

# SMART MEDICINE BOX AND CONTROLLING METHOD THEREOF

## BACKGROUND OF THE INVENTION

### 1. Field of the Invention

**[0001]** The present invention relates to a smart medicine box and a controlling method thereof; in particular, to a smart medicine box with a preset medicine taking schedule and latching devices so that a medicine user can take medicine only at the correct time, and a controlling method thereof.

### 2. Description of Related Art

**[0002]** In the prior art, there is no smart control for general medicine boxes. Especially for the elders, they often forget to take medicines, or even reuse medicines after they have already taken medicines, since they forget about it. This not only brings burden and damage to the body, but also causes waste of medicines.

## SUMMARY OF THE INVENTION

**[0003]** The present invention discloses a smart medicine box and a controlling method thereof. By proposing a smart medicine box device and a controlling method thereof, the present invention can be applied to the elders, disabled persons or medicine users with poor memory. The medicine box can be opened only when a user takes the medicine at the correct time; and the smart medicine box will be locked when the user takes the medicine at incorrect time or tries to reuse the medicine. Even when a medicine user forgets to take medicine, the smart medicine box of the present invention will notify the user to take medicine by means of a voice notification function. Therefore,

the present invention can effectively prevent the elders, disabled persons or those with poor memory from taking medicine repeatedly or forgetting to take medicine.

#### BRIEF DESCRIPTION OF THE DRAWINGS

**[0004]** Fig. 1A shows a schematic perspective diagram of a first embodiment of the present invention;

**[0005]** Fig. 1B shows a schematic perspective diagram of a second embodiment of the present invention;

**[0006]** Fig. 2 shows a schematic implementation diagram of an upper body according to the first embodiment of the present invention;

**[0007]** Fig. 3 shows a schematic implementation diagram of a latching device according to the first embodiment of the present invention;

**[0008]** Fig. 4 shows a schematic implementation diagram of a lid and a cell according to the first embodiment of the present invention;

**[0009]** Fig. 5 shows a schematic diagram of the implementation status of the lid and the cell according to the first embodiment of the present invention;

**[0010]** Fig. 6 shows a schematic implementation diagram of circuit blocks according to the first embodiment of the present invention;

**[0011]** Fig. 7 shows a schematic implementation diagram of a sound recognition controller according to the first embodiment of the present invention;

**[0012]** Fig. 8 shows a schematic implementation diagram of a date and time controller according to the first embodiment of the present invention;

**[0013]** Fig. 9 shows a schematic implementation diagram of a medicine box locking controller according to the first embodiment of the present invention;

**[0014]** Fig. 10A shows a schematic implementation diagram of a biometric recognition controller for face recognition according to the first embodiment of the present invention;

**[0015]** Fig. 10B shows a schematic implementation diagram of a biometric recognition controller for fingerprint recognition according to the first embodiment of the present invention;

**[0016]** Fig. 11 shows a flow chart of medicine box locking for face recognition according to the first embodiment of the present invention;

**[0017]** Fig. 12 shows a flow chart of medicine box locking according to the first embodiment of the present invention; and

**[0018]** Fig. 13 shows a flow chart of time reminding according to the first embodiment of the present invention.

#### DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

**[0019]** The present invention relates to a smart medicine box and a controlling method thereof, not only avoiding repeated medications harming the body, but also effectively reducing the waste of medicines to improve the demand for medication for the elders. Reference is made to Figs. 1A, 1B, and 2. A smart medicine box 10 of the present invention is shown in Fig. 1, and comprises an upper body 11, a lower body 12, a biometric recognizer 13, a screen 14, a plurality of lids 15, and a main controller 20, wherein the lower body 12 is disposed below the upper body 11. A smart medicine box 10a

without a screen 14 according to a second embodiment is shown in Fig. 1B, and also comprises an upper body 11a, a lower body 12a, a biometric recognizer 13, and a plurality of lids 15. The functions and effects of the smart medicine box 10a without a screen according to the second embodiment of the present invention are the same as those of the first embodiment of Fig. 1A except the display function. However, since the second embodiment is not provided with the screen 14, the manufacturing cost of the smart medicine box without a screen would be greatly reduced. The biometric recognizer 13 in both the first and second embodiments is disposed on an outer surface of the upper body 11 and extends to an inner surface of the upper body 11, as shown in Fig. 2.

