US008099109B2

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Altman et al.

(10) **Patent No.: US 8,099,109 B2**
(45) **Date of Patent: Jan. 17, 2012**

(54) **LOCATION-BASED ADVERTISING MESSAGE SERVING FOR MOBILE COMMUNICATION DEVICES**

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(73) Assignee: **Loopt, Inc.**, Mountain View, CA (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 842 days.

(21) Appl. No.: **11/931,113**

(22) Filed: **Oct. 31, 2007**

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(63) Continuation-in-part of application No. 11/445,730, filed on Jun. 1, 2006.

(51) **Int. Cl.**
H04W 24/00 (2009.01)

(52) **U.S. Cl.** **455/456.3**; 455/456.5; 455/456.6; 455/457; 455/466; 455/414.3; 705/14.49; 705/14.58; 705/14.57; 705/14.65; 705/14.66

(58) **Field of Classification Search** 455/456.3, 455/456.5, 456.6, 457, 466, 518, 414.3; 705/14.49, 705/14.58, 14.57, 14.65, 14.66
See application file for complete search history.

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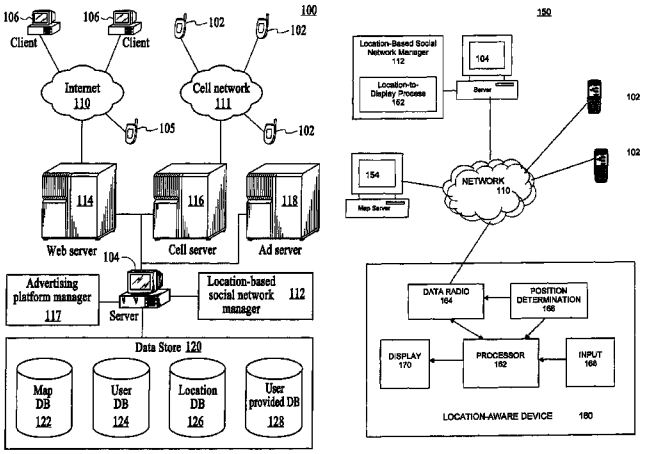
Primary Examiner — Ajit Patel
Assistant Examiner — Khai M Nguyen
(74) *Attorney, Agent, or Firm* — Dergosits & Noah LLP; Todd A. Noah

(57) **ABSTRACT**

Embodiments of a location sharing network manager process are described. The process is executed on a server computer coupled to a plurality of mobile communication devices over a wireless network. Each mobile device is a location-aware mobile communication device. The process determines the geographic location of a mobile communication device operated by a user within an area, displays a map representation of the area around the mobile communication device on a graphical user interface of the mobile communication device, and superimposes on the map the respective locations of one or more other trusted users of mobile communication devices coupled to the mobile communication device over the network. An advertising platform manager provides tools for an advertiser to create and transmit relevant ad messages to a user based on specific location, time, and profile data of the user. Such location-based ad serving allows for the creation of ads that directly leverage a key component of the user's interaction with the mobile device in that messages can be tied directly to the location display of a product or service offered by the advertiser. The ad messages can be provided in the form of text or graphic messages, logos, display branding. Information related to time and location-sensitive promotional events can also be effectively broadcast to users in the form of alerts or coupons that encourage user to visit a location that may be near the user.

20 Claims, 22 Drawing Sheets



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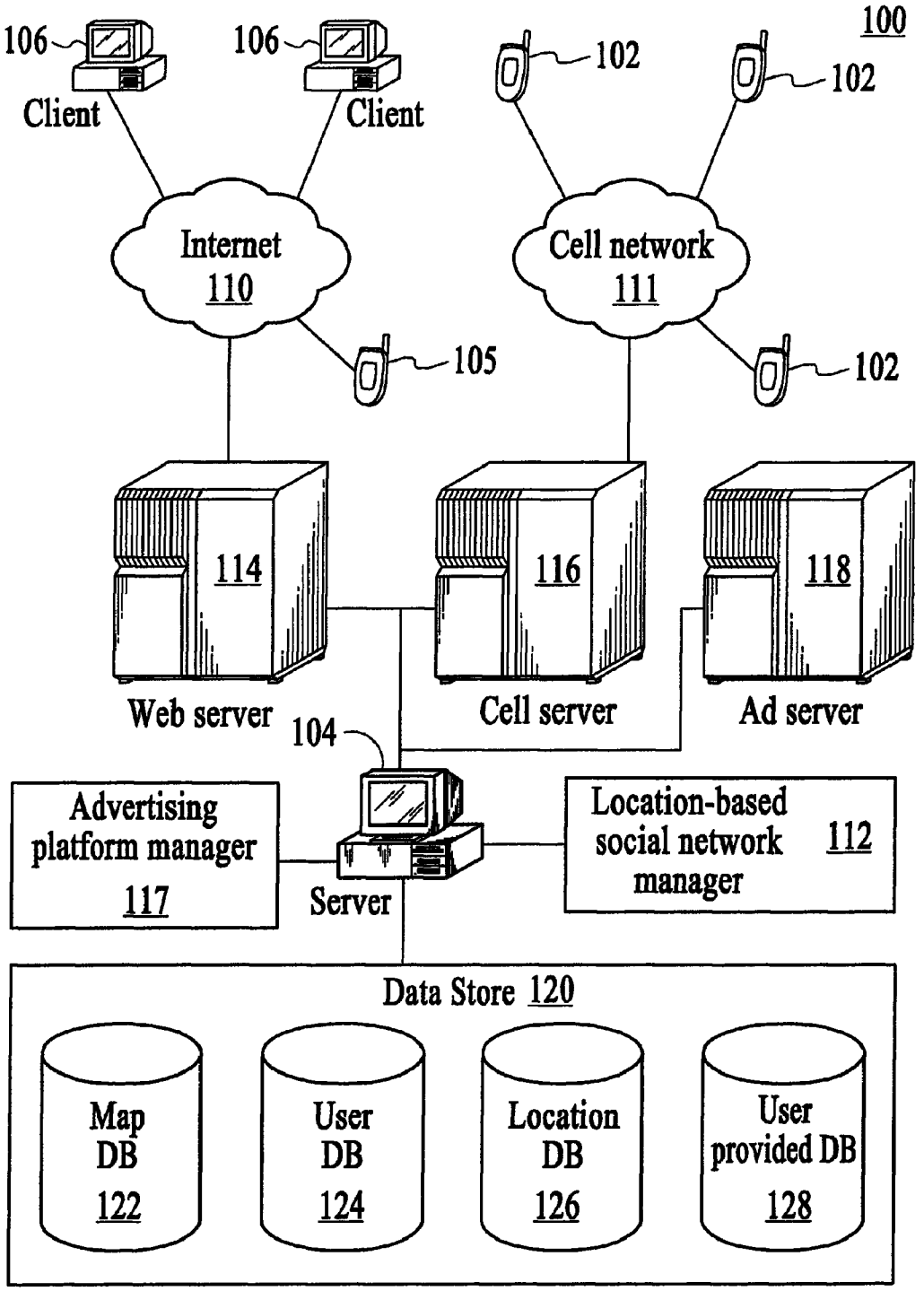

100
106
Client
106
Client
102
102
Internet
110
Cell network
111
105
102
114
116
118
Web server
Cell server
Ad server
104
Advertising platform manager
117
Server
Location-based social network manager
112
Data Store 120
Map DB
122
User DB
124
Location DB
126
User provided DB
128

FIG.1A

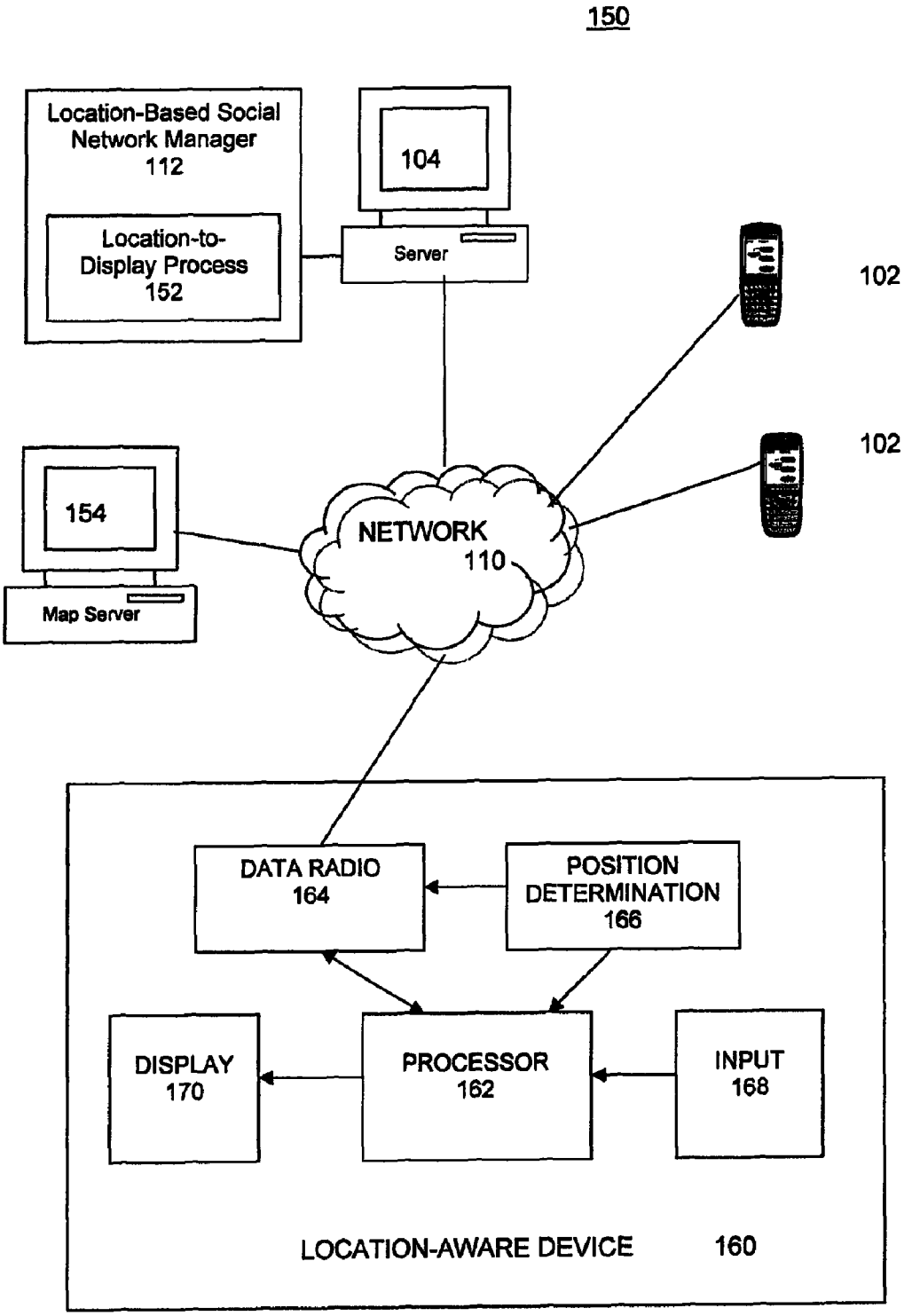

150
Location-Based Social Network Manager 112
Location-to-Display Process 152
104
Server
102
102
154
Map Server
NETWORK 110
DATA RADIO 164
POSITION DETERMINATION 166
DISPLAY 170
PROCESSOR 162
INPUT 168
LOCATION-AWARE DEVICE 160

FIG.1B

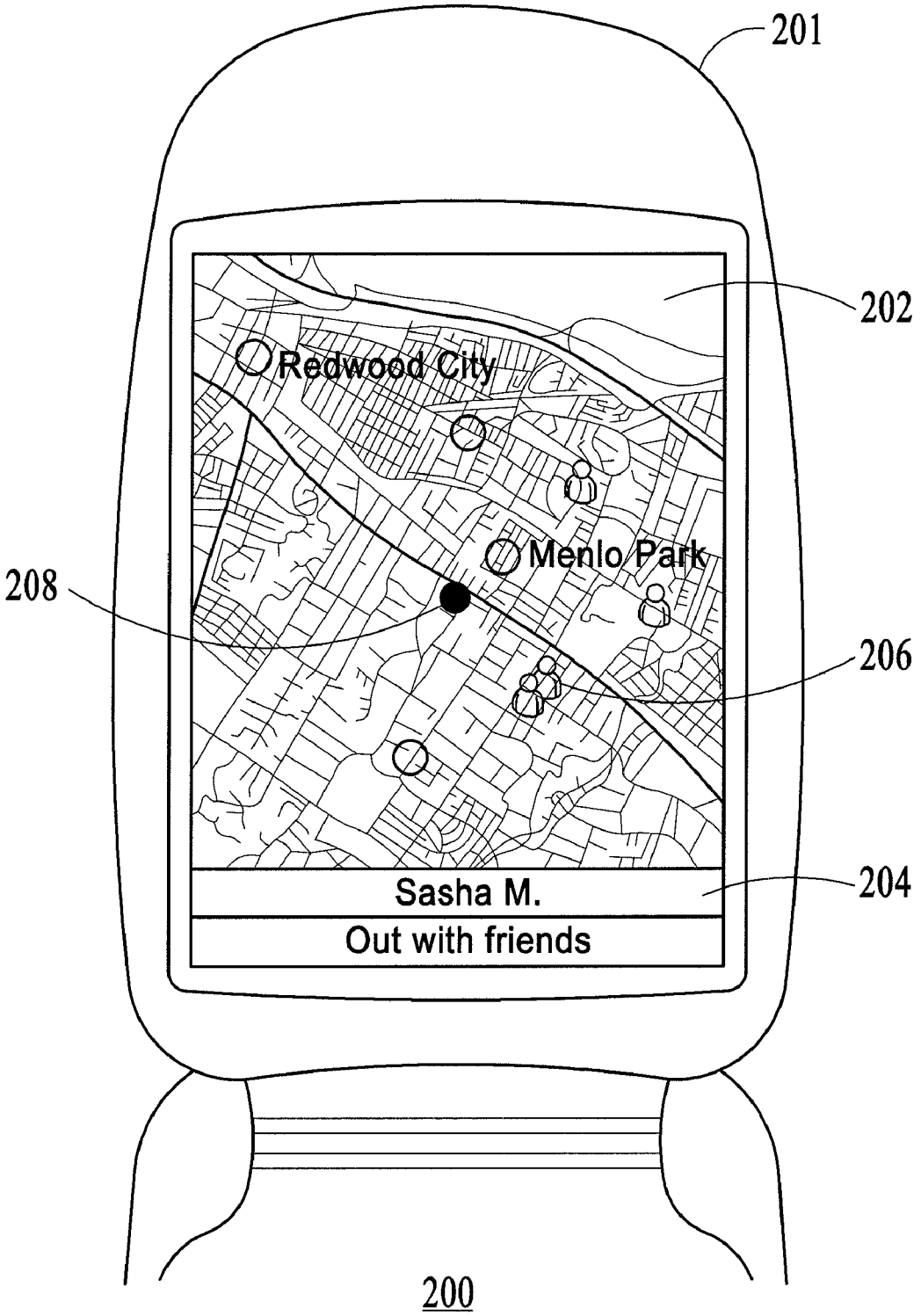
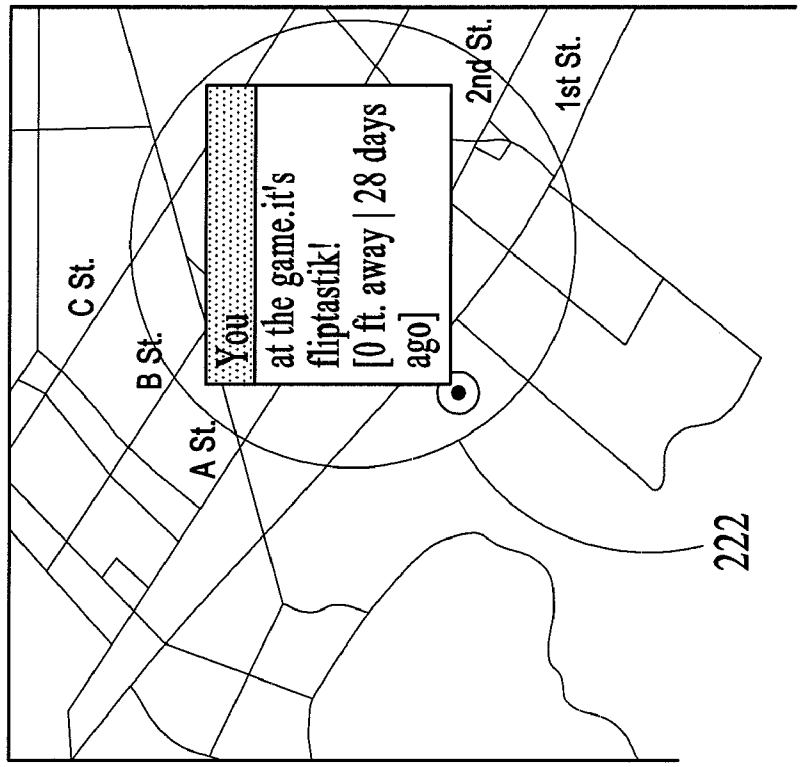

201
202
Redwood City
Menlo Park
208
206
204
Sasha M.
Out with friends
200

FIG.2A


C St.
B St.
A St.
You
at the game.it's
fliptastik!
[0 ft. away | 28 days
ago]
2nd St.
1st St.
222

