

ORDER INFORMATION DETERMINATION METHOD AND APPARATUS

Claim of Priority

This application claims priority to Chinese Patent Application No.
5 201710132342.2 filed on March 7, 2017, the entire contents of which are hereby
incorporated by reference.

Technical Field

The present disclosure relates to the field of Internet technologies, and in
particular, to an order information determination method and apparatus.

10 Background Art

After picking commodities in a traditional physical store, a consumer needs to
wait in a queue at a cashier desk for settlement, and the settlement staff conducts
settlement with the assistance of a computer. However, the settlement process often has
low efficiency, and it probably takes a long time for waiting. In order to improve the
15 efficiency of settlement, the prior art can analyze a selection process of the consumer in
real time based on technologies, such as a computer vision technology, when the
consumer is picking commodities to judge which commodities are taken and which
commodities are put back by the consumer, thereby modifying and determining order
information, i.e., a bill list of the consumer. However, there are many factors that may
20 lead to inaccurate judgment in the above analyzing process. For example, the consumer
puts an extremely similar commodity back to a wrong location by mistake, or
misjudgment is made because an identification device is blocked when more than one
person pick commodities on a relatively low storage rack at the same time. These factors
may all lead to inaccurate determination of the order information, thus affecting the
25 settlement of commodities.

Summary of the Invention

In view of the above, the present disclosure provides an order information
determination method and apparatus for determining order information of a commodity
more quickly and more accurately, so as to correlate the commodity on an order with a
30 consumer.

Specifically, the present disclosure is implemented through the following
technical solution:

In the first aspect, an order information determination method is provided, which is used for determining a correlation between a user and a commodity picked by the user and includes:

5 acquiring a container identifier of a commodity container, the container identifier being corresponding to a user identifier of the user, and the commodity container being used to contain the commodity picked by the user;

determining a distance between the commodity and the commodity container according to location information obtained by locating the commodity and the commodity container; and

10 adding commodity information of the commodity to an order if the distance is in a predetermined range, the order being an order of the user identifier corresponding to the container identifier.

In the second aspect, an order information determination apparatus is provided, which includes:

15 a container determination module configured to acquire a container identifier of a commodity container, the container identifier being corresponding to a user identifier of a user, and the commodity container being used to contain the commodity picked by the user;

20 a distance determination module configured to determine a distance between the commodity and the commodity container according to location information obtained by locating the commodity and the commodity container; and

an order processing module configured to add commodity information of the commodity to an order if the distance is in a predetermined range, the order being an order of the user identifier corresponding to the container identifier.

25 The order information determination method and apparatus in the present disclosure can quickly and accurately determine order information of a consumer, and automatically complete settlement and payment of an order. The consumer can directly leave after finishing shopping and does not need to wait in a queue at a cashier desk for settlement, such that the efficiency of shopping is improved, and a good shopping experience is provided.

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Brief Description of the Drawings

FIG. 1 is a regional layout of a convenience store according to an embodiment of the present disclosure;

FIG. 2 is a detailed schematic layout diagram of a convenience store according to an embodiment of the present disclosure;

FIG. 3 is a schematic structural diagram of a computing device according to an embodiment of the present disclosure;

5 FIG. 4 is a flowchart of order information determination according to an embodiment of the present disclosure;

FIG. 5 is a flowchart of order information determination according to an embodiment of the present disclosure; and

10 FIG. 6 is a schematic structural diagram of an order information determination apparatus according to an embodiment of the present disclosure.

FIG. 7 is a flowchart illustrating an example of a computer-implemented method for determining order information in an unmanned store, according to an implementation of the present disclosure.

Detailed Description

15 In people's daily life, shopping in supermarkets, shopping malls, convenience stores, and other places is a common shopping behavior. After finishing picking commodities, a consumer needs to wait in a queue at a cashier desk at the exit for settlement, which is very time-consuming and inconvenient. In order to improve the efficiency of shopping, a shopping management system may be used to automatically
20 identify which commodities are picked by a consumer in the shopping process, determine a correlation between the consumer and a commodity picked by the consumer, and automatically push a corresponding bill to the consumer to enable the consumer to pay by himself/herself. In this way, the consumer does not need to wait in a queue at the exit for settlement, thereby significantly improving the efficiency of
25 shopping.