**[0020]** In Fig. 2, the main controller 20 is disposed on the inner surface of the upper body 11 and is coupled to the biometric recognizer 13, and is used to receive a biometric recognition signal to perform determination and confirmation on whether a user or a medicine user is a correct one or not, and correspond to a preset medicine taking schedule or a medication schedule to control whether the smart medicine box 10 can be opened by the medicine user or the user to take medicine or not. In addition, the main controller 20 is also configured to remind arrival of the medicine-taking time to notify the medicine user or the user to use the smart medicine box. The plurality of lids 15 is disposed on the outer surface of the upper body 11, and each of the lids 15 can be opened upwards. Additionally, in Fig. 2, the smart medicine box 10 comprises a plurality of latching devices 30 coupled to the main controller 20, and each of the latching devices 30 can latch some of the lids 15; in the

embodiment as shown in Fig. 2, one latching device 30 can latch three lids 15, and the latching devices 30 are controlled by the main controller 20 to determine whether one of the lids 15 can be opened or not by the user.

**[0021]** Fig. 3 is an enlarged view showing that each of the plurality of latching devices 30 includes a plurality of electronic latches 32 and a plurality of buckles 34. Each electronic latch 32 is electrically coupled to the main controller 20 and is mainly used to receive a control signal output by the main controller 20 to perform latching or opening of the lid 15. The plurality of buckles 34 is correspondingly disposed in the plurality of electronic latches 32, and each buckle 34 is correspondingly disposed in one electronic latch 32. A fastener 35 is disposed in each lid 15 corresponding to an electronic latch 32. The buckle 34 protrudes outwards when the electronic latch 32 latches, and the buckle 34 is retracted into the electronic latch 32 when the electronic latch 32 is opened. In practical applications, the buckle 34 can protrude outwards during latching by using a slide rail structure where the buckle 34 slides outwards during latching to engage with the fastener 35, or by disposing a spindle at two sides of the buckle 34 where the buckle 34 protrudes outwards by rotation of the spindle, so that the fastener 35 on the lid 15 is engaged by the buckle 34 and thus the lid 15 can be locked and cannot be opened.

**[0022]** In Fig. 4, the fastener 35 is disposed in each lid 15 corresponding to an electronic latch 32, and each fastener 35 corresponds to each buckle 34 so that the lid 15 can be latched or opened by the user by means of the control signal of the main controller 20. As shown in Fig. 4, the lower body 12 is provided with a plurality of cells 19; and an upper opening of each of the cells

19 corresponds to each of the lids 15, that is, one lid 15 corresponds to one cell 19 so that the cell 19 forms an accommodating space with the lid. The accommodating space is required for placing the medicine for one dose, and the medicine can be placed in the accommodating space for the user or the medicine user to access. In an embodiment, as shown in Fig. 4, a pair of torsional springs 151 are provided at one side (e.g., a left side) of a lid 15 jointed to a cell 19; and the pair of torsional springs 151 are provided to enable the user to open the lid 15 from another side (e.g., a right side) to take medicine. The present invention is provided with a plurality of lids 15 and a plurality of cells 19, and therefore, a plurality of the torsional springs 151 is correspondingly provided.

**[0023]** In another embodiment as shown in Fig. 5, a press device 16 is disposed between the lid 15 and the cell 19, and the press device 16 consists of an insert 17 and a clamp 18. The press device 16 is disposed at one side (e.g., the right side) of the lid 15 and the cell 19, where the insert 17 protrudes from a lower surface of the right side of the lid 15, and the clamp 18 is disposed corresponding to a position where the insert 17 is disposed, and is internally disposed in a side wall of the right side of the cell 19 to clamp the insert 17. Moreover, when the press device 16 is pressed once, the clamp 18 will clamp the insert 17, and when pressed again, the clamp 18 releases the insert 17, so that the user can open the lid 15 to take medicine, and if pressed again, the clamp 18 will clamp the insert 17 again. In this way, the embodiment having different structures between the lid 15 and the cell 19 of Fig. 5 can be completed.

**[0024]** Fig. 6 shows a schematic implementation diagram of circuit blocks inside the main controller 20 according to an embodiment of the present invention. The main controller 20 includes a sound recognition controller 40, a date and time controller 50, a medicine box locking controller 60, a biometric recognition controller 70, a Graphics Processing Unit (GPU) 80, and a plurality of control signals 90. The sound recognition controller 40 is used to perform sound recognition and control on the user; the date and time controller 50 is used to perform date setting and control on the smart medicine box; the medicine box locking controller 60 is used to perform locking and control on the lids of the smart medicine box; and the biometric recognition controller 70 is used to perform biometric recognition and control on the user. In practical applications, the GPU 80 is a display core, a visual processor, a display chip, or a graphics chip, and is a microprocessor dedicated to drawing operations on personal computers and smart mobile devices such as tablet computers and smart phones.

