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(54) **METHOD AND DEVICE FOR CONTROLLING AIR CONDITIONER**

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Description

Field of the Invention

[0001] The present invention relates to the field of air conditioners, in particular to a method and a device for controlling an air conditioner.

Background of the Invention

[0002] US2010163633A1 relates to distributed nodes, such as intelligent register controllers, of a heating, ventilating and/or air conditioning (HVAC) system wirelessly communicate with each other on a peer-to-peer basis, forming a network, and collectively control the HVAC system, without a central controller. The intelligent register controllers collectively control the amount of conditioned air introduced into each region. Each node may base its operation at least in part on information about one or more (ideally all) of the other nodes. Each intelligent register controller automatically determines how much conditioned air to allow into its region, or how much return air to allow to be withdrawn from its region, based on information collected by the register controller, such as: current temperature of the region; desired temperature of the region; calculated amount of conditioned air required to change the region's temperature to the desired temperature; temperature of conditioned air begin supplied by a duct to the register; current time, day of week, vacation or other schedule data; temperatures of other regions and their respective desired temperatures; calculated amounts of air required to be supplied or withdrawn by the other controlled registers to change their respective regions' temperatures to their desired temperatures; or combinations thereof. Each register controller automatically determines when and to what extent to operate its respective controllable damper.

[0003] US2016320082A1 discloses an adaptive ventilation system and method for a data center are provided. The adaptive ventilation system includes: one or more system-controlled vents facilitating dynamic redirection of airflow passing through the vent(s), and including (for instance) a plurality of adjustable louvers; and a plurality of sensors dispersed within the data center for ascertaining one or more feedback parameters within different zones of the data center. The system also includes a controller configured or programmed to automatically manage adjustment of the system-controlled vent(s) based on the ascertained feedback parameter(s) within the data center. The automatically managing includes, for instance, automatically controlling orientation of multiple louvers of the system-controlled vent(s) to dynamically facilitate a desired airflow discharge adjustment to at least one system-controlled vent based, at least in part, on the sensed feedback parameter(s) within the different zones.

[0004] At present, the energy consumed by air conditioning systems for meeting indoor temperature and hu-

midity requirements accounts for about 50% of the energy annually consumed by buildings. Domestic heat pump air conditioners, as typical decentralized cooling and heating products, have been greatly popularized in people's lives. In addition, with the incorporation of air energy into the scope of renewable energy and further deepening of reduction and replacement of heating coal, heat pump heating will usher in a new spring in the heating market in the north. However, under the emphasis on sustainable development nowadays, the control of building environments faces many problems that are required to be solved urgently, such as how to mediate the contradiction between meeting the requirement of comfortability of the building environments and realizing energy conservation and environmental protection. At present, insufficient heating capacity at low temperature, poor thermal comfort and energy consumption are still prominent problems of the domestic heat pump air conditioners when in use. With the development of two-stage compression systems and variable-capacity compression systems, the problems of insufficient heating capacity at low temperature and operating reliability at low temperature are effectively solved. However, there is no effective solution for solving the problem that the air conditioner is poor in cooling and heating comfort.

Summary of the Invention

[0005] Some embodiments of the present invention provide a method and a device for controlling an air conditioner, in order to solve the technical problem that the air conditioner is poor in cooling and heating comfort in related arts.

[0006] According to an aspect of some embodiments of the present invention, a method for controlling an air conditioner is provided according to claim 1. The dependent claims set out particular embodiments of the invention.

[0007] Optionally, the one or more first control subparameters are used for controlling the first air outlet to deflect airflow horizontally or downwardly, and controlling the second air outlet to deflect airflow horizontally or upwardly.

[0008] Optionally, the first sampling point is disposed in a top area of the environment where the air conditioner is located, and the second sampling point is disposed in a middle area of the environment where the air conditioner is located.

[0009] Optionally, the third sampling point is disposed in a lower area of the environment where the air conditioner is located, and the fourth sampling point is disposed in the middle area of the environment where the air conditioner is located.

[0010] According to another aspect of some embodiments of the present invention, the device for controlling an air conditioner is further provided according to claim 8.

[0011] According to another aspect of some embodiments of the present invention, a computer readable stor-

age medium according to claim 11 is provided.

[0012] According to another aspect of some embodiments of the present invention, a processor for operating a program is further provided according to claim 12.

[0013] According to another aspect of some embodiments of the present invention, an air conditioner is further provided according to claim 13.

[0014] In some embodiments of the present invention, the current operating mode of the air conditioner is determined; in the current operating mode, the control parameter for controlling the at least two air outlets of the air conditioner is determined according to the current ambient temperature; and the air conditioner is controlled to output a corresponding airflow distribution pattern according to the control parameter. In different operating modes, the air conditioner is controlled to output the corresponding airflow distribution pattern according to the ambient temperature, thus achieving the purpose of optimizing the cooling and heating comfort of the air conditioner; and the air conditioner achieves the function of energy-saving operating, thereby achieving the technical effect of improving the cooling and heating comfort of the air conditioner, and then solving the technical problem that the air conditioner is poor in cooling and heating comfort in related arts.

Brief Descriptions of the Drawings

[0015] The accompanying drawings illustrated herein are used to provide further understanding of the present invention and constitute a part of the present application, and the illustrative embodiments of the present invention and the illustration thereof are intended to interpret the present invention, but do not constitute improper limitation to the present invention.

FIG. 1 is a flowchart showing a method for controlling an air conditioner according to some embodiments of the present invention.

FIG. 2 is a schematic view showing an optional arrangement of air outlets of the air conditioner according to some embodiments of the present invention.

FIG. 3 is a schematic view showing controlling air outlets to output airflow corresponding to distribution patterns according to the ambient temperature when the air conditioner is in a cooling mode according to some embodiments of the present invention.

FIG. 4 is a temperature cloud diagram when a first air outlet and a second air outlet are controlled to simultaneously output airflow corresponding to distribution patterns according to some embodiments of the present invention.

FIG. 5 is a temperature cloud diagram when a frontal air-out is adopted according to related arts.

FIG. 6 is a schematic view showing controlling air outlets to output airflow corresponding to a distribution pattern according to the ambient temperature when the air conditioner is in a cooling mode according to some embodiments of the present invention.

FIG. 7 is a temperature cloud diagram showing controlling the first air outlet to output airflow corresponding to a distribution pattern and controlling the second air outlet to be closed according to some embodiments of the present invention.

FIG. 8 is a temperature cloud diagram when frontal air-out is adopted according to the related arts.

FIG. 9 is a schematic view showing controlling air outlets to output airflow corresponding to distribution patterns according to the ambient temperature when the air conditioner is in a heating mode according to some embodiments of the present invention.

FIG. 10 is a schematic view showing controlling air outlets to output airflow corresponding to distribution patterns according to the ambient temperature when the air conditioner is in a heating mode according to some embodiments of the present invention.

FIG. 11 is a schematic view showing the comparison of relevant indicators in different air-deflecting airflow distribution patterns.

FIG. 12 is a schematic view showing an arrangement of sampling points according to some embodiments of the present invention.

FIG. 13 is a schematic view showing obtaining temperature values of different sampling points when the air conditioner is in the heating mode according to some embodiments of the present invention.

FIG. 14 is a schematic view of obtaining temperature values of different sampling points when the air conditioner is in the cooling mode according to some embodiments of the present invention.

FIG. 15 is a schematic view showing a device for controlling an air conditioner according to some embodiments of the present invention.

Detailed Description of the Embodiments

[0016] In order to provide a better understanding of the solutions of the present invention to those skilled in the art, the technical solutions in the embodiments of the present invention will be clearly and completely described below in conjunction with the accompanying drawings in the embodiments of the present invention. Apparently, embodiments described are merely part of

the embodiments of the present invention, rather than all of the embodiments. All other embodiments obtained by those skilled in the art based on the embodiments in the present invention without creative efforts should fall within the protection scope of the present invention.

[0017] It should be stated that the terms "first", "second" and the like in the description and claims of the present invention are used to distinguish similar objects, and are not necessarily used to describe a specific order or sequence. It should be understood that the data so used may be interchanged where appropriate, so that the embodiments of the present invention described here can be implemented in a sequence other than those illustrated or described herein. In addition, the terms "comprise" and "have" and any variations thereof are intended to cover a non-exclusive inclusion, for example, a process, method, system, product or device that comprises a series of steps or units is not necessarily limited to those steps or units explicitly listed, but may include other steps or units not explicitly listed or inherent to such process, method, product or device.

[0018] According to some embodiments of the present invention, a method for controlling an air conditioner is provided. It should be noted that the steps illustrated in the flowcharts of the drawings may be performed in a computer system such as a set of computer executable instructions. In addition, although logical sequences are shown in the flowcharts, the steps shown or described may be performed in a different order than the ones described herein in some cases.

[0019] FIG. 1 is a flowchart showing a method for controlling an air conditioner according to some embodiments of the present invention. As shown in Fig. 1, the method comprises the following steps.

[0020] In step S 102, a current operating mode of the air conditioner is determined.

[0021] In some embodiments of the present invention, the operating mode of the air conditioner may include a heating mode and a cooling mode. In the case that the current operating mode of the air conditioner is the heating mode, the air conditioner raises the ambient temperature by outputting hot air to the surrounding environment; and in the case that the current operating mode of the air conditioner is the cooling mode, the air conditioner reduces the ambient temperature by outputting cold air to the surrounding environment.

[0022] In step S 104, one or more control parameters for controlling at least two air outlets of the air conditioner are determined according to the current ambient temperature in the operating mode.

[0023] In some embodiments of the present invention, the air conditioner may comprise two or more air outlets, all of which may output airflow to the surrounding environment so as to change the ambient temperature. When the air conditioner is in the heating mode or the cooling mode, the one or more control parameters for the air outlets of the air conditioner are determined according to the current ambient temperature of the air conditioner.

Optionally, control parameters for each of the air outlets of the air conditioner comprise at least one of the direction, the intensity, the temperature or the like of the airflow output from the air outlet.

[0024] In step S 106, the air conditioner is controlled to output airflow corresponding to one or more distribution patterns according to the one or more control parameters.

[0025] After the one or more control parameters for the air outlets are determined, at least one of the direction, the intensity or the temperature of the airflow output from the air outlets are controlled according to the one or more control parameters, thereby controlling the air conditioner to output airflow corresponding to the one or more distribution patterns (also called airflow distribution patterns).

[0026] In some embodiments of the present invention, the current operating mode of the air conditioner is determined as follows: in the current operating mode, one or more control parameters for controlling at least two air outlets of the air conditioner are determined according to the current ambient temperature; and the air conditioner is controlled to output airflow corresponding to one or more distribution patterns according to the one or more control parameters. In different operating modes, the air conditioner is controlled to output airflow corresponding to one or more distribution patterns according to the ambient temperature, thus achieving the purpose of optimizing the cooling and heating comfort of the air conditioner; and the air conditioner achieves the function of energy-conservation operating. Thereby the technical effect of improving the cooling and heating comfort of the air conditioner is achieved, and then solving the technical problem that the air conditioner is poor in cooling and heating comfort in related arts.

