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(54) **SCENE POINT-CONTROL APPARATUS AND CONTROL METHOD THEREFOR, AND COMPUTER-READABLE STORAGE MEDIUM**

(57) The present application provides a method for controlling a scene point-control apparatus and a control method thereof, and a computer-readable storage medium. The method includes: receiving a scene mode trigger instruction, and determining an air parameter re-

quired for an operation of a scene mode to be triggered; obtaining the air parameter from other scene point-control apparatuses communicating with the scene point-control apparatus; and controlling an air conditioning equipment to operate according to the air parameter.

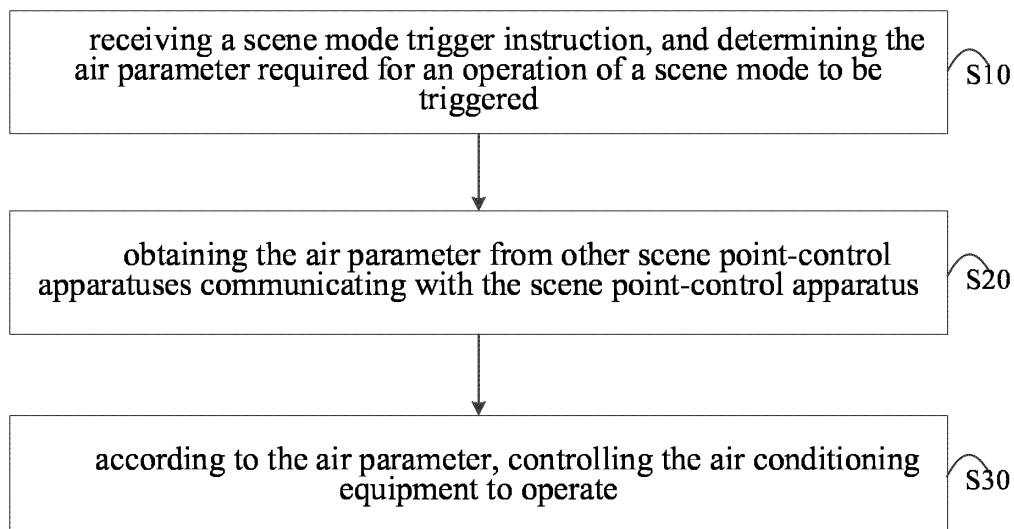


FIG. 2

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Description

[0001] This application claims priority to Chinese Patent Application No. 202210913451.9, filed on July 29, 2022, the entire disclosure of which is incorporated herein by reference.

TECHNICAL FIELD

[0002] The present application relates to the technical field of intelligent control, and in particular to a scene point-control apparatus and a control method thereof, and a computer-readable storage medium.

BACKGROUND

[0003] At present, since different types of scene point-control apparatuses can correspondingly control the air conditioning equipment in different scene modes, different types of scene point-control apparatuses are usually equipped with different types of sensor hardware. For example, a scene point-control apparatus a can control the air conditioning equipment in the scene mode A (such as the energy-saving mode), and the scene point-control apparatus a is equipped with a wind speed sensor and a temperature sensor. A scene point-control apparatus b can control the air conditioning equipment in the scene mode B (such as the comfort mode), and the scene point-control apparatus b is equipped with a temperature sensor and a humidity sensor. A scene point-control apparatus c can control the air conditioning equipment in the scene mode C (such as the clean mode), and the scene point-control apparatus c is equipped with a 2.5-micrometer particulate matter (PM2.5) concentration sensor and a carbon dioxide concentration sensor. However, when the user needs to control the smart air conditioning equipment in the scene mode D (such as the health mode), the smart air conditioning equipment in the scene mode D needs to be equipped with a wind speed sensor, a temperature sensor, a humidity sensor, a PM2.5 concentration sensor and a carbon dioxide concentration sensor, and a scene point-control apparatus d corresponding to the scene mode D needs to be purchased additionally, which greatly increases the hardware implementation cost for the user to control the smart air conditioning equipment to be in the user's personalized scene mode.

[0004] It should be noted that above contents are only used to assist in understanding the technical problems solved by the present application, and do not constitute an admission that the above contents fall within the prior art.

SUMMARY

TECHNICAL PROBLEM

[0005] The main purpose of the present application is

to provide a scene point-control apparatus and a control method thereof, as well as a computer-readable storage medium, aiming to reduce the hardware implementation cost to control the smart air conditioning equipment to be in the personalized scene mode.

TECHNICAL SOLUTION

[0006] To achieve above objects, the present application provides a method for controlling a scene point-control apparatus comprising following steps:

receiving a scene mode trigger instruction, and determining an air parameter required for an operation of a scene mode to be triggered;
obtaining the air parameter from another scene point-control apparatus communicating with the scene point-control apparatus; and
controlling an air conditioning equipment to operate according to the air parameter.

[0007] In an embodiment, the obtaining the air parameter from another scene point-control apparatus communicating with the scene point-control apparatus comprises:

determining a target point-control apparatus from another scene point-control apparatus communicating with the scene point-control apparatus, the target point-control apparatus being the scene point-control apparatus having the air parameter; and
communicating with the target point-control apparatus to obtain the air parameter.

[0008] In an embodiment, the determining the target point-control apparatus comprises:

broadcasting an information sharing request of the air parameter;
receiving an unique identification returned by another scene point-control apparatus communicating with the scene point-control apparatus in response to the information sharing request; and
determining the target point-control apparatus according to the unique identification.

[0009] In an embodiment, the determining the target point-control apparatus comprises:

determining the target point-control apparatus from a stored apparatus data mapping table, the apparatus data mapping table comprising an air parameter capable of being detected by another scene point-control apparatus communicating with the scene point-control apparatus; or
determining the target point-control apparatus from a scene apparatus sharing record, the scene apparatus sharing record comprising an air parameter cap-

able of being shared by another scene point-control apparatus communicating with the scene point-control apparatus.

[0010] In an embodiment, the determining the target point-control apparatus further comprises:

in response to that a plurality of target point-control apparatuses are provided, determining the target point-control apparatus closest to the air conditioning equipment as a final target point-control apparatus; or

determining the target point-control apparatus closest to the scene point-control apparatus as a final target point-control apparatus.

[0011] In an embodiment, the communicating with the target point-control apparatus to obtain the air parameter comprises: performing spatial positioning on the target point-control apparatus to obtain positioning information of the target point-control apparatus, and determining whether the target point-control apparatus is located in a working area corresponding to the air conditioning equipment according to the positioning information; and communicating with the target point-control apparatus in the working area to obtain the air parameter.

[0012] In an embodiment, the controlling the air conditioning equipment to operate according to the air parameter comprises:

determining a target operation parameter required for the operation of the scene mode to be triggered according to the air parameter, and sending a determined target operation parameter to the air conditioning equipment; or

sending a scene mode control instruction to the air conditioning equipment, and sending an obtained air parameter to the air conditioning equipment, to make the air conditioning equipment operate in a scene mode according to the air parameter.

[0013] In an embodiment, the determining the air parameter required for the operation of the scene mode to be triggered comprises:

querying the air parameter mapped in the scene mode to be triggered from a preset scene mode mapping table, and configuring a mapped air parameter as the air parameter required for the operation of the scene mode to be triggered.

[0014] Moreover, to achieve above objects, the present application further provides a scene point-control apparatus comprising a memory, a processor, and a control program of a scene point-control apparatus stored in the memory and executable on the processor. When the control program of the scene point-control apparatus is executed by the processor, steps of the method for controlling the scene point-control apparatus according to any embodiment mentioned above are im-

plemented.

[0015] Moreover, to achieve above objects, the present application further provides a computer-readable storage medium. A control program of a scene point-control apparatus is stored on the computer-readable storage medium, and when the control program of the scene point-control apparatus is executed by a processor, steps of the method for controlling the scene point-control apparatus according to any embodiment mentioned above are implemented.