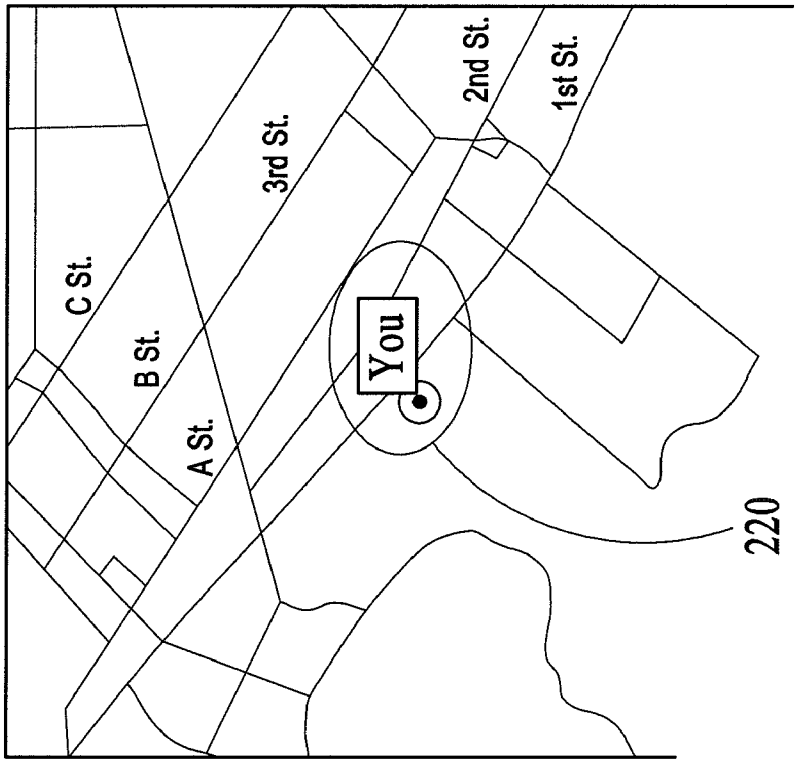
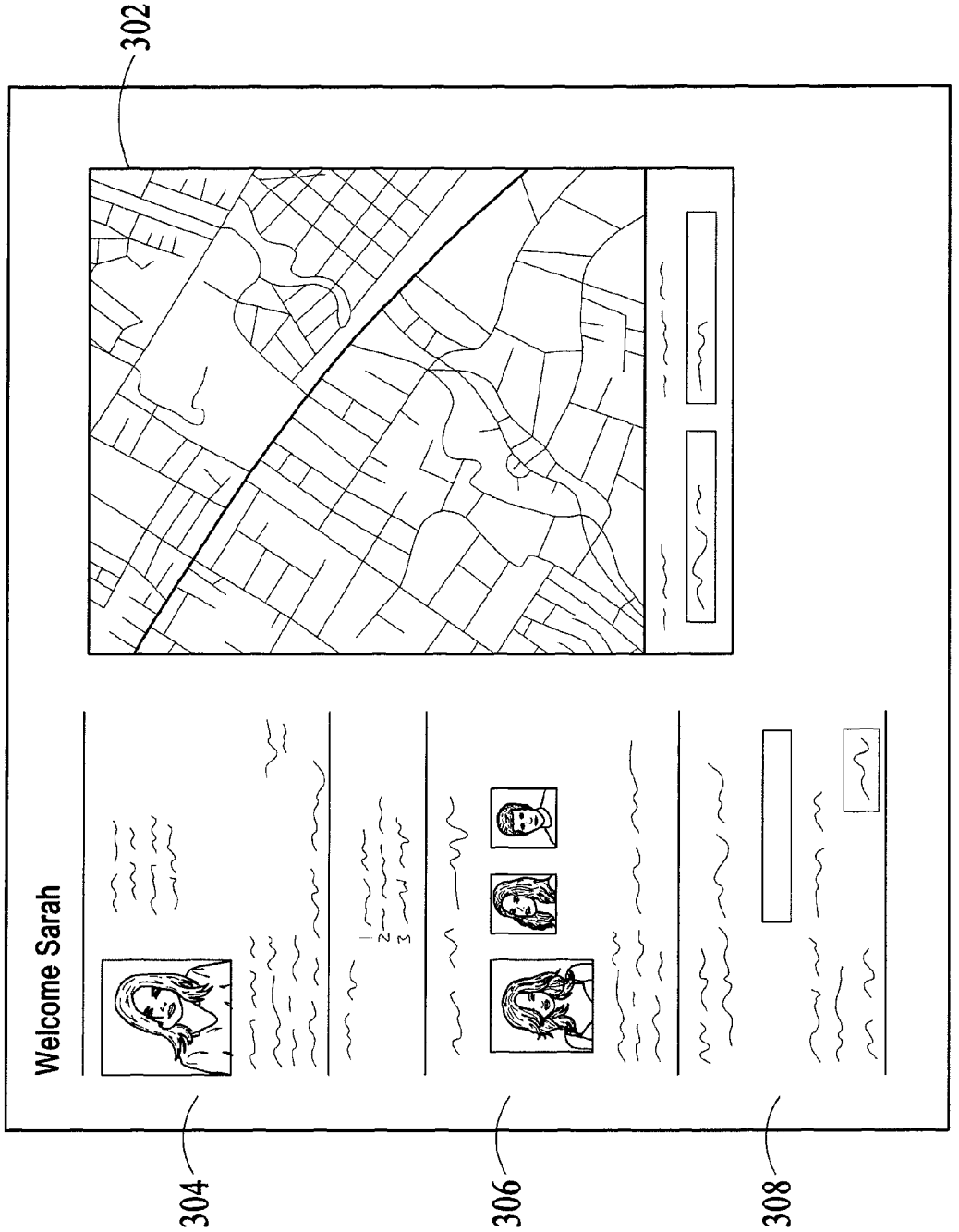

C St.
B St.
A St.
3rd St.
You
2nd St.
1st St.
220

FIG.2B



300

FIG.3

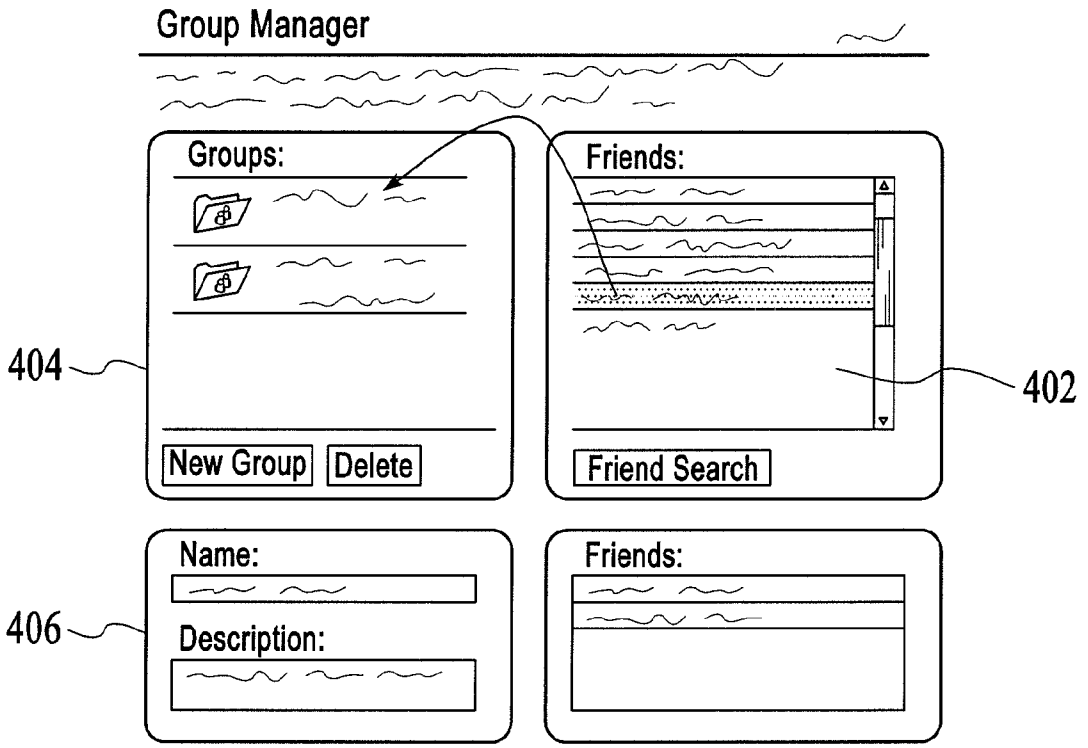

Group Manager
Groups:
Friends:
404
402
New Group
Delete
Friend Search
Name:
Description:
Friends:
406

FIG.4A

FIG.4B

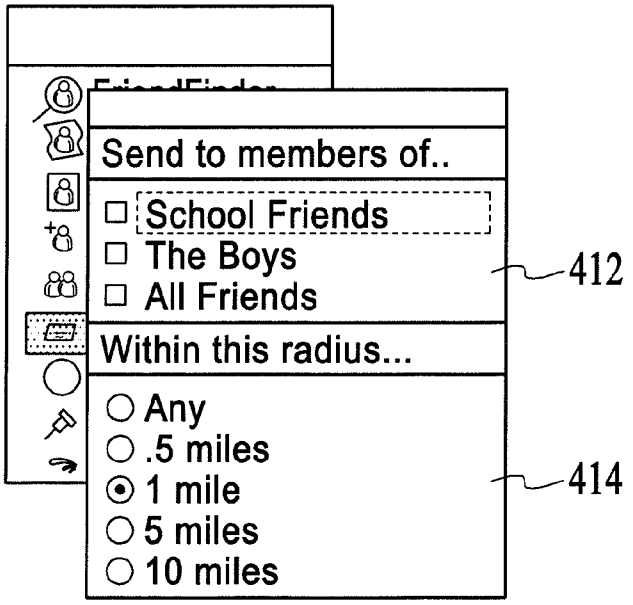
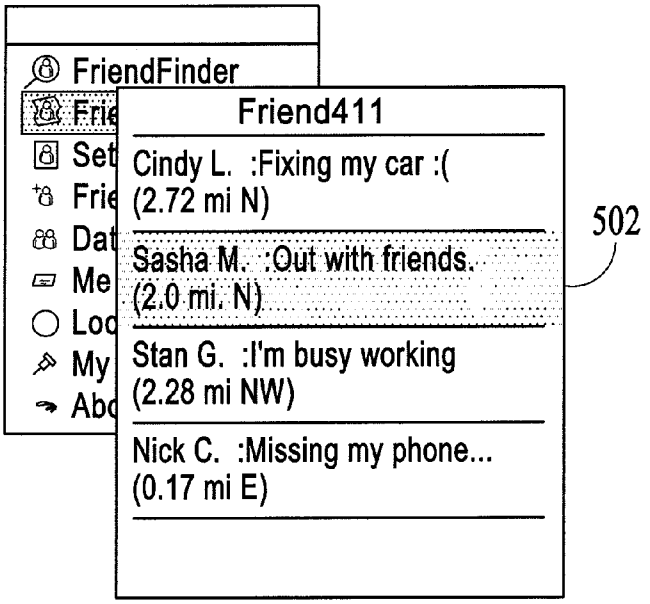

Send to members of..
School Friends
The Boys
All Friends
412
Within this radius...
Any
.5 miles
1 mile
5 miles
10 miles
414

FIG.5A


FriendFinder
Friend411
Cindy L. :Fixing my car :(
(2.72 mi N)
Sasha M. :Out with friends.
(2.0 mi. N)
Stan G. :I'm busy working
(2.28 mi NW)
Nick C. :Missing my phone...
(0.17 mi E)
502

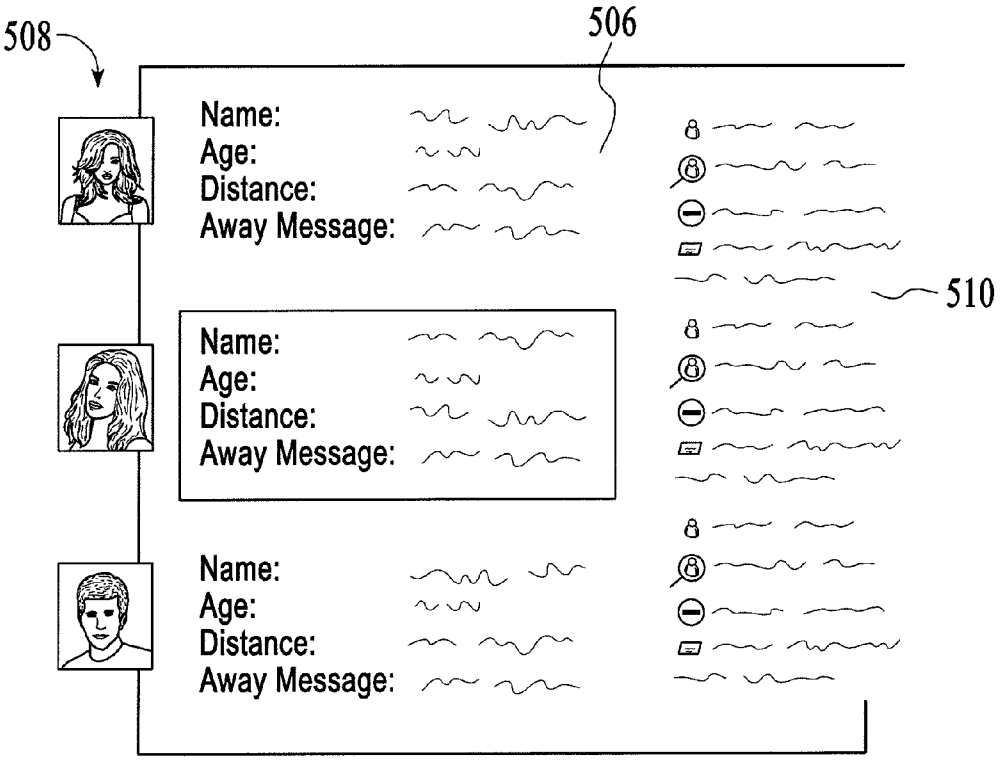
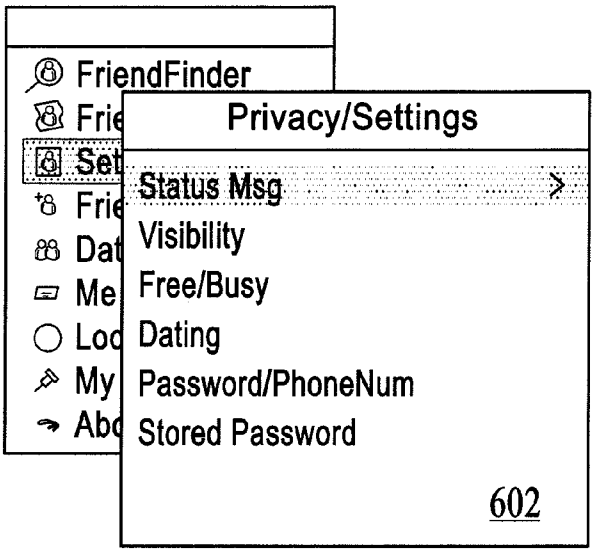

508
506
510
Name:
Age:
Distance:
Away Message:
Name:
Age:
Distance:
Away Message:
Name:
Age:
Distance:
Away Message:

FIG.5B

FIG.6A



Mobile Privacy

Status Message: 606

Choose who can see your location with the settings below.

My location is visible to: 608

○ All friends ○ Nobody ⦿ Some Friends (see blacklist below)

Block my location from certain friends by checking them: 610

This list only applies if visibility is set to "Some Friends" above.

[allow all] [block all]

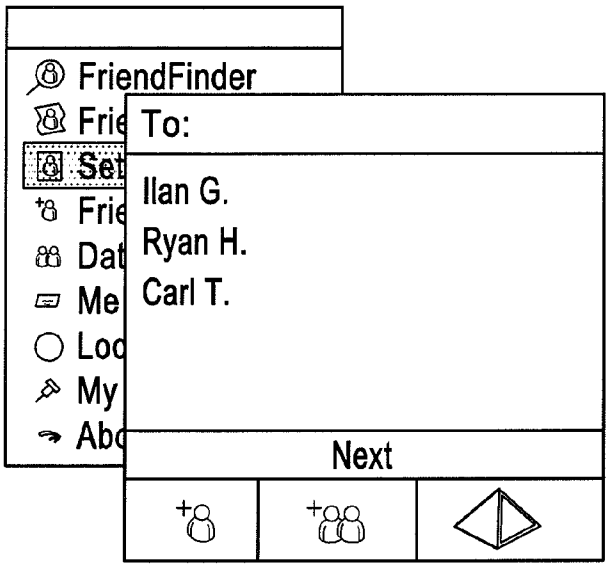
I am currently: 612

○ Free ⦿ Busy

604

FIG.6B

FIG.7A


FriendFinder
To:
Ilan G.
Ryan H.
Carl T.
Next

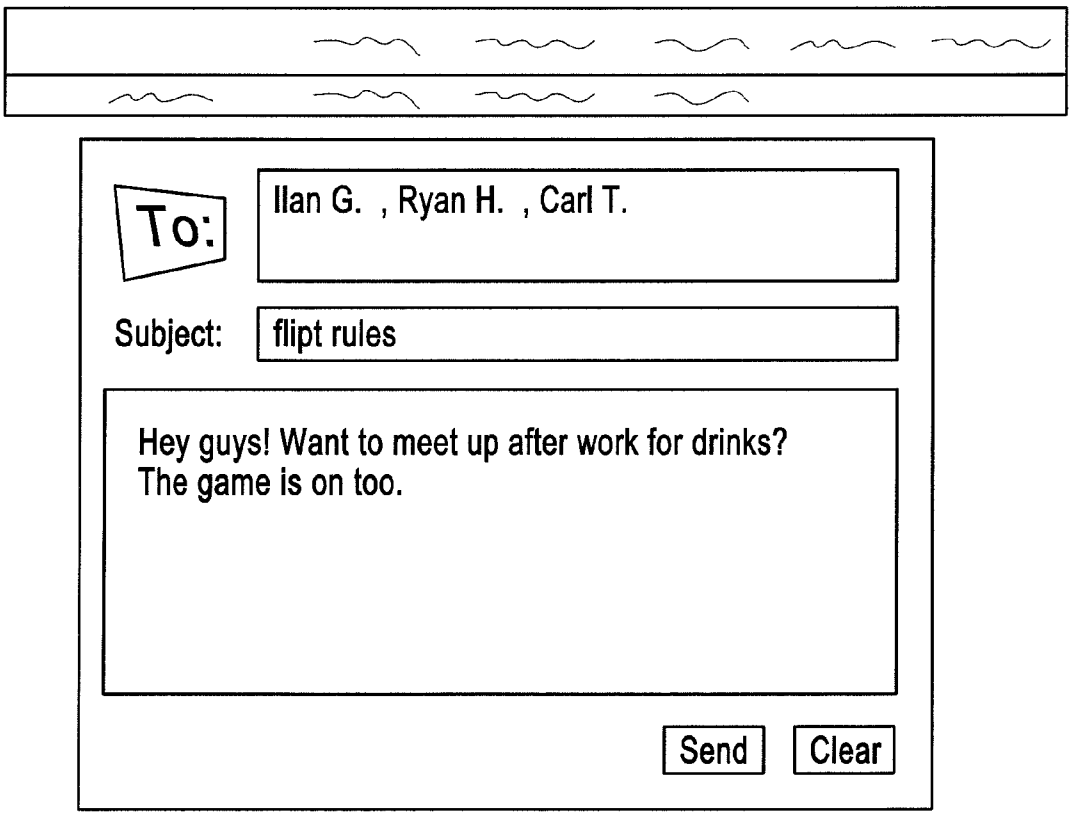
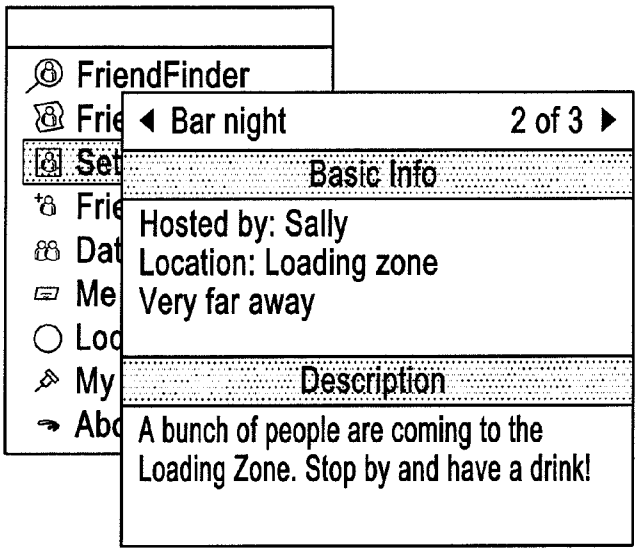

To:
Ilan G. , Ryan H. , Carl T.
Subject:
flipt rules
Hey guys! Want to meet up after work for drinks?
The game is on too.
Send
Clear

FIG.7B

FIG.8A


FriendFinder
Bar night
2 of 3
Basic Info
Hosted by: Sally
Location: Loading zone
Very far away
Description
A bunch of people are coming to the Loading Zone. Stop by and have a drink!

