

ABNORMALITY PROCESSING METHOD, ELECTRONIC DEVICE, STORAGE MEDIUM, AND ORDER MANAGEMENT SYSTEM

TECHNICAL FIELD

[0001] This specification relates to the field of Internet technologies, and in particular, to an
5 abnormality processing method, an electronic device, a storage medium, and an order management
system.

BACKGROUND

[0002] Merchants can manage orders by using POS devices. For example, order management
software can be installed in the POS device. The POS device can manage orders by running the
10 order management software.

[0003] Generally, an order management service provider presets the order management
software in hardware of the POS device for sale, that is, packages the hardware and software of
the POS device for sale. In this case, merchants need to purchase the hardware of the POS device
to use a function of the order management software. In some other cases, the order management
15 service provider can separately sell the order management software, and merchants can install the
order management software on different hardware after purchasing the order management software.
In this case, an abnormality often occurs in a process of using the order management software by
the merchant. Consequently, experience of using the order management software by the merchant
is relatively poor, and order processing efficiency of the merchant is affected.

20 [0004] Content in the background is merely information known to the inventor, and neither
means that the information has entered the public domain before the application date of this
disclosure, nor means that the information can become the existing technology of this disclosure.

SUMMARY

[0005] This specification provides an abnormality processing method, an electronic device, a
25 storage medium, and an order management system. In the method, the POS device can monitor an

abnormal event in a running process of order management software, and a service device can comprehensively analyze the abnormal event with reference to hardware information of the POS device, to obtain an accurate solution suitable for the current POS device.

[0006] According to a first aspect, this specification provides an abnormality processing method, applied to an order management system. The order management system includes a service device and a POS device. Order management software is installed in the POS device, and the order management software supports running on devices with different hardware. The method is performed by the POS device, and the method includes: monitoring a running process of the order management software; in response to detecting an abnormal event, generating event description information corresponding to the abnormal event, where the event description information represents at least running information of the order management software at a time of and/or before the abnormal event; sending the event description information to the service device, so that the service device analyzes the event description information with reference to hardware information of the POS device, to obtain a solution suitable for resolving the abnormal event on the POS device; and receiving the solution from the service device, and displaying the solution through an interaction interface.

[0007] According to a second aspect, the specification further provides an abnormality processing method, applied to an order management system. The order management system includes a service device and a POS device. Order management software is installed in the POS device, and the order management software supports running on different hardware devices. The method is performed by the service device, and the method includes: receiving event description information corresponding to an abnormal event from the POS device, where the abnormal event is an event discovered by the POS device by monitoring a running process of the order management software, and the event description information represents at least running information of the order management software at a time of and/or before the abnormal event; analyzing the event description information with reference to hardware information of the POS device, to obtain a solution suitable for resolving the abnormal event on the POS device; and sending the solution to the POS device.

[0008] According to a third aspect, this specification further provides an electronic device, serving as a POS device. The electronic device includes: at least one storage medium that stores at least one instruction set; and at least one processor that is communicatively connected to the at

least one storage medium. The at least one processor reads the at least one instruction set when running, and performs the method according to any implementation of the first aspect based on an indication of the at least one instruction set.

[0009] According to a fourth aspect, this specification further provides an electronic device.

5 The electronic device serves as a service device, and the electronic device includes: at least one storage medium that stores at least one instruction set; and at least one processor that is communicatively connected to the at least one storage medium. The at least one processor reads the at least one instruction set when running, and performs the method according to any implementation of the second aspect based on an indication of the at least one instruction set.

10 **[0010]** According to a fifth aspect, this specification further provides a computer-readable non-transitory storage medium. The computer-readable non-transitory storage medium stores at least one instruction set, and when the at least one instruction set is executed by at least one processor, the method according to any implementation of the first aspect or the second aspect is implemented.

[0011] According to a sixth aspect, this specification further provides an order management
15 system, including a POS device and a service device. Order management software is installed in the POS device, and the order management software supports running on different hardware devices. The POS device is configured to: monitor a running process of the order management software, in response to detecting an abnormal event, generate event description information corresponding to the abnormal event, and send the event description information to the service
20 device, where the event description information represents at least running information of the order management software at a time of and/or before the abnormal event. The service device is configured to: analyze the event description information with reference to hardware information of the POS device, to obtain a solution suitable for resolving the abnormal event on the POS device, and send the solution to the POS device. The POS device is further configured to display the
25 solution through an interaction interface.

[0012] Other functions of the abnormality processing method, the electronic device, the storage medium, and the order management system provided in this specification are partially listed in the following descriptions. Creative aspects of the abnormality processing method, the electronic device, the storage medium, and the order management system provided in this
30 specification can be fully explained by practice or by using the methods, apparatuses, and combinations described in the following detailed examples.

BRIEF DESCRIPTION OF DRAWINGS

[0013] To describe the technical solutions in the embodiments of this specification more clearly, the following briefly describes the accompanying drawings needed for describing the embodiments. Clearly, the accompanying drawings in the following descriptions show merely
5 some embodiments of this specification, and a person of ordinary skill in the art can still derive other drawings from these accompanying drawings without creative efforts.

[0014] FIG. 1 is a schematic diagram of an application scenario of an order management system according to an embodiment of this specification;

[0015] FIG. 2 is a schematic diagram of another application scenario of an order management
10 system according to an embodiment of this specification;

[0016] FIG. 3 is a schematic diagram of a configuration interface of order management software according to an embodiment of this specification;

[0017] FIG. 4 is a schematic diagram of another configuration interface of order management software according to an embodiment of this specification;

15 [0018] FIG. 5 is a diagram of a hardware structure of an electronic device according to an embodiment of this specification;

[0019] FIG. 6 is a schematic flowchart of an abnormality processing method according to an embodiment of this specification;

[0020] FIG. 7 is a schematic diagram of an interaction interface of a POS device according to
20 an embodiment of this specification;

[0021] FIG. 8 is a schematic diagram of another interaction interface of a POS device according to an embodiment of this specification;

[0022] FIG. 9 is a schematic diagram of still another interaction interface of a POS device according to an embodiment of this specification;

25 [0023] FIG. 10 is a schematic diagram of content in a solution library according to an embodiment of this specification;

[0024] FIG. 11 is a schematic diagram of a solution according to an embodiment of this specification;

[0025] FIG. 12 is a schematic diagram of another solution according to an embodiment of this
30 specification; and

[0026] FIG. 13 is a schematic diagram of still another interaction interface of a POS device according to an embodiment of this specification.

DESCRIPTION OF EMBODIMENTS

[0027] Specific application scenarios and requirements of this specification are provided in the following descriptions, so that a person skilled in the art can manufacture and use content of this specification. Various local modifications to the disclosed embodiments are clear to a person skilled in the art. In addition, the general principles defined herein can be applied to other embodiments and applications without departing from the spirit and scope of this specification. Therefore, this specification is not limited to the shown embodiments, but has a widest scope consistent with the claims.

[0028] The terms used herein are merely intended to describe specific example embodiments, and impose no limitation. For example, unless otherwise explicitly stated in the context, the singular forms "one", "an", and "the" used herein can include plural forms. When being used in this specification, the terms "include", "comprise", and/or "have" mean existence of an associated integer, step, operation, element, and/or component, but do not preclude existence of one or more other features, integers, steps, operations, elements, components, and/or groups or addition of other features, integers, steps, operations, elements, components, and/or groups to the system/method.

[0029] In consideration of the following descriptions, these and other features of this specification, operations and functions of related components of the structure, and economy of combination and manufacturing of components can be significantly improved. With reference to the accompanying drawings, all of these form a part of this specification. However, it should be clearly understood that the accompanying drawings are merely used for the purpose of illustration and description, and are not intended to limit the scope of this specification. It should be further understood that the accompanying drawings are not drawn to scale.

[0030] The flowchart used in this specification shows operations implemented by a system according to some embodiments of this specification. It should be clearly understood that the operations in the flowchart may not be sequentially implemented. On the contrary, the operations can be implemented in a reverse sequence or simultaneously. In addition, one or more other operations can be added to the flowchart, and one or more operations can be removed from the

flowchart.

[0031] The embodiments described in this specification can be applied to an order management scenario of a merchant. The merchant can be merchants that provide various products or services, including but not limited to a catering merchant, a store, a supermarket, a fruit and vegetable store, a flower store, a bookstore, a hotel, a beauty salon, a dry cleaning store, a barbershop, and the like. The merchant can be a small/micro merchant, a large merchant, a chain merchant, or the like. This is not limited in this specification.

[0032] In some embodiments, the merchant can be a merchant that conducts a service through an offline channel (a physical store). In this case, an order of the merchant can include an offline order. In some embodiments, the merchant can alternatively be a merchant that conducts a service through an online channel (the Internet). In this case, an order of the merchant can include an online order. In some embodiments, the merchant can alternatively be a merchant that supports both an online channel and an offline channel for service conduction. In this case, an order of the merchant can include an offline order and an online order.

[0033] In this specification, the online order refers to a product or service purchase request submitted by a consumer through an online channel (for example, a website or an application). The offline order refers to a product or service purchase request submitted by a consumer through an offline channel, for example, a product or service purchase request submitted by the consumer and a cashier in a face-to-face manner.