**[0025]** The GPU 80 is separately coupled to the sound recognition controller 40, the date and time controller 50, the medicine box locking controller 60, and the biometric recognition controller 70, as shown in Fig. 6, and is used to receive signals output by the sound recognition controller 40, the date and time controller 50, the medicine box locking controller 60, and the biometric recognition controller 70, and used to perform determination and confirmation of sound recognition on the user, the medicine user or the medicine taker, perform setting of the correct date and time about whether the lids 15 can be opened or not, perform control on whether the lids can be locked

or not, and perform recognition and determination on whether the biological characteristics of the user are correct or not, e.g., for face recognition or for fingerprint recognition. The plurality of control signals 90 is output by the GPU 80 to control the latching devices 30 of the smart medicine box 10 to perform latching or unlatching of the lids 15. The plurality of control signals 90 is output by the GPU 80 and then is transmitted to the latching devices 30 of the smart medicine box 10, and is mainly used to control the latching devices 30 of the smart medicine box 10 to perform locking or unlocking of the lids 15. In the first embodiment provided with a screen 14, the screen 14 is disposed on the outer surface of the upper body 11 and extends to the inner surface of the upper body 11 so that the screen 14 is coupled to the main controller 20 (as shown in Figs. 1A and 2). The main controller 20 is correspondingly provided with a display module 100 coupled to the screen 14 (as shown in Fig. 6). In practical applications, the screen 14 in the present invention is configured as a touch screen so that the user or the medicine user can set the date and time through the touch of a finger. Moreover, the touch screen can correspondingly display a distribution pattern of the positions of the lids 15, and based on the display of the distribution pattern, the user or the medicine user ascertains which lid 15 should be selected to be opened to take medicine.

**[0026]** In another embodiment of the present invention, the main controller 20 further includes a Bluetooth module 95 and a WiFi module 96. The Bluetooth module 95 is coupled to the GPU 80 and is connected to another smart handheld device so that the user can directly perform time setting and control for latching or unlatching of the smart medicine box 10 device via the

smart handheld device. The WiFi module 96 is also coupled to the GPU 80 and is also connected to another smart handheld device so that the user can directly perform time setting and control for latching or unlatching of the smart medicine box 10 device via the smart handheld device. In this way, it is convenient for the user to perform related setting and control such as the medicine taking schedule of the smart medicine box 10 or the distribution pattern of the lids 15 on the screen 14.

**[0027]** As shown in Fig. 7, the sound recognition controller 40 includes an audio transceiver interface 42, an audio frequency filter 44, an analog-to-digital converter 46, and an audio database 48, and, the GPU 80 is correspondingly provided with an audio comparison module 81. The audio transceiver interface 42 is used to receive voice input of the user or the medicine user, convert the same into an audio signal, and output a voice prompt. The audio frequency filter 44 is coupled to the audio transceiver interface 42 and is used to filter the audio signal to filter out a noise signal. The analog-to-digital converter 46 is coupled to the audio frequency filter 44 and the GPU 80 mainly, and is mainly used to perform conversion between an analog signal and a digital signal (Analog to Digital). The audio database 48 is coupled to the GPU 80 and is used for pre-storing or for the user to input sound signals of the user or the medicine user in the future, where the audio contents of the sound signals are digitally stored. In this embodiment, the audio comparison module 81 is disposed inside the GPU 80 corresponding to the sound recognition controller 40, and is mainly coupled to the audio database 48 and the analog-to-digital converter 46, and is used to receive the audio signal

transmitted by the analog-to-digital converter 46 and compare the audio signal with an audio of the user preset in the audio database 48 to determine whether the user or the medicine user is a correct one or not. On the other hand, the GPU 80 corresponding to the sound recognition controller 40 of the present invention can also perform related voice prompt operations, and for example, if the medicine-taking time has arrived, and the user or the medicine user has not taken the medicine after a half an hour, the GPU 80 in the main controller 20 issues a voice prompt via the preset voice prompt setting to remind the user to take medicine. Especially, modern people are busy or the elders have weaker memory, and they often forget to take medicine. With the smart medicine box of the present invention, this problem can be effectively improved.

