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(54) **PHYSIOLOGICAL SIGNAL MEASURING APPARATUS AND METHOD WITH IDENTIFICATION FUNCTION**

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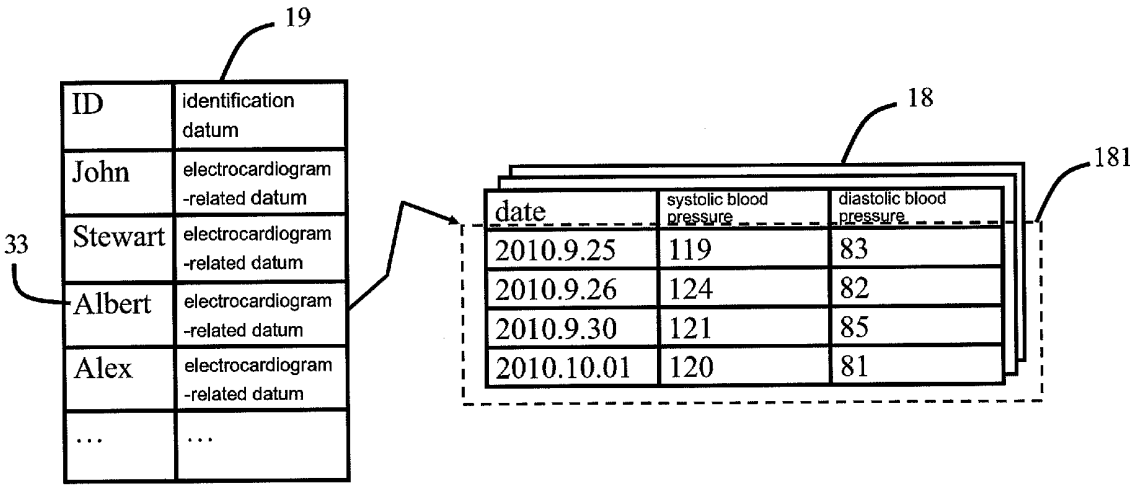
(57) **ABSTRACT**

A physiological signal measuring apparatus and method with identification function are provided. The physiological signal measuring apparatus with identification function includes a measuring module, an identifying module, and a transmitting module. The measuring module obtains a physiological signal and produces a physiological datum according to the physiological signal. The identifying module obtains an identification datum. The transmitting module is electrically connected to the measuring module and the identifying module for transmitting the physiological datum and the identification datum to a computer.



