

# **METHOD AND DEVICE FOR DISPLAY OF CARDIO-CEREBROVASCULAR DISEASE, DEVICE, AND STORAGE MEDIUM**

## **CROSS-REFERENCE TO RELATED APPLICATION(S)**

[1] This application claims priority to Chinese Patent Application No. 201910065015.9, filed on January 23, 2019, and entitled “METHOD AND DEVICE FOR DISPLAY OF CARDIO-CEREBROVASCULAR DISEASE, DEVICE, AND STORAGE MEDIUM”, the entire disclosure of which is hereby incorporated by reference in its entirety.

## **TECHNICAL FIELD**

[2] This disclosure relates to the technical field of medical data display, and particularly to a method and device for display of cardio-cerebrovascular disease, a computer device, and a storage medium.

## **BACKGROUND**

[3] Due to the acceleration of social aging and urbanization, and unhealthy lifestyles of people, the prevalence of disease such as cardio-cerebrovascular disease is increasing, showing a rapid growth and individual aggregation trend in the younger and lower income groups. When a user takes a physical examination or goes to a hospital for an examination of cardio-cerebrovascular-related signs, physical examination reports or examination reports given to the user by the hospital or physical examination institution are presented through a table or report of a fixed template according to data information obtained from the examination, and the table or report is generally presented in a static page or printed paper manner. This way of presentation is very simple, and lacks multi-level human-computer interaction experience and personalized display form for different individuals, which will not give users a deep impression.

## **SUMMARY**

[4] Implementations of the disclosure provide a method and device for display of cardio-cerebrovascular disease, a computer device, and a storage medium, which may provide a display method for cardio-cerebrovascular disease.

[5] According to a first aspect, a method for display of cardio-cerebrovascular disease is provided. The method includes the following. Sign information of a user is obtained. A type of cardio-cerebrovascular disease that the user suffers from is determined according to

the sign information of the user. According to the type of the cardio-cerebrovascular disease and the sign information of the user, a cardio-cerebrovascular disease animation corresponding to the type of the cardio-cerebrovascular disease is drawn with a three-dimension (3D) animation engine. A disease risk of the user is evaluated according to the type of the cardio-cerebrovascular disease and the sign information of the user, and a risk animation corresponding to the disease risk is drawn with the 3D animation engine. The cardio-cerebrovascular disease animation and the risk animation are displayed.

**[6]** According to a second aspect, a device for display of cardio-cerebrovascular disease is provided. The device includes an obtaining module, an analyzing module, a first drawing module, a second drawing module, and a display module. The obtaining module is configured to obtain sign information of a user. The analyzing module is configured to determine a type of cardio-cerebrovascular disease that the user suffers from according to the sign information of the user. The first drawing module is configured to draw according to the type of the cardio-cerebrovascular disease and the sign information of the user, with a 3D animation engine, a cardio-cerebrovascular disease animation corresponding to the type of the cardio-cerebrovascular disease. The second drawing module is configured to evaluate a disease risk of the user according to the type of the cardio-cerebrovascular disease and the sign information of the user, and draw, with the 3D animation engine, a risk animation corresponding to the disease risk. The display module is configured to display the cardio-cerebrovascular disease animation and the risk animation.

**[7]** According to a third aspect, a computer device is provided. The computer device includes a memory and a processor. The memory is configured to store computer programs. The processor is configured to execute the computer programs and implement the method for display of cardio-cerebrovascular disease described above when the computer programs are executed.

**[8]** According to a fourth aspect, a computer readable storage medium is provided. The computer readable storage medium storing computer programs which, when executed by a processor, are operable with the processor to implement the method for display of cardio-cerebrovascular disease described above.

**[9]** According to the method and device for display of cardio-cerebrovascular disease, the computer device, and the storage medium, the sign information of the user is obtained, and the type of the cardio-cerebrovascular disease that the user suffers from is determined according to the sign information of the user. According to the type of the cardio-cerebrovascular disease and the sign information of the user, the cardio-cerebrovascular

disease animation corresponding to the type of the cardio-cerebrovascular disease is drawn with the 3D animation engine. The disease risk of the user is evaluated according to the type of the cardio-cerebrovascular disease and the sign information of the user, and the risk animation corresponding to the disease risk is drawn with the 3D animation engine. The cardio-cerebrovascular disease animation and the risk animation are displayed, which can display the cardio-cerebrovascular disease that the user suffers from and disease risk of the user in the form of a 3D animation.

#### BRIEF DESCRIPTION OF THE DRAWINGS

**[10]** In order to describe technical solutions of implementations of the disclosure more clearly, the following will give a brief description of accompanying drawings used for describing the implementations. Apparently, the accompanying drawings described below merely illustrate some implementations. Those of ordinary skill in the art can also obtain other accompanying drawings based on the accompanying drawings described below without creative efforts.

**[11]** FIG. 1 is a schematic flow chart illustrating a method for display of cardio-cerebrovascular disease according to implementations.

**[12]** FIG. 2 is a schematic flow chart illustrating sub-steps in the method for display of cardio-cerebrovascular disease illustrated in FIG. 1.

**[13]** FIG. 3 is a schematic flow chart illustrating a method for display of cardio-cerebrovascular disease according to other implementations.

**[14]** FIG. 4 is a schematic flow chart illustrating sub-steps in the method for display of cardio-cerebrovascular disease illustrated in FIG. 3.

**[15]** FIG. 5 is a schematic structural diagram illustrating a device for display of cardio-cerebrovascular disease according to implementations.

**[16]** FIG. 6 is a schematic structural diagram illustrating a first drawing module illustrated in FIG. 5.

**[17]** FIG. 7 is a schematic structural diagram illustrating a computer device according to implementations.

#### DETAILED DESCRIPTION

**[18]** Technical solutions in the implementations of the disclosure will be described clearly and completely hereinafter with reference to the accompanying drawings in the implementations of the disclosure. Apparently, the described implementations are merely

some rather than all implementations of the disclosure. All other implementations obtained by those of ordinary skill in the art based on the implementations of the disclosure without creative efforts shall fall within the protection scope of the disclosure.

[19] The flowchart illustrated in the accompanying drawings is merely illustrative, and does not necessarily include all contents and operations/steps, nor does it have to be executed in the described order. For example, some operations/steps can also be decomposed, combined, or partially combined, and thus the actual execution order may be changed according to actual conditions.

[20] Implementations provide a method and device for display of cardio-cerebrovascular disease, a computer device, and a storage medium. The method for display of cardio-cerebrovascular disease can be used by organizations where three-dimension (3D) animation display of cardio-cerebrovascular disease is required. Examples of such organizations may include hospitals, community health service centers, physical examination institutions, government disease prevention departments, or the like.