**[0028]** As shown in Fig. 8, the date and time controller 50 includes a year-month-day setting module 52, a 24-hour setting module 54, and a week setting module 56. The year-month-day setting module 52 is coupled to the GPU 80 and is used to allow the user to set the year, month and day of taking medicine to establish the medicine taking schedule. The 24-hour setting module 54 is also coupled to the GPU 80 and is used to allow the user to further set detailed medicine-taking time. In practical applications, time setting may also be simplified to only set the morning, noon, evening, and bedtime, and then, the GPU 80 customizes the time points corresponding to the morning, noon, evening, and bedtime, so that the user can more easily set the medicine-taking time. The week setting module 56 is coupled to the GPU 80 and is used to allow the user to set the medicine taking cycle, and for example, the course of one medicine treatment is two days or one week, or four weeks a month and the

like, or a half a week, etc., which is convenient for the user to set. In this embodiment, a perpetual calendar database 82 is disposed inside the GPU 80 corresponding to the date and time controller 50 and is used to provide data about calendar time and date according to the setting requirements of the year-month-day setting module 52, the 24-hour setting module 54, and the week setting module 56.

**[0029]** As shown in Fig. 9, the medicine box locking controller 60 includes an electronic latch coding setting module 62, an electronic latch state display module 64, and a screen mapping medicine box display module 66. The electronic latch coding setting module 62 is coupled to the GPU 80 and is mainly used for the user or the medicine user to set the coding sequence of the lids 15, or arrange the distribution pattern of the lids 15 according to the date. The electronic latch state display module 64 is coupled to the GPU 80 and is used to determine and recognize that the lids 15 are in a latched state or an unlatched state so that the latching device 30 can set to be opened or locked according to whether the user takes medicine or not. The screen mapping medicine box display module 66 is coupled to the GPU 80 and is used to display the distribution pattern corresponding to the lids on the screen 14. In this embodiment, the GPU 80 corresponds to the electronic latch coding setting module 62, the electronic latch state display module 64, and the screen mapping medicine box display module 66, and generates at least an electronic latch control signal 92 via a control signal transmission interface 91, and the electronic latch control signal 92 is used for controlling the latching devices 30 to perform actions for opening or locking the lids 15.

**[0030]** As shown in Fig. 10A, the biometric recognizer 13 is a biometric recognizer 13 for face recognition, that is, the biometric recognizer 13 is an image capture module 13a; the image capture module 13a is coupled to the biometric recognition controller 70 and is used to read face images of the user and the medicine user; and the biometric recognition controller 70 includes an image signal filter 72 and an image signal amplifier 74. The image signal filter 72 is used to receive a face image signal of the image capture module 13a and filter the face image signal to remove an image noise except the face. The image signal amplifier 74 is coupled to the image signal filter 72 and the GPU 80 and is used to amplify the filtered face image signal and then transmit the same to the GPU 80 for recognition and control processing. In this embodiment, the GPU 80 is, corresponding to the biometric recognition controller 70, provided with a face image comparison module 83a, an operation control module 84a, a comparison result output control signal unit 85a, and a face image database 86a. The face image database 86a stores at least one preset face image data, and in practice, can be provided with the face image data of a plurality of users, such as face image data of family members or nursing workers of the medicine user except the medicine user. The face image comparison module 83a is coupled to the face image database 86a and is used to receive the face image signal transmitted by the image signal amplifier 74 and then compare the face image signal with the preset face image data. The operation control module 84a is coupled to the face image comparison module 83a and is used to perform operation and determination on the face image signal to make a decision of latching or unlatching the latching device 30

corresponding to the lid 15. The comparison result output control signal unit 85a is coupled to the operation control module 84a and is used to convert the comparison result into a control signal which can be output by the GPU 80.

