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(54) **METHOD AND SYSTEM FOR CONTROLLING LAUNDRY PROCESSING DEVICE AND DEVICE**

(57) A method and system for controlling a laundry processing device and equipment. The method comprises: after washing has finished, by detecting and determining whether, when configuring a washing program, a laundry processing device has been set with a subsequent operation at the end of washing, such as shaking loose and/or drying, and whether the current laundry processing device is in a work-at-home operation mode or a go-out operation mode, controlling the laundry processing device according to the determination result, so as to execute a corresponding shaking loose and/or drying operation item after washing is finished or unlocking the machine door to wait for a user to process, or the like. By means of a device control panel combined with a preset corresponding determination configuration of a subsequent operation after a washing program has ended at a remote end of an intelligent terminal, the human-computer interaction logic of control process configuration determination and processing is improved, and the dynamic switching of operation modes is combined, so that laundry processing after washing has finished is

more simply, conveniently and intelligently implemented, better improving the human-computer interaction experience of a user, and having the features of low power consumption, low costs, and strong reliability, and device control being more flexible and well-developed.

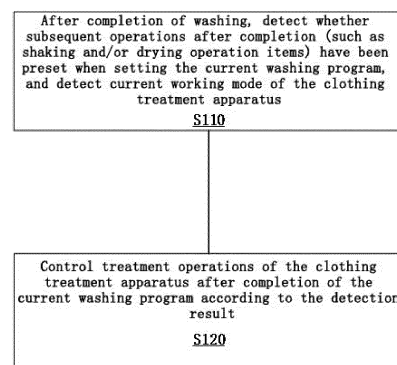


FIG.1

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## Description

### FIELD OF INVENTION

**[0001]** The present disclosure relates to the technical field of controlling a clothing treatment apparatus, and specifically relates to a method and system for controlling a clothing treatment apparatus, and an apparatus.

### BACKGROUND OF INVENTION

**[0002]** In daily life, after washing of a clothing treatment apparatus such as a washing machine is completed, there often occurs a situation in which the user went out or forgets to hang the clothing for drying in time although he/she is at home. In order to prevent the clothing from being left in a drum of the clothing treatment apparatus such as the washing machine for a long time after washing, which would otherwise cause wrinkles or odor to the clothing, some apparatus manufacturers in the prior art will, after washing is completed, judge whether a smart terminal of the user associated with the apparatus (which is communicatively connected with the apparatus and able to control the apparatus) is at home or out, or preset on a control panel of the apparatus, and decide whether to add shaking and/or drying functions for treatment. However, if the user leaves the smart terminal at home or when a control APP of the apparatus is installed on a smart terminal that the user is not carrying with him/her, such as a tablet Pad, the user will be misjudged as at home by the washing machine, so that machine door locking will be directly released after the washing process is completed, making the subsequent shaking and/or drying programs cannot be executed; or the user plans to go out when setting the washing program, so he/she sets the shaking and drying programs to be executed after completion of washing; however, in a case where the user does not go out later for various reasons, if the preset control logic is still fully followed, the shaking and/or drying programs are still executed after completion of washing with the presence of the user at home, which not only makes it inconvenient for the user to use, but also causes a waste of power resource. That is, the processing and control mode of existing clothing treatment apparatus after completion of washing still has the defects of inflexibility, imperfection and high energy consumption.

**[0003]** In view of the above defects, there exists a need for a new method for controlling a clothing treatment apparatus, so that after washing of the clothing treatment apparatus is completed, whether the user is at home or is out, the control logic can be executed in a simple, convenient and quick way according to the user's wishes and actual needs, thereby realizing the subsequent shaking and/or drying operations after completion of washing through smart control, and/or automatically unlocking the machine door to wait for the clothing to be taken out for drying, etc., which ensures that a good human-computer interaction experience between the apparatus and the

user can still be obtained even in spite of complicated changes of situation such as user's usage habits, and randomness/uncertainty of the user being at home or out, makes the operation simple, convenient, not complicated or cumbersome, and further has the characteristics of low power consumption, low cost and high reliability, etc.

### SUMMARY OF INVENTION

**[0004]** In order to overcome the above defects, the present disclosure is proposed, aiming at solving or at least partially solving the technical problem of how to improve a control process of clothing treatment after completion of washing, so as to realize clothing treatment after completion of washing in a simpler, more convenient and smarter way. In view of the above technical problem, the present disclosure provides a method and system for controlling a clothing treatment apparatus, and an apparatus.

**[0005]** In a first aspect, a method for controlling a clothing treatment apparatus is provided, which includes: after completion of running a washing program, detecting whether the clothing treatment apparatus has set operation items of subsequent operations after completion corresponding to the current washing program when setting the current washing program, and detecting the current working mode of the clothing treatment apparatus; and controlling treatment operations of the clothing treatment apparatus after completion of running the current washing program according to a detection result of the detection.

**[0006]** The "detecting whether the clothing treatment apparatus has set operation items of subsequent operations after completion corresponding to the current washing program when setting the current washing program" specifically includes: adding a "subsequent operations after completion" function after completion of running the washing program on a control panel of the clothing treatment apparatus, and/or adding a "subsequent operations after completion" item after completion of running the washing program in parameter adjustment items of a control program of a smart terminal associated with the clothing treatment apparatus; in which the "subsequent operations after completion" at least include one or more of the following operation items: 'none', 'drying', 'shaking', and 'drying + shaking', as treatment operation items to be executed after completion of running the washing program of the clothing treatment apparatus; and detecting records and/or statuses of the operation items of subsequent operations after completion recorded when setting the current washing program.

**[0007]** The "having set operation items of subsequent operations after completion corresponding to the current washing program" specifically includes: initially, making the operation items of the "subsequent operations after completion" be 'none' by default; selecting the required washing program when the clothing treatment apparatus is required for washing; and according to the selected

current washing program, setting the corresponding operation items of the "subsequent operations after completion" after completion of running the washing program through the "subsequent operations after completion" function on the control panel or the "subsequent operations after completion" item of the control program of the smart terminal; in which when setting the operation items through the control program of the smart terminal, the method further includes: judging whether the washing program supports execution of the operation items of the "subsequent operations after completion" according to the selected current washing program; if the judgment is yes, then entering a single-program setting to determine whether to select the operation items matching the washing program; and if it is judged that the single-program setting has completed the selection, then entering unified setting processing to determine whether to select activation of unified setting; in which if the activation of unified setting is selected, then once all the washing programs that support the operation items selected by the single-program setting are selected by the user, it means that the corresponding operation items after completion of running the washing programs have been set.

**[0008]** The "detecting the current working mode of the clothing treatment apparatus" specifically includes: an at-home working mode and an out-of-home working mode; and determining the working mode of the clothing treatment apparatus by judging a distance between the clothing treatment apparatus and a smart terminal associated with the clothing treatment apparatus or a communication connection mode between them.

**[0009]** The "determining the working mode of the clothing treatment apparatus by judging a distance between the clothing treatment apparatus and a smart terminal associated with the clothing treatment apparatus or a communication connection mode between them" specifically includes: collecting positioning information through a positioning module of the smart terminal, determining the distance between the smart terminal and the clothing treatment apparatus, and judging whether the distance is within a set range; if the distance is within the set range, then determining that the clothing treatment apparatus is in the at-home working mode; otherwise, determining that the clothing treatment apparatus is in the out-of-home working mode; or judging whether the clothing treatment apparatus and the smart terminal are currently connected to the same LAN; if yes, then determining that the clothing treatment apparatus is in the at-home working mode; otherwise, determining that the clothing treatment apparatus is in the out-of-home working mode.

**[0010]** The "detection result" specifically includes: a first case, in which the subsequent operations after completion corresponding to completion of the current washing program have been set in advance when setting the current washing program, and the clothing treatment apparatus is currently in the at-home working mode; a second case, in which the subsequent operations after completion corresponding to completion of the current wash-

ing program have been set in advance when setting the current washing program, and the clothing treatment apparatus is currently in the out-of-home working mode; a third case, in which the subsequent operations after completion corresponding to completion of the current washing program have not been set in advance when setting the current washing program, and the clothing treatment apparatus is currently in the at-home working mode; and a fourth case, in which the subsequent operations after completion corresponding to completion of the current washing program have not been set in advance when setting the current washing program, and the clothing treatment apparatus is currently in the out-of-home working mode.

**[0011]** The "controlling treatment operations of the clothing treatment apparatus after completion of running the current washing program according to a detection result of the detection" specifically includes: if the detection result is the first case, in which the clothing treatment apparatus is currently in the at-home working mode, then prompting the user that the washing program is completed and prompting whether to cancel the execution of the operation items of the subsequent operations after completion that have been preset previously; if the user's feedback is confirming cancellation within a preset time, then controlling the clothing treatment apparatus not to execute the operation items of the subsequent operations after completion that have been preset previously and correspond to the currently completed washing program after completion of running the current washing program, and unlocking the clothing treatment apparatus; and if the user does not feedback or the user's feedback is not cancelling within the preset time, then controlling the clothing treatment apparatus to execute the operation items of the subsequent operations after completion that have been preset previously and correspond to the currently completed washing program after completion of running the current washing program;

if the detection result is the second case, in which the clothing treatment apparatus is currently in the out-of-home working mode, then controlling the clothing treatment apparatus to directly execute the operation items of the subsequent operations after completion that have been preset previously and correspond to the currently completed washing program after completion of running the current washing program;

if the detection result is the third case, in which the clothing treatment apparatus is currently in the at-home working mode, then controlling the clothing treatment apparatus to be directly unlocked after completion of running the current washing program; and

if the detection result is the fourth case, in which the clothing treatment apparatus is currently in the out-

of-home working mode, then controlling the clothing treatment apparatus to remain locked and prompting the user that the washing program is completed and prompting whether to set and execute the operation items of the corresponding subsequent operations after completion for the currently completed washing program; if the user's feedback is setting and executing within a preset time, then setting the operation items of the corresponding subsequent operations after completion according to the currently completed washing program, and controlling the clothing treatment apparatus to execute the newly set operation items; and if the user does not feedback or the user's feedback is not setting within the preset time, then controlling the clothing treatment apparatus to be unlocked;

in which the prompt is provided to a smart terminal associated with the clothing treatment apparatus for remote control.

**[0012]** The method further includes: within the preset time, setting a short time duration or period before the user's feedback, so as to re-detect the current working mode of the clothing treatment apparatus; if the re-detected working mode is different from the previous working mode, then switching to the current re-detected working mode before re-prompting the user; and controlling the clothing treatment apparatus to execute the corresponding treatment operations according to the user's feedback to the re-prompt within a preset time.

**[0013]** In a second aspect, a system for controlling a clothing treatment apparatus is provided, which includes: a detection module which is configured for, after completion of running a washing program, detecting whether the clothing treatment apparatus has set operation items of subsequent operations after completion corresponding to the current washing program when setting the current washing program, and detecting the current working mode of the clothing treatment apparatus; and a control module which is configured for controlling treatment operations of the clothing treatment apparatus after completion of running the current washing program according to a detection result of the detection.

**[0014]** The "detecting whether the clothing treatment apparatus has set operation items of subsequent operations after completion corresponding to the current washing program when setting the current washing program" specifically includes: adding a "subsequent operations after completion" function after completion of running the washing program on a control panel of the clothing treatment apparatus, and/or adding a "subsequent operations after completion" item after completion of running the washing program in parameter adjustment items of a control program of a smart terminal associated with the clothing treatment apparatus; in which the "subsequent operations after completion" at least include one or more of the following operation items: 'none', 'drying',

'shaking', and 'drying + shaking', as treatment operation items to be executed after completion of running the washing program of the clothing treatment apparatus; and detecting records and/or statuses of the operation items of subsequent operations after completion recorded when setting the current washing program.