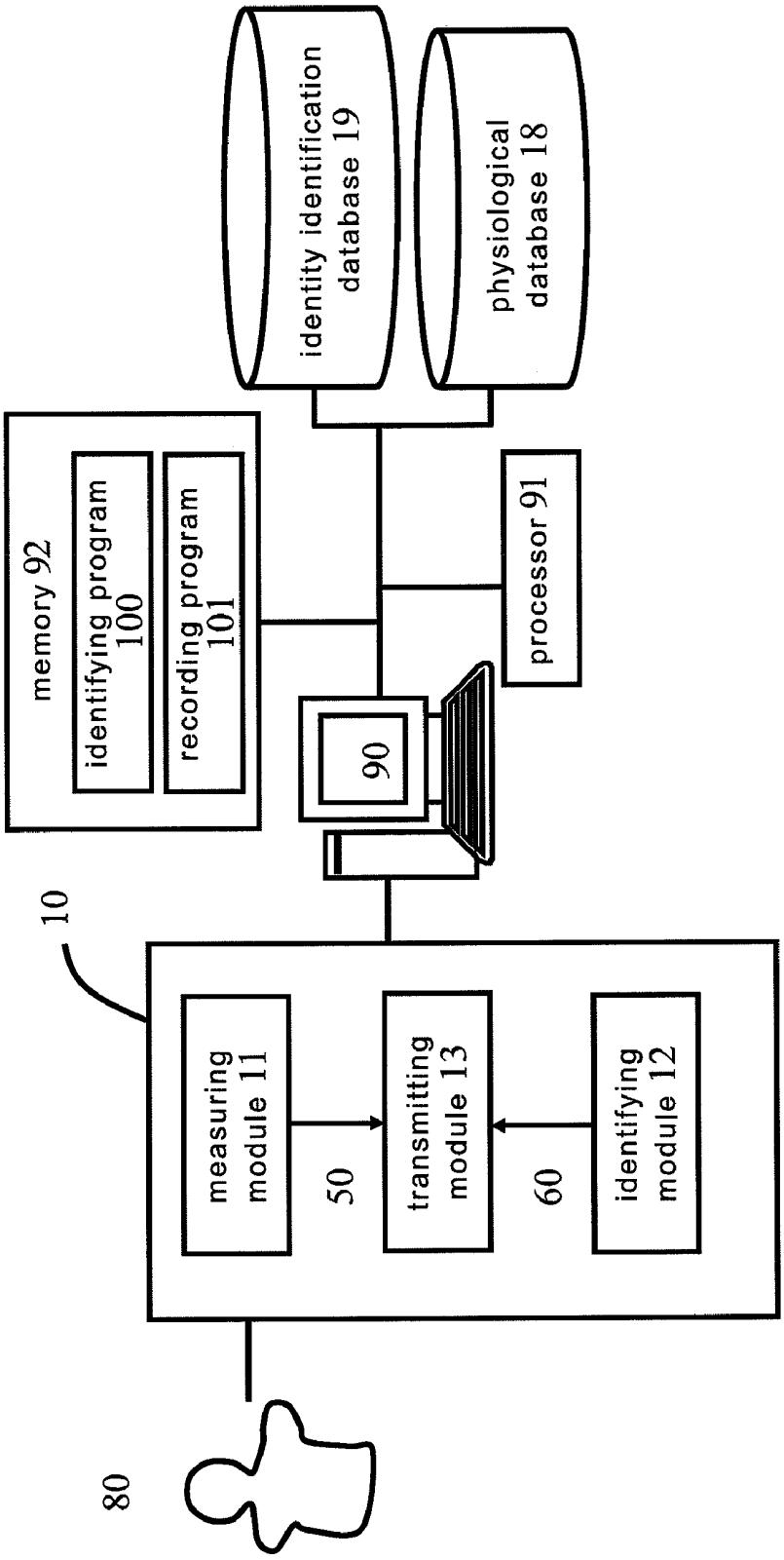

identity identification database 19
physiological database 18
memory 92
identifying program 100
recording program 101
processor 91
90
10
measuring module 11
50
transmitting module 13
60
identifying module 12
80

FIG.1

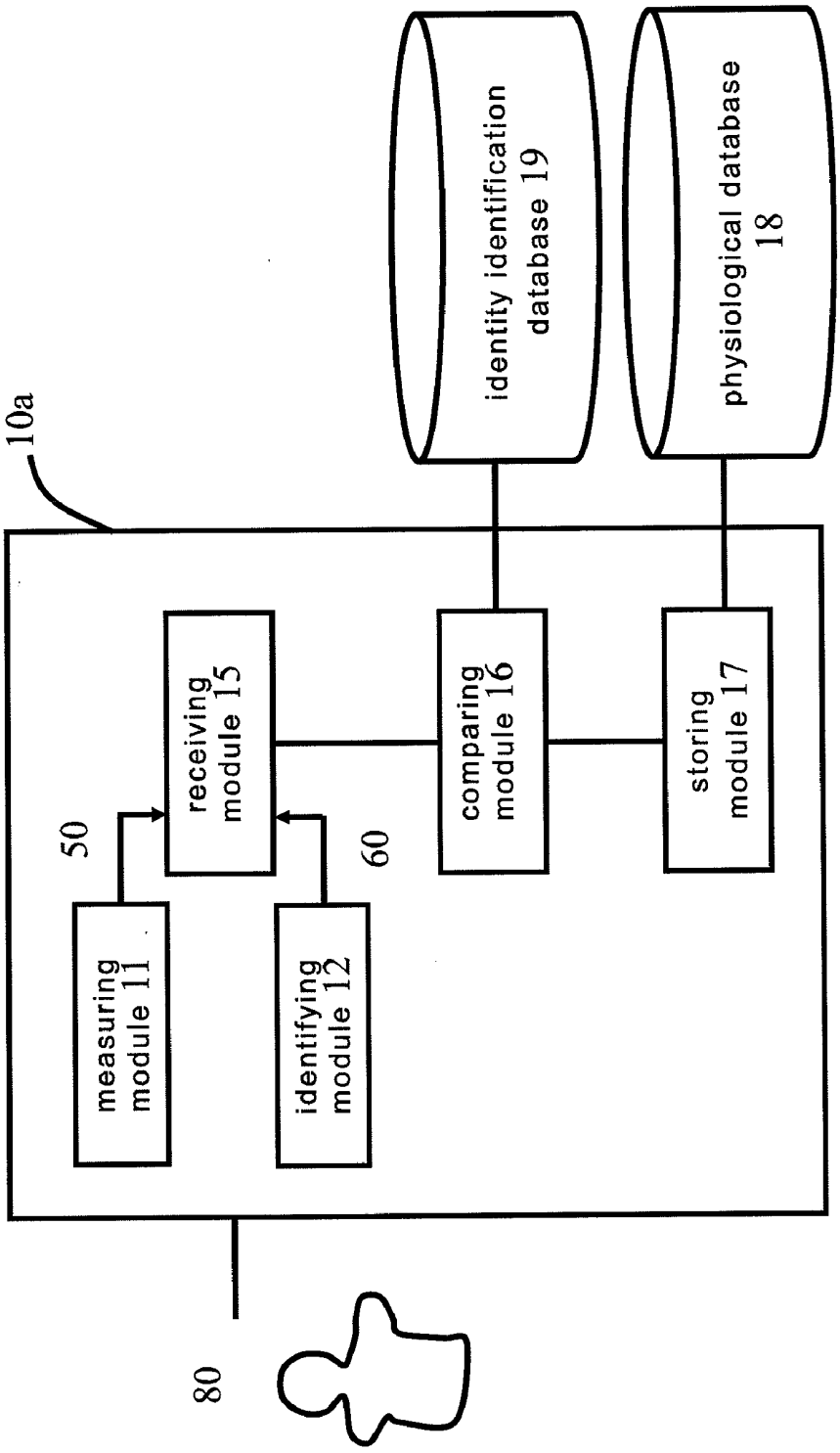

identity identification database 19
physiological database 18
10a
receiving module 15
comparing module 16
storing module 17
50
60
measuring module 11
identifying module 12
80

