

TRANSACTION VOUCHER REVIEW

TECHNICAL FIELD

[0001] This specification relates to the field of computer technologies, and in particular, to a transaction voucher review method and apparatus, a storage medium, and an electronic device.

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BACKGROUND

[0002] With continuous development of the economy and improvement of people's living standards, personal consumption demands gradually increase, and consumer finance institutions also gradually emerge, to provide convenience for microfinance demands of users. When the users use credit products provided by the consumer finance institutions, the users need to comply with repayment agreements of the consumer finance institutions to maintain good credit of the users. If an overdue record appears in credit reports of the users, much negative impact is exerted on the users. When the users have objections to the overdue records, the users can modify the overdue records by submitting a credit dispute application. When users submit the credit dispute application, the users need to provide related transaction vouchers as evidence. In this case, the consumer finance institutions can review the evidence provided by the users to confirm whether the evidence is true and then decide whether to remove the overdue record.

SUMMARY

[0003] This specification provides a transaction voucher review method and apparatus, a storage medium, and an electronic device. The technical solutions are as follows.

20 [0004] According to a first aspect, this specification provides a transaction voucher review method, applied to an electronic device. The method includes:

uploading a target model gradient parameter of a local transaction voucher review model to a service platform, where the target model gradient parameter is used to indicate the service platform to determine a target model parameter based on the target model gradient parameter uploaded by at least one electronic device;

receiving the target model parameter sent by the service platform, and updating the local transaction voucher review model based on the target model parameter to obtain a target transaction

voucher review model; and

performing transaction voucher review processing based on the target transaction review model.

[0005] According to a second aspect, this specification provides a transaction voucher review method, applied to a service platform. The method including:

receiving a target model gradient parameter uploaded by at least one electronic device;

determining a target model parameter based on the target model gradient parameter uploaded by each electronic device; and

sending the target model parameter to each electronic device, where the target model parameter is used to indicate each electronic device to update a local transaction voucher review model based on the target model parameter to obtain a target transaction voucher review model, and perform transaction voucher review processing based on the target transaction voucher review model.

[0006] According to a third aspect, this specification provides a transaction voucher review apparatus, applied to an electronic device. The apparatus includes:

a parameter uploading module, configured to upload a target model gradient parameter of a local transaction voucher review model to a service platform, where the target model gradient parameter is used to indicate the service platform to determine a target model parameter based on the target model gradient parameter uploaded by at least one electronic device;

a model updating module, configured to: receive the target model parameter sent by the service platform, and update the local transaction voucher review model based on the target model parameter to obtain a target transaction voucher review model; and

a data processing module, configured to perform transaction voucher review processing based on the target transaction review model.

[0007] According to a fourth aspect, this specification provides a transaction voucher review apparatus, applied to a service platform. The apparatus includes:

a data receiving module, configured to receive a target model gradient parameter uploaded by at least one electronic device;

a data processing module, configured to determine a target model parameter based on the target model gradient parameter uploaded by each electronic device; and

a data sending module, configured to send the target model parameter to each electronic device, where the target model parameter is used to indicate each electronic device to update a local transaction voucher review model based on the target model parameter to obtain a target transaction voucher review model, and perform transaction voucher review processing based on the target transaction voucher review model.

[0008] According to a fifth aspect, this specification provides a computer storage medium. The computer storage medium has a plurality of instructions, and the instructions are suitable for being loaded and executed by a processor to perform the above-mentioned method steps.

[0009] According to a sixth aspect, this specification provides a computer program product. The computer program product stores at least one instruction, and the at least one instruction is loaded and executed by a processor to perform the above-mentioned method steps.

[0010] According to a seventh aspect, this specification provides an electronic device. The electronic device can include a memory and a processor. The memory stores a computer program, and the computer program is suitable for being loaded and executed by the memory to perform the above-mentioned method steps.

[0011] Beneficial effects brought by the technical solutions provided in this specification include at least the following content.

[0012] In the embodiments of this specification, an electronic device uploads a target model gradient parameter of a local transaction voucher review model to a service platform. The target model gradient parameter is used to indicate the service platform to determine a target model parameter based on the target model gradient parameter uploaded by at least one electronic device; the electronic device receives the target model parameter sent by the service platform, and updates the local transaction voucher review model based on the target model parameter to obtain a target transaction voucher review model; and the electronic device performs transaction voucher review processing based on the target transaction voucher review model. In the embodiments of this specification, the target transaction voucher review model used by the electronic device for transaction voucher review processing is obtained by updating a local model based on the target model parameter obtained by the service platform through processing and calculation based on gradient data of a plurality of electronic devices. That is, the target transaction voucher review model is obtained by integrally training a model based on multi-party data. Therefore, transaction voucher review processing is performed by integrally training a model, to improve transaction voucher identification effect while ensuring security of transaction voucher review data.

BRIEF DESCRIPTION OF DRAWINGS

[0013] To describe the technical solutions in the embodiments of the present invention or the conventional technology more clearly, the accompanying drawings required for describing the embodiments or the conventional technology are described briefly below. Clearly, the accompanying drawings in the following descriptions show some embodiments of the present invention, and a person

skilled in the art can still derive other accompanying drawings from these accompanying drawings without creative efforts.

[0014] FIG. 1 is a schematic diagram of a system architecture of a transaction voucher review method according to an embodiment of this specification;

5 **[0015]** FIG. 2 is a schematic flowchart of a transaction voucher review method according to an embodiment of this specification;

[0016] FIG. 3 is a schematic flowchart of another transaction voucher review method according to an embodiment of this specification;

10 **[0017]** FIG. 4 is a schematic diagram of a time node according to an embodiment of this specification;

[0018] FIG. 5 is a schematic diagram of another time node according to an embodiment of this specification;

[0019] FIG. 6 is a schematic flowchart of a transaction voucher review method according to an embodiment of this specification;

15 **[0020]** FIG. 7 is a schematic diagram of data interaction between a service platform and an electronic device according to an embodiment of this specification;

[0021] FIG. 8 is a schematic flowchart of another transaction voucher review method according to an embodiment of this specification;

20 **[0022]** FIG. 9 is a schematic structural diagram of a transaction voucher review apparatus according to an embodiment of this specification;

[0023] FIG. 10 is a schematic structural diagram of a transaction voucher review apparatus according to an embodiment of this specification;

[0024] FIG. 11 is a schematic structural diagram of an electronic device according to an embodiment of this specification; and

25 **[0025]** FIG. 12 is a schematic structural diagram of a service platform according to an embodiment of this specification.

DESCRIPTION OF EMBODIMENTS

30 **[0026]** To make the objectives, features, and advantages of the embodiments of this specification clearer and more comprehensible, the following clearly and comprehensively describes the technical solutions in the embodiments of this specification with reference to the accompanying drawings in the embodiments of this specification. Clearly, the described embodiments are merely some rather than all of the embodiments of this specification. All other embodiments obtained by a person skilled

in the art based on the embodiment of this specification without creative efforts shall fall within the protection scope of this specification.

[0027] In the description of this specification, it is worthwhile to note that the terms "first", "second", and the like are merely used for descriptive purposes, and should not be understood as indicating or implying relative importance. In the description of this specification, it is worthwhile to note that, unless expressly stated and defined otherwise, the terms "including", "comprising", "having", and any other variant thereof, are intended to cover a non-exclusive inclusion. For example, a process, a method, a system, a product, or a device that includes a series of steps or units is not limited to the listed steps or units, but optionally further includes other unlisted steps or units, or optionally further includes another inherent step or unit of the process, the method, the product, or the device. For a person of ordinary skill in the art, a specific meaning of the previously described terms in this specification can be understood according to a specific situation. In addition, in the description of this specification, unless otherwise stated, "a plurality of" means two or more. The term "and/or" describes an association relationship between associated objects and indicates that three relationships can exist. For example, A and/or B can indicate the following three cases: Only A exists, both A and B exist, and only B exists. The character "/" usually indicates an "or" relationship between associated objects.

