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(54) **CEILING MACHINE CONTROL METHOD AND DEVICE, CEILING MACHINE AND READABLE STORAGE MEDIUM**

VERFAHREN UND VORRICHTUNG ZUR STEUERUNG EINER DECKENMASCHINE, DECKENMASCHINE UND LESBARES SPEICHERMEDIUM

PROCÉDÉ ET DISPOSITIF DE COMMANDE DE MACHINE DE PLAFOND, MACHINE DE PLAFOND ET SUPPORT D'ENREGISTREMENT LISIBLE

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Description

TECHNICAL FIELD

[0001] The present application relates to the technical field of an air conditioner, and in particular to a control method of the ceiling embedded-type air conditioner, a device, a ceiling embedded-type air conditioner and a readable storage medium.

BACKGROUND

[0002] The ceiling embedded-type air conditioner is installed on the ceiling of the room. The traditional ceiling embedded-type air conditioner can only swing back and forth or guide the airflow in a fixed angle, and cannot automatically adjust the direction of guiding airflow according to the position of the human, thus different actual needs cannot be met. Patent document EP-3176514-A describes a ceiling embedded-type air conditionerc omprising a millimeter wave human sense module and a plurality of individual deflectors configured to divide a blowing scope of the ceiling embedded-type air conditioner into a corresponding plurality of blowing angle ranges. The above content is only used to assist in understanding the technical solution of the present application and is not considered to be the prior art.

SUMMARY

[0003] The main objective of the present invention is to provide a control method of the ceiling embedded-type air conditioner, a device, a ceiling embedded-type air conditioner and a readable storage medium, to solve the problem that the existing ceiling embedded-type air conditioner cannot automatically adjust the direction of guiding airflow according to the position of the human.

[0004] In order to achieve the above objective, the present invention according to claim 1 provides a control method of a ceiling embedded-type air conditioner, applied to a ceiling embedded-type air conditioner including a millimeter wave human sense module and a plurality of individual deflectors, wherein the plurality of individual deflectors are configured to divide a blowing scope of the ceiling embedded-type air conditioner into a corresponding plurality of blowing angle ranges, wherein the control method of the ceiling embedded-type air conditioner includes:

[0005] detecting, by the millimeter wave human sense module, a first angle at which a human deviates from an angular bisector of a target blowing angle range corresponding to a target deflector, a first distance from the human to the ceiling embedded-type air conditioner, a first included angle between a connection line from the human to the ceiling embedded-type air conditioner and a plumb line, wherein the first distance from the human to the ceiling embedded-type air conditioner is a length of the connection line from the human to the ceiling embedded-type air conditioner, and the target deflector is in a blowing to human mode;

determining a target swing angle according to the first angle, the first distance and the first included angle; and

controlling the target deflector to operate according to the target swing angle, to guide the airflow to the human.

[0006] In an embodiment, the determining the target swing angle according to the first angle, the first distance and the first included angle includes:

determining a projection distance of the ceiling embedded-type air conditioner and the human on the plumb line to be a perpendicular distance, according to the first distance and the first included angle;

determining a projection distance of the ceiling embedded-type air conditioner and the human on the angular bisector to be a horizontal distance, according to the first angle, the first distance and the first included angle; and

determining the target swing angle of the target deflector according to the perpendicular distance and the horizontal distance.

[0007] In an embodiment, before the detecting, by the millimeter wave human sense module, the first angle at which the human deviates from the angular bisector of the target blowing angle range corresponding to the target deflector, the first distance from the human to the ceiling embedded-type air conditioner, the first included angle between the connection line from the human to the ceiling embedded-type air conditioner and the plumb line, the method further includes:

detecting the number of humans in the target blowing angle range;

in response to there being one human in the target blowing angle range, executing an operation: detecting, by the millimeter wave human sense module, the first angle at which the human deviates from the angular bisector of the target blowing angle range corresponding to the target deflector, the first distance from the human to the ceiling embedded-type air conditioner, the first included angle between the connection line from the human to the ceiling embedded-type air conditioner and the plumb line.

[0008] In an embodiment, after the detecting the number of the humans in the target blowing angle range, the method further includes:

in response to there being more than or equal to two humans in the target blowing angle range, detecting, by the millimeter wave human sense module, the first angle at which each human deviates from the angu-

lar bisector of the target blowing angle range corresponding to the target deflector, the first distance from each human to the ceiling embedded-type air conditioner, the first included angle between the connection line from each human to the ceiling embedded-type air conditioner and the plumb line, wherein the target deflector is in the blowing to human mode;

determining a plurality of target swing angles according to each first angle, each first distance and each first included angle;

determining a max-angle and a mini-angle in the plurality of target swing angles; and

controlling the target deflector to swing between the max-angle and the mini-angle to guide the airflow.

[0009] In an embodiment, before the detecting, by the millimeter wave human sense module, the first angle at which the human deviates from the angular bisector of the target blowing angle range corresponding to the target deflector, the first distance from the human to the ceiling embedded-type air conditioner, the first included angle between the connection line from the human to the ceiling embedded-type air conditioner and the plumb line, wherein the target deflector is in the blowing to human mode, the method further includes:

detecting a blowing mode of each deflector;

in response that the deflector is in the blowing to human mode, executing an operation: detecting, by the millimeter wave human sense module, the first angle at which the human deviates from the angular bisector of the target blowing angle range corresponding to the target deflector, the first distance from the human to the ceiling embedded-type air conditioner, the first included angle between the connection line from the human to the ceiling embedded-type air conditioner and the plumb line, wherein the target deflector is in the blowing to human mode.

[0010] In an embodiment, after the detecting the blowing mode of each deflector, the method further includes:

controlling a deflector in a blowing avoiding human mode to guide the airflow in a first limit angle, wherein the first limit angle is in a direction away from the human;

controlling a deflector in a swing mode to swing between the first limit angle and a second limit angle to guide the airflow;

controlling a deflector in a standard mode to guide the airflow in a preset swing angle.

[0011] Besides, in order to achieve the above objective, the present application further provides a control device of a ceiling embedded-type air conditioner, including: a memory, a processor and a control program of the ceiling embedded-type air conditioner stored in the memory and running on the processor, wherein the control program of the ceiling embedded-type air conditioner, when executed by the processor, can execute the control method of the ceiling embedded-type air conditioner mentioned above.

[0012] Besides, in order to achieve the above objective, the present invention according to cliam 8 further provides a ceiling embedded-type air conditioner, including a millimeter wave human sense module and N individual deflectors, wherein the N individual deflectors can divide a blowing scope of the ceiling embedded-type air conditioner into N blowing angle ranges, the ceiling embedded-type air conditioner includes: a memory, a processor and a control program of the ceiling embedded-type air conditioner stored in the memory and running on the processor, wherein the control program of the ceiling embedded-type air conditioner, when executed by the processor, can implement the control method of the ceiling embedded-type air conditioner mentioned above.

[0013] Besides, in order to achieve the above objective, the present invention according to claim 9 also provides a computer readable storage medium, wherein a control program of the ceiling embedded-type air conditioner is stored in the computer readable storage medium, the control program of the ceiling embedded-type air conditioner, when executed by a processor, can implement the control method of the ceiling embedded-type air conditioner mentioned above.

[0014] In the present invention, the millimeter wave human sense module detects a first angle at which a human deviates from an angular bisector of a target blowing angle range corresponding to a target deflector, a first distance from the human to the ceiling embedded-type air conditioner, a first included angle between a connection line from the human to the ceiling embedded-type air conditioner and a plumb line. The target deflector is in a blowing to human mode. A target swing angle is determined according to the first angle, the first distance and the first included angle, and the target deflector is controlled according to the target swing angle to guide the airflow the human. The position of the human is detected by the millimeter wave human sense module, and the target deflector is controlled according to the target swing angle, to guide the airflow the human, to realize the effect of the airflow moving with a movement of the human, to improve the comfort of users.

BRIEF DESCRIPTION OF THE DRAWINGS

[0015]

FIG. 1 is a schematic structural view of a ceiling embedded-type air conditioner in a hardware operating environment according to some embodiments of the present invention.

FIG. 2 is a flowchart of a control method of the ceiling

embedded-type air conditioner according to some embodiments of the present invention.

FIG. 3 is a schematic structural view of the ceiling embedded-type air conditioner according to some embodiments of the present invention.

FIG.4 is a schematic view of a division of blowing angle ranges according to some embodiments of the present invention.

FIG.5 is a schematic view of a plane where a human and an angle bisector are located according to some embodiments of the present invention.

FIG.6 is a schematic view of a plane where the ceiling embedded-type air conditioner and the human are located according to some embodiments of the present application.

FIG.7 is a schematic view of an auxiliary line for determining a target swing angle according to some embodiments of the present invention.