**[0031]** Fig. 10B shows a biometric recognition embodiment of fingerprint recognition relative to the biometric recognition mode of Fig. 10A, that is, the biometric recognizer 13 is a biometric recognizer 13 for fingerprint recognition; the biometric recognizer 13 is a fingerprint reading module 13b; the fingerprint reading module 13b is coupled to the biometric recognition controller 70 and is used to read a fingerprint image signal of the user or the medicine user; and the biometric recognition controller 70 includes a fingerprint image signal amplifier 76. The fingerprint image signal amplifier 76 is coupled to the fingerprint reading module 13b and the GPU 80 and is used to receive and amplify a fingerprint image signal of the fingerprint reading module 13b and transmit the fingerprint image signal to the GPU 80. In this embodiment, the GPU 80 is, corresponding to the biometric recognition controller 70, provided with a fingerprint image comparison module 83b, an operation control module 84b, a comparison result output control signal unit 85b, and a fingerprint database 86b. The fingerprint database 86b stores at least one preset fingerprint data, and can also store the fingerprint data of a plurality of persons related to the medicine user. The fingerprint image comparison module 83b is coupled to the fingerprint database 86b and is used to receive the fingerprint image signal transmitted by the fingerprint image signal amplifier 76 and then compare the fingerprint image signal with the preset fingerprint database 86b. The operation control module 84b is coupled to the fingerprint

image comparison module 83b and is used to perform operation and determination on the fingerprint image signal to make a decision of latching or unlatching the lid 15. The comparison result output control signal unit 85b is coupled to the operation control module 84b and is used to convert the comparison result into a control signal output by the GPU 80 to further control whether the lid 15 can be opened or not.

**[0032]** The present invention also provides a controlling method of a smart medicine box. The controlling method is applied to the device of the smart medicine box 10, where the steps of the controlling method of the smart medicine box 10, where the steps of the controlling method of the smart medicine box mainly correspond to a medicine user, the smart medicine box 10, a biometric recognition controller 70 for face recognition, the medicine box locking controller 60, and the sound recognition controller 40, etc. Fig. 11 shows a control flow chart of medicine box locking for face recognition. The controlling method of the smart medicine box comprises: step S10: face learning; first, learning by a medicine user via the biometric recognition controller for face recognition; step S12: taking the medicine by the medicine user at the correct time; step S13: confirming, by the smart medicine box, whether the medicine user is a correct one or not; step S14: permitting to take medicine after it is determined by the biometric recognition controller for face recognition that the medicine user is a correct one; step S16: unlocking by the medicine box locking controller to give the medicine, namely, unlatching a corresponding lid of the smart medicine box; and step S17: taking the medicine by the medicine user. On the other hand, in the first embodiment of the present invention, if the medicine user takes the medicine at incorrect time, the

controlling method of the smart medicine box in Fig. 11 comprises the following steps: step S20: taking the medicine at incorrect time; step S21: confirming, by the smart medicine box, whether the time at which the medicine user takes the medicine is correct or not, and after it is confirmed by the biometric recognition controller for face recognition that the medicine user is a correct one, if the medicine-taking time is determined to be incorrect, executing step S22: not permitting to take medicine; then step S24: latching the smart medicine box by the medicine box locking controller, and meanwhile, executing step S25: enabling, by the medicine box locking controller, the sound recognition controller to perform voice prompt, and then step S26: reminding, by the sound recognition controller, the medicine user about the next medicine-taking time.

**[0033]** Fig. 12 is a flow chart of a method of locking a medicine box according to the present invention, and the method includes a step of latching or unlatching the smart medicine box, corresponding to the medicine user, the smart medicine box, the date and time controller, and the medicine box locking controller. The step of latching or unlatching the smart medicine box includes: step S30: setting the medicine-taking time by the medicine user; step S31: writing the medicine-taking time to the smart medicine box, and setting by the date and time controller; after setting the medicine-taking time, controlling, by the medicine box locking controller, the smart medicine box to execute step S32: continuing locking before the medicine-taking time, and at this time, step S34: disabling the medicine user to take medicine because the smart medicine box is latched; then step S36: upon arrival of the medicine-taking time, starting,

by the date and time controller, the medicine box locking controller to trigger unlocking at the medicine-taking time; step S37: unlatching a corresponding lid of the smart medicine box; and step S38: taking the medicine by the medicine user. In this way, the procedures of the controlling method of medicine box locking are completed.

**[0034]** Fig. 13 is a flow chart of a method of reminding time. The method includes a step of reminding the medicine-taking time of the smart medicine box, mainly corresponding to the medicine user, the smart medicine box, the date and time controller, and the sound recognition controller, etc. The step of reminding the medicine-taking time of the smart medicine box includes: step S40: setting the medicine-taking time by the medicine user via the smart medicine box; step S41: writing the medicine-taking time by the date and time controller of the smart medicine box; then step S42: triggering the sound recognition controller by the date and time controller upon arrival of the medicine-taking time; and finally, step S43: making a sound by the sound recognition controller to remind the medicine user to take medicine. In this way, the steps of the controlling method for time reminding are completed.

