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(54) Title: DYNAMIC RECOMMENDATION IN GEO-SOCIAL NETWORKING SYSTEM

(57) Abstract: In one embodiment, a geo-social networking system records location data of a user, generate a set of recommendations based on the user's location data, and present one or more recommendations of the set of recommendations to the user based on the user's current location.



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## DYNAMIC RECOMMENDATIONS IN GEO-SOCIAL NETWORKING SYSTEM

TECHNICAL FIELD

The present disclosure relates generally to a geo-social networking service and, more particularly, to dynamically generating recommendations associated with one or more places based on a user's current location and/or location history.

BACKGROUND

A social networking system, such as a social networking website, enables its users to interact with it and with each other through the system. The social networking system may create and store a record, often referred to as a user profile, in connection with the user. The user profile may include a user's demographic information, communication channel information, and personal interest. The social networking system may also create and store a record of a user's relationship with other users in the social networking system (e.g., social graph), as well as provide services (e.g., wall-posts, photo-sharing, or instant messaging) to facilitate social interaction between users in the social networking system. A geo-social networking system is a social networking system in which geographic services and capabilities are used to enable additional social interactions. User-submitted location data or geo-location techniques (e.g., mobile phone position tracking) can allow a geo-social network to connect and coordinate users with local people or events that match their interests. For example, users can check-in to a place using a mobile client application by providing a name of a place (or selecting a place from a pre-established list of places). The geo-social networking system, among other things, can record information about the user's presence at the place and possibly provide this information to other users of the geo-social networking system.

SUMMARY

Particular embodiments relate to dynamically recommending a place and/or one or more recommended actions to a user based on the user's historical and/or current location. These and other features, aspects, and advantages of the disclosure are described in more detail below in the detailed description and in conjunction with the following figures.

## BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 illustrates an example social networking system.

Figure 2 illustrates an example method of dynamically recommending places.

Figure 3 illustrates an example network environment.

5 Figure 4 illustrates an example computer system.

Figure 5 illustrates an example mobile device platform.

## DETAILED DESCRIPTION

The invention is now described in detail with reference to a few embodiments thereof as illustrated in the accompanying drawings. In the following description, numerous specific details are set forth in order to provide a thorough understanding of the present disclosure. It is apparent, however, to one skilled in the art, that the present disclosure may be practiced without some or all of these specific details. In other instances, well known process steps and/or structures have not been described in detail in order not to unnecessarily obscure the present disclosure. In addition, while the disclosure is described in conjunction with the particular embodiments, it should be understood that this description is not intended to limit the disclosure to the described embodiments. To the contrary, the description is intended to cover alternatives, modifications, and equivalents as may be included within the spirit and scope of the disclosure as defined by the appended claims.

20 A social networking system, such as a social networking website, enables its users to interact with it, and with each other through, the system. Typically, to become a registered user of a social networking system, an entity, either human or non-human, registers for an account with the social networking system. Thereafter, the registered user may log into the social networking system via an account by providing, for example, a correct login ID or  
25 username and password. As used herein, a “user” may be an individual (human user), an entity (e.g., an enterprise, business, or third party application), or a group (e.g., of individuals or entities) that interacts or communicates with or over such a social network environment.

When a user registers for an account with a social networking system, the social networking system may create and store a record, often referred to as a “user profile”, in  
30 connection with the user. The user profile may include information provided by the user and information gathered by various systems, including the social networking system, relating to activities or actions of the user. For example, the user may provide his name, profile picture,

contact information, birth date, gender, marital status, family status, employment, education background, preferences, interests, and other demographical information to be included in his user profile. The user may identify other users of the social networking system that the user considers to be his friends. A list of the user's friends or first degree contacts may be included in the user's profile. Connections in social networking systems may be in both directions or may be in just one direction. For example, if Bob and Joe are both users and connect with each another, Bob and Joe are each connections of the other. If, on the other hand, Bob wishes to connect to Sam to view Sam's posted content items, but Sam does not choose to connect to Bob, a one-way connection may be formed where Sam is Bob's connection, but Bob is not Sam's connection. Some embodiments of a social networking system allow the connection to be indirect via one or more levels of connections (e.g., friends of friends). Connections may be added explicitly by a user, for example, the user selecting a particular other user to be a friend, or automatically created by the social networking system based on common characteristics of the users (e.g., users who are alumni of the same educational institution). The user may identify or bookmark websites or web pages he visits frequently and these websites or web pages may be included in the user's profile.

The user may provide information relating to various aspects of the user (such as contact information and interests) at the time the user registers for an account or at a later time. The user may also update his or her profile information at any time. For example, when the user moves, or changes a phone number, he may update his contact information. Additionally, the user's interests may change as time passes, and the user may update his interests in his profile from time to time. A user's activities on the social networking system, such as frequency of accessing particular information on the system, may also provide information that may be included in the user's profile. Again, such information may be updated from time to time to reflect the user's most-recent activities. Still further, other users or so-called friends or contacts of the user may also perform activities that affect or cause updates to a user's profile. For example, a contact may add the user as a friend (or remove the user as a friend). A contact may also write messages to the user's profile pages--typically known as wall-posts. A user may also input status messages that get posted to the user's profile page.

A social network system may maintain social graph information, which can generally model the relationships among groups of individuals, and may include relationships

ranging from casual acquaintances to close familial bonds. A social network may be represented using a graph structure. Each node of the graph corresponds to a member of the social network. Edges connecting two nodes represent a relationship between two users. In addition, the degree of separation between any two nodes is defined as the minimum number of hops required to traverse the graph from one node to the other. A degree of separation between two users can be considered a measure of relatedness between the two users represented by the nodes in the graph.

A social networking system may support a variety of applications, such as photo sharing, on-line calendars and events. For example, the social networking system may also include media sharing capabilities. For example, the social networking system may allow users to post photographs and other multimedia files to a user's profile, such as in a wall post or in a photo album, both of which may be accessible to other users of the social networking system. Social networking system may also allow users to configure events. For example, a first user may configure an event with attributes including time and date of the event, location of the event and other users invited to the event. The invited users may receive invitations to the event and respond (such as by accepting the invitation or declining it). Furthermore, social networking system may allow users to maintain a personal calendar. Similarly to events, the calendar entries may include times, dates, locations and identities of other users.

The social networking system may also support a privacy model. A user may or may not wish to share his information with other users or third-party applications, or a user may wish to share his information only with specific users or third-party applications. A user may control whether his information is shared with other users or third-party applications through privacy settings associated with his user profile. For example, a user may select a privacy setting for each user datum associated with the user and/or select settings that apply globally or to categories or types of user profile information. A privacy setting defines, or identifies, the set of entities (e.g., other users, connections of the user, friends of friends, or third party application) that may have access to the user datum. The privacy setting may be specified on various levels of granularity, such as by specifying particular entities in the social network (e.g., other users), predefined groups of the user's connections, a particular type of connections, all of the user's connections, all first-degree connections of the user's connections, the entire social network, or even the entire Internet (e.g., to make the posted content item index-able and searchable on the Internet). A user may choose a default privacy

setting for all user data that is to be posted. Additionally, a user may specifically exclude certain entities from viewing a user datum or a particular type of user data.

Social networking system may maintain a database of information relating to geographic locations or places. Places may correspond to various physical locations, such as restaurants, bars, train stations, airports and the like. Some places may correspond to larger regions that themselves contain places—such as a restaurant or a gate location in an airport. In one implementation, each place can be maintained as a hub node in a social graph or other data structure maintained by the social networking system, as described in U.S. Patent Application Ser. No. 12/763,171, which is incorporated by reference herein for all purposes.