[0016] The realization of the purpose, functional characteristics and advantages of the present application will be combined with the following embodiments, referring to the attached drawings for further explanation.

DETAILED DESCRIPTION OF THE EMBODIMENTS

[0017] It should be understood that the specific embodiments here are intended, to illustrate, but not limit, the present invention which is defined by the appended claims.

[0018] Referring to FIG.1, FIG.1 is a schematic structural view of a ceiling embedded-type air conditioner in a hardware operating environment according to some embodiments of the present application. Referring to FIG.1, the ceiling embedded-type air conditioner may include: a processor 1001 such as a central processing unit (CPU), a network interface 1004, a user interface 1003, a memory 1005 and a communication bus 1002. The communication bus 1002 is used to realize the connection communication among these components. The user interface 1003 may include a display, an input unit such as a keyboard. The user interface 1003 may further include a standard wired interface and a standard wireless interface. The network interface 1004 may include a standard wired interface, a standard wireless interface such as a Wi-Fi port. The memory 1005 can be a high-speed RAM memory or a non-volatile memory such a disk memory. The memory 1005 can be a storage device independent of processor 1001.

[0019] It can be understood by those skilled in the field that the structure of the ceiling embedded-type air conditioner shown in FIG.1 does not limit the ceiling embedded-type air conditioner and the ceiling embedded-type air conditioner may include more or fewer components than shown in FIG. 1, or a combination of some components, or differently arranged components shown in FIG. 1.

[0020] Referring to FIG.1, the memory 1005, as a computer storage medium, may include an operating system, a network communication module, a user interface module and a computer control program.

[0021] In the ceiling embedded-type air conditioner shown in FIG. 1, the network interface 1004 is mainly used to connect to the background server for communication. The user interface 1003 is mainly used to connect to the client (user client) for communication. The processor 1001 can be used to call the control program of the ceiling embedded-type air conditioner stored in memory 1005.

[0022] In an embodiment, the ceiling embedded-type air conditioner includes a memory 1005, a processor 1001 and a control program of the ceiling embedded-type air conditioner stored in the memory 1005 and executable on the processor 1001. The processor 1001 when calling the control program of the ceiling embedded-type air conditioner stored in memory 1005 executes the following operations:

detecting, by the millimeter wave human sense module, a first angle at which a human deviates from an angular bisector of a target blowing angle range corresponding to a target deflector, a first distance from the human to the ceiling embedded-type air conditioner, a first included angle between a connection line from the human to the ceiling embedded-type air conditioner and a plumb line, the first distance from the human to the ceiling embedded-type air conditioner is a length of the connection line from the human to the ceiling embedded-type air conditioner, and the target deflector is in a blowing to human mode;

determining a target swing angle according to the first angle, the first distance and the first included angle;

controlling the target deflector to operate according to the target swing angle to guide the airflow to human.

[0023] In an embodiment, the determining the target swing angle according to the first angle, the first distance and the first included angle includes:

determining a projection distance of the ceiling embedded-type air conditioner and the human on the plumb line to be a perpendicular distance, according to the first distance and the first included angle;

determining a projection distance of the ceiling embedded-type air conditioner and the human on the angular bisector to be a horizontal distance, according to the first angle, the first distance and the first included angle; and

determining the target swing angle of the target deflector according to the perpendicular distance and the horizontal distance.

[0024] In an embodiment, before the detecting, by the

millimeter wave human sense module, the first angle at which the human deviates from the angular bisector of the target blowing angle range corresponding to the target deflector, the first distance from the human to the ceiling embedded-type air conditioner, the first included angle between the connection line from the human to the ceiling embedded-type air conditioner and the plumb line, the method further includes:

detecting the number of the humans in the target blowing angle range;
in response that one human is in the target blowing angle range, executing an operation: detecting, by the millimeter wave human sense module, the first angle of the human deviates from the angular bisector of the target blowing angle range corresponding to the target deflector, the first distance from the human to the ceiling embedded-type air conditioner, the first included angle between the connection line from the human to the ceiling embedded-type air conditioner and the plumb line.

[0025] In an embodiment, after the operation of detecting the number of the humans in the target blowing angle range, the method further includes:
in response that no human is in the target blowing angle range, controlling the target deflector to guide the airflow in a preset swing angle.

[0026] In an embodiment, after the detecting the number of the humans in the target blowing angle range, the method further includes:

in response to there being more than or equal to two humans in the target blowing angle range, detecting, by the millimeter wave human sense module, the first angle of each human deviates from the angular bisector of the target blowing angle range corresponding to the target deflector, the first distance between each human and the ceiling embedded-type air conditioner, the first included angle between the connection line from each human to the ceiling embedded-type air conditioner and the plumb line, wherein the target deflector is in the blowing to human mode;
determining a plurality of target swing angles according to each first angle, each first distance and each first included angle;
determining a max-angle and a mini-angle of the plurality of target swing angles; and
controlling the target deflector to swing between the max-angle and the mini-angle to guide the airflow.

[0027] In an embodiment, before the detecting, by the millimeter wave human sense module, the first angle of the human deviates from the angular bisector of the target blowing angle range corresponding to the target deflector, the first distance from the human to the ceiling embedded-type air conditioner, the first included angle between the connection line from the human to the ceiling embedded-type air conditioner and the plumb line, wherein the target deflector is in the blowing to human mode, the method further includes:

detecting each blowing mode of each deflector;
the deflector is in the blowing to human mode, executing an operation: detecting, by the millimeter wave human sense module, the first angle of the human deviates from the angular bisector of the target blowing angle range corresponding to the target deflector, the first distance from the human to the ceiling embedded-type air conditioner, the first included angle between the connection line from the human to the ceiling embedded-type air conditioner and the plumb line, wherein the target deflector is in the blowing to human mode.

[0028] In an embodiment, after the detecting the blowing mode of each deflector, the method further includes:

controlling a deflector in a blowing avoiding human mode to guide the airflow in a first limit angle, wherein the first limit angle is on a direction away from the human;
controlling a deflector in a swing mode to swing between the first limit angle and a second limit angle to guide the airflow;
controlling a deflector in a normal mode to guide the airflow in a preset swing angle.

[0029] The present application also provides a control method of the ceiling embedded-type air conditioner. Referring to FIG.2, which is a flowchart of the control method of the ceiling embedded-type air conditioner according to some embodiments of the present application. The control method of the ceiling embedded-type air conditioner can be applied to a ceiling embedded-type air conditioner equipped with a millimeter wave human sense module and a plurality of individual deflectors. The plurality of individual deflectors divide a blowing scope of the ceiling embedded-type air conditioner into a corresponding plurality of blowing angle ranges. In an embodiment, the control method of the ceiling embedded-type air conditioner includes:
operation S10, detecting, by the millimeter wave human sense module, a first angle at which a human deviates from an angular bisector of a target blowing angle range corresponding to a target deflector, a first distance from the human to the ceiling embedded-type air conditioner, a first included angle between a connection line from the human to the ceiling embedded-type air conditioner and a plumb line. The target deflector is in a blowing to human mode.

[0030] The traditional ceiling embedded-type air conditioner can only swing back and forth or blow in a fixed angle, and cannot automatically adjust the direction of the airflow according to the position of the human, thus

various actual needs cannot be met. To solve the technical problem that the ceiling embedded-type air conditioner in the prior art cannot automatically adjust the direction of guiding airflow according to the position of the human. The present application provides a control method of the ceiling embedded-type air conditioner to detect the position information of the human by the millimeter wave human sense module, and determine an angle of a deflector according to the position information of the human, and can accurately determine the position information of the user, and control dynamically the deflector to swing according to the position of the user. In this way, the effect of the airflow moving with the movement of the human is realized and the comfort of the users is improved.

[0031] The millimeter wave human sense module in the embodiment may include a millimeter wave radar. The millimeter wave radar is working in millimeter wave band. The millimeter wave generally refers to the wave in the frequency domain of 30 GHz ~ 300 GHz and the wavelength of 1 mm ~ 10 mm. Compared with a centimeter wave radar, the millimeter wave radar has a small size, a light weight and a high spatial resolution. Compared with an infrared, a laser, a television and other radars, the millimeter wave radar has a strong ability to penetrate fog, smoke, dust, and is in 24-hour service (except heavy rain days). In addition, the millimeter wave radar has a better ability in anti-interfering and anti-stealth than other microwave radars. The millimeter wave radar can identify very small targets and identify multiple targets at the same time.

[0032] In an embodiment, referring to FIG. 3 and FIG. 4, the ceiling embedded-type air conditioner includes a plurality of independent deflectors, and each deflector is located in a separate outlet. Taking the center point of the ceiling embedded-type air conditioner as a center of a circle, the plurality of independent deflectors divide the blowing scope of the ceiling embedded-type air conditioner into a corresponding plurality of blowing angle ranges. Each deflector corresponds to a blowing angle range, and the complete blowing scope of each deflector can cover the corresponding blowing angle range. There are more than one deflector. It should be noted that when dividing the blowing angle ranges, the blowing scope can be averaged to be a corresponding plurality of blowing angle ranges, or can be divided in a certain rule. The specific division of the blowing scope is not limited herein.

