

DATA PROCESSING METHOD, TERMINAL DEVICE, AND DATA PROCESSING SYSTEM

Technical Field

5 The embodiments of this disclosure relate to the technical field of computers, and particularly, to a data processing method, a terminal device and a data processing system.

Background

10 With the development of the Internet and the popularization of the mobile terminal device, the two-dimensional code has gradually been widely used in the daily life, such as the bus payment scenario.

 Generally, the entities involved in the bus payment scenario may include a mobile terminal device, a bus POS machine, a server corresponding to the mobile terminal device (hereinafter referred to as a first server), and a server corresponding to the bus POS machine
15 (hereinafter referred to as a second server). The user can use the mobile terminal device to generate a riding two-dimensional code, which may include payment information. The bus POS machine may scan the riding two-dimensional code to identify the payment information, and upload the payment information to the second server. The second server may receive the payment information, and send a deduction request to the first server. The first server may
20 receive the deduction request and then perform a deduction operation, and return deduction indication information to the mobile terminal device

 In order to enable the user to take a bus in a poor network condition, the bus POS machine is usually configured to delay uploading the identified payment information to the second server. In this way, after the user scans the code, the mobile terminal device cannot
25 immediately obtain the deduction indication information, thus the user can determine whether the code is scanned successfully only from the sound emitted by the bus POS machine, which results in a poor user experience. In particular, in case of failure in sounding of the bus POS machine, it may result in plural of code scanning of the user, thereby causing loss to the user.

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Summary

 An objective of the embodiments of the present disclosure is to provide a data

processing method, a terminal device and a data processing system, by which a user can conveniently determine whether a code is scanned successfully, and the user experience can be improved.

In order to achieve the above objective, an embodiment of the present disclosure provides a data processing method, including: generating, by a first terminal, a payment code, wherein the payment code includes connection information which includes a connection identifier of the first terminal; acquiring, by a second terminal, the payment code, establishing a wireless communication connection with the first terminal based on the connection identifier, and sending first indication information to the first terminal via the wireless communication connection, wherein the first indication information is for indicating whether a payment is successful; and receiving, by the first terminal, the first indication information via the wireless communication connection, and displaying the first indication information.

In order to achieve the above objective, an embodiment of the present disclosure provides a data processing method implemented in a first terminal, including: generating a payment code, wherein the payment code includes connection information which includes a connection identifier of the first terminal; receiving, in a condition that a wireless communication connection is established with a second terminal based on the connection identifier, first indication information sent from the second terminal via the wireless communication connection, wherein the first indication information is for indicating whether a payment is successful; and displaying the first indication information.

In order to achieve the above objective, an embodiment of the present disclosure provides a terminal device, including: a generating unit configured to generate a payment code, wherein the payment code includes connection information which includes a connection identifier of a first terminal; a receiving unit configured to receive, in a condition that a wireless communication connection is established with a second terminal based on the connection identifier, first indication information sent from the second terminal via the wireless communication connection, wherein the first indication information is for indicating whether a payment is successful; and a display unit configured to display the first indication information.

In order to achieve the above objective, an embodiment of the present disclosure provides a terminal device, including: a communication component configured to establish a wireless communication connection and carry out a data transmission; a display component

configured to display first indication information; and a processor configured to generate a payment code, wherein the payment code includes connection information which includes a connection identifier of a first terminal; receive, in a condition that a wireless communication connection is established with a second terminal based on the connection identifier, the first indication information sent from the second terminal via the wireless communication connection, wherein the first indication information is for indicating whether a payment is successful; and control the display component to display the first indication information.

In order to achieve the above objective, an embodiment of the present disclosure provides a data processing method applied to a second terminal, including: acquiring a payment code, wherein the payment code includes connection information which includes a connection identifier of a first terminal; sending, in a condition that a wireless communication connection is established with the first terminal based on the connection identifier, first indication information to the first terminal via the wireless communication connection, wherein the first indication information is for indicating whether a payment is successful.

In order to achieve the above objective, an embodiment of the present disclosure provides a terminal device, including: an acquiring unit configured to acquire a payment code, wherein the payment code includes connection information which includes a connection identifier of a first terminal; and a sending unit configured to send, in a condition that a wireless communication connection is established with the first terminal based on the connection identifier, first indication information to the first terminal via the wireless communication connection, wherein the first indication information is for indicating whether a payment is successful.

In order to achieve the above objective, an embodiment of the present disclosure provides a terminal device, including: a communication component configured to establish a wireless communication connection and carry out a data transmission; and a processor configured to acquire a payment code, wherein the payment code includes connection information which includes a connection identifier of a first terminal; send, in a condition that a wireless communication connection is established with a first terminal based on the connection identifier, first indication information to the first terminal via the wireless communication connection, wherein the first indication information is for indicating whether a payment is successful.

In order to achieve the above objective, an embodiment of the present disclosure

provides a data processing system, including a first terminal and a second terminal. The first terminal is configured to generate a payment code, wherein the payment code includes connection information which includes a connection identifier of the first terminal. The second terminal is configured to acquire the payment code, establish a wireless communication connection with the first terminal based on the connection identifier, send first indication information to the first terminal via the wireless communication connection, wherein the first indication information is for indicating whether a payment is successful. The first terminal is further configured to receive the first indication information via the wireless communication connection, and display the first indication information.