[0034] When the merchant needs to conduct a service through the offline channel, the merchant needs to purchase a point of sale (POS) device to manage the offline order. The POS device provides an interaction function and can display a product or a service sold by the merchant. Based on a purchase need of a consumer, a cashier of the merchant can help the consumer select a product or a service on the POS device and submit an order. The order is an offline order.

[0035] When the merchant conducts a service through the online channel, the merchant can develop a store applet, and set an access entry (for example, a two-dimensional code) of the store applet in a store or at any other possible location. A consumer accesses the store applet through the access entry and submits an order on the store applet.

[0036] When the merchant conducts a service through the online channel, the merchant can further cooperate with different network platforms. The network platforms can include but are not limited to a takeout platform, a wallet platform, a social platform, and the like. The merchant may

interconnect with different network platforms in different manners. For example, when cooperating with some platforms (for example, the takeout platform), the merchant can apply to open an online store on these platforms, and place a product or a service of the merchant in the online store, so that a consumer places an order in the online store. For another example, when
5 cooperating with some other platforms (for example, the wallet platform or the social platform), the merchant can place the store applet on these platforms, so that a consumer places an order through the store applet.

[0037] In an online service conduction scenario, to attract more consumers, the merchant usually needs to cooperate with a plurality of network platforms. In this case, a great deal of energy
10 needs to be spent for interconnection between the merchant and the network platforms. In particular, in some geographical areas, each network platform covers a small quantity of consumers, and there are a large quantity of network platforms, for example, there may be hundreds, thousands, or even tens of thousands of online platforms. In such a geographical area, the merchant needs to interconnect with a huge quantity of network platforms, and needs to spend
15 a huge amount of energy.

[0038] The POS device used by the merchant for offline service conduction can process only the offline order, but cannot receive the online order. To implement normal order receiving on the network platform, the merchant needs to purchase a special order receiving device from the network platform. Sometimes, there are a plurality of network platforms active in the market, but
20 no network platform is in a monopolistic position in the market, that is, the plurality of network platforms cover different consumer groups. In this case, if the merchant wants to operate normally, the merchant is forced to cooperate with each of the plurality of network platforms. When cooperating with the plurality of network platforms, the merchant needs to purchase an order receiving device from each of the plurality of network platforms. This leads to relatively high
25 purchase costs. In particular, in a case of a relatively large quantity of interconnected network platforms, the purchase costs of the merchant are huge. In addition, a counter of the merchant is crowded if these order receiving devices are placed on the counter. Furthermore, in face of so many order receiving devices, the merchant is prone to distraction, resulting in problems such as untimely abnormality processing, which affects consumer experience.

[0039] Further, when the merchant cooperates with a plurality of network platforms, there are
30 a relatively large quantity of sources of orders for the merchant. Orders generated on different

network platforms are stored on servers of the corresponding network platforms. When managing online orders, the merchant needs to access serving ends of different network platforms to perform order management (for example, order query and order summarization). The merchant cannot perform unified management on all orders. In addition, different network platforms may operate order management in different manners, and the merchant needs to be familiar with operation manners of different network platforms. Due to the above-mentioned factors, an order management workload of the merchant is relatively large, and order management efficiency is relatively low.

[0040] Based on at least one of the technical problems described above, this specification provides an order management system. The order management system can help merchants implement one-stop order management. To facilitate better understanding of the one-stop order management by readers, the order management system is first described below with reference to FIG. 1.

[0041] FIG. 1 is a schematic diagram of an application scenario 100 of an order management system according to an embodiment of this specification. For ease of understanding, a catering scenario is used as an example in FIG. 1 for description. As shown in FIG. 1, the order management system can include a POS device 110 (or referred to as a POS end or a front-end device) and a service device 120 (or referred to as a serving end, a server, or a back-end device).

[0042] The POS device 110 is a multi-functional terminal. The POS device 110 can be considered as a client of the order management system. In some embodiments, the POS device 110 can be a mobile device, for example, a handheld device. The POS device 110 can be carried by a staff member of a merchant to different locations of a store for operation, providing relatively high convenience. In some embodiments, the POS device 110 can be a non-mobile device. In this case, the POS device 110 is usually placed on a checkout counter of an offline store of a merchant.

[0043] In this specification, the POS device 110 can receive an offline order and an online order of the merchant. The POS device 110 can further perform checkout processing on the offline order. The POS device 110 can also be referred to as a checkout device, a sales device, or an integrated sales and checkout device.

[0044] The POS device 110 is an electronic device with a specific computing capability. In some embodiments, the POS device 110 can include a hardware device with a data processing function and a necessary program needed to drive the hardware device to work. The POS device

110 can manage an order by driving the hardware device to execute the program. For example, order management software (or an order management program) can be installed in the POS device 110. The POS device 110 can manage an order by running the order management software. The order management software can correspond to an operating system installed in the POS device 5 110, or can correspond to an application (APP) or an instruction set installed in the POS device 110. The order management software can be software preset in the hardware device of the POS device 110 (for example, software included in the POS device 110 when the POS device 110 is delivered from a factory), or can be software subsequently installed in the POS device 110 by the staff member of the merchant. This is not limited in this specification.

10 **[0045]** In some embodiments, the POS device 110 can have a display screen, or the POS device 110 can be externally connected to a display screen. The POS device 110 can provide an interaction capability through the display screen. For example, the POS device 110 displays, through the display screen, a product or a service sold by the merchant, and generates an offline order based on a product or a service selected by an operator (the staff member of the merchant or a consumer). 15 The POS device 110 can further display a checkout entry through the display screen, so that the operator performs a checkout operation on the offline order.

[0046] When checking out an order, the POS device 110 supports a plurality of payment methods, including but not limited to cash payment, card swiping payment, code scanning payment, biometric recognition (for example, facial recognition)-based payment, near field communication 20 (NFC)-based payment, and the like.

[0047] In some embodiments, when the POS device 110 supports cash payment, the POS device 110 can be provided with a cash box for storing cash.

[0048] In some embodiments, when the POS device 110 supports card swiping payment, a card reading apparatus 111 can be built in or externally connected to the POS device 110. When 25 the built-in manner is used, the card reading apparatus 111 can be disposed at any possible location of the POS device 110. This is not limited in this specification. When the external connection manner is used, the POS device 110 can be connected to the card reading apparatus 111 in a wired or wireless manner. This is not limited in this specification. The wired connection manner can include but is not limited to a universal serial bus (USB) connection, an Ethernet connection, an 30 optical fiber connection, or the like. The wireless connection manner can include but is not limited to a Wi-Fi connection, a Bluetooth connection, or the like.

[0049] The card reading apparatus 111 is an apparatus that can read card information of a payment card (for example, a debit card or a credit card) of a consumer based on a preset payment specification. When the consumer selects card swiping payment, the POS device 110 can control the card reading apparatus 111 to enter a card reading mode. The card reading apparatus 111 can read the card information of the payment card based on the preset payment specification in response to the consumer placing the payment card close to, attaching the payment card to, or inserting the payment card into the card reading apparatus.

[0050] In some embodiments, when the POS device 110 supports code scanning payment, a code scanning apparatus 112 can be built in or externally connected to the POS device 110. When the built-in manner is used, the code scanning apparatus 112 can be disposed at any possible location of the POS device 110. This is not limited in this specification. When the external connection manner is used, the POS device 110 can be connected to the code scanning apparatus 112 in a wired or wireless manner. This is not limited in this specification. The code scanning apparatus 112 is an apparatus with a code scanning capability. For example, the code scanning apparatus 112 can include a camera module. When the consumer chooses to pay the offline order by using a payment code, the POS device 110 can control the code scanning apparatus 112 to enter a scanning mode. In response to the consumer aligning the payment code with the code scanning apparatus 112, the code scanning apparatus 112 scans code information of the payment code by using the camera module.

[0051] In some embodiments, when the POS device 110 supports biometric recognition-based payment, a camera apparatus (not shown in FIG. 1) can be built in or externally connected to the POS device 110. When the built-in manner is used, the camera apparatus can be disposed at any possible location of the POS device 110. This is not limited in this specification. When the external connection manner is used, the POS device 110 can be connected to the camera apparatus in a wired or wireless manner. This is not limited in this specification. For example, when the consumer chooses to use face scanning payment, the POS device 110 can control the camera apparatus to enter a camera mode. In response to the consumer aligning the face with the camera apparatus, the camera apparatus captures a face image of the consumer.

[0052] In some embodiments, when the POS device 110 supports near field communication-based payment, a near field communication apparatus (not shown in FIG. 1) can be built in or externally connected to the POS device 110. The near field communication apparatus can be

disposed at any possible location of the POS device 110. This is not limited in this specification. When the consumer selects near field communication-based payment, the POS device 110 can control the near field communication apparatus to enter a communication mode. In response to the consumer placing a terminal device having a near field communication component close to the near field communication apparatus, the near field communication apparatus communicates with the near field communication component in the terminal to obtain order payment information.

[0053] In some embodiments, a printing apparatus 113 can be built in or externally connected to the POS device 110. When the built-in manner is used, the printing apparatus 113 can be disposed at any possible location of the POS device 110. This is not limited in this specification. When the external connection manner is used, the POS device 110 can be connected to the printing apparatus 113 in a wired or wireless manner. This is not limited in this specification. Printing paper or label paper can be disposed in the printing apparatus 113. After the consumer successfully pays the order, the POS device 110 can control the printing apparatus 113 to print a consumer ticket or an order label corresponding to the order.