Social networking system may allow users to access information regarding each place using a client application (e.g., a browser) hosted by a wired or wireless station, such as a laptop, desktop or mobile device. For example, social networking system may serve web pages (or other structured documents) to users that request information about a place. In addition to user profile and place information, the social networking system may track or maintain other information about the user. For example, the social networking system may support geo-social networking system functionality including one or more location-based services that record the user's location. For example, users may access the geo-social networking system using a special-purpose client application hosted by a mobile device of the user (or a web- or network-based application using a browser client). The client application may automatically access Global Positioning System (GPS) or other geo-location functions supported by the mobile device and report the user's current location to the geo-social networking system. In addition, the client application may support geo-social networking functionality that allows users to check-in at various locations and communicate this location to other users. A check-in to a given place may occur when a user is physically located at a place and, using a mobile device, access the geo-social networking system to register the user's presence at the place. A user may select a place from a list of existing places near to the user's current location or create a new place. The user may also provide comments in a text string when checking in to a given place. The user may also identify one or more other users in connection with a check-in (such as friends of a user) and associate them with the check-in as well. U.S. Patent Application Ser. No. 12/574,614, which is incorporated by reference herein for all purposes, describes a system that allows a first user to check-in other users at a given place. The social networking system may automatically checks in a user to a place based on the user's current

location and past location data, as described in U.S. Patent Application No. 13/042,357, filed on March 7, 2011, which is incorporated by reference herein for all purposes. An entry including a comment and a time stamp corresponding to the time the user checked in may be displayed to other users. For example, a record of the user's check-in activity may be stored in a database. Social networking system may select one or more records associated with check-in activities of users at a given place and include such check-in activity in web pages (or other structured documents) that correspond to a given place. For example, social networking system may select the check-in activity associated with the friends or other social contacts of a user that requests a page corresponding to a place. U.S. Application Ser. No. 12/858,718, incorporated by reference in its entirety for all purposes, describes an example geo-social networking system that can be used in connection with various embodiments of the present invention. The check-in activity may also be displayed on a user profile page and in news feeds provided to users of the social networking system.

Still further, a special purpose client application hosted on a mobile device of a user may be configured to continuously capture location data of the mobile device and send the location data to social networking system. In this manner, the social networking system may track the user's location and provide various recommendations to the user related to places that are proximal to the user's path or that are frequented by the user. In one implementation, a user may opt in to this recommendation service, which causes the client application to periodically post location data of the user to the social networking system.

A social networking system may maintain a database of advertisement content from advertisers, and generate and communicate advertisements to users of the social networking system. The social networking system may increase effectiveness of advertising by providing an advertisement that is targeted to a user who is likely to be interested in the advertisement. U.S. Application No. 12/195,321, incorporated by reference in its entirety for all purposes, describes a system that selects advertisements by matching targeting criteria of advertisements and a user's profile information and past actions, and presents the selected advertisements to the user. The social networking system may also generate and communicate advertisements to a user based on the user's social graph information. For example, in addition to presenting an advertisement that is targeted to a particular user, the social networking system may communicate information about the advertisement to other users connected to the particular user. U.S. Application No. 12/193,702 describes a system

that selects advertisements for a targeted user by matching targeting criteria of advertisements and past actions of another user connected to the targeted user, and presented information about the matched action and the selected advertisements to the targeted user.

FIGURE 1 illustrates an example social networking system. In particular  
5 embodiments, the social networking system may store user profile data and social graph information in user profile database 101. In particular embodiments, the social networking system may store user event data in event database 102. For example, a user may register a new event by accessing a client application to define an event name, a time and a location, and cause the newly created event to be stored in event database 102. In particular  
10 embodiments, the social networking system may store user privacy policy data in privacy policy database 103. In particular embodiments, the social networking system may store geographic and location data in location database 104. In particular embodiments, the social networking system may store advertisement content and associated information in advertisement content database 105. For example, advertisement content can include  
15 advertising messages and media data (e.g., graphic arts, photos, video clips). For example, information associated with the advertisement content can include information about advertisers (e.g., name, URL), business category (e.g., sporting goods, Japanese restaurant, retail clothing), one or more locations, and targeting criteria (e.g., a certain age group, a certain interest). In one implementation, an administrator of a hub node corresponding to a  
20 place maintained by the geo-social networking system may configure one or more advertisements, offers or coupons that may be presented to a user. In particular embodiments, databases 101, 102, 103, 104, and 105 may be operably connected to the social networking system's front end. In particular embodiments, the front end 120 may interact with client device 122 through network cloud 121. Client device 122 is generally a computer  
25 or computing device including functionality for communicating (e.g., remotely) over a computer network. Client device 122 may be a desktop computer, laptop computer, personal digital assistant (PDA), in- or out-of-car navigation system, smart phone or other cellular or mobile phone, or mobile gaming device, among other suitable computing devices. Client device 122 may execute one or more client applications, such as a web browser (e.g.,  
30 Microsoft Windows Internet Explorer, Mozilla Firefox, Apple Safari, Google Chrome, and Opera, etc.) or special-purpose client application (e.g., Facebook for iPhone, etc.), to access and view content over a computer network. Front end 120 may include web or HTTP server



functionality, as well as other functionality, to allow users to access the social networking system. Network cloud 121 generally represents a network or collection of networks (such as the Internet or a corporate intranet, or a combination of both) over which client devices 122 may access the social network system.

5           In particular embodiments, location database 104 may store an information base of places, where each place includes a name, a geographic location and meta information (such as the user that initially created the place, reviews, comments, check-in activity data, and the like). Places may be created by administrators of the system and/or created by users of the system. For example, a user may register a new place by accessing a client application  
10   to define a place name and provide a geographic location and cause the newly created place to be registered in location database 104. As discussed above, a created place may correspond to a hub node, which an administrator can claim for purposes of augmenting the information about the place and for creating ads or other offers to be delivered to users. In particular embodiments, system front end 120 may construct and serve a web page of a place, as  
15   requested by a user. In some embodiments, a web page of a place may include selectable components for a user to “like” the place or check in to the place. In particular embodiments, location database 104 may store geo-location data identifying a real-world geographic location of a user associated with a check-in. For example, a geographic location of an Internet connected computer can be identified by the computer’s IP address. For example, a  
20   geographic location of a cell phone equipped with cellular, Wi-Fi and/or GPS capabilities can be identified by cell tower triangulation, Wi-Fi positioning, and/or GPS positioning. In particular embodiments, location database 104 may store a geographic location and additional information of a plurality of places. For example, a place can be a local business, a point of interest (e.g., Union Square in San Francisco, CA), a college, a city, or a national park. For  
25   example, a geographic location of a place (e.g., a local coffee shop) can be an address, a set of geographic coordinates (latitude and longitude), or a reference to another place (e.g., “the coffee shop next to the train station”). For example, a geographic location of a place with a large area (e.g., Yosemite National Park) can be a shape (e.g., a circle, or a polygon) approximating the boundary of the place and/or a centroid of the shape. For example,  
30   additional information of a place can be business hours, photos, or user reviews of the place. In particular embodiments, location database 104 may store a user’s location data. For example, a user can create a place (e.g., a new restaurant or coffee shop) and the social

networking system can store the created place in location database 104. For example, location database 104 may store a user's check-in activities. For example, location database 104 may store a user's geographic location provided by the user's GPS-equipped mobile device. In particular embodiments, the social networking system may calculate one or more routes of a user based on the user's user profile information, check-in activities, and/or geographic location data reported by a client application (see above) and store the one or more routes in location database 104. For example, the social networking system can calculate a "commute route" of a user between the user's home and work (as described in the user's user profile information stored in user profile database 101) by using a mapping service application such as Google Map, or by using geographic location data points from the user's GPS-equipped mobile phone while the user is driving to work. Particular embodiments herein describe methods of dynamically recommending places, actions and advertisements to a user based on the user's location data.

Figure 2 illustrates an example method of dynamically recommending places. Figure 2 can be implemented by a place recommendation process hosted by one or more computing devices of the social networking system. In particular embodiments, the place recommendation process may access location data of a user (201). For example, the place recommendation process can access the user's location data, check-in activities or route information stored in location database 104. For example, the place recommendation process can access the user's geographic locations stored in location database 104. For example, the place recommendation process can access the user's check-in activities (active check-in activities, and/or passive check-in activities by another user or by the social networking system) stored in location database 104. For example, the place recommendation process can access event database 102 for location data associated with the user's event data. In particular embodiments, the place recommendation process may calculate one or more routes of the user and store the one or more routes in location database 104. In some embodiments, a route may comprise two or more location data points that are in temporal proximity. For example, the place recommendation process can calculate a route of the user based on a set of continuously recorded geographic location data points from the user's GPS-equipped mobile phone. For example, the place recommendation process can calculate a route by two or more check-in activities of the target that happens within a certain period of time (e.g., within an hour). In other embodiments, the user may record and store one or more routes in location

database 104. For example, a user can record a “morning routine” route consisting of three location data points “kid’s school”, “Starbucks” and “work” and store the route in location database 104. A process may search for places that are nearest these location data points and recommend one or more actions to users.