**[0015]** The "having set operation items of subsequent operations after completion corresponding to the current washing program" specifically includes: initially, making the operation items of the "subsequent operations after completion" be 'none' by default; selecting the required washing program when the clothing treatment apparatus is required for washing; and according to the selected current washing program, setting the corresponding operation items of the "subsequent operations after completion" after completion of running the washing program through the "subsequent operations after completion" function on the control panel or the "subsequent operations after completion" item of the control program of the smart terminal; in which when setting the operation items through the control program of the smart terminal, it further includes: judging whether the washing program supports execution of the operation items of the "subsequent operations after completion" according to the selected current washing program; if the judgment is yes, then entering a single-program setting to determine whether to select the operation items matching the washing program; and if it is judged that the single-program setting has completed the selection, then entering unified setting processing to determine whether to select activation of unified setting; in which if the activation of unified setting is selected, then once all the washing programs that support the operation items selected by the single-program setting are selected by the user, it means that the corresponding operation items after completion of running the washing programs have been set.

**[0016]** The "detecting the current working mode of the clothing treatment apparatus" specifically includes: an at-home working mode and an out-of-home working mode; and determining the working mode of the clothing treatment apparatus by judging a distance between the clothing treatment apparatus and a smart terminal associated with the clothing treatment apparatus or a communication connection mode between them.

**[0017]** The "determining the working mode of the clothing treatment apparatus by judging a distance between the clothing treatment apparatus and a smart terminal associated with the clothing treatment apparatus or a communication connection mode between them" specifically includes: collecting positioning information through a positioning module of the smart terminal, determining the distance between the smart terminal and the clothing treatment apparatus, and judging whether the distance is within a set range; if the distance is within the set range, then determining that the clothing treatment apparatus is in the at-home working mode; otherwise, determining that the clothing treatment apparatus is in the out-of-home working mode; or judging whether the clothing

treatment apparatus and the smart terminal are currently connected to the same LAN; if yes, then determining that the clothing treatment apparatus is in the at-home working mode; otherwise, determining that the clothing treatment apparatus is in the out-of-home working mode.

**[0018]** The "detection result" specifically includes: a first case, in which the subsequent operations after completion corresponding to completion of the current washing program have been set in advance when setting the current washing program, and the clothing treatment apparatus is currently in the at-home working mode; a second case, in which the subsequent operations after completion corresponding to completion of the current washing program have been set in advance when setting the current washing program, and the clothing treatment apparatus is currently in the out-of-home working mode; a third case, in which the subsequent operations after completion corresponding to completion of the current washing program have not been set in advance when setting the current washing program, and the clothing treatment apparatus is currently in the at-home working mode; and a fourth case, in which the subsequent operations after completion corresponding to completion of the current washing program have not been set in advance when setting the current washing program, and the clothing treatment apparatus is currently in the out-of-home working mode.

**[0019]** The "controlling treatment operations of the clothing treatment apparatus after completion of running the current washing program according to a detection result of the detection" specifically includes: if the detection result is the first case, in which the clothing treatment apparatus is currently in the at-home working mode, then prompting the user that the washing program is completed and prompting whether to cancel the execution of the operation items of the subsequent operations after completion that have been preset previously; if the user's feedback is confirming cancellation within a preset time, then controlling the clothing treatment apparatus not to execute the operation items of the subsequent operations after completion that have been preset previously and correspond to the currently completed washing program after completion of running the current washing program, and unlocking the clothing treatment apparatus; and if the user does not feedback or the user's feedback is not cancelling within the preset time, then controlling the clothing treatment apparatus to execute the operation items of the subsequent operations after completion that have been preset previously and correspond to the currently completed washing program after completion of running the current washing program;

if the detection result is the second case, in which the clothing treatment apparatus is currently in the out-of-home working mode, then controlling the clothing treatment apparatus to directly execute the operation items of the subsequent operations after completion that have been preset previously and cor-

respond to the currently completed washing program after completion of running the current washing program;

if the detection result is the third case, in which the clothing treatment apparatus is currently in the at-home working mode, then controlling the clothing treatment apparatus to be directly unlocked after completion of running the current washing program; and

if the detection result is the fourth case, in which the clothing treatment apparatus is currently in the out-of-home working mode, then controlling the clothing treatment apparatus to remain locked and prompting the user that the washing program is completed and prompting whether to set and execute the operation items of the corresponding subsequent operations after completion for the currently completed washing program; if the user's feedback is setting and executing within a preset time, then setting the operation items of the corresponding subsequent operations after completion according to the currently completed washing program, and controlling the clothing treatment apparatus to execute the newly set operation items; and if the user does not feedback or the user's feedback is not setting within the preset time, then controlling the clothing treatment apparatus to be unlocked;

in which the prompt is provided to a smart terminal associated with the clothing treatment apparatus for remote control.

**[0020]** The system further includes: within the preset time, setting a short time duration or period before the user's feedback, so as to re-detect the current working mode of the clothing treatment apparatus; and if the re-detected working mode is different from the previous working mode, then switching to the current re-detected working mode before re-prompting the user; and controlling the clothing treatment apparatus to execute the corresponding treatment operations according to the user's feedback to the re-prompt within a preset time.

**[0021]** In a third aspect, a computer storage device is provided, in which a plurality of program codes are stored, the program codes being adapted to be loaded and run by a processor to perform the method for controlling a clothing treatment apparatus as described above.

**[0022]** In a fourth aspect, a control device is provided, which includes a processor and a memory, the memory being adapted to store a plurality of program codes, and the program codes being adapted to be loaded and run by the processor to perform the method for controlling a clothing treatment apparatus as described above.

**[0023]** In a fifth aspect, a clothing treatment apparatus is provided, which includes: the system for controlling a clothing treatment apparatus as described above; or the

control device as described above, which is located on the control panel and communicates with the control panel or a communication unit of the clothing treatment apparatus, the communication unit communicating with a smart terminal associated with the clothing treatment apparatus and transmitting control instructions.

**[0024]** The above one or more technical solutions of the present disclosure have at least one or more of the following advantageous effects.

**[0025]** According to the technical solution of the present disclosure, after washing is completed, it is judged through detection whether the clothing treatment apparatus has set subsequent operations after completion of washing such as shaking and/or drying when setting the washing program, and whether the clothing treatment apparatus is currently in the at-home working mode or the out-of-home working mode, so that the clothing treatment apparatus is controlled according to the judgment result to execute the corresponding shaking and/or drying operation items after completion of washing or unlock the machine door to wait for the user's processing, etc. In the solution, through the apparatus control panel in combination with a preset correspondence judgment of the subsequent operations after completion of the washing program at a remote end of the smart terminal, the human-computer interaction logic judged and processed by the control process setting is improved, and in combination with a dynamic switching of the working mode, clothing treatment after completion of washing is realized in a simpler, more convenient and smarter way. In particular, after washing is completed, whether the user is at home or is out, the clothing treatment apparatus can be smartly controlled to execute subsequent shaking and/or drying operations or unlock the machine door and the like according to the user's wishes and actual needs, which can better improve the user's human-computer interaction experience, and has the characteristics of low power consumption, low cost, high reliability, and more flexible and perfect apparatus control, etc.

## **BRIEF DESCRIPTION OF DRAWINGS**

**[0026]** Specific embodiments of the present disclosure will be described below with reference to the accompanying drawings, in which:

FIG. 1 is a main flow chart of an embodiment of a method for controlling a clothing treatment apparatus according to the present disclosure;

FIG. 2 is a structural block diagram of an embodiment of a system for controlling a clothing treatment apparatus according to the present disclosure; and

FIG. 3 is a schematic diagram showing a control logic execution process of the method for controlling a clothing treatment apparatus in an embodiment of the technical solution of the present disclosure.

## **DETAILED DESCRIPTION OF EMBODIMENT(S) OF INVENTION**

**[0027]** In order to facilitate understanding the present disclosure, the present disclosure will be described more comprehensively and specifically below in combination with the drawings and embodiments of the specification. However, it should be understood by those skilled in the art that these embodiments are only used to explain the technical principles of the present disclosure, and are not intended to limit the scope of protection of the present disclosure.

**[0028]** In the description of the present disclosure, "module" and "processor" may include hardware, software, or a combination of both hardware and software. A module may include hardware circuits, various suitable sensors, communication ports and memories, and may also include software parts such as program codes, or a combination of both software and hardware. The processor may be a central processor, a microprocessor, an image processor, a digital signal processor or any other suitable processor. The processor has data and/or signal processing functions. The processor can be implemented in software, hardware or a combination of both software and hardware. Non-temporary computer-readable storage medium includes any suitable medium that can store program codes, such as magnetic disk, hard disk, optical disk, flash memory, read-only memory, random access memory, etc. The term "A and/or B" refers to all possible combinations of A and B, such as only A, only B, or A and B. The term "at least one A or B" or "at least one of A and B" has the similar meaning to "A and/or B", and can include only A, only B, or A and B. The terms "one" and "this" in the singular form may also include the plural form.

**[0029]** At present, in order to avoid adverse consequences such as wrinkling or odor production caused due to the clothing being left untreated for a long time in the clothing treatment apparatus, through a distance or communication connection mode between the clothing treatment apparatus and a smart terminal associated with the clothing treatment apparatus or by presetting on an apparatus panel, the clothing treatment apparatus determines whether to add the shaking and/or drying functions by judging whether the user is at home or out after completion of washing. However, the clothing treatment apparatus will face various random situations in actual operation: different users have different usage habits, some may not preset, and some may not carry the smart terminal associated with the apparatus with them, etc., (for example, a control APP of the apparatus is installed on the Pad, and when the user goes out, the mobile phone is carried, but the Pad is not carried, etc.); users may also sometimes change their schedules due to various other unexpected reasons, which often makes the control of existing clothing treatment apparatus still not smart enough, causes machine programs to be executed only woodenly, and also wastes resources and electric power,

thus further leading to poor human-computer interaction experience to the users.

**[0030]** In view of the above, a control solution of the clothing treatment apparatus of the present disclosure and a clothing treatment apparatus to which the solution is applied are proposed.

**[0031]** Reference is made to FIG. 1, which is a main flow chart of an embodiment of a method for controlling a clothing treatment apparatus according to the present disclosure.

**[0032]** Step S 110: after completion of washing, detecting whether the clothing treatment apparatus has pre-set subsequent operations after completion (such as shaking and/or drying operation items) when setting the current washing program, and detecting the current working mode of the clothing treatment apparatus.

**[0033]** The clothing treatment apparatus includes a washing machine and the like. The user can set in advance when starting washing. For example, when the washing program is completed, the clothing treatment apparatus prompts the user whether to set execution of the shaking and/or drying operations after completion of washing.

**[0034]** Specifically, the user can set in advance through the control panel or operation panel of the clothing treatment apparatus or the smart terminal associated with the apparatus (such as the mobile phone, tablet Pad and the like, on which an apparatus control program/APP/applet and the like are installed), so as to set whether the clothing treatment apparatus executes the shaking and/or drying operations after completion of washing. The control programs on these panels or smart terminals include, but are not limited to, program interfaces with prompts or guidance information that can realize human-computer interaction, or menus (such as virtual menus or hardware menus, etc.) or various function keys (such as virtual keys similar to soft keyboards, or real physical keys, etc.).

**[0035]** Further, the washing programs that users can select also include daily washing, wool washing, cotton and linen washing, soft washing or user-defined washing process, rinsing process, spinning process, etc.

**[0036]** In an embodiment, by taking the washing machine and presetting on the control panel of the washing machine as an example: a "subsequent operations after completion" function is added on the interface or key or menu of the control panel of the washing machine; for example, this function can be a function option that can realize human-computer interaction by key, menu or interactive interface, etc. In an example, this function can include specific operation items such as "none/drying/shaking/drying + shaking" for users to select; the factory setting of the apparatus (such as the washing machine) can be "none" by default; further, the user can interact with the apparatus before starting the washing program, so as to select the specific control treatment in this function, such as one of the above operation items "drying", "shaking" or "drying + shaking". In this way,

when execution of the washing program is completed, the "subsequent operations after completion" function will be entered, and the washing machine will continue to perform the control treatment of the clothing according to the corresponding operation items selected when pre-setting.

