

Design of Payment System for Unmanned Convenience Store

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Abstract

The unattended convenience store system for customers to pay and pick up goods by self-service has disclosed a project to add e-commerce concept to the retail industry. The rise of the Internet has made e-commerce develop rapidly, and the development of network payment and cloud service has escorted e-commerce. But so far, e-commerce is difficult to be applied in the retail field because of people's shopping habits. This project comprehensively considers various factors, uses mechanical and electrical equipment automation, comprehensive deployment of cloud server, and key generation and verification to realize e-commerce concept in retail field.

Keywords

Unmanned Convenience Store; Payment; Internet of Things.

1. Introduction

The purpose of this part is to provide the background or context for the implementation of the design stated in the claims. The description herein is not recognized as prior art because it is included in this part. With the development of science and technology, unmanned convenience stores emerge as the times require. Unmanned convenience store usually refers to that users can complete the purchase of goods without the participation of service personnel in the whole process of shopping. After entering the unmanned convenience store, the user can purchase and purchase the items independently. After the selection, the user can settle the items by himself. In the current unmanned convenience store, users need to return to the pick-up point before settlement, which is troublesome.

2. Project Content

The design implementation example provides the return method, device and computer equipment of the unmanned convenience store to facilitate the user's return operation and optimize the user experience.

1) in the first aspect, the design embodiment provides a return method for the unmanned convenience store, which includes: the return end responds to the return operation, identifies and detects the returned goods, and generates the identification information and weight detection information of the returned goods; The server determines the returned goods information according to the goods identification information and weight detection information, and sends the returned goods information to the user; The client receives the returned goods information and displays the returned goods information in the shopping list in the first display mode; The return information of the customer is updated, and the service side completes the return operation according to the goods return list.

The return end responds to the return operation, carries out the item identification and weight detection for the returned goods, and generates the article identification information and weight detection information; In response to the goods detection command, the returned goods are photographed and the item identification information is generated; The return end

responds to the goods detection instruction to weigh the returned goods, and generates the weight detection information.

The server determines the returned goods information according to the goods identification information and weight detection information, and sends the returned goods information to the user;The server matches the characteristic information of the returned goods with that in the goods database, and determines the type of the returned goods according to the matching results;The server obtains the weight information of returned goods according to the type of returned goods;The server compares the weight detection information with the weight information to determine the quantity of returned goods;The server determines the returned goods information according to the type and quantity of returned goods;The server sends the returned goods information to the client.

Before the client receives the returned goods information and displays the returned goods information in the shopping list in the first display mode, the server determines the selected goods in response to the user's shopping operation;The client displays the information of the selected goods in the shopping list display interface in the second display mode;The client receives the returned goods information and displays the returned goods information in the shopping list in the first display mode, including: the client receives the returned goods information;The client modifies the selected goods in the shopping list into returned goods according to the returned goods information;The client displays the returned goods information in the shopping list display interface in the first display mode.

The client displays the returned goods information in the shopping list display interface in the first display mode, including:

The client displays the returned goods information in the first display mode in the shopping list display interface, and displays the unit price of the selected goods, the unit price of the returned goods, the total price of the shopping cart and the total price of the returned goods in the display interface of the shopping list.

The server responds to the confirmation operation, updates the user's shopping list according to the returned goods information, and notifies the return end that the return operation is completed;When the confirmation button is triggered, the client sends the confirmation instruction to the server;The server responds to the confirmation instruction, updates the user's shopping list according to the returned goods information, and informs the return end that the return operation is completed.

2) in the second aspect, the design embodiment provides a return device for the unmanned convenience store, including the return end, the server end and the user end. The return end is used to respond to the return operation, identify and weigh the returned goods, and generate the item identification information and weight detection information;The server is used to determine the returned goods information according to the item identification information and weight detection information, and send the returned goods information to the user;It is used to update the return list and complete the return operation according to the return information of the user;The client is used to receive the returned goods information and display the returned goods information in the shopping list in the first display mode.

3) in the third aspect, the design embodiment provides a computer device, including a memory and one or more processors;The memory is used for storing one or more programs;When the one or more programs are executed by the one or more processors, the one or more processors realize the unmanned convenience store return method as described in the first aspect.

4) in the fourth aspect, the design embodiment provides a storage medium containing computer executable instructions, which are used to execute the return method of unmanned convenience stores as described in the first aspect when executed by a computer processor.

