OFFLINE SHOPPING GUIDE METHOD AND APPARATUS

TECHNICAL FIELD

The present disclosure relates to the field of network technologies, and in particular, to an offline shopping guide method and apparatus.

BACKGROUND ART

In online shopping, a recommendation shopping guide for a user can be formed according to preferences of the user as well as online purchase and browsing behaviors of the user and other data, thereby making personalized recommendations to increase the purchase conversion rate. In offline shopping scenes, the recommended shopping-guide commodities seen by different users are generally the same. By taking a scene where users go to a shopping mall for shopping as an example, the shopping mall can place some shopping guide advertisements in the stores to guide the customers who enter the shopping mall to purchase the recommended commodities.

SUMMARY OF THE INVENTION

In view of the above, one or more embodiments of the specification provide an offline shopping guide method and apparatus to provide personalized offline shopping guide recommendations for different users.

Specifically, one or more embodiments of the specification are implemented by the following technical solutions:

In a first aspect, provided is an offline shopping guide method, comprising:

obtaining a user identifier (ID) of a shopping user and a scene ID of the shopping venue where the shopping user is located;

obtaining historical offline shopping data and historical online shopping data of the shopping user according to the user ID, and obtaining commodity information of the shopping venue according to the scene ID;

obtaining a commodity to be recommended to the shopping user this time according to the historical offline shopping data, the historical online shopping data, and the commodity information, the recommended commodity being a commodity in the shopping venue; and

sending augmented reality (AR) display information of the recommended commodity to a smart terminal of the shopping user, so that the smart terminal displays the recommended commodity in an AR mode.

In a second aspect, provided is an offline shopping guide apparatus, comprising:

an ID obtaining module configured to obtain a user ID of a shopping user and a scene ID of the shopping venue where the shopping user is located;

a data obtaining module configured to obtain historical offline shopping data and historical online shopping data of the shopping user according to the user ID, and obtain commodity information of the shopping venue according to the scene ID;

a recommendation processing module configured to obtain a commodity to be recommended to the shopping user this time according to the historical offline shopping data, the historical online shopping data, and the commodity information, the recommended commodity being a commodity in the shopping venue; and

a display processing module configured to send AR display information of the recommended commodity to a smart terminal of the shopping user, so that the smart terminal displays the recommended commodity in an AR mode.

In a third aspect, provided is a data processing device, comprising a memory, a processor, and a computer instruction stored in the memory and runnable on the processor, wherein the processor executes the instruction to realize the following steps:

obtaining a user ID of a shopping user and a scene ID of the shopping venue where the shopping user is located;

obtaining historical offline shopping data and historical online shopping data of the

shopping user according to the user ID, and obtaining commodity information of the shopping venue according to the scene ID;

obtaining a commodity to be recommended to the shopping user this time according to the historical offline shopping data, the historical online shopping data, and the commodity information, the recommended commodity being a commodity in the shopping venue; and

sending AR display information of the recommended commodity to a smart terminal of the shopping user, so that the smart terminal displays the recommended commodity in an AR mode.

In a fourth aspect, provided is an offline shopping guide system, comprising:

a shopping venue registration device configured to send a registration parameter to a shopping guide server when a shopping user enters the shopping venue;

the shopping guide server configured to obtain a user ID of the shopping user and a scene ID of the shopping venue according to the registration parameter, obtain a commodity to be recommended to the shopping user this time according to historical offline shopping data and historical online shopping data of the shopping user as well as commodity information of the shopping venue; and send AR display information of the recommended commodity to a smart terminal of the shopping user; and

the smart terminal configured to display, according to the AR display information sent by the server, the commodity information and shelf information of the recommended commodity in an AR mode.

The offline shopping guide method and apparatus of one or more embodiments of the specification make the recommended commodities more accurate and more targeted by combining the online and offline user shopping data of the user dimensions. Different commodities are recommended to different users, and thus the shopping guides are different. Moreover, the recommended commodities can be displayed to the users in an AR shopping

guide mode, and the personalized offline shopping guide mode for different users is realized.

BRIEF DESCRIPTION OF THE DRAWINGS

To illustrate the technical solutions in one or more embodiments of the specification or the prior art more clearly, the drawings to be used in the description of the embodiments or the prior art are briefly described below. It is obvious that the drawings in the following description are only some embodiments recited in one or more embodiments of the specification, and a person of ordinary skill in the art can obtain other drawings according to these drawings without any inventive effort.

FIG. 1 is a system architecture diagram of an offline shopping guide system according to one or more embodiments of the specification;

FIG. 2 is a process of obtaining a scene ID and a user ID according to one or more embodiments of the specification;

FIG. 3 is a schematic diagram of the shopping process in a shopping mall according to one or more embodiments of the specification;

FIG. 4 is a process flow of commodity recommendation according to one or more embodiments of the specification;

FIG. 5 is a flowchart of obtaining offline data according to one or more embodiments of the specification; and

FIG. 6 is a schematic structural diagram of an offline shopping guide apparatus according to one or more embodiments of the specification.