One important factor for implementing the above method is to determine the correlation between the consumer and the commodity picked by the consumer. A corresponding bill of the consumer can be obtained only after the correlation is determined. In the present disclosure, such a correlation can be referred to as "order
30 information", i.e., which commodities are picked by a consumer. The order information determination method provided in the present disclosure is intended to simply and accurately determine order information to assist in rapid settlement.

A processing procedure of the order information determination method of the present disclosure will be illustrated in the following by taking a consumer shopping in a convenience store as an example. However, the method can also be applied to other scenarios, such as supermarket shopping, mall shopping, and inventory monitoring in a warehouse (who took which inventory of the warehouse), book management in a library (which books are borrowed by a user), and other similar scenarios where a correlation between personnel and articles needs to be determined.

FIG. 1 illustrates a regional layout of a convenience store. As shown in FIG. 1, the convenience store 100 may include an entrance region 101, a storage region 102, and an exit region 103. A consumer may enter the convenience store 100 via the entrance region 101, pick commodities in the storage region 102, and leave the convenience store via the exit region 103. The storage region 102 may store many commodities. For example, 1021 to 1024 illustrated in FIG. 1 are commodities in the convenience store, which may include fruits, drinks, milk, bread, and so on. FIG. 1 only illustrates some of the commodities, and an actual storage region 102 may include more goods. The layout of the convenience store shown in FIG. 1 is a functional region division rather than an actual physical region division. In an example, multiple entrance regions 101, storage regions 102, and exit regions 103 may be in a combined layout instead of being separately arranged.

The convenience store 100 in FIG. 1 may further include a shopping management system 104. The shopping management system 104 may perform communication interaction with the entrance region 101, the storage region 102, and the exit region 103. Further referring to FIG. 2, FIG. 2 illustrates the layout of the convenience store more specifically. For example, some shopping carts 201 may be placed in the entrance region 101 of the convenience store 100, and the consumer 202 may push one shopping cart 201 to contain picked commodities when entering the convenience store. Of course, in other examples, the shopping cart 201 may also be replaced with a shopping basket, a shopping bag, and other containers. Some storage racks 203 may be placed in the storage region 102, and many commodities may be placed on the storage racks 203, such as bananas 2031 and milk 2031 illustrated in FIG. 2. The consumer may place the picked commodities into the shopping cart 201. After finishing shopping, the consumer may enter the exit region of the convenience store, and push the shopping cart 201 to exit the convenience store via an exit channel 204,

without waiting in a queue for settlement. One exit channel 204 can generally allow one person pushing the shopping cart to pass in sequence.

In an example, the present disclosure may attach Radio Frequency Identification (RFID) tags to each shopping cart and to each commodity. For example, in FIG. 2, an
5 RFID tag 205 is attached to the shopping cart, and an RFID tag 206 is attached to the commodity on the storage rack 203. Each shopping cart is attached with a different tag, and the tag includes identifier information of each shopping cart. Likewise, the tags on different commodities contain different information, and the tag includes identifier information of a corresponding commodity.

10 As shown in FIG. 2, the convenience store may also be installed with multiple readers for receiving RFID tag signals at positions such as wall and roof. For example, a reader 207 is installed in the entrance region, a reader 208 is installed in the storage region, and a reader 209 is installed in the exit region. The readers may transmit received RFID tag information to the shopping management system 104. The shopping
15 management system 104 may store and process the information. In addition, the convenience store may also be installed with monitoring devices such as a camera 210. These monitoring devices can be used for video surveillance in the store, and the monitoring information may also be transmitted to the shopping management system 104. The shopping management system 104 may also transmit the information in the
20 system by using network devices installed in the store, such as a wireless antenna, to other devices for presentation. For example, the information may be transmitted to a smart phone carried by the consumer, such that the consumer can conveniently check the information acquired by the shopping management system on the mobile phone.

The shopping management system 104 may be a local or remote server system,
25 which may include many computing and processing devices. For example, FIG. 2 illustrates two computing devices, and there may be more computing devices in actual implementation. As shown in FIG. 3, a computing device may include a processor 301, an input/output interface 302, a network interface 303, and a memory 304. The processor 301, the input/output interface 302, the network interface 303, and the memory 304 may
30 be connected to each other and communicate with each other via a bus 305. FIG. 3 only illustrates some of the components, and an actual computing device may include more or fewer components. The memory 304 may further include a data management module 3041 and a shopping management module 3042. These modules may be in the form of

hardware or software, and when being in the form of software, the modules may be computer executable programs.