[21] The following describes some implementations in detail in conjunction with the accompanying drawings. The implementations and features therein may be combined with each other without conflicts.

[22] FIG. 1 is a schematic flow chart illustrating a method for display of cardio-cerebrovascular disease according to implementations. As illustrated in FIG. 1, the method begins at S101.

[23] At S101, sign information of a user is obtained.

[24] The sign information of the user includes “age”, “gender”, “medical history”, “step counting”, “heart rate”, “pulse”, “blood pressure”, and other information. The sign information of the user can be obtained in real time through a smart wearable device (such as a smart bracelet) worn by the user, or can be obtained from the wearable device at a certain time interval. Alternatively, the sign information of the user can also be obtained from examination results provided by physical examination equipment, for example, the sign information of the user can be obtained from digital medical image information generated by imaging examination equipment, such as computed tomography (CT) equipment, magnetic resonance imaging (MRI) equipment, or positron emission computed tomography (PET) equipment. Alternatively, the sign information of the user can be obtained from a medical database center.

[25] At S102, a type of cardio-cerebrovascular disease that the user suffers from is determined according to the sign information of the user.

**[26]** As one example, the type of the cardio-cerebrovascular disease that the user suffers from is determined according to the sign information of the user as follows. The type of the cardio-cerebrovascular disease that the user suffers from can be determined by the doctor according to the sign information of the user.

**[27]** As another example, the type of the cardio-cerebrovascular disease that the user suffers from is determined according to the sign information of the user as follows. The sign information of the user is input into a pre-trained neural network model for analysis, to determine the type of the cardio-cerebrovascular disease that the user suffers from.

**[28]** The neural network model is trained in advance. To this end, sign information of a large number of users suffering from the cardio-cerebrovascular disease is input into a neural network model. The neural network model includes a convolution layer, a nonlinear unit, a pooling layer, and a full connection layer. Feature maps are obtained through convolution, and the feature maps are corrected by the nonlinear unit. Pooling is performed on the corrected feature maps to obtain feature maps with dimension reduced, where the pooling includes max pooling, average pooling, and sum pooling. Thereafter, the pooled feature maps are input into the full connection layer to be processed with an activation function, to obtain and output a probability that the user suffers from the cardio-cerebrovascular disease. A filter of the convolutional layer is adjusted and updated according to errors of output until the error falls within a target range. As such, training of the convolutional neural network based prediction model for the cardio-cerebrovascular disease is completed. The sign information of the user (obtained at S101) is input into the pre-trained neural network model, to determine whether the user suffers from the cardio-cerebrovascular disease and determine a type of the cardio-cerebrovascular disease that the user suffers from. Types of the cardio-cerebrovascular disease include “hypertension”, “hyperlipidemia”, “arteriosclerosis”, “cerebral ischemic stroke”, “cerebral hemorrhage”, “coronary heart disease”, “angina pectoris”, “myocardial ischemia”, “myocardial infarction”, “heart failure”, “arrhythmia”, and so on.

**[29]** At S103, a cardio-cerebrovascular disease animation corresponding to the type of the cardio-cerebrovascular disease is drawn with a 3D animation engine, according to the type of the cardio-cerebrovascular disease and the sign information of the user.

**[30]** In one example, as illustrated in FIG. 2, according to the type of the cardio-cerebrovascular disease and the sign information of the user, the cardio-cerebrovascular disease animation corresponding to the type of the cardio-cerebrovascular disease is drawn with the 3D animation engine as follows.

**[31]** At S1031, a cardio-cerebrovascular disease animation is drawn with the 3D

animation engine according to the type of the cardio-cerebrovascular disease.

[32] In one example, the cardio-cerebrovascular disease animation corresponding to the type of the cardio-cerebrovascular disease is drawn with the 3D animation engine according to symptoms corresponding to the type of the cardio-cerebrovascular disease. Examples of such 3D animation engine may include an object-oriented graphics rendering engine (OGRE), an open generic visual system (OpenGVS), a velocity tree syntax (Vtree), an open scene graph (OSG), and other three-dimension animation engines. For example, if the user suffers from “hypertension”, an animation corresponding to the “hypertension” is drawn with the 3D animation engine, and the animation shows that the impact pressure of the blood flow on the blood vessel walls is relatively large. For another example, if the user suffers from “hyperlipoidemia” (which is associated with “triglyceride”, “low-density lipoprotein cholesterol”, or “total cholesterol”), an animation corresponding to the “hyperlipoidemia” is drawn with the 3D animation engine, and the animation shows that a color of the blood is dark yellow, the vessel wall is very brittle, and atherosclerosis occurs. According to implementations, the drawn animation shows general symptoms of the type of the cardio-cerebrovascular disease. In addition, the drawn animation corresponding to the type of the cardio-cerebrovascular disease may be saved.

[33] At S1032, the cardio-cerebrovascular disease animation drawn is adjusted according to the sign information of the user, to obtain the cardio-cerebrovascular disease animation corresponding to the type of the cardio-cerebrovascular disease.

[34] The cardio-cerebrovascular disease animation (drawn at S1031) corresponds to general symptoms of the type of the cardio-cerebrovascular disease. Actually, indicator varies with different users, taking this into consideration, the animation (drawn at S1031) corresponding to the type of the cardio-cerebrovascular disease is adjusted according to the obtained parameter values of the sign information of the user. As one example, for “hypertension”, the animation drawn at S1031 shows the impact pressure of the blood flow against on blood vessel walls, when a blood pressure value is 160/110mmHg. As one example, when the obtained blood pressure value of the user is 180/130mmHg, the impact pressure of the blood flow on the blood vessel walls will be adjusted to be larger. As another example, if the blood pressure value of the user is 160/110 mmHg, the thickness and brittleness of the blood vessel walls may be adjusted to be larger as the age of the user increases. As yet another example, if the user suffers from “hyperlipidemia”, and “blood fat” indicator of the user is higher than that corresponding to the animation drawn at S1031, a blood flow velocity is adjusted to be slower, so it is easier to form plaques with the blood

vessel walls. In this way, the user can accurately view animations corresponding to his/her own sign information.

[35] At S1033, a parameter value of the sign information of the user is adjusted, to adjust the cardio-cerebrovascular disease animation corresponding to the type of the cardio-cerebrovascular disease.