DETAILED DESCRIPTION

To make persons skilled in the art better understand the technical solutions in one or more embodiments of the specification, the technical solutions in one or more embodiments of the specification will be clearly and completely described below with reference to the accompanying drawings. It is apparent that the described embodiments are only part of the

embodiments, rather than all the embodiments. All other embodiments obtained by a person of ordinary skill in the art based on one or more embodiments of the specification without any inventive effort shall fall within the protection scope of the present disclosure.

In the offline shopping scene, the recommended shopping guides seen by different users are generally the same. Taking a shopping mall as an example, the shopping-guide commodities in the shopping mall seen by different users entering the shopping mall can be the same. For example, all the commodities are recommended commodities arranged in the shopping mall. However, different users may have different purchase interests. Some people are more interested in food and the purchase desire is higher, and some people are more interested in electrical appliances. Therefore, if the shopping guide also provides personalized recommended commodities for different users, it is more beneficial to increase the purchase conversion of offline shopping and improve the offline shopping experience.

FIG. 1 illustrates a system architecture diagram of an offline shopping guide system. The offline shopping guide system can be applied to a shopping venue. As shown in FIG. 1, the shopping venue is exemplified by a shopping mall, and the system can be deployed in the shopping mall. In other examples, the shopping venue may also be other place such as a convenience store. The offline shopping guide system in this example may include a registration device 11 disposed at the entrance of the shopping mall, a shopping guide server 12, and a smart terminal 13.

The registration device 11 can be used to register the entry of a shopping user to the shopping mall. For example, when the shopping user enters the shopping mall, the registration device 11 can notify the shopping guide server 12, so that the shopping guide server 12 recommends a shopping-guide commodity to the shopping user. In an example, the registration device 11 may be a code scanning device disposed at an entrance access control of the shopping mall, and the user scans a code to enter the shopping mall. In other

examples, the registration device 11 can also be disposed on a commodity container (for example, a shopping cart, a shopping basket) of the shopping mall, and when the user holds the commodity container to choose commodities, the user can register through the registration device on the container to enter the shopping mall, or the registration device 11 can also be disposed on a commodity shelf (for example, a digital shelf in the shopping mall).

The smart terminal 13 may be a user's smart phone, or AR glasses, or a display device mounted on the commodity container, e.g., a display device mounted on the shopping cart. The smart terminal 13 is an AR display device. After receiving a registration notification of the registration device 11 which indicates the entry of the user to the shopping mall, the shopping guide server 12 can send relevant information of the recommended shopping-guide commodity to the smart terminal 13, so that the smart terminal 13 conducts an AR shopping guide for the user.

AR is a technology that calculates locations and angles of camera images in real time and adds corresponding images, videos, and 3D models. The goal of this technology is to put the virtual world in the real world and interact on the screen. For example, during the AR shopping guide, a commodity in the shopping mall can be obtained by a camera for identification, and combined with a virtual object generated by the computer, for example, the commodity introduction, and price and discount information of the commodity can be virtualized and combined with a real commodity obtained by the camera. The user can see the real shopping mall scene collected by the camera, and can see related information such as the commodity price superimposed on the real commodity displayed in the virtual mode. The AR shopping guide can display the effects and information that can't be realized in the real environment, and can interact with the user through the screen, which is beneficial to better display the commodity and help the user to choose commodities during shopping.

The offline shopping guide system shown in FIG. 1 can obtain the user who enters the

shopping mall through the registration device 11, and the shopping guide server 12 can obtain personalized shopping-guide commodities recommended to the user. Moreover, through the AR shopping guide display in the smart terminal 13, a personalized shopping guide scheme for different users in the offline shopping scene can finally be formed. For example, after user A enters the shopping mall, the shopping guide server 12 can obtain the shopping-guide commodities a1 and a2 recommended to the user A and send the related commodity information to the smart terminal 13 of the user A for AR display. When user B enters the shopping mall, the shopping guide server 12 can obtain the shopping-guide commodity b1 recommended to the user B, and perform AR display on the smart terminal 13 of the user B.

In an example, the user can scan the code at the entrance of the shopping mall with his/her smart phone, the shopping guide server 12 can send the shopping-guide commodity to the user's smart phone for AR shopping guide, and the user can enable a camera of the smart phone in the process of choosing commodities. In another example, the user can also register through a display device mounted on the shopping cart to enter the shopping mall, the shopping guide server 12 can send the recommended commodity information to the display device on the shopping cart used by the user, and the user can watch the AR shopping guide display on the display device while pushing the shopping cart to choose commodities, so that user doesn't have to take out his/her smart phone.

The implementation of the offline shopping guide system illustrated in FIG. 1 is described below in detail:

First, the registration device 11 registers the entry of the user to the shopping mall, so that the shopping guide server 12 knows the current shopping mall and user to form a shopping recommendation for the user in the shopping mall. To improve the speed of obtaining user and shopping mall information, a biological identification method can be used

to register the biological information of a user when the user enters the shopping mall for the first time, and a subsequent entry is directly identified based on the biological information of the user.

For example, taking facial recognition as an example, FIG. 2 illustrates the flow between the registration device and the shopping guide server:

In step 200, an APP on the smart phone of the user triggers the generation of QR code information.

