

Method, electronic device, and storage medium to establish social network connections

Field of Technology

- 5 This application relates to the field of computer communication technology, in particular to a method, electronic device, and storage medium to establish social network connections.

Background Art

10 In some venues, such as shopping malls, cafes, gyms, bars, restaurants, sports venues, or co-working space, it could be necessary to have social interactions with strangers in the same venue. Therefore, it is necessary to locate the hand-held terminals of users. However, the current satellite navigation and positioning of hand-held terminals are not accurate enough. Especially, location error turns bigger indoors. Hence, a precise method to locate users in the same venue is required.

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Summary of the Invention

The embodiment of this application provides a method, electronic device, and storage medium to establish social network connections that can solve at least a part of the problems described above.

- 20 In the first aspect, the embodiment of this application provides a method to establish social network connections, which includes the following:

A verification request is received from the first terminal. The described verification request includes the current location information of the described first terminal and the identifying information of the first venue; the described verification request is sent by the described first terminal, based on the first identifier. The described first identifier includes the described identifying information of the described first venue;

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In response to the described verification request, the second location information of the described first venue is required based on the described identifying information. If the distance between the described first terminal and the location in the described second location information is determined to be shorter than the first preset distance based on the described current location information and the described second location information, the personal information of the first user in the described first terminal is acquired, and the said first user is

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logged in the virtual first venue corresponding to the described identifying information;

The personal information of one or multiple second users is sent to the described first terminal; the described second user is a user who has logged in the described virtual first venue other than the described first user;

- 5 In response to the selection request sent by the described first terminal, the target terminal is confirmed; the described selection request includes the selection results of the personal information of the described one or multiple second users;

A communication connection between the described first terminal and the described target terminal is established.

- 10 It is understandable that, the embodiment of this application provides a method to establish social network connections. In the first aspect, by generating and displaying an identifier corresponding to the identifying information of the first venue to the first terminal to confirm its specific location, this method can accurately locate the first terminal in a specific building or venue and avoid a wrong positioning result due to an error of satellite navigation and
15 positioning, so that it is convenient for the user to perform social activities with other users in the same venue; on the other hand, the current location information of the first terminal and the second location information of the first venue are utilized to determine whether the distance between the described first terminal and the location in the described second location information is shorter than the first preset distance in order to avoid others from taking a photo of
20 the above-mentioned identifier maliciously and logging in remotely to participate in social activities of the first venue and commit fraud, which enhances the security of social network connections.

- In the second aspect, the embodiment of this application provides a method to establish social network connections that applies to the first terminal. The described method includes the
25 following:

The first identifier containing the identifying information of the first venue is identified;

- A verification request is sent to the server based on the identifying result of the described first identifier; the described verification request includes the current location information of the first terminal and the described identifying information; the described terminal verification request is
30 used to instruct the described server to acquire the second location information of the described first venue, based on the described identifying information; if the distance between the described first terminal and the location in the described second location information is determined to be shorter than the first preset distance based on the described current location information and the

described second location information, the personal information of the first user in the described first terminal is acquired, and the said first user is logged in the virtual first venue corresponding to the described identifying information;

5 In response to the server, the personal information of one or multiple second users is sent; a selection request is sent to the described server. The described second user is a user who has logged in the described virtual first venue other than the described first user; the described selection request includes the selection results of the personal information of the described one or multiple second users and is used to instruct the described server to confirm the target terminal in response to the described selection request and establish a communication connection
10 between the described first terminal and the described target terminal.

In the third aspect, the embodiment of this application provides an installation to establish social network connections, which includes:

A reception module used to receive a verification request from the first terminal. The described verification request includes the current location information of the described first terminal and
15 the identifying information of the first venue; the described verification request is sent by the described first terminal, based on the first identifier. The described first identifier includes the described identifying information of the described first venue;

A verification module used to acquire the second location information of the described first venue based on the described identifying information, in response to the described verification request. If the distance between the described first terminal and the location in the described
20 second location information is determined to be shorter than the first preset distance based on the described current location information and the described second location information, the personal information of the first user in the described first terminal is acquired, and the said first user is logged in the virtual first venue corresponding to the described identifying information;

25 An information delivery module used to send the personal information of one or multiple second users to the described first terminal; the described second user is a user who has logged in the described virtual first venue other than the described first user;

A terminal confirmation module used to confirm the target terminal in response to the selection request sent by the described first terminal; the described selection request includes the selection
30 results of the personal information of the described one or multiple second users;

A connection establishment module used to establish a communication connection between the described first terminal and the described target terminal.

In the fourth aspect, the embodiment of this application provides an installation to establish

social network connections, which includes:

An identifying module used to identify the first identifier containing the identifying information of the first venue;

5 A verification request delivery module used to send a verification request to the server based on the identifying result of the described first identifier; the described verification request includes the current location information of the first terminal and the described identifying information; the described terminal verification request is used to instruct the described server to acquire the second location information of the described first venue, based on the described identifying information; if the distance between the described first terminal and the location in the described
10 second location information is determined to be shorter than the first pre-set distance based on the described current location information and the described second location information, the personal information of the first user in the described first terminal is acquired, and the said first user is logged in the virtual first venue corresponding to the described identifying information;

A selection module used to send the personal information of one or multiple second users in
15 response to the server; and a selection request is sent to the server. The described second user is a user who has logged in the described virtual first venue other than the described first user; the described selection request includes the selection results of the personal information of the described one or multiple second users and is used to instruct the described server to confirm the target terminal and establish a communication connection between the described first terminal
20 and the described target terminal.