BENEFICIAL EFFECTS

[0016] For the scene point-control apparatus and a control method thereof, and a computer-readable storage medium, due to limitation of the self-equipped sensor hardware, the scene point-control apparatus usually cannot support more types of scene modes, and the user needs to purchase a high-end version of the scene point-control apparatus with top sensor hardware configuration, which usually increases the user cost and brings poor experience. Therefore, in the present application, the scene mode trigger instruction is received, and the air parameter required for the operation of the scene mode to be triggered will be determined. Then the air parameter is obtained from other scene point-control apparatuses communicating with the scene point-control apparatus, and the air conditioning equipment will be controlled to operate according to the air parameter, so that the air parameter information that can be collected by multiple scene point-control apparatuses in the room can be shared. In this way, the air conditioning equipment in more scene modes can be controlled, and there is no need to purchase a high-end version of the scene point-control apparatus with a top sensor hardware configuration, thereby reducing the hardware implementation cost for the user to control the smart air conditioning equipment to be in the user's personalized scene mode.

BRIEF DESCRIPTION OF THE DRAWINGS

[0017]

FIG. 1 is a schematic diagram of the terminal structure involved in the operation of the method for controlling the scene point-control apparatus in the present application.

FIG. 2 is a flowchart of the method for controlling the scene point-control apparatus according to a first embodiment of the present application.

FIG. 3 is a detailed flowchart of step S20 of the method for controlling the scene point-control apparatus according to a second embodiment of the present application.

FIG. 4 is a scene diagram showing that the scene point-control apparatus controls the air conditioning equipment to operate according to an embodiment of the present application.

FIG. 5 is a scene diagram showing that the scene point-control apparatus shares air parameters with other scene point-control apparatuses according to an embodiment of the present application.

[0018] The realization of the objective, functional characteristics, and advantages of the present application are further described with reference to the accompanying drawings.

DETAILED DESCRIPTION

[0019] It should be understood that the specific embodiments described herein are only used to explain the present application and are not used to limit the present application.

[0020] The main solutions in embodiments of the present application are: receiving a scene mode trigger instruction, and determining an air parameter required for an operation of a scene mode to be triggered; obtaining the air parameter from other scene point-control apparatuses communicating with the scene point-control apparatus; and controlling an air conditioning equipment to operate according to the air parameter.

[0021] In some embodiments, by setting control parameters via an application (APP) on the control terminal or a remote controller, the air conditioning equipment can be controlled, and the control efficiency for the air conditioning equipment is low. In order to improve the control efficiency, a scene point-control apparatus can be provided to perform intelligent control on the air conditioning equipment to customize the scene mode, thereby improving the control efficiency of the air conditioning equipment. However, since different types of scene point-control apparatuses can correspondingly control the air conditioning equipment in different scene modes, different types of scene point-control apparatuses are usually equipped with different types of sensor hardware. However, when users need to control the smart air conditioning equipment in more types of scene modes, they usually need to purchase a scene point-control apparatus equipped with corresponding sensor hardware that supports the operation of the scene mode, which greatly increases the hardware implementation cost for the user to control the smart air conditioning equipment to be in the user's personalized scene mode.

[0022] In view of this, embodiments of the present application propose a method for controlling the scene point-control apparatus and a terminal thereof. The hardware terminal involved in the method for controlling the scene point-control apparatus can be a terminal for controlling the scene point-control apparatus. As shown in FIG. 1, FIG. 1 is a schematic diagram of the hardware structure involved in the operation according to an embodiment of the present application.

[0023] As shown in FIG. 1, the hardware can be the scene point-control apparatus described in the above embodiment. The hardware comprises: a processor

1001, such as a central processing unit (CPU), a communication bus 1002, a user interface 1003, a network interface 1004, and a memory 1005. The communication bus 1002 is used to realize the connection and communication between these components. The user interface 1003 may comprise a display, an input unit such as a keyboard, and the user interface 1003 may further comprise a standard wired interface and a wireless interface. The network interface 1004 may comprise a standard wired interface and a wireless interface (such as a wireless fidelity interface). The memory 1005 may be a high-speed random access memory (RAM), or a stable non-volatile memory (NVM), such as a disk memory. The memory 1005 may further be a storage device independent of the aforementioned processor 1001.

[0024] Those skilled in the art can understand that the structure shown in FIG. 1 does not constitute a limitation on the scene point-control apparatus, and may comprise more or fewer components than shown in the figure, or combine certain components, or arrange components differently.

[0025] As shown in FIG. 1, the memory 1005 as a storage medium may comprise an operating system, a data storage module, a network communication module, a user interface module, and a control program of the scene point-control apparatus.

[0026] In the air conditioning equipment shown in FIG. 1, the network interface 1004 is mainly used for data communication with other devices. The user interface 1003 is mainly used for data interaction with the user. The processor 1001 and the memory 1005 in the scene point-control apparatus of the present application can be provided in the scene point-control apparatus, and the scene point-control apparatus calls the control program of the scene point-control apparatus stored in the memory 1005 through the processor 1001, and executes the relevant steps of the method for controlling the scene point-control apparatus in the following embodiments.

[0027] Based on the hardware architecture of the above terminal, various embodiments of the method for controlling the scene point-control apparatus in the present application are proposed.

[0028] As shown in FIG. 2, the first embodiment of the method for controlling the scene point-control apparatus in the present application is proposed. In this embodiment, the method for controlling the scene point-control apparatus comprises following steps.

[0029] Step S10, receiving a scene mode trigger instruction, and determining the air parameter required for the operation of the scene mode to be triggered.

[0030] In this embodiment, the user can input the scene mode trigger instruction by pressing a physical button or a touch screen button of the scene point-control apparatus.

[0031] Since different types of scene point-control apparatuses can correspondingly control the air conditioning equipment in different scene modes, the air parameters required when different types of scene modes are

operating are usually different. Each type of air parameter needs to be collected by a corresponding type of sensor (for example, the air parameter detected by the temperature sensor is the current ambient temperature, and the air parameter detected by the humidity sensor is the current ambient humidity), so that different types of scene point-control apparatuses are usually equipped with different types of sensor hardware.

[0032] In this embodiment, since different types of scene point-control apparatuses can correspondingly control the air conditioning equipment in different scene modes, the scene modes that can be triggered by the user according to the specific application scene comprise but are not limited to the energy-saving mode, the comfort mode, the health mode, the children mode, the elderly mode, the pregnant mode, the home mode, the away mode, the sleep mode and the exercise mode. It should be noted that the parameter control information associated with different scene modes is different. The parameter control information comprises but is not limited to temperature control information, humidity control information, wind speed control information, cleanliness control information and freshness control information. Cleanliness is mainly judged according to the indoor PM2.5 concentration, and freshness is mainly judged according to the indoor carbon dioxide concentration. The parameter control information is related to the attributes of each scene mode. For example, when the scene mode is a health scene, the requirements for cleanliness value and freshness value will be higher. For example, when the scene mode is a child mode or an elderly mode, the air conditioning equipment needs to operate more gently, and the temperature is usually appropriately higher and the wind speed is appropriately lower than that of the air conditioning equipment for middle-aged people (non-pregnant women). For example, when the scene mode is a sleeping scene, the air parameter value can be set with reference to the sleep curve. The air parameter value can be a specific value, or may be in a range, or may fall within a curve formed by a series of values.

[0033] It is easy to understand that the parameter control information usually refers to the air parameter at the air outlet of the air conditioning equipment. For example, the temperature control information indicates setting the temperature at 25°C, which usually means that the temperature at the air outlet of the air conditioning equipment is adjusted to 25°C. The humidity control information is 35%PH, which usually means that the humidity at the air outlet of the air conditioning equipment is adjusted to 35%PH. The wind speed control information is 30 wind gear, which usually means that the wind speed at the air outlet of the air conditioning equipment is set at 30 wind gear. However, the actual air parameter perceived by the user indoors is not necessarily the same as the air parameter at the air outlet of the air conditioning equipment. Therefore, the scene point-control apparatus of this embodiment needs to perceive the indoor air parameter, and then compare the perceived actual air

parameter with the target air parameter corresponding to the triggered scene mode. According to the deviation information of the real-time comparison, the parameter control information of the air conditioning equipment is dynamically and adaptively adjusted, so as to adaptively control the target operation parameter corresponding to the currently operating scene mode. Through the "perception plus control" method, the air effect (current air parameters such as temperature, humidity and wind speed) is intuitively perceived, and the operation capacity of the air conditioning equipment is determined based on the perceived current air parameter. That is, whether the air conditioning equipment reaches the current theoretical operation capacity that should be achieved is determined, and then the operation control amount is adjusted when the operation capacity is insufficient, thereby avoiding the failure to achieve the target ambient expected by the user and realizing closed-loop regulation. Compared with the control method of entering a single operation mode, the current operation parameters of the air conditioning equipment can be dynamically optimized and adjusted to make operation of the air conditioning equipment more suitable for the operation ambient corresponding to the target scene, thereby improving the adaptability of the air conditioning equipment to adjust the ambient.