[0028] In a scenario in which a user submits a credit dispute application, identification performed by a consumer finance institution on a related transaction voucher provided by the user is the key to removing an overdue record. In a related technology, the consumer finance institution identifies, based on a voucher identification model, whether the related transaction voucher provided by the user is a forging voucher. Data of a single consumer finance institution is private assets, and is not allowed to flow out. Therefore, the single consumer finance institution obtains the voucher identification model through training based on the data of the institution. However, because the single consumer finance institution has a small amount of data for training the model, the voucher identification model of the consumer finance institution has a problem of poor voucher identification effect.

[0029] To resolve the above technical problems, this specification is described in detail below with reference to specific embodiments.

[0030] FIG. 1 is a schematic diagram of a system architecture of a transaction voucher review method according to an embodiment of this specification.

[0031] As shown in FIG. 1, FIG. 1 includes a service platform and an electronic device. A quantity of electronic devices and a quantity of nodes on the service platform shown in FIG. 1 are merely examples. The quantities are not limited in this embodiment of this specification.

[0032] In this embodiment of this specification, the service platform can be a server including

one node or a server cluster including a plurality of nodes.

[0033] When the service platform is a server cluster including a plurality of nodes, each node on the service platform can be a separate server device, for example, a rack-mounted, blade, tower, or cabinet server device, or a hardware device with a strong computing capability such as a workstation or large-scale computer; or can be a server cluster including a plurality of servers. The servers can symmetrically form the service cluster, all the servers have equivalent functions and equivalent status on a transaction link, and each server can independently provide a service to the outside. Independently providing the service to the outside can be understood as not requiring assistance of another server.

[0034] In this embodiment of this specification, the electronic device can be a computer device having functions such as transaction voucher review.

[0035] It should be noted that the electronic device establishes a communication connection with at least one node on the service platform through a network for interactive communication. The network can be a wireless network or a wired network. The wireless network includes but is not limited to a cellular network, a wireless local area network, an infrared network, or a Bluetooth network. The wired network includes but is not limited to Ethernet, a universal serial bus (USB), or a controller area network. In one or more embodiments of this specification, technologies and/or formats including hyper text markup language (HTML), extensible markup language (XML), etc. are used to represent data exchanged over a network (for example, a target compressed package). In addition, conventional encryption technologies such as secure socket layer (SSL), transport layer security (TLS), virtual private network (VPN), and internet protocol security (IPsec) can be used to encrypt all or some links. In some other embodiments, customized and/or dedicated data communication technologies can also be used to replace or supplement the above-mentioned data communication technologies.

[0036] In this embodiment of this specification, an electronic device uploads a target model gradient parameter of a local transaction voucher review model to a service platform. The target model gradient parameter is used to indicate the service platform to determine a target model parameter based on the target model gradient parameter uploaded by at least one electronic device; the electronic device receives the target model parameter sent by the service platform, and updates the local transaction voucher review model based on the target model parameter to obtain a target transaction voucher review model; and the electronic device performs transaction voucher review processing based on the target transaction voucher review model. In this embodiment of this specification, the target transaction voucher review model used by the electronic device for transaction voucher review processing is obtained by updating a local model based on the target

model parameter obtained by the service platform through processing and calculation based on gradient data of a plurality of electronic devices. That is, the target transaction voucher review model is obtained by integrally training a model based on multi-party data. Therefore, transaction voucher review processing is performed by integrally training a model, to improve transaction voucher identification effect while ensuring security of transaction voucher review data.

[0037] FIG. 2 is a schematic flowchart of a transaction voucher review method according to an embodiment of this specification. In this embodiment of this specification, the method is performed by an electronic device. As shown in FIG. 2, the method in this embodiment of this specification can include steps S202 to S206.

[0038] S202: Upload a target model gradient parameter of a local transaction voucher review model to a service platform.

[0039] It is easy to understand that the target model gradient parameter is used to indicate the service platform to determine a target model parameter based on the target model gradient parameter uploaded by at least one electronic device. The target model gradient parameter is a gradient of a model parameter of the local transaction voucher review model, and the target model gradient parameter can be obtained by training the local transaction voucher review model based on training data.

[0040] The local transaction voucher review model is a model, with a transaction voucher review capability, that is obtained based on a machine learning model. The local transaction voucher review model has a transaction voucher review capability, which means that the local transaction voucher review model has a capability to identify authenticity of transaction review voucher data. The transaction review voucher data is voucher data provided by a user in the application process when the user submits a transaction review application to a consumer finance institution. Specifically, in this embodiment of this application, a scenario in which the user submits the transaction review application to the consumer finance institution can be a scenario in which the user submits a credit dispute application for a credit overdue record provided by the consumer finance institution. In this scenario, the transaction review voucher data can be voucher data such as a personal identification document and a transaction record material of the user.

[0041] The local transaction voucher review model can have a local model parameter, and the local model parameter is generated by the service platform and sent to the electronic device. The local transaction voucher review model can be obtained by the electronic device by updating an initial voucher review model based on the local model parameter. The initial voucher review model can be a model with the same model architecture as a preset transaction voucher review model on the service platform, and the preset transaction voucher review model on the service platform has a local model

parameter.

[0042] The service platform is a server that forms a federated learning architecture with the electronic device. The federated learning architecture is the system architecture shown in FIG. 1. In other words, the federated learning architecture includes one service platform and a plurality of electronic devices. In this architecture, the electronic devices send gradient data to the service platform, the service platform aggregates the gradient data sent by all the electronic devices, and then, the service platform sends an aggregation result to all the electronic devices.

[0043] In some embodiments, a step of performing S202 can specifically include: encrypting the target model gradient parameter of the local transaction voucher model to obtain encrypted gradient data, and uploading the encrypted gradient data to the service platform. An encryption key used to encrypt the target model gradient parameter to obtain the encrypted gradient data can be a preset encryption key pre-agreed upon by the electronic device and the service platform in a trusted execution environment, or can be a public key of the service platform. The electronic device encrypts the target model gradient parameter, and correspondingly, the service platform needs to decrypt the encrypted gradient data. When the encryption key is the preset encryption key, the decryption key used by the service platform is a preset decryption key corresponding to the preset encryption key; or when the encryption key is the public key of the service platform, the decryption key used by the service platform is a private key of the service platform. Therefore, the target model gradient parameter is encrypted and sent to the service platform, to avoid a problem that the target model gradient parameter is disclosed and consequently, there is insecurity.

[0044] Optionally, on the basis that the target model gradient parameter is encrypted and sent to the service platform, the encrypted gradient data obtained by encrypting the target model gradient parameter can be further uploaded to the service platform when a current time reaches a preset sending time. For example, the preset sending time can be set to 21:00, 22:00, or another time every day.

[0045] S204: Receive the target model parameter sent by the service platform, and update the local transaction voucher review model based on the target model parameter to obtain a target transaction voucher review model.

[0046] It is easy to understand that the target model parameter is the latest model parameter determined by the service platform based on processed data obtained by processing a target model gradient parameter sent by each electronic device.

[0047] In some embodiments, receiving the target model parameter sent by the service platform can be that the service platform actively sends the target model parameter to the electronic device, so that the electronic device can receive the target model parameter; or can be that the electronic device sends a parameter query request to the service platform, and the service platform sends the target

model parameter to the electronic device based on the parameter query request, so that the electronic device can receive the target model parameter. Specifically, that the electronic device receives the target model parameter sent by the service platform can include: The electronic device receives encrypted parameter data corresponding to the target model parameter sent by the service platform, and the electronic device decrypts the encrypted parameter data to obtain the target model parameter. An encryption key used by the service platform to encrypt the target model parameter to obtain the encrypted parameter data can be a preset encryption key pre-agreed upon by the electronic device and the service platform in the trusted execution environment, or can be a public key of the electronic device. Correspondingly, the service platform encrypts the target model parameter, and the electronic device needs to decrypt the encrypted parameter data. When the encryption key is the preset encryption key, the decryption key used by the electronic device is a preset decryption key corresponding to the preset encryption key; or when the encryption key is the public key of the electronic device, the decryption key used by the electronic device is a private key of the electronic device. Therefore, data that is obtained by encrypting the target model gradient parameter and that is sent by the service platform is received, to avoid a problem that the target model parameter is disclosed and consequently, there is insecurity.