For example, the computing device may receive, through the network interface 303, information transmitted by devices such as an RFID tag and a camera in the convenience store, and process the information (which will be described in detailed in the subsequent examples) such as location information obtained by locating a shopping cart or a commodity through an RFID tag, or member ID information transmitted by the consumer. The processor 301 may process the received information by executing an instruction of the shopping management module 3042 to obtain some latest data, such as information of a consumer newly entering a convenience store, commodity location information, shopping cart location information, or order information of the consumer. Moreover, the processor 301 may update these data into a database 305 by executing an instruction of the data management module 3041.

In an example, the database 305 may store data. For example, the data may include user information, location information, and order information. The user information may be some member IDs of registered users of the shopping management system, the location information may be information obtained by locating the commodity and the shopping cart described in the subsequent examples, and the order information commodities picked by the consumer. Moreover, the computing device may update the information according to latest received data. For example, the user information may be updated when a new user is registered, the location information of a commodity may be updated during real-time locating for the commodity, and further, the order information may be updated according to the change of commodities in an order. In addition, the computing device may also output the data in the database. For example, the order information may be extracted from the database and transmitted to other devices such as a mobile phone of the consumer, such that the consumer can check the information.

FIG. 4 illustrates a process of order information determination. When a consumer enters a convenience store to purchase commodities, the consumer may push a shopping cart in an entrance region, put commodities on a storage rack into the shopping cart thereof in the shopping process, and directly push the shopping cart to leave the convenience store from an exit region after finishing shopping. In this process, the shopping management system may execute the process in FIG. 4, to complete the

order information determination, i.e., to determine which commodities in the convenience store are picked by the consumer.

When a consumer enters a convenience store to purchase commodities, the consumer may push a shopping cart in an entrance region. The shopping cart may be
5 attached with a two-dimensional code and an RFID tag. The two-dimensional code contains an identifier of the shopping cart, and different shopping carts have different identifiers. In this example, the shopping cart is for example used to contain commodities. In specific implementation, the commodity container used to contain commodities picked by a user is not necessarily a shopping cart, and may also be, for
10 example, a shopping basket, a shopping case, etc. The two-dimensional code attached to the commodity container may contain a container identifier for identifying the container, such as an identifier of a shopping basket.

In step 401, for example, a user may scan the two-dimensional code on the shopping cart by using shopping software installed on his/her own smart phone. The
15 shopping software may be a client of the shopping management system, and the user has logged, on the mobile phone, into a member ID registered in the client terminal. The member ID may be referred to as a user identifier. When the user scans the two-dimensional code through the client, the member ID may be bound with the identifier of the shopping cart. The client may further upload the acquired identifier of the
20 shopping cart to the shopping management system. In this way, the shopping management system may receive binding information between the member ID and the identifier of the shopping cart member. This is equivalent to learning which shopping cart is used by the user. The shopping management system may store a corresponding relationship into a database 305.

25 The user pushes the shopping cart into a storage region to pick commodities. In the entire convenience store, RFID tags attached to the shopping cart and commodities may be located through an RFID reader 208 and the like installed in the store. For example, the reader 208 may receive tag signals sent by the RFID tags on a commodity and a commodity container. The tag signals may include commodity information and a
30 container identifier. For example, the commodity information may include a commodity code for uniquely identifying the commodity. In step 402, the reader 208 may transmit the tag signals to the shopping management system, and the shopping management system may perform location calculation according to the tag signals to obtain location

information of the location tag on the commodity and location information of the location tag on the commodity container. For example, with reference to FIG. 3, the processor 301 on the computing device may execute executable code in the shopping management module 3042, perform location calculation according to the tag signals, and store the calculated location information into the database 305 by executing executable code in the data management module 3041. This step may implement locating according to an ordinary RFID location technology.