As can be seen from the technical solutions provided by the embodiments of the present disclosure, in the embodiments of the present disclosure, the first terminal may generate a payment code, wherein the payment code includes connection information which includes a connection identifier of the first terminal. The second terminal may acquire the payment code, establish a wireless communication connection with the first terminal based on the connection identifier, and send the first indication information to the first terminal via the wireless communication connection. The first terminal may receive the first indication information via the wireless communication connection, and display the first indication information. The first indication information may be used to indicate whether the payment is successful. In this way, with the first indication information displayed by the first terminal, the user can conveniently determine whether the code is scanned successfully, and the user experience is improved.

Brief Description of the Drawings

In order to more clearly explain the technical solutions in the embodiments of the present disclosure or in the prior art, the drawings to be used to describe the embodiments or of the prior art will be briefly introduced as follows. Obviously, the drawings in the following description merely illustrate some embodiments of the present disclosure, and persons of ordinary skill in the art may acquire other drawings from them without any creative effort.

Fig. 1 is a schematic diagram of a short-range wireless communication connection between a first terminal and a second terminal according to an embodiment of the present disclosure;

Fig. 2 is a flowchart of a data processing method according to an embodiment of the

present disclosure;

Fig. 3 is a flowchart of another data processing method according to an embodiment of the present disclosure;

Fig. 4 is a flowchart of still another data processing method according to an embodiment
5 of the present disclosure;

Fig. 5 is a schematic diagram of a payment code according to an embodiment of the present disclosure;

Fig. 6 is a schematic diagram of indication information for payment success according to an embodiment of the present disclosure;

10 Fig. 7 is a schematic diagram of indication information for payment failure according to an embodiment of the present disclosure;

Fig. 8 is a schematic diagram of a functional structure of a terminal device according to an embodiment of the present disclosure;

15 Fig. 9 is a schematic diagram of a functional structure of another terminal device according to an embodiment of the present disclosure;

Fig. 10 is a schematic diagram of a functional structure of still another terminal device according to an embodiment of the present disclosure;

Fig. 11 is a schematic diagram of a functional structure of yet another terminal device according to an embodiment of the present disclosure.

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Detailed Description

In the following, the technical solutions in the embodiments of the present disclosure will be clearly and completely described with reference to the drawings for the embodiments of the present disclosure. Obviously, those described are just a part, rather than all, of the
25 embodiments of the present disclosure. Any other embodiments obtained by persons of ordinary skill in the art, based on the embodiments described herein and without any creative effort, should fall within the protection scope of the present disclosure.

An embodiment of the present disclosure provides a data processing system.

30 In this embodiment, the data processing system may include a first terminal. The first terminal may have a function of generating a payment code. The payment code may include a graphical code, an acoustic code, etc., and the graphical code may include a bar code, a two-dimensional code, etc. The first terminal may further have a function of short-range wireless communication. The short-range wireless communication may refer to a

communication in a short distance, including but not limited to, Bluetooth, IrDA, WI-FI, Ultra Wide Band, Zigbee, Near Field Communication, NFC, etc. The first terminal may be a smart phone, a tablet electronic device, a portable computer, a personal digital assistant (PDA), or a smart wearable device, etc.

5 In this embodiment, the data processing system may further include a second terminal. The second terminal may have a function of scanning a payment code. The second terminal may further have a function of short-range wireless communication. The second terminal may be a mobile device, such as a smart phone, a tablet electronic device, a portable computer, a personal digital assistant (PDA), a vehicle-onboard device, a POS machine (such
10 as a merchant POS machine, a bus POS machine, etc.), or an intelligent wearable device, etc. The second terminal may also be a desktop device, such as a server, an industrial control computer, a personal computer (PC), an all-in-one machine, or an intelligent self-service terminal (kiosk) (e.g., a subway ticket vending machine, a train ticket vending machine), etc. In one embodiment, the second terminal may further have a speaker. The speaker may
15 generate sound waves which can be heard by human beings.

In one embodiment, the data processing system may further include a first server. The first server may be one server or a server cluster including multiple servers. The first server may be a server corresponding to the first terminal. For example, the first terminal may be a smart phone installed with an Alipay APP, and the first server may be an Alipay server.

20 In one embodiment, a data set transmission system may further include a second server. The second server may be one server or a server cluster including multiple servers. The second server may be a server corresponding to the second terminal. For example, the second terminal may be a bus POS machine, and the second server may be a server corresponding to the bus POS machine.

25 Referring to Figs. 1, 2, 5, 6 and 7, an embodiment of the present specification provides a data processing method. The entities that implement the data processing method may include a first terminal and a second terminal. In order to enable a data transmission, the function of short-range wireless communication of the first terminal and the second terminal may be in an ON state. The data processing method may include the following steps.

30 Step S10: a first terminal generates a payment code.

In this embodiment, the payment code may include a graphical code, an acoustic code, etc., and the graphical code may include a bar code, a two-dimensional code, etc.

The payment code may include connection information which may include a

connection identifier of the first terminal. The connection identifier may be used to establish a wireless communication connection. The connection identifiers may be the same or different depending on the differently established wireless communication connection. For example, when the wireless communication connection is established based on the Bluetooth technology, the connection identifier may be a physical address (Media Access Control (MAC)) of the first terminal. For another example, when the wireless communication connection is established based on the wireless fidelity technology, the connection identifier may be a Service set identifier (SSID) of the first terminal. Of course, when the wireless communication connection is established based on other technologies, the connection identifier may be other identifier of the first terminal and will not be enumerated here.