[0027] Optionally, in the method for controlling the air conditioner according to some embodiments of the present invention, the at least two air outlets comprise a first air outlet and a second air outlet, wherein the first air outlet is disposed to be higher than the second air outlet. If the operating mode is a cooling mode, the determining one or more control parameters for controlling at least two air outlets of the air conditioner according to a current ambient temperature in the operating mode comprises: detecting the current ambient temperature of the environment where the air conditioner is located; judging if the current ambient temperature is greater than a first preset temperature; determining one or more first control subparameters used for controlling the first air outlet and the second air outlet to simultaneously output airflow corresponding to distribution patterns if the current ambient temperature is greater than the first preset temperature; determining one or more second control subparameters used for controlling the first air outlet to output airflow corresponding to a distribution pattern and controlling the second air outlet to be closed if the current ambient temperature is less than or equal to the first preset temperature.

[0028] As an optional implementing manner of some embodiments of the present invention, the air conditioner may comprise two air outlets, a first air outlet disposed to be higher than a second air outlet and the second air outlet. As shown in Fig. 2, the first air outlet is disposed in the upper part of the air conditioner, and the second air outlet is disposed in the lower part of the air conditioner. The air conditioner may also comprise more than two air outlets, which are disposed at different heights to achieve staggered arrangement of the air outlets of the air conditioner. When it is determined that the air conditioner is in a cooling mode, the current ambient temperature of the environment where the air conditioner is located is detected, and the ambient condition of the environment where the air conditioner is located is determined by determining the sizes of the current ambient temperature and a first preset temperature. The first preset temperature may be a preset temperature threshold that makes people feel comfortable. For example, the first preset temperature is 27°C. When the ambient temperature is greater than 27°C, the human body feels hot, and the surrounding environment is determined to be in a hot ambient condition. By this time, the first air outlet and the second air outlet are controlled to simultaneously output airflow corresponding to distribution patterns according to the one or more first control subparameters. Optionally, as shown in FIG. 3, the first air outlet could deflect the airflow horizontally or downwardly, and the second air outlet could deflect airflow horizontally or upwardly, so that the air conditioner outputs airflow of upper and lower encircling air-out to achieve rapid cooling of the surrounding environment, making the current hot environment transit to a comfortable environment quickly. FIG. 4 shows a temperature cloud diagram when the ambient air temperature is about to reach a comfortable temperature, in the case that the first air outlet and the second air outlet simultaneously output airflow corresponding to the distribution patterns. FIG. 5 shows a temperature cloud diagram when the ambient air temperature is about to reach a comfortable temperature in the case that the air conditioner adopts one air outlet for frontal air-out in the related art. Through the comparison of Fig. 4 and Fig. 5, it can be seen that when the first air outlet and the second air outlet simultaneously output airflow corresponding to the distribution patterns, the distribution of the ambient temperature is more uniform and it is more conducive to reduce the ambient temperature. When the ambient temperature is less than the first preset temperature, the human body does not feel hot, and the surrounding environment is in a more comfortable ambient condition. By this time, the airflow corresponding to the distribution pattern output from the first air outlet is controlled according to the one or more second control subparameters, and the second air outlet is controlled to be closed. As shown in Fig. 6, optionally, the first air outlet could deflect the air horizontally or downwardly, thereby reducing the blowing feeling of the human body and improving the comfort level of the human body. FIG. 7

shows a temperature cloud diagram after the first air outlet is controlled to output the airflow corresponding to the distribution pattern and the second air outlet is controlled to be closed according to the one or more second control subparameters, in the case that the ambient temperature reaches the comfortable temperature. FIG. 8 shows a temperature cloud diagram of the environment in the case that one air outlet is still used for frontal air-out when the ambient temperature of the air conditioner reaches a comfortable temperature in the related art. Through the comparison of FIG. 7 and FIG. 8, it can be seen that the overall ambient temperature could be effectively controlled and the blowing feeling of the human body in the spatial range of the air conditioner could be reduced by controlling the first air outlet to output airflow corresponding to the distribution pattern and controlling the second air outlet to be closed according to the one or more second subparameters when the ambient temperature reaches the comfortable temperature, thereby enhancing the comfort level of the human body.

[0029] Optionally, in the method for controlling the air conditioner according to some embodiments of the present invention, the at least two air outlets comprise a first air outlet and a second air outlet, wherein the first air outlet is disposed to be higher than the second air outlet. if the operating mode is a heating mode, the determining one or more control parameters for controlling at least two air outlets of the air conditioner according to a current ambient temperature in the operating mode comprises: determining one or more third control subparameters used for controlling the first air outlet to deflect airflow downwardly to output airflow corresponding to a distribution pattern and controlling the second air outlet to output airflow corresponding a distribution pattern; detecting the current ambient temperature of the environment where the air conditioner is located; determining one or more fourth control subparameters used for controlling the first air outlet to output airflow corresponding to a distribution pattern and controlling the second air outlet to output airflow corresponding to a distribution pattern if the current ambient temperature is greater than a second preset temperature.

[0030] As an optional implementing manner of some embodiments of the present invention, the air conditioner may comprise two air outlets, a first air outlet disposed to be higher than a second air outlet and the second air outlet. For example, the first air outlet is disposed in the upper part of the air conditioner, and the second air outlet is disposed in the lower part of the air conditioner. The air conditioner may also comprise more than two air outlets, which are disposed at different heights to achieve staggered arrangement of the air outlets of the air conditioner. When it is determined that the air conditioner is in the heating mode, the first air outlet is controlled to deflect air downwardly to output airflow corresponding to a distribution pattern and the second air outlet is controlled to output airflow corresponding to a distribution pattern according to the one or more third control subpa-

rameters. As shown in FIG. 9, at this time, the second air outlet deflects hot air towards the lower area of the environment to heat the space where the human feet are located, in the spatial range of the air conditioner; the first air outlet deflects hot air downwardly to heat the space where the body of the human body is located, in the spatial range of the air conditioner. The airflow output by the air conditioner is concentrated in the lower area and a space where the trunk area of the human body is located. Due to such airflow distribution patterns, the surrounding environment has a small temperature gradient and the ambient temperature distribution has good temperature uniformity; at the same time, the airflow output by the air conditioner in the heating mode is the hot airflow, so the ascent of the hot airflow in the lower area is favorable for effectively heating the environment in the spatial range of the air conditioner. The air conditioner could also detect the current ambient temperature, and the ambient condition of the air conditioner is determined by determining the sizes of the current ambient temperature and a second preset temperature. The second preset temperature may be a preset temperature threshold that makes people feel comfortable. For example, the second preset temperature is 22°C. When the ambient temperature is less than 22°C, the human body feels cold and the surrounding environment is in a cold ambient condition, thus the airflow corresponding to the one or more distribution patterns output by the air conditioner is kept unchanged to heat the surrounding environment. When the ambient temperature is greater than 22°C, the human body does not feel cold and the surrounding environment is in a comfort ambient condition. By this time, the first air outlet is controlled to output airflow corresponding to a distribution pattern and the second air outlet is controlled to output airflow corresponding to a distribution pattern simultaneously according to one or more fourth control subparameters. For example, the first air outlet is controlled to deflect airflow upwardly, and the first air outlet is controlled to deflect airflow horizontally, as shown in FIG. 10. Thus, the airflow output by the air conditioner is no longer concentrated in the trunk area space of the human body, thereby preventing high-temperature hot air from directly impacting the body and head areas of people or from being excessively conveyed to a space at such a height to cause discomfort of the human body after the ambient temperature reaches a comfortable temperature.

[0031] In addition, since the air conditioner has heated the environment for a period of time, the hot air in the surrounding environment is mainly concentrated on the top of the environment. By controlling the first air outlet, the hot air at the top of the environment could be promoted to circulate downward to other areas. Optionally, the temperature of the airflow output by the first air outlet could be reduced, and the intensity of the airflow output by the first air outlet could be enhanced, thereby accelerating the circulation of heat in the surrounding environment and achieving energy-conservation operation func-

tion of the air conditioner.

[0032] FIG. 11 shows the comparison of the relevant indicators when different air-deflecting airflow distribution patterns are used after the air conditioner performs heating operation for 3 hours, wherein centrifugal layered air-out is the air-deflecting airflow distribution pattern used in some embodiments of the present invention. It can be seen from the comparison of indicators that when the centrifugal layered air-out is used, the average ambient temperature reaches and stabilizes at about 20°C, and the vertical air temperature difference between a plane being 2.1m high and a plane being 0.1m high is 2.26°C, which is smaller than the vertical air temperature differences between the corresponding planes when other airflow distribution patterns are used; the ambient average temperature uniformity is 1.24°C, which is 2.12°C -2.51°C lower than those when other airflow distribution patterns are used, wherein the temperature uniformity is improved by 63%-74%; and the temperature rise rate of the area lower than 1.1 meters is 0.6°C/min in the first 30 minutes, which is 20%-50% higher than those when other airflow distribution patterns are used. Compared with several other airflow distribution patterns, after the air conditioner operates for 3 hours, the power consumption is the lowest, thus energy conservation of the air conditioner is achieved. In addition, by comparing the temperature cloud diagrams of the environment under different airflow distribution patterns, in the case that the one or more airflow distribution patterns of some embodiments of the present invention are used, when the air conditioner performs heating operation, the heat distribution in each area of the environment is uniform and the heat utilization efficiency in the environment is higher. But in the case that other airflow distribution patterns are used (for example, frontal air-out, encircling air-out, upper air-out and the like of the air conditioner), the heat distribution in the environment is mostly concentrated in the upper area and the ambient heat distribution is not uniform, thus the heat utilization efficiency is low.

[0033] Optionally, after controlling the air conditioner to output airflow corresponding to one or more distribution patterns according to the one or more control parameters, the method further comprises: acquiring temperatures of a plurality of sampling points preset in a space where the air conditioner is located to obtain a plurality of temperature values; and generating a temperature distribution diagram within the space based on the plurality of temperature values and positions of the sampling points corresponding to the plurality of temperature values.

[0034] As an optional implementation manner of some embodiments of the present invention, a plurality of sampling points may be selected in the space where the air conditioner is located, temperature sensors are disposed at the sampling points to acquire temperatures of the plurality of sampling points, and one or more temperature distribution patterns for the space where the air conditioner is located are generated according to the plurality

of sampling points.

[0035] For example, the placement position of the air conditioner is shown in FIG. 12, and the arrangement of the temperature sampling points in FIG. 12 comprises: in the vertical direction, a plane of temperature sensors is disposed at each height of 0.1m, 0.6m, 1.1m, 1.6m, and 2.1m from the ground. Totally 17 rows (1 to 17) of temperature sensors are uniformly disposed in the length direction of each plane, and totally 10 rows (A to J) of temperature sensors are uniformly disposed in the width direction. Totally 850 temperature sensors are disposed in a room for acquiring the temperature in the spatial range where the air conditioner is located, that is, 850 sampling points are disposed in the space where the air conditioner is located.

[0036] Optionally, the at least two air outlets comprise a first air outlet and a second air outlet, wherein the first air outlet is disposed to be higher than the second air outlet. If the operating mode is a heating mode, after controlling the air conditioner to output airflow corresponding to one or more distribution patterns according to the one or more control parameters, the method further comprises: obtaining a temperature value of a first sampling point and a temperature value of a second sampling point in the space where the air conditioner is located; judging if the difference between the temperature value of the first sampling point and the temperature value of the second sampling point is greater than a preset first temperature difference; determining one or more first fifth control subparameters used for controlling the first air outlet to output airflow corresponding to a distribution pattern and adjusting the speed at which the first air outlet outputs the airflow if the difference between the temperature value of the first sampling point and the temperature value of the second sampling point is greater than the first temperature difference; and controlling the air conditioner to output airflow corresponding to one or more distribution patterns according to the one or more first control subparameters.