**[0037]** Similarly, this function can also be added on the control program/APP of the smart terminal, just like pre-setting it on the control panel of the above apparatus such as the washing machine; for example, this function is added in parameter adjustment items, a certain one of the "none/drying/shaking/drying + shaking" operation items is selected, and execution of control treatment continues according to the operation item after completion of washing. Similarly, the default option may be "none". The user controls the washing machine through the smart terminal. Before starting the washing program, the smart terminal can set the subsequent operation content after completion of washing and issues instructions to the washing machine. That is, the smart terminal realizes remote setting and control, which are executed after completion of the washing program. The smart terminals include the mobile terminals of users such as smart phones and smart Pads. Herein, the specific setting selection, washing program selection, and the examples executed after completion of the washing program can be similar to the setting and selection of the control panel. Further, when the apparatus such as the washing machine itself is limited by the structure or the control panel, this function can be added through the control program/APP on the smart terminal to provide users with the option of pre-setting, which is flexible, simple and convenient. This mode is single-program setting/provision. Before the user starts the washing program, the subsequent operation items after completion of running the washing program are set, instructions are issued to the apparatus, and the apparatus is controlled to execute and process these operation items after completion of the program. Further, in addition to the above single-program setting mode (i.e., this function is selected and added for setting after a washing program is set), the smart terminal can also provide a unified setting/provision entry. When a unified setting switch of this function is turned on, all the washing programs that meet the conditions will automatically execute the subsequent operations after completion of washing. The setting switch can be a virtual key, a menu or another interactive interface/window, etc. The unified setting can avoid setting every time the program is started, and all the programs are universal after one time of setting, which is simple and convenient. This priority is lower than the single-program setting.

**[0038]** By meeting the conditions, it means conditions that can support the operation items of the single-program setting. Specifically, for example, the subsequent operation items such as drying and/or shaking can be set for both heavy clothing washing program and cotton clothing washing program. Then, after the single-program setting is completed, confirmation can be made or

abandoned on whether to select the unified setting, so that the corresponding subsequent treatment operation items are directly set after the above two types of washing programs are selected. The unified setting can be selected through, for example, switch key, menu, interactive interface/window/dialog box, etc.

**[0039]** Further, the items of some washing programs do not support the drying or shaking operation after completion of washing; for example, after washing of the wool clothing, it cannot be dried; that is, the drying operation item is not supported for the wool clothing; for another example, the washing mode of spin-only does not support the shaking operation item after completion of washing, etc. Therefore, after the corresponding washing program is selected, this added function will set the non-matching operation items as in a non-selectable status, such as a status in which the items are gray and cannot be clicked or a status of no such option. Therefore, it is not necessary to preset the non-matching operation items. That is, different washing programs match the operation items of different subsequent operations after completion.

**[0040]** In the following, the execution process of a preset scene will be described preferably by using an example in which the user presets this function by means of remote control through the smart terminal.

**[0041]** S 1: entering a setting interface of the control program/APP of the smart terminal so that the user selects the washing program.

**[0042]** S2: the clothing treatment apparatus/smart terminal party judging whether the selected washing program supports the subsequent operations after completion of clothing washing; if yes, then proceeding to step S3 to perform the single-program setting and judging; otherwise, proceeding to step S5 to end the setting process of subsequent operations.

**[0043]** S3: executing the single-program setting stage of the subsequent operations, and judging whether the single-program setting for the subsequent operations has been performed. In the specific single-program setting process, such as referring to the description of the "subsequent operations after completion" function on the control panel or smart terminal mentioned above, the operation items after completion of washing are preset; further, in the single-program setting herein, the specific operation items that are not supported by the washing program are in the non-selectable status. If the single-program setting has been performed, then the process proceeds to step S4 to perform the unified setting and judging; otherwise, the process proceeds to step S5 to end the setting process of subsequent operations.

**[0044]** S4: executing the unified setting stage of the subsequent operations for the current washing program selected by the user, and judging whether the unified setting of the subsequent operations corresponding to the washing program has been performed. That is, the subsequent operations will be performed as long as this washing program is selected later. If the unified setting

has been performed, for example, if the key or pop-up dialog box of the corresponding subsequent operation item "drying + shaking" of the heavy clothing strong washing program is pressed, the manual setting operation will be ended, and if the washing program is selected later again, the corresponding subsequent operation will be performed directly without presetting again. If the unified setting switch is not turned on, the process proceeds to step S5 to end.

**[0045]** The "subsequent operations after completion" function can be designed as an interaction function with other similar washing/cleaning control options according to the actual structure, need, environment and the like of the interaction object (the apparatus or the smart terminal), or can be designed independently, such as separately listing a key, menu, pop-up interface/dialog box/selection box/window and the like in the form of software and hardware, which is not limited by the way described above in the present disclosure.

**[0046]** Records and/or statuses of the operation items of the subsequent operations after completion when setting the current washing program are detected, e.g., the selected statuses of the operation items of this function, the records stored after setting, etc.

**[0047]** The working mode of the clothing treatment apparatus includes, for example, an at-home working mode and an out-of-home working mode. Further, the clothing treatment apparatus is communicatively connected with the smart terminal, and can also be remotely controlled through the smart terminal. In an example, the clothing treatment apparatus can set (manually set) the working mode thereof in advance through the control panel or the associated smart terminal.

**[0048]** Further, in an example, it is also possible that the clothing treatment apparatus is not preset; instead, the working mode of the clothing treatment apparatus is dynamically set/automatically set or switched according to a distance between the clothing treatment apparatus and the smart terminal or a communication connection mode between them. Specifically, for example, when it is detected by the smart terminal that the distance between the smart terminal and the clothing treatment apparatus is within a set range, the clothing treatment apparatus is in the at-home working mode; and when it is detected by the smart terminal that the distance between the smart terminal and the clothing treatment apparatus exceeds the set range, the clothing treatment apparatus is in the out-of-home working mode. Preferably, a positioning module of the smart terminal collects positioning information, determines the distance between the smart terminal and the clothing treatment apparatus, determines the working mode of the clothing treatment apparatus according to whether the determined distance is within the set range (for example, if it is within the range, it means that the clothing treatment apparatus is in the at-home working mode; otherwise, it means that the clothing treatment apparatus is in the out-of-home working mode, etc.), and sends information to the clothing



treatment apparatus. After receiving the information, the clothing treatment apparatus is controlled to enter the corresponding working mode. For example, if the distance between the clothing treatment apparatus and the smart terminal is within the set range of five meters (for example, three meters, five meters, etc.), or if the clothing treatment apparatus and the smart terminal are within the same LAN or home Internet of Things, etc. (for example, when the clothing treatment apparatus and the smart terminal are connected to the same LAN), then the clothing treatment apparatus can enter the at-home working mode; otherwise, the clothing treatment apparatus can enter the out-of-home working mode.

**[0049]** Preferably, positioning devices and network communication devices can also be provided in the clothing treatment apparatus and the smart terminal. A first GPS or BeiDou positioning device can be provided in the smart terminal, a second GPS or BeiDou positioning device can be provided in the clothing treatment apparatus, and the network communication devices can be WiFi, 2G/3G/4G/5G or other network communication devices. When calculating the distance between the clothing treatment apparatus and the smart terminal, the clothing treatment apparatus sends the user's position status request to the smart terminal through the network communication device, and the smart terminal collects the positioning information thereof and sends it to the clothing treatment apparatus. The clothing treatment apparatus calculates the distance difference based on the positioning information of the two. Alternatively, the clothing treatment apparatus is not provided with GPS or BeiDou positioning device; the smart terminal collects the positioning information of the clothing treatment apparatus in advance, calculates the distance difference based on the positioning information of the two, and sends the distance difference to the clothing treatment apparatus. The set range value is 30 meters. When the distance difference between the two is smaller than or equal to 30 meters, or if the clothing treatment apparatus judges that it is within the same LAN as the smart terminal, then the clothing treatment apparatus will enter the at-home working mode; and when the distance difference between the two is larger than 30 meters, the clothing treatment apparatus will enter the out-of-home working mode.

**[0050]** The above preferred example is not used as a limitation to determining which working mode should be dynamically entered according to the positioning and distance judgment of the present disclosure.

**[0051]** Step S 120: controlling treatment operations of the clothing treatment apparatus after completion of running the current washing program according to the detection result.

**[0052]** Specifically, the detection result includes at least one of the following cases of result, such as: a first case, in which the subsequent operations after completion (such as shaking and/or drying operation items) corresponding to completion of the current washing program have been set in advance when setting the

current washing program, and the clothing treatment apparatus is currently in the at-home working mode; a second case, in which the subsequent operations after completion (such as shaking and/or drying operation items) corresponding to completion of the current washing program have been set in advance when setting the current washing program, and the clothing treatment apparatus is currently in the out-of-home working mode; a third case, in which the subsequent operations after completion (such as shaking and/or drying operation items) corresponding to completion of the current washing program have not been set in advance when setting the current washing program, and the clothing treatment apparatus is currently in the at-home working mode; and a fourth case, in which the subsequent operations after completion (such as shaking and/or drying operation items) corresponding to completion of the current washing program have not been set in advance when setting the current washing program, and the clothing treatment apparatus is currently in the out-of-home working mode.

**[0053]** In an embodiment, if the detection result is the first case after completion of running the washing program, the treatment operations of the apparatus after completion of running the washing program will be controlled. For example, the apparatus prompts the user that the washing program has been completed and it is judged that it is currently in the at-home working mode, and the apparatus prompts whether to cancel the subsequent operations after completion which have been set originally, such as performing the shaking and/or drying operation items; if the user gives feedback to the prompt within a preset time, such as giving a feedback message to confirm the cancellation, then the treatment of the operation items selected in the previously preset "subsequent operations after completion" function corresponding to the currently completed washing program can be cancelled, and then the apparatus such as the washing machine door can be unlocked to wait for the user to hang the clothing for drying later; and if the user does not give feedback to the prompt within the preset time, for example, when no feedback information is obtained after time-out or the user's feedback information is not cancelling, then the treatment of the operation items selected in the previously preset "subsequent operations after completion" function corresponding to the currently completed washing program will not be cancelled, and the set operation items such as drying and/or shaking will be executed.

**[0054]** The prompt can take various forms, including visual, tactile, or sound effect forms, such as text messages, pop-up dialog boxes to smart terminals, vibration, buzzing, dynamic display of graphic images, various voices and prompt tones (such as smart voice broadcasting, etc.), light effects (such as flashing indicators), and one or more combinations of these forms. The user's feedback can include various interactive operations on these prompts, such as operations on the dialog box on the smart terminal or key selection, menu operation, in-

teractive interface/window on the control panel of the apparatus, etc. Such feedback information will trigger the execution of the next treatment after being obtained/confirmed by the apparatus.

**[0055]** Further, in an embodiment, a short time duration or period can also be set before the time preset to obtain the user's feedback message provided for the prompt expires, so as to re-detect the current working mode of the apparatus. The detection can still be performed by means of the distance or communication mode between the apparatus and the associated smart terminal as described above for detection and judgement, so that this mode is entered. If the re-detected working mode is different from the previous mode, for example, if the re-detected working mode is the out-of-home working mode, then the mode will be switched to the out-of-home working mode (i.e., the second case), and the user will be prompted again after how long (which is set as required) will the apparatus be directly controlled to execute the treatment of the previously set subsequent operations after completion corresponding to the currently completed washing program; and if there is no feedback information after the time length for re-prompt expires or the feedback information of not cancelling is obtained, the treatment of the subsequent operations after completion will be executed; otherwise, the corresponding treatment will be executed according to the user's feedback information, such as cancelling the subsequent operations after completion.

**[0056]** In an embodiment, after completion of running the washing program, if the detection result is the second case, then the treatment operation of the apparatus after completion of running the washing program will be controlled. An example is to enter the out-of-home working mode, and directly execute the operation items selected in the preset "subsequent operations after completion" function after completion of washing corresponding to the currently completed washing program, such as shaking and/or drying.