[0054] In some embodiments, the POS device 110 can further include an audio output apparatus (not shown in FIG. 1). The audio output apparatus can be, for example, a speaker. For example, when receiving an online order, the POS device 110 can output voice information through the audio output apparatus, to remind the staff member of the merchant to process the order in a timely manner. For another example, after the consumer performs a payment operation on the offline order by using the POS device 110, in response to the POS device 110 receiving a payment result of the order, the POS device 110 can output voice information through the audio output apparatus, to indicate that payment of the order succeeds or fails.

[0055] Still with reference to FIG. 1, the service device 120 is a computing system with a specific computing capability. The service device 120 is communicatively connected to the POS device 110, and provides an order management service to the POS device 110. The service device 120 can correspond to a single computing device, or can correspond to a computing cluster including a plurality of computing devices. The service device 120 can be deployed locally, or can be deployed remotely. For example, the service device 120 can be a cloud server. In some embodiments, the service device 120 can include a hardware device with a data processing function and a necessary program needed to drive the hardware device to work. The service device 120 can provide the order management service to the POS device by driving the hardware device

to execute the program. In some embodiments, the service device 120 can provide the order management service to the POS device in a software as a service (SaaS) mode.

[0056] In some embodiments, when the service device 120 is deployed remotely, the service device 120 can be connected to POS devices 110 of a plurality of merchants, and provide the order management service to the POS devices 110 of the plurality of merchants. In this case, the service device 120 can perform isolated management on orders of different merchants by using various isolation technologies, to avoid mutual interference between order data of different merchants and improve security of the order data. A person skilled in the art can understand that content of providing the order management service to POS devices 110 of different merchants by the service device 120 is similar. In the description of this specification, only an example in which the service device 120 provides an order management service to a POS device 110 of one merchant is used for description.

[0057] The service provided by the service device 120 to the POS device 110 can include an order management service for an offline order, and can further include an order management service for an online order.

[0058] A catering scenario is used as an example below to describe a working process of the order management system.

[0059] With reference to FIG. 1, a catering store can be divided into a front-of-house area and a back-of-house area. The front-of-house area is used to receive consumers and is used by the consumers for dining. The front-of-house area can also be referred to as a reception area. The back-of-house area is an area in which chefs prepare dishes. The back-of-house area can also be referred to as a preparation area. The POS device 110 is usually located in the front-of-house area. The service device 120 can be located in the front-of-house area or can be located in the cloud.

[0060] A process in which the order management system processes an offline order is as follows: With reference to FIG. 1, a consumer A comes to the store for a meal. The consumer A notifies a cashier of a desired dish. The cashier selects the corresponding dish on the POS device 110 and places an order. The POS device 110 generates an offline order in response to an order placement operation performed by the cashier. The POS device 110 sends the offline order to the service device 120, so that the service device 120 stores the offline order. The POS device 110 can further perform checkout processing on the offline order based on a payment method selected by the consumer.

[0061] The order management system can receive online orders from a plurality of online channels. Three cases are used as examples below for description.

[0062] Case 1: With reference to FIG. 1, the service device 120 can be deployed with a store applet. A two-dimensional code of the store applet is set on a dining table (or another location) of the store. A consumer B can scan the two-dimensional code by using a terminal device, to view a page of the store applet. The consumer B selects a desired dish on the applet page, places an order, and completes online payment. In this case, the service device 120 generates an online order, stores the online order, and then sends the online order to the POS device 110. Therefore, the POS device 110 receives the online order.

[0063] Case 2: With reference to FIG. 1, a merchant can place a store applet on a network platform. Placement on a wallet platform is used as an example below for description. When using the wallet platform, a consumer C accesses the store applet on the wallet platform, selects a desired dish on an applet page, places an order, and completes online payment. In this case, the wallet platform generates an online order, and sends the online order to the service device 120. The service device 120 stores the online order, and then sends the online order to the POS device 110. Therefore, the POS device 110 receives the online order.

[0064] Case 3: With reference to FIG. 1, the merchant can open an online store on a network platform. An example in which an online store is opened on a takeout platform is used below for description. When using the takeout platform, a consumer D accesses the online store of the merchant on the takeout platform, selects a desired dish, places an order, and completes online payment. In this case, the takeout platform generates an online order, and sends the online order to the service device 120. The service device 120 stores the online order, and then sends the online order to the POS device 110. Therefore, the POS device 110 receives the online order.

[0065] It can be learned from the above-mentioned descriptions that offline orders received by merchant and online orders from all channels are stored in the service device 120. Therefore, the merchant can implement unified management on all orders on the service device 120. Compared with the method in which the merchant separately manages orders on different channels, the order management system provided in this specification can improve convenience of order management by the merchant and improve order management efficiency.

[0066] The catering scenario is still used as an example. After receiving an order, the merchant needs to process and prepare a dish in the order. In actual application, after the POS device 110

receives an order (including an offline order and an online order), the POS device 110 can control the printing apparatus to print a kitchen ticket that includes dish content in the order, and the kitchen ticket is manually transferred to the back-of-house area. A chef prepares a dish based on the dish content in the kitchen ticket. In this manner of manually transferring a kitchen ticket, an error in preparing a dish is prone to occur during peak dining hours, and relatively low efficiency results in an increase in dining duration of consumers.

[0067] Therefore, in some embodiments of this specification, as shown in FIG. 1, the order management system can further include one or more display devices 130. For example, in the catering scenario, the display device 130 can also be referred to as a kitchen display system (KDS).

The display device 130 is disposed in the back-of-house area, and is communicatively connected to the POS device 110. The display device 130 can receive an order from the POS device 110, and display a to-be-prepared dish to the chef, to improve meal preparation efficiency of the chef and reduce the probability that the chef makes a meal preparation error. In some embodiments, after preparing a dish, the chef can further send a notification of completion of the dish to the POS device 110 by using the display device 130, so that the POS device 110 understands preparation progress of the order.

[0068] In stores of some merchants, the back-of-house area can be divided into a plurality of stalls. Different stalls are equipped with different chefs responsible for preparing different types of dishes. With reference to FIG. 1, an example in which the back-of-house area includes a cold dish stall and a hot dish stall is used. A chef X1 is responsible for preparing a cold dish and a chef X2 is responsible for preparing a hot dish. In this case, a display device 130 can be disposed in the cold dish stall, and is configured to display a cold dish that needs to be prepared to the chef X1; and a display device 130 can be disposed in the hot dish stall, and is configured to display a hot dish that needs to be prepared to the chef X2. In this way, dish preparation in different stalls does not interfere with each other, which can further improve meal preparation efficiency.

[0069] In the application scenario shown in FIG. 1, the POS device 110 can be connected to the service device 120 and the POS device 110 can be connected to the display device 130 through a network. The network is a medium used to provide a communication connection. The network can facilitate exchange of information or data. The network can be any type of wired or wireless network or a combination thereof. For example, the network can include a cable network, a wired network, an optical fiber network, a telecommunications network, an intranet, the Internet, a local

area network (LAN), a wide area network (WAN), a wireless local area network (WLAN), a metropolitan area network (MAN), a public switched telephone network (PSTN), a Bluetooth network, a ZigBee network, a near field communication (NFC) network, or a similar network. In some embodiments, the network can include one or more network access points. For example, the network can include a wired or wireless network access point, for example, a base station or an Internet switching point.

[0070] It should be noted that the catering scenario is used as an example in FIG. 1. It can be understood by a person skilled in the art that when the order management system provided in this specification is applied to another scenario, an implementation solution and technical effects thereof are similar to those of the catering scenario. Details are not described in this specification for the another scenario.

[0071] It can be learned from the above-mentioned descriptions that the merchant can implement one-stop order management by using the order management system provided in this specification. The one-stop order management is embodied in at least the following aspects: (1) The merchant can use one POS device 110 to process an offline order and process online orders from a plurality of online channels. In this way, the merchant does not need to interconnect with each of the plurality of online channels, and energy and time costs needed for interconnection are avoided. In addition, the merchant does not need to purchase an order receiving device from each of the plurality of online channels, and purchase costs of the merchant can be lowered. (2) All orders received by the POS device 110 are sent to the display device 130 in the back-of-house area in real time, without a need for the merchant to manually transfer kitchen tickets. This improves order processing efficiency. (3) All orders received by the merchant are stored in the service device 120, and the merchant can implement unified management, for example, order query or summarization, on all the orders on the service device 120. In this way, the merchant does not need to separately perform decentralized order management on different network platforms, thereby improving order management efficiency.

[0072] Based on the order management system provided in FIG. 1, in some embodiments, software and hardware in the order management system are integrally designed. An order management service provider presets the order management software in hardware of the POS device. That is, the hardware and software of the POS device are packaged for sale. When merchants purchase the POS device, the order management software is already installed in the

POS device. Generally, the POS device and the order management software that are integrally designed are optimized and tested before delivery from a factory. The POS device and the order management software can work together with no or very few compatibility problems. In addition, because the software runs in a preset hardware environment, the provider can accurately control a running condition of the software. When the merchant uses the software, an abnormal case usually does not occur in the software.