5           In particular embodiments, the place recommendation process may access a data store for one or more places in close proximity to the user’s location data (202). In particular embodiments, the place recommendation process may access location database 104 and identify one or more places that are in close proximity of the user’s recorded locations and routes. For example, the place recommendation process can identify one or more places (e.g.,  
10   restaurants, book store) within 1000 feet from a coffee shop that the user just checked into. For example, the place recommendation process can identify a place (e.g., “AT&T Park, San Francisco, CA) for the user based on a geographic location (e.g., 37° 46’42.13” N, 122° 23’24.27” W) from the user’s GPS-equipped mobile device. For example, the place recommendation process can identify places (e.g., restaurant, grocery store, gas station) near  
15   one or more location data points in a route of the user.

          In particular embodiments, the place recommendation process may generate a set of recommendations based on the one or more places in close proximity to the user’s location data (203). In particular embodiments, a recommendation may be an advertisement, an offer, or coupon associated with a place. In particular embodiments, a recommendation may be an  
20   action for the user (e.g., to check into a place, to like a place). For example, the place recommendation process may associate a particular location data point in a route to a particular place (such as a coffee shop). The place recommendation process may transmit a notification to the user suggesting that the user like the place. In one implementation, liking a place causes updates, such as wall posts and stories related to the place, to appear in the  
25   subject user’s news feed. In other implementations, the place recommendation process may transmit a notification suggesting that the user check-in to the place when the user is again near the particular place. In particular embodiments, the place recommendation process may access location database 104 and advertisement content database 105 and identify one or more advertisements, coupons or offers based on the one or more places in close proximity to  
30   the user’s location data. For example, if the user frequently checks in a particular coffee shop (e.g., a Starbucks store), the place recommendation process can identify an advertisement of the place (e.g., a coupon for Starbucks), an advertisement that has a location near the

particular coffee shop (e.g., a bakery store near the particular coffee shop), or an advertisement that is of the same category as the particular coffee shop (e.g., Peet's Coffee). In particular embodiments, the place recommendation process may access location database 104 and event database 102 and identify a set of events based on the one or more places in close proximity to the user's location data. For example, if the user frequently checks in a coffee shop near HP Pavilion in San Jose, CA, the place recommendation process can identify one or more future events (e.g., a tennis tournament, a concert) scheduled at HP Pavilion in San Jose, CA.

In particular embodiments, the place recommendation process may access location database 104 and advertisement content database 105 and create one or more actions for the user based on the one or more places in close proximity to the user's location data. For example, if the user frequently checks in at a particular place or in close proximity a geographic coordinates associated with the particular place, the place recommendation process can automatically check in the user to the particular place when the user is near the particular place, or recommend the user to check in at the place, or recommend the user to configure the place for future automatic check-in, as described in U.S. Patent Application No. 13/042,357, which is incorporated by reference herein for all purposes. For example, if the user is near a particular place (e.g., a Starbucks store), the place recommendation process can offer the user to check in to the particular coffee shop, offer the user to like the particular place's web page, offer the user to check in to another place near the particular place, or offer the user to like another place that is of the same category as the particular coffee shop (e.g., Peet's Coffee).

In particular embodiments, the place recommendation process may present one or more recommendations of the set of recommendations to the user based on the user's current location (204). For example, the place recommendation process can determine that the user is near a particular place based on a geographic location reported by the user's GPS-equipped mobile phone, and present to the user on the user's GPS-equipped mobile phone an offer for the user to check-in to a place. For example, the place recommendation process may determine that user is on a certain route stored in location database 104 based on GPS signals from the user's GPS-equipped mobile phone, the place recommendation process can select an advertisement with a place near the route, and present the advertisement to the user on the user's mobile phone. For example, when the user checks in to a coffee shop, the place

recommendation process can present an advertisement for a nearby bakery shop to the user's device. Additionally, the place recommendation process can present one or more recommendations to the user's device in conjunction with a notification signal, for example, buzzing and/or ringing on the user's mobile phone, or a pop-up notification in the user's device's display. In other embodiments, the place recommendation process may present the one or more recommendations to the user asynchronously. For example, when the user is near a coffee shop (as determined by the user's GPS-equipped mobile phone), the place recommendation process can present a coupon of the coffee shop to the user's mobile phone next time the user uses or unlocks his mobile phone. For example, if the user frequently checks in to a Starbucks store, the place recommendation process can present an advertisement from Starbucks (or Peet's Coffee) during the next time the user logs in to the social networking system from a desktop computer. For example, the place recommendation process can send an email to the user containing an advertisement of a restaurant near a stored route of the user. In particular embodiments, the user may configure whether the place recommendation process can present recommendations synchronously or asynchronously to the user and store the configuration in user profile database 101.

In particular embodiments, the place recommendation process may store one or more recommendations of the set of recommendations in a local storage of the user's client device 122. In particular embodiments, the place recommendation process may present the one or more recommendations stored in the local storage of the user's client device 122, to the user based on the user's current location. For example, the place recommendation process can store recommendations of automatic check-ins in a local storage (e.g., a microSD flash memory card, a embedded MultiMediaCard (eMMD) card, or a solid-state drive) in the user's GPS-equipped mobile phone. A client application process hosted on the GPS-equipped mobile phone can access GPS location data at the mobile phone, access the recommendations of automatic check-ins stored in the local storage of the mobile phone, and automatically check in the user to a particular location if the GPS location matches the particular location. In particular embodiments, the place recommendation process may periodically access one or more data stores and update the one or more recommendations stored in the local storage of the user's client device 122.

While the foregoing embodiments may be implemented in a variety of network configurations, the following illustrates an example network environment for didactic, and

not limiting, purposes. FIGURE 3 illustrates an example network environment 500. Network environment 500 includes a network 510 coupling one or more servers 520 and one or more clients 530 to each other. Network environment 500 also includes one or more data storage 540 linked to one or more servers 520. Particular embodiments may be implemented  
5 in network environment 500. For example, social networking system frontend 120 may be written in software programs hosted by one or more servers 520. For example, event database 102 may be stored in one or more storage 540. In particular embodiments, network 510 is an intranet, an extranet, a virtual private network (VPN), a local area network (LAN), a wireless LAN (WLAN), a wide area network (WAN), a metropolitan area network (MAN), a portion  
10 of the Internet, or another network 510 or a combination of two or more such networks 510. The present disclosure contemplates any suitable network 510.

One or more links 550 couple a server 520 or a client 530 to network 510. In particular embodiments, one or more links 550 each includes one or more wired, wireless, or optical links 550. In particular embodiments, one or more links 550 each includes an  
15 intranet, an extranet, a VPN, a LAN, a WLAN, a WAN, a MAN, a portion of the Internet, or another link 550 or a combination of two or more such links 550. The present disclosure contemplates any suitable links 550 coupling servers 520 and clients 530 to network 510.

In particular embodiments, each server 520 may be a unitary server or may be a distributed server spanning multiple computers or multiple datacenters. Servers 520 may be  
20 of various types, such as, for example and without limitation, web server, news server, mail server, message server, advertising server, file server, application server, exchange server, database server, or proxy server. In particular embodiments, each server 520 may include hardware, software, or embedded logic components or a combination of two or more such components for carrying out the appropriate functionalities implemented or supported by  
25 server 520. For example, a web server is generally capable of hosting websites containing web pages or particular elements of web pages. More specifically, a web server may host HTML files or other file types, or may dynamically create or constitute files upon a request, and communicate them to clients 530 in response to HTTP or other requests from clients 530. A mail server is generally capable of providing electronic mail services to various clients  
30 530. A database server is generally capable of providing an interface for managing data stored in one or more data stores.