**[0057]** In an embodiment, after completion of running the washing program, if the detection result is the third case, then the treatment operation of the apparatus after completion of running the washing program will be controlled. An example is to enter the at-home working mode, and unlock the apparatus directly after completion of washing, for example, unlocking the locked state of the washing machine door and waiting for the user to process and use, e.g., taking out the clothing for drying, etc.

**[0058]** In an embodiment, after completion of running the washing program, if the detection result is the fourth case, then the treatment operation of the apparatus after completion of running the washing program will be controlled. An example is to enter the out-of-home working mode, while the clothing treatment apparatus remains in a temporarily locked state, for example, the washing machine door is still temporarily locked, so as to wait for the smart terminal to issue a control instruction within a preset time, such as whether to execute subsequent oper-

ations after completion corresponding to the currently completed washing program (such as executing the newly selected or newly set shaking and/or drying operation items).

5 **[0059]** Further, in the temporarily locked state after completion of the washing program, the apparatus end can first send a prompt to the user to prompt the completion of the washing program. The prompt includes the situation described in the first case above. Preferably, 10 the prompt is provided to the smart terminal associated with the apparatus for remote control. The user gives feedback according to the prompt, such as providing feedback information, so as to confirm whether it is necessary to set the "subsequent operations after completion" function, specifically such as whether to select the drying and/or shaking operation items in this function, 15 and then issue/send a control instruction corresponding to the setting of this function to the apparatus. For the feedback method and feedback information, reference may be made to the situation described in the first case above.

**[0060]** Specifically, for example, if the user confirms the setting of the "subsequent operations after completion" function and then selects and sets the operation 20 items, and the smart terminal feeds back information within a preset time after obtaining the prompt, such as determining to execute the subsequent operations after completion, and issues a control instruction relevant to the setting of the "subsequent operations after completion" function (such as drying and/or shaking operation 25 items) corresponding to the currently completed washing program to the apparatus, then the apparatus will execute the subsequent operations (drying and/or shaking, etc.) which correspond to the currently completed washing program and the setting of which has just been completed; alternatively, if the user confirms the setting of 30 the "subsequent operations after completion" function and the smart terminal feeds back information within a preset time after obtaining the prompt, such as determining the control instruction to be set, then it will wait for the smart terminal to enter the setting and selection of the operation items of the subsequent operations after completion corresponding to the washing program within 35 another preset time (such as entering the setting interface/window/control program selection key menu and the like to complete setting), so that after the setting is completed, the smart terminal issues a control instruction of the subsequent operations whose setting has just been completed to the apparatus, and the apparatus executes 40 the corresponding subsequent operations whose setting has just been completed (drying and/or shaking, etc.).

**[0061]** Further, in an embodiment, a short time duration or period can also be set before the time preset to obtain the user's feedback message provided for the prompt expires, so as to re-detect the current working mode of 45 the apparatus. The detection can still be performed by means of the distance or communication mode between the apparatus and the associated smart terminal as de-

scribed above for detection and judgement, so that this mode is entered. If the re-detected working mode is different from the previous mode, for example, if the re-detected working mode is the at-home working mode, then the mode will be switched to the at-home working mode (i.e., the third case), and the user will be prompted again after how long (which is set as required) will the apparatus be directly controlled to be unlocked, for example, releasing the locked state of the washing machine door and waiting for the user to process and use; and if there is no feedback information after the time length specified for re-prompt expires or the information of determining not to set the subsequent operations after completion is received, the apparatus will be unlocked; otherwise, the corresponding treatment will be executed according to the user's feedback information, such as clearly determining to set, executing the setting, and executing the newly set operation items of the "subsequent operations after completion" function corresponding to the currently completed washing program.

**[0062]** Specifically, for example, if the user confirms that it is not necessary to set the "subsequent operations after completion" function, and feeds back to the apparatus end, that is, if it is clearly determined that the subsequent operations are not required, or no feedback is obtained after waiting for the predetermined time length after the prompt is sent, then the apparatus can be unlocked, such as unlocking the washing machine door, the operating of the washing machine can be ended, and the corresponding subsequent operation items will not be executed.

**[0063]** According to the solution of the present disclosure, whether the user is at home or is out, after completion of the washing program of the clothing treatment apparatus such as the washing machine, it can still ensure a smart control of whether to subsequently execute the subsequent operation items such as shaking and/or drying according to the user's wishes and actual needs varying at any time, or completely end the washing work and automatically unlock the door of the apparatus, etc., and wait for the user to take out the clothing for drying. By combining the working mode, presetting and remote interaction, the human-computer interaction is improved, and the control is realized simply and conveniently, which makes the present disclosure more adapted to random change of the actual situation, reduces the power consumption, lowers the cost, makes the reliability stronger, and optimizes and perfects the control logic. Specifically, in the present disclosure, after completion of washing, it is judged through detection whether the clothing treatment apparatus has set subsequent operation items such as shaking and/or drying when setting the washing program, and it is judged whether the clothing treatment apparatus and the smart terminal are connected to the same LAN, or the positioning module of the smart terminal is used to collect the positioning information to determine whether the distance between the smart terminal and the clothing treatment apparatus is within the set range, so

that the current working mode of the clothing treatment apparatus can be detected. According to the above detection result, the clothing treatment apparatus is controlled to enter the corresponding working mode and execute the treatment operation after completion of running the current washing program.

**[0064]** It should be pointed out that although the various steps are described in a specific order in the above embodiments, it should be understood by those skilled in the art that in order to achieve the effects of the present disclosure, different steps are not necessarily executed in this order; instead, they can be executed simultaneously (in parallel) or in other orders, and these changes are within the scope of protection of the present disclosure.

**[0065]** Reference is made to FIG. 2, which is a structural block diagram of an embodiment of a system for controlling a clothing treatment apparatus according to the present disclosure. The system at least includes:

a detection module 210 which is configured for, after completion of washing, detecting whether the clothing treatment apparatus has preset subsequent operations after completion (such as shaking and/or drying operation items) when setting the current washing program, and detecting the current working mode of the clothing treatment apparatus.

**[0066]** The clothing treatment apparatus includes a washing machine and the like. The user can set in advance when starting washing. For example, when the washing program is completed, the clothing treatment apparatus prompts the user whether to set execution of the shaking and/or drying operations after completion of washing.

**[0067]** Specifically, the user can set in advance through the control panel or operation panel of the clothing treatment apparatus or the smart terminal associated with the apparatus (such as the mobile phone, tablet Pad and the like, on which an apparatus control program/APP/applet and the like are installed), so as to set whether the clothing treatment apparatus executes the shaking and/or drying operations after completion of washing. The control programs on these panels or smart terminals include, but are not limited to, program interfaces with prompts or guidance information that can realize human-computer interaction, or menus (such as virtual menus or hardware menus, etc.) or various function keys (such as virtual keys similar to soft keyboards, or real physical keys, etc.).

**[0068]** Further, the washing programs that users can select also include daily washing, wool washing, cotton and linen washing, soft washing or user-defined washing process, rinsing process, spinning process, etc.

**[0069]** In an embodiment, by taking the washing machine and presetting on the control panel of the washing machine as an example: a "subsequent operations after completion" function is added on the interface or key or menu of the control panel of the washing machine; for example, this function can be a function option that can

realize human-computer interaction by key, menu or interactive interface, etc. In an example, this function can include specific operation items such as "none/drying/shaking/drying + shaking" for users to select; the factory setting of the apparatus (such as the washing machine) can be "none" by default; further, the user can interact with the apparatus before starting the washing program, so as to select the specific control treatment in this function, such as one of the above operation items "drying", "shaking" or "drying + shaking". In this way, when execution of the washing program is completed, the "subsequent operations after completion" function will be entered, and the washing machine will continue to perform the control treatment of the clothing according to the corresponding operation items selected when pre-setting.

**[0070]** Similarly, this function can also be added on the control program/APP of the smart terminal, just like pre-setting it on the control panel of the above apparatus such as the washing machine; for example, this function is added in parameter adjustment items, a certain one of the "none/drying/shaking/drying + shaking" operation items is selected, and execution of control treatment continues according to the operation item after completion of washing. Similarly, the default option may be "none". The user controls the washing machine through the smart terminal. Before starting the washing program, the smart terminal can set the subsequent operation content after completion of washing and issues instructions to the washing machine. That is, the smart terminal realizes remote setting and control, which are executed after completion of the washing program. The smart terminals include the mobile terminals of users such as smart phones and smart Pads. Herein, the specific setting selection, washing program selection, and the examples executed after completion of the washing program can be similar to the setting and selection of the control panel. Further, when the apparatus such as the washing machine itself is limited by the structure or the control panel, this function can be added through the control program/APP on the smart terminal to provide users with the option of pre-setting, which is flexible, simple and convenient. This mode is single-program setting/provision. Before the user starts the washing program, the subsequent operation items after completion of running the washing program are set, instructions are issued to the apparatus, and the apparatus is controlled to execute and process these operation items after completion of the program. Further, in addition to the above single-program setting mode (i.e., this function is selected and added for setting after a washing program is set), the smart terminal can also provide a unified setting/provision entry. When a unified setting switch of this function is turned on, all the washing programs that meet the conditions will automatically execute the subsequent operations after completion of washing. The setting switch can be a virtual key, a menu or another interactive interface/window, etc. The unified setting can avoid setting every time the program is start-

ed, and all the programs are universal after one time of setting, which is simple and convenient. This priority is lower than the single-program setting.

**[0071]** By meeting the conditions, it means conditions that can support the operation items of the single-program setting. Specifically, for example, the subsequent operation items such as drying and/or shaking can be set for both heavy clothing washing program and cotton clothing washing program. Then, after the single-program setting is completed, confirmation can be made or abandoned on whether to select the unified setting, so that the corresponding subsequent treatment operation items are directly set after the above two types of washing programs are selected. The unified setting can be selected through, for example, switch key, menu, interactive interface/window/dialog box, etc.

**[0072]** Further, the items of some washing programs do not support the drying or shaking operation after completion of washing; for example, after washing of the wool clothing, it cannot be dried; that is, the drying operation item is not supported for the wool clothing; for another example, the washing mode of spin-only does not support the shaking operation item after completion of washing, etc. Therefore, after the corresponding washing program is selected, this added function will set the non-matching operation items as in a non-selectable status, such as a status in which the items are gray and cannot be clicked or a status of no such option. Therefore, it is not necessary to preset the non-matching operation items. That is, different washing programs match the operation items of different subsequent operations after completion.

**[0073]** In the following, the execution process of a preset scene will be described preferably by using an example in which the user presets this function by means of remote control through the smart terminal.

**[0074]** S 1: entering a setting interface of the control program/APP of the smart terminal so that the user selects the washing program.

**[0075]** S2: the clothing treatment apparatus/smart terminal party judging whether the selected washing program supports the subsequent operations after completion of clothing washing; if yes, then proceeding to step S3 to perform the single-program setting and judging; otherwise, proceeding to step S5 to end the setting process of subsequent operations.

**[0076]** S3: executing the single-program setting stage of the subsequent operations, and judging whether the single-program setting for the subsequent operations has been performed. In the specific single-program setting process, such as referring to the description of the "subsequent operations after completion" function on the control panel or smart terminal mentioned above, the operation items after completion of washing are preset; further, in the single-program setting herein, the specific operation items that are not supported by the washing program are in the non-selectable status. If the single-program setting has been performed, then the process

proceeds to step S4 to perform the unified setting and judging; otherwise, the process proceeds to step S5 to end the setting process of subsequent operations.

**[0077]** S4: executing the unified setting stage of the subsequent operations for the current washing program selected by the user, and judging whether the unified setting of the subsequent operations corresponding to the washing program has been performed. That is, the subsequent operations will be performed as long as this washing program is selected later. If the unified setting has been performed, for example, if the key or pop-up dialog box of the corresponding subsequent operation item "drying + shaking" of the heavy clothing strong washing program is pressed, the manual setting operation will be ended, and if the washing program is selected later again, the corresponding subsequent operation will be performed directly without presetting again. If the unified setting switch is not turned on, the process proceeds to step S5 to end.