[0073] In some embodiments, the order management software installed in the POS device can support running on devices with different hardware. That is, the order management service provider (briefly referred to as a provider below) can separately sell the order management software, and merchants can install the order management software on different hardware devices after purchasing the order management software, to meet different requirements and budgets of the merchants. The hardware device can be provided by the provider, or is possibly not provided by the provider. Therefore, different merchants may operate the order management software in different manners. This results in an increase in abnormal cases when the order management software runs. In this case, an abnormal event occurring in a running process of the order management software needs to be monitored in a timely manner and resolved in a timely manner, to ensure high efficiency and stability of merchant operation. The following provides descriptions with reference to FIG. 2.

[0074] FIG. 2 is a schematic diagram of another application scenario of an order management system according to an embodiment of this specification. As shown in FIG. 2, the order management system can include a POS device 110 and a service device 120. Order management software is installed in the POS device 110.

[0075] Different merchants can install the order management software on different hardware devices. For example, as shown in FIG. 2, a merchant Y1 installs the order management software on a desktop hardware device provided by a provider, and uses the hardware device as a POS device. For another example, a merchant Y2 installs the order management software on a tablet computer, and uses the tablet computer as a POS device. When the order management software runs on POS devices 110 with different hardware, there are different requirements for operation manners of operators.

[0076] For example, the order management service provider performs centralized management and information configuration on a software and hardware integrated POS device 110 provided by

the order management service provider, and a merchant can directly use the software and hardware integrated POS device 110 for order management after purchasing the software and hardware integrated POS device 110. However, a merchant that purchases only the software needs to first install the order management software on a hardware device and configure information about the order management software before the POS device 110 can be used for order management.

[0077] For another example, different information configured by a merchant or the provider for the order management software may cause the order management software to provide different functions, and therefore there are different operation manners of operators.

[0078] A plurality of functional modules can be deployed in the order management software.

Different functional modules can execute different tasks in an order management process, and the plurality of functional modules work together to implement the entire order management process. The plurality of functional modules can include but are not limited to an order management module, an inventory management module, a customer management module, a financial management module, an external device management module, a supply chain management module, a marketing and promotion management module, and the like. Each functional module can further include a specific sub-functional module. For example, the order management module can include sub-functional modules such as order creation, order modification, order query, order profit analysis, and order payment. The order payment can further include functions such as code scanning, facial recognition, and card swiping. This is not limited herein in this specification.

[0079] The plurality of functional modules correspond to configuration information. The configuration information can represent whether a corresponding function of the POS device is turned on. A merchant or the provider can configure the configuration information of the functional modules, to adapt to different hardware devices and implement different functions. Different configuration information may cause the order management software to provide different functions.

[0080] FIG. 3 is a schematic diagram of a configuration interface of order management software according to an embodiment of this specification. FIG. 4 is a schematic diagram of another configuration interface of order management software according to an embodiment of this specification. FIG. 3 shows a software configuration interface 310 of the merchant Y1. FIG. 4 shows a software configuration page 410 of the merchant Y2. An example in which the functional module is the order management module is used for description. As shown in FIG. 3 and FIG. 4,

the merchants Y1 and Y2 can enter the software configuration interfaces after logging in to account information of the merchants Y1 and Y2.

[0081] All functions of the merchant Y1 in the order management module are set to an on state. Therefore, the POS device 110 of the merchant Y1 can have all functions such as order creation,
5 modification, and query listed in FIG. 3.

[0082] Compared with the POS device 110 of the merchant Y1, hardware performance of the POS device 110 of the merchant Y2 is lower. Therefore, the merchant Y2 can set only some necessary functions in the order management module to an on state. For example, the order creation function, the order query function, and the like in FIG. 4 are set to the on state, and the
10 POS device 110 of the merchant Y2 can have corresponding functions. In FIG. 4, order modification, order profit analysis, and facial recognition functions are set to an off state, and the POS device 110 of the merchant Y2 has no functions such as order modification, order profit analysis, and facial recognition.

[0083] In some embodiments, information configuration of the software needs to be adapted
15 to a hardware device. Different hardware devices affect effectiveness of the information configuration of the software. For example, the merchant Y2 sets a card swiping function in an order payment function to the on state, but no card reading apparatus is actually built in or externally connected to the tablet computer. In this case, even if the merchant Y2 sets the card swiping function to the on state, the function cannot be used during checkout.

[0084] In some embodiments, the POS device 110 and the service device 120 can
20 cooperatively perform the abnormality processing method provided in the embodiments of this specification. The POS device 110 and the service device 120 each can store data and instructions for implementing the abnormality processing method, and can execute or be configured to execute the data and the instructions.

[0085] FIG. 5 is a diagram of a hardware structure of an electronic device 500 according to an
25 embodiment of this specification.

[0086] In some embodiments, the electronic device 500 can serve as the service device 120 in
FIG. 1 or FIG. 2. The service device 120 can perform the abnormality processing method described in this specification. The abnormality processing method is described in another part of this
30 specification.

[0087] In some embodiments, the electronic device 500 can serve as the POS device 110 in

FIG. 1 or FIG. 2, and the POS device 110 can perform the abnormality processing method described in this specification. The abnormality processing method is described in another part of this specification.

[0088] As shown in FIG. 5, the electronic device 500 includes at least one storage medium 530 and at least one processor 520. In some embodiments, the electronic device 500 can further include a communication port 550 and an internal communication bus 510. In addition, the electronic device 500 can further include an I/O component 560.

[0089] The internal communication bus 510 can be connected to different system components, including the storage medium 530 and the processor 520. The I/O component 560 supports an input/output between the electronic device 500 and another component.

[0090] The storage medium 530 can include a data storage apparatus. The data storage apparatus can be a non-transitory storage medium, or can be a transitory storage medium. For example, the data storage apparatus can include one or more of a disk 532, a read-only storage medium (ROM) 534, or a random access storage medium (RAM) 536. The storage medium 530 further includes at least one instruction set stored in the data storage apparatus. The instruction set is computer program code. The computer program code can include a program, a routine, an object, a component, a data structure, a process, a module, and the like for performing the method provided in this specification.

[0091] The communication port 550 is used for data communication between the electronic device 500 and the outside. For example, the electronic device 500 can be connected to a network through the communication port 550. The at least one processor 520 is communicatively connected to the at least one storage medium 530 through the internal communication bus 510. The at least one processor 520 is configured to execute the at least one instruction set. When the electronic device 500 runs, the at least one processor 520 reads the at least one instruction set, and performs, based on an indication of the at least one instruction set, the abnormality processing method provided in this specification.

[0092] The processor 520 can perform all steps included in the abnormality processing method. The processor 520 can be in a form of one or more processors. The processor 520 can send an execution instruction. The processor 520 can include one or more hardware processors, for example, a microcontroller, a microprocessor, a reduced instruction set computer (RISC), an application-specific integrated circuit (ASIC), an application-specific instruction set processor

(ASIP), a central processing unit (CPU), a graphics processing unit (GPU), a physical processing unit (PPU), a microcontroller unit, a digital signal processor (DSP), a field programmable gate array (FPGA), an advanced RISC machine (ARM), a programmable logic device (PLD), any circuit, processor, or the like that can perform one or more functions, or any combination thereof.

5 **[0093]** To merely describe a problem, only one processor 520 is shown in the electronic device 500 in the accompanying drawings of this specification. However, it should be noted that the electronic device 500 in this specification can further include a plurality of processors. Therefore, the operations and/or method steps disclosed in this specification can be performed by one processor or can be performed jointly by a plurality of processors, as described in this specification.

10 For example, if the processor 520 in the electronic device 500 in this specification performs step A and step B, it should be understood that step A and step B can be jointly or separately performed by two different processors 520 (for example, a first processor performs step A and a second processor performs step B, or a first processor and a second processor jointly perform step A and step B).

15 **[0094]** FIG. 6 is a schematic flowchart of an abnormality processing method P600 according to an embodiment of this specification. An order management system can perform the abnormality processing method P600. As shown in FIG. 6, the abnormality processing method P600 can include the following steps.

[0095] S610: A POS device monitors a running process of order management software.

20 **[0096]** In addition to a plurality of functional modules, a monitoring module can be deployed in the order management software. The POS device can monitor running processes of the plurality of functional modules through the monitoring module. Configuration information of the functional module can further include configuration information indicating whether abnormality monitoring is turned on for the functional module. Information of the plurality of functional modules can be

25 configured to control the monitoring module whether to monitor the running processes of the plurality of functional modules.

[0097] In some embodiments, the monitoring module can implement monitoring through installation of a monitoring plugin. The monitoring running processes of the plurality of functional modules through the monitoring module can include: monitoring the running process of the order

30 management software through the monitoring plugin. The monitoring plugin can be integrated into the order management software to monitor whether a function in the functional module runs

normally. For example, the order management software provides an interface, a provider compiles a corresponding dynamic link library (that is, a plugin), and places the monitoring plugin in a directory corresponding to the functional module, and the functional module automatically searches for the directory when running, and invokes the monitoring plugin in the directory through the interface.