[0034] That is, in order to adaptively control the target operation parameter corresponding to the scene mode, the scene point-control apparatus of this embodiment usually needs to collect the air parameters required for the operation of different scene modes through different types of sensors when controlling the air conditioning equipment to operate in different scene modes, so that when the scene point-control apparatus triggers the scene mode, the real-time air parameters of the user's ambient can be detected through the corresponding type of sensors, thus operation of the air conditioning equipment is more suitable for the operation ambient corresponding to the current scene mode.

[0035] In an embodiment, when the scene point-control apparatus controls the air conditioning equipment to operate in an energy-saving mode, the air parameters required for the energy-saving mode comprise the current ambient wind speed and the current ambient temperature. Therefore, the current ambient wind speed can be detected by a wind speed sensor. The current ambient temperature can be detected by a temperature sensor. Then the target operation parameter of the air conditioning equipment in the energy-saving mode can be dynamically optimized and adjusted according to the current ambient wind speed and the current ambient temperature, so that operation of the air conditioning equipment is more suitable for the operation ambient corresponding to the energy-saving mode.

[0036] In another embodiment, when the scene point-control apparatus controls the air conditioning equipment to operate in the comfort mode, the air parameters required for the comfort mode comprise the current ambient

humidity, the current ambient freshness and the current ambient temperature. Therefore, the current ambient humidity can be detected by a humidity sensor, the current ambient freshness can be detected by a carbon dioxide concentration sensor, and the current ambient temperature can be detected by a temperature sensor. Then the target operation parameter of the air conditioning equipment in the comfort mode can be dynamically optimized and adjusted according to the current ambient humidity, the current ambient freshness and the current ambient temperature, to make the air conditioning equipment operate more in line with the operation ambient corresponding to the comfort mode.

[0037] In another embodiment, when the scene point-control apparatus controls the air conditioning equipment to operate in the clean mode, the air parameters required for the clean mode comprise the current ambient cleanliness and the current ambient humidity. Therefore, the current ambient cleanliness can be detected by the PM2.5 concentration sensor, and the current ambient humidity can be detected by the humidity sensor. Then the target operation parameter of the air conditioning equipment operating in the clean mode is dynamically optimized and adjusted according to the current ambient cleanliness and the current ambient humidity, so that the air conditioning equipment operates more in line with the operation ambient corresponding to the clean mode.

[0038] In another embodiment, when the scene point-control apparatus controls the air conditioning equipment to operate in the healthy mode, the air parameters required for the healthy mode comprise the current ambient wind speed, the current ambient cleanliness and the current ambient freshness. Therefore, the current ambient wind speed can be detected by the wind speed sensor, the current ambient cleanliness can be detected by the PM2.5 concentration sensor, and the current ambient freshness can be detected by the carbon dioxide concentration sensor. Then, according to the current ambient wind speed, the current ambient cleanliness and the current ambient freshness, the target operation parameter of the air conditioning equipment in the healthy mode is dynamically optimized and adjusted to make operation of the air conditioning equipment more suitable for the operation ambient corresponding to the healthy mode. In this case, the wind speed sensor, the PM2.5 concentration sensor and the carbon dioxide concentration sensor are target type sensors.

[0039] Step S20, obtaining the air parameter from other scene point-control apparatuses communicating with the scene point-control apparatus.

[0040] It should be noted that the communication between the scene point-control apparatus and other scene point-control apparatuses comprises but not is limited to bluetooth communication, Zifeng communication, wireless-fidelity (WIFI) communication and light fidelity (LIFI) communication.

[0041] In this embodiment, it can be understood that, the scene point-control apparatus can be used to detect

whether the air parameters required for operation of the scene mode to be triggered are missing in the air parameters detected by the scene point-control apparatus. If all of the air parameters required for operation of the scene mode to be triggered are missing, the target air parameters will be obtained from other scene point-control apparatuses communicating with the scene point-control apparatus. If some air parameters required for operation of the scene mode to be triggered are missing, the target air parameters will be obtained from the scene point-control apparatus and other scene point-control apparatuses communicating with the scene point-control apparatus.

[0042] For example, the scene point-control apparatus a can control the air conditioning equipment in energy-saving mode, and is equipped with a wind speed sensor and a temperature sensor, which are self-equipped sensors. However, if the scene point-control apparatus a comprises a pre-stored air conditioning control program corresponding to the comfort mode, and the air parameters required for the comfort mode comprise the current ambient temperature, the current ambient humidity and the current ambient carbon dioxide, the scene point-control apparatus a cannot detect the air parameters of the current ambient humidity when the comfort mode is triggered by touch operation. The other scene point-control apparatus b can control the air conditioning equipment in the clean mode, and is equipped with a PM2.5 concentration sensor and a humidity sensor. In this case, the scene point-control apparatus a can communicate with the scene point-control apparatus b and obtain the air parameters of the current ambient humidity from the scene point-control apparatus b, so that the humidity sensor of the scene point-control apparatus b can be used to indirectly detect the current ambient humidity in the room, as shown in the scene schematic diagram of FIG. 5.

[0043] Step S30, according to the air parameter, controlling the air conditioning equipment to operate.

[0044] In this embodiment, the air conditioning equipment controlled by the scene point-control apparatus may be an air conditioner, a humidifier, a fresh air blower, a purifier, an electric heater, and the like. The corresponding scene mode may be realized by the operation of one or more air conditioning equipment. The air conditioning instruction determined by the scene point-control apparatus according to the air parameter may be sent directly to each associated air conditioning equipment by the scene point-control apparatus, or may be sent to a central equipment, such as air conditioning equipment A, by the scene point-control apparatus first, and then may be forwarded to other associated air conditioning equipments by the air conditioning equipment A. Or, the air conditioning instruction determined by the scene point-control apparatus according to the air parameter may be sent to a server by the scene point-control apparatus (or through an associated air conditioning equipment, such as the air conditioning equipment B), and then sent to all

associated air conditioning equipment by the server (or by the associated air conditioning equipment B).

[0045] In order to adaptively control the target operation parameter for the operation of the scene mode to be triggered, in the embodiments of the present application, different self-equipped sensors usually need to be installed at the scene point-control apparatus that controls the air conditioning equipment to operate in different scene modes, so that when the scene point-control apparatus triggers the scene mode it supports, the real-time target air parameter information of the ambient where the user is located can be detected through the self-equipped sensors. Through the "perception plus control" method, the human body state, air effect (air parameters such as temperature, humidity and wind speed), and the like, can be intuitively perceived, to achieve closed-loop regulation of the air conditioning equipment, and then the current operation parameters of the air conditioning equipment are dynamically optimized and adjusted, so that the air conditioning equipment can operate more suitable for the operation ambient corresponding to the target scene.

[0046] However, due to limitation of the self-equipped sensor hardware, the scene point-control apparatus usually cannot support more types of scene modes, and the user needs to purchase a high-end version of the scene point-control apparatus with top sensor hardware configuration, which usually increases the user cost and brings poor experience. Therefore, in the present application, the scene mode trigger instruction is received, and the air parameter required for the operation of the scene mode to be triggered will be determined. Then the air parameter is obtained from other scene point-control apparatuses communicating with the scene point-control apparatus, and the air conditioning equipments will be controlled to operate according to the air parameter, so that the air parameter information that can be collected by multiple scene point-control apparatuses in the room can be shared. The scene diagram shown in FIG. 4 can be referred to. In this way, the air conditioning equipment in more scene modes can be controlled, and there is no need to purchase a high-end version of the scene point-control apparatus with a top sensor hardware configuration, thereby reducing the hardware implementation cost for the user to control the smart air conditioning equipment to be in the user's personalized scene mode.