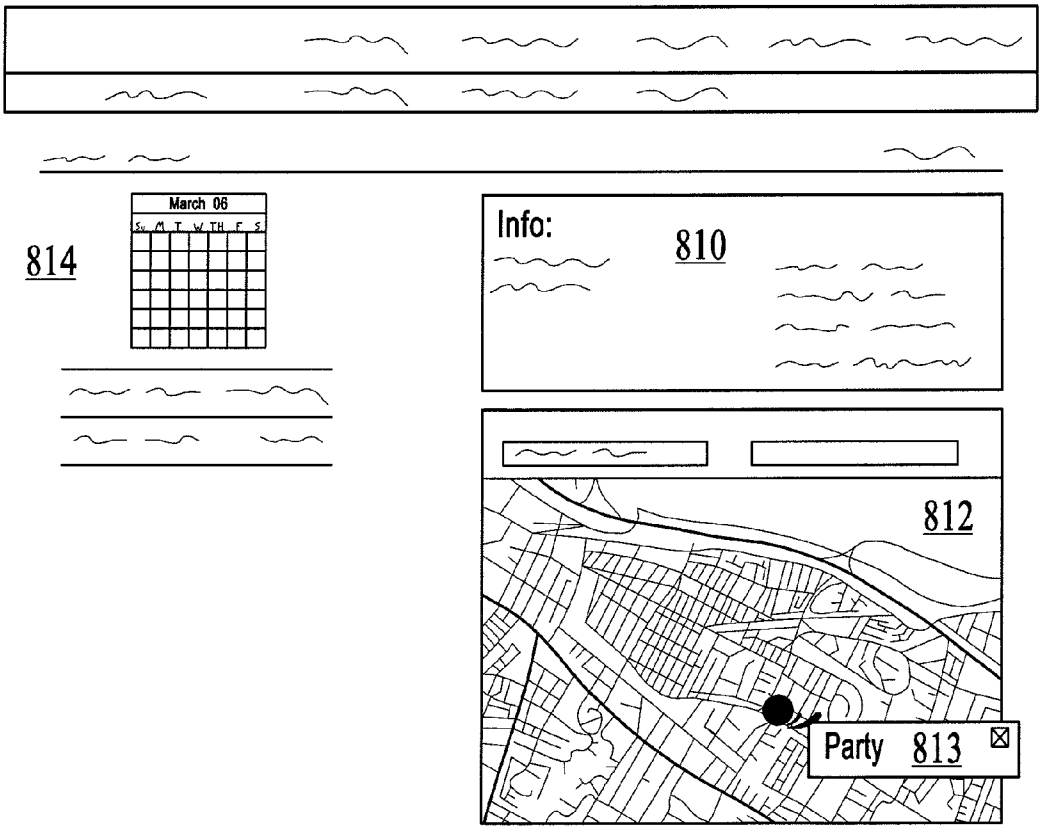

March 06
814
Info:
810
812
Party 813

FIG.8B

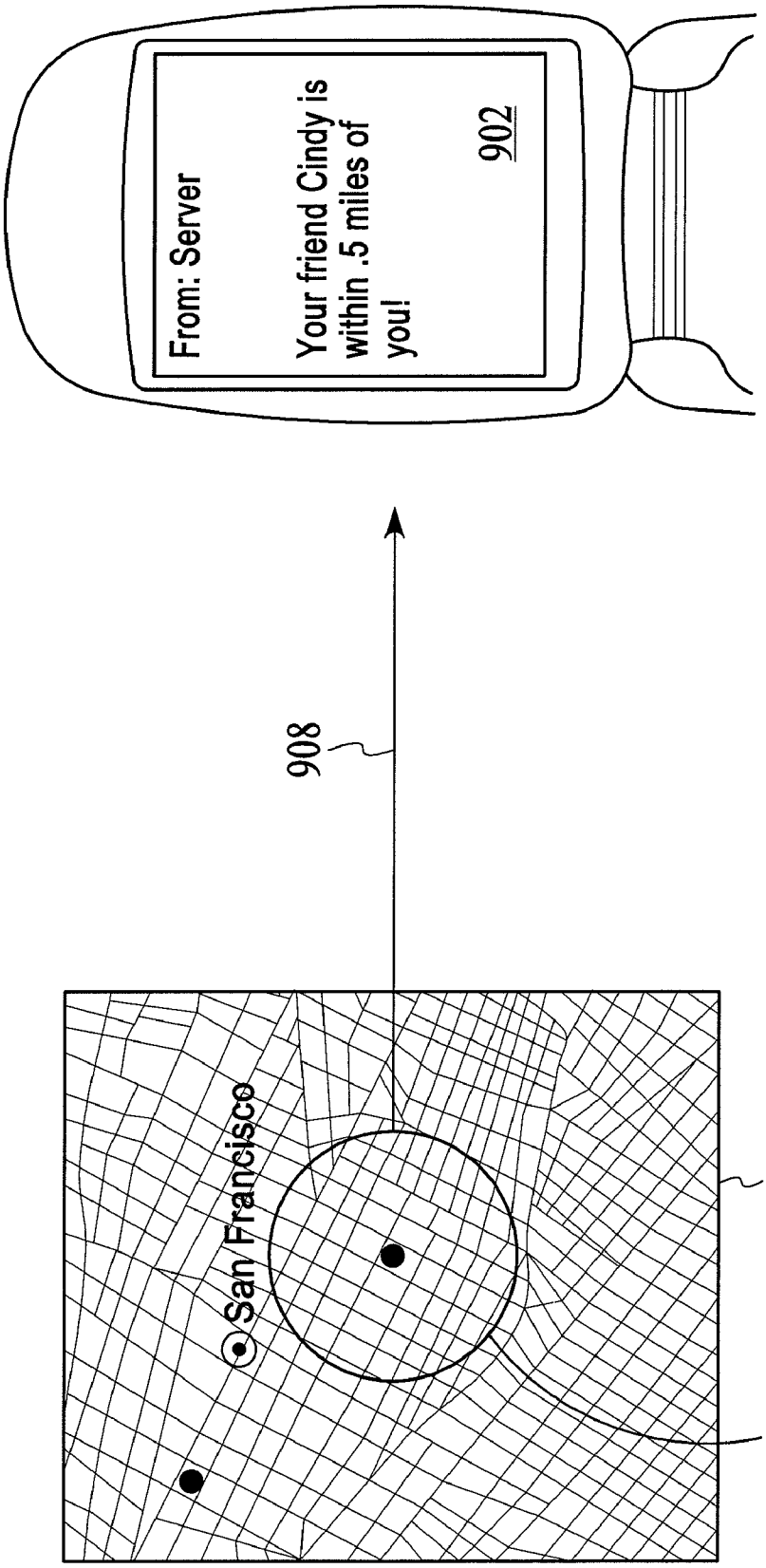

From: Server
Your friend Cindy is within .5 miles of you!
902
908
San Francisco
904
906

FIG.9

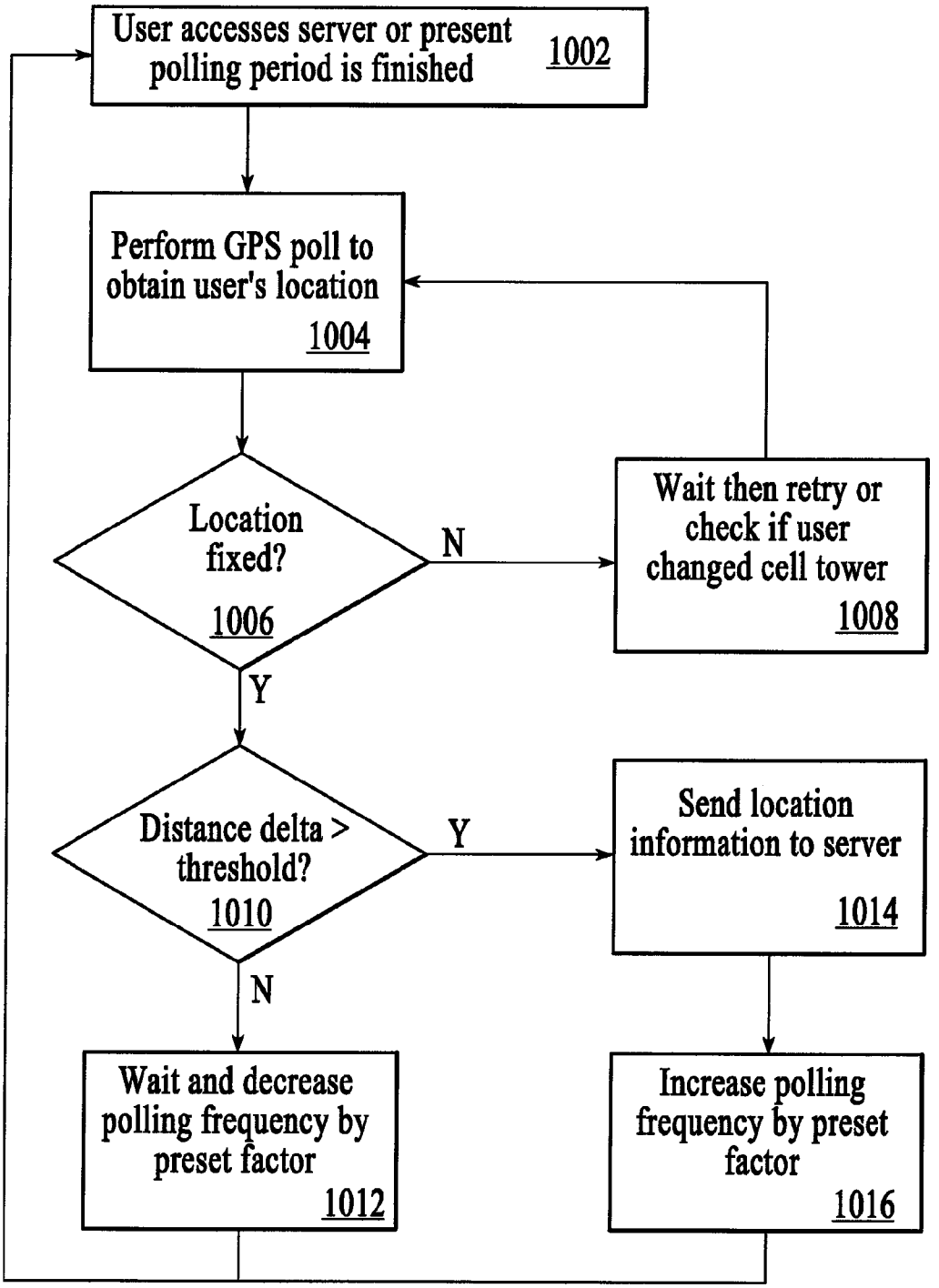

User accesses server or present polling period is finished
1002
Perform GPS poll to obtain user's location
1004
Location fixed?
1006
N
Wait then retry or check if user changed cell tower
1008
Y
Distance delta > threshold?
1010
Y
Send location information to server
1014
N
Wait and decrease polling frequency by preset factor
1012
Increase polling frequency by preset factor
1016

FIG.10

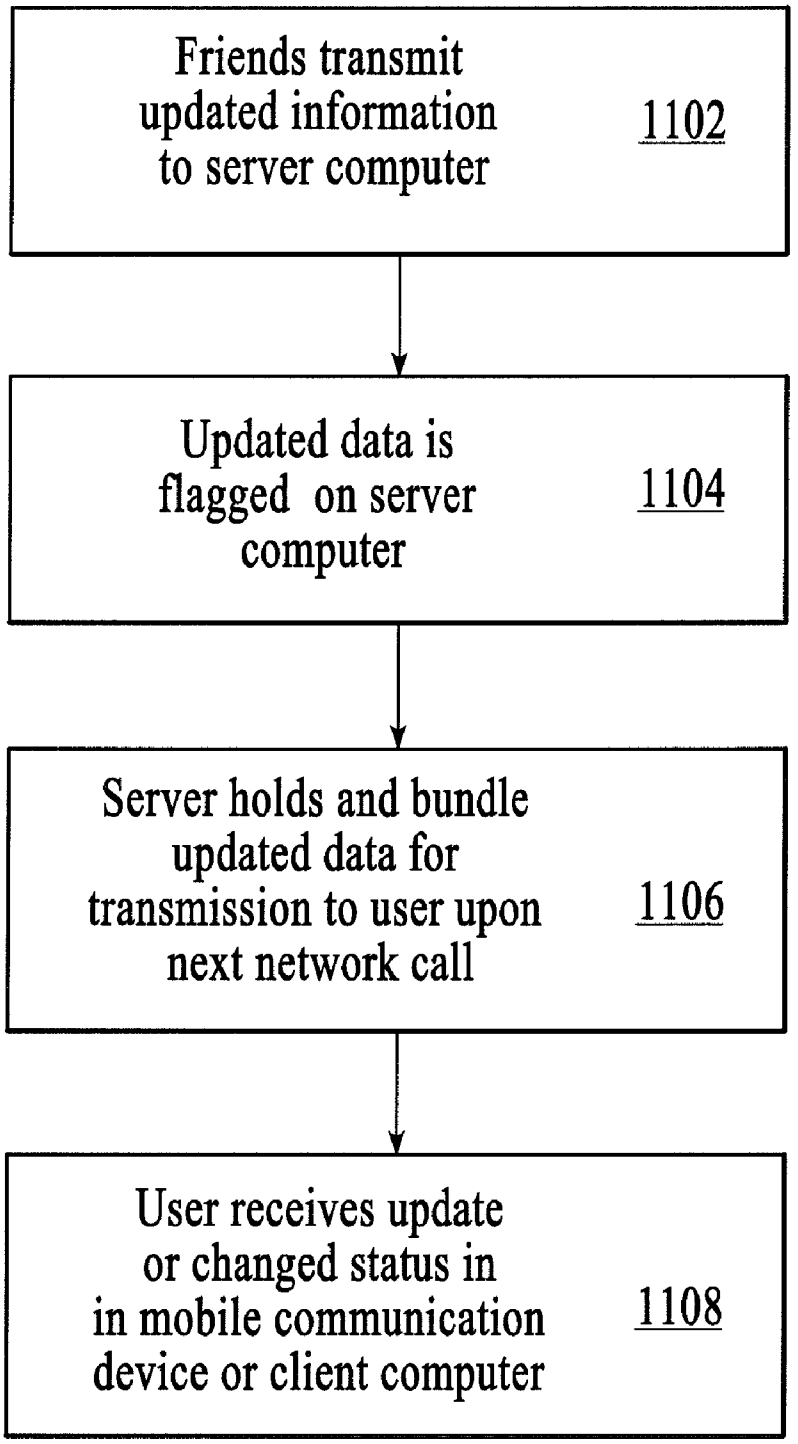
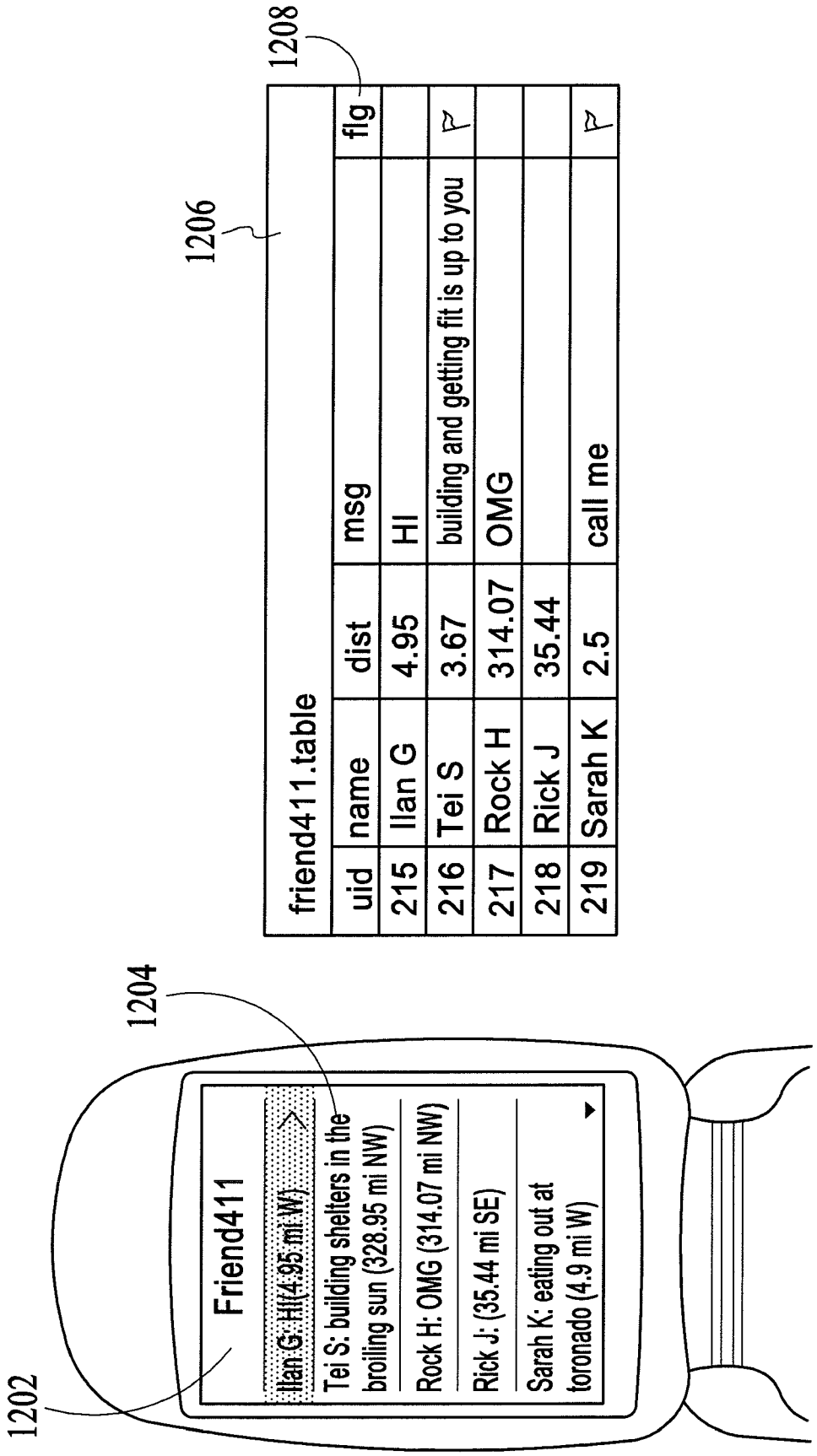

Friends transmit updated information to server computer
1102
Updated data is flagged on server computer
1104
Server holds and bundle updated data for transmission to user upon next network call
1106
User receives update or changed status in in mobile communication device or client computer
1108

FIG.11



friend411.table

uid	name	dist	msg	flg
215	Ilan G	4.95	HI	
216	Tei S	3.67	building and getting fit is up to you	⚑
217	Rock H	314.07	OMG	
218	Rick J	35.44		
219	Sarah K	2.5	call me	⚑

FIG.12

1302

USER TABLE

UID	NAME	PHONE	LINKA
1	Ilan G.	555-1452	A4321d74
2	Tei S.	555-0293	41chj892
3	Dan H.	555-2987	qr99e7b

1304

LOCATION HISTORY TABLE

LINKB	LOCATION.HISTORY
b56sha12	32.5465,14.144
4a8hop1	3243.54,324.3474
c48nfegp	143554,456477