[0098] In some embodiments, the monitoring the running process of the order management software through the monitoring plugin can include: monitoring, through the monitoring plugin based on configuration information of the plurality of functional modules, a functional module for which abnormality monitoring is turned on in the plurality of functional modules. The configuration information can indicate whether abnormality monitoring is turned on for the functional module. The monitoring plugin can monitor only the functional module for which abnormality monitoring is turned on, and does not monitor a module for which an abnormality monitoring function is not turned on, to save resources occupied for monitoring, reduce impact on performance of the entire system, and implement proper allocation and use of device resources.

[0099] For example, still with reference to FIG. 3 and FIG. 4, each functional module can have an option of whether to turn on module abnormality monitoring. For example, if a module abnormality monitoring function in an order management module is set to an on state, the monitoring module can monitor a running process of the order management module.

[0100] In some embodiments, the order management software further provides an option of whether to turn on abnormality monitoring for each sub-functional module of the order management module, to save device resources to a greater extent.

[0101] The monitoring module is disposed in the order management software, so that the POS device can automatically monitor and monitor, in real time, any abnormal case occurring in the order management software and report the abnormal case to a service device, without requiring reporting by a merchant or requiring manual monitoring by an external maintenance person. Therefore, timeliness of response to the abnormal case, integrity of uploaded information corresponding to the abnormal case, and accuracy of processing the abnormal case are ensured, and a requirement for manual reporting is reduced. In addition, most POS devices have relatively low hardware performance and are not suitable for running relatively large monitoring modules. Through the monitoring plugin, the order management software can be efficiently and comprehensively monitored when a relatively small quantity of device resources are used.

[0102] S620: In response to detecting an abnormal event, the POS device generates event description information corresponding to the abnormal event, where the event description information represents at least running information of the order management software at a time of and/or before the abnormal event.

5 **[0103]** The abnormal event represents an abnormality or error that occurs in the running process of the order management software. That the POS device detects an abnormal event can be that the monitoring module detects an abnormal event in the running process of the functional module.

[0104] In some embodiments, that the POS device detects an abnormal event can be that the
10 POS device detects that the POS device executes an abnormal code branch in the order management software. The POS device may execute the abnormal code branch due to a reason such as an improper operation of the merchant or incorrect information configuration, or due to an abnormality of code.

[0105] The abnormal code branch can be an abnormal code capture structure. The abnormal
15 code capture structure allows the code to capture an abnormality occurring in an execution process and provides corresponding processing code to prevent software crashes. The abnormal code capture structure can be disposed in running code of the order management software. For example, the abnormal code capture structure is disposed in the monitoring module. When the merchant uses a specific function, the monitoring module monitors whether code corresponding to the
20 specific function runs the abnormal code capture structure. By monitoring whether the POS device executes the abnormal code branch, it can be determined whether an abnormality occurs in the order management software.

[0106] For example, when the merchant uses an order creation function, a normal running process is as follows: The merchant enters necessary order information, for example, product
25 details, a quantity, and a price, through an order management interface, and then taps a "Place order" button. Then, the order management software automatically executes background code logic based on the entered parameters. A final result is that the software executes code for generating and displaying order information. When the software generates the order information, after the abnormal code capture structure, for example, "An arithmetic abnormality occurs. The
30 quantity of products cannot be negative", is executed, the software does not continue to run code for generating an order. The monitoring module can detect that the POS device executes the

abnormal code branch.

[0107] A plurality of abnormal code branches can be configured in the order management software, and each abnormal code branch can correspond to a specific abnormal case, to record more detailed abnormality information and facilitate subsequent accurate analysis by the service device.

[0108] In some embodiments, that the POS device detects an abnormal event can be that the POS device detects that an error prompt occurs in an interaction interface of the POS device. For example, the monitoring module detects that an error prompt occurs in the interaction interface of the POS device.

[0109] The error prompt may not include a cause of the abnormal event, but only indicates that an error occurs. FIG. 7 is a schematic diagram of an interaction interface of a POS device according to an embodiment of this specification. As shown in FIG. 7, an example in which the POS device is a tablet computer is used. The tablet computer can display an interaction interface 710. The interaction interface 710 can be an interface, that is, an ordering interface, displayed by an ordering app installed on the tablet computer. An operator of the merchant can directly order and place an order for a consumer in the ordering interface provided by the ordering app, to generate an order. In FIG. 7, when selecting a quantity of roasted chickens, the operator of the merchant sets the quantity to -1. After the operator taps a "Place order" button, an error prompt "ERROR!!! An error occurs. An order cannot be generated!" occurs in the interaction interface 710. This prompt shows only an error result, that is, an order cannot be generated, and does not show that the error result is caused due to a negative quantity of products.

[0110] The error prompt can further include a cause of the abnormal event. FIG. 8 is a schematic diagram of another interaction interface of a POS device according to an embodiment of this specification. As shown in FIG. 8, an example in which the POS device is a tablet computer is used. The tablet computer can display an interaction interface 810. The interaction interface 810 can be an interface, that is, a checkout interface, displayed by an ordering app installed on the tablet computer. Based on a payment method of a consumer, an operator of the merchant can select a checkout method in the checkout interface provided by the ordering app. When the merchant does not turn on a card swiping function in a software configuration interface of the order management software, or the order management software does not detect that an invokable card reading apparatus is built in or externally connected to the tablet computer, the card swiping

function is unavailable although a card swiping payment option is displayed in the checkout interface. Therefore, when the operator of the merchant selects card swiping payment, an error prompt "ERROR!!! An error occurs. The card reading apparatus is abnormal or is incorrectly configured!" occurs in the interaction interface 810. This prompt indicates a cause of the error

5 result. More specifically, when the POS device has no invokable card reading apparatus, the interaction page 810 can display "ERROR!!! An error occurs. No card reading apparatus is detected!". When the card swiping payment function of the POS device is not turned on, the interaction page 810 can display "ERROR!!! An error occurs. The card swiping function is not correctly configured!".

10 **[0111]** The POS device can generate the event description information corresponding to the abnormal event. The event description information represents at least the running information of the order management software at the time of the abnormal event and/or before the abnormal event.

[0112] In some embodiments, the event description information can include at least one of the following:

15 **[0113]** (1) Screenshot of an interaction interface of the POS device at a target moment, where the target moment is a moment at which the POS device detects the abnormal event

[0114] The screenshot of the interaction interface at the target moment can intuitively reflect an abnormal event that occurs in the POS device at the target moment. The screenshot of the interaction interface may further reflect an action that is performed at the target moment and that

20 causes occurrence of an abnormal case. For example, the screenshot in FIG. 7 can reflect occurrence of an abnormal event that an order cannot be generated. For another example, the screenshot in FIG. 8 shows an error prompt, and the error prompt in FIG. 8 indicates a possible cause of the error, to provide reference information for subsequently resolving the abnormal case.

[0115] (2) Running log of the POS device in a historical time period, where the historical time

25 period is a preset time period before the abnormal event is detected

[0116] The running log can be set on the POS device. The running log can record all or some data information of the POS device in a running process, including abnormal device running data corresponding to the abnormal event. The preset time period can be 10s, 20s, 30s, 1 min, 2 min, or the like before the abnormal event is detected. Running data in the historical time period is

30 obtained as the event description information, so that the service device 120 can subsequently accurately analyze the abnormal event.

[0117] For example, the screenshot in FIG. 7 shows an error prompt, but the error prompt in FIG. 7 does not indicate a cause of the error. Therefore, when subsequently determining the cause of the error (the abnormal event), the service device cannot accurately analyze the cause of the abnormal event by using only the screenshot of the interaction interface. The POS device can
5 determine, by obtaining the running log from 1 minute before the abnormal event, that when modifying the quantity of products, the operator sets the quantity of products to a negative number. This helps the service device subsequently accurately analyzes the abnormal event.

[0118] (3) Historical operation sequence of an operator in the historical time period

[0119] The historical operation sequence of the operator can reflect a specific procedure of
10 operating the order management system by the operator in the historical time period. The historical operation sequence can be used to trace a series of operations performed by the operator before the abnormal event occurs, to provide accurate information for subsequently resolving the abnormal case.

[0120] For example, as shown in FIG. 7, a historical operation sequence of the operator can
15 be as follows: Enter the ordering page -> set a quantity of hamburgers to 2 -> set the quantity of roasted chickens to -1 -> set a quantity of fries to 1 -> tap the "Place order" button. From the historical operation sequence, it can be learned that the operator performs an abnormal operation in the third step and consequently an order cannot be generated.

[0121] For example, as shown in FIG. 8, a historical operation sequence of the operator can
20 be as follows: Enter the checkout interface -> tap a card swiping payment button. From the historical operation sequence, it can be learned that the entire operation step of the operator is correct. In this case, a checkout failure may be caused due to software configuration, an abnormal external device, or another reason.

[0122] In some embodiments, the event description information further represents hardware
25 running information of the POS device at the time of and/or before the abnormal event. Abnormal hardware running may also cause abnormal running of the order management software. Therefore, the event description information generated by the POS device can further include the hardware running information. The hardware running information can reflect a hardware running status of the POS device.

[0123] The hardware running information can include but is not limited to CPU usage,
30 memory usage, hard disk usage, and an external device running status. For example, the merchant

cannot successfully create an order by using the order creation function. This may be because the POS device stores a large amount of historical data, or the POS device simultaneously runs a plurality of other applications in addition to running the order management software, and consequently the memory usage of the POS device is relatively high and memory space cannot be provided for a new order. For another example, the merchant cannot print a consumer ticket. This may be because a paper jam occurs in a printing apparatus externally connected to the POS device, and consequently the printer cannot execute a new printing item. For another example, when the merchant migrates the order management software from an old hardware device to a new upgraded hardware device, the order management software may be incompatible with the new hardware device.