[0048] The updating the local transaction voucher review model based on the target model parameter to obtain the target transaction voucher review model can specifically include: updating the local model parameter of the local transaction voucher review model to the target model parameter to obtain the target transaction voucher review model.

[0049] S206: Perform transaction voucher review processing based on the target transaction review model.

[0050] In some embodiments, target transaction review voucher data of a target user can be obtained, and then transaction voucher review processing is performed on the target transaction review voucher data by using the target transaction review model, to obtain a transaction voucher review result corresponding to the target user. The target transaction review voucher data can include voucher data such as a personal identification document and a transaction record material of the target user; the target transaction review voucher data can be directly uploaded by the user to the electronic device by using a user terminal, or can be forwarded to the electronic device by another electronic device belonging to the same consumer finance institution as the electronic device. The transaction voucher review result can include information such as a forged score and forged information that correspond to the target user.

[0051] Optionally, after obtaining the transaction voucher review result corresponding to the target user, the electronic device can further send the transaction review voucher result to the user

terminal, so that the user terminal can learn of a voucher data review result.

[0052] Optionally, in this embodiment of this specification, S202 and S204 can be a cyclically executed process, and a condition for ending such a loop is that the target model parameter received by the electronic device from the service platform is a model parameter when a model indicated by the service platform converges. In other words, when the target model parameter received by the electronic device is the model parameter when the model indicated by the service platform converges, the electronic device does not perform S202 and S204 in a time period in which no gradient calculation instruction is received; instead, after obtaining the transaction review voucher data of the target user, performs transaction voucher review processing by using a target transaction voucher review model obtained when the model converges.

[0053] In this embodiment of this specification, an electronic device uploads a target model gradient parameter of a local transaction voucher review model to a service platform. The target model gradient parameter is used to indicate the service platform to determine a target model parameter based on the target model gradient parameter uploaded by at least one electronic device; the electronic device receives the target model parameter sent by the service platform, and updates the local transaction voucher review model based on the target model parameter to obtain a target transaction voucher review model; and the electronic device performs transaction voucher review processing based on the target transaction voucher review model. In this embodiment of this specification, the target transaction voucher review model used by the electronic device for transaction voucher review processing is obtained by updating a local model based on the target model parameter obtained by the service platform through processing and calculation based on gradient data of a plurality of electronic devices. That is, the target transaction voucher review model is obtained by integrally training a model based on multi-party data. Therefore, transaction voucher review processing is performed by integrally training a model, to improve transaction voucher identification effect while ensuring security of transaction voucher review data.

[0054] FIG. 3 is a schematic flowchart of a transaction voucher review method according to an embodiment of this specification. In this embodiment of this specification, the method is performed by an electronic device. As shown in FIG. 3, the method in this embodiment of this specification can include steps S302 to S310.

[0055] S302: Determine a local transaction voucher review model, and obtain a target model gradient parameter of the local transaction voucher review model.

[0056] In some embodiments, the step of determining the local transaction voucher review model can specifically include: obtaining a plurality of first transaction voucher review models, and determining the local transaction voucher review model from the plurality of first transaction voucher

review models based on generation times corresponding to the plurality of first transaction voucher review models. Specifically, a first transaction voucher review model corresponding to a generation time closest to a current time can serve as the local transaction voucher review model. For example, the electronic device can receive a model parameter sent by a service platform every day. It is assumed that a specific day is a current day. The electronic device can update, by using a model parameter received on the current day, a first transaction voucher review model generated on a previous day, to obtain a new first transaction voucher review model. A transaction voucher identification capability of each new first transaction voucher review model is better than a transaction voucher identification capability of a previous first transaction voucher review model.

[0057] The step of obtaining the target model gradient parameter of the local transaction voucher review model can specifically include: A2: Obtain historical transaction review voucher data of a historical user. A4: Perform model training processing on the local transaction voucher review model based on the historical transaction review voucher data, to obtain the target model gradient parameter of the local transaction voucher review model.

[0058] The historical transaction review voucher data can be transaction review voucher data that is uploaded by a user terminal and that is received by the electronic device within a preset time period. In this scenario, the electronic device can directly communicate with a user terminal corresponding to a user of a consumer finance institution. In another scenario, the historical transaction review voucher data can be transaction review voucher data sent by a first electronic device and received by the electronic device, and the transaction review voucher data can be data obtained by the first electronic device within a preset time period. In this case, the electronic device and the first electronic device can be computer devices belonging to the same consumer finance institution, the first electronic device can be configured to communicate with a user terminal corresponding to a user of the consumer finance institution, to obtain transaction review voucher data and forward the transaction review voucher data to the electronic device, and the electronic device can be configured to perform data processing on the transaction review voucher data. For a definition of the transaction review voucher data, references can be specifically made to the descriptions of S202 in the embodiment shown in FIG. 2. Details are omitted herein.

[0059] FIG. 4 is a schematic diagram of a time node. The following explains the preset time period with reference to FIG. 4. As shown in FIG. 4, it is assumed that a generation time of the local transaction voucher review model is a first time of the current day, a generation time of the first transaction voucher review model on the previous day is a first time of the previous day, and the preset time period can be a time period that starts from the first time of the previous day and ends at the first time of the current day.

[0060] When step A4 is performed, details can be as follows: if it is determined that the historical transaction review voucher data meets a preset model training condition, performing model training processing on the local transaction voucher review model based on the historical transaction review voucher data, to obtain the target model gradient parameter of the local transaction voucher review model. That it is determined that the historical transaction review voucher data meets the preset model training condition can specifically include two implementations: Implementation 1: Determine whether a cumulative amount of historical transaction review voucher data is greater than a preset training amount; and if the cumulative amount is greater than the preset training amount, determine that the historical transaction review voucher data meets the preset model training condition.

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Implementation 2: Determine whether an acquisition time of the historical transaction review voucher data is within a preset training time period; and if the acquisition time is within the preset training time period, determine that the historical transaction review voucher data meets a preset model condition.

[0061] The cumulative amount is the total amount of historical transaction review voucher data obtained within the preset time period. The preset training time period can be the same as the preset time period, and a time range of the preset training time period can alternatively be smaller than a time range of the preset time period.

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[0062] Specifically, the performing model training processing on the local transaction voucher review model based on the historical transaction review voucher data, to obtain the target model gradient parameter of the local transaction voucher review model can be understood as follows: inputting several pieces of historical transaction review voucher data into the local transaction voucher review model as batch training data for forward propagation calculation, to obtain an output of the local transaction voucher review model; and calculating a gradient of each model of the local transaction voucher review model on the batch training data through backward propagation based on the output of the local transaction voucher review model, namely, the target model gradient parameter.

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[0063] S304: Upload the target model gradient parameter of the local transaction voucher review model to the service platform.

[0064] S306: Receive a target model parameter sent by the service platform, and update the local transaction voucher review model based on the target model parameter to obtain a target transaction voucher review model.

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[0065] Specifically, for implementations of S304 and S306, references can be specifically made to the explanations of S202 and S204 in the embodiment shown in FIG. 2. Details are omitted herein.

[0066] S308: Obtain transaction review voucher data of a target user.

[0067] In this embodiment of this specification, the transaction review voucher data of the target

user can be data obtained within a first preset time period. Specifically, the transaction review voucher data of the target user can be transaction review voucher data uploaded by the user terminal and received by the electronic device within the first preset time period; or can be transaction review voucher data sent by the first electronic device and received by the electronic device. The transaction review voucher data can be transaction review voucher data sent by the user terminal and received by the first electronic device within the first preset time period. The first electronic device and the electronic device can be computer devices belonging to the same consumer finance institution.