For example, when the user enters the shopping mall for the first time, the smart phone is turned on, and the generation of a QR code is triggered by the APP (which may be a shopping guide client relative to the shopping guide server) on the smart phone. For example, the option "Enable AR Shopping Guide" on the APP is clicked, and the shopping guide server is triggered to generate the QR code information by using the encryption algorithm according to the real information of the user (for example, the user ID), and meanwhile, the APP terminal can also generate the same QR code information according to the user ID. Alternatively, the shopping guide server generates a QR code according to the trigger of the APP, and then sends the QR code to the APP terminal for display.

In step 202, the registration device obtains the QR code information on the smart phone of the user. For example, the user can present the QR code to the registration device for scanning, and the registration device can obtain the QR code information.

In step 204, the registration device collects a facial image of the user through the camera.

In step 206, the registration device uploads the facial image and the QR code information to the shopping guide server.

In step 208, the shopping guide server parses the QR code to obtain a user ID.

In step 210, the shopping guide server establishes a binding relationship between the user's facial image and the user ID.

Through steps 200-210, the shopping guide server stores a correspondence between the user's biological information and the user ID. In other examples, the user's biological information may also be other information such as voiceprint, fingerprint, and palm print. In addition, the shopping guide server further stores a correspondence between the device ID of the registration device and the shopping mall ID, and the correspondence may be stored on the shopping guide server when the shopping mall installs the registration device.

In this example, when transmitting the QR code and facial image of the user to the shopping guide server, the registration device can also transmit the device ID to the shopping guide server, and the server can obtain the shopping mall ID corresponding to the device ID, so as to know which shopping mall the user identified by the QR code enters. In an example, the shopping guide server can also establish a correspondence between the shopping mall ID and the user's facial image, and store the users of the same shopping mall in a same image library, so that after the ID of the shopping mall which the user enters is obtained subsequently, the facial image can be searched and matched in the image library corresponding to the shopping mall to quickly obtain which user enters.

Steps 212-216 describe the process of obtaining the user ID and the shopping mall ID when the user enters the shopping mall subsequently. In step 212, the registration device collects the facial image of the user through the camera, and in step 214, uploads the facial image and its device ID to the shopping guide server. In step 216, the shopping guide server obtains the shopping mall ID according to the device ID of the registration device (the shopping mall ID is the scene ID of the shopping venue; for example, if the shopping venue is a convenience store, the scene ID may be a convenience store ID), and conducts matching according to the facial image to obtain a corresponding user ID, thereby realizing the shopping scene determination of the user and the shopping mall.

Referring to the schematic diagram of the shopping process of the user in the shopping

mall as illustrated in FIG. 3, when entering the entrance of the shopping mall, the user can enter the shopping mall through an intelligent check-in system, and the intelligent check-in system may include the user's smart phone, the registration device, etc. mentioned in the previous example. Through the intelligent check-in system, the shopping guide server can quickly obtain the shopping user and shopping mall of the shopping scene this time.

After the user enters the shopping mall, the shopping guide server starts to recommend commodities to the user, and the AR shopping guide is displayed to the user through the smart terminal. For example, the smart terminal is the user's smart phone, and the AR shopping guide in the following description can be displayed on the smart phone. FIG. 4 illustrates a process flow of the shopping guide recommendation by the shopping guide server, which may include:

In step 400, the shopping guide server obtains historical offline shopping data and historical online shopping data of the shopping user in the shopping mall according to the user ID, and obtains commodity information of the shopping venue according to the scene ID.

In this example, the shopping guide server can store the historical offline shopping data and the historical online shopping data in the user dimension. For example, the historical offline shopping data may include data such as a shopping venue where the user has shopped, commodity names, commodity categories, commodity prices, shopping time, discounts, and deals, etc. The historical online shopping data may include information of a website where the user has shopped, commodity names, commodity categories, commodity prices, shopping time, discounts and deals, and logistics information, etc.

After identifying the user ID according to the user biological information transmitted by the registration device, the shopping guide server can obtain the stored historical offline shopping data and historical online shopping data of the user according to the user ID.

Moreover, the shopping guide server can also obtain the corresponding scene ID according to the device ID of the registration device, and obtain the stored commodity information of the shopping venue according to the scene ID, where the commodity information may include, for example, the name and location of the shopping mall, commodities for sale in the shopping mall, current commodity discount and deals information, and shelf locations of the commodities in the shopping mall. In addition, the shopping guide server can also obtain other data such as the current time.

In step 402, the shopping guide server obtains a commodity to be recommended to the shopping user this time according to the historical offline shopping data, the historical online shopping data, and commodity information of the shopping mall.

In this step, the shopping guide server can perform a calculation for the recommended commodity by using a recommendation algorithm. For example, the recommendation algorithm may be a collaborative filtering algorithm, a user-based recommendation algorithm, an item-based recommendation algorithm, and a decision tree algorithm, etc.

In the calculation for recommended commodity, the historical offline shopping data and the historical online shopping data of the user can reflect the user's interest and preferences in shopping. For example, the user prefers to buy tableware or prefers to buy sausages, then the commodity category that the user is interested in can be recommended to the user during recommendation; or which brand of commodities the user prefers can be obtained according to the historical data. For example, if the user frequently purchases a certain brand of milk or cooked food, the commodity of the user's favorite brand can be recommended to the user during recommendation. The commodity information of the shopping mall is used to assist in obtaining which commodities can be recommended to the user, and the commodity that the user is interested in should be the commodity that the shopping mall is selling, and the commodity that the user is interested in is selected from the current commodities that the

shopping mall is selling for recommendation.