[0033] It can be understood that each deflector is independent in the embodiment, which can be realized by separately disposing each deflector on different machines. This means each deflector can support various airflow output modes simultaneously, which include but are not limited to any one of a standard mode, a swing mode, a blow avoiding human mode, a blow toward human mode and a custom mode.

[0034] Referring to FIG. 5 and FIG. 6, in an embodiment, the blowing to human mode means that the deflector swings with the movement of the human, to guide the airflow to human. When there is one deflector in the blowing to human mode, the deflector is regarded as a target deflector. The millimeter wave human sense module will detect the position information of the human in the blowing angle range corresponding to the target deflector. The position information of the human includes a first angle, a first distance and a first included angle. Each blowing angle range refers to an angle on a horizontal plane, and the angle bisector of each angle refers to the angle bisector of the blowing angle range. The first angle α refers to an included angle between the connection line from the human to the ceiling embedded-type air conditioner and the angle bisector of the target blowing angle range corresponding to the target deflector. The first distance d_0 refers to a distance from the human to the ceiling embedded-type air conditioner, that is, a length of the connection line from the human to the ceiling embedded-type air conditioner. The first included angle β refers to an included angle between the connection line from the human to the ceiling embedded-type air conditioner and the plumb line.

[0035] It should be noted that maintenance operators may previously set a unique feature point of the human such as a head part, a breast part or a foot part, according to actual needs. The feature point of the ceiling embedded-type air conditioner can be set as a central point of the millimeter wave human sense module or a central point of the ceiling embedded-type air conditioner. In an actual detection, the millimeter wave human sense module detects the feature point of the human and the feature point of the ceiling embedded-type air conditioner to determine a relative position of the human to the ceiling embedded-type air conditioner. The first angle refers to an angle at which the feature point of the human deviates from the angular bisector of the target blowing angle range corresponding to the target deflector. The first distance refers to a distance from the feature point of the human to the feature point of the ceiling embedded-type air conditioner. The first included angle refers to an included angle between the connection line from the feature point of the human to the feature point of the ceiling embedded-type air conditioner and the plumb line. The operation S20 is to determine a target swing angle of the target deflector according to the first angle, the first distance and the first included angle. The operation S20 includes: operation S21, determining a projection distance of the ceiling embedded-type air conditioner and the human on the plumb line to be a perpendicular distance, according to the first distance d_0 and the first included angle β; operation S22, determining a projection distance of the ceiling embedded-type air conditioner and the human on the angular bisector to be a horizontal distance, according to the first distance d_0 and the first included angle β; and operation S23, determining a target swing angle of the target deflector according to the perpendicular distance and the horizontal distance. It can be understood that the present application does not limit the execution sequence of the operation S21 and operation

S22.

[0036] Referring to FIG.7, the projection distance, i.e, the perpendicular distance h, of the ceiling embedded-type air conditioner and the human on the plumb line can be determined according to the first distance d_0, the first included angle β and a first formula. The first formula is $h = d_0 * \cos(\beta)$. The projection distance, i.e, the horizontal distance, of the ceiling embedded-type air conditioner and the human on the angular bisector can be determined according to the first distance d_0, the first included angle β and a second formula. The second formula is $d_2=d_1*\cos(\alpha)$, where $d_1=d_0*\sin(\beta)$. After the perpendicular distance h and the horizontal distance d_2 are determined, the target swing angle can be determined according to a third formula, $\theta=\arctan (d2/h)$.

[0037] Operation S30, controlling the target deflector according to the target swing angle, to guide the airflow to the human.

[0038] In an embodiment, after the target swing angle of the target deflector is determined, that is, the target deflector can be controlled to the target swing angle, to guide the airflow to the human.

[0039] It can be understood that the millimeter wave human sense module may detect in real-time the position information of the human. When the human moves, the millimeter wave human sense module will obtain the first angle, the first distance and the first included angle again, then to determine a new swing angle of the target deflector according to the first angle, the first distance and the first included angle, to realize that the airflow moves with the movement of the human.

[0040] In an embodiment, the millimeter wave human sense module detects the first angle at which the human deviates from the angular bisector of the target blowing angle range corresponding to the target deflector, the first distance from the human to the ceiling embedded-type air conditioner, the first included angle between the connection line from the human to the ceiling embedded-type air conditioner and the plumb line. The first distance from the human to the ceiling embedded-type air conditioner is the length of the connection line from the human to the ceiling embedded-type air conditioner. The target deflector is in a blowing to human mode. A target swing angle is determined according to the first angle, the first distance and the first included angle and the target deflector is controlled to operate according to the target swing angle, to guide the airflow to the human. The position of the human is detected by the millimeter wave human sense module, and the target deflector is controlled to operate according to the target swing angle, to guide the airflow to the human, to realize the effect of the airflow moving with a movement of the human and to improve the comfort of users.

[0041] Furthermore, based on the embodiment mentioned above, in an embodiment, before the operation S10, the control method of the ceiling embedded-type air conditioner further includes:

operation S11, detecting the number of humans in the target blowing angle.

[0042] In response to there being one human in the target blowing angle range, execute the operation S10.

[0043] In an embodiment, the number of humans in the target blowing angle range can be detected by the millimeter wave human sense module. In response to there being one human in the target blowing angle range, the operation S10 is executed.

[0044] A heartbeat signal in the target blowing angle range can be detected by the millimeter wave human sense module, and the number of the humans can be determined according to the number of heartbeat signals, or a respiration signal in the target blowing angle range can be detected by the millimeter wave human sense module, and the number of the humans can be determined according to the number of respiration signals.

[0045] In an embodiment, before the operation S11, the method further includes:

operation S12, in response to there being no humans in the target blowing angle range, controlling the target deflector to guide the airflow in a preset swing angle.

[0046] In the embodiment, the preset swing angle is previously set by a maintenance operator. At this angle, the deflector can achieve the maximum airflow output through the same fan speed. If there is no human in the target blowing angle range, it means that there is no human in the target blowing angle range, and there is no need to guide the airflow to move with the movement of the human. Therefore, the target deflector can be controlled to guide the airflow in the preset swing angle, to improve the efficiency of guiding airflow of the ceiling embedded-type air conditioner.

[0047] In an embodiment, after the operation S11, the method further includes:

operation S13, in response to there being more than or equal to two humans in the target blowing angle range, detecting, by the millimeter wave human sense module, the first angle at which each human deviates from the angular bisector of the target blowing angle range corresponding to the target deflector, the first distance from each human to the ceiling embedded-type air conditioner, the first included angle between the connection line from each human to the ceiling embedded-type air conditioner and the plumb line. The target deflector is in the blowing to human mode.

operation S14, determining a plurality of target swing angles according to each first angle, each first distance and each first included angle.

operation S15, determining a max-angle and a mini-angle in the plurality of target swing angles.

operation S16, controlling the target deflector to swing between the max-angle and the mini-angle to guide the airflow.

[0048] In an embodiment, in response to there being more than or equal to two humans in the target blowing

angle range, the millimeter wave human sense module detects the first angle at which each human in the target blowing angle range deviates from the angular bisector of the target blowing angle range corresponding to the target deflector, the first distance from each human to the ceiling embedded-type air conditioner, the first included angle between the connection line from each human to the ceiling embedded-type air conditioner and the plumb line. Similarly to step S20, the swing angle of each human is obtained according to the position information of each human; swing angles are compared to determine a max-angle and a mini-angle of swing angles; and the target deflector is controlled to swing between the max-angle and the mini-angle to guide the airflow, to each human in the target blowing angle range, and the round-trip path of the target deflector is shortened, to shorten the round-trip time, and to avoid the airflow from being given to an unmanned area. In this way, the airflow is guided to the human as much and as fast as possible and the comfort of users is improved.

[0049] Based on the embodiment mentioned above, some embodiments of the control method of the air ceiling conditioner of the present application is provided, before the operation S10, the method further includes:

operation S101, detecting each blowing mode of each deflector;

in response that the deflector is in the blowing to human mode, executing an operation: detecting, by the millimeter wave human sense module, the first angle at which the human deviates from the angular bisector of the target blowing angle range corresponding to the target deflector, the first distance from the human to the ceiling embedded-type air conditioner, the first included angle between the connection line from the human to the ceiling embedded-type air conditioner and the plumb line.

[0050] In an embodiment, each deflector is independent. Each deflector can support different airflow output modes at the same time. The modes include but are not limited to any one of the standard mode, the swing mode, the blowing avoiding human mode, the blowing to human mode and the custom mode.