[0124] FIG. 9 is a schematic diagram of still another interaction interface of a POS device according to an embodiment of this specification. As shown in FIG. 9, an example in which the POS device is a tablet computer is used. The tablet computer can display an interaction interface 910. The interaction interface 910 can be an interface, that is, an ordering interface, displayed by an ordering app installed on the tablet computer. When the memory usage of the POS device is relatively high and an available memory amount is relatively low, the POS device does not have enough memory to generate an order. Even if the operator of the merchant correctly selects a quantity of products and taps a "Place order" button, an error prompt "ERROR!!! An error occurs. An order cannot be generated!" still occurs in the interaction interface 910. In this case, an abnormal event occurs due to abnormal hardware running. Therefore, the event description information generated by the POS device can include the hardware running information, that is, the available memory amount, of the POS device in addition to including the screenshot of the interaction interface, the historical operation sequence (for example, enter the ordering page -> set the quantity of hamburgers to 2 -> set the quantity of fries to 1 -> tap the "Place order" button), and the running log.

[0125] S630: The POS device sends the event description information to the service device. Correspondingly, the service device receives the event description information from the POS device.

[0126] For example, the POS device can send the event description information to the service device through a network, so that the service device analyzes the abnormal event corresponding to the event description information.

- [0127] S640: The service device analyzes the event description information with reference to hardware information of the POS device, to obtain a solution suitable for resolving the abnormal event on the POS device.
- [0128] Hardware of the POS device affects a running status of the order management software.
- 5 Running statuses of the order management software on POS devices with different hardware are different, and there are different requirements for operation manners of operators. Therefore, the event description information is analyzed with reference to the hardware information of the POS device, so that a solution that is more accurate and more suitable for the current POS device can be obtained.
- 10 [0129] The hardware information can include but is not limited to a model, a speed, and a core quantity of a CPU, a total capacity, a used amount, and an available amount of a memory, a capacity, a type, and usage of a hard disk, a model, a size, and a drive version of a graphics card, a status of an input/output device, and the like.
- [0130] In some embodiments, the service device can prestore the hardware information of the POS device, to save transmission resources. For example, when the order management software
- 15 is used on the POS device for the first time, the POS device reports the hardware information to the service device. In some embodiments, when sending the event description information, the POS device also sends the hardware information of the POS device, to ensure that the service device can obtain a latest hardware status and configuration information, reduce a storage burden
- 20 of the service device, and improve data processing efficiency.
- [0131] In some embodiments, the service device can analyze the event description information based on a large model, to improve accuracy and reliability of analysis, and obtain the solution suitable for resolving the abnormal event on the POS device. Therefore, the service device can input the hardware information of the POS device and the event description information into a
- 25 target model, and obtain the solution output by the target model.
- [0132] The target model is trained to have a capability of providing a solution to an abnormal event for devices with different hardware. That is, the target model considers both the hardware information of the POS device and the event description information when providing a solution, to improve accuracy and practicality of the solution.
- 30 [0133] In some embodiments, a solution library is injected into the target model. The solution library includes event description information of a plurality of historical events and solutions to

each historical event on different hardware devices. The historical event can be an abnormal event that occurs in the order management software at a historical moment. The plurality of historical events can include abnormal events encountered by the order management software when different merchants use the order management software. Different merchants may install the order management software on different hardware devices. Therefore, abnormal events that occur at different historical moments, on different hardware, and on the order management software and corresponding solutions can be collected in the solution library. For example, abnormal events encountered by all merchants using the order management software and corresponding solutions can be collected in the solution library.

[0134] The solution library can be a table that includes event description information of a historical event and hardware information, or can be a compressed dictionary that includes event description information of a historical event and hardware information. This is not limited herein in this specification.

[0135] An example in which the solution library is a table is used to describe content included in the solution library. FIG. 10 is a schematic diagram of content in a solution library according to an embodiment of this specification. As shown in FIG. 10, the solution library can include hardware information, event description information, and a solution. For example, the hardware information can include a CPU model, an available memory amount, an external device status, and the like; and the event description information can include information such as an interaction interface screenshot, a running log, and a historical operation sequence.

[0136] An event 1 included in the solution library is an abnormal event corresponding to FIG. 8, and an interaction interface screenshot of the event 1 is a screenshot corresponding to FIG. 8. It can be learned from the available memory amount that the POS device has sufficient storage space. It can be learned from the external device status that the POS device is externally connected to a printing apparatus in a normal state. It can be learned from the historical operation sequence that an operation process of the operator of the merchant is correct. It can be learned from the running log that the operator sets the card swiping function to an off state during software configuration. Therefore, the cause of the POS card swiping payment failure is that the operator does not correctly configure the software function.

[0137] An event 2 included in the solution library is an abnormal event corresponding to FIG. 9, and an interaction interface screenshot of the event 2 is a screenshot corresponding to FIG. 9. It

can be learned from the available memory amount that the POS device has insufficient storage space. It can be learned from the external device status that the POS device has no external device. It can be learned from the historical operation sequence that an operation process of the operator of the operator is normal. Therefore, the reason why the POS device cannot generate an order is
5 that the POS device has insufficient memory space.

[0138] It should be noted that the above-mentioned examples of the event 1 and the event 2 are examples of simple events that are set to facilitate understanding of the principle of this application by a reader. In actual application, the event in the solution library may be a more complex event, and inference processes of an event cause and a solution may be more complex.

10 **[0139]** Through the target model, the service device can accurately output different solutions for different abnormal events. The target model can be trained to be applicable to both the following two cases:

[0140] (A) If the solution suitable for resolving the abnormal event on the POS device exists in the solution library, the service device obtains the solution suitable for resolving the abnormal
15 event on the POS device from the solution library, and outputs the solution.

[0141] That is, when the abnormal event that occurs at the target moment is a historical event that occurs at a historical moment, the service device can use a solution corresponding to the historical event as a solution to the abnormal event and output the solution. The service device can determine, by comparing the hardware information of the POS device and the event description
20 information, whether the abnormal event is a historical event.

[0142] (B) If the solution suitable for resolving the abnormal event on the POS device does not exist in the solution library, the service device determines at least one historical event similar to the abnormal event from the solution library, and generates, by using a solution related to the at least one historical event as an example, the solution suitable for resolving the abnormal event on
25 the POS device.

[0143] That is, when the abnormal event that occurs at the target moment is not a historical event that occurs at a historical moment, the service device can adaptively learn a solution to the abnormal event by using a historical event similar to the abnormal event as a reference. In some embodiments, the service device can quantify a similarity between the abnormal event and a
30 historical event by using a correlation-based similarity measure method, a cosine similarity, a Euclidean distance, and another method, to determine a historical event whose similarity is greater

than a similarity threshold from a plurality of historical events as an example. The similarity threshold can be determined based on experience, or can be determined based on a model training process.

[0144] For example, if the abnormal event at the target moment is that the merchant cannot use a code scanning payment function, the event description information corresponding to the abnormal event can include the following information:

available memory amount: 16 GB;

external device status: code scanning apparatus (normal);

interaction interface screenshot: An error prompt "ERROR!!! An error occurs. The code scanning apparatus is abnormal or is incorrectly configured!" is displayed;

running log: {<software configuration...><order payment function-on><code scanning function-off><facial recognition function-on><card swiping function-on>}); and

historical operation sequence (enter a checkout interface -> tap a code scanning payment button).

[0145] The abnormal event is not a historical event in the solution library. However, based on information about a similar historical event, that is, the event 1, the service device can determine that the abnormal event is caused because the merchant does not correctly configure the code scanning function during software configuration. Therefore, the service device can generate, based on the solution to the event 1, a solution suitable for resolving the abnormal event on the current POS device.

[0146] The target model can be a neural network model. Therefore, the service device can generate, through a neural network by using the solution related to the at least one historical event as an example, the solution suitable for resolving the abnormal event on the POS device. The target model can automatically learn the solution to the abnormal event by using the solution corresponding to the historical event.

[0147] In some embodiments, the target model can be trained by using a sample library. The sample library can include sample hardware information, sample event description information, and a corresponding sample solution. A training objective of the target model can include constraining a difference between a solution output by the target model and a pre-labeled sample solution to be within a preset difference threshold. The preset difference threshold can be determined based on experience, or can be determined based on a model training process.

[0148] The solution generated by the target model can include at least one of the following

solutions based on different abnormal events:

[0149] (1) Guidance information used to provide an operation manner of the order management software to an operator

[0150] When the order management software runs on POS devices with different terminal devices, there are different requirements for operation manners of operators. Therefore, when the abnormal event is caused due to an operation error of the operator or an operation abnormality, the service device can provide the guidance information on the operation manner of the order management software to the operator. The guidance information can include a detailed operation step of the order management software. A form of the guidance information can include but is not limited to a video demonstration, a voice guide, a guided operation wizard, and the like.