[0047] In an embodiment, as shown in FIG. 3, the step of obtaining the air parameter from other scene point-control apparatuses communicating with the scene point-control apparatus comprises following steps.

[0048] Step S21, determining a target point-control apparatus from other scene point-control apparatuses communicating with the scene point-control apparatus. The target point-control apparatus is a scene point-control apparatus having the air parameter.

[0049] Step S22, communicating with the target point-control apparatus to obtain the air parameter.

[0050] For example, the scene point-control apparatus c can control the air conditioning equipment in a comfort mode, and is equipped with a temperature sensor, a humidity sensor, and a carbon dioxide concentration sensor. The temperature sensor, the humidity sensor, and the carbon dioxide sensor are self-equipped sensors. However, if the scene point-control apparatus c has a pre-stored air conditioning control program corresponding to the clean mode and the air parameters required when the clean mode is operating comprise the current ambient cleanliness and the current ambient humidity, the scene point-control apparatus c cannot detect the air parameters (such as the current ambient cleanliness) corresponding to the PM2.5 concentration sensor when the clean mode is triggered by touch operation. Another scene point-control apparatus d that supports the health mode is equipped with a wind speed sensor, a PM2.5 concentration sensor, and a carbon dioxide concentration. In this case, the scene point-control apparatus c can communicate with the scene point-control apparatus d and obtain the air parameters for the current ambient cleanliness from the scene point-control apparatus d, so that the current ambient cleanliness in the room can be indirectly detected through the PM2.5 concentration sensor of the scene point-control apparatus d.

[0051] As another example, the scene point-control apparatus d can control the air conditioning equipment in the energy-saving mode, and is equipped with a wind speed sensor and a temperature sensor. The temperature sensor and the wind speed sensor are self-equipped sensors. However, if the scene point-control apparatus d has pre-stored the air conditioning control program corresponding to the health mode and the air parameters required when the health mode is operating comprise the current ambient wind speed, the current ambient cleanliness and the current ambient freshness, the scene point-control apparatus d cannot detect the air parameters for the current ambient freshness and the current ambient cleanliness when the health mode is triggered by touch operation, while another scene point-control apparatus e supporting the clean mode is equipped with the PM2.5 concentration sensor and the humidity sensor. Another scene point-control apparatus f supporting the comfort mode is equipped with a temperature sensor, a humidity sensor and a carbon dioxide concentration sensor. In this case, the scene point-control apparatus d can communicate with the scene point-control apparatus e and the scene point-control apparatus f, and obtain the air parameter of the current ambient cleanliness from the scene point-control apparatus e, and obtain the air parameter of the current ambient freshness from the scene point-control apparatus f, so that the air parameter required for the operation of the health mode can be indirectly obtained through the PM2.5 concentration sensor of the scene point-control apparatus e and the carbon dioxide concentration sensor of the scene point-control apparatus f.

[0052] In this embodiment, the target point-control ap-

paratus is determined as a scene point-control apparatus that cannot obtain the air parameter from the scene point-control apparatus, then by communicating with the target point-control apparatus, the air parameters are obtained. Then the air parameter required for the scene mode to be triggered can be obtained from the plurality of scene point-control apparatuses communicating with this scene point-control apparatus, thereby improving the accuracy of obtaining the the acquired air parameter.

[0053] In an embodiment, the step S40 of controlling the operation of the air conditioning equipment according to the air parameter comprises following steps.

[0054] Step B10, when the scene switching instruction is obtained, the scene mode corresponding to the scene switching instruction is determined, and the switched scene mode is used as the scene mode to be triggered. Then it will return to perform the step of determining the air parameter required for the operation of the scene mode to be triggered.

[0055] In this embodiment, it can be understood that the scene switching instruction can be input by performing a user touch operation on the scene point-control apparatus, and the user touch operation may comprise a single click operation, a double click operation, and a long press operation (for example, the long press operation means pressing for 3 seconds).

[0056] In an embodiment, the user can switch from multiple scene modes to the target scene mode required by the user's intention by performing a user touch operation on the switch button of the scene point-control apparatus. For example, the current scene point-control apparatus pre-stores air conditioning control programs corresponding to the energy-saving mode, the comfort mode, and the health mode. When the currently operating target scene mode is the energy-saving mode, the user presses the switch button once, and the target scene mode triggered by the scene point-control apparatus is switched from the energy-saving mode to the comfort mode. If the user presses the switch button again, the target scene mode triggered by the scene point-control apparatus is switched from the comfort mode to the health mode. If the user presses the switch button again, and the target scene mode triggered by the scene point-control apparatus is switched from the health mode back to the comfort mode, and the cycle repeats. That is, through the scene point-control apparatus, not only can the control of a certain scene mode be realized, but also the control of switching between multiple scene modes can be realized, so as to meet the different needs of users for scene modes at different times and the different needs of different users for scene modes, thereby enriching the operation types of scene modes that can be supported by a single scene point-control apparatus, and improving the user experience of using the scene point-control apparatus.

[0057] In an embodiment, the step of determining the target point-control apparatus comprises following steps.

[0058] Step C10, broadcasting the information sharing

request of the air parameter.

[0059] Step C20, receiving the unique identification returned by other scene point-control apparatuses communicating with the scene point-control apparatus in response to the information sharing request.

[0060] Step C30, determining the target point-control apparatus according to the unique identification.

[0061] In this embodiment, it is easy to understand that each scene point-control apparatus has a unique identification, which is the unique identification information that characterizes the scene point-control apparatus.

[0062] The scene point-control apparatus can broadcast the information sharing request through communication methods, such as Bluetooth communication, ZigBee communication, WIFi communication and LIFI communication.

[0063] In this embodiment, it is easy to understand that the information sharing request carries the air parameters required for the operation of the scene mode to be triggered.

[0064] In this embodiment, the information sharing request of the air parameter is sent by broadcasting, thereby the unique identification returned by other scene point-control apparatuses communicating with the scene point-control apparatus in response to the information sharing request will be received, and then the target point-control apparatus is determined according to the unique identification, thereby further improving the accuracy of obtaining the air parameter required for the operation of the scene mode to be triggered from the multiple scene point-control apparatuses communicating with this scene point-control apparatus.

[0065] In another practicable manner, the step of determining the target point-control apparatus comprises following steps.

[0066] Step D10, determining the target point-control apparatus from a stored apparatus data mapping table, the apparatus data mapping table comprising air parameters that can be detected by other scene point-control apparatuses that communicate with the scene point-control apparatus; or

[0067] step D20, determining the target point-control apparatus from a scene apparatus sharing record, the scene apparatus sharing record comprising air parameters that can be shared by other scene point-control apparatuses communicating with the scene point-control apparatus.

[0068] In this embodiment, the information in the apparatus data mapping table may be pre-stored in the target point-control apparatus before leaving the factory, or may be input by the user in the target point-control apparatus after leaving the factory. The scene apparatus sharing record refers to the air parameter that the scene point-control apparatus and other scene point-control apparatuses have shared in the historical use record. It is easy to understand that the scene point-control apparatus can automatically identify the air parameter that can be detected by other scene point-control apparatuses

communicating with the scene point-control apparatus by reading the scene apparatus sharing record.

[0069] In this embodiment, the air parameter that can be detected by other scene point-control apparatuses communicating with the scene point-control apparatus can be automatically identified according to the information stored in the apparatus data mapping table or the scene apparatus sharing record, so that the air parameter required for the operation of the scene mode to be triggered can be obtained more accurately from the multiple scene point-control apparatuses communicating with this scene point-control apparatus, thereby improving the accuracy of obtaining the air parameter.

[0070] In an embodiment, as an example, the step of determining the target point-control apparatus further comprises following steps.