In step 403, the shopping management system may calculate a distance between the location tag on the commodity and the location tag on the commodity container according to the location information. The distance between the two tags is equivalent to a distance between the commodity and the shopping cart. Moreover, the shopping management system may further set a predetermined distance range w , where $w=[0,d]$, $d>0$, and w is a distance range. It is judged whether the distance between the two tags is in the predetermined range. In step 404, if the distance is in the predetermined range, commodity information of the commodity may be added to an order, and the order is an order of a user identifier corresponding to the container identifier. That is, the commodity is added to the order of the user, indicating that the user picks the commodity and puts the commodity into the shopping cart. If the distance is not in the predetermined range, the commodity is not added to the order, and the user does not pick the commodity.

In the order information determination in the present disclosure, a commodity and a shopping cart are located, and then an order to which the commodity belongs is determined. This manner is more accurate in order determination. For example, even if many persons pick up commodities on a storage rack at the same time, it is required to judge a location relationship between the commodity and each shopping cart, and an order to which the commodity belongs can be determined only when the distance is short and falls within the predetermined range. For another example, even if the user puts an extremely similar commodity back to a wrong position, this will not affect the final determination of a position relationship between the commodity and the shopping cart. The method may not be affected by many misleading factors, thus being more accurate in judging an order to which the commodity belongs.

The above processing of determining the order to which the commodity belongs according to the judgment on the distance between the commodity and the shopping cart

may be performed at any time after the user enters the convenience store. In other words, after the user scans the two-dimensional code on the shopping cart by using shopping software on the smart phone, the shopping management system may start to locate the RFID tag on this shopping cart, and may perform real-time monitoring on locations of all the commodities in the convenience store all the time.

In an example, FIG. 5 illustrates a process of order information determination. As shown in FIG. 5, in step 501, after scanning a two-dimensional code on a shopping cart, a user pushes the shopping cart to start shopping in a convenience store. At this time, the shopping management system has acquired a container identifier corresponding to a user identifier and has learned which shopping cart is used by the user to contain picked commodities. In step 502, when the user picks commodities in a commodity storage region, the shopping management system locates the shopping cart of the user and the commodities in the convenience store all the time, and according to a distance between a commodity and a commodity container, add commodity information of the commodity to an order of the user when the distance is in a predetermined range w.

When adding the commodity to the order of the user, the shopping management system may update data of order information in the database 305, i.e., the picked commodity in the order of the user is updated. Moreover, the shopping management system may further send the order information to a smart phone of the user. As shown in FIG. 3, a client installed on the smart phone of the user may have a shopping cart information interface that can display a list of commodity order information. The user can see the following information: "You have picked the following commodities: bananas and apples", such that the user can know changes in the order at any time. Moreover, the quantity of commodities picked by the user or more other commodity information such as origins of the commodities may be further displayed.

The shopping management system may locate the commodities in the shopping cart and the convenience store in real time, and pay attention to location changes all the time. If it is found that a distance between a commodity and the shopping cart changes from being in the predetermined range to being out of the predetermined range, a possible situation is that the user puts the commodity into the shopping cart and then puts the commodity back to the storage rack since he/she does not want to purchase the

commodity. Therefore, the shopping management system may remove the commodity from the order.

In step 503, when the shopping management system determines, according to location information obtained by locating an RFID tag, that the user arrives at an exit region, it indicates that the user finishes shopping and wants to leave the convenience store. The shopping management system may check the order again in step 504. For example, the shopping management system may identify and locate the shopping cart and the commodity again to judge their location relationship. If the distance between the shopping cart and the commodity is in the predetermined range w , it is judged whether the commodity has been added to the order of the user corresponding to the shopping cart. If the distance between a commodity and the shopping cart is within w but the commodity is not in the order, an alarm may be triggered in step 505.

After being triggered, the alarm may be automatically released if the commodity is put back to a region where it is picked; otherwise, manual intervention may be performed for processing. With reference to FIG. 2, multiple cameras may further be installed in the convenience store, such as a camera 210. Video information collected by the camera may also be transmitted to the shopping management system, and can be stored into the database. After the alarm is triggered, the video may be retrieved for manual intervention. In addition, if the shopping management system finds that the location of an RFID tag of a commodity in the convenience store suddenly disappears, it is possible that someone has damaged the RFID tag on the commodity. In this case, the shopping management system may also trigger an automatic alarm to perform a manual intervention process.