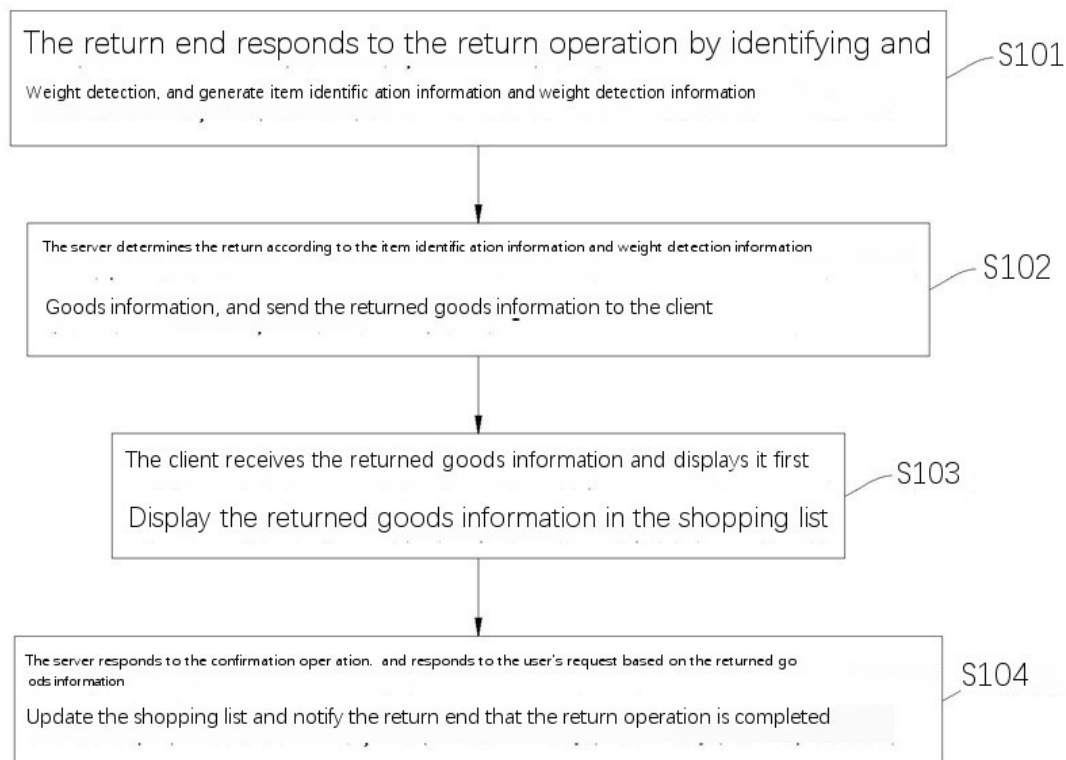


Figure 1. flow chart of return method of unmanned convenience store

3. Project Implementation Mode

Figure 1 shows the flow chart of the return method of the unmanned convenience store provided by the design embodiment. The design embodiment can be used in the unmanned convenience store. The return method of the unmanned convenience store can be implemented by the return device of the unmanned convenience store, which can be realized by hardware and / or software and integrated into the computer equipment.

The entrance guard (such as gate machine) is set at the entrance of the unmanned convenience store. Users can enter the unmanned convenience store for shopping through the entrance guard. There are many shelves for placing goods in the convenience store, and users can choose and buy goods from the goods displayed on the shelves.

A face recognition device is set at the entrance guard. The face recognition device obtains the picture before the entrance guard through the camera device, and carries out face recognition and obtains face features according to the acquired picture. After obtaining the face features of the entrance guard, the obtained face features are matched with the registered users in the registered user information database, and the account information of the matched registered users is obtained. The account information records the payment information used by the registered user for settlement and payment, and the account information is registered and recorded in the registered user information database by the user when the user registers. It can be understood that the account information can be modified by the corresponding user or administrator, and the content of the account information can be registered after the user has registered.

1) the return end responds to the return operation, identifies and detects the weight of the returned goods, and generates the identification information and weight detection information. For example, a return end is arranged at the exit of the unmanned convenience store, and a weighing device for weighing an object placed on the return end and a camera device for photographing the object placed on the weighing device are arranged on the return

end. Optional, the return end is also provided with a display screen for displaying the returned goods information and the corresponding quantity.

