **314** generates the message based on at least one of the action and interaction information and the time lapse (block **606**). In one embodiment, the message generator **314** is configured to

generate messages that are meaningful to the user **120**. For example, the following are exemplary messages:

The place about 100 feet North where you turned back

The intersection of 8th Avenue and 35th Street, about a block back

The place where you stood in Times Square 10 minutes ago

The place in Times Square where you stopped this time and on your last visit to New York

In an exemplary embodiment, the message can be generated using a template that is completed according to the information retrieved. For example, if the user **120** performed an action/interaction at the location and the location is the latest position where the specified type of action was performed by the user **120**, then a description can be generated by filling a template as follows:

Where you last took a picture (and showing a thumbnail of the picture if possible); or

Where you last sent a reminder (and showing a part of the reminder notification) If the location is not the latest position where the specified type of action was performed or if the time lapse exceeds a minimum time period, e.g., 5 minutes, then description can be generated by filling a template as follows:

Where you took a picture <time-lapse> ago [and showing a thumbnail of the picture if possible]

In another embodiment, the message generator **314** can use a time template to generate the message. For example, the following guidelines can be implemented:

If 0<time-lapse <2 minutes then, the describe time using "just"—E.g., Where you "just" took a picture

If 2 minutes <time-lapse <10 minutes (inclusive), then describe time as "<time-lapse>minutes ago"—E.g., Where you took a picture "8 minutes ago."

If 10 minutes <time-lapse<59 minutes (inclusive), then describe time as "about X minutes ago" where X is the time-lapse in minutes rounded to the nearest 5 minutes—E.g., Where you took a picture "about 25 minutes ago."

60 minutes <time-lapse<1 day (inclusive), then describe time as "at about Y" where Y is the local time at the location rounded to the nearest half hour—E.g., Where you took a picture "at about 11:30 AM." In addition, terms such as "this" or "last" or "today" or "yesterday" or "morning" or "afternoon" or "night" can be used together or singularly.

If the user **120** has performed several actions or participated in interactions at or near the location, the message generator **314** can generate a message that summarizes the actions. In one embodiment, the time descriptor can cover a time period so that the description sounds natural. For example:

Where you took 5 pictures 20-25 minutes ago;

Where you sent 3 emails from 3:30 to 4:10 PM today.

Referring again to FIG. **3**, after the location naming module **310** generates the message, it sends it to the mobile communication device **11 0** associated with the user **120** (block **362**). In one embodiment, the message can prompt the user **120** to name two or more locations when more than one location satisfies the criteria for prompting. In this embodiment, the location naming module **310** can generate a list where the locations are ordered according to their respective relevance ratings, and send the list in the message to the device **110**. In another embodiment, the message can prompt the user **120** to name the location with the highest relevance rating.

In one embodiment, the device **110** receives the message via the communication interface **118** and the message is displayed to the user **120** on the device's user interface **120**. The user **120** can provide a name for the location. In one embodiment, the user **120** can utilize the system and method described in co-pending patent application Ser. No. 11/425,623, entitled "METHOD AND SYSTEM FOR NAMING A LOCATION BASED ON USER-SPECIFIC INFORMATION," filed Jun. 21, 2006, and assigned to the assignee of the present invention. Here, a name generation module automatically provides a name of a location based on an atemporal correlation between general information and user-specific information relating to the location. Because the name for the location is based on user-specific information, the name can be meaningful to the user. The user is not required to think of and to enter a name for each location, which can be tedious when several locations need to be named and when the most appropriate name might not be readily apparent to the user. Once the name has been provided, the user **120** can send the name and location back to the location naming module via the communication interface **11 8**.

According to an exemplary embodiment, the location naming module **310** receives the name over the network **10** via the communication interface **302** and associates the name with the location (block **364**). The name and the location are then stored in the data store **220** (block **366**) so that the name can be retrieved when the user **120** returns to the location or when the user wishes to share the name with another user. For example, the name for the location can be shared with another user via the system and method described in co-pending patent application Ser. No. 11/425,650, entitled "METHOD AND SYSTEM FOR PROVIDING A DESCRIPTOR FOR A LOCATION TO A RECIPIENT," assigned to the assignee of the present and filed Jun. 21, 2006.