In this step, the commodity recommended to the shopping user by the shopping guide server this time may include the commodity name, the commodity introduction, the commodity price, the commodity price discounts, and the shelf location of the recommended commodity in the shopping mall. Information of these recommended commodities can be provided to the user in the subsequent AR display.

In addition, the historical online shopping data on which the calculation in this step is based may be the previous online shopping data of the user collected and obtained by the shopping guide server, and the historical offline shopping data may be obtained by the offline shopping guide system of one or more embodiments of the specification. The offline shopping guide system may include an offline data collection device for collecting offline data of the shopping user. Detailed deployment and collection mode of the offline data collection device is described subsequently.

In step 404, AR display information of the recommended commodity is sent to a smart terminal of the shopping user, so that the smart terminal displays the recommended commodity in an AR mode.

In this example, the personalized shopping guide recommendation commodities generated by the shopping guide server for different users can be sent to smart terminals of the users for AR display, and the smart terminal can be the display device on the shopping cart, AR glasses, etc. For example, the smart terminal is the smart phone of the user, a shopping guide client APP corresponding to the shopping guide server can be installed on the smart phone of the user. To display the recommended commodity on the smart phone in an AR mode, the shopping guide server can send the AR display information of the recommended commodity to the smart phone. The AR display information may include information such as virtual scene material of the shelf location of the recommended

commodity, and price and discounts of the recommended commodity, so that the smart terminal can display the commodity content of the recommended commodity and the shelf where the commodity is located in an AR mode.

With reference to the schematic diagram of FIG. 3, after receiving the user ID and the shopping mall ID obtained by the intelligent check-in, the shopping guide server may search for the historical shopping data of the user according to the user ID, and obtain the current shelf commodity and discounts information, etc. of the shopping mall according to the shopping mall ID, obtain the personalized recommended commodity for the user according to the foregoing information, and transmit the personalized recommended commodity to the smart terminal for AR recommendation display.

The AR display of the recommended commodity can include the following two situations:

In one situation, when the user enables the camera of the smart phone, the recommended commodities in the real range of the shopping mall that can be captured by the camera are displayed in an AR mode, and the recommended commodities outside the real scene of the shopping mall are not displayed in an AR mode.

For example, the shopping guide client on the smart phone of the user can transmit the real photographing scene captured by the camera of the smart phone of the user to the shopping guide server, and the shopping guide server can determine the recommended commodity on the commodity shelf in the real photographing scene according to the real photographing scene. For example, if the real photographing scene includes shelf S1 and shelf S2 of the shopping mall, it can be found whether the recommended commodities obtained by the recommendation algorithm include the commodities located on the two shelves, and if yes, data such as the content introduction, price discounts, and commodity shelf locations of the commodities can be sent to the smart phone of the user. The smart

phone of the user can superimpose the commodity information such as the content introduction and the price discounts of the commodity on the shelf commodity corresponding to the commodity shelf location in the real photographing scene to form the AR display.

Such AR display mode allows the user to quickly find out whether there are recommended commodities of interest at the currently browsed shelf when shopping in the shopping mall, and through the AR mode, to visually see the location of the commodity on the shelf. It does not require the user to search, thereby improving the efficiency of commodity positioning.

In another situation, in addition to the recommended commodities in the real photographing scene captured by the smart phone in the first situation, the recommended commodities on a commodity shelf outside the real photographing scene can also be sent to the smart phone for display. In this example, the shopping guide server can calculate to obtain all or some of the recommended commodities, including the commodities within and outside the real photographing scene. During the display in the smart phone, a virtual scene map of the shopping mall can be displayed, including each shelf in the shopping mall, and the recommended commodities can be displayed on the corresponding shelf locations.

After the user selects a recommended commodity, the shopping guide server can send the image feature data and the AR navigation information of the commodity to the smart phone of the user according to the selection trigger of the commodity, where the image feature data may be a photo of the commodity, and the AR navigation information may be a navigation path obtained by the shopping guide server according to the current location of the user and the shelf location of the selected commodity, and the navigation path information is sent to the smart phone of the user. The current location of the user can be positioned by a positioning device installed on the shelf in the shopping mall, and the

positioning mode can be Near Field Communication (NFC), such as WiFi, WiMax, ZigBee, Adhoc, BlueTooth, Beacon, RFID, and UWB.

The smart phone of the user can perform AR path navigation according to the AR navigation information fed back by the shopping guide server, to guide the user to go to the shelf location of the selected commodity. Moreover, in the navigation process, the camera of the smart phone of the user can capture the real photographing scene, and match the commodity image in the real photographing scene with the image feature data of the commodity returned by the navigation server. If the matching is successful, it is indicated that the recommended commodity is found, and the smart phone can also combine the information of the commodity such as the price and introduction with the commodity in the real photographing scene to perform the AR display.

Such AR display mode can enable the user to quickly know the shelf locations in the shopping mall where the recommended commodities are distributed, and to quickly and accurately find the recommended commodities according to the navigation path, which not only greatly facilitates the user to search and locate the commodities, improving the shopping speed and the shopping experience, but also improves the purchase conversion of the offline shopping and the shopping guide effect for the merchants.