The payment code may further include payment information which may include user identification information. The user identification information may be used to identify a user. The user identification information may be, for example, a user account, a code of the user account, or any other form of information by which the user account can be determined. The user account may be, for example, an Alipay account, a WeChat account, a card number of a bus card, or a card number of a campus smart card etc. Of course, the payment information may further include other information, such as at least one of a single transaction limit and an expiration timing. The single transaction limit may be, for example, 10 CNY, 20 CNY, etc. The expiration timing may be, for example, 10: 30 or 11: 15, etc.

In this embodiment, the first terminal may generate the payment code after receiving a payment instruction.

The first terminal may have a payment key, and the payment instruction may be generated when it is detected that the payment key is triggered. Here, 'the payment key is triggered' includes, but is not limited to, the situations that the payment key is pressed, clicked, double-clicked, swept, pressed for more than a predetermined time, etc. The payment key may be a physical key, or a virtual key, etc., and the virtual key includes, but is not limited to, a button widget, a graphic widget, a text widget, etc. Alternatively, the first terminal may be preset with a gesture operation. The gesture operation may include a touch trajectory on a display component (e.g., a touch display). The first terminal may generate the payment instruction upon recognition of the preset gesture operation. Alternatively, the first terminal may have a sensor, which may be used for sensing a preset motion state and may specifically include, for example, a gyroscope and/or an acceleration sensor, etc. The first terminal may generate the payment instruction upon sensation of the preset motion state.

In this embodiment, the first terminal may acquire the connection information and the payment information, and generate, based on the acquired connection identifier and payment information, a payment code by using a payment code generation algorithm.

Depending on type of the wireless communication connection predetermined by the first terminal and the second terminal, the first terminal may acquire corresponding connection information. For example, when the predetermined type of wireless communication connection is Bluetooth, the first terminal may acquire its own physical address. For another example, when the predetermined type of wireless communication connection is wireless fidelity, the first terminal may acquire its own service set identifier.

10 The first terminal may acquire the user identification information. For example, the first terminal may acquire a currently logged-in account or a historically logged-in account as the user identification information. For another example, the first terminal may acquire a card number of the bus card or a card number of the campus smart card as the user identification information. In one embodiment, the first terminal may further acquire the single transaction limit. Specifically, the first terminal may preset a single transaction limit. The first terminal may acquire the preset single transaction limit. Alternatively, the first server may have a single transaction limit. The first terminal may send a data acquisition request to the first server. The first server may receive the data acquisition request and may acquire and send the single transaction limit to the first terminal. The first terminal may receive the single transaction limit. In another implementation of this embodiment, the first terminal may further acquire a valid time of the payment code, and calculate an expiration timing of the payment code based on the current timing and the valid time. The valid time of the payment code may come from the first terminal or the first server. Specifically, the first terminal may preset the valid time of the payment code. The first terminal may acquire the preset valid time. Alternatively, the first server may have the valid time of the payment code. The first terminal may send a data acquisition request to the first server. The first server may receive the data acquisition request and may acquire and send the valid time to the first terminal. The first terminal may receive the valid time.

In this embodiment, the payment code generation algorithm may be the same or different depending on the payment code to be generated. For example, when a two-dimensional code is to be generated, the payment code generation algorithm may be a Quick Response code (QR code) algorithm. Persons skilled in the art should understand that the QR code algorithm here is only an example, and in fact any algorithm capable of generating

a two-dimensional code can be applied here. Of course, when other payment codes are to be generated, the payment code generation algorithm may be other algorithms, and will not be enumerated here.

Step S12: the second terminal acquires the payment code.

5 In this embodiment, the user may use the payment code generated by the first terminal to perform a code scanning operation. The second terminal may scan to obtain the payment code. Persons skilled in the art should understand that the second terminal may further acquire the payment code generated by the first terminal in other ways, which are not specifically limited in this embodiment.

10 Step S14: the second terminal establishes a wireless communication connection with the first terminal based on the connection identifier, and sends first indication information to the first terminal via the wireless communication connection.

In this embodiment, the second terminal may parse the payment code to obtain the connection information and the payment information.

15 In this embodiment, the connection information may include a connection identifier of the first terminal. The first terminal may be regarded as a device requesting to establish a wireless communication connection, and the second terminal may also be regarded as a device requesting to establish a wireless communication connection. The second terminal may establish a wireless communication connection with the first terminal based on the
20 connection identifier.

In this embodiment, the first indication information may be used to indicate whether the payment is successful. Specifically, the first indication information may include indication information for payment success or indication information for payment failure. The indication information for payment success may include a text, an image, an audio, a
25 video and any combination thereof. Further, the indication information for payment success may include a payment amount. The indication information for payment failure may include a text, an image, an audio, a video and any combination thereof.

In this embodiment, after parsing the payment code, the second terminal may directly send the indication information for payment success to the first terminal. Alternatively, after
30 parsing the payment code, the second terminal may authenticate the payment information, send the indication information for payment success to the first terminal when a authentication result indicates “correct”, and send the indication information for payment failure to the first terminal when the authentication result indicates “wrong”.

For example, the payment information may include an expiration timing. After parsing the payment code, the second terminal may compare the current timing with the expiration timing, regard the authentication result as “correct” when the current timing is less than or equal to the expiration timing, and regard the authentication result as “wrong” when the
5 current timing is greater than the expiration timing.