[0071] Step E10, if there are multiple target point-control apparatuses, the target point-control apparatus closest to the air conditioning equipment is determined as the final target point-control apparatus, or

[0072] step E20, the target point-control apparatus closest to the scene point-control apparatus is determined as the final target point-control apparatus.

[0073] In this embodiment, in order to avoid the target point-control apparatus exceeding the working area corresponding to the air conditioning equipment and avoid causing the air parameter shared by the target point-control apparatus to fail to reflect the indoor air conditioning operating environment accurately and effectively, the target point-control apparatus closest to the air conditioning equipment is determined as the final target point-control apparatus, thereby improving the accuracy of the air parameter required for the scene mode to be triggered.

[0074] In addition, in order to avoid the low signal strength between the scene point-control apparatus and the target point-control apparatus and affect the normal sharing of air parameters between the scene point-control apparatus and the target point-control apparatus, the target point-control apparatus closest to the scene point-control apparatus is determined as the final target point-control apparatus, so as to avoid the situation that when the scene point-control apparatus and the target point-control apparatus are sharing air parameters, the signal strength is low due to the long distance between the scene point-control apparatus and the target point-control apparatus, which causes the loss of data packets between the scene point-control apparatus and the target point-control apparatus, resulting in the failure of air parameter sharing. As a result, the present embodiment can stably and effectively obtain the air parameters required for the operation of the scene mode to be triggered and can further improve the accuracy of the air parameters required for the scene mode to be triggered.

[0075] In an embodiment, as an example, the step of communicating with the target point-control apparatus to obtain the air parameter comprises following steps.

[0076] Step F10, performing spatial positioning on the target point-control apparatus to obtain positioning information of the target point-control apparatus, and determining whether the target point-control apparatus is located in a working area corresponding to the air conditioning equipment according to the positioning information.

[0077] Step F20, obtaining the air parameter from the target point-control apparatus in the working area.

[0078] In this embodiment, spatial positioning can be performed on the target point-control apparatus through near field communication positioning. The technical solutions of the above embodiments are used to prevent the target point-control apparatus from exceeding the working area corresponding to the air conditioning equipment. The air parameter shared by the target point-control apparatus cannot reflect indoor air conditioning operation ambient more accurately and effectively. Therefore, by obtaining the air parameter from the target point-control apparatus in the working area, the accuracy of the air parameter required for the scene mode to be triggered is further improved.

[0079] In an embodiment, the step of controlling the air conditioning equipment to start executing the target scene mode comprises following steps.

[0080] Step G10, determining the target operation parameter for the operation of the scene mode to be triggered according to the air parameter, and sending the determined target operation parameter to the air conditioning equipment; or

[0081] step G20, sending the scene mode control instruction to the air conditioning equipment, and sending the obtained air parameter to the air conditioning equipment, so that the air conditioning equipment can operate in the scene mode according to the air parameter.

[0082] In an embodiment, as an example, according to the air parameter, the target operation parameter for the operation of the scene mode to be triggered can be determined, and the step of sending the determined target operation parameter to the air conditioning equipment comprises following steps.

[0083] Step H10, obtaining the standard air parameter corresponding to the scene mode to be triggered.

[0084] In this embodiment, the preset mapping relationship table between each scene mode and the standard air parameter can be pre-stored in the system, and then when the triggered scene mode is determined, the standard air parameter corresponding to the triggered scene mode is queried from the preset mapping relationship table. It can be understood that the standard air parameter corresponding to different scene modes is different.

[0085] It should be noted that the standard air parameter usually corresponds the target operation parameter. The standard air parameter may comprise at least one of the standard ambient temperature, standard ambient humidity, standard ambient wind speed, standard ambient freshness and standard ambient cleanliness.

[0086] For example, in an embodiment, the target operation parameter associated with the energy-saving mode may comprise that, the temperature control information indicates setting the air conditioning temperature at 25°C, the humidity control information indicates setting the humidity at 35%PH, and the wind speed control information indicates setting the wind speed at 30 wind gear. In this case, the standard air parameter may comprise that, the standard ambient temperature indicates setting the temperature in a range from 24°C to 26°C, the standard ambient humidity indicates setting the humidity in a range from 25%PH to 45%PH, and the standard ambient wind speed indicates setting the wind speed in a range from 25 to 30 wind gear.

[0087] In another embodiment, the target operation parameter associated with the comfort mode may comprise that, the temperature control information indicates setting the air conditioning temperature at 23°C, the cleanliness control information indicates setting the fresh air system at 30 μ g/m³ filtration gear, and the freshness control information indicates setting the fresh air system at 500PPM wind discharging gear. In this case, the standard air parameter may comprise that, the standard ambient temperature is ranged from 22°C to 24°C, the standard ambient cleanliness is below 45 μ g/m³, and the standard ambient freshness is below 800PPM.

[0088] In another embodiment, the target operation parameter associated with the health mode may comprise that, the temperature control information indicates setting the air conditioning temperature at 23°C, the humidity control information indicates setting the humidity at 50%PH, the cleanliness control information indicates setting the fresh air system at 25 μ g/m³ filtration gear, and the freshness control information indicates setting the fresh air system at 400 PPM wind discharging gear. In this case, the standard air parameter may comprise that, the standard ambient temperature is ranged from 22°C to 24°C, the standard ambient humidity is ranged from 45%PH to 65%PH, the standard ambient cleanliness is below 35 μ g/m³, and the standard ambient freshness is below 600PPM.

[0089] In another embodiment, the target operation parameter associated with the light sleep stage in the sleep mode may comprise that, the air conditioning temperature control information indicates setting the temperature at 26°C, and the wind speed control information indicates setting the wind speed at 40 wind gear. In this case, the standard air parameter may comprise that, the standard ambient temperature is ranged from 25°C to 27°C, and the standard ambient wind speed is 40 wind gear. The target operation parameter associated with the deep sleep stage in the sleep mode may comprise that, the air conditioning temperature control information indicates setting the temperature at 27°C, and the wind speed control information indicates setting the wind speed at 20 wind gear. In this case, the standard air parameter may comprise that, the standard ambient temperature is ranged from 26°C to 28°C, and the stan-

dard ambient wind speed is ranged from 15 to 25 wind gear.

[0090] Step H20, comparing the air parameter with the standard air parameter to obtain the air parameter deviation.

[0091] Step H30, determining the operation parameter adjustment information for the operation of the scene mode to be triggered according to the real-time air parameter deviation, dynamically and adaptively adjusting the target operation parameter, and obtaining the adaptively adjusted target operation parameter.

[0092] Step H40, sending the adaptively adjusted target operation parameter to the air conditioning equipment.

[0093] It can be understood that the air parameter required for the operation of the scene mode to be triggered refers to the air parameter at the current moment, which may comprise at least one of the current ambient temperature, the current ambient humidity, the current ambient wind speed, the current ambient freshness and the current ambient cleanliness. Correspondingly, the air parameter deviation may comprise at least one of the temperature deviation value, the humidity deviation value, the wind speed deviation value, the freshness deviation value and the cleanliness deviation value.

[0094] In this embodiment, based on the air parameter and the standard air parameter, the air parameter belonging to the same air parameter type can be compared with the standard air parameter to obtain the air parameter deviation. For example, in an air conditioning operation scene, the standard air parameter comprises the standard ambient temperature and the current ambient wind speed. The standard ambient temperature is ranged from 24°C to 26°C, and the standard ambient wind speed is ranged from 15 to 25 wind gear. In addition, the current ambient temperature is detected to be 28°C by the temperature sensor, and the current ambient wind speed is detected to be 22 wind gear by the wind speed sensor. In this case, the air parameter deviation comprises a temperature deviation value and a wind speed deviation value, and the temperature deviation value is equal to 3°C (28°C-25°C=3°C), and the wind speed deviation value is equal to 0 (the standard ambient wind speed falls within the standard ambient wind speed range).

[0095] For example, in an embodiment, if the temperature deviation value in the air parameter deviation is equal to 3°C, and the wind speed deviation value is equal to -5 wind gear, the operation parameter adjustment information of adjusting the air conditioning equipment up by 3°C and adjusting the wind speed down by 5 wind speeds can be obtained, and the target operation parameter can be adjusted dynamically.