[0068] The first preset time period can be a time period after the target transaction voucher review model is generated. FIG. 5 is a schematic diagram of a time node. The following explains the first preset time period with reference to FIG. 5. As shown in FIG. 5, it is assumed that a generation time of the target transaction voucher review model is a first time of a specific day, a generation time of the local transaction voucher review model is a first time of a previous day of the specific day, and the first preset time period can be a time period that starts from the first time of the specific day and ends at a second time of the specific day.

[0069] S310: Perform transaction voucher review processing on the transaction review voucher data based on the target transaction voucher review model, to obtain a transaction voucher review result corresponding to the target user.

[0070] Specifically, the step of performing S310 can include: B2: Perform voucher classification processing based on the transaction review voucher data, to obtain target transaction review voucher data, where the target transaction review voucher data carries a target voucher classification corresponding to the transaction review voucher data. B4: Perform transaction voucher review processing on the target transaction review voucher data based on the target transaction voucher review model, to obtain the transaction voucher review result corresponding to the target user.

[0071] The transaction voucher review result can include information such as a forged score, a forged basis, and forged information for the transaction review voucher data. Optionally, the larger forged score can indicate a conclusion of the greater probability that the target user performs forging.

[0072] When step B2 is performed, details can be as follows: performing voucher classification identification processing on the transaction review voucher data, to obtain the target voucher classification corresponding to the transaction review voucher data; and labeling the transaction review voucher data based on the target voucher classification, to obtain the target transaction review voucher data. The transaction review voucher data can include voucher data such as a personal identification document, a transaction record material, an error record statement, and a medical certificate material of a user. Correspondingly, the target voucher classification can include classifications such as an identification document, a transaction record, a personal statement, and a

medical material. Voucher classification identification processing can be performed on the transaction review voucher data to obtain target voucher classifications for a plurality of types of voucher data included in the transaction review voucher data. Then, the target voucher classifications are added, in a form of classification labels, to the plurality of types of voucher data included in the transaction review voucher data, to obtain target transaction review voucher data including the target voucher classifications. Therefore, transaction voucher review processing can be performed based on voucher data including an accurate voucher classification, to obtain an accurate transaction voucher review result identified by the target transaction review voucher model.

[0073] When step B2 is performed, details can be further as follows: inputting the transaction review voucher data into a voucher classification identification model, to obtain the target transaction review voucher data, where the voucher classification identification model is obtained through training based on a sample target transaction review voucher data label corresponding to labeled sample transaction review voucher data. The following explains a model training process of the voucher classification identification model.

[0074] Model creation: An initial voucher classification identification model for a voucher classification scenario is created based on a machine learning model. Sample data acquisition: A large amount of sample data is obtained. The sample data is sample data that includes a historical voucher classification and that is generated by performing data processing based on the historical transaction review voucher data obtained by the electronic device and extracting the historical voucher classification. Sample data labeling: An expert-side service is introduced based on a demand of the voucher classification scenario, to manually label the sample data with a corresponding sample label. The sample label includes a voucher classification label for each piece of sample data. Model training process: The sample data is input into the initial voucher classification identification model for at least one round of model training to obtain a predicted voucher classification. A model loss value is determined by using a model loss function based on the predicted voucher classification and a sample data label (voucher classification label). A model parameter of the initial voucher classification identification model is adjusted based on the model loss value, until a model training end condition is met to obtain the voucher classification identification model.

[0075] Optionally, a model training end condition of a model can include that, for example, a value of the loss function is less than or equal to a preset loss function threshold, or an iteration quantity reaches a preset iteration quantity threshold. A specific model training end condition can be determined based on an actual situation, and is not specifically limited herein.

[0076] It should be noted that the machine learning model in one or more embodiments of this specification includes but is not limited to fitting of one or more of the following machine learning

models: a convolutional neural network (CNN) model, a deep neural network (DNN) model, a recurrent neural network (RNN) model, an embedding model, a gradient boosting decision tree (GBDT) model, and a logistic regression (LR) model.

[0077] Optionally, in this embodiment of this specification, S302 to S306 can be a cyclically executed process, and a condition for ending such a loop is that the target model parameter received by the electronic device from the service platform is a model parameter when a model indicated by the service platform converges. In other words, when the target model parameter received by the electronic device is the model parameter when the model indicated by the service platform converges, the electronic device does not perform S302 to S306 in a time period in which no gradient calculation instruction is received; instead, after obtaining the transaction review voucher data of the target user, performs transaction voucher review processing on the transaction review voucher data by using a target transaction voucher review model obtained when the model converges.

[0078] In this embodiment of this specification, the electronic device determines the local transaction voucher review model and then determines the target model gradient parameter, thereby avoiding sending a target model gradient parameter with an error risk to the service platform. After a target model parameter sent by a service for the target model gradient parameter is received, the local transaction voucher review model is updated based on the target model parameter, to obtain a target transaction voucher review model with a higher identification capability. Therefore, when the transaction review voucher data corresponding to the target user is identified, accuracy of the transaction voucher review result corresponding to the target user is improved.

[0079] FIG. 6 is a schematic flowchart of a transaction voucher review method according to an embodiment of this specification. In this embodiment of this specification, the method is performed by a service platform. As shown in FIG. 6, the method in this embodiment of this specification can include steps S602 to S606.

[0080] S602: Receive a target model gradient parameter uploaded by at least one electronic device.

[0081] In some embodiments, the step of performing S602 can specifically include: receiving encrypted gradient data uploaded by the at least one electronic device, and decrypting each piece of encrypted gradient data to obtain a target model gradient parameter corresponding to each electronic device. Decryption keys used to decrypt encrypted gradient data sent by different electronic devices can be different. For encrypted gradient data sent by each electronic device, a decryption key used to decrypt the encrypted gradient data to obtain a target model gradient parameter can be a preset decryption key pre-agreed upon by the electronic device and the service platform in a trusted execution environment, or can be a public key of the electronic device. The service platform decrypts

the encrypted gradient data, and correspondingly, the electronic device needs to encrypt the target model gradient parameter. When a decryption key used by the service platform is the preset decryption key, a key used by the electronic device for encryption can be a preset encryption key corresponding to the preset decryption key; or when a decryption key used by the service platform is the public key of the electronic device, a key used by the electronic device for encryption can be a private key of the electronic device. In this way, the service platform receives an encrypted target model gradient parameter sent by the electronic device, to avoid a problem that the target model gradient parameter is disclosed and consequently, there is insecurity.

[0082] Optionally, before performing S602, the service platform can share a local transaction voucher review model with each electronic device. Specifically, the service platform can send a local model parameter of the local transaction voucher review model to the electronic device. The local model parameter can be an initial parameter of the local transaction voucher review model, and the local transaction voucher review model can be a model obtained by the service platform through training based on sample voucher data.

[0083] S604: Determine a target model parameter based on the target model gradient parameter uploaded by each electronic device.

[0084] The target model parameter is the latest model parameter determined by the service platform based on processed data obtained by processing the target model gradient parameter sent by each electronic device. In this embodiment of this application, the target model parameter is the latest model parameter of the local transaction voucher review model shared by the service platform and each electronic device.

[0085] In some embodiments, the service platform can perform gradient aggregation processing on target model gradient parameters in the same batch to obtain an aggregated gradient, and update the local model parameter of the local transaction voucher review model based on the aggregated gradient to obtain the target model parameter. The target model gradient parameters in the same batch can be target model gradient parameters received within the same time period. The service platform and each electronic device can pre-agree upon a time period of uploading the target model gradient parameter in each round. In a process of each round of calculating the target model parameter, the target model gradient parameter within the time period can be used for calculation to obtain the target model parameter.