The offline shopping data mentioned above is crucial for the acquisition of recommended commodities, and the following explains how to collect the offline shopping data of the shopping user. With reference to the schematic diagram of FIG. 3, the offline shopping guide system of this example is further provided with an offline data collection device. As shown in FIG. 3, a camera and an NFC positioning device such as Beacon and BlueTooth can be installed on the shelves in the shopping mall. These devices can be in a near-field communication with the smart phone of the user to locate the user, and thus, the shelves in the shopping mall form an indoor positioning system for indoor positioning of the user.

FIG. 5 illustrates a process in which the shopping guide server obtains the offline shopping data of the user, which may include:

In step 500, the shopping guide server receives a user positioning location sent by the indoor positioning device of the shopping mall and a camera-captured image corresponding to the user positioning location in the shopping process of the shopping user.

In step 502, the shopping guide server conducts matching according to the user positioning location, the camera-captured image, and commodity layout information of the shopping mall to obtain commodity browsing behavior information of the shopping user in the shopping process.

In steps 500 and 502 of this example, the smart phone of the user and the Beacon on the shelf perform communication positioning to obtain the indoor location of the user in the shopping mall. Which shelf position corresponding to the indoor location of the user can be obtained through the distance matching algorithm by combining the location information of the shelves of the shopping mall, thereby obtaining which shelf the user is currently staying and the duration of the stay. Which operations the user has done on which commodities on the shelf can be obtained by combining identification of the image collected by the shelf camera, such as which commodities are picked up and which commodities are put down. The foregoing shelf location and shelf commodity layout, etc. can be used as the commodity layout information of the shopping mall.

In the shopping process of the shopping user, for example, the positioning location information of the user can be reported to the shopping guide server through the smart phone of the user at a certain time interval, and the shopping guide server combines data such as the shelf locations and the shelf commodities of the shopping mall to determine which shelf the user is located and which commodity the user operates. When the user is reported to the shopping guide server, the shopping guide server can also record the time of receiving the

report, and can obtain the browsing path of the user in the shopping mall through a timing analysis method, thereby obtaining the commodity browsing behavior information of the shopping user in the shopping process, including the user ID (which can be identified by the reporting mobile client), places where the user has stayed, the time and duration of the stays, and which commodities are operated in sequence.

In step 504, the shopping guide server receives shopping order data of the shopping user at the shopping venue and corresponding order commodity information.

After the user makes a payment, the user purchase order can also be uploaded to the server through the smart phone of the user or a cash register of the shopping mall. The order commodity information in this step may be the shelf location, discounts, and discounts, etc. of the commodity on the order. The shopping guide server can store the commodity browsing behavior information, the shopping order data, and the order commodity information as historical offline shopping data of the shopping user at the shopping mall.

On one hand, the offline shopping guide method of this example combines the online and offline user shopping data, so that the recommended commodities are more accurate and more targeted, different commodities are recommended to different users, and thus the shopping guides are different. On the other hand, from the personalized shopping guide implementation mode, the AR shopping guide is introduced into the offline shopping guide mode, and the personalized data is sent and displayed through the smart terminals of different users. Moreover, the advantages of the AR shopping guide are greatly enhanced, and the display of the shelves where the commodities are located, and even the path navigation of the shelves where the commodities are located are combined, thereby greatly improving the shopping experience and enabling the users to quickly and conveniently find the commodities.

The execution sequence of different steps in the foregoing process shown in FIG. 2 is

not limited to the sequence in the flowchart. In addition, the description of different steps may be implemented in the form of software, hardware, or a combination thereof. For example, persons skilled in the art can implement the description in the form of a software code, which can be a computer executable instruction capable of implementing the logic function corresponding to the step. When the description is implemented in the form of software, the executable instruction can be stored in a memory and executed by a processor in the device.

For example, corresponding to the foregoing method, one or more embodiments of the specification simultaneously provide a data processing device, which may be a shopping guide server. The device can include a processor, a memory, and a computer instruction stored in the memory and runnable on the processor. The processor executes the instruction to implement the following steps:

a user ID of a shopping user and a scene ID of the shopping venue where the shopping user is located are obtained;

historical offline shopping data and historical online shopping data of the shopping user is obtained according to the user ID, and commodity information of the shopping venue is obtained according to the scene ID;

a commodity to be recommended to the shopping user this time is obtained according to the historical offline shopping data, the historical online shopping data, and the commodity information, the recommended commodity being a commodity in the shopping venue; and

AR display information of the recommended commodity is sent to a smart terminal of the shopping user, so that the smart terminal displays the recommended commodity in an AR mode.

One or more embodiments of the specification also provide an offline shopping guide apparatus, which can be located in a shopping guide server. As shown in FIG. 6, the

apparatus can include an ID obtaining module 61, a data obtaining module 62, a recommendation processing module 63, and a display processing module 64.

The ID obtaining module 61 is configured to obtain a user ID of a shopping user and a scene ID of the shopping venue where the shopping user is located.

The data obtaining module 62 is configured to obtain historical offline shopping data and historical online shopping data of the shopping user according to the user ID, and obtain commodity information of the shopping venue according to the scene ID.