In other examples, whether the distance between the commodity and the commodity container is in the predetermined range w may also be determined according to locations of the commodity and the commodity container only after it is determined that a user has arrived at the exit region. That is, a correlation between the commodity and the shopping cart is determined only in the exit region to obtain order information. Judgment of the order information may not be conducted in the storage region. In addition, the present disclosure does not exclude the use of other auxiliary judgment technologies for assisting in the order information determination. For example, assistance may be provided in video information capture of the camera, or multiple auxiliary sensors may be provided.

After determining the order information, the shopping management system may generate a to-be-paid bill according to the order, and push the bill to the user. The user can pay in a capital account corresponding to a member ID of his/her own. The user needs to have a sufficient amount of money in the capital amount or able to connect to other payment channels having a sufficient amount of money to pay the bill; otherwise, the user may be prohibited to leave with commodities exceeding the payment capability or an alarm device is triggered to warn the user.

In the example disclosed in the present disclosure, that RFID tags are attached to the commodity and the shopping cart is taken as example, and the commodity and the shopping cart are located by using the RFID tags. The specific implementation is not limited to this. Locating may also be conducted in other locating manners. Other location tags may be attached to the commodity and the shopping cart, and other corresponding locating technologies are adopted for locating.

The method in the present disclosure can quickly and accurately determine order information of a consumer, and automatically complete settlement and payment of an order. The consumer can leave directly after finishing shopping, without waiting in a queue at a cashier desk for settlement. The efficiency of shopping is enhanced, and a good shopping experience is provided.

The present disclosure further provides an order information determination apparatus, which may be located in the shopping management module in FIG. 3 or the shopping management system in FIG. 1. As shown in FIG. 6, the apparatus may include: a container determination module 61, a distance determination module 62, and an order processing module 63.

The container determination module 61 is configured to acquire a container identifier of a commodity container, the container identifier being corresponding to a user identifier corresponding to the user, and the commodity container being used to contain the commodity picked by the user.

The distance determination module 62 is configured to determine a distance between the commodity and the commodity container according to location information obtained by locating the commodity and the commodity container.

The order processing module 63 is configured to add commodity information of the commodity to an order if the distance is in a predetermined range, the order being an order of the user identifier corresponding to the container identifier.

In an example, the distance determination module 62 is specifically configured to: receive tag signals sent by location tags on the commodity and the commodity container, the tag signals including the commodity information and the container identifier; locate the location tags according to the tag signals to obtain location
5 information of the location tag on the commodity and location information of the location tag on the commodity container respectively; and calculate a distance between the location tag on the commodity and the location tag on the commodity container according to the location information.

In an example, the distance determination module 62 is further configured to
10 determine, according to the location information, that the user arrives at an exit region.

In an example, the order processing module 63 is specifically configured to: determine a distance between the commodity and the commodity container in a commodity storage region, and add commodity information of the commodity to an order if the distance is in a predetermined range; check whether the commodity in a
15 predetermined range of the commodity container is added to the order when determining, according to the location information, that the user arrives at the exit region; and trigger an alarm if a commodity being in the predetermined range but not in the order is found.

The apparatus or module illustrated in the above embodiments may be
20 specifically implemented by using a computer chip or an entity, or a product having a certain function. A typical implementation device is a computer. Specifically, the computer may be, for example, 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 device, a game console, a tablet computer, a wearable device, or a
25 combination of any of these devices.

For ease of description, when the apparatus is described, it is divided into various units in terms of functions for respective description. Definitely, when the present disclosure is implemented, functions of the modules may be implemented in the same or multiple pieces of software and/or hardware.

30 The technical carrier involved in the payment in the embodiments of the present application may, for example, include Near Field Communication (NFC), WIFI, 3G/4G/5G, POS card swiping technology, two-dimensional code scanning technology,

bar code scanning technology, Bluetooth, infrared ray, Short Message Service (SMS), and Multimedia Message Service (MMS).

The above description is merely preferred embodiments of the present disclosure, and are not intended to limit the present disclosure. Any modification, equivalent replacement, improvement or the like made without departing from the spirit and principle of the present disclosure should all fall within the scope of claims of the present disclosure.

