

System and Method for Realizing Identity Identification on the Basis of Radio Frequency Identification Technology

Technical Field

5 The present specification relates to the field of Internet technologies, and in particular, to a system and a method for realizing identity identification based on a radio frequency identification technology.

Background

10 Along with the development of various technologies, various identification technologies have been extensively applied in daily life. Taking a subway turnstile as an example, a user may pass through the turnstile and make payments by swiping a card. Taking offline electronic payments as an example, a user may use a cell phone to display a payment barcode to make payments. However, existing identification technologies still require users to present a card, a cell phone, or other articles, making it inconvenient. Moreover, if a user forgets to carry the
15 relevant article, the above functions will not be implemented.

Summary

 In view of the above, the present specification provides a system and a method for realizing identity identification based on a radio frequency identification technology.

20 For example, the present specification is implemented through the following technical solutions.

 A system for realizing identity identification based on a radio frequency identification technology comprises:

25 a radio frequency polling module configured on the ground to poll radio frequency tags and send, when a radio frequency tag is polled, information carried in the radio frequency tag to a control module;

 the control module configured to identify, according to the information, a user corresponding to the radio frequency tag, and send an execution signal to an execution module when the corresponding user is identified; and

30 the execution module configured to execute a predetermined operation upon reception of the execution signal from the control module.

 A method for realizing identity identification based on a radio frequency identification technology comprises:

 polling, based on a position on the ground, radio frequency tags;

35 identifying, when a radio frequency tag is polled, a user corresponding to the radio frequency tag according to information carried in the radio frequency tag; and

executing a predetermined operation after the user corresponding to the radio frequency tag is identified.

From the above description, it may be seen that the present specification may provide a radio frequency polling module on the ground to detect radio frequency tags carried in objects such as a user's shoes, and may identify the user according to information carried in the radio frequency tag. The user is not required to present a card, a cell phone, or other articles throughout the entire process. The implementation is convenient, fast, and secure, and the user experience is excellent.

Brief Description of the Drawings

FIG. 1 is a schematic structural diagram of an identification system illustrated in an exemplary embodiment of the present specification.

FIG. 2 is a schematic diagram of a radio frequency polling module illustrated in an exemplary embodiment of the present specification.

FIG. 3 is a schematic flow chart of a method for realizing identity identification based on a radio frequency identification technology illustrated in an exemplary embodiment of the present specification.

FIG. 4 is a top view of a turnstile system illustrated in an exemplary embodiment of the present specification.

Detailed Description

Exemplary embodiments will be described in detail below, and the examples of the embodiments are illustrated in the accompanying drawings. When the description below involves the accompanying drawings, identical numbers in different drawings represent identical or similar elements, unless otherwise indicated. The implementations described in the following exemplary embodiments do not represent all implementations that are consistent with the present specification. Conversely, they are only examples of devices and methods that are consistent with some aspects of the present specification as set forth in detail in the appended claims.

Terms used in the present application are only for the purpose of describing particular embodiments, rather than limiting the present application. "A," "the," and "said" in the singular form used in the present specification and the appended claims are intended to include the plural form as well, unless clearly indicated in the context to have other meanings. It should also be understood that the term "and/or" used in the present specification refers to and includes any or all possible combinations of one or more associated listed items.

It should be understood that terms such as first, second, third, and the like may be used in the present specification to describe various information, but the information shall not be limited to these terms. These terms are only used to differentiate information of the same type from each

other. For example, without departing from the scope of the present specification, first information may also be referred to as second information, and similarly, second information may also be referred to as first information. Depending on the context, the term “if” used here may be construed as “when...” or “at the time of...” or “in response to determination.”

5 The present specification provides a solution for identity identification based on a radio frequency identification technology, which may be implemented through cooperation between an identification system and radio frequency tags.

Here, the radio frequency tags may be placed within a shoe of a user, for example, attached to the shoe bottom, hung to the shoe side, and the like. The user may bind his/her
10 identity information with the radio frequency tag in advance to facilitate the subsequent implementation of identity identification. The radio frequency tags may also be placed within other clothing objects of the user, for example, at the trim of a trouser, which is not particularly limited in the present specification.