In particular embodiments, one or more data storages 540 may be communicatively linked to one or more servers 520 via one or more links 550. In particular embodiments, data storages 540 may be used to store various types of information. In particular embodiments, the information stored in data storages 540 may be organized according to specific data structures. In particular embodiment, each data storage 540 may be a relational database. Particular embodiments may provide interfaces that enable servers 520 or clients 530 to manage, e.g., retrieve, modify, add, or delete, the information stored in data storage 540.

In particular embodiments, each client 530 may be an electronic device including hardware, software, or embedded logic components or a combination of two or more such components and capable of carrying out the appropriate functions implemented or supported by client 530. For example and without limitation, a client 530 may be a desktop computer system, a notebook computer system, a netbook computer system, a handheld electronic device, or a mobile telephone. The present disclosure contemplates any suitable clients 530. A client 530 may enable a network user at client 530 to access network 530. A client 530 may enable its user to communicate with other users at other clients 530.

A client 530 may have a web browser 532, such as MICROSOFT INTERNET EXPLORER, GOOGLE CHROME or MOZILLA FIREFOX, and may have one or more add-ons, plug-ins, or other extensions, such as TOOLBAR or YAHOO TOOLBAR. A user at client 530 may enter a Uniform Resource Locator (URL) or other address directing the web browser 532 to a server 520, and the web browser 532 may generate a Hyper Text Transfer Protocol (HTTP) request and communicate the HTTP request to server 520. Server 520 may accept the HTTP request and communicate to client 530 one or more Hyper Text Markup Language (HTML) files responsive to the HTTP request. Client 530 may render a web page based on the HTML files from server 520 for presentation to the user. The present disclosure contemplates any suitable web page files. As an example and not by way of limitation, web pages may render from HTML files, Extensible Hyper Text Markup Language (XHTML) files, or Extensible Markup Language (XML) files, according to particular needs. Such pages may also execute scripts such as, for example and without limitation, those written in JAVASCRIPT, JAVA, MICROSOFT SILVERLIGHT, combinations of markup language and scripts such as AJAX (Asynchronous JAVASCRIPT and XML), and the like. Herein, reference to a web page encompasses one or more

corresponding web page files (which a browser may use to render the web page) and vice versa, where appropriate.

FIGURE 4 illustrates an example computer system 600, which may be used with some embodiments of the present invention. This disclosure contemplates any suitable number of computer systems 600. This disclosure contemplates computer system 600 taking any suitable physical form. As example and not by way of limitation, computer system 600 may be an embedded computer system, a system-on-chip (SOC), a single-board computer system (SBC) (such as, for example, a computer-on-module (COM) or system-on-module (SOM)), a desktop computer system, a laptop or notebook computer system, an interactive kiosk, a mainframe, a mesh of computer systems, a mobile telephone, a personal digital assistant (PDA), a server, or a combination of two or more of these. Where appropriate, computer system 600 may include one or more computer systems 600; be unitary or distributed; span multiple locations; span multiple machines; or reside in a cloud, which may include one or more cloud components in one or more networks. Where appropriate, one or more computer systems 600 may perform without substantial spatial or temporal limitation one or more steps of one or more methods described or illustrated herein. As an example and not by way of limitation, one or more computer systems 600 may perform in real time or in batch mode one or more steps of one or more methods described or illustrated herein. One or more computer systems 600 may perform at different times or at different locations one or more steps of one or more methods described or illustrated herein, where appropriate.

In particular embodiments, computer system 600 includes a processor 602, memory 604, storage 606, an input/output (I/O) interface 608, a communication interface 610, and a bus 612. Although this disclosure describes and illustrates a particular computer system having a particular number of particular components in a particular arrangement, this disclosure contemplates any suitable computer system having any suitable number of any suitable components in any suitable arrangement.

In particular embodiments, processor 602 includes hardware for executing instructions, such as those making up a computer program. As an example and not by way of limitation, to execute instructions, processor 602 may retrieve (or fetch) the instructions from an internal register, an internal cache, memory 604, or storage 606; decode and execute them; and then write one or more results to an internal register, an internal cache, memory 604, or storage 606. In particular embodiments, processor 602 may include one or more internal



caches for data, instructions, or addresses. The present disclosure contemplates processor 602 including any suitable number of any suitable internal caches, where appropriate. As an example and not by way of limitation, processor 602 may include one or more instruction caches, one or more data caches, and one or more translation look-aside buffers (TLBs).

5 Instructions in the instruction caches may be copies of instructions in memory 604 or storage 606, and the instruction caches may speed up retrieval of those instructions by processor 602. Data in the data caches may be copies of data in memory 604 or storage 606 for instructions executing at processor 602 to operate on; the results of previous instructions executed at processor 602 for access by subsequent instructions executing at processor 602 or for writing  
10 to memory 604 or storage 606; or other suitable data. The data caches may speed up read or write operations by processor 602. The TLBs may speed up virtual-address translation for processor 602. In particular embodiments, processor 602 may include one or more internal registers for data, instructions, or addresses. The present disclosure contemplates processor 602 including any suitable number of any suitable internal registers, where appropriate.  
15 Where appropriate, processor 602 may include one or more arithmetic logic units (ALUs); be a multi-core processor; or include one or more processors 602. Although this disclosure describes and illustrates a particular processor, this disclosure contemplates any suitable processor.

In particular embodiments, memory 604 includes main memory for storing  
20 instructions for processor 602 to execute or data for processor 602 to operate on. As an example and not by way of limitation, computer system 600 may load instructions from storage 606 or another source (such as, for example, another computer system 600) to memory 604. Processor 602 may then load the instructions from memory 604 to an internal register or internal cache. To execute the instructions, processor 602 may retrieve the  
25 instructions from the internal register or internal cache and decode them. During or after execution of the instructions, processor 602 may write one or more results (which may be intermediate or final results) to the internal register or internal cache. Processor 602 may then write one or more of those results to memory 604. In particular embodiments, processor 602 executes only instructions in one or more internal registers or internal caches or in  
30 memory 604 (as opposed to storage 606 or elsewhere) and operates only on data in one or more internal registers or internal caches or in memory 604 (as opposed to storage 606 or elsewhere). One or more memory buses (which may each include an address bus and a data

bus) may couple processor 602 to memory 604. Bus 612 may include one or more memory buses, as described below. In particular embodiments, one or more memory management units (MMUs) reside between processor 602 and memory 604 and facilitate accesses to memory 604 requested by processor 602. In particular embodiments, memory 604 includes  
5 random access memory (RAM). This RAM may be volatile memory, where appropriate. Where appropriate, this RAM may be dynamic RAM (DRAM) or static RAM (SRAM). Moreover, where appropriate, this RAM may be single-ported or multi-ported RAM. The present disclosure contemplates any suitable RAM. Memory 604 may include one or more memories 602, where appropriate. Although this disclosure describes and illustrates  
10 particular memory, this disclosure contemplates any suitable memory.

In particular embodiments, storage 606 includes mass storage for data or instructions. As an example and not by way of limitation, storage 606 may include an HDD, a floppy disk drive, flash memory, an optical disc, a magneto-optical disc, magnetic tape, or a Universal Serial Bus (USB) drive or a combination of two or more of these. Storage 606 may  
15 include removable or non-removable (or fixed) media, where appropriate. Storage 606 may be internal or external to computer system 600, where appropriate. In particular embodiments, storage 606 is non-volatile, solid-state memory. In particular embodiments, storage 606 includes read-only memory (ROM). Where appropriate, this ROM may be mask-programmed ROM, programmable ROM (PROM), erasable PROM (EPROM),  
20 electrically erasable PROM (EEPROM), electrically alterable ROM (EAROM), or flash memory or a combination of two or more of these. This disclosure contemplates mass storage 606 taking any suitable physical form. Storage 606 may include one or more storage control units facilitating communication between processor 602 and storage 606, where appropriate. Where appropriate, storage 606 may include one or more storages 606.  
25 Although this disclosure describes and illustrates particular storage, this disclosure contemplates any suitable storage.