[0096] It is easy to understand that the target operation parameter often refers to the operation control parameter at the outlet of the air conditioning equipment. For example, the temperature control information indicates setting the air conditioning temperature at 25°C, which often

means that the temperature at the outlet of the air conditioning equipment is adjusted to 25°C. The humidity control information indicates setting the humidity at 35% PH, which often means that the humidity at the outlet of the air conditioning equipment outlet is adjusted to 35% PH. The wind speed control information indicates setting the wind speed at 30 wind gear, which often means that the wind speed at the outlet of the air conditioning equipment is 30 wind gear. However, the actual target air parameter information perceived by the user indoors is not necessarily the same as the air parameter information at the air outlet of the air conditioning equipment. Therefore, it is necessary to perceive the current indoor air parameter, and then compare the current air parameter with the standard air parameter corresponding to the scene mode. According to the deviation information of the real-time comparison, the target operation parameter of the air conditioning equipment is dynamically and adaptively adjusted, so as to adaptively control the target operation parameter corresponding to the scene mode. Through the "perception plus control" method, the air effect (current air parameters such as temperature, humidity and wind speed) can be intuitively perceived, and the target operation parameter of the air conditioner can be dynamically optimized and adjusted, so that the air conditioner operation is more suitable for the operating environment corresponding to the target scene, thereby improving the adaptability of the air conditioning equipment to the air conditioning environment.

[0097] As an example, the steps of querying and obtaining the air parameter mapped in the scene mode to be triggered from the preset scene mode mapping table, and configuring the mapped air parameter as the air parameter required for the operation of the scene mode to be triggered comprise following steps.

[0098] Step I10, querying and obtaining the air parameter mapped in the scene mode to be triggered from the preset scene mode mapping table, and configuring the mapped air parameter as the air parameter required for the operation of the scene mode to be triggered.

[0099] It is easy to understand that the scene mode mapping table comprises multiple scene modes and air parameters mapped in each scene mode.

[0100] In an embodiment, the scene mode currently triggered is the energy-saving mode, and the air parameters mapped in the energy-saving mode may comprise the ambient temperature, the ambient humidity and the ambient wind speed.

[0101] In another embodiment, the scene mode currently triggered is the comfort mode, and the air parameters mapped in the comfort mode may comprise the ambient temperature, the ambient cleanliness and the ambient freshness.

[0102] In this embodiment, by pre-storing the mapping relationship between each scene mode and the corresponding air parameter, the air parameters required for the operation of the scene mode to be triggered can be accurately determined.

[0103] In addition, the embodiment of the present application further proposes a computer-readable storage medium, and a control program of the scene point-control apparatus is stored on the computer-readable storage medium. When the control program of the scene point-control apparatus is executed by the processor, steps of the control method for controlling the scene point-control apparatus in any embodiment as described above are implemented.

[0104] It should be noted that in the present application, the terms "comprise", "comprise" or any other variants thereof are intended to cover a non-exclusive inclusion. Thus, a process, method, article, or system that comprises a series of elements not only comprises those elements, but also comprises other elements that are not explicitly listed, or also comprises elements inherent to the process, method, article, or system. If there are no more restrictions, the element defined by the sentence "comprising a..." does not exclude the existence of other identical elements in the process, method, article or system that comprises the element.

[0105] The serial numbers of the embodiments of the present application are only for description and do not represent the advantages and disadvantages of the embodiments.

[0106] Through the description of the above embodiments, those skilled in the art can clearly understand that the above embodiments can be implemented by means of software plus the necessary general hardware platform, of course, it can further be implemented by hardware, but in many cases the former is a better implementation method. Based on this, the technical solutions of the present application, or the part that contributes to the related art, can be embodied in the form of a software product. The computer software product is stored in a storage medium (such as the ROM/RAM, the disk, or the CD) as described above, and comprises several instructions for enabling a terminal device (which can be a mobile phone, a computer, a server, an air conditioning equipment, or a network equipment, and the like) to execute the methods described in each embodiment of the present application.

[0107] The above are only preferred embodiments of the present application, and do not limit the scope of the present application thereto. Any equivalent structural transformation or equivalent process transformation made according to the description and drawings of the present application, or direct/indirect applied in other related technical fields shall fall within the claimed scope of the present application.

Claims

1. A method for controlling a scene point-control apparatus, **characterized by** comprising:

receiving a scene mode trigger instruction, and

- determining an air parameter required for an operation of a scene mode to be triggered; obtaining the air parameter from another scene point-control apparatus communicating with the scene point-control apparatus; and
controlling an air conditioning equipment to operate according to the air parameter.
2. The method for controlling the scene point-control apparatus according to claim 1, wherein the obtaining the air parameter from another scene point-control apparatus communicating with the scene point-control apparatus comprises:
- determining a target point-control apparatus from another scene point-control apparatus communicating with the scene point-control apparatus, wherein the target point-control apparatus is a scene point-control apparatus having the air parameter; and
communicating with the target point-control apparatus to obtain the air parameter.
3. The method for controlling the scene point-control apparatus according to claim 2, wherein the determining the target point-control apparatus comprises:
- broadcasting an information sharing request of the air parameter;
receiving an unique identification returned by another scene point-control apparatus communicating with the scene point-control apparatus in response to the information sharing request; and
determining the target point-control apparatus according to the unique identification.
4. The method for controlling the scene point-control apparatus according to claim 2, wherein the determining the target point-control apparatus comprises:
- determining the target point-control apparatus from a stored apparatus data mapping table, wherein the apparatus data mapping table comprises an air parameter capable of being detected by another scene point-control apparatus communicating with the scene point-control apparatus; or
determining the target point-control apparatus from a scene apparatus sharing record, wherein the scene apparatus sharing record comprises an air parameter capable of being shared by another scene point-control apparatus communicating with the scene point-control apparatus.
5. The method for controlling the scene point-control apparatus according to claim 3 or 4, wherein the determining the target point-control apparatus
- further comprises:
- in response to that a plurality of target point-control apparatuses are provided, determining a target point-control apparatus closest to the air conditioning equipment as a final target point-control apparatus; or
determining a target point-control apparatus closest to the scene point-control apparatus as a final target point-control apparatus.
6. The method for controlling the scene point-control apparatus according to claim 2, wherein the communicating with the target point-control apparatus to obtain the air parameter comprises:
- performing spatial positioning on the target point-control apparatus to obtain positioning information of the target point-control apparatus, and determining whether the target point-control apparatus is located in a working area corresponding to the air conditioning equipment according to the positioning information; and
communicating with the target point-control apparatus in the working area to obtain the air parameter.
7. The method for controlling the scene point-control apparatus according to claim 1, wherein the controlling the air conditioning equipment to operate according to the air parameter comprises:
- determining a target operation parameter required for the operation of the scene mode to be triggered according to the air parameter, and sending a determined target operation parameter to the air conditioning equipment; or
sending a scene mode control instruction to the air conditioning equipment, and sending an obtained air parameter to the air conditioning equipment, to make the air conditioning equipment operate in a scene mode according to the air parameter.
8. The method for controlling the scene point-control apparatus according to claim 1, wherein the determining the air parameter required for the operation of the scene mode to be triggered comprises:
- querying an air parameter mapped in the scene mode to be triggered from a preset scene mode mapping table, and configuring a mapped air parameter as the air parameter required for the operation of the scene mode to be triggered.
9. A scene point-control apparatus, **characterized by** comprising a memory, a processor, and a control program of the scene point-control apparatus stored in the memory and executable on the processor,

wherein when the program of the scene point-control apparatus is executed by the processor, steps of a method for controlling the scene point-control apparatus according to any one of claims 1 to 8 are implemented.

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10. A computer-readable storage medium, **characterized in that**, a control program of a scene point-control apparatus is stored on the computer-readable storage medium, and when the control program of the scene point-control apparatus is executed by a processor, steps of a method for controlling the scene point-control apparatus according to any one of claims 1 to 8 are implemented.

