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Maintenance base station and cleaning robot system

Abstract

A maintenance base station includes at least one function component, a man-machine interaction component and a controller. The man-machine interaction component is configured to receive a user input and determine a man-machine interaction signal based on the user input. The man-machine interaction signal indicates a device type and a device task type. A device indicated with the device type at least includes a cleaning robot or the function component of the maintenance base station. The controller electrically connecting the function component and the man-machine interaction component, and is configured to receive the man-machine interaction signal and call the corresponding device to work based on the man-machine intction signal.

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Background/Summary

CROSS-REFERENCE TO RELATED APPLICATIONS

(1) This application claims priority to Chinese Patent Application No. 202211349283.1, filed Oct.

31, 2022, the entire contents of which is incorporated herein by reference.

FIELD OF TECHNOLOGY

(2) The present application relates to the technical field of maintenance base stations, and more specifically, to a maintenance base station and a cleaning robot system.

BACKGROUND

(3) A maintenance base station is configured to maintain a cleaning robot. The maintenance base station may include a carrier base through which the cleaning robot can be carried. For example, the maintenance base station can provide at least one of maintenance services for the cleaning robot, such as charging, mop cleaning, waste recycling, sewage collection and fresh water supply. Generally, the maintenance base station and the cleaning robot are two separate devices. The cleaning robot can move to the maintenance base station by itself to perform routine maintenances. However, a maintenance base station has the man-machine interaction function usually limited to an on/off key, a display of status readings, and the like; and a cleaning robot has the man-machine interaction function usually limited to an on/off key and a recharging key. That is, user experience is poor as a user needs to operate back and forth between the maintenance base station and the cleaning robot due to the single function of the maintenance base station which is difficult to meet user's requirements for interaction.

SUMMARY

(4) There are provided a maintenance base station and a cleaning robot system. The technical solution is as below:

(5) According to a first aspect of the present disclosure, there is provided a maintenance base station which is configured to cooperate with a cleaning robot. The maintenance base station comprises at least one function component, a man-machine interaction component and a controller. The man-machine interaction component is configured to receive a user input and determine a man-machine interaction signal based on the user input, and the man-machine interaction signal indicates a device type and a device task type. A device indicated by the device type at least comprises the cleaning robot or the function component of the maintenance base station. The controller electrically connecting the function component and the man-machine interaction component, and the controller is configured to receive the man-machine interaction signal and call the corresponding device to work based on the man-machine interaction signal.

(6) According to a second aspect of the present disclosure, there is provided a cleaning robot system, including the maintenance base station above and a cleaning robot.

(7) It should be understood that the general description above and the detailed description below are only exemplary and explanatory, and cannot limit the present disclosure.

Description

BRIEF DESCRIPTION OF THE DRAWINGS

(1) To describe the technical solutions in the embodiments of the present application more clearly, the following briefly describes the accompanying drawings required for describing the embodiments or the prior art. Apparently, the accompanying drawings in the following description show merely some of the embodiments of the present application, and those of ordinary skills in the art may still derive other drawings from these accompanying drawings without creative efforts.

(2) FIG. 1 is a schematic diagram of a hardware configuration of a maintenance base station according to an embodiment of the present application;

(3) FIG. 2 is a schematic diagram of a hardware configuration of a man-machine interaction component of a maintenance base station according to an embodiment of the present application;

(4) FIG. 3 is a schematic diagram of a hardware configuration of a key component of a maintenance base station according to an embodiment of the present application;

- (5) FIG. 4 is a schematic diagram of a hardware configuration of a speech recognition component of a maintenance base station according to an embodiment of the present application;
- (6) FIG. 5 is a schematic diagram of a hardware configuration of a cleaning robot according to an embodiment of the present application;
- (7) FIG. 6 is a schematic structural diagram of a maintenance base station according to an embodiment of the present application;
- (8) FIG. 7 is a schematic structural diagram of a first carrier base of a maintenance base station according to an embodiment of the present application;
- (9) FIG. 8 is a partial schematic structural diagram I of a maintenance base station according to an embodiment of the present application;
- (10) FIG. 9 is a partial schematic exploded structural diagram of a maintenance base station according to an embodiment of the present application;
- (11) FIG. 10 is a partial schematic structural diagram II of a maintenance base station according to an embodiment of the present application;
- (12) FIG. 11 is a schematic structural diagram of a diffuser of a maintenance base station according to an embodiment of the present application;
- (13) FIG. 12 is an enlarged schematic structural diagram of part A in FIG. 9; and
- (14) FIG. 13 is a schematic diagram of a cleaning robot system according to an embodiment of the present application.