The executable instructions of a computer program as illustrated in FIG. **3**, FIG. **5** and FIG. **6** can be embodied in any computer readable medium for use by or in connection with an instruction execution system, apparatus, or device, such as a computer based system, processor containing system, or other system that can fetch the instructions from the instruction execution system, apparatus, or device and execute the instructions.

As used here, a "computer readable medium" can be any means that can contain, store, the program for use by or in connection with the instruction execution system, apparatus, or device. The computer readable medium can be, for example, but is not limited to, an electronic, magnetic, optical, electromagnetic, infrared, or semiconductor storage system, storage apparatus, storage device, or storage medium.

More specific examples (a non-exhaustive list) of the computer readable medium can include the following: a portable computer diskette, a random access memory (RAM), a read only memory (ROM), an erasable programmable read only memory (EPROM or Flash memory), a portable compact disc (CD), a portable digital video disc (DVD), and the like.

It will be appreciated by those of ordinary skill in the art that the concepts and techniques described here can be embodied in various specific forms without departing from the essential characteristics thereof. The presently disclosed embodiments are considered in all respects to be illustrative and not restrictive. The scope of the invention is indicated by the appended claims, rather than the foregoing description, and all changes that come within the meaning and range of equivalence thereof are intended to be embraced.

What is claimed is:

1. An apparatus for identifying a location for naming, the apparatus comprising:

a monitoring module configured to monitor actions taken by a user via a mobile communication device and to

monitor a location of the mobile communication device when an action is taken by the user and at predetermined time intervals;

a data store for storing user-specific location information, the user-specific location information including at least one of a number of times the user is present at or near the location during a first predetermined time interval and an amount of time the user is present at or near the location, and user-specific action information associated with the location monitored by the monitoring module; and

a location naming module configured to calculate a relevance rating of the location based on the user-specific action information associated with the location and on the user-specific location information, and to prompt the user to name the location based on its relevance rating,

wherein at least one of the modules includes at least one electronic hardware component.

2. The apparatus of claim **1** wherein the user-specific action information includes a number of times the user has performed at least one of an action and an interaction with another user using the mobile communication device at or near the location during the first predetermined time interval.

3. The apparatus of claim **2**, wherein the location naming module is configured to determine a significance factor of the location that increases as the at least one of the number of times the user is present at or near the location during the first predetermined time interval and the amount of time the user is present at or near the location increases and as the number of times the user has performed the at least one of the action and the interaction with another user using the mobile communication device at or near the location during the first predetermined time interval increases.

4. The apparatus of claim **3**, wherein the location naming module is configured to calculate the relevance rating of the location based on the determined significance factor of the location, wherein the relevance rating increases as the significance factor of the location increases.

5. The apparatus of claim **3**, wherein the location module is configured to apply a highest weighting to the user-specific action information and a lowest weighting to the short-term presence information in determining the significance factor of the location.

6. The apparatus of claim **3** wherein the user-specific location information further includes long-term presence information including a number of times the user is present at or near a location within a second predetermined time interval, wherein the second predetermined time interval is a long-term period that is greater than the first predetermined time interval, which is a short-term period.

7. The apparatus of claim **6** wherein the location naming module is further configured to determine a time lapse between a current time and a last time the user was present at or near the location, and to calculate the relevance rating of the location based on the determined significance factor of the location, the long-term presence information, and on the time lapse, wherein the relevance rating increases as the significance factor of the location increases, decreases as the time lapse increases and decreases as the number of times the user is present at or near the location during the second predetermined time interval increases.

8. The apparatus of claim **1** wherein the location naming module is further configured to prompt the user to name one or more locations when the user is actively using or has used the mobile communication device within a specified time period.