FIG.13

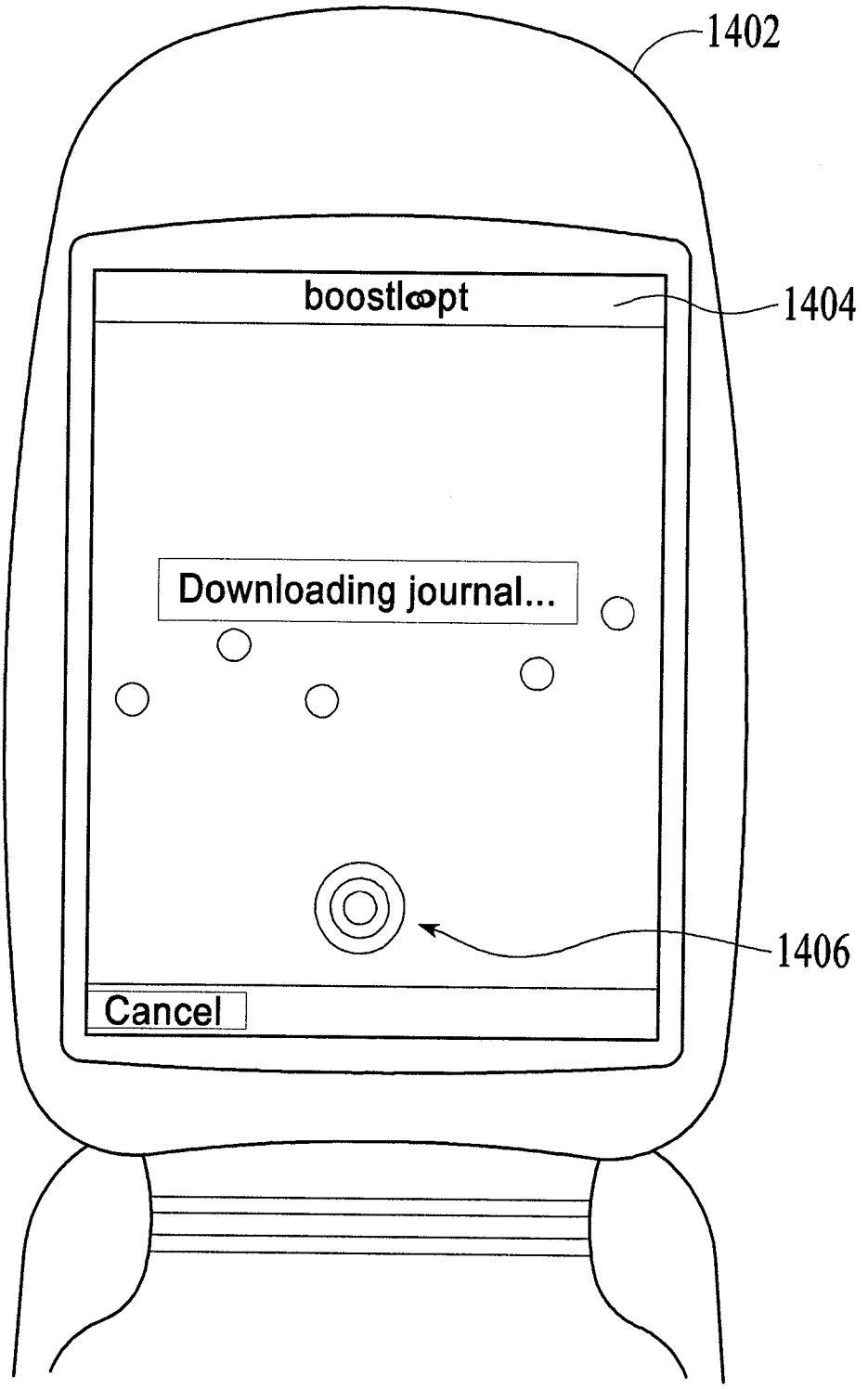


FIG.14A

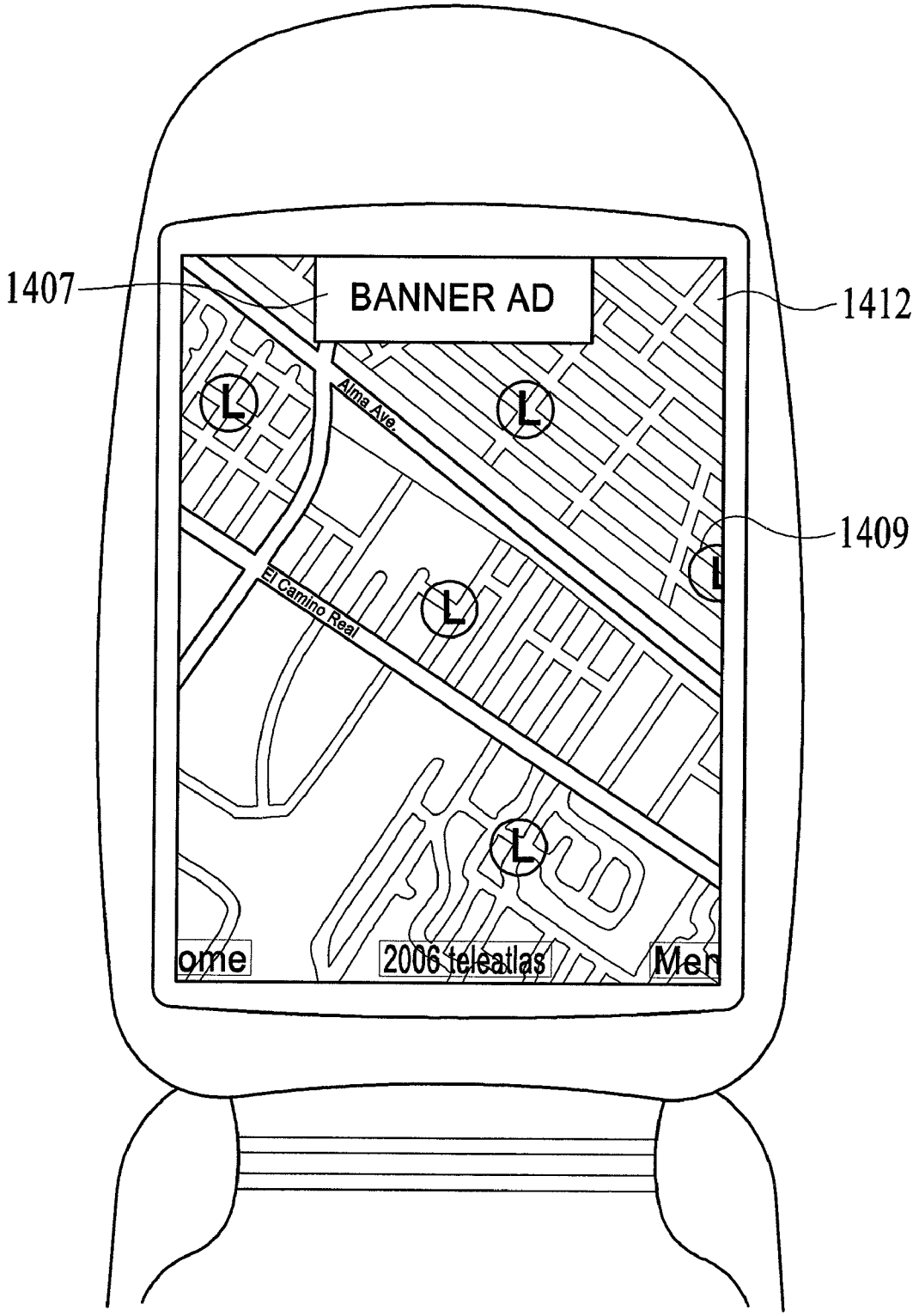

1407
BANNER AD
1412
Alma Ave.
1409
El Camino Real
ome
2006 teleatlas
Men

FIG.14B

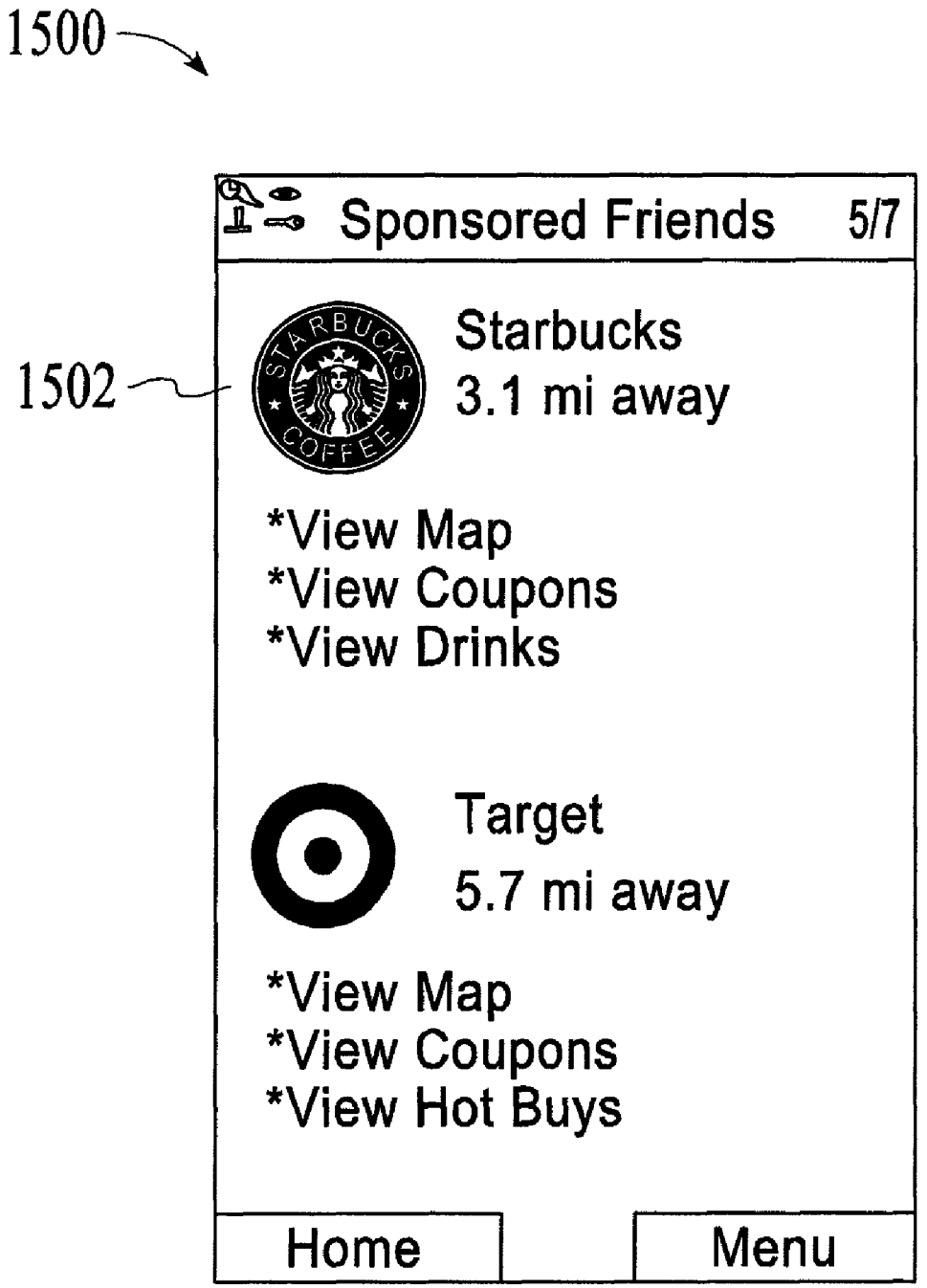

1500
1502
Sponsored Friends 5/7
Starbucks
3.1 mi away
*View Map
*View Coupons
*View Drinks
Target
5.7 mi away
*View Map
*View Coupons
*View Hot Buys
Home
Menu

FIG.15A

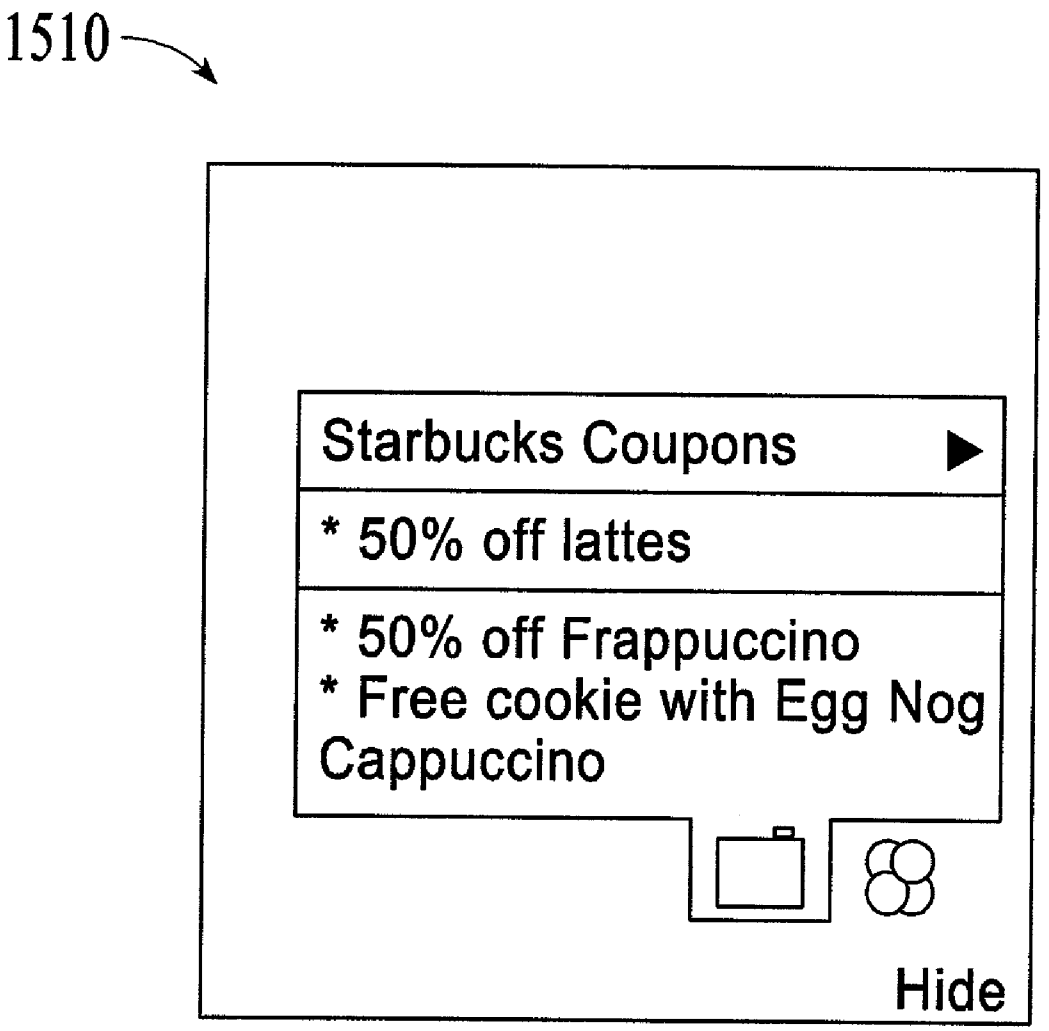

1510
Starbucks Coupons
* 50% off lattes
* 50% off Frappuccino
* Free cookie with Egg Nog Cappuccino
Hide

FIG.15B

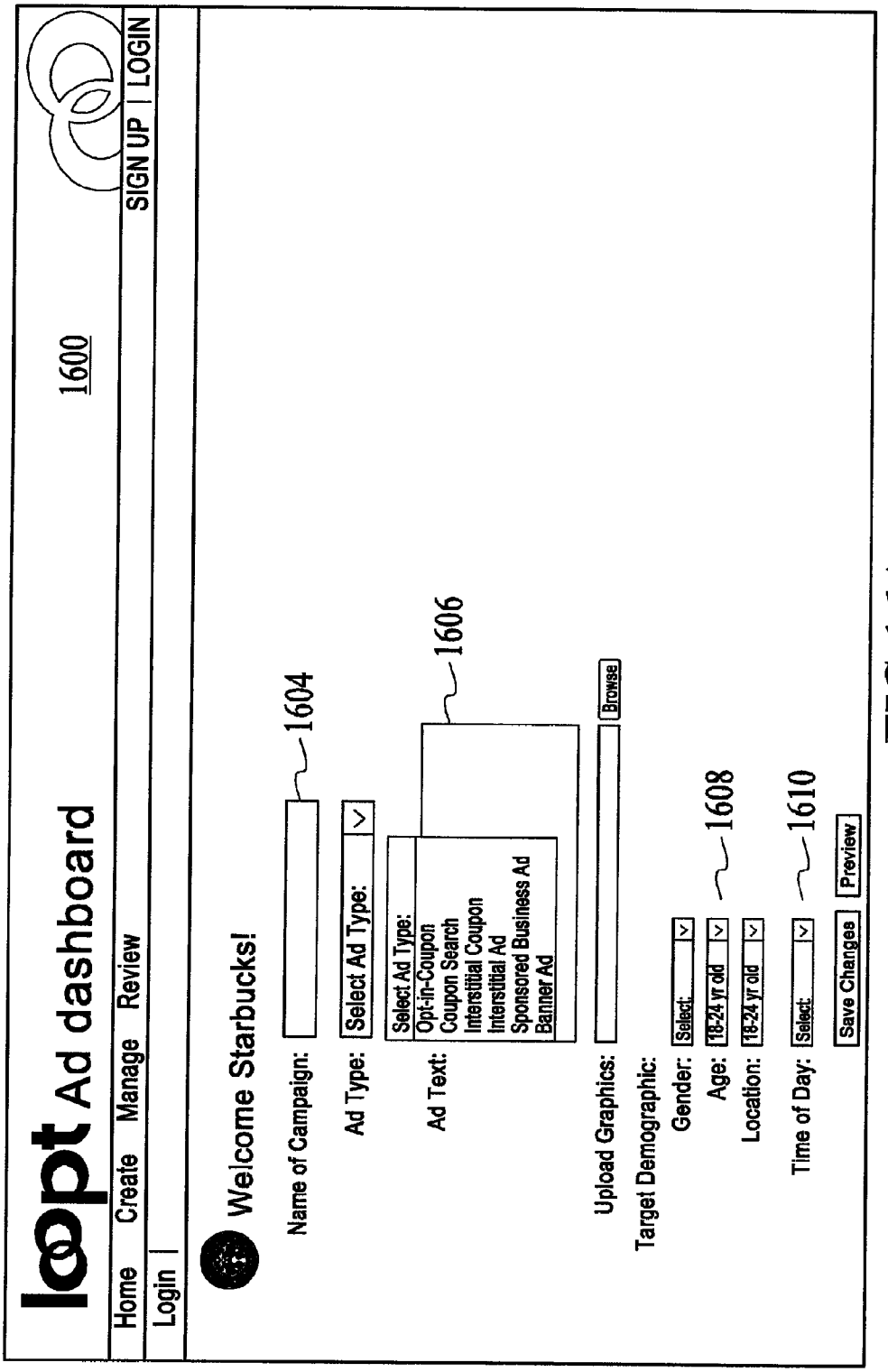

loopt Ad dashboard
1600
Home
Create
Manage
Review
SIGN UP | LOGIN
Login
Welcome Starbucks!
Name of Campaign:
1604
Ad Type:
Select Ad Type:
Ad Text:
Select Ad Type:
Opt-in-Coupon
Coupon Search
Interstitial Coupon
Interstitial Ad
Sponsored Business Ad
Banner Ad
1606
Upload Graphics:
Browse
Target Demographic:
Gender:
Select:
Age:
18-24 yr old
1608
Location:
18-24 yr old
Time of Day:
Select:
1610
Save Changes
Preview