For another example, the payment information may include a single transaction limit. The second terminal may determine the payment amount after parsing the payment code, compare the payment amount with the single transaction limit, and regard the authentication result as “correct” when the payment amount is less than or equal to the single transaction
10 limit, while regard the authentication result as “wrong” when the payment amount is greater than the single transaction limit. Here, the payment amount may be a preset default amount. Alternatively, the payment amount may be determined by the second terminal according to information input by the user. The information input by the user may include, for example, a destination station or the like. Alternatively, the payment amount may be determined by
15 the second terminal according to its current geographic location. For example, the second terminal may have a calculation rule. The second terminal may acquire its current geographic location, and calculate the payment amount based on the acquired geographic location and the calculation rule.

Step S16: the first terminal receives the first indication information via the wireless
20 communication connection, and displays the first indication information.

In this embodiment, the first indication information may include indication information for payment success or indication information for payment failure. The first terminal may receive and display the indication information for payment success or the indication information for payment failure.

25 In one embodiment, the first server may have at least one digital signature data. The digital signature data may be obtained by signing based on a private key of an asymmetric encryption technology. The asymmetric encryption technology includes, but is not limited to, an RSA algorithm, an Elgamal algorithm, a knapsack algorithm, an Elliptic Curve Cryptography (ECC), etc. Each digital signature data in the first server may correspond to a
30 public key for verifying the digital signature data, and a key identifier for identifying the public key.

In this embodiment, the first terminal may acquire digital signature data and a key identifier corresponding thereto, and generate the payment code based on the connection

information, the payment information, the digital signature data, and the key identifier.

The first server may issue at least one digital signature data and a key identifier corresponding thereto to the first terminal. In this way, the first terminal may have a digital signature data set. The digital signature data set may include at least one digital signature data, each of which may correspond to a key identifier. Thus, the first terminal may acquire one digital signature data and a key identifier corresponding thereto from the digital signature data set. Alternatively, the first terminal may send a data acquisition request to the first server. The first server may receive the data acquisition request, and acquire and send the digital signature data and the key identifier corresponding thereto to the first terminal.

10 The first terminal may receive the digital signature data and the key identifier corresponding thereto.

In this embodiment, the second terminal may acquire a payment code, parse the payment code to obtain connection information, payment information, digital signature data and a key identifier, acquire a public key identified by the key identifier as a target public key, and verify the digital signature data using the target public key. Further, the second terminal may send the first indication information to the first terminal after the verification. Specifically, the second terminal may send the indication information for payment success to the first terminal upon a successful verification. The second terminal may send the indication information for payment failure to the first terminal upon a failed verification.

20 The first server may issue a public key corresponding to at least one digital signature data to the second terminal. Thus, the second terminal may have a public key set, which may include at least one public key. In this way, the second terminal may acquire a public key corresponding to the key identifier from the public key set as a target public key.

In one embodiment, the second terminal may have a speaker. The second terminal may use the speaker to utter the sound indication information. Specifically, after parsing the payment code, the second terminal may directly use the speaker to utter the sound indication information for payment success. Alternatively, after parsing the payment code, the second terminal may authenticate the payment information, and use the speaker to utter the sound indication information for payment success when the authentication result is “correct”, while use the speaker to utter the sound indication information for payment failure when the authentication result is “wrong”.

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In one embodiment, the second server may perform a deduction operation. Specifically, the second terminal may determine a payment amount, and send the payment information

and the payment amount to the second server. The second server may receive the payment information and the payment amount. The payment information may include user identification information, the second server thus may perform a deduction operation based on the user identification information and the payment amount. Alternatively, the first server
5 may perform a deduction operation. Specifically, after receiving the payment information and the payment amount from the second terminal, the second server may send to the first server a deduction request which may carry the user identification information and the payment amount. The first server may receive the deduction request, and perform a deduction operation based on the user identification information and the payment amount.
10 Further, after performing the deduction operation, the first server may further send to the first terminal second indication information which may include indication information of success of deduction. The first terminal may receive and display the second indication information.

The second terminal may directly send the payment information and the payment
15 amount to the second server. Alternatively, the second terminal may send the payment information and the payment amount to the second server upon detection of a sending instruction, which may be automatically generated by the second terminal. For example, the second terminal may generate the sending instruction at a preset timing. The preset timing may be flexibly set according to actual needs, for example, 12:00 pm, 4:00 am, etc. For
20 another example, the second terminal may generate the sending instruction if it is detected that its own network connection is available. Of course, the sending instruction may also be actively triggered by the user. For example, the second terminal may have a sending key, and may generate the sending instruction if it is detected that the sending key is triggered. Here, 'the sending key is triggered' includes, but is not limited to, the situations that the sending
25 key is pressed, clicked, double-clicked, swept, pressed for more than a predetermined time, etc. The sending key may be a physical key, or a virtual key, etc., and the virtual key includes, but not limited to, a button widget, a graphic widget, a text widget, etc.

In this embodiment, the first terminal may generate a payment code, the payment code includes connection information which includes a connection identifier of the first terminal.
30 The second terminal may acquire the payment code, establish a wireless communication connection with the first terminal based on the connection identifier, and send the first indication information to the first terminal via the wireless communication connection. The first terminal may receive the first indication information via the wireless communication

connection, and display the first indication information. The first indication information may be used to indicate whether the payment is successful. In this way, with the first indication information displayed by the first terminal, the user can conveniently determine whether the code is scanned successful, and the user experience is improved.