Referring to FIG. 1, the identification system 100 may comprise a radio frequency polling
15 module 101, a control module 102 and an execution module 103.

Here, the radio frequency polling module 101 may be configured on the ground to poll radio frequency tags.

In some embodiments, the radio frequency polling module 101 and radio frequency tags may adopt the NFC (Near Field Communication) technology for data transmission, or may adopt
20 the ultrahigh frequency RFID (Radio Frequency Identification) technology for data transmission, which is not particularly limited in the present specification.

Referring to a schematic diagram of the radio frequency polling module 101 shown in FIG. 2, the radio frequency polling module 101 may comprise a power supply input for inputting a power supply. The radio frequency polling module 101 may typically further comprise a
25 communication interface, which may be a wired communication interface, such as a serial port, a USB port, a network port, and the like. The communication interface may also be a wireless communication interface, such as Bluetooth, GPRS (General Packet Radio Service), Wi-Fi (Wireless-Fidelity), 3G (the 3rd Generation mobile communication technology), 4G (the 4th Generation mobile communication technology), and the like, which is not particularly limited in
30 the present specification.

In one example, the radio frequency polling module 101 may be placed on the ground in the form of a floor mat to be flat on the ground.

In another example, the radio frequency polling module 101 may also be exposed on the ground, such as 5 cm above the ground. In such an implementation, referring to FIG. 2 again, an
35 inclined slope is provided on the user side of the radio frequency polling module 101 to prevent

users from bumping into the module.

After polling a radio frequency tag, the radio frequency polling module 101 may obtain information carried in the radio frequency tag, such as user account information and the like. Subsequently, the obtained information may be sent to the control module 102 via the above communication interface.

For example, when the user puts on shoes attached with a radio frequency tag and steps on the radio frequency polling module 101 placed on the ground, the radio frequency polling module 101 may obtain information carried in the radio frequency tag, and then send the information to the control module 102, so that the control module 102 identifies the identity of the user.

The control module 102 may be a CPU, an FPGA (Field Programmable Gate Array), an MCU (Microcontroller Unit), and the like, which is not particularly limited in the present specification.

Upon receiving the above-described information sent from the radio frequency polling module 101, the control module 102 may identify, according to the information, a user corresponding to the radio frequency tag.

For example, a local database may be searched according to the information to determine a user corresponding to the radio frequency tag.

As another example, the information may also be sent to a server, and the server searches for a user corresponding to the information and then returns a search result to the control module 102.

After determining that a user corresponding to the information, i.e., a user corresponding to the radio frequency tag, has been identified, the control module 102 may send an execution signal to the execution module 103.

Upon receiving the execution signal from the control module, the execution module 103 may execute a predetermined operation.

The predetermined operation may be related to an application scenario in which the identification system 100 is located.

In one example, when the identification system 100 is applied to a turnstile system, the predetermined operation may be controlling a barrier of the turnstile to open to allow a user to pass through.

In another example, when the identification system 100 is applied to a POS system, the predetermined operation may comprise: obtaining a bill of a user.

For example, a cash register page is output via a visual interface to a cashier, so that the cashier inputs an amount of consumption by the user.

As another example, an infrared identification device may also be turned on to scan products selected by a user and to calculate the price.

In an exemplary application, the identification system 100 may also be applied to other application scenarios, which is not particularly limited in the present specification.

From the above description, it may be seen that the present specification may provide a radio frequency polling module on the ground to detect radio frequency tags carried in objects such as a user's shoes, and may identify the user according to information carried in the radio frequency tag. The user is not required to present a card, a cell phone, or other articles throughout the entire process. The implementation is convenient, fast, and secure, and the user experience is excellent.

Optionally, in another example, for a scenario with a higher security level, the identification of radio frequency tags may also be combined with other identification manners to improve the security.

For example, the identification of radio frequency tags may be combined with face image recognition. In such implementation, the identification system 100 may further comprise an image collecting module (not shown) configured to collect a face image and send the collected face image to the control module 102.

According to the face image, the control module 102 may identify a corresponding user based on a local database, or may send the face image to a server, so that the server assists the identification.