FIG.2

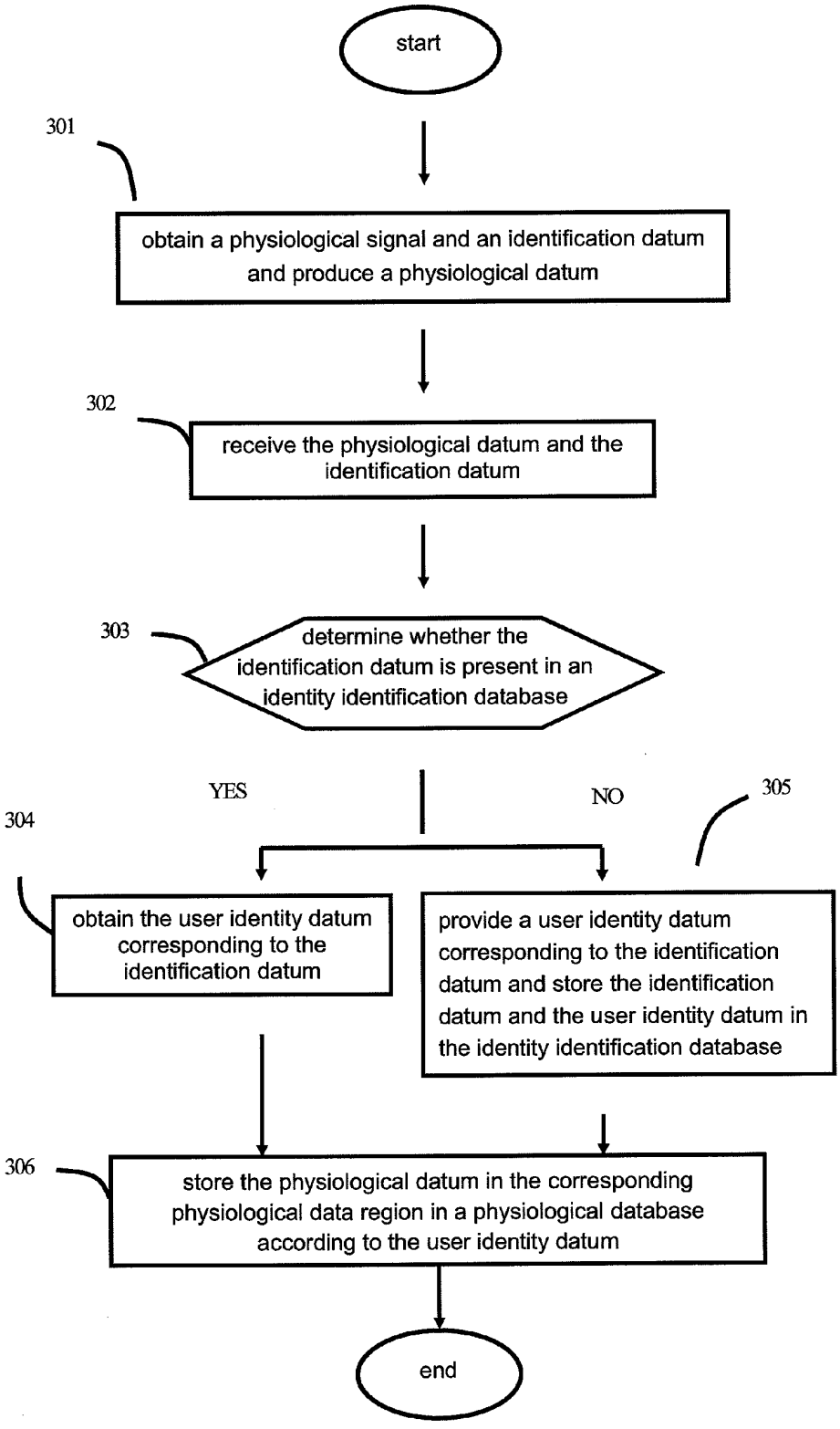

start
301
obtain a physiological signal and an identification datum and produce a physiological datum
302
receive the physiological datum and the identification datum
303
determine whether the identification datum is present in an identity identification database
YES
NO
304
305
obtain the user identity datum corresponding to the identification datum
provide a user identity datum corresponding to the identification datum and store the identification datum and the user identity datum in the identity identification database
306
store the physiological datum in the corresponding physiological data region in a physiological database according to the user identity datum
end