FIG.16A

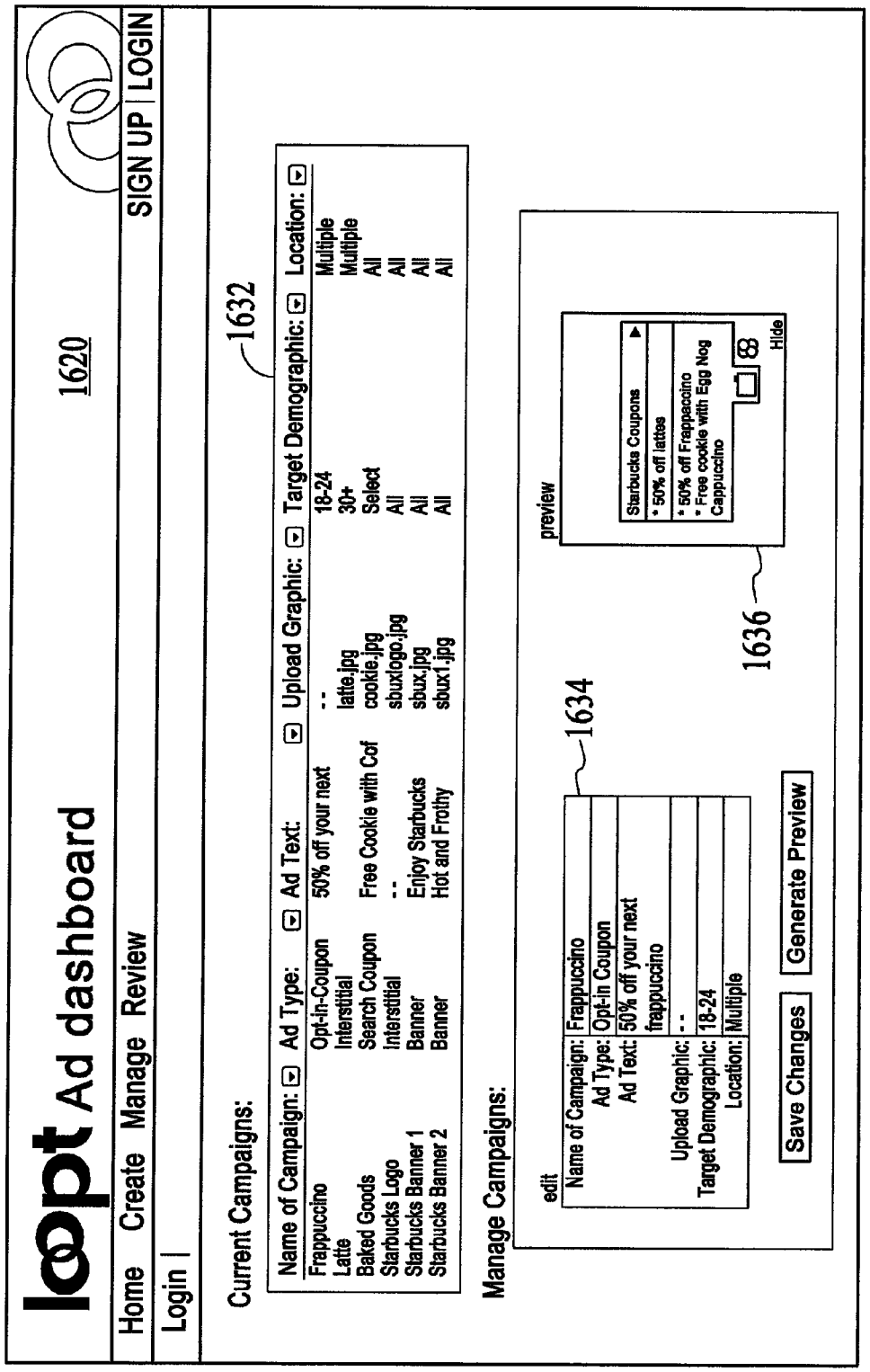
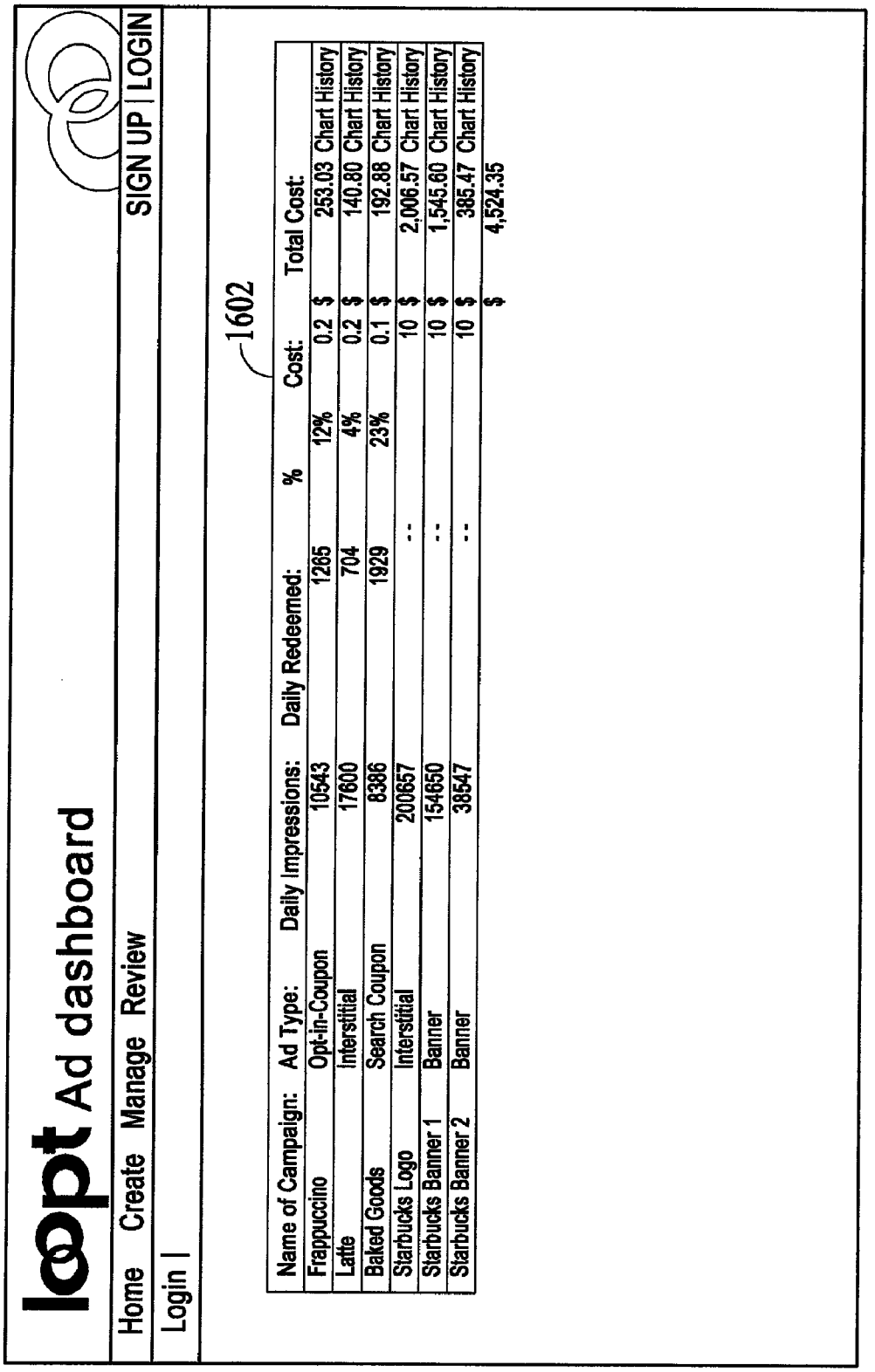

loopt Ad dashboard
1620
Home Create Manage Review
SIGN UP | LOGIN
Login |
Current Campaigns:
1632
Name of Campaign: Ad Type: Ad Text: Upload Graphic: Target Demographic: Location:
Frappuccino Opt-in-Coupon 50% off your next -- 18-24 Multiple
Latte Interstitial latte.jpg 30+ Multiple
Baked Goods Search Coupon Free Cookie with Cof cookie.jpg Select All
Starbucks Logo Interstitial -- sbuxlogo.jpg All All
Starbucks Banner 1 Banner Enjoy Starbucks sbux.jpg All All
Starbucks Banner 2 Banner Hot and Frothy sbux1.jpg All All
Manage Campaigns:
edit
Name of Campaign: Frappuccino
Ad Type: Opt-in Coupon
Ad Text: 50% off your next frappuccino
Upload Graphic: --
Target Demographic: 18-24
Location: Multiple
1634
Save Changes
Generate Preview
preview
Starbucks Coupons
* 50% off lattes
* 50% off Frappaccino
* Free cookie with Egg Nog Cappuccino
Hide
1636

FIG.16B



Name of Campaign:	Ad Type:	Daily Impressions:	Daily Redeemed:	%	Cost:	Total Cost:	
Frappuccino	Opt-in-Coupon	10543	1265	12%	0.2 $	253.03	Chart History
Latte	Interstitial	17600	704	4%	0.2 $	140.80	Chart History
Baked Goods	Search Coupon	8386	1929	23%	0.1 $	192.88	Chart History
Starbucks Logo	Interstitial	200657	--		10 $	2,006.57	Chart History
Starbucks Banner 1	Banner	154650	--		10 $	1,545.60	Chart History
Starbucks Banner 2	Banner	38547	--		10 $	385.47	Chart History
					$	4,524.35	

FIG.16C

LOCATION-BASED ADVERTISING MESSAGE SERVING FOR MOBILE COMMUNICATION DEVICES

CROSS-REFERENCE TO RELATED APPLICATIONS

The current application is a continuation-in-part application of U.S. patent application Ser. No. 11/445,730, entitled "Displaying the Location of Individuals on an Interactive Map Display on a Mobile Communication Device" and filed on Jun. 1, 2006. The current application is related to U.S. patent application Ser. No. 11/445,727, entitled "Message Transmission System for Users of Location-Aware Mobile Communication Devices in a Local Area Network," and U.S. patent application Ser. No. 11/445,729, entitled "Mobile Dating System Incorporating User Location Information," and U.S. patent application Ser. No. 11/445,751, entitled "Displaying and Tagging Places of Interest on Location-Aware Mobile Communication Devices in a Local Area Network," each of which is hereby incorporated by reference in it entirety.

FIELD

Embodiments of the invention relate generally to mobile communication networks, and more specifically, to displaying location-based advertising links and messages on a mobile device.

BACKGROUND

The incorporation of location and navigation technology, such as global positioning system (GPS) technology into mobile phones and similar wireless portable devices has created a class of "location-aware" devices that allow users to communicate with other users as well as determine or even view the location of other users on their own device. Such devices may be configured to display a regional map and the location of other users and/or places of interest on their device. This greatly enhances the social networking capability of such devices, beyond simple voice or text-based communication by allowing users to quickly find friends and associates and coordinate activities based on respective locations.

The incorporation of location display capability presents unique opportunities in the transmission of advertising and other types of supplemental messages in conjunction with data content that may be downloaded during the course of a user's interaction with a mobile application. Various characteristics of the user that may be relevant to the creation and transmission of targeted ad messages can be leveraged to enhance the effectiveness of ad campaigns created by advertisers and merchants. One such set of characteristics includes the user profile data that is often provided to the mobile application providers. A significant characteristic includes the location information inherent in the location-aware mobile device, as well as time of use. The location and time information can be used by an advertiser to create and transmit ad messages that are specifically tailored for a particular location and that are transmitted at the most opportune times. In general, present methods of serving ad messages to mobile devices are based on relatively primitive techniques of transmitting identical messages to all users of a particular service or network, or relying on ad serving methods within existing applications, such as mobile web browsers or e-mail applications.

SUMMARY

Embodiments of a location-based social network manager process are described. The process is executed on a server computer coupled to a plurality of mobile communication devices over a wireless network. At least some of the mobile devices are location-aware mobile communication devices. The process determines the geographic location of a mobile communication device operated by a user within an area, displays a map representation of the area around the mobile communication device on a graphical user interface of the mobile communication device, and superimposes on the map the respective locations of one or more other users of mobile communication devices coupled to the mobile communication device over the network. The user can build a database of trusted friends among the one or more other users whose location can be displayed on each respective mobile communication device. An advertising platform manager provides tools for an advertiser to create and transmit relevant ad messages to a user based on specific location, time, and profile data of the user. Such location-based ad serving allows for the creation of ads that directly leverage a key component of the user's interaction with the mobile device in that messages can be tied directly to the location display of a product or service offered by the advertiser. The ad messages can be provided in the form of text or graphic messages, logos, display branding. Information related to time and location-sensitive promotional events can also be effectively broadcast to users in the form of alerts or coupons that encourage user to visit a location that may be near the user.

INCORPORATION BY REFERENCE

Each publication, patent, and/or patent application mentioned in this specification is herein incorporated by reference in its entirety to the same extent as if each individual publication and/or patent application was specifically and individually indicated to be incorporated by reference.

BRIEF DESCRIPTION OF THE DRAWINGS

Embodiments are illustrated by way of example and not limitation in the figures of the accompanying drawings, in which like references indicate similar elements.

FIG. **1**A is a block diagram of a mobile communication and computer network that implements embodiments of a location-based social network system.

FIG. **1**B is a block diagram of components of a location-aware mobile device that is used in the network of FIG. **1**A, under an embodiment.

FIG. **2**A illustrates an example of a map displayed on a mobile communication device, according to an embodiment.

FIG. **2**B illustrates the display of information details for users on a map, according to an embodiment.

FIG. **3** illustrates a web page that provides access to the databases and social network manager system, under an embodiment.

FIG. **4**A illustrates an example of a database interface for storing and grouping friends on a client computer, under an embodiment.

FIG. **4**B illustrates an example of a database interface for storing and grouping friends for implementation on a mobile communication device, under an embodiment.

FIG. **5**A illustrates an example of a friend list displayed on a mobile communication device, according to an embodiment.

FIG. **5**B illustrates an example of a friend list displayed on a web page, according to an embodiment.

FIG. **6**A illustrates an example of a privacy preference menu displayed on a mobile communication device, under an embodiment.

FIG. **6**B illustrates an example of a privacy preference menu displayed on a web page, under an embodiment.

FIG. **7**A illustrates an example of a messaging function for implementation on a mobile communication device, according to an embodiment.

FIG. **7**B illustrates an example of a messaging function for implementation on a web page, according to an embodiment.

FIG. **8**A illustrates an example of an event manager function for implementation on a mobile communication device, according to an embodiment.

FIG. **8**B illustrates an example of an event manager function for implementation on a client computer, according to an embodiment.

FIG. **9** illustrates an example of an alert function for the location-based social network manager process, under an embodiment.

FIG. **10** is a flowchart that illustrates GPS polling for a location determination module, according to an embodiment.

FIG. **11** is a flowchart that illustrates an example of sending updated information to a user's mobile device, under an embodiment.

FIG. **12** illustrates an example of a user update on a mobile communication device and a corresponding update table, under an embodiment.

FIG. **13** illustrates an example of a user table and an associated location history table, under an embodiment.

FIG. **14**A illustrates the display of interstitial ad messages on a location-aware mobile communication device, under an embodiment.

FIG. **14**B illustrates the display of sponsored maps and banner ads on a location-aware mobile communication device, under an embodiment.

FIG. **15**A illustrates the display of sponsor information in a mobile application, under an embodiment.

FIG. **15**B illustrates the display of advertising coupons for advertisers on a location-aware mobile communication device, under an embodiment.

FIG. **16**A illustrates a user interface screen display for the creation of an advertising campaign, under an embodiment.

FIG. **16**B illustrates a user interface screen display for the management of an advertising campaign, under an embodiment.

FIG. **16**C illustrates a user interface screen display for the review of an advertising campaign, under an embodiment.

DETAILED DESCRIPTION

Embodiments of a location-based social network system and mobile communication device that incorporates a real-time map display with enhanced privacy features are described. In the following description, numerous specific details are introduced to provide a thorough understanding of, and enabling description for, embodiments of the system. One skilled in the relevant art, however, will recognize that these embodiments can be practiced without one or more of the specific details, or with other components, systems, and so on. In other instances, well-known structures or operations are not shown, or are not described in detail, to avoid obscuring aspects of the disclosed embodiments.

Embodiments are directed to a location-based social network system that enables the display of maps and real-time location information on mobile phones and similar communication devices. FIG. **1**A illustrates a communication and computer network system **100** that implements one or more embodiments. In system **100**, a plurality of mobile communication devices, such as cell phones or similar devices **102** are coupled to a communication network, such as cell network **111**. The mobile communication devices (or "mobile devices") are each carried and operated by a user and communicate with one another using known communication methods such as wireless telephony, radio, satellite, cellular systems (e.g., GSM, CDMA, and so on), or other similar systems. For the embodiment exemplified by FIG. **1**, the mobile communication devices are cellular phones and the network coupling these devices is a cellular telephone network, although it should be noted that any other type of wireless network that supports mobile devices can also be used.

In one embodiment, a server computer **104** runs a location-based social network manager process **112**. This process controls various data objects relating to one or more social parameters or characteristics of the users of the mobile devices **102**. The users of the mobile devices form a group or number of subgroups of people who desire to interact with one another on a social level by communicating with one another, participating in activities, sharing information or experiences, or other types of social or professional interaction based on their location. Because the users of the mobile devices are inherently transitory, a fundamental data object associated with each of the users of the mobile devices is the location of each user within a particular region. Other parameters include the profile of each user, and the preferences of each user with respect to activities, people, privileges, and so on. Each user who desires to interact with other users in the system using this data utilizes the location-based social network manager process **112**. Through a subscription, or similar membership-type (free or fee-based) participation model, each user registers with the server computer **104** by providing certain information relating to the user. Each principle parameter or characteristic for each user is stored in one or more databases accessible to the server computer **104**. For the embodiment of FIG. **1**, the data objects are stored in a data store **120** and are organized in databases for user profiles **124**, user locations **126**, user provided data **128**, and map tiles **122**. The mobile network **111** supporting the mobile devices **102** are coupled to the server computer through an intermediate server computer, such as cell server **116**.

In one embodiment, each user of a mobile device may also operate or access the location-based social network manager process **112** through a client computer **106**, or any device that can access the Internet, such as a WAP (Wireless Application Protocol) device **105**. The client computer **106**, or similar device **105** (hereinafter also referred to as a "client computer"), facilitates the establishment and management of each user's account on the server computer by providing a comprehensive interface to the databases and processes provided on the server computer **104**. For the embodiment shown, the client computer interface supported by the server computer is a World-Wide Web (WWW) based interface through a web server **114** to the network **110** that supports the client computers **106**. Thus, for this embodiment, the web server **114** is a server or process that stores data in the form of web pages and transmits these pages as Hypertext Markup Language (HTML) files over the Internet **110** to the client computers **106**. For this embodiment, the client computers typically run a web browser program to access the web pages served by the web server **114** and any available content provider or supplemental server that may also be coupled to the network. The client computers may access the Internet **110** through an

Internet Service Provider (ISP). It should be noted that network **110** may be the Internet, a Wide Area Network (WAN), a Local Area Network (LAN), or any combination thereof.

As shown in FIG. **1**A, aspects of the one or more embodiments described herein may be implemented on one or more computing devices executing software instructions. The server computer **104** is typically a server or workstation class computer, but can be any type of computing device with sufficient power and resources. The client computer **106** or **105** can be any type of personal computing devices, such as a workstation, personal computer, notebook computer, mobile communication device, game console, camera, personal digital assistant (PDA), or any device with an appropriate amount of processing capability. Likewise, each mobile device **102** can be a mobile computing device, such as a mobile phone, PDA, notebook computer, game console, or any similar class of mobile computing device with sufficient processing and communication capability to interact with other devices over network **111**.