In the fifth aspect, the embodiment of this application provides an electronic device, which includes:

A memory, a processor, and a computer program stored in the described memory and executed on the described processor. When the described processor executes the described computer
25 program, the steps of the method described in the first aspect are implemented.

In the sixth aspect, the embodiment of this application provides a computer-readable storage medium, which includes the following: The described computer-readable storage medium stores a computer program. When the described computer program is executed by the processor, the steps of the method described in the first aspect are implemented.

30 In the seventh aspect, the embodiment of this application provides a computer program product. When the computer program product is executed on the electronic device, the electronic device is enabled to implement the steps of the method described in the first aspect.

It is understandable that, the beneficial effects of the above-mentioned second to seventh aspects

may be seen in the relevant description in the above-mentioned first aspect, and will not be elaborated here.

Description of Drawings

- 5 In order to explain the technical solution in the embodiment of this application more clearly, drawings used in the description of embodiments or the prior art will be briefly introduced in the following paragraphs. Apparently, the drawings described below are only some embodiments of this application. Ordinary technicians in this field can obtain other drawings based on these drawings without creative work.
- 10 FIG. 1 is the diagram of application scenarios of an embodiment of this application;
FIG. 2 is the system diagram of an embodiment of this application;
FIG. 3 is the flowchart of the method to establish social network connections of an embodiment of this application;
FIG. 4 is the flowchart of information interaction of the method to establish social network
15 connections of an embodiment of this application;
FIG. 5 is the flowchart of the method to establish social network connections of another embodiment of this application;
FIG. 6 is the flowchart of the method to establish social network connections of another embodiment of this application;
20 FIG. 7 is the diagram of the installation to establish social network connections of an embodiment of this application;
FIG. 8 is the flowchart of the method to establish social network connections of another embodiment of this application;
FIG. 9 is the diagram of the installation to establish social network connections of another
25 embodiment of this application;
FIG. 10 is the structural diagram of the electronic device of an embodiment of this application.

Specific Embodiments

- 30 The description below contains details like specific system structures and technologies for the sake of explanation rather than restriction in order to facilitate a thorough understanding of the

embodiments of this application. Nevertheless, technicians in this field should understand that this application may also be implemented in other embodiments without these details. In other cases, a detailed description of the systems, installations, circuits, and methods known to all is omitted to prevent unnecessary detail from affecting the Description of this application.

- 5 It should be understood that, the term "include", used in the Description and Claims of this application, indicates the existence of the characteristics, wholes, steps, operation, elements and/or components described, but does not exclude the existence or addition of one or multiple other characteristics, wholes, steps, operation, elements, components, and/or their collections.

Moreover, it should be understood that, the term "and/or", used in the Description and Claims of
10 this application, refers to any one or multiple combinations listed in related items and all possible combinations, and includes these combinations.

The term "if", used in the Description and Claims of this application, can be interpreted as "when", "once", "in response to the confirmation", or "in response to the detection" based on the context. Similarly, the phrase "if... is confirmed" or "if [the described condition or event] is
15 detected" can be interpreted as "once... is confirmed", "in response to the confirmation", "once [the described condition or event] is detected", or "in response to [the described condition or event] that is detected", based on the context.

In addition, the terms, "the first", "the second", and "the third", used in the Description and Claims of this application, are only used to differentiate items rather than indicate or imply the
20 relative importance.

"One embodiment" or "some embodiments" in the Description of this application mean that one or multiple embodiments of this application include the specific characteristics, structure, or features described in the embodiment(s). Therefore, the phrases, "in one embodiment", "in some
25 embodiments", "in some other embodiments", and "in other embodiments", in the Description do not necessarily refer to the same embodiment(s). Instead, such phrases mean "one or multiple rather than all embodiments", unless otherwise specified. The terms, "include", "contain", "have", and variations thereof mean "include but is not limited to", unless specifically emphasized otherwise.

In some venues, such as shopping malls, cafes, gyms, bars, restaurants, sports venues, or co-
30 working space, it could be necessary to have social interactions with strangers. In order to avoid the embarrassment of a face-to-face encounter, it would be better to interact online in a virtual venue corresponding to the above-mentioned physical venues first and then exchange offline. Hence, we need to ensure that users online are in the same physical venue and locate their hand-

held terminals. However, the current satellite navigation and positioning of hand-held terminals are not accurate enough. Especially, location error turns bigger indoors. Hence, a precise method to locate users in the same venue is required.

Take the scenario in FIG. 1 for example. A building 101 of the first venue and a building 102 of the second venue are too close for satellite positioning to distinguish whether a user is in the building 101 or 102. If an exchange activity is held in the building 101 of the first venue, users in the building 102 in the second venue might be mistakenly classified as a user in the building 101 of the first venue due to an error of satellite positioning, so they might participate in the activity and lead to misunderstanding.

Therefore, the embodiment of this application generates an identifier, such as a QR code, corresponding to the identifying information of the target venue, such as a business name, to help users accurately locate the target venue. As shown in FIG. 1, QR codes corresponding to the identifying information of the building 101 of the first venue and building 102 of the second venue are generated. Users can use the mobile application (APP) provided by the embodiment of this application to scan the QR code to locate themselves to the building corresponding to the QR code in the server provided by the embodiment of this application, and log in the virtual venue in the server corresponding to the physical venue one to one.