FIG.3

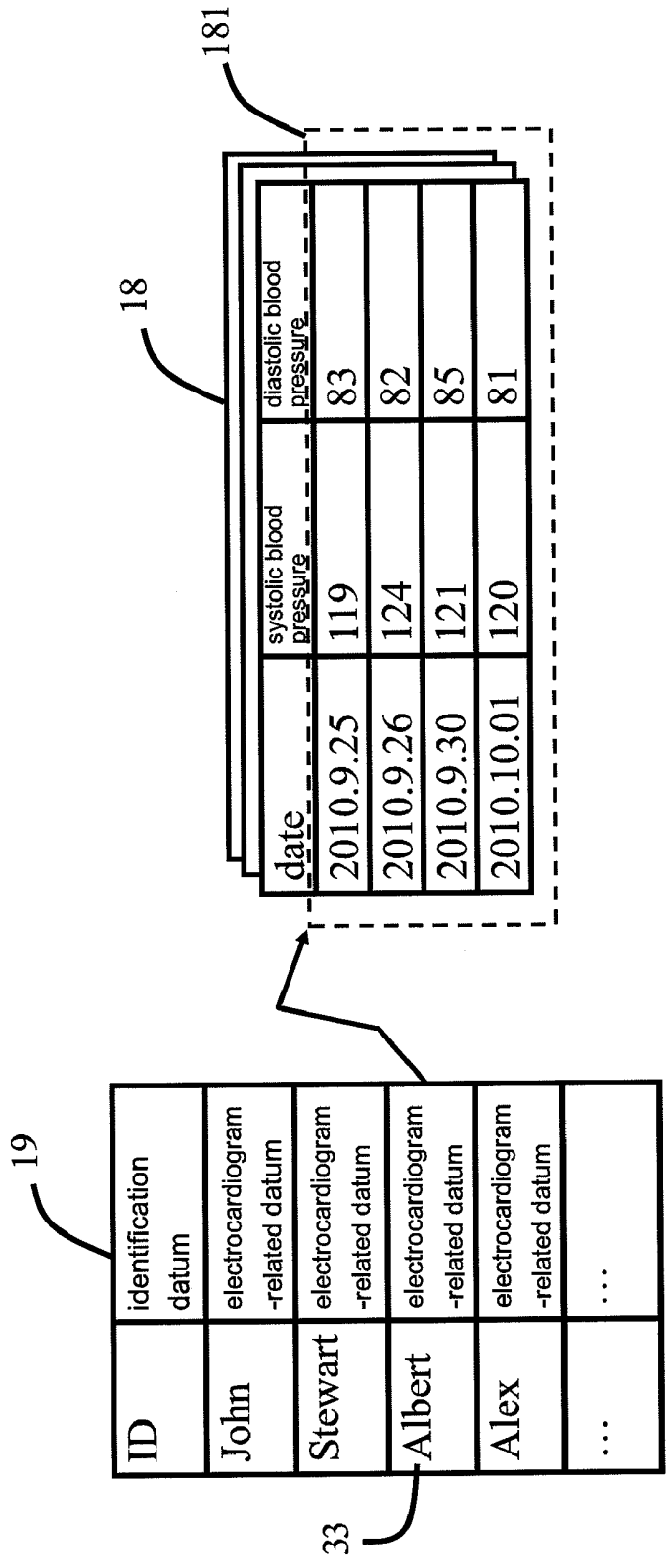

181
18
19
33
ID
identification datum
John
Stewart
Albert
Alex
electrocardiogram -related datum
...
date
systolic blood pressure
diastolic blood pressure
2010.9.25
119
83
2010.9.26
124
82
2010.9.30
121
85
2010.10.01
120
81

FIG.4

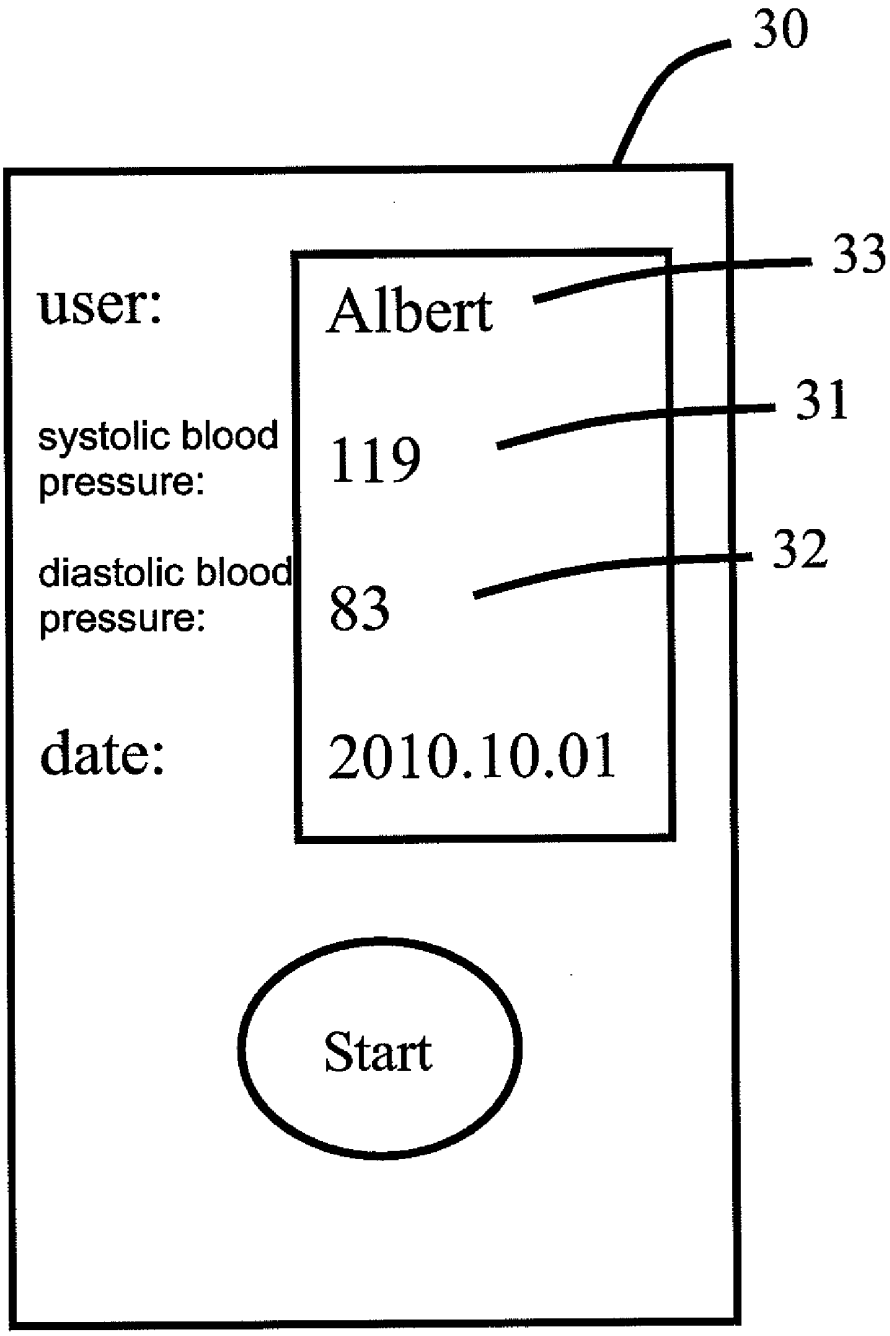

30
33
user:
Albert
31
systolic blood pressure:
119
32
diastolic blood pressure:
83
date:
2010.10.01
Start

FIG.5

PHYSIOLOGICAL SIGNAL MEASURING APPARATUS AND METHOD WITH IDENTIFICATION FUNCTION

BACKGROUND OF THE INVENTION

[0001] 1. Field of the Invention

[0002] The present invention relates to a physiological signal measuring apparatus and method with identification function, and more particularly, to a physiological signal measuring apparatus and method with identification function in performing identification on a device proper or on an external electronic device.