The recommendation processing module 63 is configured to obtain a commodity to be recommended to the shopping user this time according to the historical offline shopping data, the historical online shopping data, and the commodity information, the recommended commodity being a commodity in the shopping venue.

The display processing module 64 is configured to send AR display information of the recommended commodity to a smart terminal of the shopping user, so that the smart terminal displays the recommended commodity in an AR mode.

In an example, the ID obtaining module 61 is configured to: when obtaining a scene ID of the shopping venue, receive a device ID sent by a registration device of the shopping venue, the registration device being used to register the entry of a shopping user to the shopping venue; and obtain a scene ID of the shopping venue corresponding to the device ID.

In an example, the ID obtaining module 61 is further configured to: before obtaining a user ID of a shopping user, receive biological information and a user ID of the shopping user, the biological information and the user ID being collected by a registration device of the shopping venue; establish a binding relationship between the biological information and the user ID; and obtain, according to the binding relationship, the user ID corresponding to the biological information when receiving the biological information of the shopping user

collected by the registration device of the shopping venue.

In an example, the data obtaining module 62 is further configured to receive a user positioning location sent by an indoor positioning device of the shopping venue and a camera-captured image corresponding to the user positioning location in the shopping process of the shopping user; conduct matching according to the user positioning location, the camera-captured image, and commodity layout information of the shopping venue, to obtain commodity browsing behavior information of the shopping user in the shopping process; receive shopping order data of the shopping user at the shopping venue and corresponding order commodity information; and store the commodity browsing behavior information, the shopping order data, and the order commodity information as historical offline shopping data of the shopping user at the shopping venue.

In an example, the display processing module 64 is specifically configured to determine, according to a real photographing scene collected by the smart terminal of the shopping user, a recommended commodity on a commodity shelf in the real photographing scene; and send AR display information of the recommended commodity to the smart terminal of the shopping user, the AR display information comprising the commodity shelf location and commodity information of the recommended commodity.

The apparatuses or modules illustrated in the foregoing embodiments may be specifically implemented by computer chips or entities or implemented by a product having a certain function. A typical implementation device is a computer, and the specific form of the computer may be a personal computer, a laptop computer, a cellular phone, a camera phone, a smart phone, a personal digital assistant, a media player, a navigation device, an email transceiver, a game console, a tablet computer, a wearable device, or any combination of these devices.

For the convenience of description, the above devices are divided into various modules

according to the functions for respective description. Certainly, the functions of various modules can be implemented in one or more pieces of software and/or hardware when implementing one or more embodiments of the specification.

For the payment described in one or more embodiments of the specification, for example, the payment technology carrier involved in the payment of the shopping order by the shopping user may include NFC, WIFI, 3G/4G/5G, POS card swipe technology, QR code scanning technology, barcode scanning technology, Bluetooth, infrared, Short Message Service (SMS), Multimedia Message Service (MMS), etc.

The biological features involved in the biological identification in one or more embodiments of the specification may include, for example, eye features, voiceprints, fingerprints, palm prints, heartbeats, pulses, chromosomes, DNA, human bite marks, etc. The eye lines may include biological features such as iris and sclera.

Persons skilled in the art should understand that one or more embodiments of the specification can be provided as methods, systems, or computer program products. Therefore, one or more embodiments of the specification can be in the form of a full hardware embodiment, a full software embodiment, or an embodiment combining software and hardware. Moreover, one or more embodiments of the specification can be in the form of a computer program product implemented on one or more computer usable storage media (including but not limited to a disk memory, a CD-ROM, an optical memory, etc.) having computer usable program codes stored therein.

One or more embodiments of the specification can be described in the general context of computer executable instructions executed by a computer, such as program modules. Generally, the program modules include routines, programs, objects, components, data structures, etc. that execute particular tasks or implement particular abstract data types. One or more embodiments of the specification can also be practiced in distributed computing

environments where tasks are executed by remote processing devices that are connected through a communication network. In the distributed computing environments, the program modules can be located in both local and remote computer storage media including storage devices.

One or more embodiments in the specification are described in a progressive manner, and the same or similar portions between various embodiments may be referred to each other, and each embodiment focuses on differences from other embodiments. In particular, the offline navigation apparatus or data processing device embodiment is basically similar to the method embodiment, the description is relatively simple, and relevant parts can be referred to the description of the method embodiment.

The above describes the specific embodiments of the specification. Other embodiments are within the scope of the appended claims. In some cases, the actions or steps recited in the claims can be performed in a different order than the embodiments and can still achieve the desired results. In addition, the processes depicted in the drawings are not necessarily in a particular order or in a sequential order to achieve the desired results. In some embodiments, multi-task processing and parallel processing are also possible or may be advantageous.

The above are only preferred embodiments of one or more embodiments of the specification and are not intended to limit one or more embodiments of the specification. Any modification, equivalent substitution and improvement, etc. made within the spirit and principle of one or more embodiments of the specification should be included in the protection scope of the present disclosure.