However, users may take a photo of identifiers for positioning, such as a QR code, and remotely scan the QR code in a venue far away from the building corresponding to the QR code so as to cheat the server provided by the embodiment of this application. Consequently, the server would wrongly judge that the user is in the target venue and provide the user with services including but not limited to authentication or communication. The embodiment of this application calculates the distance between the location of the hand-held terminal acquired through satellite positioning and the location of the venue corresponding to the QR code. If the distance is longer than the preset distance, it is confirmed that the user is not near the target venue. And the user might cheat. Then, the server will reject to provide the user with services including but not limited to authentication or communication. This application provides multiple embodiments to prevent cheating in location through multiple solutions. Furthermore, as this application is designated for social contact, the embodiment of this application provides a method to raise the matching efficiency of users, besides accurate user positioning.

FIG. 2 shows a social network system 200 provided by the embodiment of this application. The system includes: A server 210 and multiple first terminals 220.

The described server 210 and any one of the first terminals 220 are connected through wireless network communication. The described wireless network communication includes but is not

limited to wireless Local Area Network (LAN) and cellular mobile communication network; any communication standard or protocol applies to the described cellular mobile communication network, including but not limited to the Global System of Mobile communication (GSM), the General Packet Radio Service (GPRS), the Code Division Multiple Access (CDMA), the
5 Wideband Code Division Multiple Access (WCDMA), the Long Term Evolution (LTE), the 5G network protocol, or the Public Land Mobile Network (PLMN) of future network evolution.

The described server 210 includes but is not limited to desktops, laptops, single servers, server clusters, distributed servers, or cloud servers.

The described first terminals 220 include but are not limited to terminal devices, such as mobiles,
10 tablets, wearable devices, mobile units, Augmented Reality (AR)/Virtual Reality (VR) devices, laptops, Ultra-mobile Personal Computers, UMPCs), netbooks, and Personal Digital Assistants (PDAs). The embodiment of this application does not restrict the specific types of terminal devices.

For example, the described terminal devices can be Stations (STs) of WLAN, cell phones,
15 cordless telephones, Session Initiation Protocol (SIP)-based telephones, stations of Wireless Local Loop (WLL), Personal Digital Assistants (PDAs), hand-held devices with a wireless communication function, computing devices or other processing devices connecting to a wireless modem, mobile units, terminals of the Internet of Vehicles, computers, laptops, hand-held communication devices, hand-held computing devices, wireless satellite devices, Customer
20 Premise Equipment (CPE), and/or other devices for communication in the wireless system and the next-generation communication system, such as mobile terminals in the 5G network or the Public Land Mobile Network (PLMN) of future network evolution.

As shown in FIG. 2, some embodiments of this application provide a display device 230. The described display device 230 and the described server 210 are connected through the above-
25 mentioned wireless network connections or wired communication. The described display device is used to display the identifier generated by the server 210 and corresponding to the identifying information of the target venue.

The dotted line in FIG. 2 indicates that the display device 230 provided by some embodiments of this application and the server 210 are connected through wireless or wired communication.

FIG. 3 shows a method to establish social network connections provided by the embodiment of
30 this application. The method applies to the server 210 in the social network system shown in the above-mentioned FIG. 2 and can be implemented by the software and/or hardware of the described server 210. As shown in FIG. 3, this method includes Steps S110-S150. The principle

of each step is described below:

S110: A verification request is received from the first terminal. The described verification request includes the current location information of the described first terminal and the identifying information of the first venue; the described verification request is sent by the described first terminal, based on the first identifier. The described first identifier includes the described identifying information of the described first venue.

The described first venue includes but is not limited to shopping malls, cafes, gyms, co-working space, libraries, sports venues, restaurants, or bars. In some venues, the described first venue can be a closed indoor venue. As the satellite positioning is more inaccurate indoors, the method to establish social network connections provided by the embodiment of this application can achieve more accurate positioning.

The described first identifier includes but is not limited to QR codes and RFID labels in near field communication.

The described identifying information is used to distinguish merchants or buildings, including but not limited to the names and IDs of merchants, venues, and buildings. For example, FITNES (a gym) or "M1202002" (the unique ID corresponding to the gym).

In a non-restricted example, a verification request can be a short message sent from the first terminal 220 to the server 210 through a wireless communication network. Or it can be a request message sent by an App, provided by the embodiment of this application and running on the first terminal, to the server 210.

In a non-restricted example, the described current location information can be the location information acquired by the first terminal through Global Navigation Satellite Systems (GNSS), including but not limited to the Bei Dou Navigation Satellite System (BDS), the GLObalnaya NAVigatsionnaya Sputnikovaya Sistema (GLONASS), the Global Positioning System (GPS), and the Galileo Satellite Navigation System.

In a non-restricted example, based on the identifying information of the first venue like a business name, the server 210 in the social network system 200 generates the first identifier containing the business name, such as a QR code. In some examples, the server can generate the first identifier based on the location and identifying information of the first venue. The first identifier contains the location and identifying information of the first venue. The first identifier, after being generated by the server 210, can be displayed in multiple ways. For example, the first identifier can be pushed to a mobile terminal connecting with the server 210 through a wireless communication network. And the display interface of the mobile terminal will display the first

identifier. Or the first identifier can be displayed through the display device 230 connecting with the server 210 through a wireless or wired connection. Or the first identifier can be printed by a printing device and pasted or hung in a specific location in the first venue. App users in the first venue or users interested in the social activities in the first venue can scan the first identifier with the App provided by the embodiment of this application. In a specific example, the QR code is scanned and identified to acquire the identifying information of the first venue. This App sends the identifying information to the server 210 through the first terminal 220 used by the user. In a specific example, the identifying information is contained in the verification request sent to the server. This verification request is used to request the server to verify whether the location information of the first terminal meets requirements.