In particular embodiments, I/O interface 608 includes hardware, software, or both providing one or more interfaces for communication between computer system 600 and one or more I/O devices. Computer system 600 may include one or more of these I/O devices,  
30 where appropriate. One or more of these I/O devices may enable communication between a person and computer system 600. As an example and not by way of limitation, an I/O device may include a keyboard, keypad, microphone, monitor, mouse, printer, scanner, speaker, still

camera, stylus, tablet, touch screen, trackball, video camera, another suitable I/O device or a combination of two or more of these. An I/O device may include one or more sensors. This disclosure contemplates any suitable I/O devices and any suitable I/O interfaces 608 for them. Where appropriate, I/O interface 608 may include one or more device or software drivers  
5 enabling processor 602 to drive one or more of these I/O devices. I/O interface 608 may include one or more I/O interfaces 608, where appropriate. Although this disclosure describes and illustrates a particular I/O interface, this disclosure contemplates any suitable I/O interface.

In particular embodiments, communication interface 610 includes hardware,  
10 software, or both providing one or more interfaces for communication (such as, for example, packet-based communication) between computer system 600 and one or more other computer systems 600 or one or more networks. As an example and not by way of limitation, communication interface 610 may include a network interface controller (NIC) or network adapter for communicating with an Ethernet or other wire-based network or a wireless NIC  
15 (WNIC) or wireless adapter for communicating with a wireless network, such as a WI-FI network. This disclosure contemplates any suitable network and any suitable communication interface 610 for it. As an example and not by way of limitation, computer system 600 may communicate with an ad hoc network, a personal area network (PAN), a local area network (LAN), a wide area network (WAN), a metropolitan area network (MAN), or one or more  
20 portions of the Internet or a combination of two or more of these. One or more portions of one or more of these networks may be wired or wireless. As an example, computer system 600 may communicate with a wireless PAN (WPAN) (such as, for example, a BLUETOOTH WPAN), a WI-FI network (such as, for example, a 802.11a/b/g/n WI-FI network, a 802.11s mesh network), a WI-MAX network, a cellular telephone network (such as, for example, a  
25 Global System for Mobile Communications (GSM) network, an Enhanced Data Rates for GSM Evolution (EDGE) network, a Universal Mobile Telecommunications System (UMTS) network, a Long Term Evolution (LTE) network), or other suitable wireless network or a combination of two or more of these. Computer system 600 may include any suitable communication interface 610 for any of these networks, where appropriate. Communication  
30 interface 610 may include one or more communication interfaces 610, where appropriate. Although this disclosure describes and illustrates a particular communication interface, this disclosure contemplates any suitable communication interface.

In particular embodiments, bus 612 includes hardware, software, or both coupling components of computer system 600 to each other. As an example and not by way of limitation, bus 612 may include an Accelerated Graphics Port (AGP) or other graphics bus, an Enhanced Industry Standard Architecture (EISA) bus, a front-side bus (FSB), a  
5 HYPERTRANSPORT (HT) interconnect, an Industry Standard Architecture (ISA) bus, an INFINIBAND interconnect, a low-pin-count (LPC) bus, a memory bus, a Micro Channel Architecture (MCA) bus, a Peripheral Component Interconnect (PCI) bus, a PCI-Express (PCI-X) bus, a serial advanced technology attachment (SATA) bus, a Video Electronics Standards Association local (VLB) bus, a Universal Asynchronous Receiver/Transmitter  
10 (UART) interface, a Inter-Integrated Circuit (I<sup>2</sup>C) bus, a Serial Peripheral Interface (SPI) bus, a Secure Digital (SD) memory interface, a MultiMediaCard (MMC) memory interface, a Memory Stick (MS) memory interface, a Secure Digital Input Output (SDIO) interface, a Multi-channel Buffered Serial Port (McBSP) bus, a Universal Serial Bus (USB) bus, a General Purpose Memory Controller (GPMC) bus, a SDRAM Controller (SDRC) bus, a  
15 General Purpose Input/Output (GPIO) bus, a Separate Video (S-Video) bus, a Display Serial Interface (DSI) bus, a Advanced Microcontroller Bus Architecture (AMBA) bus, or another suitable bus or a combination of two or more of these. Bus 612 may include one or more buses 612, where appropriate. Although this disclosure describes and illustrates a particular bus, this disclosure contemplates any suitable bus or interconnect.

20 The client-side functionality described above can be implemented as a series of instructions stored on a computer-readable storage medium that, when executed, cause a programmable processor to implement the operations described above. While the client device 122 may be implemented in a variety of different hardware and computing systems, FIGURE 5 shows a schematic representation of the main components of an example  
25 computing platform of a client or mobile device, according to various particular embodiments. In particular embodiments, computing platform 702 may comprise controller 704, memory 706, and input output subsystem 710. In particular embodiments, controller 704 which may comprise one or more processors and/or one or more microcontrollers configured to execute instructions and to carry out operations associated with a computing platform. In  
30 various embodiments, controller 704 may be implemented as a single-chip, multiple chips and/or other electrical components including one or more integrated circuits and printed circuit boards. Controller 704 may optionally contain a cache memory unit for temporary

local storage of instructions, data, or computer addresses. By way of example, using instructions retrieved from memory, controller 704 may control the reception and manipulation of input and output data between components of computing platform 702. By way of example, controller 704 may include one or more processors or one or more  
5 controllers dedicated for certain processing tasks of computing platform 702, for example, for 2D/3D graphics processing, image processing, or video processing.

Controller 704 together with a suitable operating system may operate to execute instructions in the form of computer code and produce and use data. By way of example and not by way of limitation, the operating system may be Windows-based, Mac-based, or Unix  
10 or Linux-based, or Symbian-based, among other suitable operating systems. The operating system, other computer code and/or data may be physically stored within memory 706 that is operatively coupled to controller 704.

Memory 706 may encompass one or more storage media and generally provide a place to store computer code (e.g., software and/or firmware) and data that are used by  
15 computing platform 702. By way of example, memory 706 may include various tangible computer-readable storage media including Read-Only Memory (ROM) and/or Random-Access Memory (RAM). As is well known in the art, ROM acts to transfer data and instructions uni-directionally to controller 704, and RAM is used typically to transfer data and instructions in a bi-directional manner. Memory 706 may also include one or more fixed  
20 storage devices in the form of, by way of example, hard disk drives (HDDs), solid-state drives (SSDs), flash-memory cards (e.g., Secured Digital or SD cards, embedded MultiMediaCard or eMMD cards), among other suitable forms of memory coupled bi-directionally to controller 704. Information may also reside on one or more removable storage media loaded into or installed in computing platform 702 when needed. By way of  
25 example, any of a number of suitable memory cards (e.g., SD cards) may be loaded into computing platform 702 on a temporary or permanent basis.

Input output subsystem 710 may comprise one or more input and output devices operably connected to controller 704. For example, input output subsystem may include keyboard, mouse, one or more buttons, thumb wheel, and/or, display (e.g., liquid crystal  
30 display (LCD), light emitting diode (LED), Interferometric modulator display (IMOD), or any other suitable display technology). Generally, input devices are configured to transfer data, commands and responses from the outside world into computing platform 702. The

display is generally configured to display a graphical user interface (GUI) that provides an easy to use visual interface between a user of the computing platform 702 and the operating system or application(s) running on the mobile device. Generally, the GUI presents programs, files and operational options with graphical images. During operation, the user  
5 may select and activate various graphical images displayed on the display in order to initiate functions and tasks associated therewith. Input output subsystem 710 may also include touch based devices such as touch pad and touch screen. A touchpad is an input device including a surface that detects touch-based inputs of users. Similarly, a touch screen is a display that detects the presence and location of user touch inputs. Input output system 710 may also  
10 include dual touch or multi-touch displays or touch pads that can identify the presence, location and movement of more than one touch inputs, such as two or three finger touches.