9. The apparatus of claim **8** wherein the location naming module is further configured to generate a message for each of the one or more locations to be named, the message describing the location based on at least one of an action taken by the user at or near the location and a time when the user was present at or near the location.

10. The apparatus of claim **1** wherein the location naming module is further configured to generate a list of locations to be named, wherein the locations are ordered according to their relevance ratings.

11. The apparatus of claim **1** wherein the location naming module is configured to associate a name with the location when the user provides the name, and to store the name and the location in the data store, such that the name can be retrieved when the user returns to the location or when the user wishes to share the name with another user.

12. The apparatus of claim **1**, wherein the apparatus is a mobile communication device comprising:

a communication interface coupled to a network; and

a position locator system configured to identify the location of the mobile communication device.

13. The apparatus of claim **12**, wherein the monitoring module is configured to query the position locator system to identify the location of the mobile communication device at least one of at a fixed time interval, at a time interval proportional to a velocity of the mobile communication device, and when the user performs at least one of an action and an interaction with another user using the mobile communication device.

14. The apparatus of claim **1**, wherein the apparatus is a server comprising:

a communication interface for communicating with a mobile communication device associated with a user over a network and configured to receive information related to the actions taken by the user via the mobile communication device and the location of the mobile communication device.

15. A method of identifying a location to be named, the method comprising:

monitoring actions taken by a user via a mobile communication device, and a location of the mobile communication device when an action is taken by the user and at predetermined time intervals;

storing user-specific location information, the user-specific location information including at least one of a number of times the user is present at or near the location during a first predetermined time interval and an amount of time the user is present at or near the location, and user-specific action information associated with the location monitored in a data store;

determining a relevance rating of the location based on the user-specific location information and user-specific action information associated with the location; and

prompting the user to provide a name for the location based on the relevance rating.

16. The method of claim **15** wherein monitoring further includes collecting user-specific action information that includes a number of times the user has performed at least one of an action and an interaction with another user using the mobile communication device at or near the location during the first predetermined time interval.

17. The method of claim **16** further comprising determining a significance factor of the location that increases as the at least one of the number of times the user is present at or near the location during the first predetermined time interval and the amount of time the user is present at or near the location increases and as the number of times the user has performed the at least one of the action and the interaction with another

user using the mobile communication device at or near the location during the first predetermined time interval increases.

18. The method of claim **17** wherein determining the significance factor of the location includes:

applying a highest weighting to the user-specific action information and a lowest weighting to the short-term presence information; and

summing the highest weighted user-specific action information and the lowest weighted short-term presence information.

19. The method of claim **17** wherein determining the relevance rating includes calculating the relevance rating based on the determined significance factor, wherein the relevance rating increases as the significance factor of the location increases.

20. The method of claim **17** wherein monitoring further includes collecting user-specific location information that further includes long-term presence information including a number of times the user is present at or near the location within a second predetermined time interval, wherein the second predetermined time interval is a long-term period that is greater than the first predetermined time interval, which is a short-term period.

21. The method of claim **20** further including determining a time lapse between a current time and a last time the user was present at or near the location, and wherein determining the relevance rating of the location further includes:

calculating the relevance rating of the location based on the determined significance factor of the location, the long-term presence information, and on the time lapse, wherein the relevance rating increases as the significance factor of the location increases, decreases as the time lapse increases and decreases as the number of times the user is present at or near the location during the second predetermined time interval increases.

22. The method of claim **15** wherein prompting the user to name the location includes:

determining when the user is actively using the mobile communication device; and

sending a message to the user during use or after the user has stopped actively using the mobile communication device within a specified time period.

23. The method of claim **22** wherein the message describes the location based on at least one of the user's actions at or near the location and a time when the user was last present at or near the location.

24. The method of claim **15** further comprising:

associating a name with the location when the user provides the name in response to the prompting; and

storing the name and the location in the data store such that the name can be retrieved when the user returns to the location or when the user wishes to share the name with another user.