When the user corresponding to the radio frequency tag and the user recognized from the face image are the same, the control module 102 may send an execution signal to the execution module 103.

Here, the timing for the image collecting module to collect a face image may be after the control module 102 has identified the user corresponding to the radio frequency tag, with the collection triggered by the control module 102; or may be after the control module 102 receives the information sent by the radio frequency polling module 101, with the collection triggered by the control module 102; or may be similar to the radio frequency polling module 101 where the collection is performed in a polling manner, which is not particularly limited in the present specification.

In still another example, the identification of radio frequency tags may be combined with fingerprint recognition, the identification of radio frequency tags may be combined with iris recognition, etc., which is not particularly limited in the present specification.

FIG. 3 is a schematic flow chart of a method for realizing identity identification based on a radio frequency identification technology illustrated in an exemplary embodiment of the

present specification.

Referring to FIG. 3, the method for realizing identity identification based on a radio frequency identification technology may be applied in the identification system shown in FIG. 1, and may comprise the following steps.

5 Step 302. Poll, based on a position on the ground, radio frequency tags.

Step 304. Identify, when a radio frequency tag is polled, a user corresponding to the radio frequency tag according to information carried in the radio frequency tag.

Step 306. Execute a predetermined operation after the user corresponding to the radio frequency tag is identified.

10 The implementation process of the modules of the identification system 100 in the exemplary embodiment shown in FIG. 1 may be referenced for an exemplary implementation process of the above steps in embodiments of the method, which will not be elaborated in the present specification.

15 An exemplary implementation of the present specification will be described below with reference to an exemplary application scenario.

I. The identification system is applied to a turnstile

In some embodiments, data transmission performed by the radio frequency polling module and radio frequency tags with the NFC technology is used as an example for description.

20 Referring to the top view of a turnstile system shown in FIG. 4, the turnstile system 400 comprises: an NFC floor mat 401, a box body 402, and a barrier 403.

Here, the NFC floor mat 401 may be placed at the entrance at the user side of the turnstile, and the NFC floor mat 401 may poll NFC tags at a predetermined interval, for example, poll NFC tags at an interval of 100 ms.

25 Modules such as a control module (not shown), an execution module (not shown), and the like may be provided inside the box body 402, which is used for protecting the internal parts including the control module, the execution module, and the like, and plays as a support.

The barrier 403 is used for allowing or blocking the pass of a user.

30 Taking the application of the turnstile system 400 at a bus station as an example, a user Xiao Bai has bound the NFC tag attached inside his/her shoes with his/her user account in advance. When Xiao Bai goes to the bus station to take a bus, Xiao Bai steps on the NFC floor mat 401, the NFC floor mat 401 may poll the NFC tag in Xiao Bai's shoes, obtain the account information of Xiao Bai carried in the NFC tag, and then send the account information to the control module inside the box body 402.

35 The control module may send the account information to a server, and the server identifies the user account of Xiao Bai according to the account information and then returns a

message of successful identification to the control module.

Upon receiving the message of successful identification, the control module may send an execution signal to the execution module, and then the execution module may control the barrier 403 to open, to allow Xiao Bai to pass through.

5 In some embodiments, the control module may also send a payment request to the server, and the payment request carries the account information of Xiao Bai and the amount required for the current bus ride by Xiao Bai. Upon receiving the payment request, the server may deduct the above amount from the account of Xiao Bai based on the account information of Xiao Bai, thereby realizing the payment of the bus expense.

10 Optionally, after successfully deducting the above amount, the server may also send a payment deduction message to Xiao Bai.

Here, the timing for the control module to send the payment request may be when the message of successful identification is received, or may be after the execution module controls the barrier 403 to open, which is not particularly limited in the present specification.

15 In another example, an auxiliary module (not shown) may be further provided inside the box body 402. Upon receiving the message of successful identification, the control module may further send a control signal of successful identification to the auxiliary module, so that the auxiliary module outputs corresponding prompt information, such as a sound, a light, and the like, to prompt Xiao Bai that the identification is successful and passage is allowed.