**[0078]** The "subsequent operations after completion" function can be designed as an interaction function with other similar washing/cleaning control options according to the actual structure, need, environment and the like of the interaction object (the apparatus or the smart terminal), or can be designed independently, such as separately listing a key, menu, pop-up interface/dialog box/selection box/window and the like in the form of software and hardware, which is not limited by the way described above in the present disclosure.

**[0079]** Records and/or statuses of the operation items of the subsequent operations after completion when setting the current washing program are detected, e.g., the selected statuses of the operation items of this function, the records stored after setting, etc.

**[0080]** The working mode of the clothing treatment apparatus includes, for example, an at-home working mode and an out-of-home working mode. Further, the clothing treatment apparatus is communicatively connected with the smart terminal, and can also be remotely controlled through the smart terminal. In an example, the clothing treatment apparatus can set (manually set) the working mode thereof in advance through the control panel or the associated smart terminal.

**[0081]** Further, in an example, it is also possible that the clothing treatment apparatus is not preset; instead, the working mode of the clothing treatment apparatus is dynamically set/automatically set or switched according to a distance between the clothing treatment apparatus and the smart terminal or a communication connection mode between them. Specifically, for example, when it is detected by the smart terminal that the distance between the smart terminal and the clothing treatment apparatus is within a set range, the clothing treatment apparatus is in the at-home working mode; and when it is detected by the smart terminal that the distance between the smart terminal and the clothing treatment apparatus exceeds the set range, the clothing treatment apparatus is in the out-of-home working mode. Preferably, a posi-

tioning module of the smart terminal collects positioning information, determines the distance between the smart terminal and the clothing treatment apparatus, determines the working mode of the clothing treatment apparatus according to whether the determined distance is within the set range (for example, if it is within the range, it means that the clothing treatment apparatus is in the at-home working mode; otherwise, it means that the clothing treatment apparatus is in the out-of-home working mode, etc.), and sends information to the clothing treatment apparatus. After receiving the information, the clothing treatment apparatus is controlled to enter the corresponding working mode. For example, if the distance between the clothing treatment apparatus and the smart terminal is within the set range of five meters (for example, three meters, five meters, etc.), or if the clothing treatment apparatus and the smart terminal are within the same LAN or home Internet of Things, etc. (for example, when the clothing treatment apparatus and the smart terminal are connected to the same LAN), then the clothing treatment apparatus can enter the at-home working mode; otherwise, the clothing treatment apparatus can enter the out-of-home working mode.

**[0082]** Preferably, positioning devices and network communication devices can also be provided in the clothing treatment apparatus and the smart terminal. A first GPS or BeiDou positioning device can be provided in the smart terminal, a second GPS or BeiDou positioning device can be provided in the clothing treatment apparatus, and the network communication devices can be WiFi, 2G/3G/4G/5G or other network communication devices. When calculating the distance between the clothing treatment apparatus and the smart terminal, the clothing treatment apparatus sends the user's position status request to the smart terminal through the network communication device, and the smart terminal collects the positioning information thereof and sends it to the clothing treatment apparatus. The clothing treatment apparatus calculates the distance difference based on the positioning information of the two. Alternatively, the clothing treatment apparatus is not provided with GPS or BeiDou positioning device; the smart terminal collects the positioning information of the clothing treatment apparatus in advance, calculates the distance difference based on the positioning information of the two, and sends the distance difference to the clothing treatment apparatus. The set range value is 30 meters. When the distance difference between the two is smaller than or equal to 30 meters, or if the clothing treatment apparatus judges that it is within the same LAN as the smart terminal, then the clothing treatment apparatus will enter the at-home working mode; and when the distance difference between the two is larger than 30 meters, the clothing treatment apparatus will enter the out-of-home working mode.

**[0083]** The above preferred example is not used as a limitation to determining which working mode should be dynamically entered according to the positioning and distance judgment of the present disclosure.

**[0084]** A control module 220, which is configured for controlling treatment operations of the clothing treatment apparatus after completion of running the current washing program according to the detection result.

**[0085]** Specifically, the detection result includes at least one of the following cases of result, such as:

a first case, in which the subsequent operations after completion (such as shaking and/or drying operation items) corresponding to completion of the current washing program have been set in advance when setting the current washing program, and the clothing treatment apparatus is currently in the at-home working mode; a second case, in which the subsequent operations after completion (such as shaking and/or drying operation items) corresponding to completion of the current washing program have been set in advance when setting the current washing program, and the clothing treatment apparatus is currently in the out-of-home working mode; a third case, in which the subsequent operations after completion (such as shaking and/or drying operation items) corresponding to completion of the current washing program have not been set in advance when setting the current washing program, and the clothing treatment apparatus is currently in the at-home working mode; and a fourth case, in which the subsequent operations after completion (such as shaking and/or drying operation items) corresponding to completion of the current washing program have not been set in advance when setting the current washing program, and the clothing treatment apparatus is currently in the out-of-home working mode.

**[0086]** In an embodiment, if the detection result is the first case after completion of running the washing program, the treatment operations of the apparatus after completion of running the washing program will be controlled. For example, the apparatus prompts the user that the washing program has been completed and it is judged that it is currently in the at-home working mode, and the apparatus prompts whether to cancel the subsequent operations after completion which have been set originally, such as performing the shaking and/or drying operation items; if the user gives feedback to the prompt within a preset time, such as giving a feedback message to confirm the cancellation, then the treatment of the operation items selected in the previously preset "subsequent operations after completion" function corresponding to the currently completed washing program can be cancelled, and then the apparatus such as the washing machine door can be unlocked to wait for the user to hang the clothing for drying later; and if the user does not give feedback to the prompt within the preset time, for example, when no feedback information is obtained after time-out or the user's feedback information is not cancelling, then the treatment of the operation items selected in the previously preset "subsequent operations after completion" function corresponding to the currently completed washing program will not be cancelled, and the set operation items such as drying and/or shaking will be executed.

**[0087]** The prompt can take various forms, including visual, tactile, or sound effect forms, such as text messages, pop-up dialog boxes to smart terminals, vibration, buzzing, dynamic display of graphic images, various voices and prompt tones (such as smart voice broadcasting, etc.), light effects (such as flashing indicators), and one or more combinations of these forms. The user's feedback can include various interactive operations on these prompts, such as operations on the dialog box on the smart terminal or key selection, menu operation, interactive interface/window on the control panel of the apparatus, etc. Such feedback information will trigger the execution of the next treatment after being obtained/confirmed by the apparatus.

**[0088]** Further, in an embodiment, a short time duration or period can also be set before the time preset to obtain the user's feedback message provided for the prompt expires, so as to re-detect the current working mode of the apparatus. The detection can still be performed by means of the distance or communication mode between the apparatus and the associated smart terminal as described above for detection and judgement, so that this mode is entered. If the re-detected working mode is different from the previous mode, for example, if the re-detected working mode is the out-of-home working mode, then the mode will be switched to the out-of-home working mode (i.e., the second case), and the user will be prompted again after how long (which is set as required) will the apparatus be directly controlled to execute the treatment of the previously set subsequent operations after completion corresponding to the currently completed washing program; and if there is no feedback information after the time length for re-prompt expires or the feedback information of not cancelling is obtained, the treatment of the subsequent operations after completion will be executed; otherwise, the corresponding treatment will be executed according to the user's feedback information, such as cancelling the subsequent operations after completion.

**[0089]** In an embodiment, after completion of running the washing program, if the detection result is the second case, then the treatment operation of the apparatus after completion of running the washing program will be controlled. An example is to enter the out-of-home working mode, and directly execute the operation items selected in the preset "subsequent operations after completion" function after completion of washing corresponding to the currently completed washing program, such as shaking and/or drying.

**[0090]** In an embodiment, after completion of running the washing program, if the detection result is the third case, then the treatment operation of the apparatus after completion of running the washing program will be controlled. An example is to enter the at-home working mode, and unlock the apparatus directly after completion of washing, for example, unlocking the locked state of the washing machine door and waiting for the user to process and use, e.g., taking out the clothing for drying, etc.

**[0091]** In an embodiment, after completion of running the washing program, if the detection result is the fourth case, then the treatment operation of the apparatus after completion of running the washing program will be controlled. An example is to enter the out-of-home working mode, while the clothing treatment apparatus remains in a temporarily locked state, for example, the washing machine door is still temporarily locked, so as to wait for the smart terminal to issue a control instruction within a pre-set time, such as whether to execute subsequent operations after completion corresponding to the currently completed washing program (such as executing the newly selected or newly set shaking and/or drying operation items).

**[0092]** Further, in the temporarily locked state after completion of the washing program, the apparatus end can first send a prompt to the user to prompt the completion of the washing program. The prompt includes the situation described in the first case above. Preferably, the prompt is provided to the smart terminal associated with the apparatus for remote control. The user gives feedback according to the prompt, such as providing feedback information, so as to confirm whether it is necessary to set the "subsequent operations after completion" function, specifically such as whether to select the drying and/or shaking operation items in this function, and then issue/send a control instruction corresponding to the setting of this function to the apparatus. For the feedback method and feedback information, reference may be made to the situation described in the first case above.

**[0093]** Specifically, for example, if the user confirms the setting of the "subsequent operations after completion" function and then selects and sets the operation items, and the smart terminal feeds back information within a preset time after obtaining the prompt, such as determining to execute the subsequent operations after completion, and issues a control instruction relevant to the setting of the "subsequent operations after completion" function (such as drying and/or shaking operation items) corresponding to the currently completed washing program to the apparatus, then the apparatus will execute the subsequent operations (drying and/or shaking, etc.) which correspond to the currently completed washing program and the setting of which has just been completed; alternatively, if the user confirms the setting of the "subsequent operations after completion" function and the smart terminal feeds back information within a preset time after obtaining the prompt, such as determining the control instruction to be set, then it will wait for the smart terminal to enter the setting and selection of the operation items of the subsequent operations after completion corresponding to the washing program within another preset time (such as entering the setting interface/window/control program selection key menu and the like to complete setting), so that after the setting is completed, the smart terminal issues a control instruction of the subsequent operations whose setting has just been

completed to the apparatus, and the apparatus executes the corresponding subsequent operations whose setting has just been completed (drying and/or shaking, etc.).

**[0094]** Further, in an embodiment, a short time duration or period can also be set before the time preset to obtain the user's feedback message provided for the prompt expires, so as to re-detect the current working mode of the apparatus. The detection can still be performed by means of the distance or communication mode between the apparatus and the associated smart terminal as described above for detection and judgement, so that this mode is entered. If the re-detected working mode is different from the previous mode, for example, if the re-detected working mode is the at-home working mode, then the mode will be switched to the at-home working mode (i.e., the third case), and the user will be prompted again after how long (which is set as required) will the apparatus be directly controlled to be unlocked, for example, releasing the locked state of the washing machine door and waiting for the user to process and use; and if there is no feedback information after the time length specified for re-prompt expires or the information of determining not to set the subsequent operations after completion is received, the apparatus will be unlocked; otherwise, the corresponding treatment will be executed according to the user's feedback information, such as clearly determining to set, executing the setting, and executing the newly set operation items of the "subsequent operations after completion" function corresponding to the currently completed washing program.

**[0095]** Specifically, for example, if the user confirms that it is not necessary to set the "subsequent operations after completion" function, and feeds back to the apparatus end, that is, if it is clearly determined that the subsequent operations are not required, or no feedback is obtained after waiting for the predetermined time length after the prompt is sent, then the apparatus can be unlocked, such as unlocking the washing machine door, the operating of the washing machine can be ended, and the corresponding subsequent operation items will not be executed.

**[0096]** Reference is made to FIG. 3 below, which is a schematic diagram showing a control logic execution process of the method for controlling a clothing treatment apparatus in an embodiment of the technical solution of the present disclosure. According to this example, a further description will be given as to a process of controlling a working state of the clothing treatment apparatus after completion of washing in the present disclosure by combining whether the clothing treatment apparatus has set the subsequent shaking and/or drying operations with the working mode.