[36] In one example, one or more parameter values of the sign information of the user are adjusted, to adjust the cardio-cerebrovascular disease animation drawn at S1032, which corresponds to the type of the cardio-cerebrovascular disease. In this way, it allows the user to know the consequences if indicators continue to deteriorate or what will happen if the user gets better after control. In the example given above, the user suffers from “hypertension”, and if one of sign information parameters of the cardio-cerebrovascular disease animation corresponding to the type of the cardio-cerebrovascular disease is “blood pressure”, the value of which is 180/130mmHg, the blood pressure value will be adjusted, for example, the blood pressure value is gradually increased. Therefore, the cardio-cerebrovascular disease animation will show that the impact pressure of the blood flow on the blood vessel walls gradually increases until the blood vessel walls rupture. In this way, the user can see the consequences if the blood pressure continues to rise without control. On the contrary, if the blood pressure value is decreased such that the “blood pressure” gradually decreases, the cardio-cerebrovascular disease animation will show that the impact pressure of the blood flow on the blood vessel walls gradually decreases until it is in the normal state.

[37] At S104, a disease risk of the user is evaluated according to the type of the cardio-cerebrovascular disease and the sign information of the user, and a risk animation corresponding to the disease risk is drawn with the 3D animation engine.

[38] In at least one implementation, according to the type of the cardio-cerebrovascular disease (obtained at S102) and the sign information of the user, the disease risk of the user is evaluated. For example, the disease risk evaluated is: the user suffers from “hypertension”, and the blood pressure value is above 180/130mmHg. Evaluation of various sign indicators of the user shows that if the blood pressure is not well controlled, it will lead to myocardial compensatory hypertrophy, and myocardial ischemia and hypoxia, which turns into hypertensive heart disease, and heart failure can occur at any time. Therefore, with the 3D animation engine, the entire process of the occurrence of myocardial compensatory hypertrophy, myocardial ischemia and hypoxia, hypertensive heart disease, and heart failure may be simulated. For another example, the disease risk evaluated is: the user suffers from “cerebral stroke”, and blood vessels of the brain of the user may be displayed partially. For

instance, the animation simulates a process in which the plaque falls off and forms a blood clot that blocks the blood vessels of the brain, resulting in cerebral ischemia and stroke, or the animation simulates a process in which cerebral hemorrhage occurs because the user's cerebrovascular wall is too brittle and narrow. In addition, with aid of the 3D real-time calculation model, 3D animations may be drawn to show the process of myocardial infarction, coronary heart disease, and heart failure. In this way, it is possible to dynamically describe the cardio-cerebrovascular disease risks.

**[39]** At S105, the cardio-cerebrovascular disease animation and the risk animation are displayed.

**[40]** After the cardio-cerebrovascular disease animation and the risk animation are drawn, the cardio-cerebrovascular disease animation and the risk animation can be directly displayed on a drawn terminal device or sent to other devices for display.

**[41]** According to implementations provided herein, the cardio-cerebrovascular disease animation corresponding to the type of the cardio-cerebrovascular disease can be drawn with the 3D animation engine, according to the type of the cardio-cerebrovascular disease that the user suffers from and the sign information of the user. The disease risk of the user can be evaluated according to the type of the cardio-cerebrovascular disease and the sign information of the user, and the risk animation corresponding to the disease risk can be drawn with the 3D animation engine, such that the display of the cardio-cerebrovascular disease may be vivid and diversified, and thus the user may have a deeper understanding of the characteristics of the cardio-cerebrovascular disease.

**[42]** As illustrated in FIG. 3, FIG. 3 is a schematic flow chart illustrating a method for display of cardio-cerebrovascular disease according to other implementations. As illustrated in FIG. 3, the method begins at S201.

**[43]** At S201, sign information of a user is obtained.

**[44]** In one example, the sign information of the user can be obtained in real time through a smart wearable device (such as a smart bracelet) worn by the user, or can be obtained from the wearable device at a certain time interval. Alternatively, the sign information of the user can also be obtained from examination results provided by physical examination equipment, for example, the sign information of the user can be obtained from digital medical image information generated by imaging examination equipment, such as CT equipment, MRI equipment, and PET equipment. In addition, the sign information of the user can be obtained from a medical database center. The sign information of the user includes "age", "gender", "medical history", "step counting", "heart rate", "pulse", "blood pressure",

and other information.

[45] At S202, a type of cardio-cerebrovascular disease that the user suffers from is determined according to the sign information of the user.

[46] In one example, feature values of the sign information of the user are compared with pre-stored feature values of sign information of types of cardio-cerebrovascular disease to obtain multiple comparison results, according to which the type of cardio-cerebrovascular disease that the user suffers from is determined. In one example, a name of each type of the cardio-cerebrovascular disease (that is, disease type) and feature values of sign information of each type of the cardio-cerebrovascular disease are pre-stored in a database, for example, pre-stored in the form of a data table as illustrated in Table 1.

Table 1: Correspondence between disease type and feature value of the sign information

| Serial number | Disease type    | Feature value of the sign information |                                               |                              |                                               |     |
|---------------|-----------------|---------------------------------------|-----------------------------------------------|------------------------------|-----------------------------------------------|-----|
|               |                 | Feature value 1                       | Feature value 2                               | Feature value 3              | Feature value 4                               | ... |
| 1             | Hypertension    | Blood pressure value > 140/90mmHg     | Age > 40 years old                            | /                            | /                                             | ... |
| 2             | Hyperlipoidemia | Total cholesterol > 200mg/di          | Low-density lipoprotein cholesterol >120mg/di | Serum triglyceride >150mg/di | High-density lipoprotein cholesterol <35mg/di | ... |
| ...           | ...             | ...                                   | ...                                           | ...                          | ...                                           | ... |

[47] In at least one implementation, the feature values of the sign information of the user are compared with the pre-stored feature values of the sign information of the types of cardio-cerebrovascular disease to obtain the multiple comparison results, according to which the type of the cardio-cerebrovascular disease that the user suffers from is determined as follows. According to the feature values of the sign information of the user and the pre-stored feature values of the sign information of the types of cardio-cerebrovascular disease, a probability that the user suffers from the cardio-cerebrovascular disease of a type (such as, “hypertension” or “hyperlipoidemia”) is calculated according to a correlation formula:

$$b_j = \frac{C_1 + C_2 + \dots + C_n}{n} = \frac{\sum_{i=1}^n C_i}{n}, \text{ where}$$

$$C_i = \begin{cases} 1, & X_i \in Y_i \\ 0, & X_i \notin Y_i \end{cases}, \text{ } n \text{ represents the amount of the feature values, } X_i \text{ represents the } i^{\text{th}} \text{ feature}$$

value of the sign information of the user, and  $Y_i$  represents the  $i^{\text{th}}$  feature value of the sign information of the pre-stored type of the cardio-cerebrovascular disease. When the probability is greater than a preset probability corresponding to the type of the cardio-cerebrovascular disease, determine that the user suffers from the cardio-cerebrovascular disease of the type.