[0037] The air conditioner may also comprise more than two air outlets, which are disposed at different heights to achieve staggered arrangement of the air outlets of the air conditioner. When it is determined that the air conditioner is in the heating mode, the temperature values of the first sampling point and the second sampling point could be obtained, and whether the difference between the temperature value of the first sampling point and the temperature value of the second sampling point is greater than a first temperature difference is judged, wherein the first temperature difference may be set according to actual situations. The first sampling point is at a height different from the second sampling point, as shown in FIG. 13. The first sampling point could be disposed in a top area of the environment where the air conditioner is located, that is, a preset area 1, the second sampling point can be disposed in a middle area of the environment where the air conditioner is located, that is, a preset area 2. The air conditioner obtains the temper-

ature value of the preset area 1 (the first sampling point) and the temperature value of the preset area 2 (the second sampling point) through an infrared monitor. When the difference between the temperature value of the first sampling point and the temperature value of the second sampling point is greater than the first temperature difference, it is determined that the heat in the surrounding environment is concentrated in the top area. The first air outlet is controlled to output airflow corresponding to the distribution pattern according to the one or more first control subparameters, and the speed at which the first air outlet outputs the airflow is adjusted to promote circulation of the heat from the top area of the environment to other areas, thereby achieving the function of energy-conservation operating of the air conditioner.

[0038] Optionally, the at least two air outlets comprise a first air outlet and a second air outlet, wherein the first air outlet is disposed to be higher than the second air outlet; if the operating mode is a cooling mode, after controlling the air conditioner to output airflow corresponding to one or more distribution patterns according to the one or more control parameters, the method further comprises: obtaining a temperature value of a third sampling point and a temperature value of a fourth sampling point in the space where the air conditioner is located; determining one or more sixth control subparameters used for controlling the first air outlet to output airflow corresponding to a distribution pattern and controlling the second air outlet to be closed if at least one of the temperature value of the third sampling point or the temperature value of the fourth sampling point is less than a preset second temperature; and controlling the air conditioner to output airflow corresponding to one or more distribution patterns according to the one or more sixth control subparameters.

[0039] As an optional implementing manner of some embodiments of the present invention, the air conditioner may comprise two air outlets, a first air outlet disposed to be higher than a second air outlet and the second air outlet. For example, the first air outlet is disposed in the upper part of the air conditioner, and the second air outlet is disposed in the lower part of the air conditioner. The air conditioner may also comprise more than two air outlets, which are disposed at different heights to achieve staggered arrangement of the air outlets of the air conditioner. When it is determined that the air conditioner is in the cooling mode, the temperature values of a third sampling point and a fourth sampling point could be obtained, and sizes of the temperature value of the third sampling point, the temperature value of the fourth sampling point and a second temperature are judged, wherein the second temperature may be set according to actual situations. The third sampling point may be at a height different from the fourth sampling point. As shown in FIG. 14, the third sampling point could be disposed in a lower area of the environment where the air conditioner is located, that is, a preset area 3; the fourth sampling point could be disposed in the middle area of the environment

where the air conditioner is located, that is, a preset area 4. The air conditioner obtains the temperature value of the preset area 3 (the third sampling point) and the temperature value of the preset area 4 (the fourth sampling point) through an infrared monitor. When the temperature value of the third sampling point and/or the temperature value of the fourth sampling point is less than a preset temperature, it could be determined that the temperature of the surrounding environment has reached the upper limit of the comfortable temperature. People will feel uncomfortable if air is still supplied. By this time, the second air outlet could be controlled to be closed and the first air outlet could be controlled to deflect airflow downwardly to form the corresponding distribution pattern according to the one or more sixth subparameters, so as to avoid that the human body feels uncomfortable due to the generated blowing feeling.

[0040] According to some embodiments of the present invention, a computer readable storage medium comprising a stored program is further provided, wherein the program controls a device where the storage medium is located to perform the above method for controlling the air conditioner while operating.

[0041] According to some embodiments of the present invention, an embodiment of a processor for operating a program is further provided, wherein the processor performs the above method for controlling the air conditioner while the program is operating.

[0042] It should be noted that the steps shown in the flowcharts of the drawings may be performed in a computer system such as a set of computer executable instructions. In addition, although logical sequences are shown in the flowcharts, the steps shown or described may be performed in a different order than the ones described herein in some cases.

[0043] Some embodiments of the present invention further provide a device for controlling the air conditioner. It should be noted that the device for controlling the air conditioner provided by the embodiments of the present invention could be used for performing the method for controlling the air conditioner provided by the embodiments of the present invention. The device for controlling the air conditioner provided by the embodiments of the present invention will be introduced below.

[0044] According to some embodiments of the present invention, an embodiment of a device for controlling the air conditioner is further provided. FIG. 15 is a schematic view showing an optional device for controlling an air conditioner according to some embodiments of the present invention. As shown in FIG. 15, the device comprises the followings.

[0045] A first determining unit 1410 is configured to determine a current operating mode of the air conditioner. In some embodiments of the present invention, the operating mode of the air conditioner may comprise a heating mode and a cooling mode. When the current operating mode of the air conditioner is the heating mode, the air conditioner raises the ambient temperature by output-

ting hot air to the surrounding environment; and when the current operating mode of the air conditioner is the cooling mode, the air conditioner reduces the ambient temperature by outputting cold air to the surrounding environment;

A second determining unit 1420 is configured to determine one or more control parameters for controlling at least two air outlets of the air conditioner according to a current ambient temperature in the operating mode. In some embodiments of the present invention, the air conditioner may comprise two or more air outlets, all of which may output airflow to the surrounding environment so as to change the ambient temperature. When the air conditioner is in the heating mode or the cooling mode, the one or more control parameters for the air outlet of the air conditioner are determined according to the current ambient temperature of the air conditioner. Optionally, the one or more control parameters for the air outlet of the air conditioner may comprise the direction, the intensity or the temperature of the output airflow from the air outlet.

[0046] A control unit 1430 is configured to control the air conditioner to output airflow corresponding to one or more distribution patterns according to the one or more control parameters. After the one or more control parameters for the air outlet are determined, at least one of the direction, intensity or temperature of the output airflow from the air outlet could be controlled according to the one or more control parameters, thereby controlling the air conditioner to output airflow corresponding to one or more distribution patterns.

[0047] It should be noted herein that the first determining unit 1410, the second determining unit 1420 and the control unit 1430 aforementioned may be operated in a computer terminal as part of the device, and the functions realized by the above modules may be performed by a processor in the computer terminal. The computer terminal could also be a smart phone (such as an Android phone, an iOS phone, etc.), a tablet computer, a handheld computer and mobile Internet devices (Mobile Internet Devices, MIDs), a PAD, etc.

[0048] In some embodiments of the present invention, in different operating modes, the air conditioner is controlled to output airflow corresponding to one or more distribution patterns according to the ambient temperature, thus achieving the purpose of optimizing the cooling and heating comfort of the air conditioner, and the air conditioner achieves the function of energy-saving operating, thereby achieving the technical effect of improving the cooling and heating comfort of the air conditioner, and then solving the technical problem that the air conditioner is poor in cooling and heating comfort in related arts.

[0049] Optionally, if the operating mode is a cooling mode, the second determining unit comprises: a first detection module configured to detect the current ambient temperature of the environment where the air conditioner is located; a judging module configured to judge if the

current ambient temperature is greater than a first preset temperature; a first determining module configured to determine one or more first control subparameters if the current ambient temperature is greater than the first preset temperature, wherein the one or more first control subparameters are used for controlling the first air outlet and the second air outlet to simultaneously output airflow corresponding to distribution patterns; and a second determining module configured to determine one or more second control subparameters if the current ambient temperature is less than or equal to the first preset temperature, wherein the one or more second control subparameters are used for controlling the first air outlet to output airflow corresponding to a distribution pattern and controlling the second air outlet to be closed.

[0050] As shown in Fig. 2, the first air outlet is disposed in the upper part of the air conditioner, and the second air outlet is disposed in the lower part of the air conditioner. The air conditioner may also comprise more than two air outlets, which are disposed at different heights to achieve staggered arrangement of the air outlets of the air conditioner. When it is determined that the air conditioner is in a cooling mode, the current ambient temperature of the environment where the air conditioner is located is detected, and the ambient condition of the environment where the air conditioner is located is determined by determining the sizes of the current ambient temperature and a first preset temperature. The first preset temperature may be a preset temperature threshold that makes people feel comfortable. When the ambient temperature is greater than the first preset temperature, the human body feels hot, and the surrounding environment is in a hot ambient condition. By this time, the first air outlet and the second air outlet are controlled to simultaneously output airflow corresponding to distribution patterns according to the one or more second first control subparameters. Optionally, as shown in FIG. 3, the first air outlet could deflect the airflow horizontally or downwardly, and the second air outlet could deflect airflow horizontally or upwardly, so that the air conditioner outputs airflow of upper and lower encircling air-out to achieve rapid cooling of the surrounding environment, making the current hot environment transit to a comfortable environment quickly. FIG. 4 shows a temperature cloud diagram when the ambient air temperature is about to reach a comfortable temperature, in the case that the first air outlet and the second air outlet simultaneously output airflow corresponding to the distribution patterns. FIG. 5 shows a temperature cloud diagram when the ambient air temperature is about to reach a comfortable temperature in the case that the air conditioner adopts one air outlet for frontal air-out. Through the comparison of Fig. 4 and Fig. 5, it can be seen that when the first air outlet and the second air outlet simultaneously output airflow corresponding to the distribution patterns, the distribution of the ambient temperature is more uniform and it is more conducive to reduce the ambient temperature. When the ambient temperature is less than the first preset

temperature, the human body does not feel hot, and the surrounding environment is in a more comfortable ambient condition. By this time, the airflow corresponding to the distribution pattern output from the first air outlet is controlled according to the one or more third control subparameters, and the second air outlet is controlled to be closed. As shown in Fig. 6, optionally, the first air outlet could deflect the air horizontally or downwardly, thereby reducing the blowing feeling of the human body and improving the comfort level of the human body. FIG. 7 shows a temperature cloud diagram after the first air outlet is controlled to output the airflow corresponding to the distribution pattern and the second air outlet is controlled to be closed according to the one or more third control subparameters, in the case that the ambient temperature reaches the comfortable temperature. FIG. 8 shows a temperature cloud diagram of the environment in the case that one air outlet is still used for frontal air-out when the ambient temperature of the air conditioner reaches a comfortable temperature in the related art. Through the comparison of FIG. 7 and FIG. 8, it can be seen that the overall ambient temperature could be effectively controlled and the blowing feeling of the human body in the spatial range of the air conditioner could be reduced by controlling the first air outlet to output airflow corresponding to the distribution pattern and controlling the second air outlet to be closed according to the one or more third subparameters when the ambient temperature reaches the comfortable temperature, thereby enhancing the comfort level of the human body.