**[0097]** Taking the washing machine as an example, after the washing machine is started:

in step S310, the user prepares to perform the clothing washing operation, and needs to select the corresponding washing program; for example, when selecting the washing program, the user is prompted whether to set

the subsequent operations after completion of washing. Preferably, if the user chooses to set the "subsequent operations after completion" function, the smart terminal can select the washing program and set the subsequent operations according to the settings in steps S1 to S5. Whether the setting is completed or not, the washing program is selected to start the washing process and wash the clothing.

**[0098]** In step S320, when the current washing program is completed, it is judged through detection whether the corresponding subsequent operation items after completion of the current washing program have been set. If "yes", the process proceeds to step S330; and if "not", the process proceeds to step S340.

**[0099]** In step S330, the current working mode is detected. If it is the at-home working mode, the process proceeds to step S3301; otherwise, if it is the out-of-home working mode, the process proceeds to step S3302.

**[0100]** In step S3301, the treatment of the at-home working mode is entered, and the user is prompted whether to cancel the treatment of the subsequent operations set previously. The prompt can be sending information to the smart terminal of the user, or sending a short message to the mobile communication device of the user, or various voice signals, or graphics/images/optical signals (flashing indicators) and other ways that the user can notice and see. When the user who receives the prompt feeds back confirmation information of cancelling, for example, if a dialog box is sent to the user's smart terminal to prompt the user and the user clicks the key of confirming the cancellation, etc., then the process proceeds to step S350 to unlock the apparatus such as the washing machine door and end the operating of the washing machine, and the corresponding subsequent operation items will not be executed; otherwise, if no feedback information is received, for example, if no feedback is obtained after waiting for a predetermined time length or the user feeds back the confirmation information of not cancelling (such as clicking the key of not cancelling), then the process proceeds to step S360 to execute the preset subsequent operation items after completion of washing corresponding to the currently completed washing program, such as shaking and/or drying.

**[0101]** In step S3302, the treatment of the out-of-home working mode is entered to directly execute the preset subsequent operation items after completion of washing corresponding to the currently completed washing program, such as shaking and/or drying.

**[0102]** In step S340, the current working mode is detected. If it is the at-home working mode, then the process proceeds to step S3401 to end washing directly, then unlock the apparatus such as the washing machine door and wait for the user to use; otherwise, if it is the out-of-home working mode, then the process proceeds to step S3402 to temporarily keep the locked state of the apparatus such as the washing machine door, and prompt the remote smart terminal of the user that the washing is completed, wait for the user to remotely issue a control

instruction/control signal through the smart terminal, and determine whether to set the subsequent operation items after completion of washing so as to further control the treatment of the clothing (such as shaking and/or drying).

5 For example, a dialog box is sent to the user's smart terminal to prompt whether to set or not; if no feedback information is received, for example, if the user's feedback information is determining not to set the subsequent operations (such as clicking the key of not setting in the dialog box, etc.) or no feedback is obtained after waiting for a predetermined time length, then the process proceeds to step S370 to unlock the apparatus such as the washing machine door and end the operating of the washing machine, and the corresponding subsequent operation items will not be executed; otherwise, if the user feeds back information (such as clicking the option key of setting the subsequent operations in the dialog box, etc.), then the process proceeds to step S380 to enter the setting and selection of the operation items of the subsequent operations after completion corresponding to the washing program (such as entering the setting interface/window/control program selection key menu and the like to complete setting), and then wait until the setting is completed so as to execute the subsequent operations which correspond to the currently completed washing program and the setting of which has just been completed.

**[0103]** The working mode detection of the washing machine is determined according to the distance judgment, communication connection and the like between the washing machine and the associated smart terminal, so as to detect the actual working mode after completion of the current washing program and dynamically switch to this mode. Preferably, it is also possible to perform one time of detection after completion of washing, and later perform one time of judgment after a short time duration/period so that the current working mode more can be detected more flexibly.

**[0104]** Further, in an embodiment of a computer storage device of the present disclosure, the computer storage device has a plurality of program codes stored thereon, and the program codes are adapted to be loaded and run by a processor to perform the method for controlling a clothing treatment apparatus as described above.

**[0105]** Further, in an embodiment of a control device of the present disclosure, the control device includes a processor and a memory, the memory being adapted to store a plurality of program codes, and the program codes being adapted to be loaded and run by the processor to perform the method for controlling a clothing treatment apparatus as described above.

**[0106]** Further, in an embodiment of a clothing treatment apparatus of the present disclosure, the clothing treatment apparatus includes the system for controlling a clothing treatment apparatus as described above; or the control device as described above, which is located on the control panel and communicates with the control



panel or a communication unit of the clothing treatment apparatus, the communication unit communicating with a smart terminal associated with the clothing treatment apparatus and transmitting control instructions.

**[0107]** It can be understood by those skilled in the art that the present disclosure realizes all or part of the procedures in the method of the above embodiment, which can also be completed by instructing the relevant hardware through a computer program. The computer program can be stored in a computer-readable storage medium. When the computer program is executed by a processor, it can realize the steps of the above method embodiments. The computer program includes computer program codes, which can be in the form of source code, object code, executable file or some intermediate forms. The computer-readable medium can include any entity or device, medium, USB flash disk, mobile hard disk, magnetic disk, optical disk, computer memory, read-only memory, random access memory, electric carrier signal, telecommunication signal, software distribution medium, etc., which are capable of carrying the computer program codes. It should be noted that the contents included in the computer-readable medium can be appropriately increased or decreased according to the requirements of the legislation and patent practice in the jurisdiction. For example, in some jurisdictions, according to the legislation and patent practice, the computer-readable medium does not include electric carrier signal and telecommunication signal.

**[0108]** Further, it should be understood that since the settings of various modules are only used to describe functional units of the system of the present disclosure, physical devices corresponding to these modules can be the processor itself, or a part of the software in the processor, a part of the hardware, or a part of the combination of software and hardware. Therefore, the number of the modules in the drawings is only schematic.

**[0109]** It can be understood by those skilled in the art that each module in the system can be split or combined adaptively. Such splitting or combining of specific modules will not cause the technical solution to deviate from the principle of the present disclosure. Therefore, the technical solution after splitting or combining will fall within the scope of protection of the present disclosure.

**[0110]** Hitherto, the technical solutions of the present disclosure have been described in connection with an embodiment shown in the accompanying drawings, but it is easily understood by those skilled in the art that the scope of protection of the present disclosure is obviously not limited to these specific embodiments. Without departing from the principles of the present disclosure, those skilled in the art can make equivalent changes or replacements to relevant technical features, and all the technical solutions after these changes or replacements will fall within the scope of protection of the present disclosure.

## Claims

1. A method for controlling a clothing treatment apparatus, comprising:

after completion of running a washing program, detecting whether the clothing treatment apparatus has set operation items of subsequent operations after completion corresponding to the current washing program when setting the current washing program, and detecting the current working mode of the clothing treatment apparatus; and  
controlling treatment operations of the clothing treatment apparatus after completion of running the current washing program according to a detection result of the detection.

2. The method according to claim 1, wherein the "detecting whether the clothing treatment apparatus has set operation items of subsequent operations after completion corresponding to the current washing program when setting the current washing program" specifically comprises:

adding a "subsequent operations after completion" function after completion of running the washing program on a control panel of the clothing treatment apparatus, and/or adding a "subsequent operations after completion" item after completion of running the washing program in parameter adjustment items of a control program of a smart terminal associated with the clothing treatment apparatus;  
wherein the "subsequent operations after completion" at least comprise one or more of the following operation items: 'none', 'drying', 'shaking', and 'drying + shaking', as treatment operation items to be executed after completion of running the washing program of the clothing treatment apparatus; and  
detecting records and/or statuses of the operation items of subsequent operations after completion recorded when setting the current washing program.

3. The method according to claim 2, wherein the "having set operation items of subsequent operations after completion corresponding to the current washing program" specifically comprises:

initially, making the operation items of the "subsequent operations after completion" be 'none' by default;  
selecting the required washing program when the clothing treatment apparatus is required for washing; and  
according to the selected current washing pro-

gram, setting the corresponding operation items of the "subsequent operations after completion" after completion of running the washing program through the "subsequent operations after completion" function on the control panel or the "subsequent operations after completion" item of the control program of the smart terminal; wherein when setting the operation items through the control program of the smart terminal, the method further comprises:

judging whether the washing program supports execution of the operation items of the "subsequent operations after completion" according to the selected current washing program; if the judgment is yes, then entering a single-program setting to determine whether to select the operation items matching the washing program; and if it is judged that the single-program setting has completed the selection, then entering unified setting processing to determine whether to select activation of unified setting; wherein if the activation of unified setting is selected, then once all the washing programs that support the operation items selected by the single-program setting are selected by the user, it means that the corresponding operation items after completion of running the washing programs have been set.

4. The method according to claim 1, wherein the "detecting the current working mode of the clothing treatment apparatus" specifically comprises:

an at-home working mode and an out-of-home working mode; and determining the working mode of the clothing treatment apparatus by judging a distance between the clothing treatment apparatus and a smart terminal associated with the clothing treatment apparatus or a communication connection mode between them.

5. The method according to claim 3, wherein the "determining the working mode of the clothing treatment apparatus by judging a distance between the clothing treatment apparatus and a smart terminal associated with the clothing treatment apparatus or a communication connection mode between them" specifically comprises:

collecting positioning information through a positioning module of the smart terminal, determining the distance between the smart terminal and the clothing treatment apparatus, and judging whether the distance is within a set range; if the distance is within the set range, then determining that the clothing treatment apparatus is in the at-home working mode; otherwise, deter-

mining that the clothing treatment apparatus is in the out-of-home working mode; or judging whether the clothing treatment apparatus and the smart terminal are currently connected to the same LAN; if yes, then determining that the clothing treatment apparatus is in the at-home working mode; otherwise, determining that the clothing treatment apparatus is in the out-of-home working mode.

6. The method according to claim 1, wherein the "detection result" specifically comprises:

a first case, in which the subsequent operations after completion corresponding to completion of the current washing program have been set in advance when setting the current washing program, and the clothing treatment apparatus is currently in the at-home working mode; a second case, in which the subsequent operations after completion corresponding to completion of the current washing program have been set in advance when setting the current washing program, and the clothing treatment apparatus is currently in the out-of-home working mode; a third case, in which the subsequent operations after completion corresponding to completion of the current washing program have not been set in advance when setting the current washing program, and the clothing treatment apparatus is currently in the at-home working mode; and a fourth case, in which the subsequent operations after completion corresponding to completion of the current washing program have not been set in advance when setting the current washing program, and the clothing treatment apparatus is currently in the out-of-home working mode.

7. The method according to claim 6, wherein the "controlling treatment operations of the clothing treatment apparatus after completion of running the current washing program according to a detection result of the detection" specifically comprises:

if the detection result is the first case, in which the clothing treatment apparatus is currently in the at-home working mode, then prompting the user that the washing program is completed and prompting whether to cancel the execution of the operation items of the subsequent operations after completion that have been preset previously; if the user's feedback is confirming cancellation within a preset time, then controlling the clothing treatment apparatus not to execute the operation items of the subsequent operations after completion that have been preset previously and correspond to the currently complet-

ed washing program after completion of running the current washing program, and unlocking the clothing treatment apparatus; and if the user does not feedback or the user's feedback is not cancelling within the preset time, then controlling the clothing treatment apparatus to execute the operation items of the subsequent operations after completion that have been preset previously and correspond to the currently completed washing program after completion of running the current washing program;

if the detection result is the second case, in which the clothing treatment apparatus is currently in the out-of-home working mode, then controlling the clothing treatment apparatus to directly execute the operation items of the subsequent operations after completion that have been preset previously and correspond to the currently completed washing program after completion of running the current washing program;

if the detection result is the third case, in which the clothing treatment apparatus is currently in the at-home working mode, then controlling the clothing treatment apparatus to be directly unlocked after completion of running the current washing program; and

if the detection result is the fourth case, in which the clothing treatment apparatus is currently in the out-of-home working mode, then controlling the clothing treatment apparatus to remain locked and prompting the user that the washing program is completed and prompting whether to set and execute the operation items of the corresponding subsequent operations after completion for the currently completed washing program; if the user's feedback is setting and executing within a preset time, then setting the operation items of the corresponding subsequent operations after completion according to the currently completed washing program, and controlling the clothing treatment apparatus to execute the newly set operation items; and if the user does not feedback or the user's feedback is not setting within the preset time, then controlling the clothing treatment apparatus to be unlocked; and

wherein the prompt is provided to a smart terminal associated with the clothing treatment apparatus for remote control.