Step S101 specifically includes: the return end responds to the return operation and issues an item detection instruction; In response to the goods detection command, the returned goods are photographed and the item identification information is generated; The return end responds to the goods detection instruction to weigh the returned goods, and generates the weight detection information.

The return operation can be triggered by the return button set at the return end, and the return instruction can be generated by clicking the return button set at the user end and sent to the return end by the server. After triggering the return operation, the return end generates an item detection instruction and sends it to the weighing device and the camera device. At this time, the returned goods are detected and identified in response to the goods return command; The return end responds to the goods detection instruction to weigh the returned goods, and generates the weight detection information. For example, if there is only one user in the convenience store, the user who triggers the return operation can be directly determined as the user. In other optional embodiments, the determination of the user triggering the return operation can be confirmed by the face recognition confirmation of the user before the return end or the relative position of the user position obtained from the position of the return end and the human body tracking.

2) the server determines the returned goods information according to the goods identification information and weight detection information, and sends the returned goods information to the user.

Step S102 specifically includes:

S1021: the server obtains the characteristic information of returned goods according to the item identification information.

Specifically, the return end sends the identification information of the photographed goods to the server, and the server compares the real-time image taken with the background image of the returned goods placement area at the return end, so as to obtain the range of the returned goods and obtain the characteristic information of the returned goods within the range.

S1022: the server matches the characteristic information of returned goods with the commodity feature information in the article database, and determines the type of returned goods according to the matching results.

As an example, the server stores the basic information, price information, weight information, and commodity feature information of various types of commodities. After obtaining the characteristic information of the returned goods, the server will retrieve the commodity feature information of all the goods in the convenience store from the goods database, and match the feature information of the returned goods with the commodity features in the goods database one by one. After the matching is successful, it is determined that the commodity type of the returned goods is consistent with that of the matched commodities. Among them, the commodity feature information in the goods database is registered when the goods are put into the warehouse. The entry of the commodity feature information can be obtained through the external import, and can be collected and generated through the on-site influence, and the commodity feature information is saved in the article database when the goods are put into storage. The server also stores the basic information of various types of commodities, including commodity type, price information and weight information, and the basic information of the same type of commodity is bound with the commodity feature information.

S1023: the server obtains the weight information of returned goods according to the type of returned goods.

S1024: the server compares the weight detection information with the weight information to determine the quantity of returned goods.

Specifically, after determining the commodity type of the returned goods, the weight information of the returned goods is retrieved according to the commodity type, and the weight detection information is compared with the weight information to determine the quantity of the returned goods. For example, if the total weight of the returned goods is determined to be 50g according to the weight detection information, and the corresponding weight information in the commodity type determined according to the matching result is that the single weight of the commodity is 25g, then the quantity of the corresponding returned goods is determined to be 2 pieces.

S1025: the server determines the returned goods information according to the type and quantity of returned goods.

S1026: the server sends the returned goods information to the client.

3) the client receives the returned goods information and displays the returned goods information in the shopping list in the first display mode.

Specifically, when the user triggers the return operation, it displays the shopping list in the display interface, which includes the purchased goods and the corresponding quantity. After receiving the returned goods information, the user will change the display mode of returned goods in the shopping list into the first display mode in the display interface. The first display mode is different from the display mode of the goods in the shopping list. The first display mode can be highlighted, bold display, add delete line, etc.

S104: the server responds to the confirmation operation, updates the user's shopping list according to the returned goods information, and informs the return end that the return operation is completed.

After the confirmation of the shopping list, the user will respond to the confirmation of the shopping list, and then the user will respond to the confirmation of the shopping list. If the quantity of returned goods is consistent with the quantity of corresponding goods on the shopping list, the corresponding goods will be directly deleted from the shopping list. If the quantity of returned goods is less than the quantity of corresponding goods, the corresponding quantity of the goods can be subtracted from the shopping list.

After completing the update of the user's shopping list, the server sends the updated shopping list to the user, and the user displays the updated shopping list to facilitate the user to check. At the same time, the server sends the return completion notice to the return end. Alternatively, a conveying device for conveying the returned goods to the storage box is arranged on the return end, and the returned goods can be placed on the conveying device after the identification of the returned goods is completed. After receiving the return notification, the return terminal starts the conveying device to transfer the returned goods to the storage box.