As shown in FIG. **1**A, server computer **104** runs a server-side location-based social network manager process **112**. The client computers **106** may run a client side version of this program, or they may access executable program components over the network **110**, such as through web browser. Data for any of the clients **106** or mobile devices **102** may be provided by a data store **120** that is closely or loosely coupled to any of the server **104** and/or each network **110** and **111**. A separate content provider computer may provide some of the data that is associated with the social network manager program **112**. Although data store **120** is shown coupled to the network server **104**, it should be noted that content data may be stored in or more data stores coupled to any of the computers of the network, such as a network client **106** or to devices within the network **110** itself.

In one embodiment, the location-based social network manager process **112** contains one or more program components that perform the tasks of displaying location and user profile information related to each mobile communication device that is part of the network, on each mobile device and client computer, and facilitating communication between devices based on the location information. The process also includes a database manager program that manages the different databases stored in data store **120**. It should be noted that the various databases **122** to **128** shown in data store **120** can be organized as separate databases, portions of a single database, or any other logical structure appropriate for storing the data.

As illustrated in FIG. **1**A, data store **120** stores user information in user database **124**. This information relates to each user of a mobile device **102** and includes basic information, such as the user's name, identifier (nickname or "uid"), security check information (e.g., date of birth, password), and so on. Depending on the social network services provided by the system, this database can also store the user's social and consumer preference information, such as what type of people the user is interested in meeting or dating, what types of food or events the user prefers, and so on. The user provided database **128** stores graphic information related to each user, such as the user's picture, and any other associated images. These images can be displayed on the other user's mobile devices to provide a visual reference for each user. The user provided database can also store other data objects, such as video clips, audio clips, hypertext links, documents, or other data provided by or associated with the user. Real-time location information for each user, and geo-tagged places and journal entries, and so on, is stored in the location database **126**. A map database **122** can also be included. This database provides the background maps that are displayed on each user's mobile device and correspond to an area or region around the user at the time the user invokes the process. In one embodiment, the map images comprise map tiles that are image files of maps with varying degrees of granularity. For example, a map tile of the United States may provide an image of the continental U.S. that can be zoomed to display a regional street level map for any area in the U.S. The maps may be stored locally within the data store **120** to be provided by the server **104** to the appropriate mobile device **102**, or they may be provided by a third party map provider. Other databases storing information relating to the user's of the system and the areas of their operation can also be included in data store **120**, such as an events database, a place of interest database, a store finder database, and the like.

FIG. **1**B is a block diagram of components of a location-aware mobile device that is used in the network of FIG. **1**A, under an embodiment. For the embodiment of FIG. **1**B, location-aware device **160** represents a mobile phone or similar mobile device that incorporates the location sharing feature provided by the location-based social network manager process **112**. This allows the location of device **160** to be displayed on its own display **170** as well as on the display of other user devices **102**, which may or may not have location capabilities, and/or server computers **104**. Location information for the device is determined by position determination unit **166**, such as a Global Positioning System (GPS) method, or other location determination process implemented within the device **160**. The location information is provided in a standardized format, such as latitude/longitude to a processor **162** and a data radio **164**. Because of the limited size of the displays on devices **160** and **102**, the background map must be appropriately scaled depending on user preference. In one embodiment, the scale information is provided by the user through input **168** (e.g., keypad input). The data radio **164** transmits the location data for the device as well as the scale information over network **110** to server **104**.

In one embodiment, the location-based social network manager process **112** executed by server **104** includes a location-to-display process **152**. This process converts the location data into pixel data that displays an icon representing the device **160** on a map that is appropriately scaled based on user input. The background maps may be provided by a separate map server **154**. The location-based social network manager process **112** includes components that display the location information for device **160** to other user devices **102** based on lists of friends whom user **160** has specified as authorized to view such location information.

In an alternative embodiment, the location-to-display process may be implemented in part or in whole by a process that is executed locally on device **160**.

Social Networking

In one embodiment, each user of a mobile device **102** maintains an account on the server computer **104** that is set up and maintained through a subscription or similar membership mechanism. This account allows each user to define their own profile and preference data and define the boundaries of interaction with the other users in the system. The server computer **104** may be a centralized server or cluster of server computers that maintains the processes and databases for a number of different users, or it may represent a distributed set of computers located in different geographic regions, each serving a different group of users.

The location-based social network manager allows each user to set up virtual networks that connect that user to other people, places, and events in a manner that adaptively utilizes the geographic location information for each or any of these

items. The process **112** utilizes the user profile and preference information to allow the user to define networks of friends within the entire group of users and then locate these friends on maps that are displayed on the mobile device itself. Using the messaging and/or calendar functions of the mobile device, the user can then send and receive messages on the device from these friends, or find places of interest or events in the area.

In one embodiment, each mobile communication device runs local client versions of the map generator and database manager components. Such a component or components may be a thin-client program, such as a Java program running on a cell phone, for example. In one embodiment, each mobile communication device includes a circuit or component that determines the geographic location of the device relative to a standard set of coordinates. Such a location determination component can be a GPS module or assisted GPS (A-GPS) that provides the location of the mobile communication devices in terms of latitude/longitude coordinates, or a locator module that provides the location in terms of distance to the nearest fixed cell transmitter location or a group of transmitters, or other similar location determination method. Such methods can include, but are not limited to: Time-of-Arrival (TOA), Time-Difference-of-Arrival (TDOA), a Wireless Fidelity (WiFi) network, mesh networks, and similar networks. The client side map generator displays a map of an area (provided by map database **122**) around the user on the display screen of the mobile communication device. Superimposed on this map is an indicator for the location of the mobile communication device. As the user moves, the position of his location on the displayed map is updated in real-time or near real-time. The map image information is configurable depending upon the location of the user, and can be provided by the server computer **104**, a separate map provider service, or it can be programmed into the mobile device itself.

In one embodiment, the client-side database manager component stores user-generated connections between the subscribing user and other subscribing users (e.g., acquaintances, friends, family, or other contacts) (hereinafter collectively referred to as "friends"), as well as other items of interest, such as places of interest or locations of events of interest as generated by the subscribing users. The map generator component can be configured to display the locations of such subscriber-generated places or of any friends that are within the region displayed on the map, and have mobile devices that are similarly capable of determining their own location. In this manner, the user of the mobile communication device can see his or her location relative to other friends or places of interest directly on maps displayed on the mobile communication device. In general, the displayed map is a street level map to aid the navigation of the user within the region displayed by the map. The map can be scaled from any number of degrees of resolution, such as from country to state or city level down to block level, depending upon the configuration of the map generator component.

FIG. **2**A illustrates an example of a map displayed on a mobile communication device, according to an embodiment. As shown in FIG. **2**A, a mobile communication device, such as cellular phone **200** has a display screen **202**. The map generator displays a map on the display with certain icons superimposed thereon denoting the location of certain friends or places of interest to the user. For example, a large circular icon **208** may denote the location of the user of the mobile device, while smaller icons **206** or icons of a different shape and/or color may indicate the location of his or her friends. The display area can be divided into a number of different sub-display areas devoted to displaying information relating to the items displayed. Thus, as shown in FIG. **2**A, display area **204** displays certain information relating to the user, such as name, and status information. The status information includes both a status message, a user-programmed message that is displayed on the mobile devices of the other users, and an indication of availability of the user, such as "free" or "busy." A status flag can be defined to allow the user to specify whether he or she is busy or free to all or certain users.

Depending upon the constraints of the display of the mobile device, other items of interest, such as names and status of friends and/or places of interest or events can also be displayed or shown on the map. Different visual indicators or tiling techniques, or nested menu techniques can be used to provide access to the graphical information provided on the display. In one embodiment, the process can be configured to display the name, image, and any associated status information for a user when the icon associated with the user is selected on the display.

FIG. **2**B illustrates the display of information details for users on a map, according to an embodiment. Because of display space limitations that may be inherent in the mobile communication devices, and even the web pages, various different display configurations can be used to maximize the amount of information displayed at any one time. In one embodiment, pop-up screens are utilized to display the user information for a user whose location is displayed on a map. As shown in FIG. **2**B, the default display for a user **220** shows the name or user ID for each displayed user. In this example, the displayed icon is for the user of the mobile communication device himself, and so the user icon is labeled "You." Instead of displaying the user information is a portion of the display screen, the user information is provided in a pop-screen that is activated by a toggle switch or command. Thus, as shown in pop-up display **222**, information relating to the displayed user, such as an image, a profile, or a pre-stored message can be displayed without occupying too much display space. This window can be minimized using the appropriate reverse toggle sequence. In this manner, the amount of displayed information can be selected directly by the user.

In one embodiment, access to the account for a mobile device user is also provided through a web-based (or similar) interface from a client computer **106**. In general, client accounts and databases are created using the server computer. The client computer provides the means for the user to manage the databases used by the map generator, user database, user provided database, etc. and takes advantage of greater processing power typically not found in mobile devices, such as cell phones. One or more databases are created to store information related to the user's friends and other items of interest, such as events, locations, and the like. In one embodiment, the client computer **106** runs a web browser **114** to access web pages and resources available on server **104** and served by web server **114**. FIG. **3** illustrates a web page that provides access to the databases and social network manager system, under an embodiment. For the example web page illustrated in FIG. **3**, a first display region displays a map **302** showing the location of the user's mobile device. The user's profile is displayed in display area **304**. Other display areas can be configured to display other items of information depending upon the requirements of the user. For example, display area **306** can display messages or requests from friends, and display area **308** can provide an input area to send messages or requests to friends. The information shown on the web page **300** can be the same information displayed on the mobile device in a scaled up and rearranged format to take

advantage of greater display space, or it may display information that is impractical to show and manage on the mobile device.

The database manager allows a user to create a database of friendship connections, events, places of interest, favorite things, and any other items that have geographic and/or time context with respect to interests of the user. These data objects are stored in the user database **124** for each user. The information in this database can be organized in any number of ways. For friends, a grouping function allows the user to define specific sub-groups of friends to facilitate finding or messaging select people out of the total number of friends. Thus, friends can be grouped into different categories to allow easier identification and contact with specific people. The client side module on the mobile device allows the user to access and modify these databases of friends, events, and so on, on the mobile device. FIG. **4**A illustrates an example of a database interface for storing and grouping friends on a web page, and FIG. **4**B illustrates an example of a database interface for accessing the friends database on the mobile communication device. In one embodiment, the mobile communication device interface can also allow the user to manage the database by allowing storage and grouping of friends through a function similar to that illustrated in FIG. **4**A. As shown in FIG. **4**A, a list of contact names from the user database **124** is displayed in display area **402** and a set of groups is displayed in display area **404**. Through a drag and drop operation, or similar method, names can be added to one or more appropriate groups. Display area **406** allows a user to define or modify an existing group by naming, describing and modifying the composition of the group. A similar database access and grouping function is provided through the client side program for execution on the mobile communication device. The client side module allows the user to access the group database on the client computer, and add or modify the group definitions. As shown in FIG. **4**B, the defined groups are shown in display area **412**. In addition, a geographic descriptor is also provided to further define a characteristic associated with the group or any member within a group. For the embodiment illustrated in FIG. **4**B, display area **414** includes a descriptor that specifies the radius of the friends group relative to the user's mobile communication device. In this manner, a message or alert can be sent not only to friends in a particular group, but friends who are within a certain proximity to the user. This additional degree of communication filtering takes advantage of the geographic location information determined by the network **100**. This location element related to the database of friends and friend-groups can also be employed by the client computer **106** when it accesses the database on server **104**.

Information within the databases stored in data store **120** can be combined in any number of ways to provide the user with appropriate data relating to his or her friends. The location information relating to each friend can be used to provide a visual reference for the user on a map of the area, such as that illustrated in FIG. **2**A. In one embodiment, the location-based social network manager process includes a list utility that allows the user to pull and display various items of information relating to each of the friends within the system. Not only can location information be displayed on a map, but specific information can be displayed in a list format on the client computer or mobile device of the user. FIG. **5**A illustrates an example of a friend list displayed on a mobile communication device, and FIG. **5**B illustrates an example of a friend list displayed on a client computer, according to embodiments. As shown in FIG. **5**A, the friend list function starts a display window **502** on the display of the mobile device that lists friends whose information is accessible to the user. For each listed friend, various items of associated information can be displayed, such as the name, location (address, distance plus direction vector, latitude/longitude, time of last update or other), and any associated message or status information. The status information is programmed into the profile portion of the user database **124** for each friend and is pulled from that database, while the location information is pulled from the location database **126** for each friend and is pulled from that database. If the display of the mobile device accommodates the inclusion of the user's image, the image may be pulled from the images within the user provided database **128** and also displayed on the mobile device. This is illustrated in the interface for the client computer shown in FIG. **5**B. In this embodiment, the same location and status information **506** is displayed for each friend along with an image **508** of that person. Also provided in the illustrated client computer interface is a menu area **510** that allows the user to perform certain tasks associated with the friends list, such as finding or removing friends, or sending messages to other users.

Security and Privacy Features

Because the location-based social network manager stores and provides access to sometimes sensitive personal identification information (PII) of a user to a network of people, certain privacy measures are included to allow the user to control who has access to this information. PII data may include information about the user (e.g., name, mobile phone number, personal profile, and other unique identifier information), as well as information used by the user (e.g., e-mail address, username, location information, and other network interaction information).

In order to promote the privacy of users, as well as the proper use of location and PII data, the system implements consent-based features, in which any use or disclosure of system data is strictly based upon receiving a user's authorization. A confirmation process confirms that such consent is actually received from a device that is to be located by the system. In one embodiment, the location sharing system is a closed system in which location determination and display services are supported in direct interactions between real and trusted friends. The service does not necessarily control any such interaction, but rather offers privacy settings and tools that encourages such interaction and allows users to define their networks. This mechanism is meant to strengthen the friendships between people who already know each other and spend time together, not to facilitate the creation of new friendships with people that subscribers do not already know. The security functions may be implemented in a privacy manager module within the location based social network manager **112** of server **104**.

An important feature of the privacy functions include the ability to turn off the location sharing so that the location of the device is not broadcast to friends and cannot be determined by friends. The location sharing on/off feature can be triggered through the website, the mobile application, a customer service call, or via an SMS message, or the like. If the mobile communication device is lost or otherwise compromised, the system can disable access to the service by expiring the session ID and erasing all information from the device by means of an appropriate message or signal to the device.

In one embodiment, individual users are provided the capability of turning on or off their location sharing capability. This can be implemented through means of a toggle switch provided by the user interface on the mobile device or the web page, for each individual user of the system. This would allow a user to turn off location sharing for friend **1**, but keep it on for friend **2**, or to turn it off for a class of friends, and so on.

The user interface also provides a method for the user to specify certain times or time periods in which location sharing is to be automatically disabled or enabled. For example, a user may specify that his or her location should never be shared between 11 pm and 9 am, or on weekends, or any other time parameter. Such restrictions can also be specified for location, such as enabling or disabling location based on area.

Along with location sharing itself, users may also turn off the automatic location updating process. This will cause the display of the last known location of the user if location sharing is enabled, but automatic location updating is not allowed. The automatic location update feature could also implement certain security mechanisms. For example, a user can turn-off or set to 'manual' the location update feature, in which case his or her location fix, time stamp and status is essentially frozen and displayed as a constant to the other users. In one embodiment, the system can be configured to make it appear as if the location information has been updated, though, in reality it has not been updated with the actual recent or current location of the user. Thus, an apparently updated message may read "Work, 15 minutes ago," even though this location may have been manually set days ago.

Through a privacy preference utility, the user can define which characteristics the user can share with others within his or her social network, and set filters to limit access of certain information to only certain users. For example, the user can specify which user or group of users within the network can see the location of the user by defining a "blocklist" of users who are not allowed to see the location information.

FIG. **6**A illustrates an example of a privacy preference menu displayed on a mobile communication device, and FIG. **6**B illustrates an example of a privacy preference menu displayed on a client computer, according to embodiments. As shown in FIG. **6**B, the privacy and settings window **604** provides fields or commands that allow the user to specify a status message. This is the message that is displayed on the mobile devices of the other users, such as shown in FIG. **5**A, and the web pages of other users. A short message can be typed in depending upon the constraints of the system and can provide a small amount of useful information. The visibility setting **608** allows the user to set which friends are allowed to view the user's location information, and can be applied to all or no friends, or specific friends specified on the blocklist. Display area **610** allows the user to list the friends in the blocklist. Display area **612** illustrates a simple free/busy toggle that allows the user to set his or her status as free or busy. The busy setting may be configured to block the user's information from his or her friends until the user becomes free. The interface **604** illustrated in FIG. **6**A allows the user to set the privacy for the user's mobile device. Depending upon the constraints of the mobile device, the same or a subset of the privacy settings can also be displayed and accessed on the mobile device itself. The corresponding fields for the mobile device are illustrated in display window **602** of FIG. **6**A.

As stated above, the service offers end user privacy settings to encourage interaction only between real and trusted friends. The system incorporates certain fundamental privacy features. First, the system requires that two users mutually consent to be friends in the system before any direct interaction (messaging, location sharing, event invitations, etc.) can occur. This request for mutual consent can come in the form as an invitation to the service, in the case that one of the users is not yet a registered user of the service, or as a request to be friends on the network, in the case that both users are already registered users of the service. Accordingly, the system is a "closed network." Besides, mutual consent, the service requires that the users input a user's phone number before being able to invite them to the service or request a friendship connection. This requirement accomplishes two primary objectives. First, it helps to encourage usage of the service with real and trusted friends. Since consumers are generally trained to be careful to whom they give their phone number, and knowledge of someone's phone numbers typically makes the existence of a real relationship more likely. Second, it limits the ability of users to either inadvertently or maliciously invite or request friendship from users that they do not already know. Thus the system avoids the two most difficult problems faced by many open social networks today: the ability predators have to spam users with friend requests, and "phishing," the creation and use of fake identities or multiple anonymous profiles in the hope that an unsuspecting user will accept a bogus friend request. The service will not send an invite or request until a valid phone number has been entered, and there is no other means by which to create a friend connection on the system.

In one embodiment, users are able to invite friends to join the service via SMS or e-mail messages after entering a valid mobile phone number of the prospective friend. Before sending out an invite on behalf of the user, the system checks to see that the invite-a-friend messages are sent from verified mobile numbers and accounts. If an invitee accepts an invitation and joins the service, the invitee automatically receives a friend request from inviter. Note that this exchange does not automatically make these parties "friends." The invitee must explicitly consent to the friend request to create a reciprocal friendship connection. No information sharing occurs through the system until both users mutually and expressly consent to a friendship connect, and the sharing of location information.

FIG. **13** illustrates an example of a user table and an associated location table, under an embodiment. The user table **1302** contains the listing of the users with certain key information, such as name, user ID, and phone number, among other possible identification information. Certain databases within the system store sensitive user information, such location information and dating preferences, and the like. To ensure privacy and security, these tables are not explicitly associated with any particular user. This ensures that anyone gaining unauthorized access to the databases within the system will not be able to associate any particular sensitive information with the corresponding user. This correspondence is provided only by way of an encoded linkage structure. Thus, as illustrated in FIG. **13**, there is a code denoted "linkA" for each user. When a user is created within the system, the unique linkA code is generated for that user. It is a randomly generated alpha-numeric text string that is unique to each user. The user also provides a password, which is not itself is not stored within the system, but is instead used to encode or link the table entries in the user table **1302** to other data objects in the user's database. Thus, in one embodiment, the linkA code is used by the system to link to other database tables holding sensitive or confidential information for the user within the system.