[0086] S606: Send the target model parameter to each electronic device.

[0087] The target model parameter is used to indicate each electronic device to update a local transaction voucher review model based on the target model parameter to obtain a target transaction voucher review model, and perform transaction voucher review processing based on the target

transaction voucher review model.

[0088] In some embodiments, the step of performing S606 can specifically include: encrypting the target model parameter to obtain encrypted parameter data, and sending the encrypted parameter data to each electronic device. Encryption keys used to encrypt encrypted parameter data sent to different electronic devices can be different. For the target model parameter sent to each electronic device, an encryption key used to encrypt the target model parameter to obtain the encrypted parameter data can be a preset encryption key pre-agreed upon by the electronic device and the service platform in the trusted execution environment, or can be the public key of the electronic device. The service platform encrypts the target model parameter, and correspondingly, the electronic device needs to decrypt the encrypted parameter data. When an encryption key used by the service platform is the preset encryption key, a key used by the electronic device for decryption can be a preset decryption key corresponding to the preset encryption key; or when an encryption key used by the service platform is the public key of the electronic device, a key used by the electronic device for decryption can be the private key of the electronic device. In this way, the service platform sends the encrypted target model parameter to the electronic device, to avoid a problem that the target model parameter is disclosed and consequently, there is insecurity.

[0089] It should be noted that the service platform can calculate a plurality of rounds of target model parameters based on a plurality of batches of target model gradient parameters to continuously update the local transaction voucher review model shared with each electronic device, until the local transaction voucher review model converges. Each time the service platform updates the local transaction voucher review model, the service platform can send the latest model parameter, namely, the target model parameter, of the local transaction voucher review model to each electronic device.

[0090] FIG. 7 is a schematic diagram of data interaction between a service platform and an electronic device. The following explains, with reference to FIG. 7, a process in which the service platform updates the local transaction voucher review model each time: Step 1: The service platform sends a first model parameter to each electronic device. Step 2: Each electronic device updates a local transaction voucher review model based on the first model parameter to obtain a first transaction voucher review model. Each electronic device uploads a first model gradient parameter of the first transaction voucher review model to the service platform. Step 3: The service platform determines a second model parameter based on the first model gradient parameter. The service platform sends each second model parameter to each electronic device. Step 1 and step 2 are cyclically performed, so that the service platform and each electronic device jointly train the transaction voucher review model, until the transaction voucher review model converges.

[0091] In this embodiment of this specification, the service platform receives the target model

gradient parameter uploaded by each electronic device, to determine the target model parameter based on each target model gradient parameter, thereby integrally training a model based on multi-party data and further improving an identification capability of the model. Then, the service platform sends the target model parameter to each electronic device, so that the electronic device updates, based on the target model parameter, the local transaction voucher review model shared by the service platform, to obtain a target transaction voucher review model with a better identification capability. This improves effect of identifying, by the electronic device, the transaction voucher by using the target transaction voucher review model.

[0092] FIG. 8 is a schematic flowchart of a transaction voucher review method according to an embodiment of this specification. In this embodiment of this specification, the method is performed by a service platform. As shown in FIG. 7, the method in this embodiment of this specification can include steps S802 to S808.

[0093] S802: Receive a target model gradient parameter uploaded by at least one electronic device.

[0094] For details, references can be made to the descriptions of S602 in the embodiment shown in FIG. 6. Details are omitted herein.

[0095] S804: Determine a target model gradient average value based on a target model gradient parameter uploaded by each electronic device.

[0096] In some embodiments, when S804 is performed, details can include: obtaining a sample quantity corresponding to the target model gradient parameter, and determining a target weight corresponding to the target model gradient parameter based on the sample quantity; and calculating the target model gradient average value based on the target model gradient parameter and the target weight.

[0097] The sample quantity is an amount of sample transaction review voucher data used in a process in which the electronic device calculates the target model gradient parameter, and the sample transaction review voucher data is training data used in a process in which the electronic device trains a local transaction voucher review model to obtain the target model gradient parameter.

[0098] The service platform can be configured with a preset weight mapping relationship between a reference sample quantity and a reference weight. For sample quantities corresponding to target model gradient parameters sent by different electronic devices, a target weight corresponding to the sample quantity can be queried based on the weight mapping relationship.

[0099] For example, there are three electronic devices, and target model gradient parameters of the electronic devices are successively g_1 , g_2 , and g_3 ; a target weight determined based on a sample quantity corresponding to g_1 is m_1 , a target weight determined based on a sample quantity

corresponding to g_2 is m_2 , and a target weight determined based on a sample quantity corresponding to g_3 is m_3 . It can be learned that the target model gradient average value is $g_0 = g_1 * m_1 + g_2 * m_2 + g_3 * m_3$.

[0100] In this embodiment of this application, the gradient average value is calculated, to
5 comprehensively evaluate each target model gradient parameter and ensure accuracy of a gradient used to update a model parameter.

[0101] S806: Update a local model parameter based on the target model gradient average value, to obtain a target model parameter.

[0102] It is easy to understand that the local model parameter is a model parameter of a local
10 transaction voucher review model, in a latest version, shared by the service platform and each electronic device.

[0103] In some embodiments, the target model gradient average value and the local model parameter can be calculated based on a preset parameter updating formula, to obtain the target model parameter.

15 [0104] For example, the preset parameter updating formula can be $w = w_0 - a * g_0$. Herein, w is the target model parameter, w_0 is the local model parameter, a is a model parameter learning rate, and g_0 is the target model gradient average value.

[0105] S808: Send the target model parameter to each electronic device.

[0106] For details, references can be made to the descriptions of S606 in the embodiment shown
20 in FIG. 6. Details are omitted herein.

[0107] In this embodiment of this specification, the service platform receives the target model gradient parameter uploaded by each electronic device, to determine the target model gradient average value based on each target model gradient parameter, and then determines the target model parameter based on the target model gradient average value. While a model is integrally trained based on multi-
25 party data, gradient accuracy is further improved by calculating the target model gradient average value, thereby calculating a more accurate target model parameter through more accurate gradient calculation, to update the model with the more accurate target model parameter, and better improve an identification capability of the model. Then, the service platform sends the more accurate target model parameter to each electronic device, so that the electronic device updates, based on the more
30 accurate target model parameter, the local transaction voucher review model shared by the service platform, to obtain a target transaction voucher review model with a better identification capability. This better improves effect of identifying, by the electronic device, the transaction voucher by using the target transaction voucher review model.

[0108] The following describes, in detail with reference to FIG. 9, a transaction voucher review

apparatus provided in the embodiments of this application. It should be noted that the transaction voucher review apparatus shown in FIG. 9 is configured to perform the methods in the embodiments shown in FIG. 2 and FIG. 3 in this application. For ease of description, only parts related to the embodiments of this specification are shown. For specific technical details not disclosed, references can be made to the embodiments shown in FIG. 2 and FIG. 3 in this application.

[0109] FIG. 9 is a schematic structural diagram of a transaction voucher review apparatus according to an embodiment of this specification. The transaction voucher review apparatus 900 can be implemented as all or part of the apparatus by using software, hardware, or a combination thereof. According to some embodiments, the transaction voucher review apparatus 1 includes a parameter uploading module 911, a model updating module 912, and a data processing module 913.

[0110] The parameter uploading module 911 is configured to upload a target model gradient parameter of a local transaction voucher review model to a service platform. The target model gradient parameter is used to indicate the service platform to determine a target model parameter based on the target model gradient parameter uploaded by at least one electronic device.

[0111] The model updating module 912 is configured to: receive the target model parameter sent by the service platform, and update the local transaction voucher review model based on the target model parameter to obtain a target transaction voucher review model.

[0112] The data processing module 913 is configured to perform transaction voucher review processing based on the target transaction review model.

[0113] Optionally, the data processing module 913 includes:
a first processing unit, configured to obtain transaction review voucher data of a target user; and

a second processing unit, configured to perform transaction voucher review processing on the transaction review voucher data based on the target transaction voucher review model, to obtain a transaction voucher review result corresponding to the target user.