[0003] 2. Description of the Prior Art

[0004] In a modern society, due to medical advancements, people nowadays are attaching increasingly great importance to personal health and thus often need to measure physiological signals related to blood pressure, blood sugar, or body fat, etc. Due to technological advancements, measured physiological signals are not necessarily recorded on conventional paper or stored in a storage device of a computer, but can be directly stored in a cloud-based database to enable medical institutions to better perform real-time patient follow-up.

[0005] The elderly account for the majority of the numerous patients who need to be monitored in real time. The elderly are seldom good at operating a computer. Hence, increased ease of operating a computer will result in more convenient and less erroneous measurement of physiological signals. Measuring physiological signals and identifying a user identity concurrently can reduce the required manpower of medical care institutions, simplify the way in which the user operates a computer (especially computer operations performed by the elderly or users unfamiliar with the use of computers), and prevent a measurement record from being wrongly entered because of a mistake made by the user in the course of operation.

[0006] In addition to common means of recognition, such as fingerprint and retina recognition, identity recognition technology applies to identity recognition, using recognition means such as a palmprint, face, iris, DNA, or electrocardiography (ECG) waveforms. In this regard, many academic institutions, both local and overseas, study the identity recognition rate achievable by ECG waveforms, and in consequence, the ECG waveform-based identity recognition rate is confirmed to be above 90% for various algorithms.

[0007] Accordingly, the present invention provides a physiological signal measuring apparatus and method with identification function to measure a physiological signal and identify a user identity concurrently with a view to overcoming the drawbacks of the prior art.

SUMMARY OF THE INVENTION

[0008] It is a primary objective of the present invention to provide a physiological signal measuring apparatus with identification function.

[0009] Another primary objective of the present invention is to provide a physiological signal measuring method with identification function.

[0010] In order to achieve the above and other objectives, the physiological signal measuring apparatus with identification function of the present invention comprises a measuring module, an identifying module, and a transmitting module. The measuring module obtains a physiological signal and produces a physiological datum according to the physiological signal. The identifying module obtains an identification datum. The transmitting module is electrically connected to the measuring module and the identifying module for transmitting the physiological datum and the identification datum to a computer.

[0011] In order to achieve the above and other objectives, the physiological signal measuring method with identification function of the present invention comprises the steps of: receiving a physiological datum and an identification datum; determining whether the identification datum is present in an identity identification database, so as to perform one of the two steps of: providing a user identity datum corresponding to the identification datum and storing the identification datum and the user identity datum in the identity identification database if it is determined that the identification datum is not present in the identity identification database; or obtaining the user identity datum corresponding to the identification datum if it is determined that the identification datum is present in the identity identification database; and storing the physiological datum in a corresponding physiological data region in a physiological database according to the user identity datum.

BRIEF DESCRIPTION OF THE DRAWINGS

[0012] To render the above and other objectives, features, and advantages of the present invention more salient and comprehensible, the present invention are hereunder illustrated with specific embodiments in conjunction with the accompanying drawings, in which:

[0013] FIG. **1** is a schematic view of a physiological signal measuring apparatus with identification function according to the first embodiment of the present invention;

[0014] FIG. **2** is a schematic view of the physiological signal measuring apparatus with identification function according to the second embodiment of the present invention;

[0015] FIG. **3** is a flowchart of a physiological signal measuring method with identification function according to the present invention;

[0016] FIG. **4** is a schematic view of a physiological database and an identity identification database according to the present invention; and

[0017] FIG. **5** is a schematic view of an operating interface of the physiological signal measuring apparatus with identification function according to the present invention.

DETAILED DESCRIPTION OF THE EMBODIMENTS

[0018] Referring to FIG. **1**, there is shown a schematic view of a physiological signal measuring apparatus with identification function according to the first embodiment of the present invention. In this embodiment, a physiological signal measuring apparatus with identification function (**10**) can be connected to an external electronic device **90**, such that the external electronic device **90** performs identity identification. The physiological signal measuring apparatus with identification function (**10**) comprises a measuring module **11**, an identifying module **12**, and a transmitting module **13**. The external electronic device **90** comprises a processor **91** and a memory **92**. An identifying program **100** and a recording program **101** are stored in the memory **92**. The external electronic device **90** is connected to a physiological database **18** and an identity identification database **19**. After obtaining a physiological signal (such as blood pressure, blood sugar, or

heartbeat) of a user **80** through the measuring module **11**, the physiological signal measuring apparatus with identification function (**10**) produces a physiological datum **50** (such as a blood pressure-related datum, a blood sugar-related datum, or an electrocardiogram-related datum) according to the physiological signal, obtains an identification datum **60** (such as a fingerprint-related datum or an electrocardiogram-related datum) of the user **80** through the identifying module **12**, and transmits the physiological datum **50** and the identification datum **60** to the external electronic device **90** via the transmitting module **13**. The processor **91** of the external electronic device **90** executes the identifying program **100** in the memory **92**, searches the identity identification database **19** to identify the identity of the user **80** according to the identification datum **60**, and then executes the recording program **101** to store the physiological datum **50** in a corresponding physiological data region in the physiological database **18**. In this embodiment, the external electronic device **90** is a personal computer, though the disclosure of the present invention is not limited thereto, because the external electronic device **90** can also be a PDA or a smart phone.