In particular embodiments, computing platform 702 may additionally comprise audio subsystem 712, camera subsystem 712, wireless communication subsystem 716, sensor subsystems 718, and/or wired communication subsystem 720, operably connected to  
15 controller 704 to facilitate various functions of computing platform 702. For example, Audio subsystem 712, including a speaker, a microphone, and a codec module configured to process audio signals, can be utilized to facilitate voice-enabled functions, such as voice recognition, voice replication, digital recording, and telephony functions. For example, camera subsystem 712, including an optical sensor (e.g., a charged coupled device (CCD), or a complementary  
20 metal-oxide semiconductor (CMOS) image sensor), can be utilized to facilitate camera functions, such as recording photographs and video clips. For example, wired communication subsystem 720 can include a Universal Serial Bus (USB) port for file transferring, or a Ethernet port for connection to a local area network (LAN). Additionally, computing platform 702 may be powered by power source 732.

25 Wireless communication subsystem 716 can be designed to operate over one or more wireless networks, for example, a wireless PAN (WPAN) (such as, for example, a BLUETOOTH WPAN, an infrared PAN), a WI-FI network (such as, for example, an 802.11a/b/g/n WI-FI network, an 802.11s mesh network), a WI-MAX network, a cellular telephone network (such as, for example, a Global System for Mobile Communications  
30 (GSM) network, an Enhanced Data Rates for GSM Evolution (EDGE) network, a Universal Mobile Telecommunications System (UMTS) network, and/or a Long Term Evolution (LTE) network). Additionally, wireless communication subsystem 716 may include hosting

protocols such that computing platform 702 may be configured as a base station for other wireless devices.

Sensor subsystem 718 may include one or more sensor devices to provide additional input and facilitate multiple functionalities of computing platform 702. For example, sensor subsystems 718 may include GPS sensor for location positioning, altimeter for altitude positioning, motion sensor for determining orientation of a mobile device, light sensor for photographing function with camera subsystem 714, temperature sensor for measuring ambient temperature, and/or biometric sensor for security application (e.g., fingerprint reader).

In particular embodiments, various components of computing platform 702 may be operably connected together by one or more buses (including hardware and/or software). As an example and not by way of limitation, the one or more buses may include an Accelerated Graphics Port (AGP) or other graphics bus, an Enhanced Industry Standard Architecture (EISA) bus, a front-side bus (FSB), a HYPERTRANSPORT (HT) interconnect, an Industry Standard Architecture (ISA) bus, an INFINIBAND interconnect, a low-pin-count (LPC) bus, a memory bus, a Micro Channel Architecture (MCA) bus, a Peripheral Component Interconnect (PCI) bus, a PCI-Express (PCI-X) bus, a serial advanced technology attachment (SATA) bus, a Video Electronics Standards Association local (VLB) bus, a Universal Asynchronous Receiver/Transmitter (UART) interface, a Inter-Integrated Circuit (I<sup>2</sup>C) bus, a Serial Peripheral Interface (SPI) bus, a Secure Digital (SD) memory interface, a MultiMediaCard (MMC) memory interface, a Memory Stick (MS) memory interface, a Secure Digital Input Output (SDIO) interface, a Multi-channel Buffered Serial Port (McBSP) bus, a Universal Serial Bus (USB) bus, a General Purpose Memory Controller (GPMC) bus, a SDRAM Controller (SDRC) bus, a General Purpose Input/Output (GPIO) bus, a Separate Video (S-Video) bus, a Display Serial Interface (DSI) bus, an Advanced Microcontroller Bus Architecture (AMBA) bus, or another suitable bus or a combination of two or more of these.

Herein, reference to a computer-readable storage medium encompasses one or more non-transitory, tangible computer-readable storage media possessing structure. As an example and not by way of limitation, a computer-readable storage medium may include a semiconductor-based or other integrated circuit (IC) (such, as for example, a field-programmable gate array (FPGA) or an application-specific IC (ASIC)), a hard disk, an HDD, a hybrid hard drive (HHD), an optical disc, an optical disc drive (ODD), a magneto-

optical disc, a magneto-optical drive, a floppy disk, a floppy disk drive (FDD), magnetic tape, a holographic storage medium, a solid-state drive (SSD), a RAM-drive, a SECURE DIGITAL card, a SECURE DIGITAL drive, a MultiMediaCard (MMC) card, an embedded MMC (eMMC) card, or another suitable computer-readable storage medium or a combination  
5 of two or more of these, where appropriate. Herein, reference to a computer-readable storage medium excludes any medium that is not eligible for patent protection under 35 U.S.C. § 101. Herein, reference to a computer-readable storage medium excludes transitory forms of signal transmission (such as a propagating electrical or electromagnetic signal per se) to the extent that they are not eligible for patent protection under 35 U.S.C. § 101.

10 This disclosure contemplates one or more computer-readable storage media implementing any suitable storage. In particular embodiments, a computer-readable storage medium implements one or more portions of processor 602 (such as, for example, one or more internal registers or caches), one or more portions of memory 604, one or more portions of storage 606, or a combination of these, where appropriate. In particular embodiments, a  
15 computer-readable storage medium implements RAM or ROM. In particular embodiments, a computer-readable storage medium implements volatile or persistent memory. In particular embodiments, one or more computer-readable storage media embody software. Herein, reference to software may encompass one or more applications, bytecode, one or more computer programs, one or more executables, one or more instructions, logic, machine code,  
20 one or more scripts, or source code, and vice versa, where appropriate. In particular embodiments, software includes one or more application programming interfaces (APIs). This disclosure contemplates any suitable software written or otherwise expressed in any suitable programming language or combination of programming languages. In particular embodiments, software is expressed as source code or object code. In particular  
25 embodiments, software is expressed in a higher-level programming language, such as, for example, C, Perl, JavaScript, or a suitable extension thereof. In particular embodiments, software is expressed in a lower-level programming language, such as assembly language (or machine code). In particular embodiments, software is expressed in JAVA. In particular embodiments, software is expressed in Hyper Text Markup Language (HTML), Extensible  
30 Markup Language (XML), or other suitable markup language.

The present disclosure encompasses all changes, substitutions, variations, alterations, and modifications to the example embodiments herein that a person having



ordinary skill in the art would comprehend. Similarly, where appropriate, the appended claims encompass all changes, substitutions, variations, alterations, and modifications to the example embodiments herein that a person having ordinary skill in the art would comprehend.

CLAIMS

What is claimed is:

1. A method, comprising  
accessing, at a computer system, a data store for location data of a first user;  
5 accessing one or more data stores for one or more places in proximity to the  
first user's location data;  
generating a set of recommendations based on the one or more places in  
proximity to the first user's location data; and  
presenting one or more recommendations of the set of recommendations to the  
10 first user.

2. The method of Claim 1 wherein a recommendation of the set of  
recommendations is an advertisement.

15 3. The method of Claim 1 wherein a recommendation of the set of  
recommendations is a recommended action for the first user.

4. The method of Claim 3 wherein the recommended action for the first user is a  
place check-in.  
20

5. The method of Claim 4 wherein the recommending action is enabling an  
automatic check-in to a place identified in a geo-social networking system.

25 6. The method of Claim 1 wherein the presenting one or more recommendations  
of the set of recommendations to the first user further comprises:

receiving from a remote client device, at the computer system, a current  
location of the first user;

selecting one or more recommendations of the set of recommendations based  
on the current location of the first user; and

30 transmitting the selected one or more recommendations to the remote client  
device, causing the remote client device to present the selected one or more  
recommendations to the first user.

7. The method of Claim 1 wherein the location data of the first user comprises route information.

5 8. A system, comprising:

a memory;

one or more processors; and

a non-transitory, storage medium storing computer-readable instructions operative, when executed, to cause the one or more processors to:

10 access a data store for location data of a first user;

access one or more data stores for one or more places in proximity to the first user's location data;

generate a set of recommendations based on the one or more places in proximity to the first user's location data; and

15 present one or more recommendations of the set of recommendations to the first user.

9. The system of Claim 8 wherein a recommendation of the set of recommendations is an advertisement.

20 10. The system of Claim 8 wherein a recommendation of the set of recommendations is a recommended action for the first user.