[0114] Optionally, the second processing unit includes:
a first sub-unit, configured to perform voucher classification processing based on the transaction review voucher data, to obtain target transaction review voucher data, where the target transaction review voucher data carries a target voucher classification corresponding to the transaction review voucher data; and

a second sub-unit, configured to perform transaction voucher review processing on the target transaction review voucher data based on the target transaction voucher review model, to obtain a transaction voucher review result corresponding to the target user.

[0115] Optionally, the second sub-unit is specifically configured to:

perform voucher classification identification processing on the transaction review voucher data, to obtain the target voucher classification corresponding to the transaction review voucher data; and

5 label the transaction review voucher data based on the target voucher classification, to obtain the target transaction review voucher data.

[0116] Optionally, the second sub-unit is specifically configured to:

input the transaction review voucher data into a voucher classification identification model, to obtain the target transaction review voucher data, where the voucher classification identification model is obtained through training based on a sample target transaction review voucher data label corresponding to labeled sample transaction review voucher data.

10 **[0117]** Optionally, the transaction voucher review apparatus 1 further includes:

a parameter determining module, configured to: determine the local transaction voucher review model, and obtain the target model gradient parameter of the local transaction voucher review model.

15 **[0118]** Optionally, the parameter determining module includes:

a parameter acquisition module, configured to obtain historical transaction review voucher data of a historical user; and

a parameter generation module, configured to perform model training processing on the local transaction voucher review model based on the historical transaction review voucher data, to obtain the target model gradient parameter of the local transaction voucher review model.

20 **[0119]** Optionally, the parameter generation module includes:

a parameter generation unit, configured to: if it is determined that the historical transaction review voucher data meets a preset model training condition, perform model training processing on the local transaction voucher review model based on the historical transaction review voucher data, to obtain the target model gradient parameter of the local transaction voucher review model.

25 **[0120]** Optionally, the parameter generation unit is specifically configured to:

determine whether a cumulative amount of historical transaction review voucher data is greater than a preset training amount; and if the cumulative amount is greater than the preset training amount, determine that the historical transaction review voucher data meets the preset model training condition; or

30 determine whether an acquisition time of the historical transaction review voucher data is within a preset training time period; and if the acquisition time is within the preset training time period, determine that the historical transaction review voucher data meets a preset model condition.

[0121] The following describes, in detail with reference to FIG. 10, a transaction voucher review

apparatus provided in the embodiments of this application. It should be noted that the transaction voucher review apparatus in FIG. 10 is configured to perform the methods in the embodiments shown in FIG. 6 and FIG. 8 in this application. For ease of description, only parts related to the embodiments of this specification are shown. For specific technical details not disclosed, references can be made to the embodiments shown in FIG. 6 and FIG. 8 in this application.

[0122] FIG. 10 is a schematic structural diagram of a transaction voucher review apparatus according to an embodiment of this specification. The transaction voucher review apparatus 1000 can be implemented as all or part of an apparatus by using software, hardware, or a combination thereof. According to some embodiments, the transaction voucher review apparatus 1 includes a data receiving module 1011, a data processing module 1012, and a data sending module 1013.

[0123] The data receiving module 1011 is configured to receive a target model gradient parameter uploaded by at least one electronic device.

[0124] The data processing module 1012 is configured to determine a target model parameter based on the target model gradient parameter uploaded by each electronic device.

[0125] The data sending module 1013 is configured to send the target model parameter to each electronic device, where the target model parameter is used to indicate each electronic device to update a local transaction voucher review model based on the target model parameter to obtain a target transaction voucher review model, and perform transaction voucher review processing based on the target transaction voucher review model.

[0126] Optionally, the data processing module 1012 includes:

a first calculation unit, configured to determine a target model gradient average value based on the target model gradient parameter uploaded by each electronic device; and

a second calculation unit, configured to update a local model parameter based on the target model gradient average value, to obtain the target model parameter.

[0127] Optionally, the first calculation unit is specifically configured to:

obtain a sample quantity corresponding to the target model gradient parameter, and determine a target weight corresponding to the target model gradient parameter based on the sample quantity; and

calculate the target model gradient average value based on the target model gradient parameter and the target weight.

[0128] FIG. 11 is a schematic structural diagram of an electronic device according to an example embodiment of this specification. The electronic device in this specification can include one or more of the following components: a processor 110, a memory 120, an input apparatus 130, an output apparatus 140, and a bus 150. The processor 110, the memory 120, the input apparatus 130, and the

output apparatus 140 can be connected to each other through the bus 150.

[0129] The processor 110 can include one or more processing cores. The processor 110 connects all parts of the entire terminal device by using various interfaces and lines, and performs various functions and data processing of the terminal device 100 by running or executing instructions, programs, code sets, or instruction sets stored in the memory 120, and invoking data stored in the memory 120. Optionally, the processor 110 can be implemented in at least one hardware form in a digital signal processor (DSP), a field-programmable gate array (FPGA), and a programmable logic array (PLA). One or a combination of a central processing unit (CPU), a graphics processing unit (GPU), a modem, etc. can be integrated into the processor 110. The CPU mainly processes an operating system, a user interface, an application, etc. The GPU is configured to be responsible for rendering and drawing display content. The modem is configured to process wireless communication. It can be understood that the modem may not be integrated into the processor 110, and is separately implemented by using a communication chip.

[0130] The memory 120 can include a random access memory (RAM), or can include a read-only memory (ROM). Optionally, the memory 120 includes a non-transitory computer-readable storage medium. The memory 120 can be configured to store instructions, a program, code, a code set, or an instruction set. The memory 120 can include a program storage area and a data storage area. The program storage area can store instructions for implementing an operating system, instructions for implementing at least one function (for example, a touch function, a sound playing function, or an image playing function), instructions for implementing the following method embodiments, etc. The operating system can be an Android system, including a system deeply developed based on the Android system; or an IOS system developed by Apple, including a system deeply developed based on the IOS system; or another system.

[0131] To enable the operating system to distinguish between specific application scenarios of a third-party application, data communication between the third-party application and the operating system needs to be enabled, so that the operating system can obtain current scenario information of the third-party application at any time, and then perform targeted system resource adaptation based on a current scenario.

[0132] The input apparatus 130 is configured to receive the input instructions or data. The input apparatus 130 includes, but is not limited to, a keyboard, a mouse, a camera, a microphone, or a touch device. The output apparatus 140 is configured to output instructions or data. The output apparatus 140 includes, but is not limited to, a display device, a speaker, and the like. In an example, the input apparatus 130 and the output apparatus 140 can be disposed together, and the input apparatus 130 and the output apparatus 140 are touchscreens.

[0133] The touchscreen can be designed as a full screen, a curved screen, or a profiled screen. The touchscreen can alternatively be designed as a combination of a full screen and a curved screen, or a combination of a profiled screen and a curved screen, which is not limited in the embodiments of this specification.

5 **[0134]** In addition, a person skilled in the art can understand that a structure of the electronic device shown in the above-mentioned accompanying drawings does not constitute a limitation on the electronic device. The electronic device can include more or fewer components than those shown in the figure, or combine some components, or have different component arrangements. For example, the electronic device further includes components such as a radio frequency circuit, an input unit, a
10 sensor, an audio circuit, a wireless fidelity (Wi-Fi) module, a power supply, and a Bluetooth module. Details are not described herein.

[0135] In the electronic device shown in FIG. 11, the processor 110 can be configured to invoke a program, of a transaction voucher review method, stored in the memory 120, and specifically perform the following operations:

15 uploading a target model gradient parameter of a local transaction voucher review model to a service platform, where the target model gradient parameter is used to indicate the service platform to determine a target model parameter based on the target model gradient parameter uploaded by at least one electronic device;

receiving the target model parameter sent by the service platform, and updating the local
20 transaction voucher review model based on the target model parameter to obtain a target transaction voucher review model; and

performing transaction voucher review processing based on the target transaction review model.