S120: In response to the described verification request, the second location information of the described first venue is required based on the described identifying information. If the distance between the described first terminal and the location in the described second location information is determined to be shorter than the first preset distance based on the described current location information and the described second location information, the personal information of the first user in the described first terminal is acquired, and the said first user is logged in the virtual first venue corresponding to the described identifying information.

In some embodiments, the described second location information is the known longitude and latitude or the known longitude, latitude, and altitude of the central location of the first venue. In some other embodiments, the described second location information can be acquired through the above-mentioned GNSS.

In some embodiments, the described preset distance is the preset maximum distance between the first terminal and the central location of the first venue, such as 100m. In some other embodiments, different first venues have varied preset distances. After receiving the verification request from the first terminal and acquiring the identifying information in the verification request, the server 210 confirms the first target venue based on the identifying information and acquires the information on size and property of the first target venue. The described information on size and property includes but is not limited to the area of the first target venue as well as the horizontal projected area and the maximum distance between any two points on the horizontal projected contour of the main building in the first target venue.

In a non-restricted example, before determining that the distance between the described first terminal and the described first venue is shorter than the preset distance, the server 210 acquires the information on size and property of the described first venue and confirms the described first preset distance accordingly.

In a specific example, the server acquires that the maximum distance between any two points on the horizontal projected contour of the main building in the first target venue is 30m. Through a specific table or a present formula, the first preset distance corresponding to the maximum distance is confirmed to be 50m. In another non-restricted example, the server acquires that the maximum distance between any two points on the horizontal projected contour of the main building in the first target venue is 300m. Through a specific table or a present formula, the first preset distance corresponding to the maximum distance is confirmed to be 350m.

It is understandable that, the first preset distance is confirmed by matching the first preset distance and the information on size and property of the first venue in order to avoid a wrong verification result due to a single fixed preset distance. For example, the user wants to confirm that his/her location is in a cafe. If the first preset distance is too big, the user will be judged to be in the cafe, even if he/she is in a building next to the cafe. For another example, the user wants to confirm that his/her location is in a sports venue. However, as the first preset distance is too small, the user will not be judged to be in the cafe, even if he/she is in the sports venue. The method to confirm the first preset distance provided by the embodiment of this application can avoid inaccurate positioning due to a single preset distance.

In some embodiments, the described personal information is the personal information entered into the App of the first terminal by the first user of the first terminal. The described personal information includes but is not limited to the name, alias, nickname, gender, age, height, photo, and hobbies and interests of the first user. In some embodiments, the described personal information also includes the gender, age, height, and hobbies and interests of the target user with whom the first user wants to make an acquaintance.

The described virtual first venue is the virtual space corresponding to the first venue in the server 210, including but not limited to chat rooms, BBS, user lists, or virtual reality space.

In a non-restricted example, the described logging the first user in the virtual the first venue corresponding to the described identifying information means to match the registration information of the first user with the virtual venue corresponding to the first venue and set the login status of the user as valid.

S130: The personal information of one or multiple second users is sent to the described first terminal; the described second user is a user who has logged in the described virtual first venue other than the described first user.

In a non-restricted example, the server 210 includes the personal information of multiple users. The terminal that needs to accept the personal information at present is the first terminal. The

user of the first terminal is the first user; other users in the server who log in the virtual first venue are the second user. The server pushes the personal information of all or some second users to the App of the first terminal for the choice of the first user.

5 S140: In response to the selection request sent by the described first terminal, the target terminal is confirmed; the described selection request includes the selection results of the personal information of the described one or multiple second users.

In a non-restricted example, the described target terminal is the terminal used by the described second user; the server sends the information of one or multiple second users to the first user terminal. Such information is displayed on the App interface of the first terminal of the first user; 10 the first user operates the App of the first terminal to choose the second user with whom he/she wants to make an acquaintance; the App of the first terminal sends the selection result of the first user to the server. The server confirms the second user, based on the user information contained in the selection result, and then confirms that the terminal used by the second user is the target terminal.

15 S150: A communication connection between the described first terminal and the described target terminal is established.

In a non-restricted example, a data interaction channel between the first and target terminals is established through the server 210. The forwarding between the first and target terminals is implemented through the server.

20 In a non-restricted example, the server 210 sends the mailing address of the other party to both the first and target terminals to establish a direct communication connection between the two terminals. The described mailing address includes the IP address and the identity identifier of the App.

It is understandable that, users can send text and voice messages, images, videos to each other 25 and have a voice chat with others, through the communication connection between the described first terminal and the described target terminal.

In a non-restricted example, the server 210 sends a connection establishment request to the described target terminal, before establishing a communication connection between the described first terminal and the described target terminal. After receiving a reply on the connection 30 establishment from the described target terminal, the server will establish the communication connection between the described first terminal and the described target terminal; the described connection establishment request includes the personal information of the described first user; the described reply on the connection establishment includes an instruction agree to establish the

connection. It is understandable that, this example can further strengthen the safety of the establishment of social network connections and avoid harassment.