5 Please refer to Fig. 3. An embodiment of the present disclosure further provides another data processing method. The entities that implement the data processing method may include a first terminal. In order to enable a data transmission, the function of short-range wireless communication of the first terminal may be in an ON state. The data processing method may include the following steps.

10 Step S20: generating a payment code.

In this embodiment, the first terminal may generate a payment code upon receipt of a payment instruction.

Step S22: in a condition that a wireless communication connection is established with a second terminal based on a connection identifier, receiving first indication information
15 from the second terminal via the wireless communication connection.

In this embodiment, the first indication information may be used to indicate whether the payment is successful. Specifically, the first indication information may include indication information for payment success or indication information for payment failure.

In this embodiment, the second terminal may acquire the payment code, parse the
20 payment code to obtain connection information, establish a wireless communication connection with the first terminal based on a connection identifier in the connection information, and send the first indication information to the first terminal via the wireless communication connection. The first terminal may receive the first indication information from the second terminal via the wireless communication connection.

25 Step S24: displaying the first indication information.

In one embodiment, the first terminal may acquire digital signature data and a key identifier corresponding thereto, and generate the payment code based on the connection information, the payment information, the digital signature data, and the key identifier.

In one embodiment, the first terminal may receive second indication information from
30 the first server, and display the second indication information. The second indication information may include indication information of success of deduction.

In this embodiment, the first terminal may generate a payment code; in a condition that a wireless communication connection is established with a second terminal based on a

connection identifier, receive first indication information from the second terminal via the wireless communication connection; and display the first indication information. The first indication information may be used to indicate whether the payment is successful. In this way, with the first indication information displayed by the first terminal, the user may conveniently determine whether the code is scanned successfully, and therefore the user experience is improved.

Please refer to Fig. 4. An embodiment of the present disclosure further provides another data processing method. The entities that implement the data processing method may include a second terminal. In order to enable a data transmission, the function of short-range wireless communication of the second terminal may be in an ON state. The data processing method may include the following steps.

Step S30: acquiring a payment code.

Step S32: in a condition that a wireless communication connection is established with a first terminal based on a connection identifier, sending first indication information to the first terminal via the wireless communication connection.

In this embodiment, the first indication information may be used to indicate whether the payment is successful. Specifically, the first indication information may include indication information for payment success or indication information for payment failure.

In this embodiment, the second terminal may parse the payment code to obtain the connection information and the payment information. The connection information may include a connection identifier of the first terminal. The first terminal may be regarded as a device requesting to establish a wireless communication connection, and the second terminal may also be regarded as a device requesting to establish a wireless communication connection. The second terminal may establish a wireless communication connection with the first terminal based on the connection identifier.

In this embodiment, after parsing the payment code, the second terminal may directly send the indication information for payment success to the first terminal. Alternatively, after parsing the payment code, the second terminal may authenticate the payment information, send the indication information for payment success to the first terminal when a authentication result is “correct”, and send the indication information for payment failure to the first terminal when the authentication result is “wrong”.

In one embodiment, the second terminal may acquire a payment code, parse the payment code to obtain connection information, payment information, digital signature data

and a key identifier, acquire a public key identified by the key identifier as a target public key, and verify the digital signature data using the target public key. Further, the second terminal may send the first indication information to the first terminal after the verification. Specifically, the second terminal may send the indication information for payment success
5 to the first terminal upon a successful verification. The second terminal may send the indication information for payment failure to the first terminal upon a failed verification.

In one embodiment, the second terminal may further have a speaker. The second terminal may use the speaker to utter sound indication information.

In one embodiment, the second terminal may determine a payment amount, and send
10 the payment information and the payment amount to the second server. The second server may receive the payment information and the payment amount. The payment information may include user identification information, the second server may perform a deduction operation based on the user identification information and the payment amount. Alternatively, after receiving the payment information and the payment amount from the second terminal,
15 the second server may send to the first server a deduction request which may carry the user identification information and the payment amount. The first server may receive the deduction request, and perform a deduction operation based on the user identification information and the payment amount.

In this embodiment, the second terminal may acquire a payment code, and in a
20 condition that a wireless communication connection is established with a first terminal based on a connection identifier, send first indication information to the first terminal via the wireless communication connection, so that the first terminal can display the first indication information. The first indication information may be used to indicate whether the payment is successful. In this way, with the first indication information displayed by the first terminal,
25 the user may conveniently determine whether the code is scanned successfully, and therefore the user experience is improved.

Please refer to Figs. 1, 2, 5, 6 and 7. An example of scenario of an embodiment of the present disclosure is described below.

In an embodiment for this scenario, the data processing system may include a first
30 terminal, a second terminal, a first server and a second server. The first terminal may be a smart phone. The smart phone may be installed with Alipay APP. The smart phone may have a Bluetooth communication function which may be in an ON state. The second terminal may be a bus POS machine, which may have a Bluetooth communication function which may be

in an ON state. The bus POS machine may further have a speaker. The first server may be an Alipay server. The second server may be a server corresponding to the bus POS machine.

In an embodiment for this scenario, the Alipay server may have at least one digital signature data. The digital signature data may be obtained by signing based on a private key of an asymmetric encryption technology. Each digital signature data in the Alipay server may correspond to a public key for verifying the digital signature data, and a key identifier for identifying the public key. The Alipay server may issue at least one digital signature data and a key identifier corresponding thereto to the smart phone. In this way, the smart phone may have a digital signature data set, which may include at least one digital signature data, each of which may correspond to a key identifier. The Alipay server may further issue a public key corresponding to the at least one digital signature data to the bus POS machine. Thus, the bus POS machine may have a public key set, which may include at least one public key.