[0151] FIG. 11 is a schematic diagram of a solution according to an embodiment of this specification. The event 1 in the solution library is used as an example. The cause of the event 1, that is, the card swiping payment failure, is that the operator does not correctly configure the card swiping function during configuration of software information. Therefore, the service device can provide a solution 1, that is, guidance information about correct configuration of the card swiping function. As shown in FIG. 11, the merchant can complete configuration of the card swiping function based on the guidance information, to receive card payment from a consumer.

[0152] (2) Guidance information used to provide optimization of hardware performance of the POS device to the operator

[0153] When the abnormal event is caused due to abnormal hardware performance of the POS device, the service device can provide the guidance information on optimizing the hardware performance of the POS device to the operator. The hardware performance of the POS device can be optimized by clearing memory space, replacing a printing apparatus, adding a large capacity hard disk, or the like. The event 2 in the solution library is used as an example. The cause of the event 2, that is, the POS device cannot generate an order, is that the POS device has insufficient memory space. Therefore, the service device can provide a solution 2, that is, guidance information about clearing of the memory space of the POS device. The merchant can complete clearing of the memory space based on the guidance information, so that the POS device has sufficient memory to generate and store a new order.

[0154] (3) Guidance information used to prompt the operator to update a version of the order management software

[0155] When the abnormal event is caused due to abnormal running of the order management software, the service device can provide the guidance information on updating the version of the order management software to the operator. For example, some functions in the order management software crash and cannot be used normally. For another example, when the merchant migrates the order management software from old hardware to new upgraded hardware, the order management software is incompatible with the new hardware. These cases can be resolved by updating the software version. FIG. 12 is a schematic diagram of another solution according to an embodiment of this specification. As shown in FIG. 12, the merchant can complete updating of the version of the order management software based on the guidance information, so that the order management software runs normally.

[0156] Still with reference to FIG. 6, the abnormality processing method P600 can further include the following steps.

[0157] S650: The service device sends the solution to the POS device. Correspondingly, the POS device receives the solution from the service device.

[0158] For example, the service device can send the solution to the POS device through a network.

[0159] S660: The POS device displays the solution through an interaction interface.

[0160] For example, as shown in FIG. 11 and FIG. 12, the POS device can display the solution corresponding to the abnormal event through the interaction interface. In some embodiments, the POS device can further include an audio output apparatus, to broadcast the solution by using a voice. The audio output apparatus can be, for example, a speaker.

[0161] The POS device reports an abnormal case to the service device, and the service device can quickly return a solution. However, when the merchant encounters an abnormality when using the order management software, especially when there is relatively high customer traffic, the merchant usually does not let the consumer wait and resolve the abnormal event based on the solution, but proposes another alternative solution to avoid slowing down a transaction speed and affecting order processing efficiency and consumer experience. For example, when the merchant cannot use card swiping payment, the merchant usually recommends the consumer to use another payment method such as code scanning payment or cash payment to complete payment. The merchant can process the abnormal event based on the solution when business hours end or there are a small quantity of transactions.

[0162] Therefore, in some embodiments, the abnormality processing method can further include the following step: The POS device stores the solution in a preset storage unit; and in response to detecting that the abnormal event occurs again in the POS device, the POS device obtains the solution from the preset storage unit, and displays the solution to the operator.

5 **[0163]** The preset storage unit can be a power-off volatile storage unit. In this way, the solution is automatically cleared after the POS device is powered off, to avoid impact on performance of the POS device. This is applicable to a case in which the POS device has relatively low performance. Before the POS device is powered off, the merchant can resolve the abnormal event based on the solution. For example, after business hours on a day end, the merchant powers off all
10 devices in the store, to save energy and prolong device lives. Before the business hours end, the merchant can resolve all abnormal events. The power-off volatile storage unit can include but is not limited to a dynamic random access memory (DRAM), a static random access memory (SRAM), or the like.

[0164] The preset storage unit can alternatively be a nonvolatile storage unit. In this way, the
15 POS device can store the solution for a long time, so that help can be provided to the operator in a timely manner when the same abnormal event subsequently occurs again. This is applicable to a case in which the POS device has relatively high performance. That is, the solution can be stored in the preset storage unit even if the merchant powers off the device. When the same abnormal event occurs again in the order management software, the POS device does not need to make a
20 report to the service device, and can directly obtain the solution from the preset storage medium. The nonvolatile storage unit can include but is not limited to a hard disk drive (HDD), a flash memory, or the like.

[0165] In some embodiments, the abnormality processing method P600 can further include the following steps.

25 **[0166]** S670: The POS device displays a feedback page to the operator, and obtains feedback information of the operator for the solution through the feedback page.

[0167] Feedback is collected from the operator, so that applicability and effectiveness of the solution shown by the POS device can be understood, to help subsequently adjust and optimize the solution in a targeted manner and improve effectiveness and applicability of the solution. The
30 feedback information can include but is not limited to whether the solution has resolved the abnormality, satisfaction of the operator with the solution, and a suggestion of the operator for the

solution. The suggestion of the operator for the solution can be to suggest that the solution is more detailed and concise or that the solution is displayed in another manner.

[0168] FIG. 13 is a schematic diagram of still another interaction interface of a POS device according to an embodiment of this specification. As shown in FIG. 13, an example in which the POS device is a tablet computer is used. The tablet computer can display an interaction interface 1310. The POS device can collect the feedback of the operator for the solution through the interaction interface 1310.

[0169] S680: The POS device sends the feedback information to the service device. Correspondingly, the service device receives the feedback information.

[0170] For example, the POS device can send the feedback information to the service device through a network.

[0171] S690: The service device adds the solution to a sample library based on the feedback information, or adjusts the solution and then adds the solution to a sample library, where the sample library is used to train the target model.

[0172] When the feedback information is positive, the service device can directly add the solution to the sample library to train the target model. When the feedback information is negative, the service device can add the solution to the sample library after improving the solution based on textual feedback from the operator or an adaptation capability of the neural network.

[0173] In some embodiments, when the feedback information is negative, the service device can forward the abnormal event to a staff member on a service device side, manually analyze a correct solution, and add the correct solution to the sample library.

[0174] By collecting the feedback information, the service device can identify a deficiency in the solution and perform corresponding adjustment. These adjusted solutions are added to the sample library to train the target model, to improve accuracy and practicality of the target model.

[0175] In conclusion, according to the abnormality processing method, the electronic device, the storage medium, and the order management system provided in this specification, the running process of the order management software can be automatically monitored, and the abnormal event encountered in the running process of the order management software can be comprehensively analyzed with reference to the hardware information, to obtain the solution that is more accurate and suitable for the current POS device. The plurality of functional modules in the order management software can be monitored by using the monitoring module in the order management

software. In addition, the software is monitored in the form of a monitoring plugin, so that the monitoring module can be applicable to most POS devices with low hardware performance. Therefore, the order management software is efficiently and comprehensively monitored when a relatively small quantity of device resources are occupied. In addition, the service device can more
5 intelligently and efficiently analyze the abnormal event by using the target model, to obtain an accurate and effective solution.

[0176] According to another aspect of this specification, a non-transitory storage medium is provided, and stores at least one group of executable instructions for performing abnormality processing. When the executable instructions are executed by a processor, the executable
10 instructions instruct the processor to implement the steps in the abnormality processing method P600 described in this specification. In some possible implementations, various aspects of this specification can be further implemented in a form of a program product, including program code. When the program product runs on the order management system, the program code is used to enable the order management system to perform the steps in the abnormality processing method
15 P600 described in this specification. The program product configured to implement the above-mentioned method can be a portable compact disc read-only memory (CD-ROM) that includes program code, and can run on the order management system. However, the program product in this specification is not limited thereto. In this specification, a readable storage medium can be any tangible medium that includes or stores a program, and the program can be used by or in
20 combination with an instruction execution system. The program product can be any combination of one or more readable media. The readable medium can be a readable signal medium or a readable storage medium. For example, the readable storage medium can be but is not limited to an electrical system, apparatus, or device, a magnetic system, apparatus, or device, an optical system, apparatus, or device, an electromagnetic system, apparatus, or device, an infrared system,
25 apparatus, or device, or a semiconductor system, apparatus, or device, or any combination thereof. More specific examples of the readable storage medium include an electrical connection including one or more conducting wires, a portable disk, a hard disk, a random access memory (RAM), a read-only memory (ROM), an erasable programmable read-only memory (EPROM or flash memory), an optical fiber, a portable compact disc read-only memory (CD-ROM), an optical
30 storage device, a magnetic storage device, or any proper combination thereof. The computer-readable storage medium can include a data signal propagated in a baseband or as a part of a carrier,

and carries readable program code. The propagated data signal can be in a plurality of forms, and includes but is not limited to an electromagnetic signal, an optical signal, or any proper combination thereof. The readable storage medium can alternatively be any readable medium other than the readable storage medium, and the readable medium can send, propagate, or transmit a
5 program used by or in combination with an instruction execution system, apparatus, or device. The program code included in the readable storage medium can be transmitted by using any proper medium, including but not limited to a wireless medium, a wired medium, an optical cable, an RF medium, or any proper combination thereof. Program code for performing the operations in this specification can be written in any combination of one or more program design languages. The
10 program design language includes an object-oriented program design language, for example, Java or C++, and further includes a conventional procedural program design language, for example, a "C" language, or a similar program design language. The program code can be completely executed on the order management system, partially executed on the order management system, executed as an independent software package, partially executed on the order management system
15 and partially executed on a remote computing device, or completely executed on a remote computing device.