In a specific non-restricted example, FIG. 4 demonstrates the flowchart of information interaction of a social network system 200 provided by the embodiment of this application. As shown in FIG. 4, the server 210 generates the first identifier, based on the identifying information of the first venue, such as a business name. The server displays the first identifier through a display device; after acquiring the first identifier through a scanning installation, the first terminal identifies the first identifier to acquire the identifying information of the first venue; the first terminal acquires its own current location information through a satellite navigation and positioning installation, and combines the identifying information to generate a verification request; the first terminal sends the verification request to the server; in response to the described verification request, the server verifies the current location information of the first terminal; specifically, the server acquires the second location information of the described first venue, based on the described identifying information. If the distance between the described first terminal and the location in the described second location information is determined to be shorter than the first preset distance based on the described current location information and the described second location information, the server will the personal information of the first user in the described first terminal is acquired, and the said first user is logged in the virtual first venue corresponding to the described identifying information; the server prepares the personal information of one or multiple second users for the first terminal and sends such information to the first terminal; after receiving the personal information of one or multiple second users sent by the server, the first terminal displays such information through its App; the first user selects the information of second users displayed by the first terminal to confirm the target user; the App of the first terminal sends the selection result in the form of a selection request through the first terminal to the server; in response to the selection request sent by the described first terminal, the server confirms the target terminal and establishes a communication connection between the described first terminal and the described target terminal. It is understandable that, this example enables technicians in this field to better understand all embodiments of this application. All examples in all embodiments of this application can be used to revenue or supplement this example.

It is understandable that, the embodiment of this application provides a method to establish social network connections. In the first aspect, by generating and displaying an identifier corresponding to the identifying information of the first venue to the first terminal to confirm its specific location, this method can accurately locate the first terminal in a specific building or

venue and avoid a wrong positioning result due to an error of satellite navigation and positioning, so that it is convenient for the user to perform social activities with other users in the same venue; on the other hand, the current location information of the first terminal and the second location information of the first venue are utilized to determine whether the distance between the described first terminal and the location in the described second location information is shorter than the first preset distance in order to avoid others from taking a photo of the above-mentioned identifier maliciously and logging in remotely to participate in social activities of the first venue and commit fraud, which enhances the security of social network connections.

Based on the above-mentioned embodiment of the method to establish social network connections shown in FIG. 3, after the communication connection between the described first terminal and the described target terminal is established in S150, as shown in FIG. 5, there are also S1601 and S1602 or S1603:

S1601: The login status of the described first user is verified for validity.

As non-restricted, the server 210 identifies whether the login status of the first user is valid, by maintaining the login status identifier of the first user. For example, if the login status identifier is 0, the login status will be valid; if the login status identifier is 1, the login status will be invalid.

In a non-restricted example, whether the login status of the described first user is valid is verified, which includes the following

If it is detected that the first terminal of the described first user does not send data through the described communication connection within the first preset duration, the login status of the described first user is confirmed to be invalid; or if it is detected that the login duration of the described first user is longer than the second preset duration, the login status of the first user is confirmed to be invalid. For example, the first preset duration is 3h; for example, the second preset duration is 24h. Technicians in this field can set them, based on the actual situation.

In a non-restricted example, the current location information of the described first terminal is regularly acquired; if the distance between the described first terminal and the location in the described second location information is determined to be longer than the second preset distance based on the described current location information and the described second location information, the login status of the described first user is confirmed to be invalid. In some embodiments, the described second preset distance is the first preset distance. Or the second preset distance is equivalent to the first preset distance. It is understandable that, in such a circumstance, when the first user is judged to have left the scope verified at login based on the second preset distance, the user will also be regarded as having left the first venue. In some

embodiments, the second preset distance is bigger than the first preset distance; for example, the first preset distance is 50m. And the second preset distance is 80m. Certainly, the described second preset distance can be confirmed based on the information on size and property of the first venue. Specifically, the described first preset distance is confirmed based on the first preset distance. The second preset distance is confirmed based on the first preset distance and the proportionality coefficient. For example, the second preset distance is equivalent to 1.5 multiplying by the first preset distance. It is understandable that, when the first user is in or near the first venue, the location of the first user can be accurately confirmed by verifying the first user; however, suppose the first user leaves the first venue temporarily after login and is not far away from the first venue. For example, the first user visits a nearby shop and returns to the first venue soon. If the first user is logged out during this period, and he/she needs to have social interactions with other people in the first venue after his/her return, his/her location information should be re-verified, resulting in poor user experience; suppose the user leaves the first venue (e.g. a cafe) where he/she has logged in to buy a pack of gum at a nearby convenience store, and then returns to the cafe. If the user is logged out when the distance is bigger than the first preset distance, the login stability of the user is not good; and the user experience is poor. Therefore, when the second preset distance is set to be bigger than the first preset distance, the login stability and experience of the user can be enhanced.

In a more specific example, if the real-time distance between the described first terminal and the described second location information is calculated based on the described current location information and the described second location information, and if the described real-time distance is longer than the second preset distance and their difference is longer than the third preset distance, the login status of the first user is confirmed to be invalid. In the above-mentioned example, if the first user exceeds the second preset distance, it might because the current location information of the user terminal momentarily drifts away from the second preset distance, due to factors of satellite navigation and positioning signals like a multi-path error. And the user is logged out innocently in this case. The time when the first terminal leaves the second preset distance is judged based on the third preset time, e.g. 5min, in order to eliminate the influence of the transient drifting of location information. In this way, the login stability of the user will not be disturbed by a multi-path error of satellite navigation and positioning. The login stability and experience of the user will be improved.

S1602: If the login status of the described first user is valid, the communication connection of the first terminal of the first user is maintained.

S1603: If the login status of the described first user is invalid, the communication connection of

the first terminal of the first user is disconnected and the described first user is logged out.

The described logout includes but is not limited to the following operations: The login status of the first user is set as invalid to prevent the user from communicating with other users through the server prior to re-verification of his/her location.

- 5 In a non-restricted example, when disconnecting the communication with the first terminal of the first user, the server will send a prompt message to the target terminal connecting with the first terminal to prevent the user of the target terminal from waiting.