[0019] A point to note is that the application of the physiological signal measuring apparatus with identification function (**10**) of the present invention is not limited to connection with the external electronic device **90**. The user **80** can also directly use the physiological signal measuring apparatus with identification function (**10**) to measure the physiological signal and identify a user identity concurrently, without using the external electronic device **90**.

[0020] Referring to FIG. **2**, there is shown a schematic view of a physiological signal measuring apparatus with identification function (**10***a*) according to the second embodiment of the present invention. In this embodiment, the user **80** can directly use the physiological signal measuring apparatus with identification function (**10***a*) to measure the physiological signal and identify a user identity concurrently, without using the external electronic device **90**. The physiological signal measuring apparatus with identification function (**10***a*) comprises the measuring module **11**, the identifying module **12**, a receiving module **15**, a comparing module **16**, and a storing module **17**. The measuring module **11** obtains the physiological signal of the user **80** and produces the physiological datum **50** according to the physiological signal. The identifying module **12** obtains the identification datum **60** of the user **80**. The receiving module **15** receives the physiological datum **50** and the identification datum **60**. The comparing module **16** searches the identity identification database **19** to identify a user identity according to the identification datum **60**. The storing module **17** stores the physiological datum **50** in the corresponding physiological data region in the physiological database **18** according to the user identity datum.

[0021] A point to note is that, in an embodiment of the present invention, the aforesaid elements can not only come in the form of a hardware device, a software program, firmware, or a combination thereof, but also come in the form of a circuit loop or any other appropriate arrangement. If any one of the elements is implemented by software, it can be loaded on a computer-readable storage medium. Each of the elements can be self-contained; alternatively, the elements can operate in conjunction with each other. Furthermore, this embodiment is intended to be illustrative of a preferred embodiment of the present invention, and is not described in detail in terms of any possible combination of variations for the sake of brevity. However, persons skilled in the art should be able to understand that the present invention can, for the purpose of the implementation thereof, require any other more delicate conventional modules or elements. The modules or elements can be omitted or altered as needed. Any other module or element is not necessarily absent between any two of the modules.

[0022] Referring to FIG. **3**, FIG. **4**, and FIG. **5**, there is shown in FIG. **3** a flowchart of a physiological signal measuring method with identification function according to a specific embodiment of the present invention. Although the physiological signal measuring method with identification function of the present invention is illustrated hereunder with the physiological signal measuring apparatus with identification function (**10***a*) shown in FIG. **2**, the physiological signal measuring method with identification function of the present invention is not limited to its application in the physiological signal measuring apparatus with identification function (**10***a*).

[0023] Step **301**: obtain a physiological signal and an identification datum and produce a physiological datum.

[0024] Step **301** is executed by the measuring module **11** and the identifying module **12**. The user **80** measures the physiological signal with the measuring module **11**. The measuring module **11** obtains the physiological signal and then produces the physiological datum **50**. The identification datum **60** is obtained by means of the identifying module **12**. In this embodiment, the user **80** measures blood pressure with the measuring module **11** and then produces a blood pressure level, such that the blood pressure level thus produced functions as the physiological datum **50**. A feature parameter of an electrocardiogram of the user **80** is obtained by means of the identifying module **12**, such that the obtained feature parameter functions as the identification datum **60**. A point to note is that the physiological signal is not limited to a blood pressure-related signal, because the physiological signal can also be a blood sugar-related signal, an electrocardiogram-related signal, or any other physiological signal. Likewise, the physiological datum **50** is not limited to a blood pressure level, because the physiological datum **50** can also be a blood sugar level, an electrocardiogram-related datum, or any other physiological datum. Likewise, the identification datum **60** is not limited to an electrocardiogram-related datum, because the identification datum **60** can also be a fingerprint-related datum, an iris-related datum, a facial feature-related datum, or any other identifiable datum. Also, a way of obtaining a physiological signal and producing a physiological datum and a way of obtaining the identification datum **60** are attributable to the prior art but are not regarded as a focus of the present invention, and thus they are not described in detail herein for the sake of brevity.

[0025] Step **302**: receive the physiological datum and the identification datum.

[0026] The receiving module **15** receives the identification datum **60** and the physiological datum **50** of the user **80**. In this embodiment, the receiving module **15** receives a systolic blood pressure **31** and a diastolic blood pressure **32** of the user **80** and receives an electrocardiogram-related datum of the user **80**. The systolic blood pressure **31** and the diastolic blood pressure **32** thus received function as the physiological datum **50**. The electrocardiogram-related datum thus received functions as the identification datum **60**.

[0027] Step **303**: determine whether the identification datum is present in an identity identification database.

[0028] Upon receipt of the physiological datum **50** and the identification datum **60**, the comparing module **16** determines whether the identification datum **60** is present in the identity identification database **19**. Referring to FIG. **4**, there is shown a schematic view of the physiological database and the identity identification database **19** according to the present invention. User IDs and the identification datum **60** (that is, the electrocardiogram-related datum in this embodiment) corresponding to the user IDs, respectively, are stored in the identity identification database **19**; hence, the comparing module **16** can determine whether the electrocardiogram-related datum (that is, the identification datum **60**) of the user **80** is present in the identity identification database **19**. A way of determining whether the identification datum is present in the identity identification database **19** is attributable to the prior art but is not regarded as a focus of the present invention, and thus it is not described in detail herein for the sake of brevity.

[0029] If the identification datum is present in the identity identification database, then go to step **304**: obtain the user identity datum corresponding to the identification datum.