Because the social networking system can provide location information for individual members of a network, certain privacy features are provided to allow a user to mask or hide a user's actual location information, or limit access to the user's location information. This is an alternative to turning off the location display feature entirely for a user. In one embodiment, a fuzzy location feature is provided. This function adds a random offset to the actual location of a user, and allows the user to share his general location information with

other users but hide his exact location. For example, the offset could be one mile, thus the user's location would be offset by a mile when displayed on another user's mobile communication device. The offset value is used until the user moves out of the offset radius. The offset value is then reset and used until the user moves outside of the boundaries defined by the previous or new offset value. The user is randomly displayed in any location within the offset radius, and can be displayed as a large icon encompassing the entire fuzzy area or as a focused icon randomly placed within the radius. This prevents other users from being able to guess a user's location by selecting the location in the middle of several densities.

In another embodiment, the display obfuscation method includes snapping a location indicator to set location, such as the upper right corner of a grid. This would prevent so-called "centroid" attacks on the system to try to decode the user's location. Location information can also be obfuscated on the basis of other location parameters, such as zip code, city, region, and so on. In this case, an icon or location indicator would indicate that a user was in a certain region or zip code, but would not provide the location of the user within that area. Other obfuscation techniques could also be implemented to mask or obscure the location information for users or groups of users. For example, groups of close points on a map, either users or points of interest on a map may be clustered. A key would then be needed to scroll through the clustered points.

In certain deployments, such as those involving many mobile device users based around one or more server computers, the amount of data transmitted throughout the system can be very high. If many users constantly change location and/or message other users on a frequent basis and at approximately the same time, the network traffic could easily overwhelm the system causing lock-up conditions or drastic slowing of network traffic. In one embodiment, the location-based social network manager process employs a data compression mechanism to compress the location and message data to reduce the network traffic between the mobile devices and the server computer. The data compression mechanism, according to one embodiment recognizes frequently used patterns and assigns them a number between 0 and 255. These patterns can thus be represented in one-byte. A dictionary of the 256 most frequently used patterns is generated and stored on one or both of the server and client devices and shared between the client and server. In alternative embodiments, other known data compression methods can be used to compress the network traffic between the server computer and the client computers and mobile communication devices.

Messaging Functionality

The mobile communication device can also be configured to provide other functions or utilities that facilitate user interaction with friends based on the location information displayed on the mobile communication device. For example, a messaging utility can be used to send and receive text or voice messages from a friend or groups of friends within a displayed area. In one embodiment, the location-based social network manager process **112** includes a messaging module that allows messages to be sent to friends on the device where they are most likely to see it. The messaging module utilizes the group module and the geographic location functionality of the mobile communication device. The message can be sent as a text message or instant message (IM) between mobile communication devices, or as a web message between client computers. In general, messages can be transmitted between any of the computers and devices illustrated in FIG. **1**, thus, messages can go from mobile to mobile, web to web or mobile to web.

FIG. **7**A illustrates an example of a messaging function for implementation on a mobile device, and FIG. **7**B illustrates an example of a messaging function for implementation on a client computer, according to embodiments. As shown in FIG. **7**B, the client computer based messaging function can be provided as a simple user interface with fields for the recipients, message subject, and message. An attachment utility can also be included to allow the transmission of attached data objects, such as documents, files, pictures, and the like. The mobile communication device version of the messaging function is typically a simple text based utility that displays the recipients and the text message to be sent, and if space is constrained, these display areas may be provided in successive screens of the device, as shown in FIG. **7**A. Message data can be sent via standard SMS protocol, data transfer, or any other suitable messaging protocol.

In one embodiment, the social network manager also includes an event manager module that allows a user to program places and/or events of interest. The event manager allows the user to create and manage various events using date and location information and send invitations or messages regarding the events to friends using the grouping function and messaging utilities of the system. Thus, the event manager module utilizes the group module and the geographic location functionality of the mobile communication device. Lists of public events can be provided by separate event servers accessible to the server, client computers or mobile devices of the system **100**, or they may be programmed into an event database stored in data store **120**. Typically private events are created and stored by each user, and each user may store events or other similar information in their own user provided database. Alternatively, events can be stored in one or more separate event databases (public and/or private events) within database store **120**. If permission is granted, the database functionality of the mobile devices allows a user to view events created by other users or those that are public. Public events are typically events that are provided by users or partners that provide event information.

FIG. **8**A illustrates an example of an event manager function for implementation on a mobile device, and FIG. **8**B illustrates an example of an event manager function for implementation on a client computer, according to embodiments. As shown in FIG. **8**B, a display area **810** displays a description of the event including the time and place of the event, as well as any other relevant information. The location of the event is shown as an icon **813** on a map displayed in display area **812**, and the date of the event can be shown on a calendar displayed in display area **814**. Similar information can be provided through the client side program for display through the mobile communication device, as shown in FIG. **8**A. Depending upon the constraints of the display the event information can be provided in a series of screens. Additionally, certain geographic parameters can also be provided, such as relative distance to the event based on the location of the mobile communication device as well as the location of the event on the map.

User-Generated Locations

In one embodiment, the location-based social network manager includes a user-generated location feature, feature that allows users in the network to program and share private and possibly, public places of interest (POI) with one another. A database specifying places and/or events can be stored in data store **120**. This database can store different items of information relevant to a place of interest, such as, location, hours, products/services provided, and so on. This information can be provided to a user in a "pull" model, in which the user searches for the stored user-generated location through

the web page or mobile communication device. Alternatively, the information can be provided to the user in a "push" model in which the server sends relevant POI information to a user based on a user condition, such as if the user goes near a particular POI. The POI feature utilizes a reverse geocoding method in which the system determines the user's location, and correlates the location coordinates to entries in the POI database to determine which bar, restaurant, or other where they may be. This POI information can then be displayed on the user's friends mobile communication devices as the location of the user. This allows the system to automatically determine and display the location of a user and to share more descriptive and precise location information without requiring the user to manually type anything. For example, using the friend finding and messaging functions, a user can send a message to his or her friends simply saying that they are near the "ABC" bookstore instead of any address or other location information. In determining the location of the user, the server looks up the latitude/longitude information of the user, matches it to the corresponding POI, and sends the POI information to the other users in the network.

The storage of user-generated location information in a database allows a user to search for and find user-generated places almost automatically using the location finding capabilities of the mobile communication device. The user can specify a POI to be found, and the system will display the location of the POI relative to the user. The user can then bring up the relevant information relating to the POI, such as hours, prices, and so on. User-generated places can be private or public. Public user-generated places are those that are defined or provided by the server or third party providers. Private user-generated places are those that are defined by individual users. Depending upon the privilege settings, a user may be able to access his or her friend's user-generated places.

In one embodiment, the user-generated location feature provides a tagging and feedback sharing mechanism that allows the user to tag a place and provide feedback. Tagging involves noting the location of a place or capturing an image of the place and downloading it to the server. User feedback can be provided as text messages or rankings using a user-defined or pre-defined template that is stored in the user-provided database or separate POI database. This database can be made available to friends or other users of the network, depending upon the preferences set by the user. Various messages, such as reviews, advertisements, and the like can be associated with each POI and displayed upon selection of the POI by the user. The POI and messaging features also enable users to send itineraries of trips to groups of friends. This greatly facilitates the planning and communication of group trips.

In one embodiment, the location-based social network manager includes a review and recommendation function that allows each user to review and rank events or user-generated places so that this information can be shared with the other users. When a user visits a tagged POI (or attends a tagged event), he or she can provide a numerical (keypad) ranking of 1-9 and/or write a short summary of the place. The server process can also be configured to automatically request or remind the user to provide a ranking or summary of the POI upon the user's next system login through the web site or the mobile communication device. For each POI, the server compiles the rankings and summary reports and makes these available to any user who desires to see them. The server process can also be configured to compile statistical profiles or qualitative profiles of different tagged user-generated places once enough ranking or summary information is available.

The server process can also include a machine learning component that can provide personalized ranking and reviews for individual users based on the identity of the reviewers. This process includes a Bayesian trust network component that learns each user's trust levels with respect to the other user's. Each user may trust certain of their friends with respect to certain types of user-generated places. In this case, the system will weight the ranking provided to the user based on the identity of the reviewer if the reviewer opinion is particularly trusted with respect to the tagged POI. In this manner, personalized and dynamic ranking and review profiles can be established for each POI based on the users and reviewers.

In one embodiment, an auto messaging mechanism sends an alert to a user based on the POI of another user. For this embodiment, when the user tags a particular POI, the server sends an alert to that user when a friend of the user gets within a certain distance of the POI. In this manner, the user can call, send a message, or arrange to meet with his or her friend at the POI, without needing to go through the trouble of pre-arranging a meeting. This facilitates spontaneous networking among users and their friends at particular user-generated places. It should be noted that user-generated places can be any type of location, such as retail establishment (store, restaurant, club, theater, gas station etc.), building (office, house, etc.), public resource (library, museum), street corner, object (e.g., ATM kiosk, post box), and the like.

Several interactive network features are facilitated through the use of the location determination and message capabilities of the mobile devices. For example, not only can friend locations be displayed on a user's mobile device, but an alert function can provide a graphic or audible alert to the user when a particular friend has entered a user determined area or region around the user. FIG. **9** illustrates an example of an alert function for the location-based social network manager process, under an embodiment. The user can specify a radius **906** around which he or she should be notified if a friend enters. The server computer then performs a periodic comparison of the user's location compared to that of his or her friends to determine if any of the user's friends are within this specified radius. The user location and radius are displayed on map **904**. When a friend enters this radius, as determined by the server computer, a message is sent from the server to the user over network link **908** and displayed on the user's mobile device **902**. The alert function can also be used to facilitate other interactive features, such as displaying or alerting the user to the location of user-generated places in the displayed area or the time and location of events of interest when the user enters a particular area.

The user interface screens illustrated in FIGS. **2**A through **9** can be configured in any number of ways depending upon the constraints, requirements, and preferences of the system and system integrators. Various types of icons can be used to specify the identity and status of users and friends on the mobile devices and client computers of each user. For example, a portion of the mobile device display, such as the top of the menu may include one or more icons indicating whether the location of the device has been determined and whether or not the user is sharing his or her location information. The icons can be color or shape coded to define all of the different states available with regard to the user's location and status information. Likewise, the map display and icons for friends, places, events, and so on can be customized depending upon the needs and preferences of the user. Scrolling and scaling functions for control of the displays on both the mobile device and client computers can also be customized to utilize the input/output interfaces available on the different

devices that can be used in conjunction with embodiments of the location-based social network manager process.

The display process may utilize various smart mechanisms for panning, zooming, scaling, or otherwise displaying dynamic (time and space) information on inherently small form factor displays (i.e., mobile phones). For example, a smart pan and zoom feature may utilize an automatic zoom out mechanism that uses a zoom box instead of a cursor when a user pans off a screen. Then display then zooms back to the original zoom level when the user stops panning.

Location Determination

In one embodiment, each mobile communication device **102** includes a device location module that allows the mobile communication device to determine its own geographic location so that the location of the user operating the device can be displayed on a map on the device, as well as on the mobile devices and client computers of other users in the network. In one embodiment, the location information for mobile communication device is transmitted and stored in the server computer of the network. The location information for all of the users is then transmitted from the server to the mobile communication devices based on the filters and preferences established for each of the users.

For an embodiment in which the network **110** is a cellular phone network, and the mobile communication devices are cellular phones or cell based communication devices, the device location module is a cell ID positioning program that determines the location of the device relative to the nearest one or more cell transmitters to determine a location fix of the device. Depending upon the capabilities of the system, location accuracy can be provided on the order of one to two hundred meters to actual location. If accuracy is not sufficient, the user can be provided with their approximate location either through map or text display and then input their actual location using street address, point of interest, or latitude longitude information.

In one embodiment, the location determination module is a GPS (global positioning system) circuit that determines the location of the mobile communication device using GPS methodology. GPS circuits are capable of updating a device's location on a real or near real-time basis. However, such continuous updates can impose a great deal of processing and communications overhead on the device and the network. Moreover, for a device that is capable of displaying the location of any number of other users, such continuous update methods are highly impractical. If the actual location of every friend in a network were required to be determined every time the user brought up a map, the time and cost requirements would likely be excessive. For embodiments in which the communication network comprises a cellular phone network and the mobile devices are cell phones, the location determination module may be an assisted GPS or "A-GPS" module that uses an assistance server and cell tower that helps the GPS receiver in the phone perform tasks of range measurements and position solutions.

In general, the task of determining location in a mobile device and transmitting location information to a server can utilize a significant amount of power and processing resources, as well as generate a great deal of network traffic to the server. For systems with a large number of mobile devices, polling each device at a set frequency (e.g., every three minutes) could result in an overwhelming amount of network traffic. To minimize the power usage and network and processing overhead, an embodiment of the location determination module employs a GPS polling method that polls the device location of each mobile device in the system as infrequently as possible to thereby impose a minimum load on the carrier networks. The GPS polling method is an iterative polling method that employs a caching mechanism that updates a user's location based on known location information and user behavior. Instead of polling each mobile device in the network at a fixed frequency, the frequency of the location polls for each device depends on the movement and/or activity (interaction with the server) of the user. If the user is stationary and inactive the polling frequency is minimized to result in fewer GPS location polls. If a user is on the move and/or interacting with the server computer, the polling frequency is increased to result in more frequent GPS location polls. A difference value can be used to determine whether the updated location information is stored in the cache and/or transmitted to the server computer, thus adaptively utilizing system resources depending upon the amount of movement or activity of the user.

FIG. **10** is a flowchart that illustrates GPS polling for a location determination module, according to an embodiment. A location poll operation can be performed each time a user forces a location update from his mobile device, accesses the server computer from the mobile device, or at the end of a present polling period, **1002**. In the event of any of these occurrences, the user's present geographic location is determined, **1004**. In certain cases, a location fix might not be obtained, such as due to lack of signal, loss of device power, and so on. In step **1006** it is determined whether or not a location fix was obtained. If not, the device will wait (enter sleep mode) for a preset period of time, such as two minutes, and then retry the location fix. If a location fix is not obtained after a number (e.g., five) of tries, the system will determine whether or not the user has changed cell tower location, **1008**. If so, the system will send the cell tower location to the device and the location fix will be attempted again, otherwise, the device will longer period sleep mode before retrying.

If a location fix is obtained, a smart polling process is executed wherein the change in distance (distance delta) of the user from the present location and the previous location is used to set the polling frequency, and the location information is updated to the server computer. In step **1010** it is determined whether the new fixed location differs from the previous location by a threshold distance. If the distance delta is not greater than the threshold value, it is assumed that the user has not moved by an appreciable amount, and therefore no location update to the server computer is necessary. In this case, the location polling interval is increased by decreasing the GPS polling frequency by a preset factor. This results in fewer GPS location pulls for a relatively static user. The process then continues from step **1002** at the end of the first new polling period. If, in step **1010**, it is determined that the distance delta is greater than the threshold value, then it is assumed that the user has moved by an appreciable amount. In this case, the location information is transmitted to the server, **1014**. The polling frequency is also increased by a preset factor depending upon the current polling frequency. If the present polling frequency is slow, it can be increased to track the user. The process then continues from step **1002** to obtain a new fix at the end of the shorter period. If the user slows down or stops, the distance delta comparison step **1010** will cause the polling frequency to decrease in accordance with the reduced movement of the user.

The initial and modified location polling frequencies can be set to any value in accordance with the requirements and constraints of the server and mobile devices. For example, an initial polling interval could be set to 20 minutes, and the wait or sleep period could be set to anywhere between 15 seconds to 300 minutes. Likewise, the threshold distance represents the minimum distance that the user has traveled to require that

the system update his or her location, and can vary from a few meters to a few kilometers, or more. The increase or decrease in the polling interval performed in steps **1012** and **1016** can vary from 100% of the present polling period up to a certain maximum number of minutes, such as between 80 minutes to 300 minutes, depending on certain factors such as time of day, system requirements, and so on.

The GPS polling method illustrated in FIG. **10** provides for efficient use of network and mobile device resources based on each user's activity and movement. The more active or more mobile a user is, the more frequent the GPS location determination operations occur. Likewise, if a user is stationary or less active, the GPS polling frequency is reduced. This results in less use of GPS services and network usage. Such polling can also be tailored depending on a user's sleep or general travel or commute patterns.

In one embodiment, the latest location information for a user is stored as a data entry on the mobile communication device and sent to the server for temporary or permanent storage. Each location entry is stored, at least temporarily, in the location database **126** on the server computer. The server computer can be configured to store only the latest location for the user, or all previous locations of the user in a location log. The location log entries include a time stamp based on the location poll time and the latitude/longitude (or other location indicator) at that time. To reduce memory usage successive unchanged location entries can be discarded so that only changes in location are stored in the location log. Security or privacy functions can be implemented to block the access of location history information to anyone but the user himself.

Data Synchronization and Privacy

In one embodiment, the location-based social network manager process **112** includes an intelligent caching and synchronization function that caches critical data with normal updates to each mobile communication device in the network. Because a user can update their own data on either the mobile communication device or through the client computer, and other members can also impact a particular user's data, a synchronization function is necessary to ensure that the information available to the user is as up-to-date as possible while minimizing network traffic. Data between the user's mobile communication device and account data stored on the server and/or client may be out of sync because the user changed the data on the web site, but not the mobile device, a friendship request from another user was confirmed, or some other input from another user was input to the system. Each class of information to be synchronized is assigned a version number, which is maintained by both the server computer **104** and the respective mobile communication device **102**. Each time a mobile communication device makes a request to the server, its data packets are prepended with a set of synchronization bytes. The server checks all of these bytes. If the data is out of sync with data that is on the server, the updated information is prepended by the server computer for transmission back to the mobile communication device.

Certain important data is cached on the mobile communication device itself. This includes the status of a user's friends on the network and other similar data that is small in size and frequently accessed. The caching mechanism reduces the network traffic between the mobile communication device and the server computer, thereby increasing network efficiency, minimizing open sockets on the network, and providing a more fluid and immediate user experience through the mobile communication device. The synchronization function is used in conjunction with the mobile communication device cache to ensure data coherence between the user's mobile communication device and the server computer. FIG. **11** is a flowchart that illustrates an example of sending updated information to a user's mobile device, under an embodiment. In step **1102**, any friends with updated information transmit the new data to the server computer. The updated information can be generated by a new location fix or through a message transmitted over the system or a parameter change in the user's database. For example, an information update can be performed by the user inputting certain new or modified information directly into his or her mobile device, or automatically through a friend update, such as a status change caused by a friend changing location, sending a message, or changing the status availability flag. The updated information is transmitted from the mobile communication device to the server computer. On the server computer, the data is updated and flagged as updated data, step **1104**.

Although the server computer can be configured to transmit the updated information along to the user as soon as it is received, in a preferred embodiment, the updated information is sent only upon user activity to reduce network traffic and tailor data updates based on user demand. If a user is not active, it is assumed that the user does not necessarily need real time updates of changed friend information. Any user activity with the server computer can trigger an update, such as powering on the device, making a request for services, forcing a location fix, or a performing a refresh operation, and the like. Upon receiving a network call from the user, the server computer bundles all of the flagged and held updated data and transmits it to the user. Thus, in step **1108**, the user receives the updated data or changed status for his or her friend on the mobile device or client computer.