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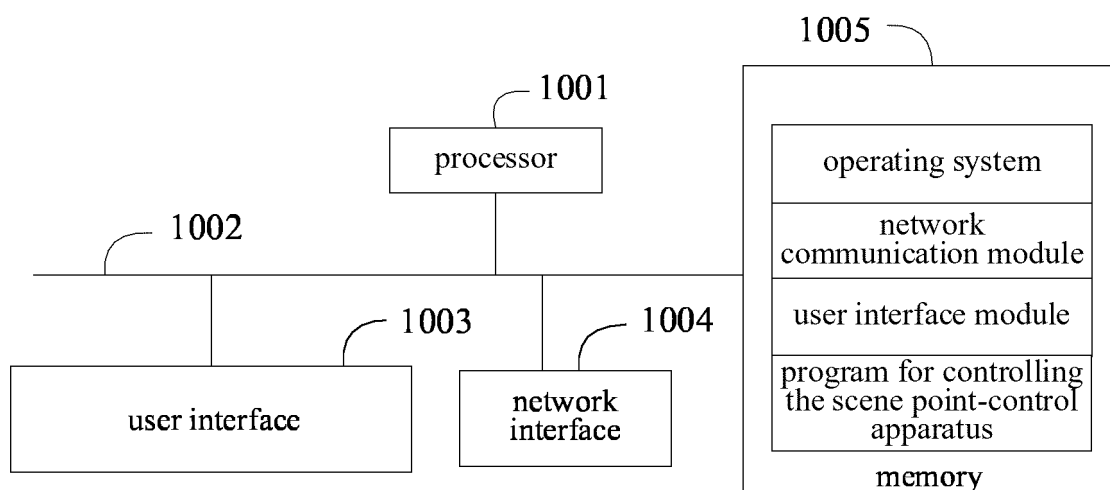