DESCRIPTION OF THE EMBODIMENTS

- (15) The embodiments of the present application are described in detail below. Examples of the embodiments are shown in the accompanying drawings, and the same or similar reference signs indicate the same or similar components or components with the same or similar functions. The embodiments described below with reference to the accompanying drawings are exemplary and intended to explain the present application, but cannot be understood as a limitation of the present application.
- (16) In the descriptions of the present application, it should be understood that the orientations or positional relationships indicated by the terms “length”, “width”, “upper”, “lower”, “front”, “rear”, “left”, “right”, “perpendicular”, “horizontal”, “top”, “bottom”, “inside”, “outside”, and the like are based on the orientations or positional relationships shown in the accompanying drawings, are merely intended to facilitate the descriptions of the present application and simplify the descriptions, are not intended to indicate or imply that the apparatuses or components mentioned in the present application must have specific orientations, or be constructed and operated for a specific orientation, and therefore shall not be construed as a limitation to the present application.
- (17) In addition, the terms “first”, “second”, etc. are merely intended for a purpose of description, and shall not be understood as an indication or implication of relative importance or implicit indication of the number of indicated technical features. Therefore, a feature limited by “first” or “second”, etc. may explicitly or implicitly include one or more features. In the description of the present application, the phrase “a plurality of” means two or more, unless otherwise explicitly and specifically defined.
- (18) In the description of the present application, unless otherwise expressly specified and limited, the terms “mount”, “connected”, “connect”, “fix”, etc. should be understood in a broad sense, such as, a fixed connection, a detachable connection, or an integral connection; a mechanical connection, or an electrical connection; a direct connection, an indirect connection through an intermediate medium, an internal connection of two elements, or interaction between two elements. For those of ordinary skills in the art, the specific meaning of the foregoing terms in the present application may be understood according to specific circumstances.
- (19) Referring to FIGS. 1 to 5, embodiments of the present application provide a maintenance base station **100**. The maintenance base station **100** is configured to cooperate with a cleaning robot **200**, and the maintenance base station **100** includes at least one function component **101**, a man-machine

interaction component **300** and a controller **400**.

(20) The man-machine interaction component **300** is configured to receive a user input and determine a man-machine interaction signal based on the user input. The man-machine interaction signal indicates a device type and a device task type, and the device indicated by the device type is the cleaning robot **200** or the function component of the maintenance base station **100**.

(21) The controller **400** is electrically connected to the man-machine interaction component **300**, and is configured to receive the man-machine interaction signal and call the corresponding device to work based on the man-machine interaction signal.

(22) In the maintenance base station **100** and a cleaning robot system **1000** according to the embodiments of the present application, the man-machine interaction component **300** is configured to receive a user input and determine a man-machine interaction signal based on the user input, the man-machine interaction signal indicates a device type and a device task type, and a device indicated with the device type is the cleaning robot **200** or the function component **101** of the maintenance base station **100**; and the controller **400** is electrically connected to the man-machine interaction component **300**, and the controller **400** is configured to receive the man-machine interaction signal and call the corresponding device to work based on the man-machine interaction signal; therefore, the maintenance base station **100** can intelligently recognize the user input and distinguish whether a control object of a user is the cleaning robot **200** or the function component **101** of the maintenance base station **100**, and then can call the cleaning robot **200** or the maintenance base station **100** itself to work, thus solving the problem that the user operates back and forth between the maintenance base station **100** and the cleaning robot **200** due to the single function of an existing maintenance base station **100** which is difficult to meet user's requirements for interaction.

(23) It is to be understood that the cleaning robot **200** may be a sweeping robot, a sweeping and mopping integrated robot, a mopping robot, a floor scrubbing robot, a floor washing robot, or an air purification robot, etc. The cleaning robot **200** is configured to perform surface cleaning tasks, can clean dust and debris on the floor in an all-round manner, thus improving the cleanliness of an indoor environment in an all-round manner. The surface cleaning tasks may include any one or a combination of some of sweeping, vacuuming, scrubbing, washing and mopping.