25 11. The system of Claim 10 wherein the recommended action for the first user is a place check-in.

12. The system of Claim 11 wherein the recommending action is enabling an automatic check-in to a place identified in a geo-social networking system.

30 13. The system of Claim 8, wherein to present one or more recommendations of the set of recommendations to the first user, further comprising instructions operable to cause the one or more processors to:

receive from a remote client device a current location of the first user;

select one or more recommendations of the set of recommendations based on the current location of the first user; and

transmit the selected one or more recommendations to the remote client device, causing the remote client device to present the selected one or more recommendations to the first user.

14. The system of Claim 8 wherein the location data of the first user comprises route information.

1/5

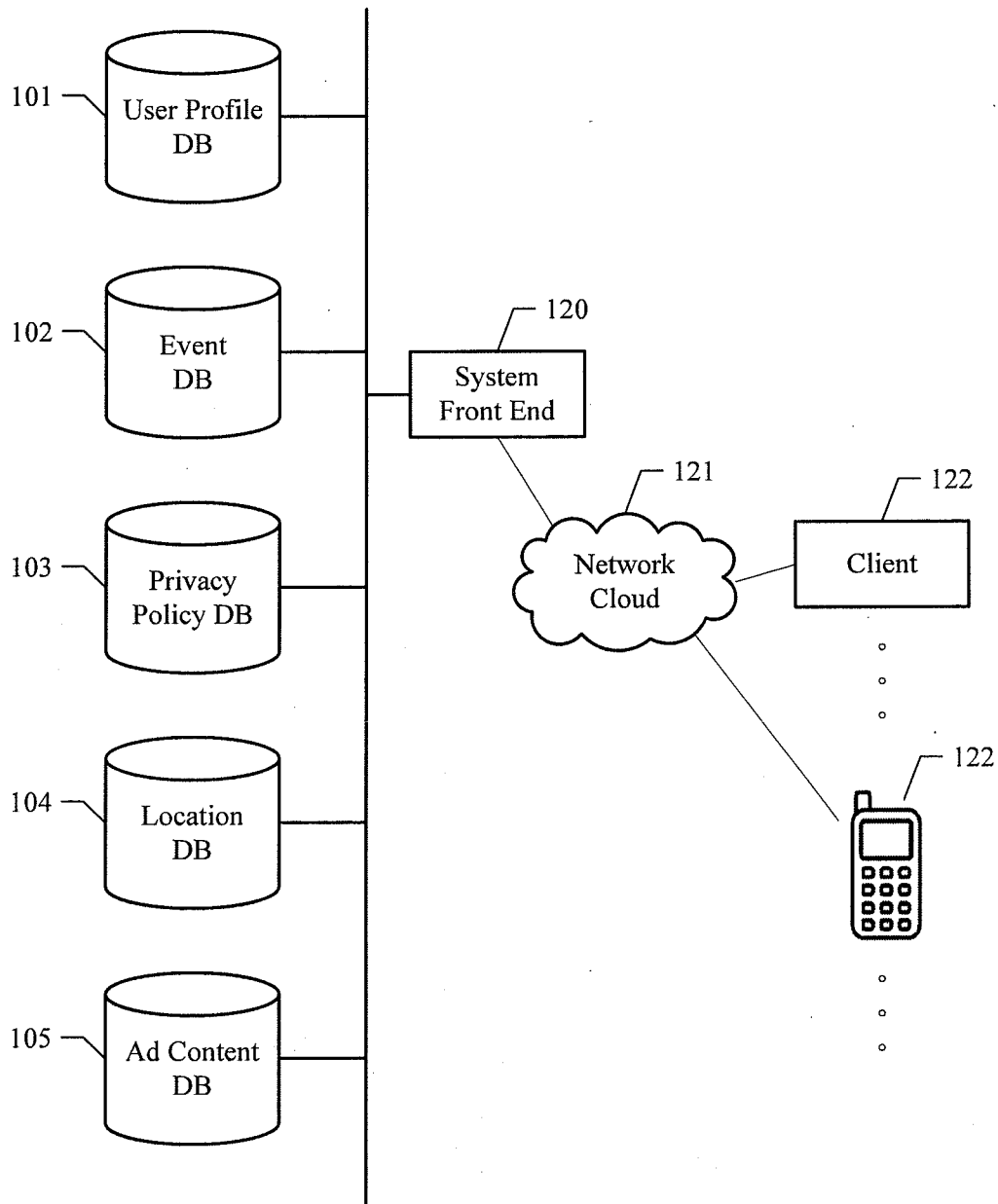


FIGURE 1

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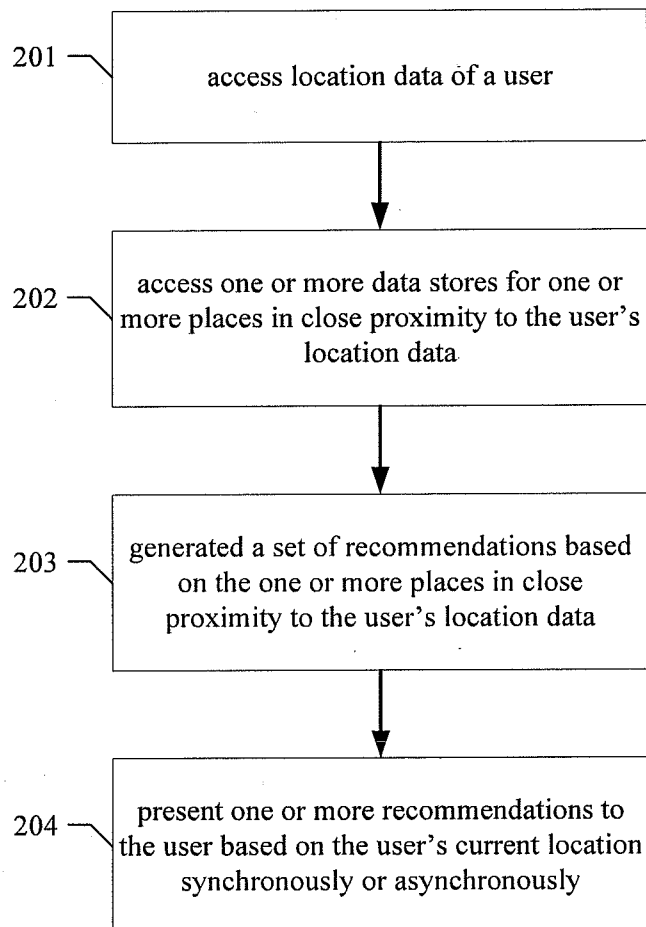