In an embodiment for this scenario, the user may send a payment instruction to the smart phone when he wants to take a bus. The smart phone may acquire connection information and payment information upon receipt of the payment instruction, acquire one digital signature data and a key identifier corresponding thereto from the digital signature data set, and generate a payment code based on the connection information, the payment information, the acquired digital signature data, and the acquired key identifier.

In an embodiment for this scenario, the user may use the payment code to perform a code scanning operation at the bus POS machine. The bus POS machine may acquire the payment code, and parse the payment code to obtain the connection information, the payment information, the digital signature data, and the key identifier.

The connection information may include a physical address of the smart phone. In this way, the bus POS machine may use the physical address in the connection information to establish a Bluetooth communication connection with the smart phone.

The bus POS machine may further acquire the public key identified by the key identifier from the public key set as a target public key, and verify the digital signature data using the target public key. Upon a successful verification, the bus POS machine may send indication information for payment success to the smart phone through the Bluetooth communication connection. Alternatively, upon a failed verification, the bus POS machine may send indication information for payment failure to the smart phone through the Bluetooth communication connection. The smart phone may receive and display the indication

information for payment success or the indication information for payment failure. In this way, the user can conveniently determine whether the code is scanned successfully with his smart phone.

In addition, upon a successful verification, the bus POS machine may further determine
5 a payment amount, and send the payment information and the payment amount to the second server. The second server may receive the payment information and the payment amount, and the payment information may include user identification information. The second server may then send to the Alipay server a deduction request which may carry the user identification information and the payment amount. The Alipay server may receive the
10 deduction request, perform a deduction operation based on the user identification information and the payment amount, and send indication information of success of deduction to the smart phone. The smart phone may receive and display the indication information of success of deduction.

Please refer to Fig. 8. An embodiment of the present disclosure provides a data
15 processing device, including a generating unit 40, a reception unit 42 and a display unit 44.

The generating unit 40 is configured to generate a payment code including connection information, which includes a connection identifier of the first terminal;

the reception unit 42 is configured to receive, in a condition that a wireless communication connection is established with the second terminal based on a connection
20 identifier, first indication information from the second terminal via the wireless communication connection, with the first indication information being for indicating whether a payment is successful; and

the display unit 44 is configured to display the first indication information.

Please refer to Fig. 9. An embodiment of the present disclosure provides a terminal
25 device, including a communication component, a display component and a processor.

In this embodiment, the communication component may be implemented in any suitable manner, for example, a wireless network card, a Bluetooth module, an infrared transceiver module, an ultra-wideband communication module, and a ZigBee protocol communication module, etc. The communication component may be configured to establish
30 a communication connection and carry out a data transmission.

In this embodiment, the display component includes, but is not limited to, a Liquid Crystal Display (LCD) display, a Cathode Ray Tube (CRT) display, a Light Emitting Diode (LED) display, etc. The display component may be configured to display the first indication

information.

In this embodiment, the processor may be implemented in any suitable manner. For example, the processor may take the form of such as a microprocessor or a processor, as well as a computer readable medium storing computer readable program codes (e. g., software or
5 firmware) executable by the (micro) processor, a logic gate, a switch, an Application Specific Integrated Circuit (ASIC), a programmable logic controller, an embedded microcontroller, etc.

The processor may be configured to generate a payment code including connection information which includes a connection identifier of the first terminal; receive, in a
10 condition that a wireless communication connection is established with a second terminal based on the connection identifier, first indication information from the second terminal via the wireless communication connection, with the first indication information being for indicating whether a payment is successful; and control the display component to display the first indication information.

15 The specific functions of the communication component, the display component and the processor of the terminal device disclosed in this embodiment may be appreciated with reference to the previous embodiments in the present disclosure.

Please refer to Fig. 10. A data processing device includes an acquiring unit 50 and a sending unit 52.

20 The acquiring unit 50 is configured to acquire a payment code, the payment code includes connection information which includes a connection identifier of the first terminal.

The sending unit 52 is configured to send, in a condition that a wireless communication connection is established with the first terminal based on the connection identifier, first indication information to the first terminal via the wireless communication connection, with
25 the first indication information being for indicating whether a payment is successful.

Please refer to Fig. 11. The embodiments of the present disclosure provide a terminal device, including a communication component and a processor.

In this embodiment, the communication components may be implemented in any suitable manner, for example, a wireless network card, a Bluetooth module, an infrared
30 transceiver module, an ultra-wideband communication module, and a ZigBee protocol communication module, etc. The communication component may be configured to establish a communication connection and carry out a data transmission.

In this embodiment, the processor may be implemented in any suitable manner. For

example, the processor may take the form of such as a microprocessor or a processor, as well as a computer readable medium storing computer readable program codes (e. g., software or firmware) executable by the (micro) processor, a logic gate, a switch, an Application Specific Integrated Circuit (ASIC), a programmable logic controller, an embedded microcontroller,
5 etc.

The processor may be configured to acquire a payment code including connection information which includes a connection identifier of the first terminal; and send, in a condition that a wireless communication connection is established with the first terminal based on the connection identifier, first indication information to the first terminal via the
10 wireless communication connection, with the first indication information being for indicating whether a payment is successful.