[0051] Optionally, the at least two air outlets comprise a first air outlet and a second air outlet, wherein the first air outlet is disposed to be higher than the second air outlet, the second determining unit comprises: a third determining module configured to determine one or more fourth control subparameters used for controlling the first air outlet to deflect airflow downwardly to output airflow corresponding to a distribution pattern and controlling the second air outlet to output airflow corresponding a distribution pattern; a second detection module configured to detect the current ambient temperature of the environment where the air conditioner is located; and a fourth determining module configured to determine one or more fifth control subparameters used for controlling the first air outlet to output airflow corresponding to a distribution pattern and controlling the second air outlet to output airflow corresponding to a distribution pattern if the current ambient temperature is greater than a second preset temperature.

[0052] The air conditioner may also comprise more than two air outlets, which are disposed at different heights to achieve staggered arrangement of the air outlets of the air conditioner. When it is determined that the air conditioner is in the heating mode, the first air outlet is controlled to deflect air downwardly to output airflow corresponding to a distribution pattern and the second air outlet is controlled to output airflow corresponding to a distribution pattern according to the one or more third

control subparameters. As shown in FIG. 9, at this time, the second air outlet deflects hot air towards the lower area of the environment to heat the space where the human feet are located; the first air outlet deflects hot air downwardly to heat the space where the body of the human body is located. The airflow output by the air conditioner is concentrated in the lower area and a space where the trunk area of the human body is located. Due to such airflow distribution patterns, the surrounding environment has a small temperature gradient and the ambient temperature distribution has good temperature uniformity; at the same time, the airflow output by the air conditioner in the heating mode is the hot airflow, so the ascent of the hot airflow in the lower area is favorable for effectively heating the environment in the spatial range of the air conditioner. The air conditioner could also detect the current ambient temperature, and the ambient condition of the air conditioner is determined by determining the sizes of the current ambient temperature and a second preset temperature. The second preset temperature may be a preset temperature threshold that makes people feel comfortable. When the ambient temperature is less than the second preset temperature, the human body feels cold, and the surrounding environment is in a cold ambient condition, thus airflow corresponding to one or more distribution patterns output by the air conditioner are kept unchanged to heat the surrounding environment. When the ambient temperature is greater than the second preset temperature, the human body does not feel cold, and the surrounding environment is in a comfort ambient condition. By this time, the first air outlet is controlled to output airflow corresponding to a distribution pattern and the second air outlet is controlled to output airflow corresponding to a distribution pattern simultaneously according to one or more fifth control subparameters, as shown in FIG. 10. Thus, the airflow output by the air conditioner is no longer concentrated in the trunk area space of the human body, thereby preventing high-temperature hot air from directly impacting the body and head areas of people or from being excessively conveyed to a space at such a height to cause discomfort of the human body after the ambient temperature reaches a comfortable temperature.

[0053] In addition, since the air conditioner has heated the environment for a period of time, the hot air in the surrounding environment is mainly concentrated on the top of the environment. By controlling the first air outlet, the hot air at the top of the environment could be promoted to circulate downward to other areas. Optionally, the temperature of the airflow output by the first air outlet could be reduced, and the intensity of the airflow output by the first air outlet could be enhanced, thereby accelerating the circulation of heat in the surrounding environment and achieving energy-conservation operation function of the air conditioner.

[0054] FIG. 11 shows the comparison of the relevant indicators when different air-deflecting airflow distribution patterns are used after the air conditioner performs heat-

ing operation for 3 hours, wherein centrifugal layered air-out is the air-deflecting airflow distribution pattern used in some embodiments of the present invention. It can be seen from the comparison of indicators that when the centrifugal layered air-out is used, the average ambient temperature reaches and stabilizes at about 20°C, and the vertical air temperature difference between a plane being 2.1m high and a plane being 0.1m high is 2.26°C, which is smaller than the vertical air temperature differences between the corresponding planes when other airflow distribution patterns are used; the ambient average temperature uniformity is 1.24°C, which is 2.12°C -2.51°C lower than those when other airflow distribution patterns are used, wherein the temperature uniformity is improved by 63%-74%; and the temperature rise rate of the area lower than 1.1 meters is 0.6°C/min in the first 30 minutes, which is 20%-50% higher than those when other airflow distribution patterns are used. Compared with several other airflow distribution patterns, after the air conditioner operates for 3 hours, the power consumption is the lowest, thus energy conservation of the air conditioner is achieved. In addition, by comparing the temperature cloud diagrams of the environment under different airflow distribution patterns, in the case that the one or more airflow distribution patterns of some embodiments of the present invention are used, when the air conditioner performs heating operation, the heat distribution in each area of the environment is uniform and the heat utilization efficiency in the environment is higher. But in the case that other airflow distribution patterns are used, the heat distribution in the environment is mostly concentrated in the upper area and the ambient heat distribution is not uniform, thus the heat utilization efficiency is low.

[0055] According to some embodiments of the present invention, an air conditioner is further provided, comprising the followings.

[0056] A sensor is configured to determine a current operating mode of the air conditioner. In some embodiments of the present invention, the operating mode of the air conditioner may comprise a heating mode and a cooling mode. When the current operating mode of the air conditioner is the heating mode, the air conditioner raises the ambient temperature by outputting hot air to the surrounding environment; and when the current operating mode of the air conditioner is the cooling mode, the air conditioner reduces the ambient temperature by outputting cold air to the surrounding environment.

[0057] A processor is configured to determine, in the current operating mode, one or more control parameters for controlling at least two air outlets of the air conditioner according to the current ambient temperature and generate a control instruction. In some embodiments of the present invention, the air conditioner may comprise two or more air outlets, all of which may output airflow to the surrounding environment so as to change the ambient temperature. When the air conditioner is in the heating mode or the cooling mode, the one or more control pa-

rameters for the air outlet of the air conditioner are determined according to the current ambient temperature of the air conditioner. The one or more control parameters for the air outlet of the air conditioner may comprise at least one of the direction, the intensity or the temperature of the output airflow from the air outlet.

[0058] An actuator is configured to control the air conditioner to output airflow corresponding to one or more distribution patterns according to the one or more control parameters. After the one or more control parameters for the air outlet are determined, at least one of the direction, the intensity or the temperature of the output airflow of the air outlet can be controlled according to the one or more control parameter, thereby controlling the air conditioner to output airflow corresponding to the distribution pattern.

[0059] The above-described embodiments of the present invention are merely for the purpose of description, and do not represent the merits of the embodiments.

[0060] In the above embodiments of the present invention, the description of each embodiment has its own emphasis, and for a part not detailed in a certain embodiment, reference can be made to the related description of other embodiments.

[0061] In the several embodiments provided by the present application, it should be understood that the disclosed technical contents may be implemented in other ways as long as within the scope of the invention as defined in the claims. The device embodiments described above are only schematic. For example, the division of the unit may be a logical function division, but may be a division in other manner. For instance, a plurality of units or components may be combined or integrated into another system, or some features can be ignored or not performed, as long as these features are defined as optional in the appended claims. In addition, the mutual coupling or direct coupling or communication connection shown or discussed may be an indirect coupling or communication connection through some interfaces, units or modules, and may be electrical or otherwise.

[0062] The units illustrated as separate components may or may not be physically separated, and the components shown as units may or may not be physical units, that is, they may be located in one place, or may be distributed on multiple units. Part or all of the units may be selected according to actual needs to achieve the purpose of the solution of the embodiment.

[0063] In addition, respective functional units in respective embodiments of the present invention may be integrated in one processing unit, or may be present physically separately, or two or more units may be integrated in one unit. The integrated unit above can be implemented in the form of hardware or a software functional unit.

[0064] The integrated unit, if implemented in the form of a software functional unit and sold or used as a standalone product, may be stored in a computer readable storage medium. Based on such an understanding, in

essence, the technical solution of the present invention, or the part of the technical solution making contribution to the prior art, or all or part of the technical solution may be embodied in the form of a software product. The computer software product is stored in a storage medium, and includes a number of instructions for enabling a computer device (which may be a personal computer, a server or a network device, etc.) to perform all or part of the steps of the method described in the embodiments of the present invention. The foregoing storage medium includes: a U disk, a read-only memory (ROM, Read-Only Memory), a random access memory (RAM, Read-Only Memory), a removable hard disk, a magnetic disk, or an optical disk or other medium capable of storing program codes.

[0065] The above description are merely preferred embodiments of the present invention. It should be noted that various improvements and modifications may also be made for those of ordinary skill in the art without departing from the principles of the present invention as set out in the appended claims, and these improvements and modifications also should be contemplated as being within the protection scope of the present invention.

Claims

1. A method for controlling an air conditioner, comprising:

determining a current operating mode of the air conditioner (S 102);

determining one or more control parameters for controlling at least two air outlets of the air conditioner according to a current ambient temperature in the operating mode (S 104), wherein, the one or more control parameters comprise at least one of the direction, the intensity or the temperature of the airflow output from the air outlet, the at least two air outlets comprise a first air outlet and a second air outlet, and the first air outlet is disposed to be higher than the second air outlet; and

controlling the air conditioner to output airflow corresponding to one or more distribution patterns according to the one or more control parameters (S 106);

acquiring temperatures of a plurality of sampling points preset in a space where the air conditioner is located to obtain a plurality of temperature values;

generating a temperature distribution diagram within the space based on the plurality of temperature values and positions of the sampling points corresponding to the plurality of temperature values; and

if the operating mode is a heating mode, the method further comprises:

- obtaining a temperature value of a first sampling point and a temperature value of a second sampling point in the space where the air conditioner is located;
 judging if the difference between the temperature value of the first sampling point and the temperature value of the second sampling point is greater than a preset first temperature difference;
 determining one or more first control subparameters used for controlling the first air outlet to output airflow corresponding to a distribution pattern and adjusting the speed at which the first air outlet outputs the airflow if the difference between the temperature value of the first sampling point and the temperature value of the second sampling point is greater than the first temperature difference; and
 controlling the air conditioner to output airflow corresponding to one or more distribution patterns according to the one or more first control subparameters.
2. The method according to claim 1, **characterized in that**
 if the operating mode is a cooling mode, the determining one or more control parameters for controlling at least two air outlets of the air conditioner according to a current ambient temperature in the operating mode (S104) comprises:
 detecting the current ambient temperature of the environment where the air conditioner is located;
 judging if the current ambient temperature is greater than a first preset temperature;
 determining one or more second control subparameters used for controlling the first air outlet and the second air outlet to simultaneously output airflow corresponding to distribution patterns if the current ambient temperature is greater than the first preset temperature;
 determining one or more third control subparameters used for controlling the first air outlet to output airflow corresponding to a distribution pattern and controlling the second air outlet to be closed if the current ambient temperature is less than or equal to the first preset temperature.
3. The method according to claim 2, **characterized in that** the one or more second control subparameters are used for controlling the first air outlet to deflect airflow horizontally or downwardly, and controlling the second air outlet to deflect airflow horizontally or upwardly.
4. The method according to claim 1, **characterized in that**
 if the operating mode is a heating mode, the determining one or more control parameters for controlling at least two air outlets of the air conditioner according to a current ambient temperature in the operating mode (S104) comprises:
 determining one or more fourth control subparameters used for controlling the first air outlet to deflect airflow downwardly to output airflow corresponding to a distribution pattern and controlling the second air outlet to output airflow corresponding to a distribution pattern;
 detecting the current ambient temperature of the environment where the air conditioner is located;
 determining one or more fifth control subparameters used for controlling the first air outlet to output airflow corresponding to a distribution pattern and controlling the second air outlet to output airflow corresponding to a distribution pattern if the current ambient temperature is greater than a second preset temperature.
5. The method according to claim 1, **characterized in that** the first sampling point is disposed in a top area of the environment where the air conditioner is located, and the second sampling point is disposed in a middle area of the environment where the air conditioner is located.
6. The method according to claim 1, **characterized in that**
 if the operating mode is a cooling mode, after controlling the air conditioner to output airflow corresponding to one or more distribution patterns according to the one or more control parameters (S106), the method further comprises:
 obtaining a temperature value of a fourth sampling point and a temperature value of a fifth sampling point in the space where the air conditioner is located;
 determining one or more sixth control subparameters used for controlling the first air outlet to output airflow corresponding to a distribution pattern and controlling the second air outlet to be closed if at least one of the temperature value of the fourth sampling point or the temperature value of the fifth sampling point is less than a preset second temperature; and
 controlling the air conditioner to output airflow corresponding to one or more distribution patterns according to the one or more sixth control subparameters.
7. The method according to claim 6, **characterized in that** the fourth sampling point is disposed in a lower

area of the environment where the air conditioner is located, and the fifth sampling point is disposed in the middle area of the environment where the air conditioner is located.