[0051] The blowing to human mode refers to that the deflector swings following the movement of humans, to guide the airflow to the human. The custom mode refers to that the deflector guides the airflow according to the angle set by the user.

[0052] Furthermore, after the operation S101, the method further includes:

controlling the deflector in the blowing avoiding human mode to guide the airflow in a first limit angle. The first limit angle is in a direction away from the human;

controlling the deflector in the swing mode to swing between the first limit angle and a second limit angle to guide the airflow;

controlling the deflector in the standard mode to guide the airflow in a preset swing angle.

[0053] In an embodiment, the standard mode refers to that the deflector is fixed to guide the airflow in a preset swing angle, at this angle, the deflector can achieve a maximum airflow output through the same fan speed. The swing mode refers to that the deflector swings between a first limit angle and a second limit angle to guide the airflow. The limit angle is defined by a mechanical structure, so that the deflector can only swing between the first limit angle and the second limit angle. The blowing to human mode refers to that the deflector guides airflow in the first limit angle. The first limit angle is in a direction away from the human, so that a direction of guiding the airflow is away from the human.

[0054] In an embodiment, different deflectors can support different airflow output modes at the same time to meet the multiple airflow output requirements of the users.

[0055] In addition, the present application also provides a computer readable storage medium, on which a control program of the ceiling embedded-type air conditioner is stored, the operations realized when the control program of the ceiling embedded-type air conditioner is executed by the processor can be referred to the above embodiments of the control method of the ceiling embedded-type air conditioner, which will not be repeated herein.

[0056] It should be noted that, in this article, the terms "includes", "comprises" or any other variation thereof are intended to encompass non-exclusive inclusion, so that a process, method, object or system including a set of elements includes not only those elements, but also other elements not explicitly listed, or elements inherent to the process, the method, the object, or the system. In the absence of further limitations, an element defined with the statement "include a..." does not preclude the existence of additional identical elements in the process, method, article, or system that includes the element.

[0057] The serial numbers of the embodiments of the present application are for descriptive purposes only and do not represent the advantages or disadvantages of the embodiment.

[0058] From the above description of embodiments, it is clear for those skilled in the art that the above embodiments can be implemented by means of software plus the common hardware platform. It can also be implemented by means of hardware, but in many cases the former is the preferred implementation. Based on this understanding, the technical solutions of the present application, in essence or part contributing to existing technology can be manifested in the form of a software product. The product is stored in the computer software as described above in a storage medium (such as a ROM/RAM, a disk, and an optical disk), including several instructions to make a terminal device (can be a mobile phone, a com-

puter, a server, a ceiling embedded-type air conditioner, or a network equipment, etc.) to perform the methods described in each embodiment of the present application.

Claims

1. A control method of a ceiling embedded-type air conditioner, applied to the ceiling embedded-type air conditioner comprising a millimeter wave human sense module and a plurality of individual deflectors, wherein the plurality of individual deflectors are configured to divide a blowing scope of the ceiling embedded-type air conditioner into a corresponding plurality of blowing angle ranges, wherein the control method of the ceiling embedded-type air conditioner is **characterised in that** it comprises:

   detecting (S10), by the millimeter wave human sense module, a first angle at which a human deviates from an angular bisector of a target blowing angle range corresponding to a target deflector, a first distance from the human to the ceiling embedded-type air conditioner, a first included angle between a connection line from the human to the ceiling embedded-type air conditioner and a plumb line, wherein the first distance from the human to the ceiling embedded-type air conditioner is a length of the connection line from the human to the ceiling embedded-type air conditioner, and the target deflector is in a blowing to human mode;
   determining (S20) a target swing angle according to the first angle, the first distance and the first included angle; and
   controlling (S30) the target deflector to operate according to the target swing angle, to guide the airflow to the human.

2. The control method of the ceiling embedded-type air conditioner of claim 1, wherein the determining the target swing angle according to the first angle, the first distance and the first included angle comprises:

   determining a projection distance of the ceiling embedded-type air conditioner and the human on the plumb line to be a perpendicular distance, according to the first distance and the first included angle;
   determining a projection distance of the ceiling embedded-type air conditioner and the human on the angular bisector to be a horizontal distance, according to the first angle, the first distance and the first included angle; and
   determining the target swing angle of the target deflector according to the perpendicular distance and the horizontal distance.

3. The control method of the ceiling embedded-type air conditioner of claim 1, wherein before the detecting, by the millimeter wave human sense module, the first angle at which the human deviates from the angular bisector of the target blowing angle range corresponding to the target deflector, the first distance from the human to the ceiling embedded-type air conditioner, the first included angle between the connection line from the human to the ceiling embedded-type air conditioner and the plumb line, the method further comprises:

   detecting (S11) the number of humans in the target blowing angle range;
   in response to there being one human in the target blowing angle range, executing an operation: detecting, by the millimeter wave human sense module, the first angle at which the human deviates from the angular bisector of the target blowing angle range corresponding to the target deflector, the first distance from the human to the ceiling embedded-type air conditioner, the first included angle between the connection line from the human to the ceiling embedded-type air conditioner and the plumb line.

4. The control method of the ceiling embedded-type air conditioner of claim 3, wherein after the detecting the number of the humans in the target blowing angle range, the method further comprises:
   in response to there being no humans in the target blowing angle range, controlling (S12) the target deflector to guide the airflow in a preset swing angle.

5. The control method of the ceiling embedded-type air conditioner of claim 3, wherein after the detecting the number of the humans in the target blowing angle range, the method further comprises:

   in response to there being more than or equal to two humans in the target blowing angle range, detecting (S13), by the millimeter wave human sense module, the first angle at which each human deviates from the angular bisector of the target blowing angle range corresponding to the target deflector, the first distance from each human to the ceiling embedded-type air conditioner, the first included angle between the connection line from each human to the ceiling embedded-type air conditioner and the plumb line, wherein the target deflector is in the blowing to human mode;
   determining (S14) a plurality of target swing angles according to each first angle, each first distance and each first included angle;
   determining (S15) a max-angle and a mini-angle in the plurality of target swing angles; and
   controlling (S16) the target deflector to swing

between the max-angle and the mini-angle to guide the airflow.

6. The control method of the ceiling embedded-type air conditioner of claim 1, wherein before the detecting, by the millimeter wave human sense module, the first angle at which the human deviates from the angular bisector of the target blowing angle range corresponding to the target deflector, the first distance from the human to the ceiling embedded-type air conditioner, the first included angle between the connection line from the human to the ceiling embedded-type air conditioner and the plumb line, wherein the target deflector is in the blowing to human mode, the method further comprises:

detecting a blowing mode of each deflector;
in response that the deflector is in the blowing to human mode, executing an operation: detecting, by the millimeter wave human sense module, the first angle at which the human deviates from the angular bisector of the target blowing angle range corresponding to the target deflector, the first distance from the human to the ceiling embedded-type air conditioner, the first included angle between the connection line from the human to the ceiling embedded-type air conditioner and the plumb line, wherein the target deflector is in the blowing to human mode.

7. The control method of the ceiling embedded-type air conditioner of claim 6, wherein after the detecting the blowing mode of each deflector, the method further comprises:

controlling a deflector in a blowing avoiding human mode to guide the airflow in a first limit angle, wherein the first limit angle is in a direction away from the human;
controlling a deflector in a swing mode to swing between the first limit angle and a second limit angle to guide the airflow;
controlling a deflector in a standard mode to guide the airflow in a preset swing angle.

8. A ceiling embedded-type air conditioner, comprising a millimeter wave human sense module and a plurality of individual deflectors, wherein the plurality of individual deflectors are configured to divide a blowing scope of the ceiling embedded-type air conditioner into a corresponding plurality of blowing angle ranges, the ceiling embedded-type air conditioner comprises: a memory (1005), a processor (1001) and a control program of the ceiling embedded-type air conditioner stored in the memory (1005) and running on the processor (1001), wherein the control program of the ceiling embedded-type air conditioner, when executed by the processor (1001), implements the control method of the ceiling embedded-type air conditioner according to any one of claims 1 to 7.

9. A computer readable storage medium (1005), wherein a control program of the ceiling embedded-type air conditioner is stored on the computer readable storage medium (1005), the control program of the ceiling embedded-type air conditioner, when executed by a processor (1001), implements the control method of the ceiling embedded-type air conditioner according to any one of claims 1 to 7.