[0136] In an embodiment, when performing the step of performing transaction voucher review
25 processing based on the target voucher identification model, the processor 110 specifically performs the following operations:

obtaining transaction review voucher data of a target user; and

performing transaction voucher review processing on the transaction review voucher data
based on the target transaction voucher review model, to obtain a transaction voucher review result
30 corresponding to the target user.

[0137] In an embodiment, when performing the step of performing transaction voucher review processing on the transaction review voucher data based on the target transaction voucher review model, to obtain a transaction voucher review result corresponding to the target user, the processor 110 specifically performs the following operations:

performing voucher classification processing based on the transaction review voucher data, to obtain target transaction review voucher data, where the target transaction review voucher data carries a target voucher classification corresponding to the transaction review voucher data; and

5 performing transaction voucher review processing on the target transaction review voucher data based on the target transaction voucher review model, to obtain the transaction voucher review result corresponding to the target user.

[0138] In an embodiment, when performing the step of performing voucher classification processing based on the transaction review voucher data, to obtain target transaction review voucher data, the processor 110 specifically performs the following operations:

10 performing voucher classification identification processing on the transaction review voucher data, to obtain the target voucher classification corresponding to the transaction review voucher data; and

labelling the transaction review voucher data based on the target voucher classification, to obtain the target transaction review voucher data.

15 **[0139]** In an embodiment, when performing the step of performing voucher classification processing based on the transaction review voucher data, to obtain target transaction review voucher data, the processor 110 specifically performs the following operations:

inputting the transaction review voucher data into a voucher classification identification model, to obtain the target transaction review voucher data, where the voucher classification identification model is obtained through training based on a sample target transaction review voucher data label corresponding to labeled sample transaction review voucher data.

[0140] In an embodiment, before the uploading a target model gradient parameter of a local transaction voucher review model to a service platform, the processor 110 further performs the following operations:

25 determining the local transaction voucher review model, and obtaining the target model gradient parameter of the local transaction voucher review model.

[0141] In an embodiment, when performing the step of obtaining the target model gradient parameter of the local transaction voucher review model, the processor 110 specifically performs the following operations:

30 obtaining historical transaction review voucher data of a historical user; and

performing model training processing on the local transaction voucher review model based on the historical transaction review voucher data, to obtain the target model gradient parameter of the local transaction voucher review model.

[0142] In an embodiment, when performing the step of performing model training processing on

the local transaction voucher review model based on the historical transaction review voucher data, to obtain the target model gradient parameter of the local transaction voucher review model, the processor 110 specifically performs the following operations:

if it is determined that the historical transaction review voucher data meets a preset model training condition, performing model training processing on the local transaction voucher review model based on the historical transaction review voucher data, to obtain the target model gradient parameter of the local transaction voucher review model.

[0143] In an embodiment, when performing the step in which it is determined that the historical transaction review voucher data meets a preset model training condition, the processor 110 specifically performs the following operations:

determining whether a cumulative amount of historical transaction review voucher data is greater than a preset training amount; and if the cumulative amount is greater than the preset training amount, determining that the historical transaction review voucher data meets the preset model training condition; or

determining whether an acquisition time of the historical transaction review voucher data is within a preset training time period; and if the acquisition time is within the preset training time period, determining that the historical transaction review voucher data meets a preset model condition.

[0144] FIG. 12 is a schematic structural diagram of a service platform according to an example embodiment of this specification. The service platform in this specification can include one or more of the following components: a processor 110, a memory 120, an input apparatus 130, an output apparatus 140, and a bus 150. The processor 110, the memory 120, the input apparatus 130, and the output apparatus 140 can be connected to each other through the bus 150.

[0145] The processor 110 can include one or more processing cores. The processor 110 connects all parts of the entire terminal device by using various interfaces and lines, and performs various functions and data processing of the terminal device 100 by running or executing instructions, programs, code sets, or instruction sets stored in the memory 120, and invoking data stored in the memory 120. Optionally, the processor 110 can be implemented in at least one hardware form in a digital signal processor (DSP), a field-programmable gate array (FPGA), and a programmable logic array (PLA). One or a combination of a central processing unit (CPU), a graphics processing unit (GPU), a modem, etc. can be integrated into the processor 110. The CPU mainly processes an operating system, a user interface, an application, etc. The GPU is configured to be responsible for rendering and drawing display content. The modem is configured to process wireless communication. It can be understood that the modem may not be integrated into the processor 110, and is separately implemented by using a communication chip.

[0146] The memory 120 can include a random access memory (RAM), or can include a read-only memory (ROM). Optionally, the memory 120 includes a non-transitory computer-readable storage medium. The memory 120 can be configured to store instructions, a program, code, a code set, or an instruction set. The memory 120 can include a program storage area and a data storage area. The program storage area can store instructions for implementing an operating system, instructions for implementing at least one function (for example, a touch function, a sound playing function, or an image playing function), instructions for implementing the following method embodiments, etc. The operating system can be an Android system, including a system deeply developed based on the Android system; or an IOS system developed by Apple, including a system deeply developed based on the IOS system; or another system.

[0147] To enable the operating system to distinguish between specific application scenarios of a third-party application, data communication between the third-party application and the operating system needs to be enabled, so that the operating system can obtain current scenario information of the third-party application at any time, and then perform targeted system resource adaptation based on a current scenario.

[0148] The input apparatus 130 is configured to receive the input instructions or data. The input apparatus 130 includes, but is not limited to, a keyboard, a mouse, a camera, a microphone, or a touch device. The output apparatus 140 is configured to output instructions or data. The output apparatus 140 includes, but is not limited to, a display device, a speaker, and the like. In an example, the input apparatus 130 and the output apparatus 140 can be disposed together, and the input apparatus 130 and the output apparatus 140 are touchscreens.

[0149] The touchscreen can be designed as a full screen, a curved screen, or a profiled screen. The touchscreen can alternatively be designed as a combination of a full screen and a curved screen, or a combination of a profiled screen and a curved screen, which is not limited in the embodiments of this specification.

[0150] In addition, a person skilled in the art can understand that a structure of the electronic device shown in the above-mentioned accompanying drawings does not constitute a limitation on the service platform. The service platform can include more or fewer components than those shown in the figure, or combine some components, or have different component arrangements. For example, the electronic device further includes components such as a radio frequency circuit, an input unit, a sensor, an audio circuit, a wireless fidelity (Wi-Fi) module, a power supply, and a Bluetooth module. Details are not described herein.

[0151] On the service platform shown in FIG. 11, the processor 110 can be configured to invoke a program, of a transaction voucher review method, stored in the memory 120, and specifically

perform the following operations:

receiving a target model gradient parameter uploaded by at least one electronic device;

determining a target model parameter based on the target model gradient parameter uploaded by each electronic device; and

5 sending the target model parameter to each electronic device, where the target model parameter is used to indicate each electronic device to update a local transaction voucher review model based on the target model parameter to obtain a target transaction voucher review model, and perform transaction voucher review processing based on the target transaction voucher review model.

[0152] In an embodiment, when performing the step of determining a target model parameter based on the target model gradient parameter uploaded by each electronic device, the processor 110 specifically performs the following operations:

determining a target model gradient average value based on the target model gradient parameter uploaded by each electronic device; and

15 updating a local model parameter based on the target model gradient average value, to obtain the target model parameter.

[0153] In an embodiment, when performing the step of determining a target model gradient average value based on the target model gradient parameter uploaded by each electronic device, the processor 110 specifically performs the following operations:

20 obtaining a sample quantity corresponding to the target model gradient parameter, and determining a target weight corresponding to the target model gradient parameter based on the sample quantity; and

calculating the target model gradient average value based on the target model gradient parameter and the target weight.