20 Optionally, if no corresponding user may be identified according to the account information, for example, the NFC tag does not carry account information or the carried account information is invalid, the identification may be determined as failed. The control module may send a control signal of failed identification to the auxiliary module, so that the auxiliary module outputs corresponding prompt information, such as a sound, a light, and the like, to prompt Xiao
25 Bai that the identification is failed, passage is not allowed at this moment, and identification may be performed again.

In another turnstile application scenario, the turnstile system 400 shown in FIG. 4 may also be applied to subway entrances and exits. Unlike bus stations, segment pricing is typically used for a subway, i.e., the amount paid by a user for subway rides is related to the distance of
30 the rides. In such application scenario, NFC floor mats may be provided for turnstile systems at subway entrances and exits.

When a user enters a station, the control module of the entrance turnstile may store a correspondence relationship between the account information of the user and the entering station after identifying the user. When the user exits a station, the control module of the exit turnstile
35 may search for the entering station according to the account information of the user, then

calculate the amount for the current subway ride by the user according to the exiting station and the entering station, generate a payment request and send the payment request to the server.

In another turnstile application scenario, the turnstile system 400 shown in FIG. 4 may also be applied at ticket gates of train stations and tourist attractions.

5 Taking a ticket gate at a tourist attraction as an example, the user Xiao Bai may bind his/her identity information with the NFC tag in his/her shoes in advance. For example, his/her ID number is bound with the NFC tag. After Xiao Bai successfully purchases a ticket to the tourist attraction, the tourist attraction's system may store the ID number of Xiao Bai into a predetermined database of purchased tickets.

10 When Xiao Bai goes to the tourist attraction and steps on the NFC floor mat of the ticket gate turnstile, the NFC floor mat may obtain the ID number of Xiao Bai carried in the NFC tag in the shoes of Xiao Bai, and then may send the ID number to the control module.

The control module searches the database of purchased tickets according to the ID number. If the search finds a match, the control module may determine that Xiao Bai has
15 purchased a ticket and send an execution signal to the execution module, and the execution module may then control the barrier 403 to open, to allow Xiao Bai to pass through.

From the above description, it may be seen that the identification system provided by the present specification may be applied in payment, ticket checking, and other various turnstile systems. The identification may be realized without requiring the user to present a card, a ticket,
20 or other articles. The implementation is convenient, fast, and secure, and the user experience is excellent.

II. The identification system is applied to a POS system of a merchant

In some embodiments, data transmission performed by the radio frequency polling module and radio frequency tags with the NFC technology is used as an example for description.

25 Taking the application of the identification system to a POS system of a restaurant as an example, an NFC floor mat may be placed on the ground in front of a checkout counter. When a user checks out at the checkout counter, both feet are on the NFC floor mat. The NFC floor mat then obtains the account information of the user carried in the NFC tag in the shoes of the user, and then the control module identifies the user according to the account information.

30 If a corresponding user is successfully identified, the control module may send an execution signal to the execution module, and then the execution module may output a cash register page to a cashier of the restaurant. The cashier may manually input an amount of consumption by the user, so that the control module initiates a payment request to a server.

Taking the application of the identification system to a supermarket with self-checkout as
35 an example, an NFC floor mat may also be placed on the ground in front of a checkout counter.

When a user checks out at the checkout counter, both feet are on the NFC floor mat. The NFC floor mat then obtains the account information of the user carried in the NFC tag in the shoes of the user, and then the control module identifies the user according to the account information.

If a corresponding user is successfully identified, the control module may send an execution signal to the execution module, and then the execution module may turn on an infrared identification device, and the user scans products selected by himself/herself for pricing. When the user completes the scanning, the control module may initiate a payment request to a server according to the total amount.

Here, relevant technologies may be referenced for implementation of sending and paying the above payment requests, which will not be elaborated in the present specification.

From the above description, it may be seen that the identification system provided by the present specification may be applied in POS systems at supermarkets, restaurants and other merchants. The payment function may be realized without requiring the user to call a payment code of a cell phone. The implementation is convenient, fast, and secure, and the user experience is excellent.