In one embodiment, the terminal device may further include a speaker, which may generate sound waves audible to human beings.

The specific functions of the communication component and the processor of the
15 terminal device disclosed in this embodiment may be appreciated with reference to the previous embodiments in the present disclosure.

It should be noted that the embodiments in the present disclosure are described in a progressive manner, which means descriptions of each embodiment are focused on the differences from other embodiments, and the descriptions of the same or similar aspects of
20 the embodiments are applicable in common. In particular, the embodiments of the terminal device are analogue to the embodiments of the data processing method, therefore detailed description thereof is omitted and reference can be made to the embodiments of the data processing method.

In addition, it can be understood that in the light of the present disclosure, persons
25 skilled in the art may conceive of any combination of some or all of the embodiments in the present disclosure without paying any creative effort, and it can be understood that these combinations fall within the scope of the present disclosure.

In the 1990s, it is easy to tell whether a technical improvement is a hardware improvement (for example, an improvement to a circuit structure such as a diode, a transistor, a switch, etc.), or a software improvement (an improvement to a methodical flow). However,
30 with the development of technologies, many improvements to methodical processes nowadays can be regarded as improvements to the hardware circuit structures. Basically all improved methodical processes can be programmed into a hardware circuit to obtain

corresponding hardware circuit structures. Therefore, it can not be ruled out to implement an improvement to a methodical process with a physical hardware module. For example, a Programmable Logic Device (PLD) (e.g., Field Programmable Gate Array (FPGA)) is an integrated circuit of which logical functions are determined by user's programming of the device. The designer programs by himself to 'integrate' a digital system onto a piece of PLD, without needing to design and manufacture the ASIC chip by a chip manufacturer. Moreover, at present, instead of manually manufacturing the integrated circuit chips, such programming is mostly implemented using software 'logic compiler', which is similar to the software compiler used for the program development, and the original codes to be compiled should be written in a specific programming language referred to as Hardware Description Language (HDL). There are many kinds of HDLs, such as Advanced Boolean Expression Language (ABEL), Altera Hardware Description Language (AHDL), Confluence, Cornell University Programming Language (CUPL), HDCal, Java Hardware Description Language (JHDL), Lava, Lola, MyHDL, PALASM, Ruby Hardware Description Language (RHDL), etc., and currently the most commonly used is Very-High-Speed Integrated Circuit Hardware Description Language (VHDL) and Verilog2. It is comprehensible to those skilled in the art that a hardware circuit that implements a methodical process can be easily obtained by adequately programming the methodical process into an integrated circuit with the aforementioned hardware description languages.

The systems, devices, modules or units set forth in the above embodiments specifically may be implemented by a computer chip or entity, or by a product having a certain function.

The systems, devices, modules or units set forth in the above embodiments specifically may be implemented by a computer chip or entity, or by a product having a certain function. A typical device implementation 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 any combination thereof.

From the above description of the embodiments, it is clear to persons skilled in the art that the present disclosure may be implemented by means of software plus necessary general-purpose hardware platform. In this sense, the technical solutions of the present disclosure can essentially be, or a part thereof that manifests improvements over the prior art can be, embodied in the form of a computer software product, which may be stored in a storage medium such as an ROM/RAM, a magnetic disk, an optical disk, etc. , and which

may include instructions to cause a computer device (e.g., a personal computer, a server, or a network device, etc.) to perform the methods described in embodiments or some parts thereof in the present disclosure.

5 The present disclosure may be applied in many general-purpose or dedicated computer system environments or configurations, such as a personal computer, a server computer, a handheld device or a portable device, a tablet device, a multiprocessor system, a microprocessor-based system, a set-top box, a programmable consumer electronic device, a network PC, a minicomputer, a mainframe computer, a distributed computing environments including any of the above systems or devices, and the like.

10 The present disclosure may be described in the general context of computer executable instructions executed by the computer, e.g., a program module. In general, the program module includes a routine, a program, an object, a component, a data structure, etc. executing a particular task or realizing a particular abstract data type. The present disclosure may also be implemented in a distributed computing environments in which tasks are executed by
15 remote processing devices connected through a communication network. In the distributed computing environments, the program modules may be located in a local and remote computer storage medium including a storage device.

20 Although the present disclosure has been described by means of the embodiments, persons of ordinary skill in the art will appreciate that there are many variations and modifications to the present disclosure without departing from the spirit of the present disclosure, and it is intended that the appended claims covers these variations and modifications without departing from the spirit of the present disclosure.

CLAIMS

1. A data processing method, comprising:

generating, by a first terminal, a payment code, wherein said payment code comprises
5 connection information which comprises a connection identifier of said first terminal;
acquiring, by a second terminal, said payment code, establishing a wireless communication
connection with said first terminal based on said connection identifier, and sending first indication
information to said first terminal via said wireless communication connection, wherein said first
indication information is for indicating whether a payment is successful;
10 receiving, by the first terminal, said first indication information via said wireless
communication connection, and displaying said first indication information.

2. A data processing method implemented in a first terminal, comprising:

generating a payment code, wherein said payment code comprises connection information
which comprises a connection identifier of said first terminal;
15 receiving, in a condition that a wireless communication connection is established with a
second terminal based on said connection identifier, first indication information sent from the
second terminal via said wireless communication connection, wherein said first indication
information is for indicating whether a payment is successful; and
displaying said first indication information.