It is understandable that, timely logout of the user who does not engage in communication or interaction for a long time can avoid others from maliciously occupying communication and social contact resources. Whether the first user has left the first venue is detected to ensure the
10 timeliness and effectiveness of the social activities of the first venue.

Based on the above-mentioned embodiment of the method to establish social network connections shown in FIG. 3, before sending the personal information of one or multiple second users to the described first terminal in S130, as shown in FIG. 6, there is also S125:

- 15 S125: The personal information of each second user is matched with the personal information of the described first user to filter and obtain the personal information of the described one or multiple second users.

In a non-restricted example, the first user selects the historical data of the second user. A statistical model is established to screen a second user matching with the current first user. For
20 example, upon statistics, it is highly probable that men will select a woman two to three years younger than him. The current first user is a 25-year man. Based on the statistical result and the personal information of the first user, the personal information of women who are two to three years younger than the current first user is screened out as the personal information of the second user matching with the first user.

- 25 In a non-restricted example, the information of second users is filtered through a trained neural network model to obtain the personal information of a second user matching with the current first user. Specifically, the Pseudo-Siamese Network can be adopted. The historical data on the selection of second users by the first user and the personal information of the first and second users corresponding to the historical data are regarded as the training samples of the Pseudo-
30 Siamese Network; through the training samples, a model for the output of the matching degree of the personal information of the first and second users is obtained; the personal information of the current first user and all second users is regarded as the input of the model to acquire the matching degree of the personal information of the two users. Generally, the matching degree is

the probability of matching output by the model; the personal information of the top N second users with the biggest probabilities of matching is regarded as the screened personal information of the second users, wherein N is an integer bigger than or equal to one.

It is understandable that, the personal information of one or multiple described second users is filtered and obtained by matching the personal information of the first and second users. The filtered personal information of second users is sent to the first user; on the one hand, the volume of data to be sent can be reduced. And network resources can be saved; on the other hand, fewer data will occupy less space of the first terminal of the first user, which enhances the compatibility with the first terminal device; moreover, when the first user selects in the App, fewer and pertinent options improve user experience and raise the matching efficiency of social contacts.

Corresponding to the method to establish social network connections shown in FIG. 3, FIG. 7 demonstrates an installation establish social network connections provided by the embodiment of this application, which includes:

A reception module M110 used to receive a verification request from the first terminal. The described verification request includes the current location information of the described first terminal and the identifying information of the first venue; the described verification request is sent by the described first terminal, based on the first identifier. The described first identifier includes the described identifying information of the described first venue

A verification module M120 used to acquire the second location information of the described first venue based on the described identifying information, in response to the described verification request. If the distance between the described first terminal and the location in the described second location information is determined to be shorter than the first preset distance based on the described current location information and the described second location information, the personal information of the first user in the described first terminal is acquired, and the said first user is logged in the virtual first venue corresponding to the described identifying information.

An information delivery module M130 used to send the personal information of one or multiple second users to the described first terminal; the described second user is a user who has logged in the described virtual first venue other than the described first user.

A terminal confirmation module M140 used to confirm the target terminal in response to the selection request sent by the described first terminal; the described selection request includes the selection results of the personal information of the described one or multiple second users.

A connection establishment module M150 used to establish a communication connection between the described first terminal and the described target terminal.

It is understandable that, all implementation methods and combinations of implementation methods and the beneficial effects thereof in the above-mentioned embodiments apply to this embodiment, which will not be elaborated here.

FIG. 9 shows a method to establish social network connections provided by the embodiment of this application. The method applies to the server 220 in the above-mentioned FIG. 2 and can be implemented by the software and/or hardware of the described server 220. The method includes S210-S230. The principle of each step is described below:

S210: The first identifier containing the identifying information of the first venue is identified.

S220: A verification request is sent to the server based on the identifying result of the described first identifier; the described verification request includes the current location information of the first terminal and the described identifying information; the described terminal verification request is used to instruct the described server to acquire the second location information of the described first venue, based on the described identifying information; if the distance between the described first terminal and the location in the described second location information is determined to be shorter than the first pre-set distance based on the described current location information and the described second location information, the personal information of the first user in the described first terminal is acquired, and the said first user is logged in the virtual first venue corresponding to the described identifying information.

S230: In response to the server, the personal information of one or multiple second users is sent; a selection request is sent to the described server. The described second user is a user who has logged in the described virtual first venue other than the described first user; the described selection request includes the selection results of the personal information of the described one or multiple second users and is used to instruct the described server to confirm the target terminal in response to the described selection request and establish a communication connection between the described first terminal and the described target terminal.

It is understandable that, all the above-mentioned embodiments of the method to establish social network connections apply to this embodiment, which will not be elaborated here.

Corresponding to the method to establish social network connections shown in FIG. 8, FIG. 9 demonstrates an installation establish social network connections provided by the embodiment of this application, which includes:

An identifying module M210 used to identify the first identifier containing the identifying

information of the first venue.

A verification request delivery module M220 used to send a verification request to the server based on the identifying result of the described first identifier; the described verification request includes the current location information of the first terminal and the described identifying
5 information; the described terminal verification request is used to instruct the described server to acquire the second location information of the described first venue, based on the described identifying information; if the distance between the described first terminal and the location in the described second location information is determined to be shorter than the first pre-set distance based on the described current location information and the described second location
10 information, the personal information of the first user in the described first terminal is acquired, and the said first user is logged in the virtual first venue corresponding to the described identifying information.