8. A device for controlling an air conditioner, comprising:

a first determining unit (1410) configured to determine a current operating mode of the air conditioner;

a second determining unit (1420) configured to determine one or more control parameters for controlling at least two air outlets of the air conditioner according to a current ambient temperature in the operating mode, wherein, the one or more control parameters comprise at least one of the direction, the intensity or the temperature of the airflow output from the air outlet, the at least two air outlets comprise a first air outlet and a second air outlet, and the first air outlet is disposed to be higher than the second air outlet; and

a control unit (1430) configured to control the air conditioner to output airflow corresponding to one or more distribution patterns according to the one or more control parameters;

wherein, the device is further configured to acquire temperatures of a plurality of sampling points preset in a space where the air conditioner is located to obtain a plurality of temperature values, and to generate a temperature distribution diagram within the space based on the plurality of temperature values and positions of the sampling points corresponding to the plurality of temperature values; and

if the operating mode is a heating mode, the device is further configured to: obtain a temperature value of a first sampling point and a temperature value of a second sampling point in the space where the air conditioner is located, to judge if the difference between the temperature value of the first sampling point and the temperature value of the second sampling point is greater than a preset first temperature difference, to determine one or more first control subparameters used for controlling the first air outlet to output airflow corresponding to a distribution pattern and adjusting the speed at which the first air outlet outputs the airflow if the difference between the temperature value of the first sampling point and the temperature value of the second sampling point is greater than the first temperature difference, and to control the air conditioner to output airflow corresponding to one or more distribution patterns according to the one or more first control subparameters.

9. The device according to claim 8, **characterized in that**

if the operating mode is a cooling mode, the second determining unit (1420) comprises:

a first detection module configured to detect the current ambient temperature of the environment where the air conditioner is located;

a judging module configured to judge if the current ambient temperature is greater than a first preset temperature;

a first determining module configured to determine one or more second control subparameters used for controlling the first air outlet and the second air outlet to simultaneously output airflow corresponding to distribution patterns if the current ambient temperature is greater than the first preset temperature; and

a second determining module configured to one or more third control subparameters used for controlling the first air outlet to output airflow corresponding to a distribution pattern and controlling the second air outlet to be closed if the current ambient temperature is less than or equal to the first preset temperature.

10. The device according to claim 8, **characterized in that** the second determining unit (1420) comprises:

a third determining module configured to determine one or more fourth control subparameters used for controlling the first air outlet to deflect airflow downwardly to output airflow corresponding to a distribution pattern and controlling the second air outlet to output airflow corresponding to a distribution pattern;

a second detection module configured to detect the current ambient temperature of the environment where the air conditioner is located; and a fourth determining module configured to determine one or more fifth control subparameters used for controlling the first air outlet to output airflow corresponding to a distribution pattern and controlling the second air outlet to output airflow corresponding to a distribution pattern if the current ambient temperature is greater than a second preset temperature.

11. A computer readable storage medium comprising a stored program, wherein the program controls a device configured for controlling an air conditioner where the storage medium is located to implement the method when executed on the device for controlling the air conditioner according to any one of claims 1 to 7 while operating.

12. A processor for controlling an air conditioner for operating a program, wherein the processor imple-

ments a program configured to control the air conditioner according to the method according to any one of claims 1 to 7 while the program is operating.

13. An air conditioner, **characterized by** comprising: 5
- a sensor configured to determine a current operating mode of the air conditioner;
 - the processor of claim 12; and
 - an actuator configured to control the air conditioner to output airflow corresponding to one or more distribution patterns according to the one or more control parameters. 10

Patentansprüche

1. Verfahren zur Steuerung einer Klimaanlage, umfassend: 20
- Bestimmung eines aktuellen Betriebsmodus der Klimaanlage (S102);
 - Bestimmen von einem oder mehreren Steuerparametern zum Steuern von mindestens zwei Luftauslässen der Klimaanlage gemäß einer aktuellen Umgebungstemperatur in dem Betriebsmodus (S104), wobei der eine oder die mehreren Steuerparameter mindestens Richtung, Intensität oder Temperatur des von dem Luftauslass ausgegebenen Luftstroms umfassen, die mindestens zwei Luftauslässe einen ersten Luftauslass und einen zweiten Luftauslass umfassen und der erste Luftauslass so angeordnet ist, dass er höher als der zweite Luftauslass ist; und Steuerung der Klimaanlage zur Ausgabe eines Luftstroms, der einem oder mehreren Verteilungsmustern entspricht, entsprechend dem einen oder den mehreren Steuerparametern (S106);
 - Erfassen von Temperaturen an einer Vielzahl von Abtastpunkten, die in einem Raum, in dem sich die Klimaanlage befindet, voreingestellt sind, um eine Vielzahl von Temperaturwerten zu erhalten;
 - Erzeugen eines Temperaturverteilungsdiagramms innerhalb des Raums auf der Grundlage der mehreren Temperaturwerte und der Positionen der Abtastpunkte, die den mehreren Temperaturwerten entsprechen; und
 - wenn der Betriebsmodus ein Heizmodus ist, umfasst das Verfahren außerdem: 50

- Ermitteln eines Temperaturwerts eines ersten Abtastpunktes und eines Temperaturwerts eines zweiten Abtastpunktes in dem Raum, in dem sich die Klimaanlage befindet;
- Beurteilung, ob die Differenz zwischen dem

Temperaturwert des ersten Abtastpunktes und dem Temperaturwert des zweiten Abtastpunktes größer ist als eine vorgegebene erste Temperaturdifferenz;

Bestimmen eines oder mehrerer erster Steuerungsunterparameter, die zum Steuern des ersten Luftauslasses verwendet werden, um einen Luftstrom entsprechend einem Verteilungsmuster auszugeben, und Einstellen der Geschwindigkeit, mit der der erste Luftauslass den Luftstrom ausgibt, wenn die Differenz zwischen dem Temperaturwert des ersten Abtastpunktes und dem Temperaturwert des zweiten Abtastpunktes größer ist als die erste Temperaturdifferenz; und Steuerung der Klimaanlage zur Ausgabe eines Luftstroms, der einem oder mehreren Verteilungsmustern gemäß dem einen oder den mehreren ersten Steuerungsunterparametern entspricht.

2. Verfahren nach Anspruch 1, **dadurch gekennzeichnet, dass**

wenn der Betriebsmodus ein Kühlmodus ist, das Bestimmen eines oder mehrerer Steuerparameter zum Steuern von mindestens zwei Luftauslässen der Klimaanlage gemäß einer aktuellen Umgebungstemperatur in dem Betriebsmodus (S104) umfasst:

- Erfassung der aktuellen Umgebungstemperatur der Umgebung, in der sich die Klimaanlage befindet;

- Beurteilung, ob die aktuelle Umgebungstemperatur höher ist als eine erste voreingestellte Temperatur;

- Bestimmen eines oder mehrerer zweiter Steuerungsunterparameter, die zur Steuerung des ersten Luftauslasses und des zweiten Luftauslasses verwendet werden, um gleichzeitig einen den Verteilungsmustern entsprechenden Luftstrom abzugeben, wenn die aktuelle Umgebungstemperatur höher als die erste voreingestellte Temperatur ist;

- Bestimmung eines oder mehrerer dritter Steuerungsunterparameter, die zur Steuerung des ersten Luftauslasses verwendet werden, um einen Luftstrom entsprechend einem Verteilungsmuster auszugeben, und Steuerung des zweiten Luftauslasses, der geschlossen werden muss, wenn die aktuelle Umgebungstemperatur kleiner oder gleich der ersten voreingestellten Temperatur ist.

3. Verfahren nach Anspruch 2, **dadurch gekennzeichnet, dass** der eine oder die mehreren zweiten Steuerungsunterparameter zur Steuerung des ersten Luftauslasses verwendet werden, um den Luft-

strom horizontal oder nach unten abzulenken, und zur Steuerung des zweiten Luftauslasses, um den Luftstrom horizontal oder nach oben abzulenken.

4. System nach Anspruch 1, **dadurch gekennzeichnet, dass** wenn der Betriebsmodus ein Heizmodus ist, das Bestimmen eines oder mehrerer Steuerparameter zum Steuern von mindestens zwei Luftauslässen der Klimaanlage gemäß einer aktuellen Umgebungstemperatur in dem Betriebsmodus (S104) umfasst:

Bestimmen eines oder mehrerer vierter Steuerungsunterparameter, die zum Steuern des ersten Luftauslasses verwendet werden, um den Luftstrom nach unten abzulenken, um einen einem Verteilungsmuster entsprechenden Luftstrom auszugeben, und Steuern des zweiten Luftauslasses, um einen einem Verteilungsmuster entsprechenden Luftstrom auszugeben; Erfassung der aktuellen Umgebungstemperatur der Umgebung, in der sich die Klimaanlage befindet;

Bestimmen eines oder mehrerer fünfter Steuerungsunterparameter, die zum Steuern des ersten Luftauslasses verwendet werden, um einen einem Verteilungsmuster entsprechenden Luftstrom auszugeben, und Steuern des zweiten Luftauslasses, um einen einem Verteilungsmuster entsprechenden Luftstrom auszugeben, wenn die aktuelle Umgebungstemperatur größer als eine zweite voreingestellte Temperatur ist.

5. Verfahren nach Anspruch 1, **dadurch gekennzeichnet, dass** der erste Abtastpunkt in einem oberen Bereich der Umgebung angeordnet ist, in dem sich die Klimaanlage befindet, und dass der zweite Abtastpunkt in einem mittleren Bereich der Umgebung angeordnet ist, in dem sich die Klimaanlage befindet.