[0154] Embodiments of this specification further provide a computer program product. The computer program product stores at least one instruction, and the at least one instruction is loaded and executed by a processor to implement the transaction voucher review method in the above-mentioned embodiments.

[0155] It should be noted that the information (including but not limited to user equipment information, user personal information, etc.), the data (including but not limited to data used for analysis, stored data, displayed data, etc.), and the signal involved in the embodiments of this specification are authorized by users or fully authorized by all parties, and the related data need to be collected, used, and processed in compliance with related laws, regulations, and standards of related countries and regions. For example, the transaction review voucher data, the target transaction review voucher data, the historical transaction review voucher data, etc. involved in this specification are all

obtained when being fully authorized.

[0156] A person skilled in the art should be aware that in the above-mentioned one or more examples, functions described in the embodiments of this specification can be implemented by hardware, software, firmware, or any combination thereof. When being implemented by software, these functions can be stored in a computer-readable medium or transmitted as one or more instructions or code in a computer-readable medium. The computer-readable medium includes a computer storage medium and a communication medium. The communication medium includes any medium that enables a computer program to be transmitted from one place to another place. The storage medium can be any usable medium accessible to a general-purpose or special-purpose computer.

[0157] The above-mentioned descriptions are merely optional embodiments of this specification, but are not intended to limit this specification. Any modification, equivalent replacement, or improvement made within the spirit and principles of this specification shall be included in the protection scope of this specification.

[0158] Particular implementations 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 an order different from that in the embodiments and desired results 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 feasible or may be advantageous.

CLAIMS

What is claimed is:

1. A transaction voucher review method, applied to an electronic device, wherein the method comprises:

5 uploading a target model gradient parameter of a local transaction voucher review model to a service platform, wherein the target model gradient parameter is used to indicate the service platform to determine a target model parameter based on the target model gradient parameter uploaded by at least one electronic device;

10 receiving the target model parameter sent by the service platform, and updating the local transaction voucher review model based on the target model parameter to obtain a target transaction voucher review model; and

performing transaction voucher review processing based on the target transaction review model.

2. The method according to claim 1, wherein the performing transaction voucher review processing based on the target voucher identification model comprises:

15 obtaining transaction review voucher data of a target user; and

performing transaction voucher review processing on the transaction review voucher data based on the target transaction voucher review model, to obtain a transaction voucher review result corresponding to the target user.

20 3. The method according to claim 2, wherein the performing transaction voucher review processing on the transaction review voucher data based on the target transaction voucher review model, to obtain a transaction voucher review result corresponding to the target user comprises:

performing voucher classification processing based on the transaction review voucher data, to obtain target transaction review voucher data, wherein the target transaction review voucher data carries a target voucher classification corresponding to the transaction review voucher data; and

25 performing transaction voucher review processing on the target transaction review voucher data based on the target transaction voucher review model, to obtain the transaction voucher review result corresponding to the target user.

30 4. The method according to claim 3, wherein the performing voucher classification processing based on the transaction review voucher data, to obtain target transaction review voucher data comprises:

performing voucher classification identification processing on the transaction review voucher data, to obtain the target voucher classification corresponding to the transaction review voucher data; and

labeling the transaction review voucher data based on the target voucher classification, to obtain the target transaction review voucher data.

5. The method according to claim 3, wherein the performing voucher classification processing based on the transaction review voucher data, to obtain target transaction review voucher data

5 comprises:

inputting the transaction review voucher data into a voucher classification identification model, to obtain the target transaction review voucher data, wherein the voucher classification identification model is obtained through training based on a sample target transaction review voucher data label corresponding to labeled sample transaction review voucher data.

10 6. The method according to claim 1, wherein before the uploading a target model gradient parameter of a local transaction voucher review model to a service platform, the method further comprises:

determining the local transaction voucher review model, and obtaining the target model gradient parameter of the local transaction voucher review model.

15 7. The method according to claim 6, wherein the obtaining the target model gradient parameter of the local transaction voucher review model comprises:

obtaining historical transaction review voucher data of a historical user; and

performing model training processing on the local transaction voucher review model based on the historical transaction review voucher data, to obtain the target model gradient parameter of the
20 local transaction voucher review model.

8. The method according to claim 7, wherein the performing model training processing on the local transaction voucher review model based on the historical transaction review voucher data, to obtain the target model gradient parameter of the local transaction voucher review model comprises:

25 if it is determined that the historical transaction review voucher data meets a preset model training condition, performing model training processing on the local transaction voucher review model based on the historical transaction review voucher data, to obtain the target model gradient parameter of the local transaction voucher review model.

9. The method according to claim 8, wherein that it is determined that the historical transaction review voucher data meets the preset model training condition comprises:

30 determining whether a cumulative amount of historical transaction review voucher data is greater than a preset training amount; and if the cumulative amount is greater than the preset training amount, determining that the historical transaction review voucher data meets the preset model training condition; or

determining whether an acquisition time of the historical transaction review voucher data is

within a preset training time period; and if the acquisition time is within the preset training time period, determining that the historical transaction review voucher data meets a preset model condition.

10. A transaction voucher review method, applied to a service platform, wherein the method comprises:

- 5 receiving a target model gradient parameter uploaded by at least one electronic device;
- determining a target model parameter based on the target model gradient parameter uploaded by each electronic device; and
- 10 sending the target model parameter to each electronic device, wherein the target model parameter is used to indicate each electronic device to update a local transaction voucher review model based on the target model parameter to obtain a target transaction voucher review model, and perform transaction voucher review processing based on the target transaction voucher review model.

11. The method according to claim 10, wherein the determining a target model parameter based on the target model gradient parameter uploaded by each electronic device comprises:

- 15 determining a target model gradient average value based on the target model gradient parameter uploaded by each electronic device; and
- updating a local model parameter based on the target model gradient average value, to obtain the target model parameter.

12. The method according to claim 11, wherein the determining a target model gradient average value based on the target model gradient parameter uploaded by each electronic device comprises:

- 20 obtaining a sample quantity corresponding to the target model gradient parameter, and determining a target weight corresponding to the target model gradient parameter based on the sample quantity; and
- calculating the target model gradient average value based on the target model gradient parameter and the target weight.

25 13. A transaction voucher review apparatus, applied to an electronic device, wherein the apparatus comprises:

- a parameter uploading module, configured to upload a target model gradient parameter of a local transaction voucher review model to a service platform, wherein the target model gradient parameter is used to indicate the service platform to determine a target model parameter based on the target model gradient parameter uploaded by at least one electronic device;
- 30 a model updating module, configured to: receive the target model parameter sent by the service platform, and update the local transaction voucher review model based on the target model parameter to obtain a target transaction voucher review model; and
- a data processing module, configured to perform transaction voucher review processing based

on the target transaction review model.

14. A transaction voucher review apparatus, applied to a service platform, wherein the apparatus comprises:

5 a data receiving module, configured to receive a target model gradient parameter uploaded by at least one electronic device;

a data processing module, configured to determine a target model parameter based on the target model gradient parameter uploaded by each electronic device; and

10 a data sending module, configured to send the target model parameter to each electronic device, wherein the target model parameter is used to indicate each electronic device to update a local transaction voucher review model based on the target model parameter to obtain a target transaction voucher review model, and perform transaction voucher review processing based on the target transaction voucher review model.

15 15. A computer storage medium, wherein the computer storage medium stores a plurality of instructions, and the instructions are suitable for being loaded and executed by a processor to perform the steps of the method according to any one of claims 1 to 9 or 10 to 12.

16. A computer program product, wherein the computer program product stores at least one instruction, and the at least one instruction is suitable for being loaded and executed by a processor to perform the steps of the method according to any one of claims 1 to 9 or 10 to 12.

20 17. An electronic device, comprising a processor and a memory, wherein the memory stores a computer program, and the computer program is suitable for being loaded and executed by a processor to perform the steps of the method according to any one of claims 1 to 9 or 10 to 12.