A selection module M230 used to send the personal information of one or multiple second users in response to the server; and a selection request is sent to the server. The described second user
15 is a user who has logged in the described virtual first venue other than the described first user; the described selection request includes the selection results of the personal information of the described one or multiple second users and is used to instruct the described server to confirm the target terminal and establish a communication connection between the described first terminal and the described target terminal.

20 It is understandable that, all the above-mentioned embodiments of the method to establish social network connections apply to this embodiment, which will not be elaborated here.

FIG. 10 is the structural diagram of the electronic device of an embodiment of this application. This electronic device is used to realize the server 210 or the first terminal 220 in the above-mentioned social network system 200 and execute all steps of all the methods above. As shown
25 in FIG. 10, the electronic device D10 in this embodiment includes: At least one processor D100 (only one is shown in FIG. 10), memory D101, and computer program D102 stored in the described memory D101 and executed on the described processor D100. When the described processor D100 executes the described computer program D102, steps of any of the methods described in any of the above-mentioned embodiments are implemented. Or when the described
30 processor D100 executes the described computer program D102, functions of each module/unit in the embodiments of each installation described above are implemented.

The described electronic device D10 can be a computing device like a desktop, a laptop, a PDA, or a cloud server. This electronic device can include but be not limited to the processor D100 and the memory D101. Technicians in this field can understand that FIG. 10 only shows an example

of the electronic device D10 rather than restricts the electronic device D10. It can include more or fewer components than those in the drawing or combine some or different components. For example, it can include input and network access devices.

The said processor D100 can be a Central Processing Unit (CPU). The said processor D100 can also be other general processors, Digital Signal Processor (DSPs), Application Specific Integrated Circuits (ASICs), Field-Programmable Gate Arrays (FPGAs), or other programmable logic devices, discrete or transistor logic devices, or discrete hardware components. A general processor can be a microprocessor or any general processor.

In some embodiments, the described memory D101 can be an internal storage unit of the described electronic device D10, such as a hard drive or a memory of the electronic device D10. In some other embodiments, the described memory D101 can also be an external storage device of the described electronic device D10, such as a plug-and-play hard drive on the described electronic device D10, a Smart Media Card (SMC), a Secure Digital (SD) Card, or a Flash Card. Furthermore, the described memory D101 can include both the internal and external storage units of the described electronic device D10. The described memory D101 is used to store operating systems, application programs, BootLoaders, data, and other programs, such as program codes of the described computer program. The described memory D101 can also be used to temporarily store data that are output or to be output.

It is worth noting that, information interaction and execution process among the above-mentioned installations/units are based on the same conception of embodiments of this application. For specific functions and technical effects, see the part of embodiments, which will not be elaborated here.

Technicians in this field can clearly understand that only the above-mentioned functional units and modules are explained in the examples for convenient and concise description. The above-mentioned functions may be completed by different functional units and modules in the actual applications as needed. In other words, the internal structure of the described installation is divided into different functional units or modules to complete all or some of the functions described above. All functional units and modules in the embodiments can be integrated into a processor unit; or each unit can exist separately and physically; or two or more units can be integrated into a unit. The above-mentioned integrated unit can be implemented in the form of hardware or a functional unit of software. In addition, the names of all functional units and modules are for convenient distinction, and are not used to restrict the protection scope of this application. For the specific working processes of units and modules in the above-mentioned system, see the corresponding processes in the above-mentioned embodiments, which will not be

elaborated here.

The embodiment of this application also provides a network device. The said network device includes: At least one processor, a memory, and a computer program stored in the described memory and executed on the described at least one processor. When the described processor
5 executes the described computer program, steps of the server 210 in any of the above-mentioned embodiments are implemented.

The embodiment of this application also provides a computer-readable storage medium. The described computer-readable storage medium stores a computer program. When the described computer program is executed by the processor, the steps of all method embodiments above-
10 mentioned are implemented.

The embodiment of this application provides a computer program product. When the computer program product is executed on the mobile terminal, the mobile terminal is enabled to implement the steps executed by the first terminal 220 in each of the above-mentioned method embodiments.

If it is implemented in the form of a functional unit of software or is sold or used as an
15 independent product, the described integrated unit can be stored in a computer-readable storage medium. Based on such understanding, the computer program can instruct relevant hardware to complete all or some procedures in the above-mentioned embodiment methods of this application. The described computer program can be stored in a computer-readable storage medium. When the computer program is executed by the processor, the steps of all above-
20 mentioned method embodiments are implemented. The described computer program includes computer program codes. The described computer program codes can be source codes, object codes, executable files, or some intermediate forms. The described computer-readable medium includes at least: Any entities or installations that can bring computer program codes to a camera installation/terminal device, recording media, computer memories, Read-Only Memories
25 (ROMs), Random Access Memories (RAMs), power line carrier signals, telecommunications signals, and software distribution media. Examples include USB flash drives, portable hard drives, disk drives, or optical disks. In some jurisdictions, computer-readable media cannot be power line carrier signals or telecommunications signals, based on legislation and patent practices.

Each embodiment described above has a specific focus. For the part that is not explained in detail or recorded in one embodiment, see the relevant description in other embodiments.

Ordinary technicians in this field should become aware that the units or steps of algorithms of all examples of the embodiments in this paper can be implemented through electronic hardware, or

the combination of computer software and electronic hardware. Whether these functions are executed by hardware or software depends on the constraint conditions of the specific applications and design of technical solutions. Professional technicians can adopt different methods for each specific application to realize the described functions. However, such
5 implementation should not exceed the scope of this application.