6. Verfahren nach Anspruch 1, **dadurch gekennzeichnet, dass**, wenn der Betriebsmodus ein Kühlmodus ist, nach der Steuerung der Klimaanlage zur Ausgabe eines Luftstroms, der einem oder mehreren Verteilungsmustern gemäß dem einen oder den mehreren Steuerparametern (S106) entspricht, das Verfahren ferner umfasst:

Ermitteln eines Temperaturwerts eines vierten Abtastpunktes und eines Temperaturwerts eines fünften Abtastpunktes in dem Raum, in dem sich die Klimaanlage befindet;

Bestimmen eines oder mehrerer sechster Steuerungsunterparameter, die zur Steuerung des ersten Luftauslasses verwendet werden, um einen Luftstrom auszugeben, der einem Vertei-

lungsmuster entspricht, und Steuern des zweiten Luftauslasses, der geschlossen werden muss, wenn mindestens der Temperaturwert des vierten Abtastpunktes oder der Temperaturwert des fünften Abtastpunktes kleiner als eine voreingestellte zweite Temperatur ist; und Steuerung der Klimaanlage zur Ausgabe eines Luftstroms entsprechend einem oder mehreren Verteilungsmustern gemäß dem einen oder den mehreren sechsten Steuerungsunterparametern.

7. Verfahren nach Anspruch 6, **dadurch gekennzeichnet, dass** der vierte Abtastpunkt in einem unteren Bereich der Umgebung angeordnet ist, in dem sich die Klimaanlage befindet, und der fünfte Abtastpunkt in dem mittleren Bereich der Umgebung angeordnet ist, in dem sich die Klimaanlage befindet.

8. Vorrichtung zur Steuerung einer Klimaanlage, umfassend:

eine erste Bestimmungseinheit (1410), die so konfiguriert ist, dass sie einen aktuellen Betriebsmodus der Klimaanlage bestimmt;

eine zweite Bestimmungseinheit (1420), die so konfiguriert ist, dass sie einen oder mehrere Steuerparameter zum Steuern von mindestens zwei Luftauslässen der Klimaanlage gemäß einer aktuellen Umgebungstemperatur in dem Betriebsmodus bestimmt, wobei der eine oder die mehreren Steuerparameter mindestens einen der Parameter Richtung, Intensität oder Temperatur des von dem Luftauslass ausgegebenen Luftstroms umfassen, die mindestens zwei Luftauslässe einen ersten Luftauslass und einen zweiten Luftauslass umfassen und der erste Luftauslass so angeordnet ist, dass er höher als der zweite Luftauslass ist; und

eine Steuereinheit (1430), die so konfiguriert ist, dass sie die Klimaanlage so steuert, dass sie einen Luftstrom ausgibt, der einem oder mehreren Verteilungsmustern gemäß dem einen oder den mehreren Steuerparametern entspricht;

wobei die Vorrichtung ferner so konfiguriert ist, dass sie Temperaturen einer Vielzahl von Abtastpunkten erfasst, die in einem Raum, in dem sich die Klimaanlage befindet, voreingestellt sind, um eine Vielzahl von Temperaturwerten zu erhalten, und dass sie ein Temperaturverteilungsdiagramm innerhalb des Raums auf der Grundlage der Vielzahl von Temperaturwerten und Positionen der Abtastpunkte entsprechend der Vielzahl von Temperaturwerten erzeugt; und

wenn der Betriebsmodus ein Heizmodus ist, ist die Vorrichtung ferner konfiguriert, um: einen

Temperaturwert eines ersten Abtastpunktes und einen Temperaturwert eines zweiten Abtastpunktes in dem Raum, in dem sich die Klimaanlage befindet, zu erhalten, um zu beurteilen, ob die Differenz zwischen dem Temperaturwert des ersten Abtastpunktes und dem Temperaturwert des zweiten Abtastpunktes größer ist als eine vorgegebene erste Temperaturdifferenz, einen oder mehrere erste Steuerunterparameter zu bestimmen, die zum Steuern des ersten Luftauslasses verwendet werden, um einen Luftstrom entsprechend einem Verteilungsmuster auszugeben und die Geschwindigkeit einzustellen, mit der der erste Luftauslass den Luftstrom ausgibt, wenn die Differenz zwischen dem Temperaturwert des ersten Abtastpunktes und dem Temperaturwert des zweiten Abtastpunktes größer als die erste Temperaturdifferenz ist, und die Klimaanlage zu steuern, um einen Luftstrom entsprechend einem oder mehreren Verteilungsmustern gemäß dem einen oder mehreren ersten Steuerunterparametern auszugeben.

9. Vorrichtung nach Anspruch 8, dadurch gekennzeichnet, dass

wenn der Betriebsmodus ein Kühlmodus ist, die zweite Bestimmungseinheit (1420) Folgendes umfasst:

ein erstes Erfassungsmodul, das so konfiguriert ist, dass es die aktuelle Umgebungstemperatur der Umgebung, in der sich das Klimagerät befindet, erfasst;

ein Beurteilungsmodul, das so konfiguriert ist, dass es beurteilt, ob die aktuelle Umgebungstemperatur höher ist als eine erste voreingestellte Temperatur;

ein erstes Bestimmungsmodul, das so konfiguriert ist, dass es einen oder mehrere zweite Steuerungsunterparameter bestimmt, die zur Steuerung des ersten Luftauslasses und des zweiten Luftauslasses verwendet werden, um gleichzeitig einen Luftstrom entsprechend den Verteilungsmustern auszugeben, wenn die aktuelle Umgebungstemperatur größer als die erste voreingestellte Temperatur ist; und

ein zweites Bestimmungsmodul, das so konfiguriert ist, dass es einen oder mehrere dritte Steuerungsunterparameter verwendet, um den ersten Luftauslass so zu steuern, dass er einen Luftstrom ausgibt, der einem Verteilungsmuster entspricht, und um den zweiten Luftauslass so zu steuern, dass er geschlossen wird, wenn die aktuelle Umgebungstemperatur kleiner als oder gleich der ersten voreingestellten Temperatur ist.

10. Vorrichtung nach Anspruch 8, dadurch gekennzeichnet, dass die zweite Bestimmungseinheit (1420) Folgendes umfasst:

ein drittes Bestimmungsmodul, das so konfiguriert ist, dass es einen oder mehrere vierte Steuerunterparameter bestimmt, die zum Steuern des ersten Luftauslasses verwendet werden, um den Luftstrom nach unten abzulenken, um einen Luftstrom auszugeben, der einem Verteilungsmuster entspricht, und zum Steuern des zweiten Luftauslasses, um einen Luftstrom auszugeben, der einem Verteilungsmuster entspricht;

ein zweites Erfassungsmodul, das so konfiguriert ist, dass es die aktuelle Umgebungstemperatur der Umgebung, in der sich das Klimagerät befindet, erfasst; und

ein viertes Bestimmungsmodul, das so konfiguriert ist, dass es einen oder mehrere fünfte Steuerungsunterparameter bestimmt, die zum Steuern des ersten Luftauslasses verwendet werden, um einen Luftstrom entsprechend einem Verteilungsmuster auszugeben, und zum Steuern des zweiten Luftauslasses, um einen Luftstrom entsprechend einem Verteilungsmuster auszugeben, wenn die aktuelle Umgebungstemperatur größer als eine zweite voreingestellte Temperatur ist.

11. Computerlesbares Speichermedium mit einem gespeicherten Programm, wobei das Programm eine Vorrichtung steuert, die zur Steuerung einer Klimaanlage konfiguriert ist, in der sich das Speichermedium befindet, um das Verfahren zu implementieren, wenn es auf der Vorrichtung ausgeführt wird, um die Klimaanlage nach einem der Ansprüche 1 bis 7 während des Betriebs zu steuern.

12. Prozessor zur Steuerung einer Klimaanlage zur Ausführung eines Programms, wobei der Prozessor ein Programm implementiert, das so konfiguriert ist, dass es die Klimaanlage gemäß dem Verfahren nach einem der Ansprüche 1 bis 7 steuert, während das Programm ausgeführt wird.

13. Eine Klimaanlage, dadurch gekennzeichnet, dass sie umfasst:

einen Sensor, der so konfiguriert ist, dass er einen aktuellen Betriebsmodus der Klimaanlage bestimmt;

der Prozessor nach Anspruch 12, und

ein Stellglied, das so konfiguriert ist, dass es die Klimaanlage so steuert, dass sie einen Luftstrom ausgibt, der einem oder mehreren Verteilungsmustern gemäß dem einen oder den mehreren Steuerparametern entspricht.

Revendications

1. Procédé de commande d'un climatiseur, comprenant :

la détermination du mode de fonctionnement actuel du climatiseur (S102) ;
la détermination d'un ou plusieurs paramètres de commande pour commander au moins deux sorties d'air du climatiseur en fonction d'une température ambiante actuelle dans le mode de fonctionnement (S104), dans lequel, le ou les paramètres de commande comprennent au moins l'un parmi la direction, l'intensité ou la température du flux d'air sortant de la sortie d'air, les au moins deux sorties d'air comprennent une première sortie d'air et une deuxième sortie d'air, et la première sortie d'air est disposée de manière à être plus élevée que la deuxième sortie d'air ; et
la commande du climatiseur pour qu'il émette un débit d'air correspondant à un ou plusieurs modèles de distribution en fonction d'un ou plusieurs paramètres de commande (S106) ;
l'acquisition des températures d'une pluralité de points d'échantillonnage prédéfinis dans un espace où se trouve le climatiseur, afin d'obtenir une pluralité de valeurs de température ;
la génération d'un diagramme de distribution de la température dans l'espace sur la base de la pluralité de valeurs de température et des positions des points d'échantillonnage correspondant à la pluralité de valeurs de température ; et
si le mode de fonctionnement est un mode de chauffage, le procédé comprend en outre :

l'obtention d'une valeur de température d'un premier point d'échantillonnage et d'une valeur de température d'un deuxième point d'échantillonnage dans l'espace où se trouve le climatiseur ;
la détermination si la différence entre la valeur de température du premier point d'échantillonnage et la valeur de température du deuxième point d'échantillonnage est supérieure à une première différence de température prédéfinie ;
la détermination d'un ou plusieurs premiers sous-paramètres de commande utilisés pour commander la première sortie d'air afin de produire un flux d'air correspondant à un modèle de distribution et ajuster la vitesse à laquelle la première sortie d'air produit le flux d'air si la différence entre la valeur de température du premier point d'échantillonnage et la valeur de température du deuxième point d'échantillonnage est supérieure à la première différence de

température ; et

la commande du climatiseur pour qu'il émette un débit d'air correspondant à un ou plusieurs modèles de distribution en fonction d'un ou plusieurs premiers sous-paramètres de commande.

2. Procédé selon la revendication 1, **caractérisé en ce que** :

si le mode de fonctionnement est un mode de refroidissement, la détermination d'un ou plusieurs paramètres de commande pour commander au moins deux sorties d'air du climatiseur en fonction d'une température ambiante actuelle dans le mode de fonctionnement (S104) comprend :

la détection de la température ambiante actuelle de l'environnement où se trouve le climatiseur ;
la détermination si la température ambiante actuelle est supérieure à une première température prédéfinie ;

la détermination d'un ou plusieurs deuxièmes sous-paramètres de commande utilisés pour commander la première sortie d'air et la deuxième sortie d'air afin de produire simultanément un débit d'air correspondant à des modèles de distribution si la température ambiante actuelle est supérieure à la première température prédéfinie ;

la détermination d'un ou plusieurs troisièmes sous-paramètres de commande utilisés pour commander la première sortie d'air afin qu'elle émette un flux d'air correspondant à un modèle de distribution et pour commander la fermeture de la deuxième sortie d'air si la température ambiante actuelle est inférieure ou égale à la première température prédéfinie.