[0177] Specific embodiments of this specification are described above. Other embodiments fall within the scope of the appended claims. In some cases, the actions or steps described in the claims can be performed in a sequence different from that in the embodiments and desired results
20 can still be achieved. In addition, the process depicted in the accompanying drawings does not necessarily need a particular sequence or consecutive sequence to achieve the desired results. In some implementations, multitasking and parallel processing are possible or may be advantageous.

[0178] In conclusion, after reading the detailed disclosure, a person skilled in the art can understand that the detailed disclosure can be presented only by using an example, and can impose
25 no limitation. Although it is not explicitly stated herein, a person skilled in the art can understand that the requirements of this specification include various proper changes, improvements, and modifications to the embodiments. These changes, improvements, and modifications are intended to be provided in this specification, and fall within the spirit and scope of the example embodiments of this specification.

[0179] In addition, some terms in this specification are used to describe the embodiments of
30 this specification. For example, "one embodiment", "embodiments", and/or "some embodiments"

mean/means that specific features, structures, or characteristics described with reference to the embodiment can be included in at least one embodiment of this specification. Therefore, it can be emphasized and understood that two or more references to "embodiments", "one embodiment", or "alternative embodiments" in various parts of this specification do not necessarily refer to a same embodiment. In addition, specific features, structures, or characteristics can be properly combined in one or more embodiments of this specification.

[0180] It should be understood that in the above-mentioned descriptions of the embodiments of this specification, to help understand a feature, for the purpose of simplifying this specification, various features are combined in a single embodiment, accompanying drawing, or description thereof in this specification. However, this does not mean that the combination of these features is necessary. It is entirely possible for a person skilled in the art to label some devices and understand the devices as separate embodiments when reading this specification. That is, the embodiments of this specification can also be understood as an integration of a plurality of secondary embodiments. Content of each secondary embodiment is also true when a quantity of features is less than a quantity of all features in one of the embodiments disclosed above.

[0181] Each patent, patent application, publication of a patent application, and other materials, for example, articles, books, instructions, publications, documents, and products, that are cited in this specification and that are other than any document that is inconsistent or conflict with this document or that imposes limiting impact on the widest scope of the claims can be incorporated herein by reference and used for all purposes now or later associated with this document. In addition, the terms in this document shall prevail if there is any inconsistency or conflict between the descriptions, definitions, and/or use of the related terms in any material and the descriptions, definitions, and/or use of the related terms in this document.

[0182] Finally, it should be understood that the principles of the implementation solutions of this specification are described in the implementation solutions of the application disclosed in this specification. Other modified embodiments also fall within the scope of this specification. Therefore, the embodiments disclosed in this specification are merely examples and not limitations. A person skilled in the art can use an alternative configuration according to the embodiments of this specification to implement the application in this specification. Therefore, the embodiments of this specification are not limited to the embodiments accurately described in the application.

CLAIMS

What is claimed is:

1. An abnormality processing method, applied to an order management system, wherein the order management system comprises a service device and a POS device, order management
5 software is installed in the POS device, the order management software supports running on devices with different hardware, and the method is performed by the POS device and comprises:

monitoring a running process of the order management software;

in response to detecting an abnormal event, generating event description information
corresponding to the abnormal event, wherein the event description information represents at least
10 running information of the order management software at a time of and/or before the abnormal event;

sending the event description information to the service device, so that the service device
analyzes the event description information with reference to hardware information of the POS
device, to obtain a solution suitable for resolving the abnormal event on the POS device; and

15 receiving the solution from the service device, and displaying the solution through an interaction interface.

2. The method according to claim 1, wherein a monitoring module and a plurality of functional modules are deployed in the order management software, and the monitoring a running process of the order management software comprises:

20 monitoring running processes of the plurality of functional modules through the monitoring module.

3. The method according to claim 2, wherein the detecting an abnormal event comprises at least one of the following:

detecting that the POS device executes an abnormal code branch in the order management
25 software; or

detecting that an error prompt appears in the interaction interface of the POS device.

4. The method according to claim 1, wherein the event description information comprises at least one of the following:

a screenshot of the interaction interface of the POS device at a target moment, wherein the
30 target moment is a moment at which the abnormal event is detected;

a running log of the POS device in a historical time period, wherein the historical time period is a preset time period before the abnormal event is detected; and

a historical operation sequence of an operator in the historical time period.

5 5. The method according to claim 4, wherein the event description information further represents hardware running information of the POS device at the time of and/or before the abnormal event.

6. The method according to claim 1, wherein the solution comprises at least one of the following:

10 guidance information used to provide an operation manner of the order management software to an operator;

guidance information (for example, a need to clear a memory) used to provide optimization of hardware performance of the POS device to the operator; and

guidance information used to prompt the operator to update a version of the order management software.

15 7. The method according to claim 1, wherein the method further comprises:

storing the solution in a preset storage unit; and

in response to detecting that the abnormal event occurs again in the POS device, obtaining the solution from the preset storage unit, and displaying the solution to an operator.

8. The method according to claim 1, wherein the method further comprises:

20 displaying a feedback page to an operator, and obtaining feedback information of the operator for the solution through the feedback page; and

sending the feedback information to the service device.

9. An abnormality processing method, applied to an order management system, wherein the order management system comprises a service device and a POS device, order management software is installed in the POS device, the order management software supports running on different hardware devices, and the method is performed by the service device and comprises:

25 receiving event description information corresponding to an abnormal event from the POS device, wherein the abnormal event is an event discovered by the POS device by monitoring a running process of the order management software, and the event description information represents at least running information of the order management software at a time of and/or before the abnormal event;

analyzing the event description information with reference to hardware information of the POS device, to obtain a solution suitable for resolving the abnormal event on the POS device; and sending the solution to the POS device.

10. The method according to claim 9, wherein the analyzing the event description information
5 with reference to hardware information of the POS device, to obtain a solution suitable for resolving the abnormal event on the POS device comprises:

inputting the hardware information of the POS device and the event description information into a target model, and obtaining the solution output by the target model, wherein

the target model is trained to have a capability of providing a solution to an abnormal event
10 for devices with different hardware.

11. The method according to claim 10, wherein a solution library is injected into the target model, the solution library comprises event description information of a plurality of historical events and solutions to each historical event on different hardware devices, and the target model is trained to:

15 if the solution suitable for resolving the abnormal event on the POS device exists in the solution library, obtain the solution suitable for resolving the abnormal event on the POS device from the solution library, and output the solution; and

if the solution suitable for resolving the abnormal event on the POS device does not exist in the solution library, determine at least one historical event similar to the abnormal event from the
20 solution library, and generate, by using a solution related to the at least one historical event as an example, the solution suitable for resolving the abnormal event on the POS device.

12. The method according to claim 10, wherein the method further comprises:

receiving feedback information of an operator for the solution from the POS device; and

adding the solution to a sample library based on the feedback information, or adjusting the
25 solution and then adding the solution to a sample library, wherein the sample library is used to train the target model.

13. The method according to claim 9, wherein the event description information comprises at least one of the following:

a screenshot of an interaction interface of the POS device at a target moment, wherein the
30 target moment is a moment at which the abnormal event is detected;

a running log of the POS device in a historical time period, wherein the historical time period

is a preset time period before the abnormal event is detected; and

a historical operation sequence of an operator in the historical time period.

14. The method according to claim 13, wherein the event description information further represents hardware running information of the POS device at the time of and/or before the abnormal event.

15. The method according to claim 9, wherein the solution comprises at least one of the following:

guidance information used to provide an operation manner of the order management software to an operator;

guidance information used to provide optimization of hardware performance of the POS device to the operator; and

guidance information used to prompt the operator to update a version of the order management software.

16. An electronic device, serving as a POS device, wherein the electronic device comprises:

at least one storage medium that stores at least one instruction set; and

at least one processor that is communicatively connected to the at least one storage medium, wherein the at least one processor reads the at least one instruction set when running, and performs the method according to any one of claims 1 to 8 based on an indication of the at least one instruction set.

17. An electronic device, serving as a service device and comprising:

at least one storage medium that stores at least one instruction set; and

at least one processor that is communicatively connected to the at least one storage medium, wherein the at least one processor reads the at least one instruction set when running, and performs the method according to any one of claims 9 to 15 based on an indication of the at least one instruction set.

18. A computer-readable non-transitory storage medium, wherein the computer-readable non-transitory storage medium stores at least one instruction set, and when the at least one instruction set is executed by at least one processor, the method according to any one of claims 1 to 15 is implemented.

19. An order management system, comprising a POS device and a service device, wherein order management software is installed in the POS device, and the order management software

supports running on different hardware devices;

the POS device is configured to: monitor a running process of the order management software, in response to detecting an abnormal event, generate event description information corresponding to the abnormal event, and send the event description information to the service device, wherein

5 the event description information represents at least running information of the order management software at a time of and/or before the abnormal event;

the service device is configured to: analyze the event description information with reference to hardware information of the POS device, to obtain a solution suitable for resolving the abnormal event on the POS device, and send the solution to the POS device; and

10 the POS device is further configured to display the solution through an interaction interface.