CLAIMS

[Claim 1] An offline shopping guide method, comprising:

obtaining, by a registration device associated with a shopping venue, QR code information from a shopping user;

collecting, by the registration device, biometric information of the shopping user;

receiving the biometric information of the shopping user and the QR code information uploaded by the registration device;

parsing the QR code information to obtain a user identifier (ID);

establishing and storing a binding relationship between the biometric information of the shopping user and the user ID;

obtaining the user ID of the shopping user based on the binding relationship between the biometric information and the user ID, and a scene ID of the shopping venue where the shopping user is located;

obtaining historical offline shopping data and historical online shopping data of the shopping user according to the user ID, and obtaining commodity information of the shopping venue according to the scene ID;

obtaining a commodity to be recommended to the shopping user according to the historical offline shopping data, the historical online shopping data, and the commodity information, the recommended commodity being a commodity in the shopping venue; and

sending augmented reality (AR) display information of the recommended commodity to a smart terminal of the shopping user, so that the smart terminal displays the recommended commodity in an AR mode,

wherein the sending AR display information of the recommended commodity to a smart terminal of the shopping user comprises:

sending AR display information of the recommended commodity to the smart terminal, wherein the recommended commodity is located on a commodity shelf outside a real photographing scene

collected by the smart terminal of the shopping user, and the AR display information comprises the commodity shelf location and commodity information of the recommended commodity; and

sending image feature data and AR navigation information of the recommended commodity to the smart terminal when triggering of the recommended commodity is received, so that the smart terminal performs AR navigation according to the AR navigation information and matches the image feature data with commodity image data obtained in the real photographing scene to look for the recommended commodity.

[Claim 2] The method according to claim 1, wherein the obtaining a scene ID of the shopping venue comprises:

receiving a device ID sent by the registration device of the shopping venue, the registration device being used to register the entry of a shopping user to the shopping venue; and

obtaining a scene ID of the shopping venue corresponding to the device ID.

[Claim 3] The method according to claim 2, wherein the registration device is mounted in an entrance access control of the shopping venue, or a commodity container of the shopping venue, or a commodity shelf of the shopping venue.

[Claim 4] The method according to claim 1, wherein

the obtaining the user ID of the shopping user comprises:

receiving biological information of the shopping user collected by the registration device of the shopping venue; and

obtaining, according to the binding relationship, the user ID corresponding to the biological information.

[Claim 5] The method according to claim 4, wherein the biological information comprises a face, a

voiceprint, a fingerprint, or a palm print of the shopping user.

[Claim 6] The method according to claim 1, further comprising:

receiving a user positioning location sent by an indoor positioning device of the shopping venue and a camera-captured image corresponding to the user positioning location in the shopping process of the shopping user;

conducting matching according to the user positioning location, the camera-captured image, and commodity layout information of the shopping venue, to obtain commodity browsing behavior information of the shopping user in the shopping process;

receiving shopping order data of the shopping user at the shopping venue and corresponding order commodity information; and

storing the commodity browsing behavior information, the shopping order data, and the order commodity information as historical offline shopping data of the shopping user at the shopping venue.

[Claim 7] The method according to claim 1, wherein the sending AR display information of the recommended commodity to a smart terminal of the shopping user comprises:

determining, according to the real photographing scene collected by the smart terminal of the shopping user, a recommended commodity on a commodity shelf in the real photographing scene; and

sending AR display information of the recommended commodity to the smart terminal of the shopping user, the AR display information comprising the commodity shelf location and commodity information of the recommended commodity, so that the smart terminal displays the commodity shelf where the recommended commodity is located and the commodity information.

[Claim 8] The method according to claim 1, wherein the smart terminal comprises a smart phone, AR glasses, or a display device mounted on the commodity container.

[Claim 9] An offline shopping guide apparatus, comprising:

an identifier (ID) obtaining module configured to:

obtain, by a registration device associated with a shopping venue, QR code information from a shopping user;

collect, by the registration device, biometric information of the shopping user;

receive the biometric information of the shopping user and the QR code information uploaded by the registration device;

parse the QR code information to obtain a user identifier (ID);

establish and store a binding relationship between the biometric information of the shopping user and the user ID; and

obtain the user ID of the shopping user based on the binding relationship between the biometric information and the user ID, and a scene ID of the shopping venue where the shopping user is located;

a data obtaining module configured to obtain historical offline shopping data and historical online shopping data of the shopping user according to the user ID, and obtain commodity information of the shopping venue according to the scene ID;

a recommendation processing module configured to obtain a commodity to be recommended to the shopping user according to the historical offline shopping data, the historical online shopping data, and the commodity information, the recommended commodity being a commodity in the shopping venue; and

a display processing module configured to send augmented reality (AR) display information of the recommended commodity to a smart terminal of the shopping user, so that the smart terminal displays the recommended commodity in an AR mode,

wherein sending AR display information of the recommended commodity to a smart terminal of the shopping user comprises:

sending AR display information of the recommended commodity to the smart terminal, wherein the recommended commodity is located on a commodity shelf outside a real photographing scene collected by the smart terminal of the shopping user, and the AR display information comprises the commodity shelf location and commodity information of the recommended commodity; and

sending image feature data and AR navigation information of the recommended commodity to the smart terminal when triggering of the recommended commodity is received, so that the smart terminal performs AR navigation according to the AR navigation information and matches the image feature data with commodity image data obtained in the real photographing scene to look for the recommended commodity.