Patentansprüche

1. Steuerverfahren eines Klimagerätes vom Deckeneinbautyp, angewandt auf das Klimagerät vom Deckeneinbautyp, das ein Millimeterwellen-Personenerkennungsmodul und eine Mehrzahl von individuellen Deflektoren umfasst, wobei die Mehrzahl von individuellen Deflektoren konfiguriert sind, einen Ausblasgesamtbereich des Klimagerätes vom Deckeneinbautyp in eine entsprechende Mehrzahl von Ausblaswinkelbereichen zu unterteilen, wobei das Steuerverfahren des Klimagerätes vom Deckeneinbautyp **dadurch gekennzeichnet ist, dass** es Folgendes umfasst:

Erkennen (S10), durch das Millimeterwellen-Personenerkennungsmodul, eines ersten Winkels, bei dem eine Person von einer Winkelhalbierenden eines Zielausblaswinkelbereichs abweicht, der einem Zieldeflektor entspricht, eines ersten Abstands von der Person zum Klimagerät vom Deckeneinbautyp und eines ersten eingeschlossenen Winkels zwischen einer Verbindungslinie von der Person zum Klimagerät vom Deckeneinbautyp und einer Lotlinie, wobei der erste Abstand von der Person zum Klimagerät vom Deckeneinbautyp eine Länge der Verbindungslinie von der Person zum Klimagerät vom Deckeneinbautyp ist und der Zieldeflektor sich in einem personenanblasenden Modus befindet;
Bestimmen (S20) eines Zielschwenkwinkels gemäß dem ersten Winkel, dem ersten Abstand und dem ersten eingeschlossenen Winkel; und
Steuern (S30) des Zieldeflektors, gemäß dem Zielschwenkwinkel zu arbeiten, um den Luftstrom zu der Person hin zu leiten.

2. Steuerverfahren des Klimagerätes vom Deckeneinbautyp nach Anspruch 1, wobei das Bestimmen des Zielschwenkwinkels gemäß dem ersten Winkel, dem ersten Abstand und dem ersten eingeschlossenen Winkel Folgendes umfasst:

Bestimmen eines Projektionsabstands des Klimagerätes vom Deckeneinbautyp und der Person auf der Lotlinie als ein lotrechter Abstand gemäß dem ersten Abstand und dem ersten eingeschlossenen Winkel;
Bestimmen eines Projektionsabstands des Klimagerätes vom Deckeneinbautyp und der Person auf der Winkelhalbierenden als ein horizontaler Abstand gemäß dem ersten Winkel, dem ersten Abstand und dem ersten eingeschlossenen Winkel; und
Bestimmen des Zielschwenkwinkels des Zieldeflektors gemäß dem lotrechten Abstand und dem horizontalen Abstand.

3. Steuerverfahren des Klimagerätes vom Deckeneinbautyp nach Anspruch 1, wobei vor dem Erkennen, durch das Millimeterwellen-Personenerkennungsmodul, des ersten Winkels, bei dem die Person von der Winkelhalbierenden eines Zielausblaswinkelbereichs abweicht, der dem Zieldeflektor entspricht, des ersten Abstands von der Person zum Klimagerät vom Deckeneinbautyp und des ersten eingeschlossenen Winkels zwischen der Verbindungslinie von der Person zum Klimagerät vom Deckeneinbautyp und der Lotlinie, das Verfahren ferner Folgendes umfasst:

Erkennen (S11) der Anzahl von Personen im Zielausblaswinkelbereich;
in Antwort darauf, dass sich eine Person im Zielausblaswinkelbereich befindet, Ausführen folgender Operation: Erkennen, durch das Millimeterwellen-Personenerkennungsmodul, des ersten Winkels, bei dem die Person von der Winkelhalbierenden eines Zielausblaswinkelbereichs abweicht, der dem Zieldeflektor entspricht, des ersten Abstands von der Person zum Klimagerät vom Deckeneinbautyp und des ersten eingeschlossenen Winkels zwischen der Verbindungslinie von der Person zum Klimagerät vom Deckeneinbautyp und der Lotlinie.

4. Steuerverfahren des Klimagerätes vom Deckeneinbautyp nach Anspruch 3, wobei nach dem Erkennen der Anzahl von Personen im Zielausblaswinkelbereich das Verfahren ferner Folgendes umfasst:
in Antwort darauf, dass sich keine Personen im Zielausblaswinkelbereich befinden, Steuern (S12) des Zieldeflektors, um den Luftstrom in einen voreingestellten Schwenkwinkel zu leiten.

5. Steuerverfahren des Klimagerätes vom Deckeneinbautyp nach Anspruch 3, wobei nach dem Erkennen der Anzahl von Personen im Zielausblaswinkelbereich das Verfahren ferner Folgendes umfasst:

in Antwort darauf, dass sich mehr als oder gleich zwei Personen im Zielausblaswinkelbereich befinden, Erkennen (S13), durch das Millimeterwellen-Personenerkennungsmodul, des ersten Winkels, bei dem jede Person von der Winkelhalbierenden des Zielausblaswinkelbereichs abweicht, der dem Zieldeflektor entspricht, des ersten Abstands von jeder Person zum Klimagerät vom Deckeneinbautyp und des ersten eingeschlossenen Winkels zwischen der Verbindungslinie von jeder Person zum Klimagerät vom Deckeneinbautyp und der Lotlinie, wobei der Zieldeflektor sich im personenanblasenden Modus befindet;
Bestimmen (S14) einer Mehrzahl von Zielschwenkwinkels gemäß jedem ersten Winkel, jedem ersten Abstand und jedem ersten eingeschlossenen Winkel;
Bestimmen (S15) eines Maximalwinkels und eines Minimalwinkels in der Mehrzahl von Zielschwenkwinkeln; und
Steuern (S16) des Zieldeflektors, zum Leiten des Luftstroms zwischen dem Maximalwinkel und dem Minimalwinkel zu schwenken.

6. Steuerverfahren des Klimagerätes vom Deckeneinbautyp nach Anspruch 1, wobei vor dem Erkennen, durch das Millimeterwellen-Personenerkennungsmodul, des ersten Winkels, bei dem die Person von der Winkelhalbierenden des Zielausblaswinkelbereichs abweicht, der dem Zieldeflektor entspricht, des ersten Abstands von der Person zum Klimagerät vom Deckeneinbautyp und des ersten eingeschlossenen Winkels zwischen der Verbindungslinie von der Person zum Klimagerät vom Deckeneinbautyp und der Lotlinie, wobei der Zieldeflektor sich im personenanblasenden Modus befindet, das Verfahren ferner Folgendes umfasst:

Erkennen eines Anblasmodus jedes Deflektors;
in Antwort darauf, dass sich der Deflektor im personenanblasenden Modus befindet, Ausführen folgender Operation: Erkennen, durch das Millimeterwellen-Personenerkennungsmodul, des ersten Winkels, bei dem die Person von der Winkelhalbierenden des Zielausblaswinkelbereichs abweicht, der dem Zieldeflektor entspricht, des ersten Abstands von der Person zum Klimagerät vom Deckeneinbautyp und des ersten eingeschlossenen Winkels zwischen der Verbindungslinie von der Person zum Klimagerät vom Deckeneinbautyp und der Lotlinie, wobei der Zieldeflektor sich im personenanblasenden Modus befindet.

7. Steuerverfahren des Klimagerätes vom Deckeneinbautyp nach Anspruch 6, wobei nach dem Erkennen des Anblasmodus jedes Deflektors das Verfahren ferner Folgendes umfasst:

Steuern eines Deflektors in einem personenvermeidenden Anblasmodus, den Luftstrom in einen ersten Grenzwinkel zu leiten, wobei der erste Grenzwinkel in einer von der Person abgewandten Richtung liegt;
Steuern eines Deflektors in einem Schwenkmodus, zum Leiten des Luftstroms zwischen dem ersten Grenzwinkel und einem zweiten Grenzwinkel zu schwenken;
Steuern eines Deflektors in einem Standardmodus, den Luftstrom in einen voreingestellten Schwenkwinkel zu leiten.

8. Klimagerät vom Deckeneinbautyp, umfassend ein Millimeterwellen-Personenerkennungsmodul und eine Mehrzahl von individuellen Deflektoren, wobei die Mehrzahl von individuellen Deflektoren konfiguriert sind, einen Ausblasgesamtbereich des Klimagerätes vom Deckeneinbautyp in eine entsprechende Mehrzahl von Ausblaswinkelbereichen zu unterteilen, wobei das Klimagerät vom Deckeneinbautyp Folgendes umfasst: einen Arbeitsspeicher (1005), einen Prozessor (1001) und ein Steuerprogramm des Klimagerätes vom Deckeneinbautyp, das im Arbeitsspeicher (1005) gespeichert ist und auf dem Prozessor (1001) läuft, wobei das Steuerprogramm des Klimagerätes vom Deckeneinbautyp bei Ausführung durch den Prozessor (1001) das Steuerverfahren des Klimagerätes vom Deckeneinbautyp nach einem der Ansprüche 1 bis 7 implementiert.