3. Procédé selon la revendication 2, **caractérisé en ce que** le ou les deuxièmes sous-paramètres de commande sont utilisés pour commander la première sortie d'air afin de dévier le flux d'air horizontalement ou vers le bas, et pour commander la deuxième sortie d'air afin de dévier le flux d'air horizontalement ou vers le haut.

4. Procédé selon la revendication 1, **caractérisé en ce que** :

si le mode de fonctionnement est un mode de chauffage, la détermination d'un ou plusieurs paramètres de commande pour commander au moins deux sorties d'air du climatiseur en fonction d'une température ambiante actuelle dans le mode de fonctionnement (S104) comprend :

la détermination d'un ou plusieurs quatrièmes sous-paramètres de commande utilisés pour commander la première sortie d'air afin de dé-

- vier le flux d'air vers le bas pour produire un flux d'air correspondant à un modèle de distribution et pour commander la deuxième sortie d'air afin de produire un flux d'air correspondant à un modèle de distribution ;
la détection de la température ambiante actuelle de l'environnement où se trouve le climatiseur ;
la détermination d'un ou plusieurs cinquièmes sous-paramètres de commande utilisés pour commander la première sortie d'air afin de produire un débit d'air correspondant à un modèle de distribution et pour commander la deuxième sortie d'air afin de produire un débit d'air correspondant à un modèle de distribution si la température ambiante actuelle est supérieure à une deuxième température prédéfinie.
5. Procédé selon la revendication 1, **caractérisé en ce que** le premier point d'échantillonnage est situé dans une zone supérieure de l'environnement où se trouve le climatiseur, et que le deuxième point d'échantillonnage est situé dans une zone centrale de l'environnement où se trouve le climatiseur.
6. Procédé selon la revendication 1, **caractérisé en ce que**, si le mode de fonctionnement est un mode de refroidissement, après avoir commandé le climatiseur pour produire un débit d'air correspondant à un ou plusieurs modèles de distribution selon un ou plusieurs paramètres de commande (S106), le procédé comprend en outre :
- l'obtention d'une valeur de température d'un premier point d'échantillonnage et d'une valeur de température d'un cinquième point d'échantillonnage dans l'espace où se trouve le climatiseur ;
la détermination d'un ou plusieurs sixièmes sous-paramètres de commande utilisés pour commander la première sortie d'air afin qu'elle émette un débit d'air correspondant à un modèle de distribution et pour commander la fermeture de la deuxième sortie d'air si au moins l'une des valeurs de température du quatrième point d'échantillonnage ou la valeur de température du cinquième point d'échantillonnage est inférieure à une deuxième température prédéfinie ;
et
la commande du climatiseur pour qu'il émette un débit d'air correspondant à un ou plusieurs modèles de distribution en fonction d'un ou plusieurs sixièmes sous-paramètres de commande ;
7. Procédé selon la revendication 6, **caractérisé en ce que** le quatrième point d'échantillonnage est situé dans une zone inférieure de l'environnement où se trouve le climatiseur, et que le cinquième point d'échantillonnage est situé dans une zone centrale de l'environnement où se trouve le climatiseur.
8. Dispositif de commande d'un climatiseur, comprenant :
- une première unité de détermination (1410) configurée pour déterminer un mode de fonctionnement actuel du climatiseur ;
une deuxième unité de détermination (1420) configurée pour déterminer un ou plusieurs paramètres de commande pour commander au moins deux sorties d'air du climatiseur en fonction d'une température ambiante actuelle dans le mode de fonctionnement, dans lequel, le ou les paramètres de commande comprennent au moins l'un parmi la direction, l'intensité ou la température du flux d'air sortant de la sortie d'air, les au moins deux sorties d'air comprennent une première sortie d'air et une deuxième sortie d'air, et la première sortie d'air est disposée de manière à être plus élevée que la deuxième sortie d'air ; et
une unité de commande (1430) configurée pour commander le climatiseur afin qu'il émette un flux d'air correspondant à un ou plusieurs modèles de distribution en fonction d'un ou plusieurs paramètres de commande ;
dans lequel le dispositif est en outre configuré pour acquérir les températures d'une pluralité de points d'échantillonnage prédéfinis dans un espace où se trouve le climatiseur afin d'obtenir une pluralité de valeurs de température, et pour générer un diagramme de distribution de la température dans l'espace sur la base de la pluralité de valeurs de température et des positions des points d'échantillonnage correspondant à la pluralité de valeurs de température ; et
si le mode de fonctionnement est un mode de chauffage, le dispositif est en outre configuré pour : obtenir une valeur de température d'un premier point d'échantillonnage et une valeur de température d'un deuxième point d'échantillonnage dans l'espace où se trouve le climatiseur, pour juger si la différence entre la valeur de température du premier point d'échantillonnage et la valeur de température du deuxième point d'échantillonnage est supérieure à une première différence de température prédéfinie, déterminer un ou plusieurs premiers sous-paramètres de commande utilisés pour commander la première sortie d'air afin d'émettre un flux d'air correspondant à un modèle de distribution et ajuster la vitesse à laquelle la première sortie d'air émet le flux d'air si la différence entre la valeur de température du premier point d'échantillonnage et la valeur de température du deuxième point d'échantillonnage est supérieure à la

première différence de température, et pour commander le climatiseur afin d'émettre un flux d'air correspondant à un ou plusieurs modèles de distribution en fonction d'un ou plusieurs premiers sous-paramètres de commande.

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9. Dispositif selon la revendication 8, caractérisé en ce que

si le mode de fonctionnement est un mode de refroidissement, la deuxième unité de détermination (1420) comprend :

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un premier module de détection configuré pour détecter la température ambiante actuelle de l'environnement où se trouve le climatiseur ;

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un module d'évaluation configuré pour déterminer si la température ambiante actuelle est supérieure à une première température prédéfinie ;

un premier module de détermination configuré pour déterminer un ou plusieurs deuxièmes sous-paramètres de commande utilisés pour commander la première sortie d'air et la deuxième sortie d'air afin de produire simultanément un flux d'air correspondant à des schémas de distribution si la température ambiante actuelle est supérieure à la première température prédéfinie ; et

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un deuxième module de détermination configuré pour déterminer un ou plusieurs troisièmes sous-paramètres de commande utilisés pour commander la première sortie d'air afin qu'elle émette un flux d'air correspondant à un modèle de distribution et pour commander la fermeture de la deuxième sortie d'air si la température ambiante actuelle est inférieure ou égale à la première température prédéfinie.

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10. Dispositif selon la revendication 8, caractérisé en ce que la deuxième unité de détermination (1420) comprend :

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un troisième module de détermination configuré pour déterminer un ou plusieurs quatrièmes sous-paramètres de commande utilisés pour commander la première sortie d'air afin de dévier le flux d'air vers le bas pour produire un flux d'air correspondant à un modèle de distribution et pour commander la deuxième sortie d'air afin de produire un flux d'air correspondant à un modèle de distribution ;

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un deuxième module de détection configuré pour détecter la température ambiante actuelle de l'environnement où se trouve le climatiseur ; et

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un quatrième module de détermination configuré pour déterminer un ou plusieurs cinquièmes sous-paramètres de commande utilisés pour

commander la première sortie d'air afin de produire un débit d'air correspondant à un modèle de distribution et pour commander la deuxième sortie d'air afin de produire un débit d'air correspondant à un modèle de distribution si la température ambiante actuelle est supérieure à une deuxième température prédéfinie.

11. Support de stockage lisible par ordinateur comprenant un programme stocké, dans lequel le programme commande un dispositif configuré pour commander un climatiseur où le support de stockage est situé afin de mettre en oeuvre le procédé lorsqu'il est exécuté sur le dispositif pour commander le climatiseur selon l'une quelconque des revendications 1 à 7 pendant qu'il fonctionne.

12. Processeur de commande d'un climatiseur pour l'exécution d'un programme, dans lequel le processeur met en oeuvre un programme configuré pour commander le climatiseur selon le procédé décrit dans l'une quelconque des revendications 1 à 7 lorsque le programme est en cours d'exécution.

13. Climatiseur, caractérisé en ce qu'il comprend :

un capteur configuré pour déterminer un mode de fonctionnement actuel du climatiseur ; le processeur selon la revendication 12 ; et un actionneur configuré pour commander le climatiseur afin qu'il émette un flux d'air correspondant à un ou plusieurs modèles de distribution en fonction des un ou plusieurs paramètres de commande.