**[48]** According to the above probability calculation method, the feature values of the sign information of the user and the feature values of the sign information of all the types illustrated in the Table 1 are compared and calculated one by one, so as to determine the type(s) of the cardio-cerebrovascular disease that the user suffers from.

**[49]** In one example, the obtained feature values of the sign information of the user are:  $X_1, X_2, \dots, X_n$ , each of which represents a numerical value of corresponding sign information. For example,  $X_1$  represents “age” 40, and  $X_2$  represents “blood pressure” 150/100mmHg. The feature values of the sign information of the pre-stored type (such as, disease type  $j$ ) of the cardio-cerebrovascular disease are:  $Y_1, Y_2, \dots, Y_n$ , each of which represents a numerical range or a numerical value. For example,  $Y_1$  represents an age range which is greater than or equal to ( $\geq$ ) 35 years old,  $Y_2$  represents a blood pressure range which is greater than or equal to ( $\geq$ ) 140/90mmHg, and so on. Compare  $X_1, X_2, \dots, X_n$  with  $Y_1, Y_2, \dots, Y_n$  to obtain multiple comparison results, which are marked as  $C_1, C_2, \dots, C_n$ . If  $X_i \in Y_i$ ,  $C_i = 1$ ; otherwise,  $C_i = 0$ , where  $1 \leq i \leq n$ . As another example, if  $X_2$  represents “blood pressure” 150/100mmHg, and represents a blood pressure range which is greater than or equal to ( $\geq$ ) 140/90mmHg,  $X_2 \in Y_2$ , and thus  $C_2 = 1$ . The probability  $b_j$  that the user suffers from the cardio-cerebrovascular disease type  $j$  is calculated by:

$$b_j = \frac{C_1 + C_2 + \dots + C_n}{n} = \frac{\sum_{i=1}^n C_i}{n}. \text{ In one example, when } b_j \geq \alpha, \text{ for example, when } b_j \geq 0.5,$$

determine that the user suffers from the cardio-cerebrovascular disease type  $j$ ; otherwise, determine that the user does not suffer from the cardio-cerebrovascular disease type  $j$ . In one example, the preset probability  $\alpha$  can be adjusted according to experience.

**[50]** As illustrated in Table 1, the pre-stored types of cardio-cerebrovascular disease

include “hypertension”, “hyperlipidemia”, and other types of cardio-cerebrovascular disease. The preset probability corresponding to each of the above two types of cardio-cerebrovascular disease (that is, “hypertension” and “hyperlipidemia”) is 0.5. The preset probability can also be set to be other values according to actual needs. In one example, when the probability corresponding to the “hypertension” calculated with the correlation formula is 0.6, and the probability corresponding to the “hyperlipidemia” calculated with the correlation formula is 0.4, it can be determined that the type of the cardio-cerebrovascular disease that the user suffers from is “hypertension”. The user may suffer from two or more types of the cardio-cerebrovascular diseases.

[51] At S203, according to the type of the cardio-cerebrovascular disease and the sign information of the user, a cardio-cerebrovascular disease animation corresponding to the type of the cardio-cerebrovascular disease is drawn with a 3D animation engine.

[52] In one example, as illustrated in FIG. 4, according to the type of the cardio-cerebrovascular disease and the sign information of the user, the cardio-cerebrovascular disease animation corresponding to the type of the cardio-cerebrovascular disease is drawn with the 3D animation engine as follows.

[53] At S2031, a normal cardio-cerebrovascular animation is drawn with the 3D animation engine.

[54] In one example, the normal cardio-cerebrovascular animation (that is, an animation related to cardio-cerebral blood vessels under normal conditions) is drawn with the 3D animation engine. For example, if the user suffers from “hypertension”, an animation related to the pressure of the blood flow on the blood vessel walls under normal conditions is drawn with the 3D animation engine. For another example, if the user suffers from “hyperlipidemia”, an animation related to a blood flow velocity under normal conditions is drawn with the 3D animation engine.

[55] At S2032, the normal cardio-cerebrovascular animation drawn is adjusted according to the sign information of the user, to obtain the cardio-cerebrovascular disease animation corresponding to the type of the cardio-cerebrovascular disease.

[56] In one example, according to the sign information of the user, adjustment is made to the normal cardio-cerebrovascular animation drawn at S2031, to obtain the cardio-cerebrovascular disease animation corresponding to the type of the cardio-cerebrovascular disease. For example, if the user suffers from “hypertension”, and the obtained blood pressure value of the user is 160/110mmHg, a normal blood pressure value (that is, the blood pressure value corresponding to the normal cardio-cerebrovascular animation drawn) may be adjusted,

for example, the normal blood pressure value may be gradually adjusted to be 160/110mmHg, such that the normal cardio-cerebrovascular animation drawn may be adjusted accordingly. That is, the impact pressure of the blood flow on the blood vessel walls may be gradually increased, and therefore an animation corresponding to “hypertension” may be obtained. For another example, if the user suffers from “hyperlipidemia”, and the obtained cholesterol of the user is 260mg/dl and the obtained serum triglyceride of the user is 180mg/dl, normal cholesterol and serum triglycerides (that is, the cholesterol and the serum triglycerides corresponding to the normal cardio-cerebrovascular animation drawn) are adjusted to the obtained cholesterol and serum triglycerides of the user, respectively. In this way, the blood flow velocity in the normal cardio-cerebrovascular animation may be gradually slowed down, and the color of the blood gradually becomes dark yellow, such that the animation corresponding to “hyperlipidemia” may be obtained. In this way, the user can gradually view the contrast effect of the normal cardio-cerebrovascular animation and the cardio-cerebrovascular disease animation, such that the display of the cardio-cerebrovascular disease may be vivid, thereby deepening the impression of the user.

**[57]** At S204, a disease risk of the user is evaluated according to the type of the cardio-cerebrovascular disease and the sign information of the user, and a risk animation corresponding to the disease risk is drawn with the 3D animation engine.

**[58]** In one example, according to the type of cardio-cerebrovascular disease (obtained at S202) and the sign information of the user, the disease risk of the user is evaluated. For example, the disease risk evaluated is: the user suffers from “cerebral stroke”, and blood vessels of the brain of the user may be displayed partially. For instance, the animation simulates a process in which the plaque falls off and forms a blood clot that blocks the blood vessels of the brain, resulting in cerebral ischemia and stroke, or the animation simulates a process cerebral hemorrhage occurs because the user’s cerebrovascular wall is too brittle and narrow. In addition, with aid of the 3D real-time calculation model, 3D animations may be drawn to show the process of myocardial infarction, coronary heart disease, and heart failure. In this way, it is possible to dynamically describe the cardio-cerebrovascular disease risks, and the user may have a deeper understanding of the risks, enabling the user to pay attention to disease prevention.