When the user needs to return the selected goods, the user can return the goods at the return terminal set at the exit of the convenience store. According to the identification results and weight detection results of the goods, the returned quantity of the commodity type of the returned goods is determined and displayed in the user side. After the user confirms, the server updates the user's shopping list according to the returned goods information. It also informs the return end that the return operation is completed and the returned goods are recycled. The user does not need to go back to the shelf to put the returned goods back to their original position, so as to optimize the shopping process and improve the user experience.

On the basis of the above embodiment, Fig. 2 shows the flow chart of another return method provided by the design embodiment. The return method of the unmanned convenience store is the embodiment of the return method of the unmanned convenience store. Referring to figure 2, the return method of the unmanned convenience store includes:

S201: the server determines the selected product in response to the user's shopping operation.
S202: the client displays the selected product information of the selected product in the shopping list display interface in the second display mode.

Specifically, a weight detection device is set on the shelf of the convenience store to detect the weight of the goods on the shelf, output the shelf weight information reflecting the weight of the goods on the shelf, and upload it to the server in real time. The weight detection device can be a weight sensor set on the pallet of goods on the shelf. The weight of the goods on the pallet can be determined by detecting the deformation of the pallet. The electronic scale can also be used as the weight detection device to detect the weight of the goods placed on the pallet.

The weight detection devices in different positions are bound with the basic information of commodities placed in corresponding positions. Generally, one weight detection device corresponds to the basic information of a commodity, and the basic information of a commodity can be bound with multiple weight detection devices. It can be understood that the binding relationship between the weight detection device and the basic information can be specifically set according to the placement position of the commodity.

According to the shelf weight information output by the server-side weight detection device, the weight change of goods on the shelf is tracked, and when the weight reduction of goods on the shelf reaches the preset change, the goods on the shelf are considered to be selected by the user's shopping operation and taken away. When it is confirmed that the goods on the shelf are taken away, the selected goods are determined according to the basic information of the goods bound by the corresponding weight detection device, and the selected goods are added to the shopping list corresponding to the user.

Optionally, the basic information of the commodity includes the weight information of the commodity, and the reduced quantity of the commodity can be determined according to the weight change of the commodity and the weight information of the commodity on the weight monitoring device. When goods are added to the shopping list, the server determines the number of goods added to the shopping list according to the reduced number of goods on the shelves. If this type of goods does not exist in the shopping list, directly add this type of goods and mark the corresponding quantity; if this type of goods already exists in the shopping list, increase the corresponding quantity of the goods, so as to update the shopping list. When updating the shopping list, the server sends the updated shopping list to the user.

Meanwhile, after receiving the shopping list, the user terminal displays the selected commodity information of the selected commodity in the shopping list display interface in the second display mode. In this embodiment, the second display mode is different from the first display mode, and should be understood as a common display mode of shopping list.

S203: In response to the return operation, the return end carries out item identification and weight detection on the returned goods, and generates item identification information and weight detection information.

S204: the server determines the returned goods information according to the goods identification information and the weight detection information, and sends the returned goods information to the user.

S205: the user terminal receives the returned goods information.

S206: the user terminal modifies the corresponding selected goods in the shopping list into returned goods according to the returned goods information.

S207: the user terminal displays the returned goods information in the shopping list display interface in the first display mode.

4) In response to the return operation, the return end performs item identification and weight detection on the returned goods, generates item identification information and weight detection information, and obtains the image information of the user.

Specifically, after the return operation is triggered, the return end generates an item detection instruction and sends it to the weighing device and the camera set at the return end. At this time, the return end responds to the goods detection instruction to drive the camera to shoot the returned goods and generate goods identification information; The return end responds to the goods detection instruction to drive the weighing device to weigh the returned goods and generate weight detection information. The return end is also provided with a photographing device for obtaining the image information of the user who performs the return operation. When the return end responds to the return operation, the return end obtains the image information of the user through the photographing device and uploads it to the server.

S402: The server matches registered users in the registered user information database according to their image information, and locates the user who triggers the return operation according to the matching result.

S403: the server determines the returned commodity information according to the commodity identification information and the weight detection information, and sends the returned commodity information to the user terminal corresponding to the user who triggered the return operation.

After receiving the image information, the server obtains the face features in the image information, matches the image information with registered users in the registered user information base according to the face features, and after the matching is successful, locates the corresponding registered user as the user triggering the return operation according to the matching result, and obtains the account information of the registered user.