9. Computerlesbares Speichermedium (1005), wobei ein Steuerprogramm des Klimagerätes vom Deckeneinbautyp auf dem computerlesbaren Speichermedium (1005) gespeichert ist, wobei bei Ausführen durch einen Prozessor (1001) das Steuerprogramm des Klimagerätes vom Deckeneinbautyp das Steuerverfahren des Klimagerätes vom Deckeneinbautyp nach einem der Ansprüche 1 bis 7 implementiert.

Revendications

1. Procédé de commande d'un climatiseur de type encastré au plafond, appliqué au climatiseur de type encastré au plafond comprenant un module de détection humaine à ondes millimétriques et une pluralité de déflecteurs individuels, la pluralité de déflecteurs individuels étant configurés pour diviser une portée de soufflage du climatiseur de type encastré au plafond en une pluralité correspondante de plages d'angle de soufflage, le procédé de commande du climatiseur de type encastré au plafond étant **caractérisé en ce qu'**il comprend les étapes consistant à :

détecter (S10), par le module de détection humaine à ondes millimétriques, un premier angle auquel un être humain s'écarte d'une bissectrice angulaire d'une plage d'angles de soufflage cible correspondant à un déflecteur cible, une première distance entre l'être humain et le climatiseur de type encastré au plafond, et un premier angle inclus entre une ligne de liaison entre l'être humain et le climatiseur de type encastré au plafond et une ligne à plomb, la première distance entre l'être humain et le climatiseur de type encastré au plafond étant une longueur de la ligne de liaison entre l'être humain et le climatiseur de type encastré au plafond, et le déflecteur cible étant dans un mode de soufflage vers un être humain ;
déterminer (S20) un angle d'oscillation cible selon le premier angle, la première distance et le premier angle inclus ; et
commander (S30) le déflecteur cible pour qu'il fonctionne selon l'angle d'oscillation cible, afin de guider le flux d'air vers l'être humain.

2. Procédé de commande du climatiseur de type encastré au plafond selon la revendication 1, la détermination de l'angle d'oscillation cible selon le premier angle, de la première distance et du premier angle inclus comprenant les étapes consistant à :

déterminer une distance de projection du climatiseur de type encastré au plafond et de l'être humain sur la ligne à plomb comme étant une distance perpendiculaire, selon la première distance et le premier angle inclus ;
déterminer une distance de projection du climatiseur de type encastré au plafond et de l'être humain sur la bissectrice angulaire comme étant une distance horizontale, selon le premier angle, la première distance et le premier angle inclus ; et
déterminer l'angle d'oscillation cible du déflecteur cible selon la distance perpendiculaire et la distance horizontale.

3. Procédé de commande du climatiseur de type encastré au plafond selon la revendication 1, le procédé comprenant en outre, avant la détection, par le module de détection humaine à ondes millimétriques, du premier angle auquel l'être humain s'écarte de la bissectrice angulaire de la plage d'angles de soufflage cible correspondant au déflecteur cible, de la première distance entre l'être humain et le climatiseur de type encastré au plafond, et du premier angle inclus entre la ligne de liaison entre l'être humain et le climatiseur de type encastré au plafond et la ligne à plomb, les étapes consistant à :

détecter (S11) le nombre d'êtres humains dans la plage d'angles de soufflage cible ;

en réponse à la présence d'un être humain dans la plage d'angles de soufflage cible, exécuter une opération : détecter, par le module de détection humaine à ondes millimétriques, le premier angle auquel l'être humain s'écarte de la bissectrice angulaire de la plage d'angles de soufflage cible correspondant au déflecteur cible, la première distance entre l'être humain et le climatiseur de type encastré au plafond, et le premier angle inclus entre la ligne de liaison entre l'être humain et le climatiseur de type encastré au plafond et la ligne à plomb.

4. Procédé de commande du climatiseur de type encastré au plafond selon la revendication 3, le procédé comprenant en outre, après la détection du nombre d'êtres humains dans la plage d'angles de soufflage cible, l'étape consistant à :
en réponse à l'absence d'êtres humains dans la plage d'angles de soufflage cible, commander (S12) le déflecteur cible pour qu'il guide le flux d'air selon un angle d'oscillation prédéfini.

5. Procédé de commande du climatiseur de type encastré au plafond selon la revendication 3, le procédé comprenant en outre, après la détection du nombre d'êtres humains dans la plage d'angles de soufflage cible, les étapes consistant à :

en réponse à la présence d'un nombre d'êtres humains supérieur ou égal à deux dans la plage d'angles de soufflage cible, détecter (S13), par le module de détection humaine à ondes millimétriques, le premier angle auquel chaque être humain s'écarte de la bissectrice angulaire de la plage d'angles de soufflage cible correspondant au déflecteur cible, la première distance entre chaque être humain et le climatiseur de type encastré au plafond, et le premier angle inclus entre la ligne de liaison entre chaque être humain et le climatiseur de type encastré au plafond et la ligne à plomb, le déflecteur cible étant dans le mode de soufflage vers un être humain ;
déterminer (S14) une pluralité d'angles d'oscillation cibles selon chaque premier angle, chaque première distance et chaque premier angle inclus ;
déterminer (S15) un angle maximal et un angle minimal dans la pluralité d'angles d'oscillation cibles ; et
commander (S16) le déflecteur de cible pour qu'il oscille entre l'angle maximal et l'angle minimal afin de guider le flux d'air.

6. Procédé de commande du climatiseur de type encastré au plafond selon la revendication 1, le procédé comprenant en outre, avant la détection, par le module de détection humaine à ondes millimétriques, du premier angle auquel l'être humain s'écarte de la bissectrice angulaire de la plage d'angles de soufflage cible correspondant au déflecteur cible, de la première distance entre l'être humain et le climatiseur de type encastré au plafond, et du premier angle inclus entre la ligne de liaison entre l'être humain et le climatiseur de type encastré au plafond et la ligne à plomb, le déflecteur cible étant dans le mode de soufflage vers un être humain, les étapes consistant à :

détecter un mode de soufflage de chaque déflecteur ;
en réponse au fait que le déflecteur est dans le mode de soufflage vers un être humain, exécuter une opération : détecter, par le module de détection humaine à ondes millimétriques, le premier angle auquel l'être humain s'écarte de la bissectrice angulaire de la plage d'angles de soufflage cible correspondant au déflecteur cible, la première distance entre l'être humain et le climatiseur de type encastré au plafond, et le premier angle inclus entre la ligne de liaison entre l'être humain et le climatiseur de type encastré au plafond et la ligne à plomb, le déflecteur cible étant dans le mode de soufflage vers un être humain.

7. Procédé de commande du climatiseur de type encastré au plafond selon la revendication 6, le procédé comprenant en outre, après la détection du mode de soufflage de chaque déflecteur, les étapes consistant à :

commander un déflecteur dans un mode de soufflage évitant un être humain afin de guider le flux d'air selon un premier angle limite, le premier angle limite étant dans une direction opposée à l'être humain ;
commander un déflecteur dans un mode d'oscillation pour qu'il oscille entre le premier angle limite et un second angle limite afin de guider le flux d'air ;
commander un déflecteur dans un mode standard afin de guider le flux d'air selon un angle d'oscillation prédéfini.

8. Climatiseur de type intégré au plafond, comprenant un module de détection humaine à ondes millimétriques et une pluralité de déflecteurs individuels, la pluralité de déflecteurs individuels étant configurés pour diviser une portée de soufflage du climatiseur de type encastré au plafond en une pluralité correspondante de plages d'angle de soufflage, le climatiseur de type intégré au plafond comprenant : une mémoire (1005), un processeur (1001) et un programme de commande du climatiseur de type encastré au plafond stocké dans la mémoire (1005) et

s'exécutant sur le processeur (1001), le programme de commande du climatiseur de type encastré au plafond, lorsqu'il est exécuté par le processeur (1001), mettant en œuvre le procédé de commande du climatiseur de type encastré au plafond selon l'une quelconque des revendications 1 à 7.

9. Support de stockage lisible par ordinateur (1005), un programme de commande du climatiseur de type encastré au plafond étant stocké sur le support de stockage lisible par ordinateur (1005), le programme de commande du climatiseur de type encastré au plafond, lorsqu'il est exécuté par un processeur (1001), mettant en œuvre le procédé de commande du climatiseur de type encastré au plafond selon l'une quelconque des revendications 1 à 7.