**[59]** At S205, at least one of the cardio-cerebrovascular disease animation or the risk animation is sent to a terminal device for display.

**[60]** As one example, the cardio-cerebrovascular disease animation and/or the risk animation can be sent to the terminal device of the user. For example, the cardio-

cerebrovascular disease animation and/or the risk animation can be sent to the terminal device (such as mobile phone, iPad, etc.) of the user or of families of the user through WiFi, 4G/5G, or other networks. In this way, the user and his/her families can view the cardio-cerebrovascular disease animation and/or the risk animation at any time. Alternatively, the cardio-cerebrovascular disease animation and the risk animation can be saved in a local database for subsequent viewing. As another example, the user can modify or edit the received cardio-cerebrovascular disease animation and/or the risk animation through the terminal device. For example, when the sign information of the user changes, the user can adjust a parameter value corresponding to the animation so as to modify the animation.

**[61]** In one example, the type of the cardio-cerebrovascular disease determined and the sign information of the user can be displayed through virtual reality (VR). In addition, the user can enter his/her own virtual human body with aid of the VR equipment, to observe internal structures of the cardio-cerebrovascular system, such that a relationship between the cardio-cerebrovascular disease risks and various indicators (such as, “height”, “weight”, “blood sugar”, “blood lipid”, “blood pressure”, etc.) may be obvious.

**[62]** A device for display of cardio-cerebrovascular disease is provided. As illustrated in FIG. 5, FIG. 5 is a schematic structural diagram illustrating a device 40 for display of cardio-cerebrovascular disease according to implementations. The device 40 for display of cardio-cerebrovascular disease is configured to implement any of the methods for display of cardio-cerebrovascular disease described above. The device 40 for display of cardio-cerebrovascular disease can be applied in a server or a terminal. The server may be an independent server or a server cluster. The terminal may be a mobile phone, a tablet computer, a notebook computer, a desktop computer, a personal digital assistant, a wearable device, or other electronic devices. The device 40 for display of cardio-cerebrovascular disease includes an obtaining module 41, an analyzing module 42, a first drawing module 43, a second drawing module 44, and a display module 45.

**[63]** The obtaining module 41 is configured to obtain sign information of a user. The analyzing module 42 is configured to determine a type of cardio-cerebrovascular disease that the user suffers from according to the sign information of the user. The first drawing module 43 is configured to draw according to the type of the cardio-cerebrovascular disease and the sign information of the user, with a 3D animation engine, a cardio-cerebrovascular disease animation corresponding to the type of the cardio-cerebrovascular disease. The second drawing module 44 is configured to evaluate a disease risk of the user according to the type of the cardio-cerebrovascular disease and the sign information of the user, and draw, with the

3D animation engine, a risk animation corresponding to the disease risk. The display module 45 is configured to display the cardio-cerebrovascular disease animation and the risk animation.

**[64]** In one example, the analyzing module 42 includes an analyzing sub-module 421 and a comparing module 422. The analyzing sub-module 421 is configured to input the sign information of the user into a pre-trained neural network model for analysis, to determine the type of cardio-cerebrovascular disease that the user suffers from. The comparing module 422 is configured to compare feature values of the sign information of the user and pre-stored feature values of sign information of types of cardio-cerebrovascular disease to obtain multiple comparison results, and determine the type of the cardio-cerebrovascular disease that the user suffers from according to the multiple comparison results.

**[65]** In one example, the comparing module 422 is configured to calculate, according to the feature values of the sign information of the user and the pre-stored feature values of the sign information of the types of cardio-cerebrovascular disease, a probability that the user suffers from the cardio-cerebrovascular disease of a type according to a correlation formula, and determine that the user suffers from the cardio-cerebrovascular disease of the type, when the probability is greater than a preset probability corresponding to the type of the cardio-cerebrovascular disease, where the correlation formula is:

$$b_j = \frac{C_1 + C_2 + \dots + C_n}{n} = \frac{\sum_{i=1}^n C_i}{n}, \text{ where}$$

$$C_i = \begin{cases} 1, & X_i \in Y_i \\ 0, & X_i \notin Y_i \end{cases}, \text{ } n \text{ represents the amount of the feature values, } X_i \text{ represents the } i^{\text{th}} \text{ feature}$$

value of the sign information of the user, and  $Y_i$  represents the  $i^{\text{th}}$  feature value of the sign information of the pre-stored type of the cardio-cerebrovascular disease.

**[66]** In at least one implementation, as illustrated in FIG. 6, FIG. 6 is a schematic structural diagram illustrating the first drawing module 43. The first drawing module 43 includes a first drawing sub-module 431 and a first adjusting module 432. The first drawing sub-module 431 is configured to draw, with the 3D animation engine, a cardio-cerebrovascular disease animation according to the type of the cardio-cerebrovascular disease. The first adjusting module 432 is configured to adjust, according to the sign information of the user, the cardio-cerebrovascular disease animation drawn, to obtain the cardio-cerebrovascular disease animation corresponding to the type of the cardio-cerebrovascular disease.

**[67]** In at least one implementation, the first drawing module 43 includes a second drawing sub-module 433 and a second adjusting module 434. The second drawing sub-module 433 is configured to draw, with the 3D animation engine, a normal cardio-cerebrovascular animation. The second adjusting module 434 is configured to adjust, according to the sign information of the user, the normal cardio-cerebrovascular animation drawn, to obtain the cardio-cerebrovascular disease animation corresponding to the type of the cardio-cerebrovascular disease.

**[68]** In at least one implementation, the first drawing module 43 further includes a third adjusting module 435. The third adjusting module 435 is configured to adjust a parameter value of the sign information of the user, to adjust the cardio-cerebrovascular disease animation corresponding to the type of the cardio-cerebrovascular disease.

**[69]** In at least one implementation, the display module 45 includes a sending module 451. The sending module 451 is configured to send at least one of the cardio-cerebrovascular disease animation or the risk animation to a terminal device for display or modification of the at least one of the cardio-cerebrovascular disease animation or the risk animation.

**[70]** It should be noted that those skilled in the art can clearly understand that for the convenience and brevity of the description, for specific functions of the device for display of cardio-cerebrovascular disease and various modules described above, reference may be made to the corresponding process in the foregoing implementations of the method for display of cardio-cerebrovascular disease, and details are not described herein again.

**[71]** The above device for display of cardio-cerebrovascular disease can be implemented in the form of a computer program, and the computer program can be run on a computer device as illustrated in FIG. 7.