25. The method of claim **15** wherein monitoring includes repeatedly identifying the location of the mobile communication device at least one of at a fixed time interval, at a time interval proportional to a velocity of the mobile communication device, and when the user performs at least one of an action and an interaction with another user using the mobile communication device.

26. A computer readable medium containing programming instructions for identifying a location to be named, the program instructions for performing a method comprising:

monitoring actions taken by a user via a mobile communication device, and a location of the mobile communication device when an action is taken by the user and at predetermined time intervals;

storing user-specific location information, the user-specific location information including at least one of a number of times the user is present at or near the location during a first predetermined time interval and an amount of time the user is present at or near the location, and user-specific action information associated with the location monitored in a data store;

calculating a relevance rating of the location based on the user-specific location information and user-specific action information associated with the location; and

prompting the user to provide a name for the location based on the relevance rating.

27. The computer readable medium of claim **26** wherein instructions for monitoring further include collecting user-specific action information that includes a number of times the user has performed at least one of an action and an interaction with another user using the mobile communication device at or near the location during the first predetermined time interval.

28. The computer readable medium of claim **27** further comprising instructions for:

determining a significance factor of the location that increases as the at least one of the number of times the user is present at or near the location during the first predetermined time interval and the amount of time the user is present at or near the location increases and as the number of times the user has performed the at least one of the action and the interaction with another user using the mobile communication device at or near the location during the first predetermined time interval increases.

29. The computer readable medium of claim **28** wherein instructions for determining the significance factor of the location include:

applying a highest weighting to the user-specific action information and a lowest weighting to the short-term presence information; and

summing the highest weighted user-specific action information and the lowest weighted short-term presence information.

30. The computer readable medium of claim **28** wherein instructions for determining the relevance rating include calculating the relevance rating based on the determined significance factor, wherein the relevance rating increases as the significance factor of the location increases.

31. The computer readable medium of claim **28** wherein instructions for monitoring further include collecting user-specific location information that further includes long-term presence information including a number of times the user is present at or near the location within a second predetermined time interval, wherein the second predetermined time interval is a long-term period that is greater than the first predetermined time interval, which is a short-term period.

32. The computer readable medium of claim **31** further including instructions for determining a time lapse between a current time and a last time the user was present at or near the location, and wherein instructions for determining the relevance rating of the location further include:

calculating the relevance rating of the location based on the determined significance factor of the location, the long-term presence information, and on the time lapse, wherein the relevance rating increases as the significance factor of the location increases, decreases as the time lapse increases and decreases as the number of times the user is present at or near the location during the second predetermined time interval increases.

33. The computer readable medium of claim 26 wherein instructions for prompting the user to name the location include:

determining when the user is actively using the mobile communication device; and

sending a message to the user during use or after the user has stopped actively using the mobile communication device within a specified time period.

34. The computer readable medium of claim 26 further comprising instructions for:

associating a name with the location when the user provides the name in response to the prompting; and

storing the name and the location in the data store such that the name can be retrieved when the user returns to the location or when the user wishes to share the name with another user.

35. The computer readable medium of claim 26 wherein instructions for monitoring include repeatedly identifying the location of the mobile communication device at least one of at a fixed time interval, at a time interval proportional to a velocity of the mobile communication device, and when the user performs at least one of an action and an interaction with another user using the mobile communication device.

36. An apparatus for identifying a location for naming, the apparatus comprising:

means for monitoring actions taken by a user via a mobile communication device and for monitoring a location of the mobile communication device when an action is taken by the user and at predetermined time intervals;

means for storing user-specific location information, the user-specific location information including at least one of a number of times the user is present at or near the location during a first predetermined time interval and an amount of time the user is present at or near the location, and user-specific action information associated with the location monitored by the monitoring module; and

means for prompting the user to name the location based on the user-specific action information associated with the location and on the user-specific location information, wherein at least one of the means includes at least one electronic hardware component.

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