FIG. 1

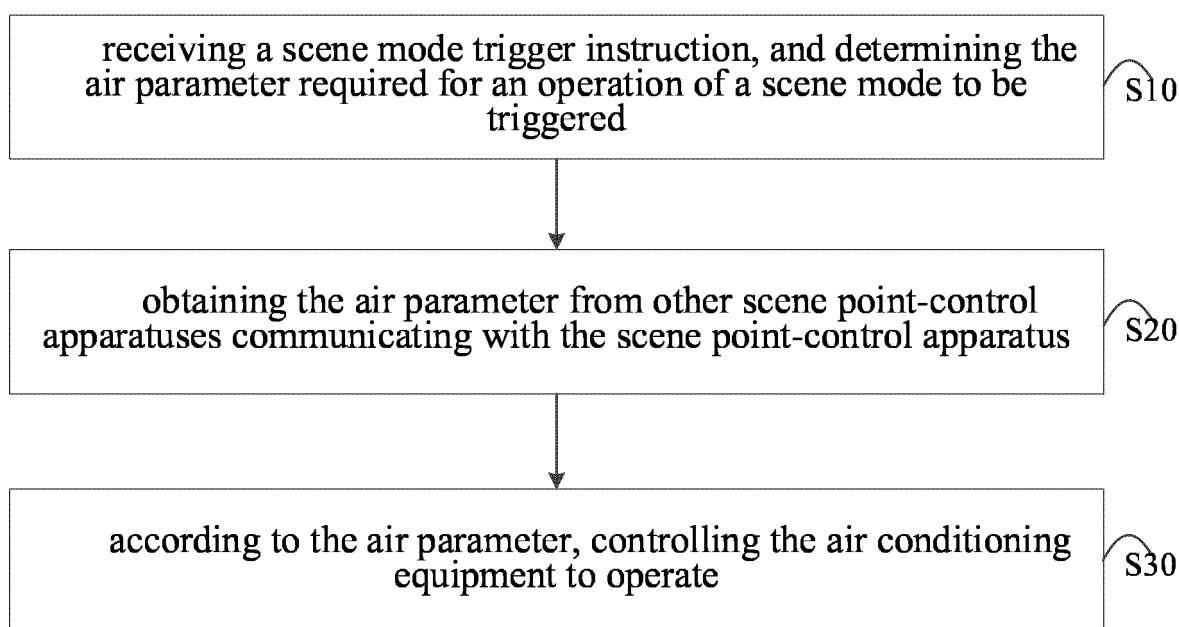


FIG. 2

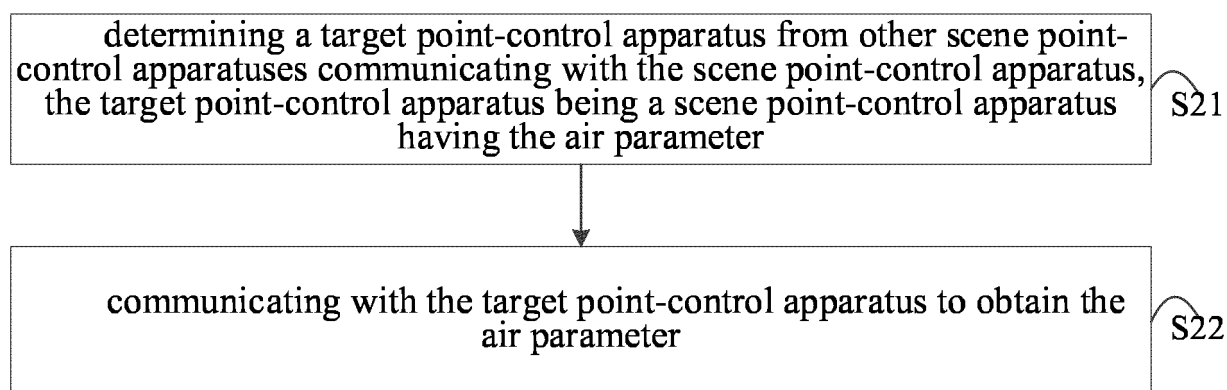


FIG. 3

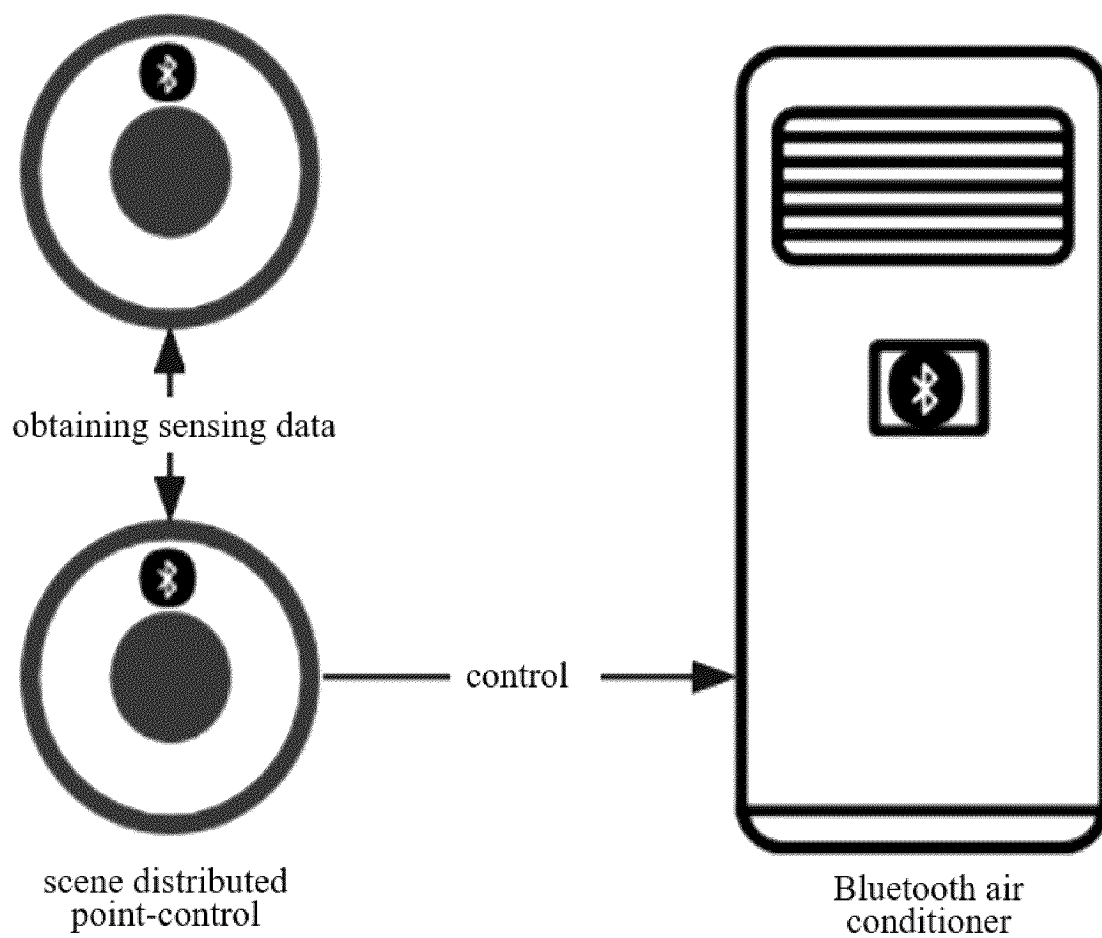


FIG. 4

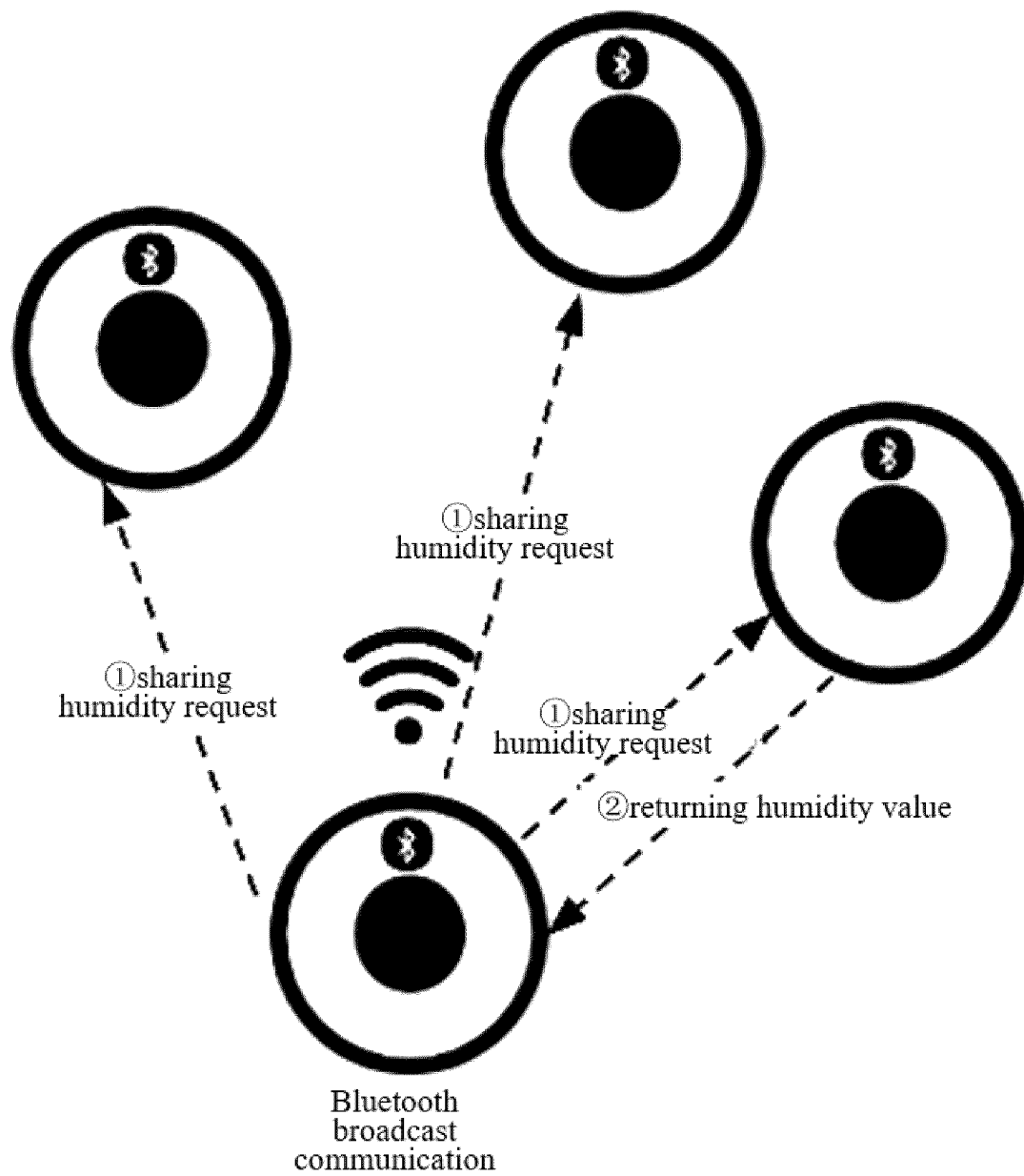


FIG. 5

INTERNATIONAL SEARCH REPORT

International application No.

PCT/CN2023/077283

A. CLASSIFICATION OF SUBJECT MATTER

F24F11/56(2018.01);F24F11/64(2018.01);F24F11/65(2018.01)i

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC: F24F

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)

CNTXT, ENTXT, WPABS, VEN, CJFD: 情景, 场景, 通信, 传感器, 空气参数, 温度, 湿度, 浓度, 风速, 洁净度, scene, communicat+, sensor, detector, air parameter, temperature, humidity, density, concentration, thickness, wind speed, wind velocity, cleanliness

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	CN 108731207 A (GUANGDONG MIDEA REFRIGERATION EQUIPMENT CO., LTD.) 02 November 2018 (2018-11-02) description, paragraphs 72-213, and figures 1-8	1, 7, 9, 10
Y	CN 112984751 A (FOSHAN YUNMI ELECTRICAL APPLIANCE SCIENCE & TECHNOLOGY CO., LTD. et al.) 18 June 2021 (2021-06-18) description, paragraphs 26-104, and figures 1-5	1, 7, 9, 10
A	JP 2014070883 A (SHARP K. K.) 21 April 2014 (2014-04-21) entire document	1-10
A	CN 108444076 A (GUANGDONG MEDIA REFRIGERATION EQUIPMENT CO., LTD. et al.) 24 August 2018 (2018-08-24) entire document	1-10
A	CN 114061096 A (ZHEJIANG CROSSBOW BRAND ELECTRIC APPLIANCE CO., LTD.) 18 February 2022 (2022-02-18) entire document	1-10

☒ Further documents are listed in the continuation of Box C.☒ See patent family annex.

* Special categories of cited documents:

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“O” document referring to an oral disclosure, use, exhibition or other means

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“T” later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

“X” document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

“Y” document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

“&” document member of the same patent family

Date of the actual completion of the international search

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Authorized officer

Telephone No.

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/CN2023/077283

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	CN 211903221 U (FOSHAN YUNMI ELECTRICAL APPLIANCE SCIENCE & TECHNOLOGY CO., LTD. et al.) 10 November 2020 (2020-11-10) entire document	1-10
A	CN 109539489 A (WU SHIQIN) 29 March 2019 (2019-03-29) entire document	1-10
A	WO 2020255875 A1 (PANASONIC INTELLECTUAL PROPERTY MANAGEMENT CO., LTD.) 24 December 2020 (2020-12-24) entire document	1-10

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.

PCT/CN2023/077283

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Patent document cited in search report			Publication date (day/month/year)	Patent family member(s)			Publication date (day/month/year)
CN	108731207	A	02 November 2018	WO	2019200707	A1	24 October 2019
				EP	3742063	A1	25 November 2020
				EP	3742063	A4	14 April 2021
CN	112984751	A	18 June 2021	None			
JP	2014070883	A	21 April 2014	JP	6105246	B2	29 March 2017
CN	108444076	A	24 August 2018	None			
CN	114061096	A	18 February 2022	None			
CN	211903221	U	10 November 2020	None			
CN	109539489	A	29 March 2019	None			
WO	2020255875	A1	24 December 2020	JPWO	2020255875	A1	24 December 2020

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- CN 202210913451 [0001]