20 3. The method according to claim 2, wherein said payment code comprises at least one of a
graphical code and an acoustic code.

4. The method according to claim 2, wherein said payment code further comprises payment
information which comprises user identification information.

25 5. The method according to claim 4, wherein said payment information further comprises at
least one of a single transaction limit and an expiration timing.

6. The method according to claim 2, wherein said connection identifier comprises at least one
of a physical address and a service set identifier.

7. The method according to claim 2, wherein said wireless communication connection
comprises at least one of:

30 a wireless communication connection established based on Bluetooth technology;
a wireless communication connection established based on infrared technology;
a wireless communication connection established based on wireless fidelity technology;
a wireless communication connection established based on ultra-wideband communication

technology;

a wireless communication connection established based on Zigbee technology; and

a wireless communication connection established based on near field communication technology.

5 8. The method according to claim 4 or 5, wherein generating the payment code comprises:

acquiring the connection information and the payment information;

acquiring digital signature data and a key identifier corresponding to said digital signature data; and

generating the payment code based on said connection information, said payment information,

10 said digital signature data and said key identifier.

9. The method according to claim 2, further comprising:

receiving second indication information sent from a first server, wherein said second indication information comprises indication information indicating success of deduction; and

displaying said second indication information.

15 10. A terminal device, comprising:

a generating unit configured to generate a payment code, wherein said payment code comprises connection information which comprises a connection identifier of a first terminal;

a receiving unit configured to receive, in a condition that a wireless communication connection is established with a second terminal based on said connection identifier, first

20 indication information sent from the second terminal via said wireless communication connection, wherein said first indication information is for indicating whether a payment is successful; and

a display unit configured to display said first indication information.

11. A terminal device, comprising:

a communication component configured to establish a wireless communication connection

25 and carry out a data transmission;

a display component configured to display first indication information; and

a processor configured to

generate a payment code, wherein said payment code comprises connection information which comprises a connection identifier of a first terminal;

30 receive, in a condition that a wireless communication connection is established with a second terminal based on the connection identifier, the first indication information sent from the second terminal via said wireless communication connection, wherein said first indication information is for indicating whether a payment is successful; and

control said display component to display said first indication information.

12. A data processing method implemented in a second terminal, comprising:

acquiring a payment code, wherein said payment code comprises connection information which comprises a connection identifier of a first terminal;

5 sending, in a condition that a wireless communication connection is established with said first terminal based on the connection identifier, first indication information to said first terminal via the wireless communication connection, wherein said first indication information is for indicating whether a payment is successful.

13. The method according to claim 12, wherein said payment code comprises at least one of
10 a graphical code and an acoustic code.

14. The method according to claim 12, wherein said payment code further comprises payment information which comprises user identification information.

15. The method according to claim 14, wherein said payment information further comprises at least one of a single transaction limit and an expiration timing.

15 16. The method according to claim 12, wherein said connection identifier comprises at least one of a physical address and a service set identifier.

17. The method according to claim 12, wherein said wireless communication connection comprises at least one of:

a wireless communication connection established based on Bluetooth technology;

20 a wireless communication connection established based on infrared technology;

a wireless communication connection established based on wireless fidelity technology;

a wireless communication connection established based on ultra-wideband communication technology;

a wireless communication connection established based on Zigbee technology; and

25 a wireless communication connection established based on near field communication technology.

18. The method according to claim 12, wherein said payment code further comprises digital signature data and a key identifier; correspondingly, after acquiring the payment code, the method further comprises:

30 acquiring a public key corresponding to said key identifier as a target public key; and
verifying said digital signature data using said target public key.

19. The method according to claim 18, wherein sending the first indication information to said first terminal via said wireless communication connection comprises:

sending indication information indicating success of payment to said first terminal via said wireless communication connection, when the verification is successful;

or, sending indication information indicating failure of payment to said first terminal via said wireless communication connection, when the verification is failed.

5 20. The method according to claim 14 or 15, wherein sending the first indication information to said first terminal via said wireless communication connection comprises:

authenticating said payment information;

sending indication information indicating success of payment to said first terminal via said wireless communication connection when the payment information is authenticated to be valid, or

10 sending indication information indicating failure of payment to said first terminal via the wireless communication connection when the payment information is authenticated to be invalid.

21. The method according to claim 14 or 15, further comprising:

determining a payment amount; and

sending said payment information and said payment amount to a second server.

15 22. A terminal device, comprising:

an acquiring unit configured to acquire a payment code, wherein said payment code comprises connection information which comprises a connection identifier of a first terminal; and

a sending unit configured to send, in a condition that a wireless communication connection is established with said first terminal based on the connection identifier, first indication information

20 to said first terminal via said wireless communication connection, wherein said first indication information is for indicating whether a payment is successful.

23. A terminal device, comprising:

a communication component configured to establish a wireless communication connection and carry out a data transmission; and

25 a processor configured to

acquire a payment code, wherein said payment code comprises connection information which comprises a connection identifier of a first terminal;

send, in a condition that a wireless communication connection is established with a first terminal based on said connection identifier, first indication information to said first terminal via

30 said wireless communication connection, wherein said first indication information is for indicating whether a payment is successful.

24. A data processing system comprising a first terminal and a second terminal, wherein,

said first terminal is configured to implement the steps of the method according to any one of

claims 2 to 9; and

said second terminal is configured to implement the steps of the method according to any one of claims 12 to 21.