[0030] If the identification datum **60** is present in the identity identification database **19**, the comparing module **16** can directly obtain the user identity datum corresponding to the identification datum **60**. In this embodiment, assuming that the comparing module **16** discovers that the electrocardiogram-related datum (that is, the identification datum **60**) of the user **80** is present in the identity identification database **19**, the user identity datum **33** (Albert) corresponding to the identification datum **60** can be obtained.

[0031] If the identification datum is not present in the identity identification database, then go to step **305**: provide a user identity datum corresponding to the identification datum and store the identification datum and the user identity datum in the identity identification database.

[0032] Assuming, in step **303**, that the comparing module **16** discovers that the identification datum **60** is not present in the identity identification database **19**, the comparing module **16** will provide the user identity datum ("Albert", for example) corresponding to the identification datum **60** and store the identification datum **60** and the user identity datum corresponding thereto in the identity identification database **19**.

[0033] Step **306**: store the physiological datum in the corresponding physiological data region in a physiological database according to the user identity datum.

[0034] After the user identity has been identified, the physiological datum **50** of the user **80** can be stored in a data block of the physiological database by means of the storing module **17**, wherein the data block corresponds to the user **80**. Referring to FIG. **4** and FIG. **5**, in this embodiment, the storing module **17** stores the systolic blood pressure **31** and the diastolic blood pressure **32** of the user **80** in a corresponding physiological data region **181** in the physiological database **18** for use in subsequent comparison, wherein the corresponding physiological data region **181** is attributed to the user identity datum **33**. The systolic blood pressure **31**, the diastolic blood pressure **32**, and the user identity datum **33** are displayed on an operating interface **30**. Ways of identifying a user identity according to an electrocardiogram-related datum are disclosed in academic papers published by local academics and overseas academics, and the identification datum **60** is not limited to an electrocardiogram-related datum; hence, possible ways are not described in detail herein for the sake of brevity.

[0035] The aforesaid embodiments illustrate how the user directly uses the physiological signal measuring apparatus with identification function (**10***a*) to measure a physiological signal and identify a user identity concurrently. Nonetheless, the physiological signal measuring apparatus with identification function of the present invention can also identify a user identity through the external electronic device **90**. The physiological signal measuring method with identification function, which is performed with the physiological signal measuring apparatus with identification function (**10**) shown in FIG. **1**, effectuates identification of a user identity through the external electronic device **90**, by following the steps as follows:

[0036] Step **301**: obtain a physiological signal and an identification datum and produce a physiological datum.

[0037] Step **301** is executed by the measuring module **11** and the identifying module **12**. In this embodiment, the user **80** measures an electrocardiogram through the measuring module **11**, produces an electrocardiogram-related datum that functions as the physiological datum **50**, and obtains a fingerprint-related datum of the user **80** through the identifying module **12**, wherein the obtained fingerprint-related datum functions as the identification datum **60**.

[0038] Step **302**: receive the physiological datum and the identification datum.

[0039] After obtaining the physiological signal and the identification datum **60** and producing the physiological datum **50**, it is feasible for the transmitting module **13** to transmit the aforesaid datum to the external electronic device **90**, such that the external electronic device **90** receives the aforesaid datum and processes them. In this embodiment, the transmitting module **13** transmits an electrocardiogram-related datum and a fingerprint-related datum to the external electronic device **90**.

[0040] Step **303**: determine whether the identification datum is present in an identity identification database.

[0041] After the external electronic device **90** has received the aforesaid datum, the processor **91** executes the identifying program **100** in the memory **92** to determine whether the identification datum **60** is present in the identity identification database **19**. In this embodiment, the identifying program **100** determines whether the fingerprint-related datum is present in the identity identification database **19**.

[0042] If the identification datum **60** is present in the identity identification database, then go to step **304**: obtain the user identity datum corresponding to the identification datum.

[0043] If the identification datum **60** is present in the identity identification database **19**, the external electronic device **90** can directly obtain the user identity datum corresponding to the identification datum **60**. In this embodiment, assuming that the external electronic device **90** discovers that the fingerprint-related datum of the user **80** is present in the identity identification database **19**, the user identity datum corresponding to the identification datum **60** can be obtained.

[0044] If the identification datum **60** is not present in the identity identification database **19**, then go to step **305**: provide a user identity datum corresponding to the identification datum and store the identification datum and the user identity datum in the identity identification database.

[0045] Assuming, in step **303**, that the external electronic device **90** discovers that the identification datum **60** is not present in the identity identification database **19**, the external electronic device **90** will provide a user identity datum cor-

responding to the identification datum **60** (that is, the fingerprint-related datum of the user **80**) and store the identification datum **60** and the user identity datum corresponding thereto in the identity identification database **19**.

[0046] Step **306**: store the physiological datum in the corresponding physiological data region in a physiological database according to the user identity datum.

[0047] After the user identity has been identified, the processor **91** executes a recording program **101** in the memory **92** and stores the physiological datum **50** of the user in a data block of the physiological database, wherein the data block corresponds to the user. In this embodiment, an electrocardiogram-related datum of the user **80** is stored in a data block of the physiological database **18** for use in subsequent comparison, wherein the data block corresponds to the user **80**.

[0048] A point to note is that the physiological signal measuring method with identification function of the present invention is not limited to the aforesaid sequence of the steps; instead, the aforesaid sequence of the steps can be subject to changes, provided that the objectives of the present invention are achieved.