FIG. 7 is a flowchart illustrating an example of a computer-implemented method 700 for determining order information in an unmanned store, according to an implementation of the present disclosure. For clarity of presentation, the description that follows generally describes method 700 in the context of the other figures in this description. However, it will be understood that method 700 can be performed, for example, by any system, environment, software, and hardware, or a combination of systems, environments, software, and hardware, as appropriate. In some implementations, various steps of method 700 can be run in parallel, in combination, in loops, or in any order.

At 702, registration information including a container ID associated with a shopping container is received from a mobile device of a customer shopping at a store. The shopping container can be a shopping cart or shopping basket used to hold items selected by the customer at the store. The registration information can be obtained by scanning a quick response (QR) code attached to the shopping container. The scanned QR code can correspond to the container ID uniquely associated with the shopping container. In some cases, the customer can log on to a user account of an application associated with shopping at the store installed on the user's mobile device. The customer can scan the QR code attached to the shopping container using the application. From 702, method 700 proceeds to 704.

At 704, the customer's user account is associated with the container ID based on the registration information. In some cases, the user account of the customer can be associated with the container ID based on using the application associated with the customer's user account to scan the QR code to retrieve the container ID of a shopping container. In some cases, the user can register at or near the entrance of the store to generate a user account. A shopping management system can be used to associate the user account with a container ID associated with a shopping container selected by the

user. For example, the customer can present a QR code associated with a user account to a QR code scanner at or near the entrance of the store, the customer's user account ID can be scanned and saved by the shopping management system. When the customer selects a shopping container, the shopping management system can associate the container ID of the shopping container with the user account. Aside from scanning a QR code from a customer's mobile device, other identity recognition methods, such as identifying through Bluetooth or near field communications (NFC) from a Bluetooth or NFC enabled device of the customer, can be used. In some cases, biometric recognition or authentication methods can be used to identify or provide a customer's user account. For example, a customer can use facial recognition or input the user fingerprint information to enable the shopping management system to identify a user account. The shopping management system can then associate the identified user account to a shopping container selected by the user. From 704, method 700 proceeds to 706.

At 706, a radio frequency (RF) signal is detected from an RF tag attached to the shopping container. The RF tag can be an RFID or other sensor that can emit RF signal to identify the article it is attached to. The RF signal can be detected by one or more RF detectors installed in the store to determine the location of the shopping container. In some cases, the location of the shopping container can be determined in real-time. In some cases, the location of the shopping container can be updated based on the RF signal periodically. In some cases, the location of the shopping container can be determined based on the RF signal after the customer enters a check out region. From 706, method 700 proceeds to 708.

At 708, a plurality of RF signals can be detected from a plurality of RF tags attached to a plurality of corresponding items in the store. Similarly, the plurality of RF signals can be detected to determine the locations of the corresponding plurality of items. From 708, method 700 proceeds to 710.

At 710, the customer is checked out at a checkout area of the store. The customer check out can be activated when the customer enters the checkout area of the store. From 710, method 700 proceeds to 712.

At 712, one or more items of the plurality of items are determined to be within a predetermined distance from the shopping container based on the RF signal detected from the RF tag attached to the shopping container and the plurality of RF signals detected from the plurality of RF tags attached to the plurality of corresponding items.

After a checkout process starts, the shopping management system can determine which items are included in the customer's order. In other words, items included in the customer's order can be items selected by the customer and put into the shopping container. This can be determined based on relative locations of the items and the shopping container. If the locations of the items determined from the corresponding
5 detected RF signals are within a predetermined distance (for example, 1 meter), the items are determined to be included in the customer's order. From 712, method 700 proceed to 714.

At 714, an order including the determined one or more items are generated. From
10 714, method 700 proceeds to 716.

At 716, the order is associated to the customer's user account to be paid by the customer. In some cases, the order information can be sent to the customer's user account. The customer can review, confirm, or pay the order by using an application associated with the user account or from a checkout device installed in the store. In some
15 cases, the shopping management system can automatically charge the user account when the customer leaves the checkout area or exits the store.

The checkout area can be in proximity to the exit of the store. In some cases, an alarm can be sent to the shopping management system if a location of an item is determined to be within the predetermined distance from the location of the shopping
20 container but is not included in the order, or an RF signal of an item is no longer detectable. In some cases, human intervention can be used to determine if the item has failed to be registered to the order or the RF tag is damaged. After 716, method 700 stops.