## WHAT IS CLAIMED IS:

1. A smart medicine box, comprising an upper body and a lower body, the lower body being disposed below the upper body, wherein

the upper body comprises:

a biometric recognizer disposed on an outer surface of the upper body and extending to an inner surface of the upper body;

a main controller disposed on the inner surface of the upper body and coupled to the biometric recognizer, configured to receive a biometric recognition signal to perform determination and confirmation of a user and correspond to a preset medicine taking schedule to control whether the smart medicine box is capable of being opened to take medicine or not and remind arrival of the medicine-taking time;

a plurality of lids disposed on the outer surface of the upper body, each configured to be opened upwards; and

a plurality of latching devices coupled to the main controller, each configured to latch some of the lids and determine, according to a control signal of the main controller, whether one of the lids is capable of being opened or not; and

the lower body comprises:

a plurality of cells, wherein an upper opening of each of the cells corresponds to each of the lids, that is, one lid corresponds to one cell, so that the cell forms an accommodating space with the lid, the accommodating space being required for placing the medicine for one dose.

2. The smart medicine box according to claim 1, wherein each of the plurality of latching devices comprises:

a plurality of electronic latches, each coupled to the main controller, and configured to receive the control signal output by the main controller to perform latching or opening; and

a plurality of buckles correspondingly disposed in the plurality of electronic latches, each buckle being correspondingly disposed in one electronic latch; wherein the buckle protrudes outwards when the electronic latch latches, and the buckle is retracted into the electronic latch when the electronic latch is opened;

wherein each lid is provided with a fastener corresponding to each electronic latch, and each fastener corresponds to each buckle so that latching or opening of the lid is performed according to the control signal of the main controller.

3. The smart medicine box according to claim 1, wherein the main controller comprises:

a sound recognition controller configured to perform sound recognition and control on the user;

a date and time controller configured to perform date setting and control on the smart medicine box;

a medicine box locking controller configured to perform locking and control on the lids of the smart medicine box;

a biometric recognition controller configured to perform biometric recognition and control on the user;

a graphics processing unit separately coupled to the sound recognition controller, the date and time controller, the medicine box locking controller, and the biometric recognition controller, and configured to receive signals output by the sound recognition controller, the date and time controller, the medicine box locking controller, and the biometric recognition controller, and configured to perform determination and confirmation of the sound recognition of the user, perform setting of the correct date and time about whether the lids are capable of being opened or not, perform control on whether the lids are capable of being locked or not, and perform recognition and determination on whether the biological characteristics of the user are correct or not; and

a plurality of control signals output by the graphics processing unit and configured to control the latching devices of the smart medicine box to perform latching or unlatching of the lids.

4. The smart medicine box according to claim 3, wherein the upper body is provided with a screen; the screen is disposed on the outer surface of the upper body and extends to the inner surface of the upper body so that the screen is coupled to the main controller; the main controller is correspondingly provided with a display module coupled to the screen; the screen is configured as a touch screen; the user performs setting of the date and time via touch control; and the touch screen is provided with a distribution pattern correspondingly displaying the positions of the lids, and based on the display of the distribution pattern, the user ascertains which lid is selected to be opened to take medicine.

5. The smart medicine box according to claim 3, wherein the biometric recognizer is a biometric recognizer for face recognition, namely, an image capture module, the image capture module coupled to the biometric recognition controller to read a face image of the user; and the biometric recognition controller comprises:

an image signal filter configured to receive and filter a face image signal of the image capture module; and

an image signal amplifier coupled to the image signal filter and the graphics processing unit and configured to amplify the filtered face image signal and then transmit the same to the graphics processing unit for control processing;

wherein the graphics processing unit is, corresponding to the biometric recognition controller, provided with:

a face image database storing at least one preset face image data;

a face image comparison module coupled to the face image database and configured to receive the face image signal transmitted by the image signal amplifier and then compare the face image signal with the preset face image base;

an operation control module coupled to the face image comparison module and configured to perform operation and determination on the face image signal to make a decision of latching or unlatching; and

a comparison result output control signal unit coupled to the operation control module and configured to convert the comparison result into a control signal output by the graphics processing unit.