[0049] In conclusion, the features of the present invention are completely different from those of the prior art in terms of objectives, means, and effects. However, it should be noted that the above embodiments are illustrative of the principle and effect of the present invention only, and should not be interpreted as restrictive of the scope of the present invention. Hence, persons skilled in the art can make modifications and changes to the aforesaid embodiments without going against the technical principle and spirit of the present invention. Accordingly, the extent of legal protection for the rights claimable toward the present invention should be defined by the appended claims.

What is claimed is:

1. A physiological signal measuring apparatus with identification function, the apparatus being electrically connected to a computer, the apparatus comprising:
- a measuring module for obtaining a physiological signal of a user and producing a physiological datum according to the physiological signal;
- an identifying module for obtaining an identification datum of the user; and
- a transmitting module electrically connected to the measuring module and the identifying module for transmitting the physiological datum and the identification datum to the computer.

2. The apparatus of claim **1**, wherein the identification datum is one of a set of an electrocardiogram-related datum, a fingerprint-related datum, a facial feature-related datum, and an iris-related datum.

3. The apparatus of claim **2**, wherein the physiological signal is one of a set of a blood pressure-related signal, a blood sugar-related signal, and an electrocardiogram-related signal, and the physiological datum is one of a set of a blood pressure level, a blood sugar level, and the electrocardiogram-related datum.

4. The apparatus of claim **1**, wherein the physiological signal is one of a set of a blood pressure-related signal, a blood sugar-related signal, and an electrocardiogram-related signal, and the physiological datum is one of a set of a blood pressure level, a blood sugar level, and an electrocardiogram-related datum.

5. A physiological signal measuring method with identification function, the method comprising the steps of:
- receiving an identification datum and a physiological datum of a user;
- determining whether the identification datum is present in an identity identification database, so as to perform one of the two steps of:
- providing a user identity datum corresponding to the identification datum and storing the identification datum and the user identity datum in the identity identification database if it is determined that the identification datum is not present in the identity identification database; or
- obtaining the user identity datum corresponding to the identification datum if it is determined that the identification datum is present in the identity identification database;
- and
- storing the physiological datum in a corresponding physiological data region in a physiological database according to the user identity datum.

6. The method of claim **5**, wherein the identification datum is one of a set of an electrocardiogram-related datum, a fingerprint-related datum, a facial feature-related datum, and an iris-related datum.

7. The method of claim **6**, wherein the physiological datum is one of a set of a blood pressure level, a blood sugar level, and the electrocardiogram-related datum.

8. The method of claim **5**, wherein the physiological datum is one of a set of a blood pressure level, a blood sugar level, and an electrocardiogram-related datum.

9. A physiological signal measuring apparatus with identification function, the apparatus comprising:
- a receiving module for receiving an identification datum and a physiological datum of a user;
- a comparing module electrically connected to the receiving module for determining whether the identification datum is present in an identity identification database, so as to perform one of the two mechanisms of:
- providing a user identity datum corresponding to the identification datum and storing the identification datum and the user identity datum in the identity identification database if it is determined that the identification datum is not present in the identity identification database; or
- obtaining the user identity datum corresponding to the identification datum if it is determined that the identification datum is present in the identity identification database;
- and
- a storing module electrically connected to the comparing module for storing the physiological datum in a corresponding physiological data region in a physiological database according to the user identity datum.

10. The apparatus of claim **9**, further comprising:
- a measuring module for obtaining a physiological signal of the user and producing the physiological datum according to the physiological signal;
- and
- an identifying module for obtaining the identification datum of the user.

11. The apparatus of claim **10**, wherein the identification datum is one of a set of an electrocardiogram-related datum, a fingerprint-related datum, a facial feature-related datum, and an iris-related datum.

12. The apparatus of claim **11**, wherein the physiological signal is one of a set of a blood pressure-related signal, a blood sugar-related signal, and an electrocardiogram-related signal, and the physiological datum is one of a set of a blood pressure

level, a blood sugar level, and the electrocardiogram-related datum.

13. The apparatus of claim **10**, wherein the physiological signal is one of a set of a blood pressure-related signal, a blood sugar-related signal, and an electrocardiogram-related signal, and the physiological datum is one of a set of a blood pressure level, a blood sugar level, and an electrocardiogram-related datum.

* * * * *

专利名称(译)	具有识别功能的生理信号测量装置和方法		
公开(公告)号	US20120302851A1	公开(公告)日	2012-11-29
申请号	US13/420895	申请日	2012-03-15
[标]申请(专利权)人(译)	LIN舒红 昌耀TSUNG 李嘉HSIEN 林杨PAI CHUNG顺驰		
申请(专利权)人(译)	林树HUNG 昌耀震 李嘉贤 LIN PAI-YANG 忠信-CHI		
当前申请(专利权)人(译)	纬创资通		
[标]发明人	LIN SHU HUNG CHANG YAO TSUNG LI CHIA HSIEN LIN PAI YANG CHUNG SHUN CHI		
发明人	LIN, SHU-HUNG CHANG, YAO-TSUNG LI, CHIA-HSIEN LIN, PAI-YANG CHUNG, SHUN-CHI		
IPC分类号	A61B5/145 A61B5/0402 A61B5/021 A61B5/00		
CPC分类号	A61B5/02 A61B5/117 G06F19/3406 A61B5/14532 G06F19/322 A61B5/1172 A61B5/1171 G16H10/60 G16H40/63		
优先权	100118703 2011-05-27 TW		
外部链接	Espacenet USPTO		

摘要(译)

提供了一种具有识别功能的生理信号测量装置和方法。具有识别功能的生理信号测量装置包括测量模块，识别模块和发送模块。测量模块获取生理信号并根据生理信号产生生理数据。识别模块获得识别数据。传输模块电连接到测量模块和识别模块，用于将生理数据和识别数据传输到计算机。