**[72]** As illustrated in FIG. 7, FIG. 7 is a schematic structural diagram illustrating a computer device according to implementations. The computer device may be a server or a terminal.

**[73]** As illustrated in FIG. 7, the computer device includes a processor, a storage, and a network interface which are coupled with each other via a system bus. The storage may include a non-transitory storage medium and a memory. The non-transitory storage medium stores an operating system and a computer program. The computer program includes program instructions which, when executed by the processor, cause the processor to implement the method for display of cardio-cerebrovascular disease.

**[74]** The processor is configured to provide computing and control capabilities to support the operation of the entire computer device. The memory provides an operating

environment for the computer program in the non-transitory storage medium. When the computer program is executed by the processor, the computer program causes the processor to implement the method for display of cardio-cerebrovascular disease.

**[75]** The network interface may be used for network communication, such as sending of assigned tasks, and so on. Those skilled in the art can understand that FIG. 7 merely illustrates a partial structure of the computer device related to the solution of the disclosure, and does not constitute a limitation on the computer device to which the solution of the disclosure is applied. The computer device may include more or fewer components than illustrated, or may combine certain components, or may adopt different arrangements of components.

**[76]** It can be understood that the processor may be a central processing unit (CPU), or may be other general-purpose processors, digital signal processors (DSP), application-specific integrated circuits (ASIC), field programmable gate arrays (FPGA), or other programmable logic devices, discrete gate or transistor logic devices, discrete hardware components, or the like. The general-purpose processor may be a microprocessor, any conventional processor, or the like.

**[77]** The processor is configured to run the computer program stored in the memory to implement: obtain sign information of a user; determine a type of cardio-cerebrovascular disease that the user suffers from according to the sign information of the user; draw according to the type of the cardio-cerebrovascular disease and the sign information of the user, with a 3D animation engine, a cardio-cerebrovascular disease animation corresponding to the type of the cardio-cerebrovascular disease; evaluate a disease risk of the user according to the type of the cardio-cerebrovascular disease and the sign information of the user, and draw, with the 3D animation engine, a risk animation corresponding to the disease risk; display the cardio-cerebrovascular disease animation and the risk animation.

**[78]** In one example, in terms of determining the type of the cardio-cerebrovascular disease that the user suffers from according to the sign information of the user, the processor is configured to: input the sign information of the user into a pre-trained neural network model for analysis, to determine the type of the cardio-cerebrovascular disease that the user suffers from; and/or compare feature values of the sign information of the user with pre-stored feature values of sign information of types of cardio-cerebrovascular disease to obtain multiple comparison results, and determine the type of the cardio-cerebrovascular disease that the user suffers from according to the multiple comparison results.

**[79]** In one example, in terms of comparing the feature values of the sign information

of the user with the pre-stored feature values of the sign information of the types of cardio-cerebrovascular disease to obtain the multiple comparison results, and determine the type of the cardio-cerebrovascular disease that the user suffers from according to the multiple comparison results, the processor is configured to: calculate, according to the feature values of the sign information of the user and the pre-stored feature values of the sign information of the types of cardio-cerebrovascular disease, a probability that the user suffers from the cardio-cerebrovascular disease of a type according to a correlation formula, and determine that the user suffers from the cardio-cerebrovascular disease of the type, when the probability is greater than a preset probability corresponding to the type of the cardio-cerebrovascular disease, where the correlation formula is:

$$b_j = \frac{C_1 + C_2 + \dots + C_n}{n} = \frac{\sum_{i=1}^n C_i}{n}, \text{ where}$$

$$C_i = \begin{cases} 1, & X_i \in Y_i \\ 0, & X_i \notin Y_i \end{cases}, n \text{ represents the amount of the feature values, } X_i \text{ represents the } i^{\text{th}} \text{ feature}$$

value of the sign information of the user, and  $Y_i$  represents the  $i^{\text{th}}$  feature value of the sign information of the pre-stored type of the cardio-cerebrovascular disease.

**[80]** In one example, in terms of drawing according to the type of the cardio-cerebrovascular disease and the sign information of the user, with the 3D animation engine, the cardio-cerebrovascular disease animation corresponding to the type of the cardio-cerebrovascular disease, the processor is configured to: draw, with the 3D animation engine, a cardio-cerebrovascular disease animation according to the type of the cardio-cerebrovascular disease; adjust, according to the sign information of the user, the cardio-cerebrovascular disease animation drawn, to obtain the cardio-cerebrovascular disease animation corresponding to the type of the cardio-cerebrovascular disease.

**[81]** In one example, in terms of drawing according to the type of the cardio-cerebrovascular disease and the sign information of the user, with the 3D animation engine, the cardio-cerebrovascular disease animation corresponding to the type of the cardio-cerebrovascular disease, the processor is configured to: draw, with the 3D animation engine, a normal cardio-cerebrovascular animation; adjust, according to the sign information of the user, the normal cardio-cerebrovascular animation drawn, to obtain the cardio-cerebrovascular disease animation corresponding to the type of the cardio-cerebrovascular disease.

**[82]** In one example, the processor is further configured to adjust a parameter value of

the sign information of the user, to adjust the cardio-cerebrovascular disease animation corresponding to the type of the cardio-cerebrovascular disease, after obtaining the cardio-cerebrovascular disease animation corresponding to the type of the cardio-cerebrovascular disease.

**[83]** In one example, in terms of displaying the cardio-cerebrovascular disease animation and the risk animation, the processor is configured to: send at least one of the cardio-cerebrovascular disease animation or the risk animation to a terminal device for display or modification of the at least one of the cardio-cerebrovascular disease animation or the risk animation.

**[84]** Implementations of the disclosure further provide a computer readable storage medium. The computer readable storage medium stores computer programs, the computer programs include program instructions, and the processor executes the program instructions to implement any of the methods for display of cardio-cerebrovascular disease provided in the above implementations.

**[85]** The computer readable storage medium may be an internal storage unit of the computer device described in the foregoing implementations, such as the hard disk or memory of the computer device. The computer readable storage medium may also be an external storage device of the computer device, such as a plug-in hard disk, a smart memory card (SMC), and a secure digital (SD) card, a flash Card, and so on, which are equipped on the computer device.

**[86]** The foregoing merely describes some implementations of the disclosure, but the protection scope of the disclosure is not limited thereto. Those skilled in the art can easily think of various equivalent modifications or substitutions within the technical scope disclosed in the disclosure, and these modifications or substitutions should be covered by the protection scope of the disclosure. Therefore, the protection scope of the disclosure should be subject to the protection scope of the claims.