(24) Referring to FIGS. **1** and **6**, it is to be understood that the maintenance base station **100** includes at least one function component **101**, the maintenance base station **100** may include one or two or more than two function components **101**. The at least one function component **101** may include any one or a combination of some of an air purification component, an illumination component, a loudspeaker component, a charging component, a suction power component for recycling waste in a dust box, a fresh water supply drive component, a sewage collection drive component, a mop cleaning drive component, and the like.

(25) In this embodiment, the maintenance base station **100** can be configured to cooperate with the cleaning robot **200**. The maintenance base station **100** is provided with a charging device **16b**, such that the charging device **16b** of the maintenance base station **100** can be configured to provide a charging maintenance service to the cleaning robot **200** during the period when the cleaning robot **200** is docked at the maintenance base station **100**. In addition to the charging maintenance service, those skilled in the art may further extend the configuration of a carrier base according to needs. For example, the maintenance base station **100** may provide at least one of the maintenance services of mop cleaning, waste recycling, sewage collection and fresh water supply to the cleaning robot **200**. Accordingly, the maintenance base station **100** may be provided with at least one of a mop cleaning device, a dust box waste recycling device, a sewage collection device, a fresh water supply device, and the like. The mop cleaning device includes a mop cleaning component. The dust box waste recycling device includes a suction power component (e.g., a fan) for recycling waste in the dust box. The sewage collection device includes a sewage collection drive component (e.g. a sewage pump). The fresh water supply device includes a fresh water supply drive component (e.g.,

a fresh water pump). The mop cleaning device includes a mop cleaning drive component (e.g. a drive motor) and/or a cleaning fluid supply component.

(26) The maintenance base station **100** includes a man-machine interaction component **300**, and the man-machine interaction component **300** includes a key component **91**, or/and a speech recognition component **500**. In this embodiment, the man-machine interaction component **300** includes a key component **91** and a speech recognition component **500**. In other embodiments, the man-machine interaction component **300** includes a key component **91** and does not include a speech recognition component **500**; or, the man-machine interaction component **300** includes a speech recognition component **500** and does not include a key component **91**.

(27) The key component **91** is provided with a first key portion **91a** and a second key portion **91b**, the first key portion **91a** and the second key portion **91b** are both electrically connected to the controller **400**, and the first key portion **91a** is configured to trigger a first man-machine interaction signal and the second key portion **91b** is configured to trigger a second man-machine interaction signal. The first man-machine interaction signal indicates that the device type is the cleaning robot **200**, and the second man-machine interaction signal indicates that the device type is the function component **101** of the maintenance base station **100**.

(28) When the user presses the first key portion **91a** on the key component **91**, the determination of the first man-machine interaction signal is triggered, and the device type indicated by the first man-machine interaction signal is the cleaning robot **200**, so that the cleaning robot **200** can be controlled to work. For example, the function of the first key portion **91a** can be set as starting cleaning, stopping cleaning, starting recharging, or pausing recharging, and correspondingly, the device type indicated by the first man-machine interaction signal is the cleaning robot **200**, and the device task type indicated by the first man-machine interaction signal may be starting cleaning, stopping cleaning, starting recharging, or pausing recharging, so that the cleaning robot **200** can be controlled to start cleaning, stop cleaning, start recharging, or pause recharging.

(29) When the user presses the second key portion **91b** on the key component **91**, the determination of the second man-machine interaction signal is triggered, and the device type indicated by the second man-machine interaction signal is the function component **101** of the maintenance base station **100**, so that the function component **101** of the maintenance base station **100** can be controlled to work.

(30) For example, the function of the second key **91b** can be set as starting air purification, stopping air purification, increasing air speed of air purification, or decreasing air speed of air purification, and correspondingly, the device type indicated by the second man-machine interaction signal is the air purification component of the maintenance base station **100**, and the device task type indicated by the second man-machine interaction signal may be starting air purification, stopping air purification, increasing air speed of air purification, or decreasing air speed of air purification, so that the air purification component of the maintenance base station **100** can be controlled to start air purification, stop air purification, increase air speed of air purification, or decrease air speed of air purification.