It should be understood that, installations/network devices and methods disclosed in the embodiments of this application can be implemented in other ways. For example, the embodiments of installations/network devices described above are only schematic. For example, the described modules or units are only classified by logical functions. They can be classified in
10 other ways in actual implementation. For example, multiple units or components can be combined or integrated into another system, or some characteristics could be omitted or not be executed. Besides, the displayed or discussed mutual coupling or direct coupling or communication connections can be indirect coupling or communication connections based on some interfaces, installations, or units, and can be electrical, mechanical, or in other forms.

15 The described units explained as separated components could be physically separated or not. The components displayed as units could be physical units or not. In other words, they can be in one place or distributed in multiple network units. Some or all units can be selected, based on actual needs, to achieve the purpose of the embodiment.

The described embodiments are only used to describe rather than restrict the technical solutions of this application; although this application has been described in detail based on the above-mentioned embodiments, ordinary technicians in this field should understand: They still can
20 modify the technical solutions recorded in the above-mentioned embodiments, or equally replace some of the technical characteristics therein; however, these modifications or replacements do not depart the essence of the corresponding technical solutions from the spirit and scope of the
25 technical solutions of all embodiments of this application. Instead, they should be included in the protection scope of this application.

Claims

1. A method to establish social network connections in the field of computer communication technology is characterized in that it also includes the following:

5 A verification request is received from the first terminal. The described verification request includes the current location information of the described first terminal and the identifying information of the first venue; the described verification request is sent by the described first terminal, based on the first identifier. The described first identifier includes the described identifying information of the described first venue;

10 In response to the described verification request, the second location information of the described first venue is required based on the described identifying information. If the distance between the described first terminal and the location in the described second location information is determined to be shorter than the first preset distance based on the described current location information and the described second location information, the personal
15 information of the first user in the described first terminal is acquired, and the said first user is logged in the virtual first venue corresponding to the described identifying information;

The personal information of one or multiple second users is sent to the described first terminal; the described second user is a user who has logged in the described virtual first venue other than the described first user;

20 In response to the selection request sent by the described first terminal, the target terminal is confirmed; the described selection request includes the selection results of the personal information of the described one or multiple second users;

A communication connection between the described first terminal and the described target terminal is established.

25 2. The method as described in Claim 1 is characterized in that, after the communication connection between the described first terminal and the described target terminal is established, the described method also includes the following:

The login status of the described first user is verified for validity;

If the login status of the described first user is valid, the communication connection of the first
30 terminal of the first user is maintained;

If the login status of the described first user is invalid, the communication connection of the first terminal of the first user is disconnected and the described first user is logged out.

3. The method as described in Claim 2 is characterized in that the login status of the described first user is verified for validity, which includes the following:

If it is detected that the first terminal of the described first user does not send data through the described communication connection within the first preset duration, the login status of the first user is confirmed to be invalid; or,

If it is detected that the login duration of the described first user is longer than the second preset duration, the login status of the described first user is confirmed to be invalid.

4. The method as described in Claim 2 is characterized in that the login status of the described first user is verified for validity, which includes the following:

The current location information of the described first terminal is acquired regularly;

If the distance between the described first terminal and the location in the described second location information is determined to be longer than the second preset distance based on the described current location information and the described second location information, the login status of the described first user is confirmed to be invalid.

5. The method as described in Claim 4 is characterized in that, if the distance between the described first terminal and the location in the described second location information is determined to be longer than the second preset distance based on the described current location information and the described second location information, the login status of the first user is confirmed to be invalid, which includes the following:

If the real-time distance between the described first terminal and the location in the described second location information is calculated based on the described current location information and the described second location information, and if the duration, in which the described real-time distance is longer than the second preset distance, is longer than the third preset distance, the login status of the first user is confirmed to be invalid.

6. The method as described in Claim 1 is characterized in that, before the distance between the described first terminal and the described first venue is determined to be shorter than the preset distance, the method also includes the following:

The information on size and property of the described first venue is acquired and the described first preset distance is determined according to the described information on size and property.

7. The method as described in Claim 1 is characterized in that, before sending the personal information of one or multiple second users to the described first terminal, the method also includes the following:

The personal information of each second user is matched with the personal information of the described first user to filter and obtain the personal information of the described one or multiple second users.

5 8. A method to establish social network connections in the field of computer communication technology is characterized in that it applies to the first terminal. The described method includes the following:

The first identifier containing the identifying information of the first venue is identified;

10 A verification request is sent to the server based on the identifying result of the described first identifier; the described verification request includes the current location information of the first terminal and the described identifying information; the described terminal verification request is used to instruct the described server to acquire the second location information of the described first venue, based on the described identifying information; if the distance between the described first terminal and the location in the described second location information is determined to be shorter than the first preset distance based on the described current location information and the
15 described second location information, the personal information of the first user in the described first terminal is acquired, and the said first user is logged in the virtual first venue corresponding to the described identifying information;

In response to the server, the personal information of one or multiple second users is sent; a selection request is sent to the described server. The described second user is a user who has
20 logged in the described virtual first venue other than the described first user; the described selection request includes the selection results of the personal information of the described one or multiple second users and is used to instruct the described server to confirm the target terminal in response to the described selection request and establish a communication connection between the described first terminal and the described target terminal.

25 9. An electronic device is characterized in that it also includes: A memory, a processor, and a computer program stored in the described memory and executed on the described processor. The method as described in any of claims from Claim 1 to 7, or the method as described in Claim 8 is implemented when the described processor executes the described computer program.

30 10. A computer-readable storage medium. The described computer-readable storage medium stores a computer program characterized in that, when the described computer program is executed by the processor, the method as described in any of claims from Claims 1 to 7, or in Claim 8 is implemented.