FIGURE 2

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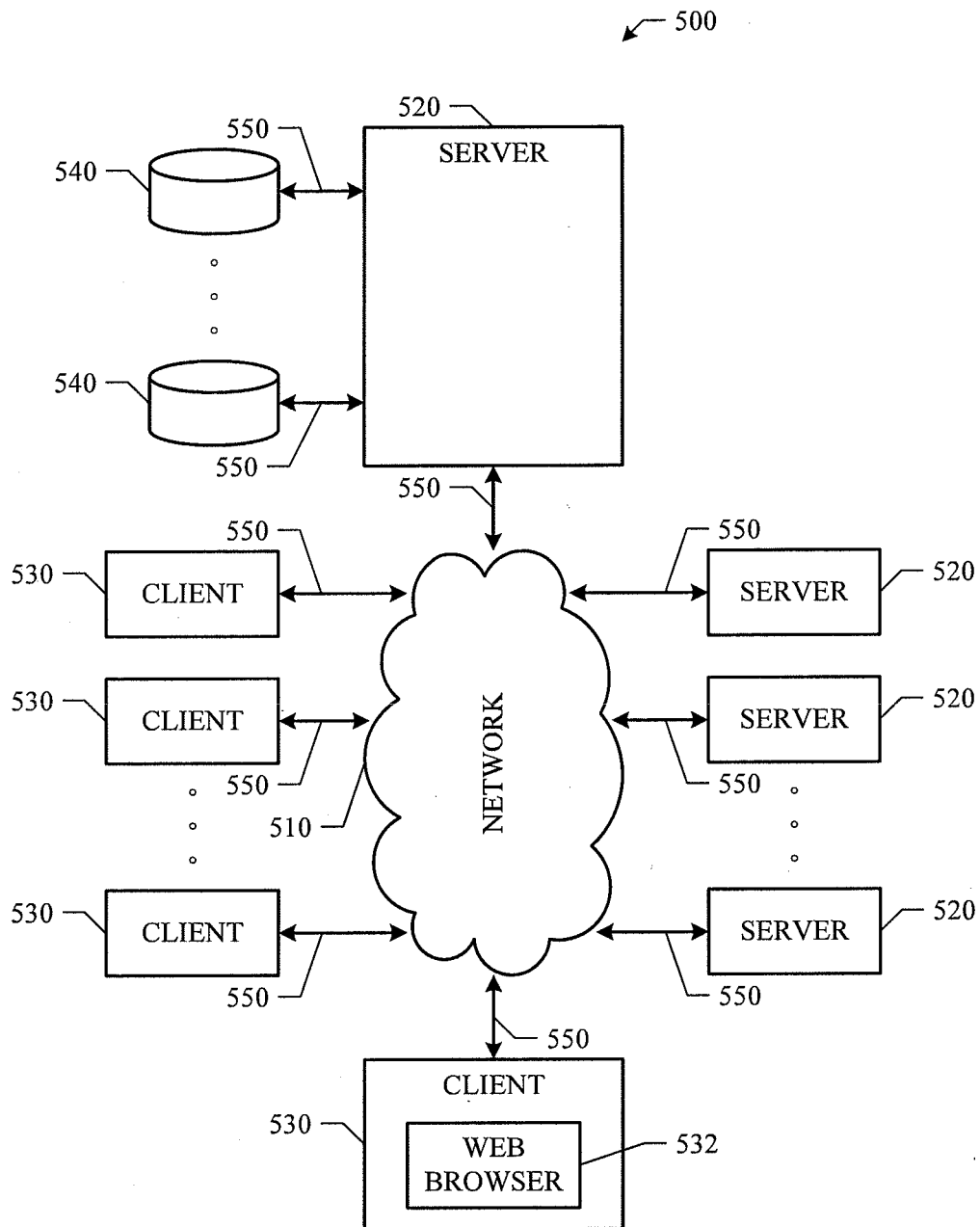


FIGURE 3

4/5

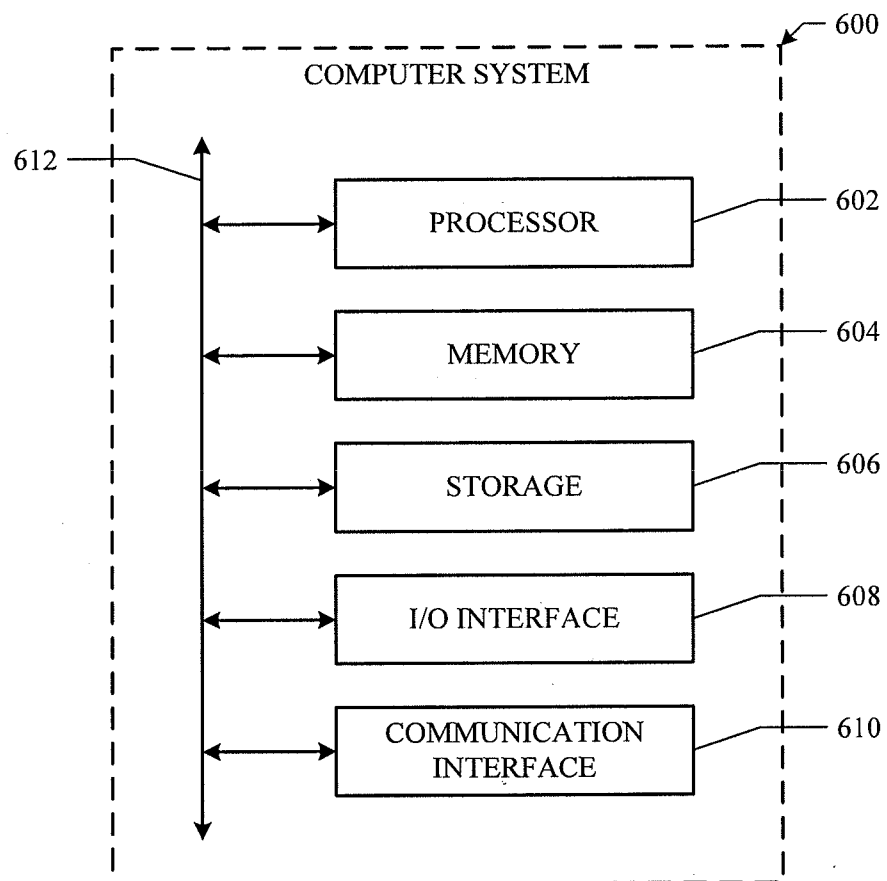


FIGURE 4



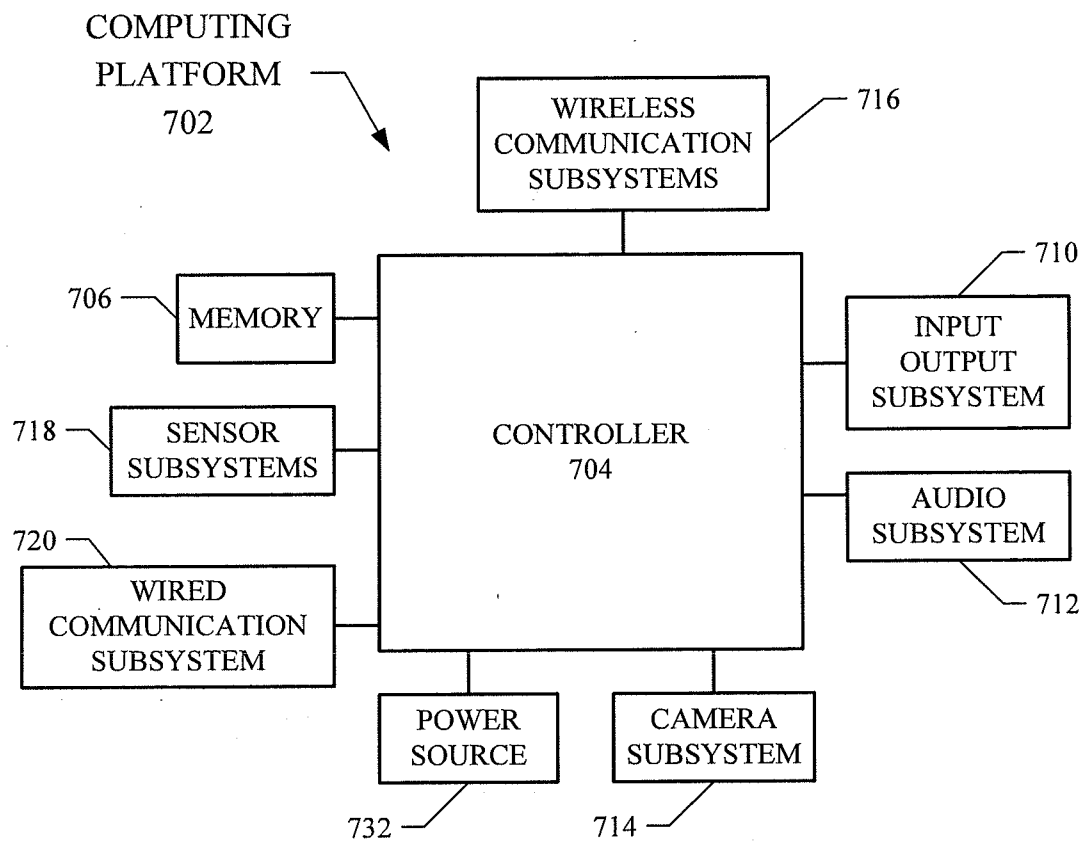


FIGURE 5