8. The method according to claim 7, further comprising:

within the preset time, setting a short time duration or period before the user's feedback, so as to re-detect the current working mode of the clothing treatment apparatus; and

if the re-detected working mode is different from

the previous working mode, then switching to the current re-detected working mode before re-prompting the user; and controlling the clothing treatment apparatus to execute the corresponding treatment operations according to the user's feedback to the re-prompt within a preset time.

9. A system for controlling a clothing treatment apparatus, comprising:

a detection module which is configured for, after completion of running a washing program, detecting whether the clothing treatment apparatus has set operation items of subsequent operations after completion corresponding to the current washing program when setting the current washing program, and detecting the current working mode of the clothing treatment apparatus; and

a control module which is configured for controlling treatment operations of the clothing treatment apparatus after completion of running the current washing program according to a detection result of the detection.

10. The system according to claim 9, wherein the "detecting whether the clothing treatment apparatus has set operation items of subsequent operations after completion corresponding to the current washing program when setting the current washing program" specifically comprises:

adding a "subsequent operations after completion" function after completion of running the washing program on a control panel of the clothing treatment apparatus, and/or adding a "subsequent operations after completion" item after completion of running the washing program in parameter adjustment items of a control program of a smart terminal associated with the clothing treatment apparatus;

wherein the "subsequent operations after completion" at least comprise one or more of the following operation items: 'none', 'drying', 'shaking', and 'drying + shaking', as treatment operation items to be executed after completion of running the washing program of the clothing treatment apparatus; and

detecting records and/or statuses of the operation items of subsequent operations after completion recorded when setting the current washing program.

11. The system according to claim 10, wherein the "having set operation items of subsequent operations after completion corresponding to the current washing program" specifically comprises:

initially, making the operation items of the "subsequent operations after completion" be 'none' by default;

selecting the required washing program when the clothing treatment apparatus is required for washing; and

according to the selected current washing program, setting the corresponding operation items of the "subsequent operations after completion" after completion of running the washing program through the "subsequent operations after completion" function on the control panel or the "subsequent operations after completion" item of the control program of the smart terminal;

wherein when setting the operation items through the control program of the smart terminal, it further comprises:

judging whether the washing program supports execution of the operation items of the "subsequent operations after completion" according to the selected current washing program; if the judgment is yes, then entering a single-program setting to determine whether to select the operation items matching the washing program; and if it is judged that the single-program setting has completed the selection, then entering unified setting processing to determine whether to select activation of unified setting; wherein if the activation of unified setting is selected, then once all the washing programs that support the operation items selected by the single-program setting are selected by the user, it means that the corresponding operation items after completion of running the washing programs have been set.

12. The system according to claim 9, wherein the "detecting the current working mode of the clothing treatment apparatus" specifically comprises:

an at-home working mode and an out-of-home working mode; and

determining the working mode of the clothing treatment apparatus by judging a distance between the clothing treatment apparatus and a smart terminal associated with the clothing treatment apparatus or a communication connection mode between them.

13. The system according to claim 11, wherein the "determining the working mode of the clothing treatment apparatus by judging a distance between the clothing treatment apparatus and a smart terminal associated with the clothing treatment apparatus or a communication connection mode between them" specifically comprises:

collecting positioning information through a po-

sitioning module of the smart terminal, determining the distance between the smart terminal and the clothing treatment apparatus, and judging whether the distance is within a set range; if the distance is within the set range, then determining that the clothing treatment apparatus is in the at-home working mode; otherwise, determining that the clothing treatment apparatus is in the out-of-home working mode; or judging whether the clothing treatment apparatus and the smart terminal are currently connected to the same LAN; if yes, then determining that the clothing treatment apparatus is in the at-home working mode; otherwise, determining that the clothing treatment apparatus is in the out-of-home working mode.

14. The system according to claim 9, wherein the "detection result" specifically comprises:

a first case, in which the subsequent operations after completion corresponding to completion of the current washing program have been set in advance when setting the current washing program, and the clothing treatment apparatus is currently in the at-home working mode;

a second case, in which the subsequent operations after completion corresponding to completion of the current washing program have been set in advance when setting the current washing program, and the clothing treatment apparatus is currently in the out-of-home working mode;

a third case, in which the subsequent operations after completion corresponding to completion of the current washing program have not been set in advance when setting the current washing program, and the clothing treatment apparatus is currently in the at-home working mode; and

a fourth case, in which the subsequent operations after completion corresponding to completion of the current washing program have not been set in advance when setting the current washing program, and the clothing treatment apparatus is currently in the out-of-home working mode.

15. The system according to claim 14, wherein the "controlling treatment operations of the clothing treatment apparatus after completion of running the current washing program according to a detection result of the detection" specifically comprises:

if the detection result is the first case, in which the clothing treatment apparatus is currently in the at-home working mode, then prompting the user that the washing program is completed and prompting whether to cancel the execution of the operation items of the subsequent opera-

tions after completion that have been preset previously; if the user's feedback is confirming cancellation within a preset time, then controlling the clothing treatment apparatus not to execute the operation items of the subsequent operations after completion that have been preset previously and correspond to the currently completed washing program after completion of running the current washing program, and unlocking the clothing treatment apparatus; and if the user does not feedback or the user's feedback is not cancelling within the preset time, then controlling the clothing treatment apparatus to execute the operation items of the subsequent operations after completion that have been preset previously and correspond to the currently completed washing program after completion of running the current washing program;

if the detection result is the second case, in which the clothing treatment apparatus is currently in the out-of-home working mode, then controlling the clothing treatment apparatus to directly execute the operation items of the subsequent operations after completion that have been preset previously and correspond to the currently completed washing program after completion of running the current washing program;

if the detection result is the third case, in which the clothing treatment apparatus is currently in the at-home working mode, then controlling the clothing treatment apparatus to be directly unlocked after completion of running the current washing program; and

if the detection result is the fourth case, in which the clothing treatment apparatus is currently in the out-of-home working mode, then controlling the clothing treatment apparatus to remain locked and prompting the user that the washing program is completed and prompting whether to set and execute the operation items of the corresponding subsequent operations after completion for the currently completed washing program; if the user's feedback is setting and executing within a preset time, then setting the operation items of the corresponding subsequent operations after completion according to the currently completed washing program, and controlling the clothing treatment apparatus to execute the newly set operation items; and if the user does not feedback or the user's feedback is not setting within the preset time, then controlling the clothing treatment apparatus to be unlocked; and

wherein the prompt is provided to a smart terminal associated with the clothing treatment apparatus for remote control.

16. The system according to claim 15, further comprising:

within the preset time, setting a short time duration or period before the user's feedback, so as to re-detect the current working mode of the clothing treatment apparatus; and

if the re-detected working mode is different from the previous working mode, then switching to the current re-detected working mode before re-prompting the user; and controlling the clothing treatment apparatus to execute the corresponding treatment operations according to the user's feedback to the re-prompt within a preset time.

17. A computer storage device, in which a plurality of program codes are stored, wherein the program codes are adapted to be loaded and run by a processor to perform the method for controlling a clothing treatment apparatus according to any one of claims 1 to 8.

18. A control device, comprising a processor and a memory, wherein the memory is adapted to store a plurality of program codes, and the program codes are adapted to be loaded and run by the processor to perform the method for controlling a clothing treatment apparatus according to any one of claims 1 to 8.

19. A clothing treatment apparatus, comprising:

the system for controlling a clothing treatment apparatus according to any one of claims 9 to 16; or

the control device according to claim 14, wherein the control device is located on the control panel and communicates with the control panel or a communication unit of the clothing treatment apparatus, and the communication unit communicates with a smart terminal associated with the clothing treatment apparatus and transmits control instructions.