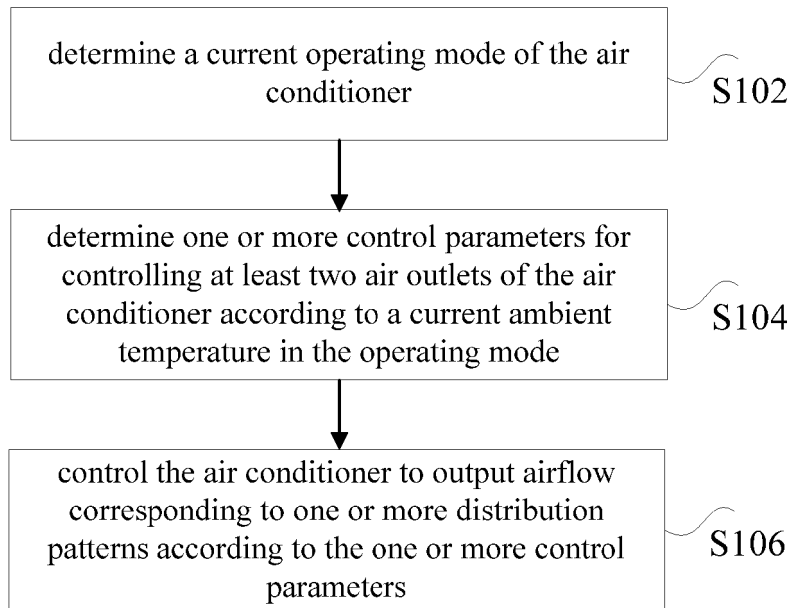


FIG. 1

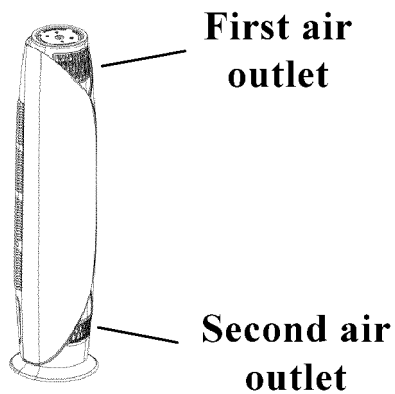


FIG. 2

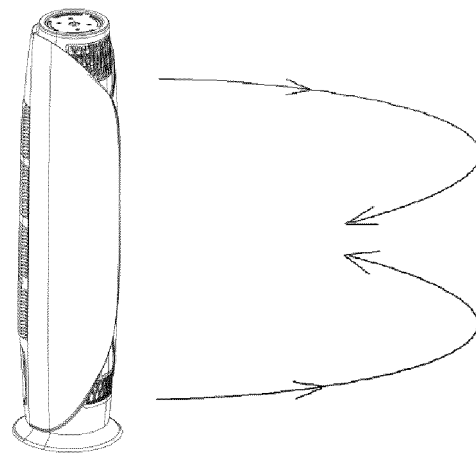


FIG. 3

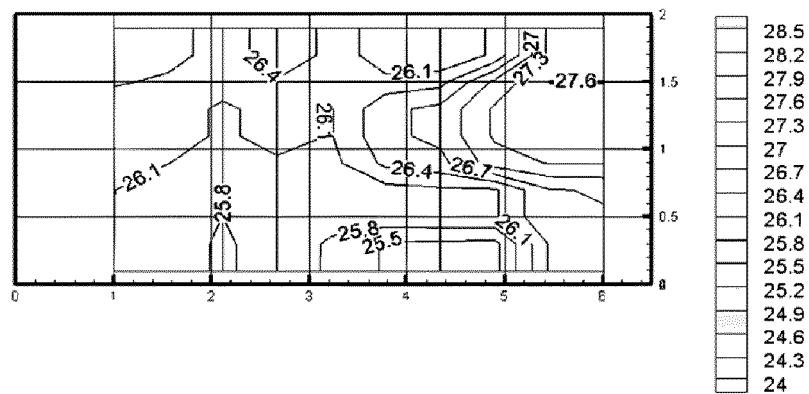


FIG. 4

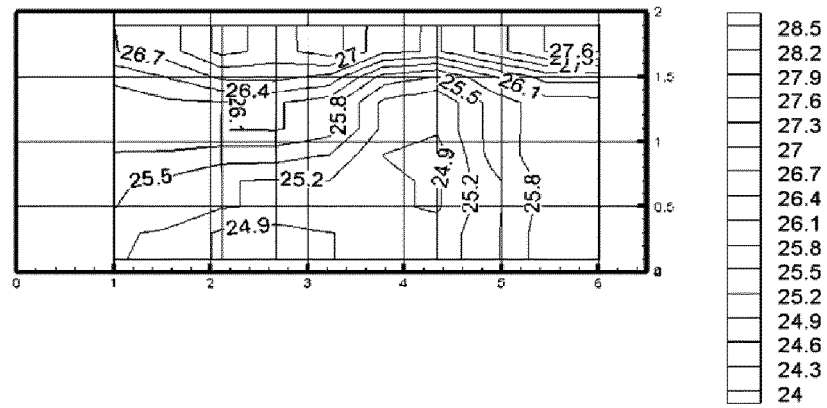


FIG. 5

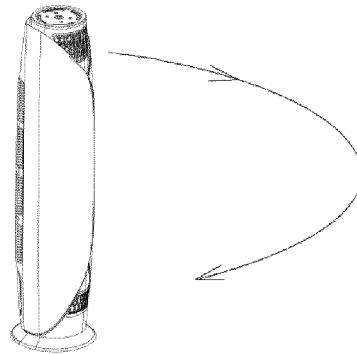


FIG. 6

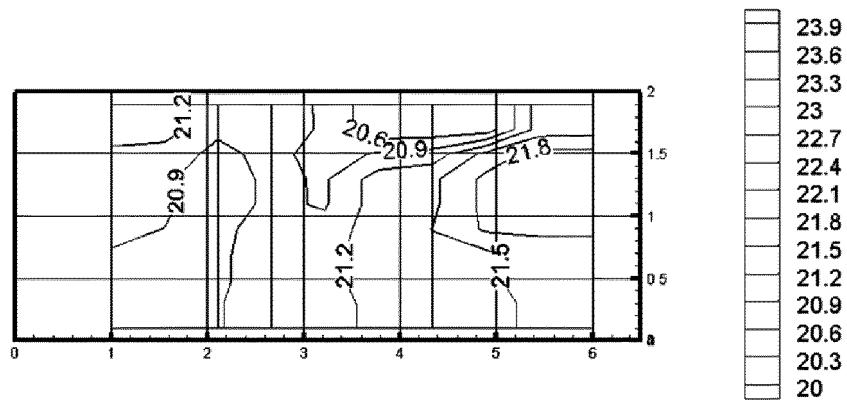


FIG. 7

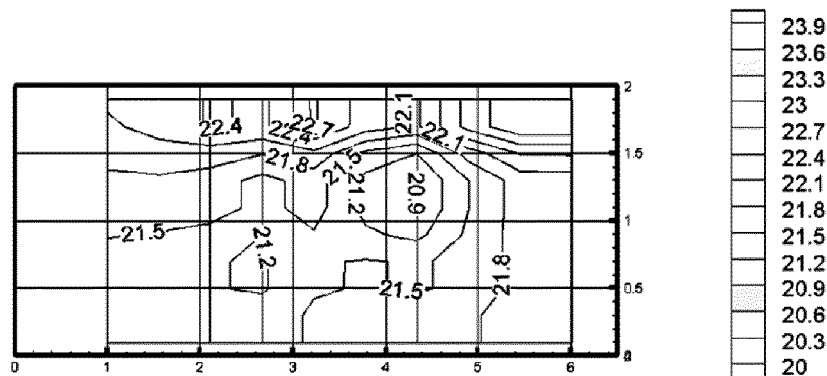


FIG. 8

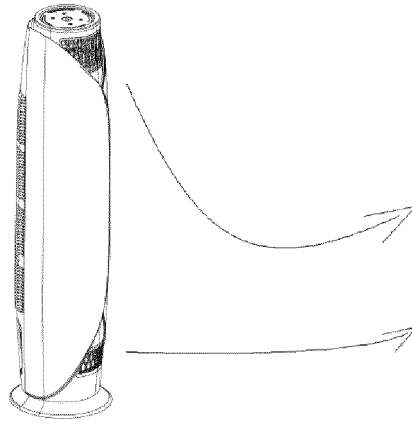


FIG. 9

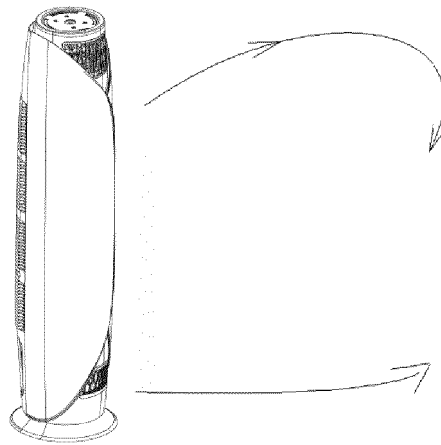


FIG. 10

Compared item	Airflow distribution pattern			
	Centrifugal layered air-out	Single-perfusion frontal air-outlet	Dual-perfusion encircling air-out	Centrifugal upper air-out
Vertical temperature difference($^{\circ}\text{C}$) 0.6m-0.1m	1.22 (19.70-18.48)	7.04 (19.53-12.49)	5.3 (18.18-12.88)	4.78 (18.93-14.15)
Vertical temperature difference($^{\circ}\text{C}$) 1.1m-0.1m	1.65 (20.13-18.48)	10.7 (23.19-12.49)	8 (20.88-12.88)	7.37 (21.52-14.15)
Vertical temperature difference($^{\circ}\text{C}$) 1.6m-0.1m	2.21 (20.69-18.48)	11.71 (24.20-12.49)	8.73 (21.61-12.88)	8.29 (22.45-14.15)
Vertical temperature difference($^{\circ}\text{C}$) 2.1m-0.1m	2.26 (20.74-18.48)	12.18 (24.67-12.49)	9.15 (22.03-12.88)	8.41 (22.57-14.15)
Temperature uniformity($^{\circ}\text{C}$)	1.24	4.75	3.61	3.36
Power consumption (kW·h)	7.3	12.7	10.9	10.7
Comparison of temperature rise rates of active areas (0.1m to 1.1m) in the first 30 min($^{\circ}\text{C}/\text{min}$)	0.60	0.45	0.50	0.40

FIG. 11

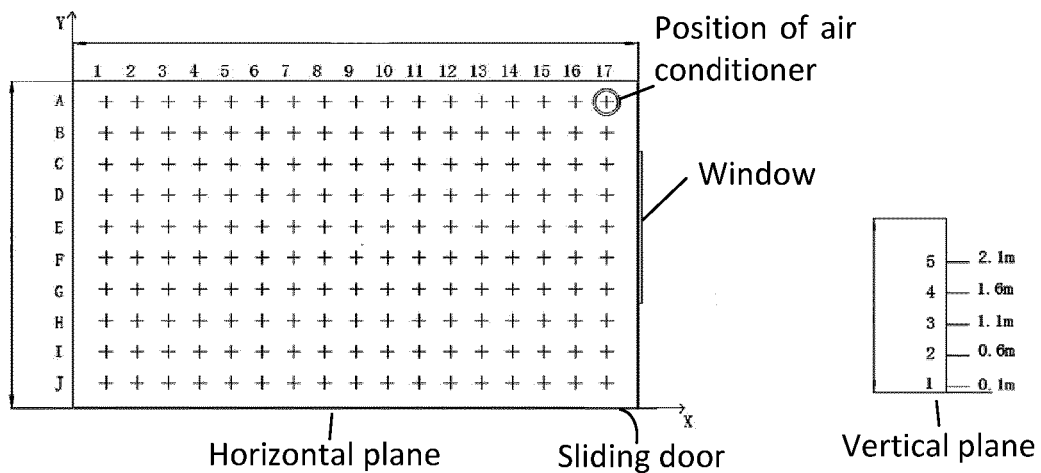


FIG. 12

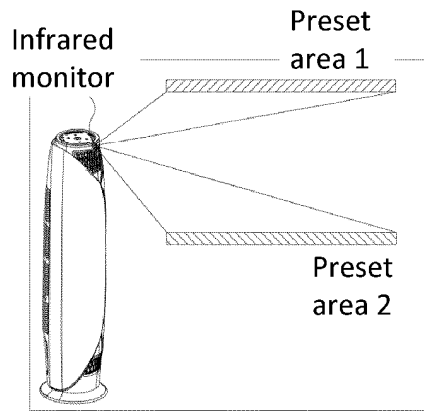


FIG. 13

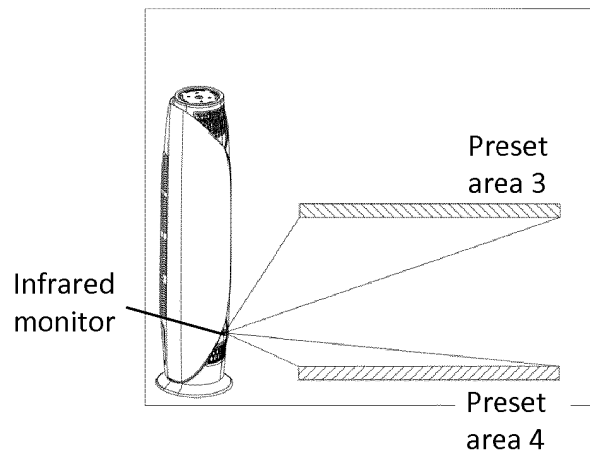


FIG. 14

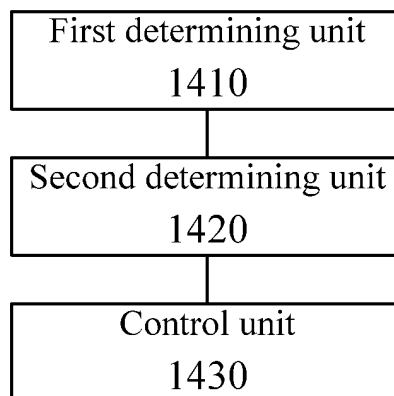


FIG. 15

REFERENCES CITED IN THE DESCRIPTION

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