FIG. **12** illustrates an example of a user update on a mobile communication device and a corresponding update table, under an embodiment. The display area **1204** of mobile communication device **1202** displays the status information for a number of friends. This information is cached on the mobile device itself. The status information may be updated as a friend changes location or sends a message or signal that indicates a change in his or her status with respect to the user of the mobile communication device. The status information is stored in a corresponding friend information table **1206**, which is stored on the data store **120** of the server computer **104**. As shown in FIG. **12**, the information table **1206** stores the user ID, and name of the user's friends, as well as their distance to the user and any message text that was sent to the user from each friend. The table **1206** also includes a flag column **1208** to indicate the friends which have updated status information transmitted from the user's mobile communication device. For the example shown in FIG. **12**, message information for users **216** and **219** have been updated as indicated by the flag icon in column **1208**, as well as the graphical overwriting of the message in their respective message columns. This flagged data will be sent to the user upon his next interaction with the server computer.

Mobile Applications and Ad Serving

In general, the location-based social network manager **112** comprises a mobile application that provides the location-based services described above. The manager program **112** can also be used by third parties to provide other mobile applications that leverage the location-based services provided by manager **112**. These can include stand-alone programs that execute on the location-aware mobile device, or plug-in type programs that operate in conjunction with the manager **112**.

In one embodiment, the location-based social network manager **112** allows a developer to customize or personalize the platform software based on user inputted codes, location, or handset type. This allows product releases or updates to be

timed until the very last minute of production. When the mobile application first launches on a user's mobile device, it makes a request to the servers to check whether or not a postponement trigger calls for customization. If the application needs to be customized, the server transmits the new or revised data (e.g., customized content, color schemes, icons, and so on) or a request to unlock certain functionality. Examples of postponement include certain features that are provided in limited release to specific areas. For example, instead of creating multiple versions of an application, the application can be customized after it has been distributed to the user's handset. This feature also facilitates the creation and delivery of time-sensitive ad messages. Third parties (e.g., merchants) or advertisers may offer a customized, branded experience and users can request the branded experience by entering an offer code. The offer code can then be validated against the server and additional content can be sent to customize the user interface on the user's mobile device.

In one embodiment, the location-based social network manager can incorporate or be used as a platform for a revenue-based social networking business system. One or more aspects of the process will involve fee-based services that generate income for any of the service providers and/or users. For example, a fee could be charged to each user every time a location fix is provided and displayed for the user's friends on his or her mobile communication device, or every time a message is sent or received from the user's friends, or every time a user tries to contact someone outside of their network of friends in a mobile dating scenario. Revenue generating aspects can also be associated with the POI feature. For example, a fee could be charged to a user for accessing and displaying a POI on the mobile communication device. For commercial user-generated places, a fee might be charged to the business for displaying the location on the user's mobile communication device.

In one embodiment, the location-based mobile communication network serves as a platform in which fees are charged for the transmission of advertising messages to the users in a network. Such ads could be associated directly with particular places of interest, or they could be streamed to users through an ad serving service, or the like. Various different revenue models can be implemented with the fee structure defined and controlled by the server computer administrator. Any revenue received through the use of service fees, message fees, advertising fees, subscription/membership fees, and the like can be retained by the system administrator or shared among the parties in a manner defined by the administrator.

With regard to advertising, the location-based social network manager system includes a comprehensive advertising platform that allows an advertiser, such as a provider of a product or service, to serve advertising messages for display on the location-aware mobile device and to implement advertising campaigns featuring targeted ad serving, incentive programs (e.g., coupons), interactive messaging, and sponsored displays. As shown in FIG. **1** the server computer **104** executes an advertising platform manager **117** that allows an advertisement or supplemental message server **118** to have advertisement services provided to the user's mobile devices **102** and/or client computers **106**. This allows an advertiser to directly tie an ad message with a user based directly on the user's activity in a location and time-based context. The advertisement messages can be provided in the form of banner ad messages, advertisement screens, sponsored maps, and the like. The messages can be in the form of text, graphics, animation, logo, trademark or any other suitable format. Other forms of ad messages include customized or branded display backgrounds or UI "skins".

FIG. **14**A illustrates the display of a product logo during the loading screen of the mobile application provided by the location-based social network manager **112**, under an embodiment. The display area **1404** of mobile device **1402** displays the logo for the mobile application and a loading screen. During the load process, a logo **1406** or advertising message may be displayed. The advertising message or logo for a product or service can also be incorporated into the map display provided by the mobile application. FIG. **14**B illustrates the display of sponsored maps and banner ads on a location-aware mobile communication device through the location-based social network manager **112**, under an embodiment. In this embodiment, a banner ad **1407** may be displayed over a portion of the map display and can be a persistent message displayed for the duration of a particular session, or it can be a temporary ad displayed for only a pre-set period of time, such as five seconds. The advertising platform manager also includes a mechanism for an advertiser to create sponsored maps. In this embodiment, an advertiser may have a particular logo or graphic displayed when a POI corresponding to that advertiser is present in a map. Thus, as shown in FIG. **14**B, a coffee shop logo **1409** may be displayed on map **1412** for each location within the map area. Such logos can also be displayed when a user searches for a particular product or service using the search function of the mobile application. For advertisers who agree to fulfill a sponsorship type of function, a logo or message for the advertiser can be given top display priority when a location corresponding to the search is within the map display area. For example, if the user searches for "coffee shop," all sponsored coffee shops within a set distance of the user (e.g., a one-mile radius) are displayed as logos on the map, as shown in FIG. **14**B. Advertisers who provide sponsorship functions generally pay or compensate the mobile application or system manager in exchange for the display of the ad messages or logos. Advertising fees can be paid on a subscription basis or per-ad basis. Advertisers can include local businesses, nationwide or global businesses, affiliates, or any appropriate business entity.

In one embodiment, the mobile application can be configured to facilitate the display of locations, products, and promotions for the sponsors. FIG. **15**A illustrates the display of sponsor information in a mobile application, under an embodiment. Display area **1500** includes a sponsor display section **1502** that provides information and links to relevant items associated with the sponsor. These can include a map of the nearest sponsor location, any relevant coupons, product or service listing, and promotional items such as special offers, events or incentive programs.

In one embodiment, the advertising platform manager provides a mechanism for advertisers to provide location-based coupons. The coupons are delivered to users who have opted-in to receive discounts and promotions via text messages or within the application. The service targets relevant coupons to users based on their location and the time of day. Coupons are delivered as a text message and through the mobile application itself, such as through interstitial displays, menus, banners, and the like. The coupons are delivered in a manner similar to the auto-alert feature of sending an alert when the user or a friend is at or within a defined distance of a particular location. FIG. **15**B illustrates the display of a coupon on a location-aware mobile device, under an embodiment. The displayed coupon **1510** indicates the item or service which is offered at a discount along with a coupon code, barcode, or other mechanism to validate the coupon to the merchant. The coupon message can also include a link to a map that shows the nearest merchant location and/or directions to the loca-

tion. Coupons can be "clipped" and saved for use at a later time. This extends the shelf life of a coupon. A user clips a coupon by selecting an appropriate command or key on the mobile device and saving the coupon to their account.

Coupons are an effective way for merchants or advertisers to attract business and represent a messaging mechanism that is actionable and relevant in that it they are targeted to users who have expressed an interest in a product or at least within an appropriate target demographic with regard to location. Coupons are generally configured to be delivered to users in one of a number of different ways. A first delivery method includes coupons returned in response to a user search. A second method of delivery consists of location-targeted coupons ("opt-in" coupons) that are transmitted via SMS or alert when the user is near a merchant location; and a third method are interstitial coupons that are delivered during the loading screen of the mobile application.

Coupons can be transferred among users in a "word of mouth" type of marketing method. The messaging platform allows coupons to be forwarded from one user to another, who can then redeem it or clip it for later use. In this case, the coupon message can include the option "send coupon to a friend" which then facilitates the text messaging of the coupon to the user's friends. In one embodiment, a revenue model allows the service to be paid in exchange for the distribution of ad messages and coupons. In one embodiment, a cost-per-referral (CPR) value is assigned to each instance of the sharing of a coupon among users.

In one embodiment, the advertising platform manager **117** includes an ad campaign management process that allows an advertiser or merchant to create, manage, and review their ad campaigns provided through the mobile application. In general an ad campaign comprises two or more ad messages run simultaneously or at different times, and that may be targeted at different user based on location or other demographic factors. In general, the advertisers utilize the profile data obtained by the mobile application system manager and/or the location-based social network manager to compile relevant demographic data that can be used to target specific users for ad message serving.

The ad campaign management process consists of one or more user interface screens that are displayed to the ad server **118** administrator and allow interaction between the server **104** system administrator and the advertiser or merchant. FIG. **16**A illustrates a user interface screen display for the creation of an advertising campaign, under an embodiment. The ad creation page **1600** allows the advertiser to specify certain parameters related to the ad campaign. These include the name of the campaign **1604** and the type of ad **1606**. As shown in FIG. **16**A, an ad can be in the form of a message or coupon, and can be delivered in response to a search, displayed interstitially, or based on user location (opt-in). The advertiser can type in the text of the ad message or attach a graphic file or element. The advertiser can also specify relevant characteristics of the target users including demographic information **1608**, such as gender and age. Information related to the mobile device itself can also be used to target the ads. This type of information **1610** typically includes the location of the device and the time of day that the ad should delivered. The location can be specified within a certain radius of a point of interest, or geographically, such as by city, district, state, and so on, and the time of day can be specified as a particular time and date or a periodic time (e.g., between 9 and 12 a.m. every day).

Once an ad campaign has been created, it can be monitored and revised through an ad campaign management process. This process allows an advertiser to view all of the ads in a campaign and edit or optimize the ads, and view changes in real-time. FIG. **16**B illustrates a user interface screen display for the management of an advertising campaign, under an embodiment. Display area **1620** includes a display area **1632** that lists all of the ad campaigns created by the advertiser. The displayed information includes the campaign name, ad type content, demographics, location, and so on. The management display area includes an editable summary area **1634** that lists the parameters of each ad within an ad campaign, and a preview pane **1636** that allows the advertiser to preview the ad as it will appear on a user's mobile device. Any changes to an ad can be made directly in the management display area **1634**.

The effectiveness of the ad campaigns can be obtained by an ad campaign review module that is provided within the advertising platform manager **117**. This review module allows the advertiser to track the effectiveness of any ad, manage the amount of money spent on an ad or ad campaign and review historical performance of the ad campaigns. FIG. **16**C illustrates a user interface screen display for the review of an advertising campaign, under an embodiment. As shown in FIG. **16**C, an ad review display area **1602** shows the number of daily impressions for each ad of a campaign. For coupons, the number of redemptions is also provided. This display area also includes any relevant cost data for the ad campaigns, such as total cost, percentage cost, redemption value for coupons, and so on.

In one embodiment, the geographic activity of a user may utilized by an advertiser to target the delivery of ads or coupons. For example, if a person is moving across a region and consistently searching for a particular item or service, an advertiser may track this activity and deliver location-based ads based on this anticipated movement.

The location-based social network manager of an embodiment includes a mobile communication device comprising a network interface configured to allow the mobile communication device to communicate with one or more other mobile communication devices over a network. The device of an embodiment includes a geographic location circuit coupled to the network interface and configured to determine the location of the device relative to a terrestrial coordinate system. The device of an embodiment includes a graphical user interface including a display area allowing output of information to a user of the device. The device of an embodiment includes a map generation circuit configured to display a map encompassing an area around the location of the device on the graphical user interface. The map generation circuit of an embodiment displays geographic location information on the display area for any of the one or more other mobile communication devices that are within a predefined range of the device and that are in communication with the device over the network. The device of an embodiment includes a filter circuit configured to allow a user of the mobile communication device to limit sharing of geographic location information to certain users of the one or more other mobile communication devices by preventing display of the geographic location information on the displays of the mobile communication devices of users who are not selected as able to share the geographic location information.

The network of an embodiment comprises a cellular telephone network. The device and each of the one or more other mobile communication devices of an embodiment comprises a location aware cellular telephone.

The terrestrial coordinate system of an embodiment comprises a latitude/longitude coordinate system. The geographic location device of an embodiment comprises one of a global positioning system circuit, a WiFi circuit, and a mesh network

circuit capable of determining a position of the device to within a predetermined radius of a given latitude/longitude position of the device.

Embodiments of the location-based social network manager process described herein may be applied to various types of computer and mobile device networks utilizing communication over the Internet or similar distributed network protocols.

Aspects of the mobile communication device location display system described herein may be implemented as functionality programmed into any of a variety of circuitry, including programmable logic devices ("PLDs"), such as field programmable gate arrays ("FPGAs"), programmable array logic ("PAL") devices, electrically programmable logic and memory devices and standard cell-based devices, as well as application specific integrated circuits. Some other possibilities for implementing aspects of the process include: microcontrollers with memory (such as EEPROM), embedded microprocessors, firmware, software, etc. Furthermore, aspects of the described process may be embodied in microprocessors having software-based circuit emulation, discrete logic (sequential and combinatorial), custom devices, fuzzy (neural) logic, quantum devices, and hybrids of any of the above device types. The underlying device technologies may be provided in a variety of component types, e.g., metal-oxide semiconductor field-effect transistor ("MOSFET") technologies like complementary metal-oxide semiconductor ("CMOS"), bipolar technologies like emitter-coupled logic ("ECL"), polymer technologies (e.g., silicon-conjugated polymer and metal-conjugated polymer-metal structures), mixed analog and digital, and so on.

It should also be noted that the various functions disclosed herein may be described using any number of combinations of hardware, firmware, and/or as data and/or instructions embodied in various machine-readable or computer-readable media, in terms of their behavioral, register transfer, logic component, and/or other characteristics. Computer-readable media in which such formatted data and/or instructions may be embodied include, but are not limited to, non-volatile storage media in various forms (e.g., optical, magnetic or semiconductor storage media) and carrier waves that may be used to transfer such formatted data and/or instructions through wireless, optical, or wired signaling media or any combination thereof. Examples of transfers of such formatted data and/or instructions by carrier waves include, but are not limited to, transfers (uploads, downloads, e-mail, etc.) over the Internet and/or other computer networks via one or more data transfer protocols (e.g., HTTP, FTP, SMTP, and so on).

Unless the context clearly requires otherwise, throughout the description and the claims, the words "comprise," "comprising," and the like are to be construed in an inclusive sense as opposed to an exclusive or exhaustive sense; that is to say, in a sense of "including, but not limited to." Words using the singular or plural number also include the plural or singular number respectively. Additionally, the words "herein," "hereunder," "above," "below," and words of similar import refer to this application as a whole and not to any particular portions of this application. When the word "or" is used in reference to a list of two or more items, that word covers all of the following interpretations of the word: any of the items in the list, all of the items in the list and any combination of the items in the list.

The above description of illustrated embodiments of the location-sharing network manager process is not intended to be exhaustive or to limit the embodiments to the precise form or instructions disclosed. While specific embodiments of, and examples for, the process and system are described herein for illustrative purposes, various equivalent modifications are possible within the scope of the described embodiments, as those skilled in the relevant art will recognize.

The elements and acts of the various embodiments described above can be combined to provide further embodiments. These and other changes can be made to the location-based social network manager process in light of the above detailed description.

In general, in any following claims, the terms used should not be construed to limit the described system to the specific embodiments disclosed in the specification and the claims, but should be construed to include all operations or processes that operate under the claims. Accordingly, the described system is not limited by the disclosure, but instead the scope of the recited method is to be determined entirely by the claims.

While certain aspects of the location-based social network manager process are presented below in certain claim forms, the inventor contemplates the various aspects of the methodology in any number of claim forms. For example, while only one aspect of the system is recited as embodied in machine-readable medium, other aspects may likewise be embodied in machine-readable medium. Accordingly, the inventor reserves the right to add additional claims after filing the application to pursue such additional claim forms for other aspects of the described systems and methods.

What is claimed is:

1. A location-aware mobile communication device system comprising:

a location determination component determining the relative locations of a plurality of mobile devices within a defined area;

a map display component displaying a scalable map on each mobile device of the plurality of mobile devices;

a location sharing component displaying the location of a first mobile device on the scalable map and displaying the locations of one or more other mobile devices on the scalable map when a trusted relationship has been established between a user of the first mobile device and respective users of the one or more other mobile devices, and a location sharing option has been enabled; and

an advertising component for displaying on the first mobile device an advertising message delivered from an ad server, the advertising message including content relevant to a characteristic of the user or activity performed by the user, and wherein the ad message is transmitted in response to a location of the user.

2. The system of claim **1** wherein the advertising message comprises one of a text message or graphic element displayed as a banner ad on the display area of the mobile device.

3. The system of claim **1** wherein the advertising message comprises one of a text message or graphic element displayed as an interstitial ad during a loading period of the map.

4. The system of claim **1** wherein location sharing function causes the display of one or more point of interest icons representing locations on the map associated with the advertiser, and wherein the advertising message comprises one of a text message or graphic element displayed as the point of interest icon on the display area of the mobile device.

5. The system of claim **4** wherein the location of the registered user is updated on the scalable map by updated location information determined by a global positioning system component.

6. The system of claim **5** wherein the location sharing component includes a location determining module selected from the group consisting of user input, global positioning

system technology, WiFi positioning technology, Bluetooth technology, Radio Frequency signal technology, and Cellular identification technology.

7. The system of claim **6** wherein the user of the first mobile device and respective users of the one or more other mobile devices are coupled to one another over a cellular telephone network, and wherein each respective location-aware mobile device comprises a cellular telephone.

8. The system of claim **1** wherein the advertising message comprises one a redeemable coupon displayed as a text message or graphical element on the display area of the mobile device.

9. The system of claim **8** wherein the coupon is displayed in response to a search performed by the user.

10. The system of claim **8** wherein the coupon is displayed when the mobile device is within a defined distance of a location associated with the advertiser.

11. The system of claim **8** wherein the coupon is displayed only during a defined time period.

12. The system of claim **1** further comprising an ad campaign user interface component including:

a campaign creation component configured to allow an advertiser to create an ad campaign including a plurality of ad messages transmitted to users of mobile devices at different times or locations;

a campaign management component listing ad messages for each ad campaign and configured to allow the advertiser to modify one or more parameters of each ad; and

a campaign review component displaying effectiveness of each ad based on one or more performance measurements.

13. The system of claim **12** wherein the one or more parameters are selected from the group consisting of: ad type, text content, graphic content, target demographic, and location.

14. The system of claim **13** wherein the ad type comprises one of a coupon or an ad message.

15. The system of claim **14** wherein the performance measures comprise the number of daily impressions of an ad message and a cost of the ad message.

16. The system of claim **14** wherein the performance measures comprise the redemption amount in the case where the ad type is a coupon.

17. A method comprising:

providing, by a server, an advertising campaign including a plurality of advertising messages for transmitting to users of mobile devices at different times or locations;

receiving, by the server, the geographic location of a mobile communication device operated by a user within an area; and

transmitting to the mobile communication device for display, at least one of the plurality of advertising messages, wherein the advertising message includes content relevant to a characteristic of the user or activity performed by the user and is in the form of a text advertising message, coupon and/or graphic element that is superimposed over a map representation of the area around the mobile communication device displayed on a graphical user interface of the mobile communication device of the user, displayed in an interstitial display page of the graphical user interface or displayed as a text-based message, and wherein the ad message is transmitted in response to a location of the user.

18. The method of claim **17** wherein the ad message is displayed in an interstitial display page of the graphical user interface.

19. The method of claim **17**, wherein the advertising message comprises a branded icon corresponding to a location of a business associated with the advertiser.

20. The method of claim **17** further comprising displaying, by the server, the effectiveness of each advertising campaign based on one or more performance measurements.

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