Embodiments and the operations described in this specification can be
25 implemented in digital electronic circuitry, or in computer software, firmware, or hardware, including the structures disclosed in this specification or in combinations of one or more of them. The operations can be implemented as operations performed by a data processing apparatus on data stored on one or more computer-readable storage devices or received from other sources. A data processing apparatus, computer, or
30 computing device may encompass apparatus, devices, and machines for processing data, including by way of example a programmable processor, a computer, a system on a chip, or multiple ones, or combinations, of the foregoing. The apparatus can include special purpose logic circuitry, for example, a central processing unit (CPU), a field

programmable gate array (FPGA) or an application-specific integrated circuit (ASIC). The apparatus can also include code that creates an execution environment for the computer program in question, for example, code that constitutes processor firmware, a protocol stack, a database management system, an operating system (for example an
5 operating system or a combination of operating systems), a cross-platform runtime environment, a virtual machine, or a combination of one or more of them. The apparatus and execution environment can realize various different computing model infrastructures, such as web services, distributed computing and grid computing infrastructures.

10 A computer program (also known, for example, as a program, software, software application, software module, software unit, script, or code) can be written in any form of programming language, including compiled or interpreted languages, declarative or procedural languages, and it can be deployed in any form, including as a stand-alone program or as a module, component, subroutine, object, or other unit suitable for use in
15 a computing environment. A program can be stored in a portion of a file that holds other programs or data (for example, one or more scripts stored in a markup language document), in a single file dedicated to the program in question, or in multiple coordinated files (for example, files that store one or more modules, sub-programs, or portions of code). A computer program can be executed on one computer or on multiple
20 computers that are located at one site or distributed across multiple sites and interconnected by a communication network.

Processors for execution of a computer program include, by way of example, both general- and special-purpose microprocessors, and any one or more processors of any kind of digital computer. Generally, a processor will receive instructions and data
25 from a read-only memory or a random-access memory or both. The essential elements of a computer are a processor for performing actions in accordance with instructions and one or more memory devices for storing instructions and data. Generally, a computer will also include, or be operatively coupled to receive data from or transfer data to, or both, one or more mass storage devices for storing data. A computer can be embedded
30 in another device, for example, a mobile device, a personal digital assistant (PDA), a game console, a Global Positioning System (GPS) receiver, or a portable storage device. Devices suitable for storing computer program instructions and data include non-volatile memory, media and memory devices, including, by way of example, semiconductor

memory devices, magnetic disks, and magneto-optical disks. The processor and the memory can be supplemented by, or incorporated in, special-purpose logic circuitry.

Mobile devices can include handsets, user equipment (UE), mobile telephones (for example, smartphones), tablets, wearable devices (for example, smart watches and smart eyeglasses), implanted devices within the human body (for example, biosensors, cochlear implants), or other types of mobile devices. The mobile devices can communicate wirelessly (for example, using radio frequency (RF) signals) to various communication networks (described below). The mobile devices can include sensors for determining characteristics of the mobile device's current environment. The sensors can include cameras, microphones, proximity sensors, GPS sensors, motion sensors, accelerometers, ambient light sensors, moisture sensors, gyroscopes, compasses, barometers, fingerprint sensors, facial recognition systems, RF sensors (for example, Wi-Fi and cellular radios), thermal sensors, or other types of sensors. For example, the cameras can include a forward- or rear-facing camera with movable or fixed lenses, a flash, an image sensor, and an image processor. The camera can be a megapixel camera capable of capturing details for facial and/or iris recognition. The camera along with a data processor and authentication information stored in memory or accessed remotely can form a facial recognition system. The facial recognition system or one-or-more sensors, for example, microphones, motion sensors, accelerometers, GPS sensors, or RF sensors, can be used for user authentication.

To provide for interaction with a user, embodiments can be implemented on a computer having a display device and an input device, for example, a liquid crystal display (LCD) or organic light-emitting diode (OLED)/virtual-reality (VR)/augmented-reality (AR) display for displaying information to the user and a touchscreen, keyboard, and a pointing device by which the user can provide input to the computer. Other kinds of devices can be used to provide for interaction with a user as well; for example, feedback provided to the user can be any form of sensory feedback, for example, visual feedback, auditory feedback, or tactile feedback; and input from the user can be received in any form, including acoustic, speech, or tactile input. In addition, a computer can interact with a user by sending documents to and receiving documents from a device that is used by the user; for example, by sending web pages to a web browser on a user's client device in response to requests received from the web browser.