6. The smart medicine box according to claim 3, wherein the biometric recognizer is a biometric recognizer for fingerprint recognition, namely, a fingerprint reading module, the fingerprint reading module coupled to the biometric recognition controller to read a fingerprint image signal of the user; and the biometric recognition controller comprises:

a fingerprint image signal amplifier coupled to the fingerprint reading module and the graphics processing unit and configured to receive and amplify the fingerprint image signal of the fingerprint reading module and transmit the fingerprint image signal to the graphics processing unit;

wherein the graphics processing unit is, corresponding to the biometric recognition controller, provided with:

a fingerprint database storing at least one preset fingerprint data;

a fingerprint image comparison module coupled to the fingerprint database and configured to receive the fingerprint image signal transmitted by the fingerprint image signal amplifier and then compare the fingerprint image signal with the preset fingerprint database;

an operation control module coupled to the fingerprint image comparison module and configured to perform operation and determination on the fingerprint image signal to make a decision of latching or unlatching; and

a comparison result output control signal unit coupled to the operation control module and configured to convert the comparison result into a control signal output by the graphics processing unit.

7. The smart medicine box according to claim 4, wherein the medicine box locking controller comprises:

an electronic latch coding setting module coupled to the graphics processing unit and configured for the user to set a coding sequence of the lids;

an electronic latch state display module coupled to the graphics processing unit and configured to determine and recognize that the lids are in a latched state or an unlatched state; and

a screen mapping medicine box display module coupled to the graphics processing unit and configured to display on the screen the distribution pattern corresponding to the lids;

wherein the graphics processing unit corresponds to the electronic latch coding setting module, the electronic latch state display module and the screen mapping medicine box display module and generates at least an electronic latch control signal via a control signal transmission interface.

8. A controlling method of a smart medicine box, applied to the smart medicine box according to claim 3, the steps of the controlling method of a smart medicine box corresponding to a medicine user, the smart medicine box, a biometric recognition controller for face recognition, the medicine box locking controller, and the sound recognition controller, the controlling method of a smart medicine box comprising the steps of:

taking a medicine by the medicine user at the correct time;

confirming, by the smart medicine box, whether the medicine user is a correct one or not;

permitting to take medicine after it is determined by the biometric recognition controller for face recognition that the medicine user is a correct one;

unlocking by the medicine box locking controller to take medicine; and  
unlatching a corresponding lid of the smart medicine box so that the  
medicine user takes the medicine;

wherein when the medicine user takes the medicine at incorrect time, the  
controlling method of a smart medicine box comprises the steps of:

confirming, by the smart medicine box, whether the time at which the  
medicine user takes the medicine is correct or not;

if the medicine-taking time is determined to be incorrect after the  
medicine user is confirmed by the biometric recognition controller for face  
recognition,

latching, by the medicine box locking controller, the smart medicine box;  
and

enabling, by the medicine box locking controller, the sound recognition  
controller to perform voice prompt, and reminding, by the sound recognition  
controller, the medicine user about the next medicine-taking time.

9. The controlling method of a smart medicine box according to claim 8,  
comprising a step of latching or unlatching the smart medicine box  
corresponding to the medicine user, the smart medicine box, the date and time  
controller, and the medicine box locking controller, the step of latching or  
unlatching the smart medicine box comprising:

setting the medicine-taking time by the medicine user;

writing the medicine-taking time to the smart medicine box, and setting by  
the date and time controller;

after setting the medicine-taking time, controlling, by the medicine box locking controller, the smart medicine box to continue locking before the medicine-taking time, during which, the medicine user is not permitted to take medicine;

upon arrival of the medicine-taking time, starting, by the date and time controller, the medicine box locking controller to trigger unlocking at the medicine-taking time, and unlatching a corresponding lid of the smart medicine box; and

taking the medicine by the medicine user.

10. The controlling method of a smart medicine box according to claim 8, comprising a step of reminding the medicine-taking time of the smart medicine box corresponding to the medicine user, the smart medicine box, the date and time controller, and the sound recognition controller, the step of reminding the medicine-taking time of the smart medicine box comprising:

setting the medicine-taking time by the medicine user via the smart medicine box;

writing the medicine-taking time by the date and time controller of the smart medicine box;

triggering the sound recognition controller by the date and time controller upon arrival of the medicine-taking time; and

making a sound by the sound recognition controller to remind the medicine user to take medicine.