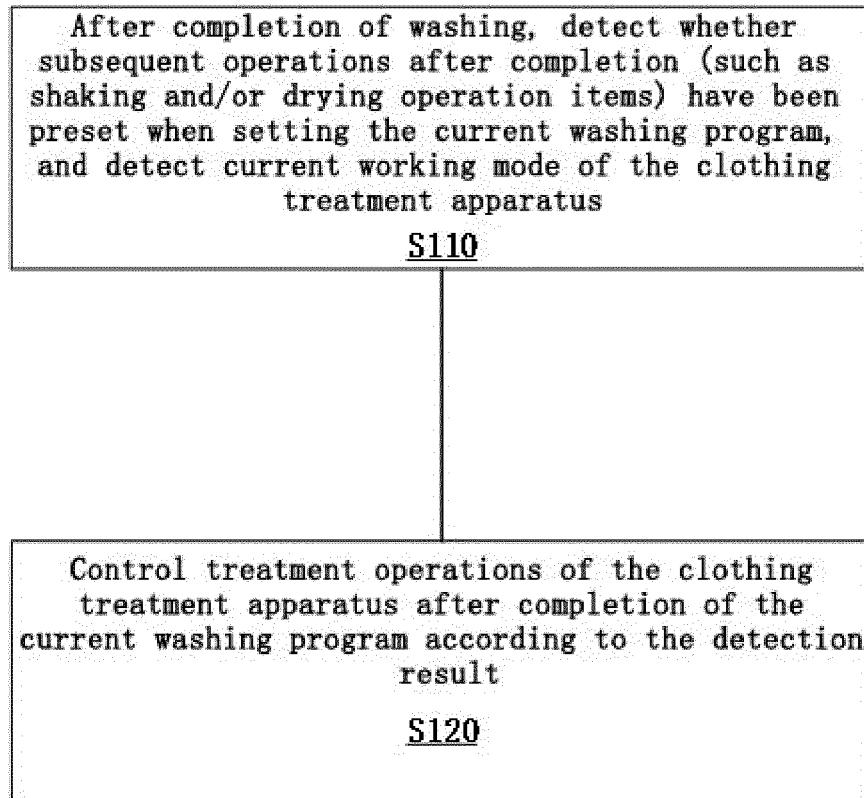


FIG.1

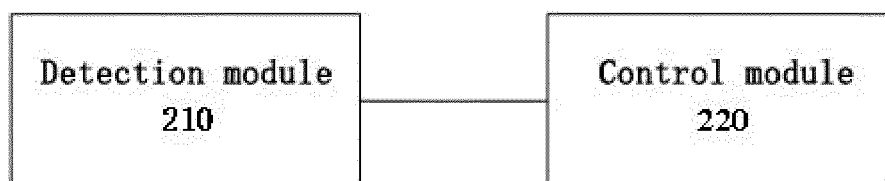


FIG.2

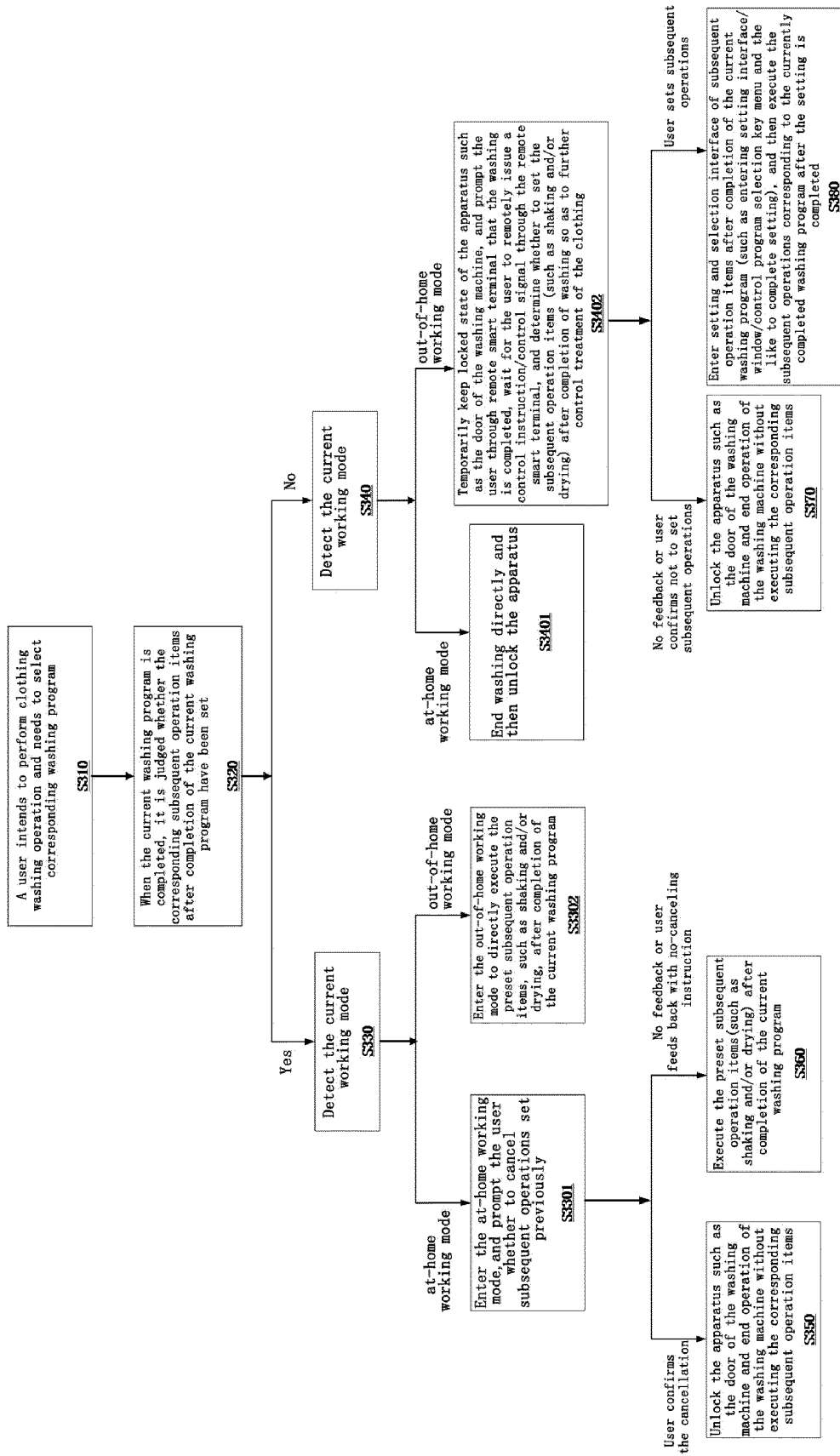


FIG.3

## INTERNATIONAL SEARCH REPORT

International application No.

PCT/CN2021/116374

| <b>A. CLASSIFICATION OF SUBJECT MATTER</b><br>D06F 33/30(2020.01)i<br><br>According to International Patent Classification (IPC) or to both national classification and IPC                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                          |                                                                                    |                       |   |                                                                                                                      |                  |   |                                                                                                                      |              |   |                                                                                                                          |              |   |                                                                                                      |      |   |                                                                                                                |      |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-----------------------|---|----------------------------------------------------------------------------------------------------------------------|------------------|---|----------------------------------------------------------------------------------------------------------------------|--------------|---|--------------------------------------------------------------------------------------------------------------------------|--------------|---|------------------------------------------------------------------------------------------------------|------|---|----------------------------------------------------------------------------------------------------------------|------|
| <b>B. FIELDS SEARCHED</b><br>Minimum documentation searched (classification system followed by classification symbols)<br>D06F<br><br>Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                          |                                                                                    |                       |   |                                                                                                                      |                  |   |                                                                                                                      |              |   |                                                                                                                          |              |   |                                                                                                      |      |   |                                                                                                                |      |
| Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)<br>CNABS, CNTXT, DWPI, SIPOABS, CNKI: 外出, 在外, 不在家, 远程, 洗涤, 洗衣, 完成, 结束, 检测, 操作, 步骤, 程序, 后续, 之后, 随后, 工作, 非工作, 抖散, 打散, 防皱, 防褶皱, 烘干, 干衣, 干燥, 移动终端, 手机, APP, PAD, 距离, 通信, GPS, 北斗, 局域网, 物联网, out+, work+, nonwork+, mode, wash+, finish+, end+, detect+, follow, after, subsequent, later, procedure, routine, step, process, shak+, wrinkle, dry+, dri+, mobile, terminal, phone, distance, communicat+, beidou, LAN, network, web                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                          |                                                                                    |                       |   |                                                                                                                      |                  |   |                                                                                                                      |              |   |                                                                                                                          |              |   |                                                                                                      |      |   |                                                                                                                |      |
| <b>C. DOCUMENTS CONSIDERED TO BE RELEVANT</b> <table border="1"> <thead> <tr> <th>Category*</th> <th>Citation of document, with indication, where appropriate, of the relevant passages</th> <th>Relevant to claim No.</th> </tr> </thead> <tbody> <tr> <td>X</td> <td>CN 105696246 A (WUXI LITTLE SWAN COMPANY LIMITED) 22 June 2016 (2016-06-22)<br/>description, paragraphs [0034]-[0078]</td> <td>1-3, 9-11, 17-19</td> </tr> <tr> <td>Y</td> <td>CN 105696246 A (WUXI LITTLE SWAN COMPANY LIMITED) 22 June 2016 (2016-06-22)<br/>description, paragraphs [0034]-[0078]</td> <td>4, 5, 12, 13</td> </tr> <tr> <td>Y</td> <td>CN 110597073 A (ANHUI FANMI TECHNOLOGY CO., LTD.) 20 December 2019 (2019-12-20)<br/>description, paragraphs [0025]-[0034]</td> <td>4, 5, 12, 13</td> </tr> <tr> <td>A</td> <td>CN 109811505 A (QINGDAO HAIER WASHING MACHINE CO., LTD.) 28 May 2019 (2019-05-28)<br/>entire document</td> <td>1-19</td> </tr> <tr> <td>A</td> <td>CN 111534970 A (QINGDAO HAIER WASHING MACHINE CO., LTD. et al.) 14 August 2020 (2020-08-14)<br/>entire document</td> <td>1-19</td> </tr> </tbody> </table>                                                                                                                                                                                                                                                                                                                                                         | Category*                                                                                                                | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. | X | CN 105696246 A (WUXI LITTLE SWAN COMPANY LIMITED) 22 June 2016 (2016-06-22)<br>description, paragraphs [0034]-[0078] | 1-3, 9-11, 17-19 | Y | CN 105696246 A (WUXI LITTLE SWAN COMPANY LIMITED) 22 June 2016 (2016-06-22)<br>description, paragraphs [0034]-[0078] | 4, 5, 12, 13 | Y | CN 110597073 A (ANHUI FANMI TECHNOLOGY CO., LTD.) 20 December 2019 (2019-12-20)<br>description, paragraphs [0025]-[0034] | 4, 5, 12, 13 | A | CN 109811505 A (QINGDAO HAIER WASHING MACHINE CO., LTD.) 28 May 2019 (2019-05-28)<br>entire document | 1-19 | A | CN 111534970 A (QINGDAO HAIER WASHING MACHINE CO., LTD. et al.) 14 August 2020 (2020-08-14)<br>entire document | 1-19 |
| Category*                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Citation of document, with indication, where appropriate, of the relevant passages                                       | Relevant to claim No.                                                              |                       |   |                                                                                                                      |                  |   |                                                                                                                      |              |   |                                                                                                                          |              |   |                                                                                                      |      |   |                                                                                                                |      |
| X                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | CN 105696246 A (WUXI LITTLE SWAN COMPANY LIMITED) 22 June 2016 (2016-06-22)<br>description, paragraphs [0034]-[0078]     | 1-3, 9-11, 17-19                                                                   |                       |   |                                                                                                                      |                  |   |                                                                                                                      |              |   |                                                                                                                          |              |   |                                                                                                      |      |   |                                                                                                                |      |
| Y                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | CN 105696246 A (WUXI LITTLE SWAN COMPANY LIMITED) 22 June 2016 (2016-06-22)<br>description, paragraphs [0034]-[0078]     | 4, 5, 12, 13                                                                       |                       |   |                                                                                                                      |                  |   |                                                                                                                      |              |   |                                                                                                                          |              |   |                                                                                                      |      |   |                                                                                                                |      |
| Y                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | CN 110597073 A (ANHUI FANMI TECHNOLOGY CO., LTD.) 20 December 2019 (2019-12-20)<br>description, paragraphs [0025]-[0034] | 4, 5, 12, 13                                                                       |                       |   |                                                                                                                      |                  |   |                                                                                                                      |              |   |                                                                                                                          |              |   |                                                                                                      |      |   |                                                                                                                |      |
| A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | CN 109811505 A (QINGDAO HAIER WASHING MACHINE CO., LTD.) 28 May 2019 (2019-05-28)<br>entire document                     | 1-19                                                                               |                       |   |                                                                                                                      |                  |   |                                                                                                                      |              |   |                                                                                                                          |              |   |                                                                                                      |      |   |                                                                                                                |      |
| A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | CN 111534970 A (QINGDAO HAIER WASHING MACHINE CO., LTD. et al.) 14 August 2020 (2020-08-14)<br>entire document           | 1-19                                                                               |                       |   |                                                                                                                      |                  |   |                                                                                                                      |              |   |                                                                                                                          |              |   |                                                                                                      |      |   |                                                                                                                |      |
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| Date of the actual completion of the international search<br><b>20 November 2021</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Date of mailing of the international search report<br><b>08 December 2021</b>                                            |                                                                                    |                       |   |                                                                                                                      |                  |   |                                                                                                                      |              |   |                                                                                                                          |              |   |                                                                                                      |      |   |                                                                                                                |      |
| Name and mailing address of the ISA/CN<br><b>China National Intellectual Property Administration (ISA/CN)<br/> No. 6, Xitucheng Road, Jimenqiao, Haidian District, Beijing 100088, China</b><br>Facsimile No. (86-10)62019451                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Authorized officer<br><br><br>Telephone No.                                                                              |                                                                                    |                       |   |                                                                                                                      |                  |   |                                                                                                                      |              |   |                                                                                                                          |              |   |                                                                                                      |      |   |                                                                                                                |      |

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## INTERNATIONAL SEARCH REPORT

International application No.

PCT/CN2021/116374

### C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category* | Citation of document, with indication, where appropriate, of the relevant passages      | Relevant to claim No. |
|-----------|-----------------------------------------------------------------------------------------|-----------------------|
| A         | JP 2002159784 A (SANYO ELECTRIC CO., LTD.) 04 June 2002 (2002-06-04)<br>entire document | 1-19                  |

**INTERNATIONAL SEARCH REPORT**  
**Information on patent family members**

International application No.

**PCT/CN2021/116374**

| Patent document<br>cited in search report |            |   | Publication date<br>(day/month/year) | Patent family member(s) |            |    | Publication date<br>(day/month/year) |
|-------------------------------------------|------------|---|--------------------------------------|-------------------------|------------|----|--------------------------------------|
| CN                                        | 105696246  | A | 22 June 2016                         | WO                      | 2016082455 | A1 | 02 June 2016                         |
| CN                                        | 110597073  | A | 20 December 2019                     | None                    |            |    |                                      |
| CN                                        | 109811505  | A | 28 May 2019                          | None                    |            |    |                                      |
| CN                                        | 111534970  | A | 14 August 2020                       | None                    |            |    |                                      |
| JP                                        | 2002159784 | A | 04 June 2002                         | None                    |            |    |                                      |

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