After the server determines the returned product information according to the product identification information and the weight detection information, it sends the returned product information to the corresponding user terminal according to the obtained account information.

S404: the user terminal receives the returned goods information and displays the returned goods information in the shopping list in the first display mode.

S405: The server responds to the confirmation operation, updates the shopping list of the user according to the information of the returned goods, and notifies the return end that the return operation is completed.

As mentioned above, by collecting the image information of the users who return goods at the return end, and matching the registered users from the registered user information base, the corresponding user end of the user is determined, the user who triggers the return operation is accurately positioned, the accuracy of the return operation is improved, and the user experience is optimized.

On the basis of the above embodiments, fig. 5 is a structural schematic diagram of the unmanned convenience store return device provided by this design embodiment. Referring to fig. 5, the unmanned convenience store return device provided in this embodiment includes a return terminal 53, a server terminal 52 and a user terminal 51.

Among them, the return terminal 53 is used to respond to the return operation, perform item identification and weight detection on the returned goods, and generate item identification information and weight detection information; the server 52 is used to determine the returned commodity information according to the item identification information and weight detection information. , sends the returned product information to the user terminal 51; and is used to respond to the confirmation operation, update the user's shopping list according to the returned product information, and notify the return terminal 53 that the return operation is completed; the user terminal 51 is used to receive the returned product information, and Display the returned product information in the shopping list in the first display mode.

As mentioned above, when the user needs to return the selected product, the return terminal 53 set at the exit of the convenience store can carry out the return operation for the product,

and according to the item identification result and weight detection result of the product, determine the return status of the product type of the returned product. After the user confirms, the server 52 updates the user's shopping list according to the returned product information, and notifies the return terminal 53 that the return operation is completed and the returned product is recycled without the need for the user to go Put the returned goods back on the shelf, optimize the shopping process, and improve the user experience.

4. Computer Equipment

The present design embodiment also provides a computer device, and the computer device can integrate the unmanned convenience store return device provided by the present design embodiment. FIG. 6 is a schematic structural diagram of a computer device provided in an embodiment of the present design. 6, the computer includes: an input device 63, an output device 64, a memory 62, and one or more processors 61; the memory 62 is used to store one or more programs; when the one or more programs are The one or more processors 61 execute, so that the one or more processors 61 implement the method for returning an unmanned convenience store as provided in the above-mentioned embodiments. The input device 63 , the output device 64 , the memory 62 and the processor 61 may be connected by a bus or in other ways, and the connection by a bus is taken as an example in FIG. 6 .

The memory 62, as a readable storage medium for a computing device, can be used to store software programs, computer-executable programs, and modules, such as program instructions/modules corresponding to the method for returning an unmanned convenience store described in any embodiment of the present design (for example, without (returning terminal, server and user terminal in the return device of the convenience store). The memory 62 may mainly include a storage program area and a storage data area, wherein the storage program area may store an operating system, an application program required for at least one function; the storage data area may store data created according to the use of the device, and the like. Additionally, memory 62 may include high-speed random access memory, and may also include non-volatile memory, such as at least one magnetic disk storage device, flash memory device, or other non-volatile solid-state storage device. In some instances, memory 62 may further include memory located remotely relative to processor 61, and these remote memories may be connected to the device through a network. Examples of such networks include, but are not limited to, the Internet, an intranet, a local area network, a mobile communication network, and combinations thereof.

The input device 63 can be used to receive input numerical or character information, and to generate key signal input related to user settings and function control of the device. The output device 64 may include a display device such as a display screen.

The processor 61 executes various functional applications and data processing of the device by running the software programs, instructions, and modules stored in the memory 62, ie, realizes the above-mentioned method for returning an unmanned convenience store.

5. Conclusion

In this design embodiment, when the user needs to return the selected product, the product can be returned at the return terminal set at the exit of the convenience store, and the return of the product type of the returned product can be determined according to the item identification result and the weight detection result of the product. After the user confirms, the server updates the user's shopping list according to the returned product information, and informs the return end that the return operation is completed and the returned products are recycled, without the need for the user to go back to the shelf Put the returned goods back in their original places, optimize the shopping process, and improve the user experience. The unmanned convenience

store return device and computer equipment provided above can be used to execute the unmanned convenience store return method provided by the above embodiments, and have corresponding functions and beneficial effects.

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