Embodiments can be implemented using computing devices interconnected by

any form or medium of wireline or wireless digital data communication (or combination thereof), for example, a communication network. Examples of interconnected devices are a client and a server generally remote from each other that typically interact through a communication network. A client, for example, a mobile device, can carry out transactions itself, with a server, or through a server, for example, performing buy, sell, pay, give, send, or loan transactions, or authorizing the same. Such transactions may be in real time such that an action and a response are temporally proximate; for example an individual perceives the action and the response occurring substantially simultaneously, the time difference for a response following the individual's action is less than 1 millisecond (ms) or less than 1 second (s), or the response is without intentional delay taking into account processing limitations of the system.

Examples of communication networks include a local area network (LAN), a radio access network (RAN), a metropolitan area network (MAN), and a wide area network (WAN). The communication network can include all or a portion of the Internet, another communication network, or a combination of communication networks. Information can be transmitted on the communication network according to various protocols and standards, including Long Term Evolution (LTE), 5G, IEEE 802, Internet Protocol (IP), or other protocols or combinations of protocols. The communication network can transmit voice, video, biometric, or authentication data, or other information between the connected computing devices.

Features described as separate implementations may be implemented, in combination, in a single implementation, while features described as a single implementation may be implemented in multiple implementations, separately, or in any suitable sub-combination. Operations described and claimed in a particular order should not be understood as requiring that the particular order, nor that all illustrated operations must be performed (some operations can be optional). As appropriate, multitasking or parallel-processing (or a combination of multitasking and parallel-processing) can be performed.

CLAIMS

1. A method for order information determination, the method comprising:

acquiring a container identifier of a commodity container, from a mobile device of a user, the
5 container identifier corresponding to a user identifier of the user, and the commodity container
being used to contain a commodity picked by the user;

determining, according to location information obtained by locating the commodity and the
commodity container, that the user arrives at an exit region;

determining a distance between the commodity and the commodity container according to
10 the location information, the location information of the commodity and of the commodity
container being updated in real time;

adding commodity information of the commodity to an order if the distance is in a
predetermined range, the order being the order of the user identifier corresponding to the container
identifier; and

15 checking whether the commodity in the predetermined range of the commodity container is
added to the order when it is determined, according to the location information, that the user arrives
at the exit region.

2. The method of claim 1, wherein determining the distance comprises:

20 receiving tag signals sent by location tags on the commodity and the commodity container,
the tag signals comprising the commodity information and the container identifier;

locating the location tags according to the tag signals to obtain location information of a
commodity location tag and location information of a commodity container location tag
respectively; and

calculating a distance between the commodity location tag and the commodity container location tag according to the location information.

3. The method of claim 2, wherein the location tags comprise a radio frequency identification (RFID) tag.

4. The method of claim 1, wherein determining the distance comprises:
determining the distance between the commodity and the commodity container in a commodity storage region, and adding commodity information of the commodity to the order if the distance is in the predetermined range.

5. The method of claim 1, wherein the method further comprises:
triggering an alarm if the commodity being in the predetermined range but not in the order is found.

6. The method of claim 1, wherein the method further comprises:
removing the commodity from the order if it is determined that the distance is changed from being in the predetermined range to being out of the predetermined range.

7. The method of claim 1, wherein the location information of the commodity is determined from signals received by multiple radio frequency readers in a store.

8. The method of claim 7, further comprising:
performing real-time monitoring of locations of all the commodities having location tags in the store all the time;

locating the commodity container of the user and the commodities in the store all the time;
determining whether the distance is in the predetermined range; and

in response to determining that the distance is in the predetermined range, adding commodity
information of the commodity to the order of the user according to the distance between the
5 commodity and the commodity container.

9. The method of claim 1, further comprising:

determining that a radio frequency signal from a first location tag of a first commodity is no
longer detectable and as a result triggering an alarm.

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10. The method of any one of claims 1 to 9, wherein the commodity information of the
commodity comprises a commodity code that uniquely identifies the commodity.

11. An apparatus for order information determination, the apparatus comprising a plurality of
15 modules configured to perform the method of any one of claims 1 to 10.