The systems, devices, modules or units set forth in the foregoing embodiments may be achieved, for example, by computer chips or entities, or by products with certain functions. A typical implementation device is a computer. An exemplary form of the computer may be a personal computer, a laptop computer, a cell phone, a camera phone, a smart phone, a PDA (personal digital assistant), a media player, a navigation device, an email sending and receiving device, a game console, a tablet computer, a wearable device or a combination of any of these devices.

Particular embodiments of the present specification are described above, and other embodiments may fall within the scope of the appended claims. In some cases, actions or steps set forth in the claims may be executed in an order different from those in the embodiments and may still achieve desired results. In addition, processes depicted in the accompanying drawings may not necessarily require the illustrated particular order or a continuous order to achieve desired results. In some implementations, multi-task processing and parallel processing are also feasible or may be beneficial.

The above-described is only preferred embodiments of the present specification, which are not used to limit the present specification. Any modification, equivalent substitution, or improvement made within the spirit and principle of the present specification shall be encompassed by the claims of the present specification.

CLAIMS

1. A system for realizing identity identification based on a radio frequency identification technology, comprising:

a first radio frequency polling module configured on a ground of a first station of a train or subway system to poll radio frequency tags and send, when a radio frequency tag is polled, first information carried in a radio frequency tag to a control module;

an image collecting module configured to collect a face image and send the collected face image to the control module;

the control module configured to:

identify, according to the first information, a first account number corresponding to the radio frequency tag, and

determine, according to the collected face image, a second account number; and

a first execution module configured to control a barrier of an entrance turnstile of the first station to open, to allow the user to pass through when the first account number and the second account number match

a second radio frequency polling module configured on a ground of a second station of the train or subway system to poll radio frequency tags and send, when a radio frequency tag is polled, second information carried in the radio frequency tag to the control module;

the control module further configured to:

identify, according to second the information, the first account number corresponding to the radio frequency tag,

search for information of the first station according to the first account number, and

responsive to finding the information of the first station:

control a barrier of an exit turnstile of a second station to open, to allow the user to pass through,

calculate a payment amount according to the information of the first station and the information of the second station, and

generate a payment request comprising the payment amount.

2. The system according to claim 1,

wherein the control module is further configured to identify a corresponding user according to the face image, and when the user recognized from the face image and the user corresponding to the radio frequency tag are the same, send an execution signal to the execution module.

3. The system according to claim 1, wherein
the control module is further configured to send the payment request to a server.

4. The system according to claim 1, wherein the execution module executing a
predetermined operation comprises:
the execution module obtaining a bill of the user.

5. The system according to claim 1, wherein
the radio frequency tag is located inside a shoe of the user.

6. A method for realizing identity identification based on a radio frequency identification
technology, comprising:

polling, from a location on a ground of a first station of a train or subway system, radio
frequency tags;
identifying, when a radio frequency tag is polled from the location on the ground of the
first station of the train or subway system, a first account number corresponding to the radio
frequency tag according to information carried in the radio frequency tag;

collecting a face image;
determining, according to the collected face image, a second account number;
controlling a barrier of an entrance turnstile of the first station to open, to allow the user
to pass through when the first account number and the second account number match;

polling, from a location on a ground of a second station of the train or subway system,
radio frequency tags;
obtaining, when the radio frequency tag is polled from the location on the ground of the
second station, second information carried in the radio frequency tag;

identifying, according to the second information, the first account number corresponding
to the radio frequency tag,
searching for information of the first station according to the first account number, and
responsive to finding the information of the first station:

controlling a barrier of an exit turnstile of the second station to open, to allow the
user to pass through,

calculating a payment amount according to the information of the first station and
the information of the second station, and

generating a payment request comprising the payment amount

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7. The method according to claim 6, further comprising:

identifying a corresponding user according to the face image, and when the user
recognized from the face image and the user corresponding to the radio frequency tag are the
5 same, executing a predetermined operation.

8. The method according to claim 6, further comprising:
sending the payment request to a server.

10 9. The method according to claim 7, wherein the executing a predetermined operation
comprises:
obtaining a bill of the user.

10. The method according to claim 6, wherein
15 the radio frequency tag is located inside a shoe of the user.

11. A computer-readable storage medium comprising instructions stored thereon which,
when executed by a computing device, cause the computing device to perform the method of any
of claims 6-10.