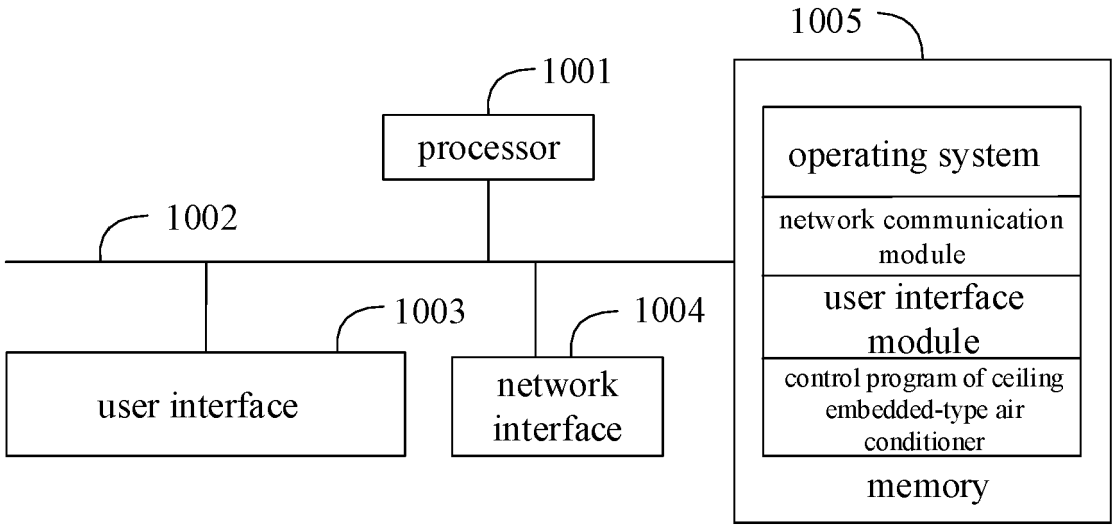
1005
1001
processor
operating system
network communication module
1002
user interface module
1003
1004
control program of ceiling embedded-type air conditioner
user interface
network interface
memory

FIG. 1

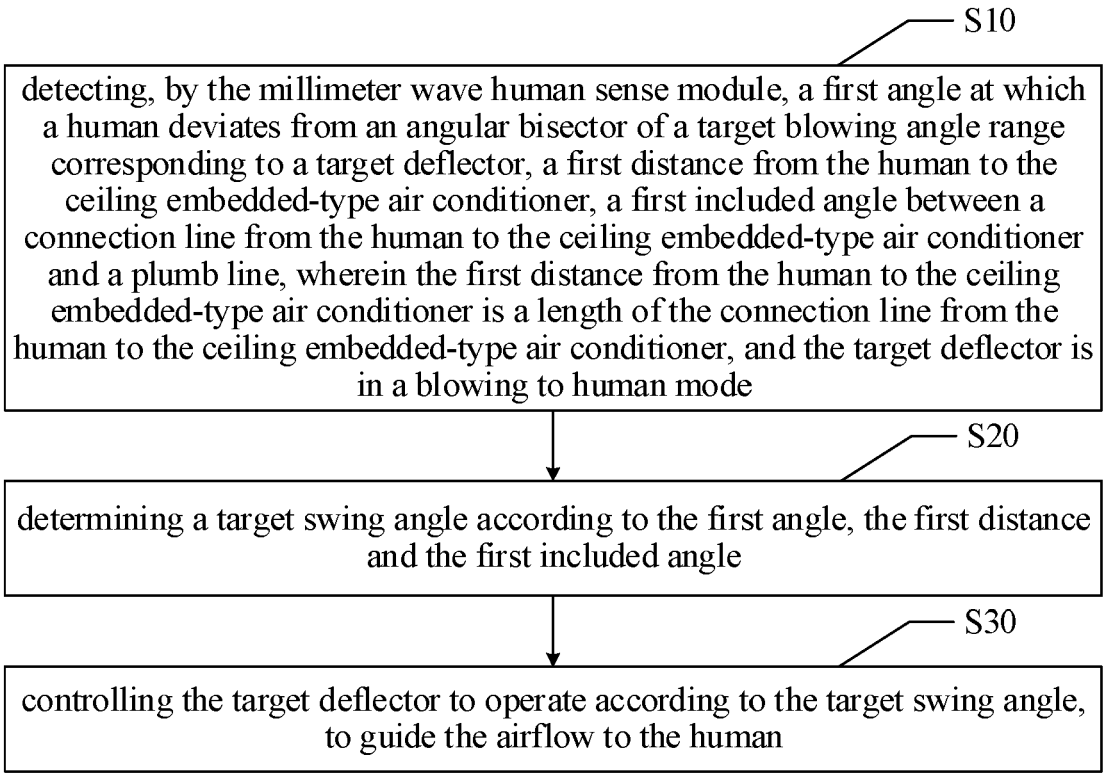
S10
detecting, by the millimeter wave human sense module, a first angle at which a human deviates from an angular bisector of a target blowing angle range corresponding to a target deflector, a first distance from the human to the ceiling embedded-type air conditioner, a first included angle between a connection line from the human to the ceiling embedded-type air conditioner and a plumb line, wherein the first distance from the human to the ceiling embedded-type air conditioner is a length of the connection line from the human to the ceiling embedded-type air conditioner, and the target deflector is in a blowing to human mode
S20
determining a target swing angle according to the first angle, the first distance and the first included angle
S30
controlling the target deflector to operate according to the target swing angle, to guide the airflow to the human

FIG. 2

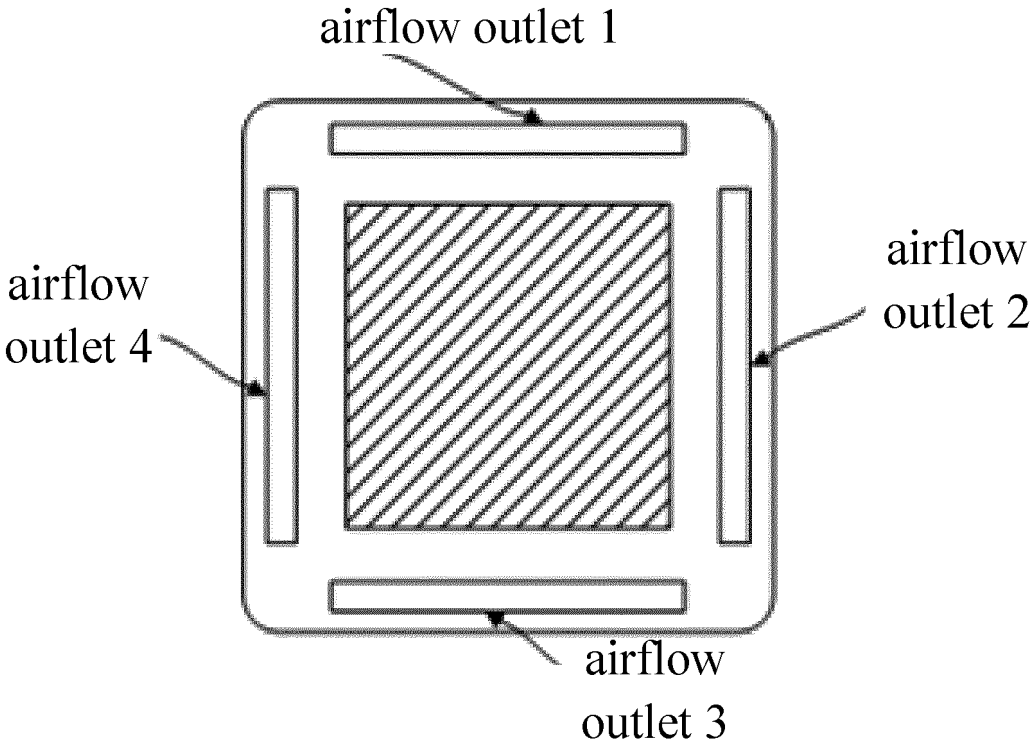
airflow outlet 1
airflow outlet 4
airflow outlet 2
airflow outlet 3