What is claimed is:

1. A computer device, comprising:

a processor; and

a memory configured to store computer programs which, when executed by the processor, cause the processor to:

obtain sign information of a user;

input the sign information of the user into a pre-trained neural network model for analysis, to determine a type of cardio-cerebrovascular disease that the user suffers from; and/or

calculate, according to feature values of the sign information of the user and pre-stored feature values of sign information of types of cardio-cerebrovascular disease, a probability that the user suffers from the cardio-cerebrovascular disease of a type according to a correlation formula, and determine that the user suffers from the cardio-cerebrovascular disease of the type, when the probability is greater than a preset probability corresponding to the type of the cardio-cerebrovascular disease, wherein the correlation formula is:

$$b_j = \frac{C_1 + C_2 + \dots + C_n}{n} = \frac{\sum_{i=1}^n C_i}{n}, \text{ wherein}$$

$$C_i = \begin{cases} 1, & X_i \in Y_i \\ 0, & X_i \notin Y_i \end{cases}, \text{ } n \text{ represents the amount of the feature values, } X_i \text{ represents the } i^{\text{th}}$$

feature value of the sign information of the user, and  $Y_i$  represents the  $i^{\text{th}}$  feature value of the sign information of the pre-stored type of the cardio-cerebrovascular disease;

draw according to the type of the cardio-cerebrovascular disease and the sign information of the user, with a three-dimension (3D) animation engine, a cardio-cerebrovascular disease animation corresponding to the type of the cardio-cerebrovascular disease;

evaluate a disease risk of the user according to the type of the cardio-cerebrovascular disease and the sign information of the user, and draw, with the 3D animation engine, a risk animation corresponding to the disease risk; and

display the cardio-cerebrovascular disease animation and the risk animation.

2. The computer device of claim 1, wherein the processor configured to draw according to the type of the cardio-cerebrovascular disease and the sign information of the user, with the

3D animation engine, the cardio-cerebrovascular disease animation corresponding to the type of the cardio-cerebrovascular disease is configured to:

draw, with the 3D animation engine, a cardio-cerebrovascular disease animation according to the type of the cardio-cerebrovascular disease; and

adjust, according to the sign information of the user, the cardio-cerebrovascular disease animation drawn, to obtain the cardio-cerebrovascular disease animation corresponding to the type of the cardio-cerebrovascular disease.

3. The computer device of claim 1, wherein the processor configured to draw according to the type of the cardio-cerebrovascular disease and the sign information of the user, with the 3D animation engine, the cardio-cerebrovascular disease animation corresponding to the type of the cardio-cerebrovascular disease is configured to:

draw, with the 3D animation engine, a normal cardio-cerebrovascular animation; and

adjust, according to the sign information of the user, the normal cardio-cerebrovascular animation drawn, to obtain the cardio-cerebrovascular disease animation corresponding to the type of the cardio-cerebrovascular disease.

4. The computer device of claim 3, wherein the processor is further configured to:

after obtaining the cardio-cerebrovascular disease animation corresponding to the type of the cardio-cerebrovascular disease,

adjust a parameter value of the sign information of the user, to adjust the cardio-cerebrovascular disease animation corresponding to the type of the cardio-cerebrovascular disease.

5. The computer device of claim 1, wherein the processor configured to display the cardio-cerebrovascular disease animation and the risk animation is configured to:

send at least one of the cardio-cerebrovascular disease animation or the risk animation to a terminal device for display or modification of the at least one of the cardio-cerebrovascular disease animation or the risk animation.

6. A device for display of cardio-cerebrovascular disease, comprising:

an obtaining module configured to obtain sign information of a user;

an analyzing module configured to

input the sign information of the user into a pre-trained neural network model

for analysis, to determine a type of cardio-cerebrovascular disease that the user suffers from; and/or

calculate, according to feature values of the sign information of the user and pre-stored feature values of sign information of types of cardio-cerebrovascular disease, a probability that the user suffers from the cardio-cerebrovascular disease of a type according to a correlation formula, and determine that the user suffers from the cardio-cerebrovascular disease of the type, when the probability is greater than a preset probability corresponding to the type of the cardio-cerebrovascular disease, wherein the correlation formula is:

$$b_j = \frac{C_1 + C_2 + \dots + C_n}{n} = \frac{\sum_{i=1}^n C_i}{n}, \text{ wherein}$$

$$C_i = \begin{cases} 1, & X_i \in Y_i \\ 0, & X_i \notin Y_i \end{cases}, \text{ } n \text{ represents the amount of the feature values, } X_i \text{ represents the } i^{\text{th}}$$

feature value of the sign information of the user, and  $Y_i$  represents the  $i^{\text{th}}$  feature value of the sign information of the pre-stored type of cardio-cerebrovascular disease;

a first drawing module configured to draw according to the type of the cardio-cerebrovascular disease and the sign information of the user, with a three-dimension (3D) animation engine, a cardio-cerebrovascular disease animation corresponding to the type of the cardio-cerebrovascular disease;

a second drawing module configured to evaluate a disease risk of the user according to the type of the cardio-cerebrovascular disease and the sign information of the user, and draw, with the 3D animation engine, a risk animation corresponding to the disease risk; and

a display module configured to display the cardio-cerebrovascular disease animation and the risk animation.

7. The device of claim 6, wherein the first drawing module comprises:

a first drawing sub-module configured to draw, with the 3D animation engine, a cardio-cerebrovascular disease animation according to the type of the cardio-cerebrovascular disease; and

a first adjusting module configured to adjust, according to the sign information of the user, the cardio-cerebrovascular disease animation drawn, to obtain the cardio-cerebrovascular disease animation corresponding to the type of the cardio-cerebrovascular disease.

8. The device of claim 6, wherein the first drawing module comprises:  
a second drawing sub-module configured to draw, with the 3D animation engine, a normal cardio-cerebrovascular animation; and  
a second adjusting module configured to adjust, according to the sign information of the user, the normal cardio-cerebrovascular animation drawn, to obtain the cardio-cerebrovascular disease animation corresponding to the type of the cardio-cerebrovascular disease.
9. The device of claim 8, wherein the first drawing module further comprises:  
a third adjusting module configured to adjust a parameter value of the sign information of the user, to adjust the cardio-cerebrovascular disease animation corresponding to the type of the cardio-cerebrovascular disease.
10. The device of claim 6, wherein the display module comprises  
a sending module configured to send at least one of the cardio-cerebrovascular disease animation or the risk animation to a terminal device for display or modification of the at least one of the cardio-cerebrovascular disease animation or the risk animation.
11. A computer readable storage medium storing computer programs which, when executed by a processor, are operable with the processor to:  
obtain sign information of a user;  
input the sign information of the user into a pre-trained neural network model for analysis, to determine a type of cardio-cerebrovascular disease that the user suffers from;  
and/or  
calculate, according to feature values of the sign information of the user and pre-stored feature values of sign information of types of cardio-cerebrovascular disease, a probability that the user suffers from the cardio-cerebrovascular disease of a type according to a correlation formula, and determine that the user suffers from the cardio-cerebrovascular disease of the type, when the probability is greater than a preset probability corresponding to the type of the cardio-cerebrovascular disease, wherein the correlation formula is:

$$b_j = \frac{C_1 + C_2 + \dots + C_n}{n} = \frac{\sum_{i=1}^n C_i}{n}, \text{ wherein}$$

$$C_i = \begin{cases} 1, & X_i \in Y_i \\ 0, & X_i \notin Y_i \end{cases}, \quad n \text{ represents the amount of the feature values, } X_i \text{ represents the } i^{\text{th}}$$

feature value of the sign information of the user, and  $Y_i$  represents the  $i^{\text{th}}$  feature value of the sign information of the pre-stored type of cardio-cerebrovascular disease;

draw according to the type of the cardio-cerebrovascular disease and the sign information of the user, with a three-dimension (3D) animation engine, a cardio-cerebrovascular disease animation corresponding to the type of the cardio-cerebrovascular disease;

evaluate a disease risk of the user according to the type of the cardio-cerebrovascular disease and the sign information of the user, and draw, with the 3D animation engine, a risk animation corresponding to the disease risk; and

display the cardio-cerebrovascular disease animation and the risk animation.

12. The computer readable storage medium of claim 11, wherein the computer programs operable with the processor to draw according to the type of the cardio-cerebrovascular disease and the sign information of the user, with the 3D animation engine, the cardio-cerebrovascular disease animation corresponding to the type of the cardio-cerebrovascular disease are operable with the processor to:

draw, with the 3D animation engine, a cardio-cerebrovascular disease animation according to the type of the cardio-cerebrovascular disease; and

adjust, according to the sign information of the user, the cardio-cerebrovascular disease animation drawn, to obtain the cardio-cerebrovascular disease animation corresponding to the type of the cardio-cerebrovascular disease.

13. The computer readable storage medium of claim 11, wherein the computer programs operable with the processor to draw according to the type of the cardio-cerebrovascular disease type and the sign information of the user, with the 3D animation engine, the cardio-cerebrovascular disease animation corresponding to the type of the cardio-cerebrovascular disease are operable with the processor to:

draw, with the 3D animation engine, a normal cardio-cerebrovascular animation; and

adjust, according to the sign information of the user, the normal cardio-cerebrovascular animation drawn, to obtain the cardio-cerebrovascular disease animation corresponding to the type of the cardio-cerebrovascular disease.

14. The computer readable storage medium of claim 13, wherein the computer programs are further operable with the processor to:

after obtaining the cardio-cerebrovascular disease animation corresponding to the type of the cardio-cerebrovascular disease,

adjust a parameter value of the sign information of the user, to adjust the cardio-cerebrovascular disease animation corresponding to the type of the cardio-cerebrovascular disease.

15. The computer readable storage medium of claim 11, wherein the computer programs operable with the processor to display the cardio-cerebrovascular disease animation and the risk animation are operable with the processor to:

send at least one of the cardio-cerebrovascular disease animation or the risk animation to a terminal device for display or modification of the at least one of the cardio-cerebrovascular disease animation or the risk animation.

16. A method for display of cardio-cerebrovascular disease, comprising:

obtaining sign information of a user;

inputting the sign information of the user into a pre-trained neural network model for analysis, to determine a type of cardio-cerebrovascular disease that the user suffers from; and/or

calculating, according to feature values of the sign information of the user and pre-stored feature values of sign information of types of cardio-cerebrovascular disease, a probability that the user suffers from the cardio-cerebrovascular disease of a type according to a correlation formula, and determining that the user suffers from the cardio-cerebrovascular disease of the type, when the probability is greater than a preset probability corresponding to the type of the cardio-cerebrovascular disease, wherein the correlation formula is

$$b_j = \frac{C_1 + C_2 + \dots + C_n}{n} = \frac{\sum_{i=1}^n C_i}{n}, \text{ wherein}$$

$$C_i = \begin{cases} 1, & X_i \in Y_i \\ 0, & X_i \notin Y_i \end{cases}, \text{ } n \text{ represents the amount of the feature values, } X_i \text{ represents the } i^{\text{th}}$$

feature value of the sign information of the user, and  $Y_i$  represents the  $i^{\text{th}}$  feature value of the

sign information of the pre-stored type of cardio-cerebrovascular disease;

drawing according to the type of the cardio-cerebrovascular disease and the sign information of the user, with a three-dimension (3D) animation engine, a cardio-cerebrovascular disease animation corresponding to the type of the cardio-cerebrovascular disease;

evaluating a disease risk of the user according to the type of the cardio-cerebrovascular disease and the sign information of the user, and drawing, with the 3D animation engine, a risk animation corresponding to the disease risk; and

displaying the cardio-cerebrovascular disease animation and the risk animation.

17. The method of claim 16, wherein drawing according to the type of the cardio-cerebrovascular disease and the sign information of the user, with the 3D animation engine, the cardio-cerebrovascular disease animation corresponding to the type of the cardio-cerebrovascular disease type comprises:

drawing, with the 3D animation engine, a cardio-cerebrovascular disease animation according to the type of the cardio-cerebrovascular disease; and

adjusting, according to the sign information of the user, the cardio-cerebrovascular disease animation drawn, to obtain the cardio-cerebrovascular disease animation corresponding to the type of the cardio-cerebrovascular disease.

18. The method of claim 16, wherein drawing according to the type of the cardio-cerebrovascular disease and the sign information of the user, with the 3D animation engine, the cardio-cerebrovascular disease animation corresponding to the type of the cardio-cerebrovascular disease comprises:

drawing, with the 3D animation engine, a normal cardio-cerebrovascular animation; and

adjusting, according to the sign information of the user, the normal cardio-cerebrovascular animation drawn, to obtain the cardio-cerebrovascular disease animation corresponding to the type of the cardio-cerebrovascular disease.

19. The method of claim 18, further comprising:

after obtaining the cardio-cerebrovascular disease animation corresponding to the type of the cardio-cerebrovascular disease,

adjusting a parameter value of the sign information of the user, to adjust the

cardio-cerebrovascular disease animation corresponding to the type of the cardio-cerebrovascular disease.

20. The method of claim 16, wherein displaying the cardio-cerebrovascular disease animation and the risk animation comprises:

    sending at least one of the cardio-cerebrovascular disease animation or the risk animation to a terminal device for display or modification of the at least one of the cardio-cerebrovascular disease animation or the risk animation.