[Claim 10] The apparatus according to claim 9, wherein

the ID obtaining module is configured to: when obtaining a scene ID of the shopping venue, receive a device ID sent by the registration device of the shopping venue, the registration device being used to register the entry of a shopping user to the shopping venue; and obtain a scene ID of the shopping venue corresponding to the device ID.

[Claim 11] The apparatus according to claim 9, wherein

the ID obtaining module is further configured to: obtain, according to the binding relationship, the user ID corresponding to the biological information when receiving the biological information of the shopping user collected by the registration device of the shopping venue.

[Claim 12] The apparatus according to claim 9, wherein

the data obtaining module is further configured to receive a user positioning location sent by an indoor positioning device of the shopping venue and a camera-captured image corresponding to the user positioning location in the shopping process of the shopping user; conduct matching according to the user positioning location, the camera-captured image, and commodity layout information of

the shopping venue, to obtain commodity browsing behavior information of the shopping user in the shopping process; receive shopping order data of the shopping user at the shopping venue and corresponding order commodity information; and store the commodity browsing behavior information, the shopping order data, and the order commodity information as historical offline shopping data of the shopping user at the shopping venue.

[Claim 13] The apparatus according to claim 9, wherein

the display processing module is specifically configured to determine, according to the real photographing scene collected by the smart terminal of the shopping user, a recommended commodity on a commodity shelf in the real photographing scene; and send AR display information of the recommended commodity to the smart terminal of the shopping user, the AR display information comprising the commodity shelf location and commodity information of the recommended commodity.

[Claim 14] A data processing device, comprising a memory, a processor, and a computer instruction stored in the memory and runnable on the processor, wherein the processor executes the instruction to realize the following steps:

obtaining, by a registration device associated with a shopping venue, QR code information from a shopping user;

collecting, by the registration device, biometric information of the shopping user;

receiving the biometric information of the shopping user and the QR code information uploaded by the registration device;

parsing the QR code information to obtain a user identifier (ID);

establishing and storing a binding relationship between the biometric information of the shopping user and the user ID;

obtaining the user ID of the shopping user based on the binding relationship between the biometric information and the user ID, and a scene ID of the shopping venue where the shopping user is located;

obtaining historical offline shopping data and historical online shopping data of the shopping user according to the user ID, and obtaining commodity information of the shopping venue according to the scene ID;

obtaining a commodity to be recommended to the shopping user according to the historical offline shopping data, the historical online shopping data, and the commodity information, the recommended commodity being a commodity in the shopping venue; and

sending augmented reality (AR) display information of the recommended commodity to a smart terminal of the shopping user, so that the smart terminal displays the recommended commodity in an AR mode,

wherein the sending AR display information of the recommended commodity to a smart terminal of the shopping user comprises:

sending AR display information of the recommended commodity to the smart terminal, wherein the recommended commodity is located on a commodity shelf outside a real photographing scene collected by the smart terminal of the shopping user, and the AR display information comprises the commodity shelf location and commodity information of the recommended commodity; and

sending image feature data and AR navigation information of the recommended commodity to the smart terminal when triggering of the recommended commodity is received, so that the smart terminal performs AR navigation according to the AR navigation information and matches the image feature data with commodity image data obtained in the real photographing scene to look for the recommended commodity.

[Claim 15] An offline shopping guide system, comprising:

a shopping venue registration device configured to obtain QR code information from a shopping user and collect biometric information of the shopping user;

a shopping guide server configured to receive the biometric information of the shopping user and the QR code information uploaded by the registration device, parse the QR code information to obtain a user identifier (ID), and establish and store a binding relationship between the biometric information of the shopping user and the user ID;

the shopping guide server further configured to obtain the user ID of the shopping user based on the binding relationship between the biometric information and the user ID, and a scene ID of the shopping venue according to the registration parameter, obtain a commodity to be recommended to the shopping user according to historical offline shopping data and historical online shopping data of the shopping user as well as commodity information of the shopping venue; and send augmented reality (AR) display information of the recommended commodity to a smart terminal of the shopping user; and

the smart terminal configured to display, according to the AR display information sent by the server, the commodity information and shelf information of the recommended commodity in an AR mode,

wherein sending AR display information of the recommended commodity to a smart terminal of the shopping user comprises:

sending AR display information of the recommended commodity to the smart terminal, wherein the recommended commodity is located on a commodity shelf outside a real photographing scene collected by the smart terminal of the shopping user, and the AR display information comprises the commodity shelf location and commodity information of the recommended commodity; and

sending image feature data and AR navigation information of the recommended commodity to the smart terminal when triggering of the recommended commodity is received, so that the smart terminal performs AR navigation according to the AR navigation information and matches the image

feature data with commodity image data obtained in the real photographing scene to look for the recommended commodity.

[Claim 16] The system according to claim 15, wherein the registration parameter comprises biological information of the shopping user, or a device ID of the registration device.

[Claim 17] The system according to claim 15, further comprising:

an offline data collection device configured to send a user positioning location of the shopping user at the shopping venue and a corresponding camera-captured image, as well as shopping order data and corresponding order commodity information to the shopping guide server, so that the shopping guide server obtains historical offline shopping data of the shopping user at the shopping venue.