FIG. 3

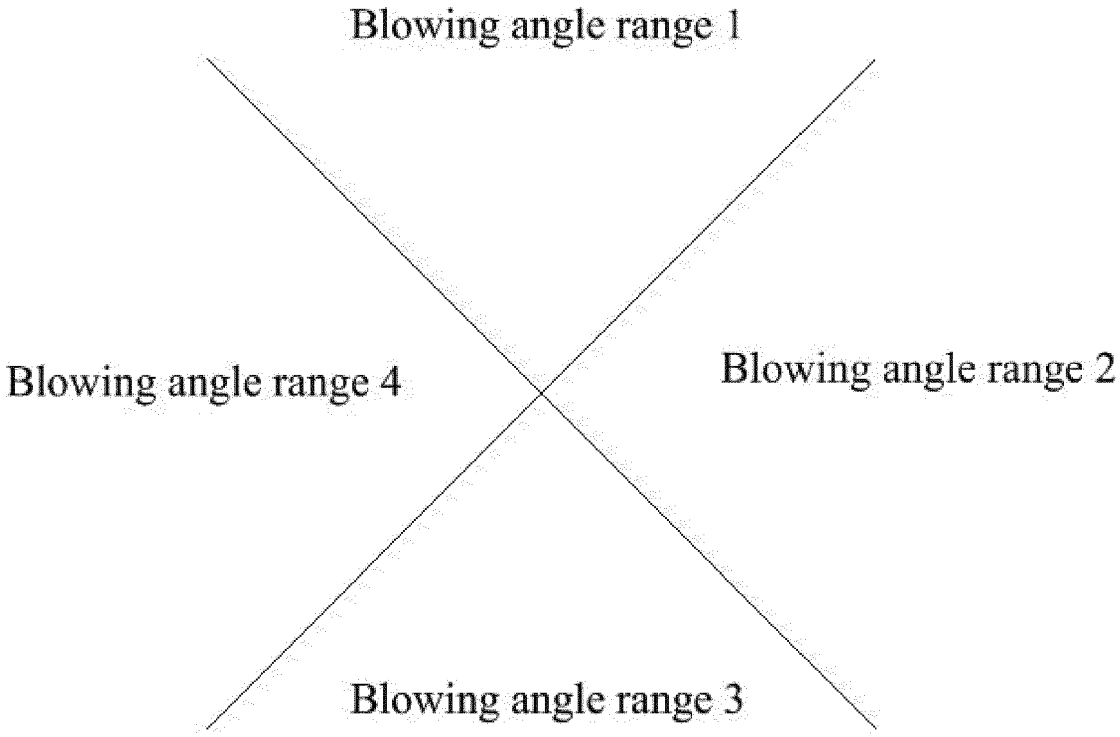
Blowing angle range 1
Blowing angle range 4
Blowing angle range 2
Blowing angle range 3

FIG. 4

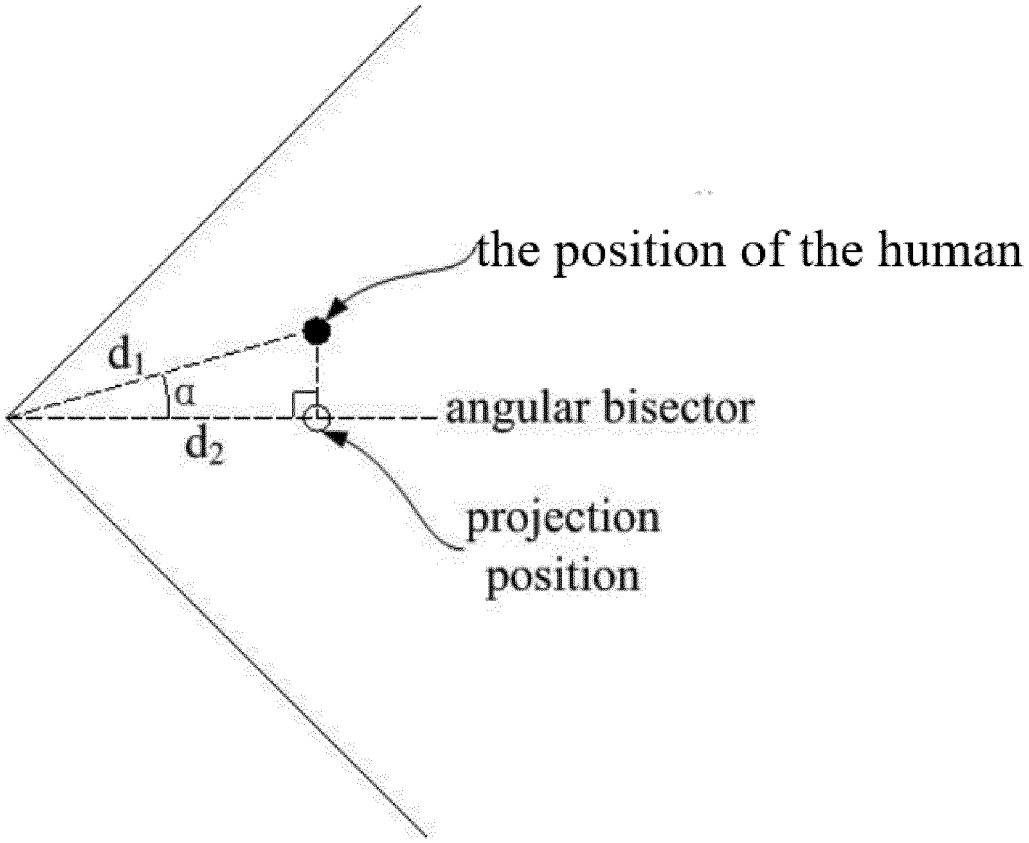
the position of the human
d1
α
angular bisector
d2
projection
position

FIG. 5

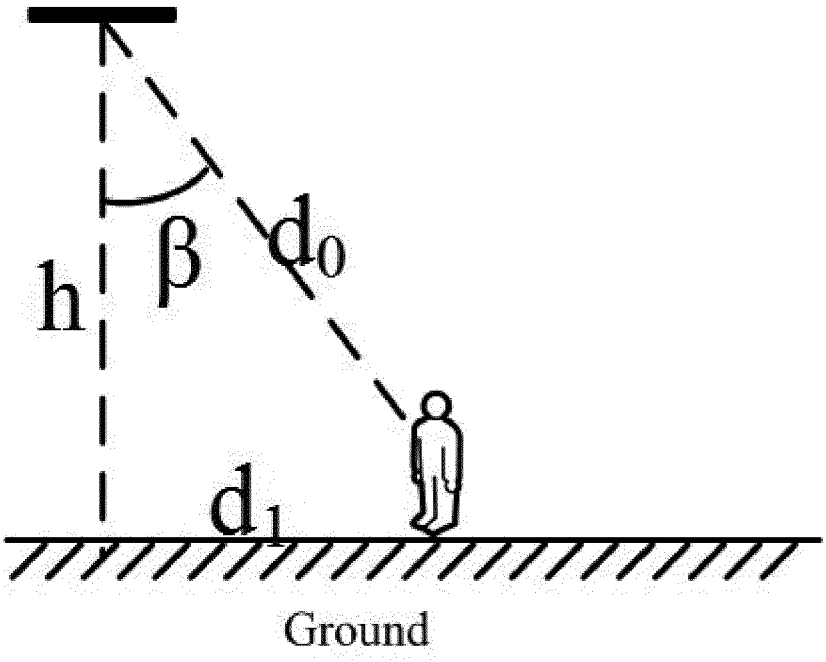

FIG. 6

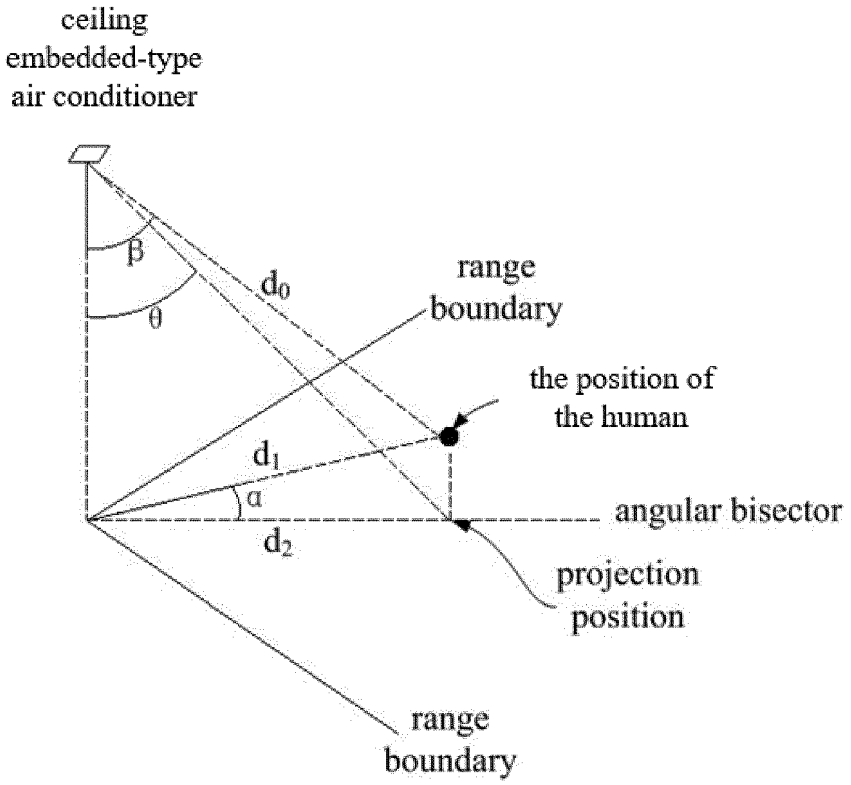
ceiling
embedded-type
air conditioner
β
θ
d_0
range
boundary
the position of
the human
d_1
α
angular bisector
d_2
projection
position
range
boundary

FIG. 7

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- EP 3176514 A **[0002]**