(31) For example, the function of the second key portion **91b** can be set as starting illumination, stopping illumination, increasing illumination brightness, decreasing illumination brightness, or switching lighting color, and correspondingly, the device type indicated by the second man-machine interaction signal is the illumination component of the maintenance base station **100**, and the device task type indicated by the second man-machine interaction signal may be starting illumination, stopping illumination, increasing illumination brightness, decreasing illumination brightness, or switching lighting color, so that the illumination component of the maintenance base station **100** can be controlled to start illumination, stop illumination, increase illumination brightness, decrease illumination brightness, or switch lighting color.

(32) For example, the function of the second key portion **91b** can be set as starting playing music, stopping playing music, increasing volume, decreasing volume, or switching songs, and

correspondingly, the device type indicated by the second man-machine interaction signal is the loudspeaker component of the maintenance base station **100**, and the device task type indicated by the second man-machine interaction signal may be starting playing music, stopping playing music, increasing volume, decreasing volume, or switching songs, so that the loudspeaker component of the maintenance base station **100** can be controlled to start playing music, stop playing music, increase volume, decrease volume, or switch music.

(33) For example, the function of the second key portion **91b** can be set as starting mop cleaning, stopping mop cleaning, cleaning the mop with detergent, or cleaning the mop with water, and correspondingly, the device type indicated by the second man-machine interaction signal is the mop cleaning component of the maintenance base station **100**, and the device task type indicated by the second man-machine interaction signal may be starting mop cleaning, stopping mop cleaning, cleaning the mop with detergent, or cleaning mop with water, so that the mop cleaning component of the maintenance base station **100** can be controlled to start mop cleaning, stop mop cleaning, clean the mop with detergent, or clean the mop with water. In some embodiments, when the user presses the second key portion **91b**, the cleaning robot automatically returns to the maintenance base station for maintenance, and the maintenance base station **100** can control the mop cleaning component to start mop cleaning, stop mop cleaning, clean the mop with detergent, or clean the mop with water, based on the second man-machine interaction signal. Thus, the purpose of mop cleaning can be achieved according to the user's needs, which helps to improve the mopping cleanliness.

(34) It can be seen that the user can control the maintenance base station **100** and the cleaning robot **200** respectively through the key component **91** on the maintenance base station **100**, and the user does not have to find the cleaning robot **200** first and then press a body key on the cleaning robot **200** to control the cleaning robot **200**, thus bringing more convenience to use and being conducive to improving the user experience.

(35) It is to be understood that the key component **91** may include one or two or more than two first key portions **91a**, and two or more first key portions **91a** can be configured to control the cleaning robot **200** to perform different work tasks; similarly, the key component **91** may include one or two or more than two second key portions **91b**, and two or more second key portions **91b** can be configured to control the same function component **101** of the maintenance base station **100** to perform different work tasks; alternatively, two or more second key portions **91b** can be configured to separately control different function components **101** of the maintenance base station **100** to perform work tasks.

(36) The speech recognition component **500** includes a first microphone **501** and a speech parsing component **80** electrically connected to the first microphone **501**. The speech parsing component **80** is electrically connected to the controller **400**, the first microphone **501** is configured to acquire speech input by the user, and the controller **400** parses the speech acquired by the first microphone **501** through the speech parsing component **80** to determine the man-machine interaction signal.

(37) When the user sends speech towards the maintenance base station **100**, the maintenance base station **100** can acquire the speech input by the user through the first microphone **501**. The maintenance base station **100** determines the first man-machine interaction signal or the second man-machine interaction signal by parsing the speech through the speech parsing component **80**. The first man-machine interaction signal indicates that the device type is the cleaning robot **200** and the second man-machine interaction signal indicates that the device type is the function component **101** of the maintenance base station **100**.

(38) For example, in a case that the speech input by the user includes a speech keyword (e.g., the speech includes a keyword such as “start cleaning”, “stop cleaning”, “start recharging”, or “pause recharging”), the maintenance base station **100** determines the first man-machine interaction signal by parsing the speech through the speech parsing component **80**, the first man-machine interaction signal indicates that the device type is the cleaning robot **200**, and the first man-machine interaction

signal indicates that the device task type may be starting cleaning, stopping cleaning, starting recharging, or pausing recharging.

(39) For example, in a case that the speech input by the user includes a speech keyword (e.g., the speech includes a keyword such as “start air purification”, “stop air purification”, “increase air speed of air purification”, or “decrease air speed of air purification”), the maintenance base station **100** determines the second man-machine interaction signal by parsing the speech through the speech parsing component **80**, the second man-machine interaction signal indicates that the device type is the air purification component of the maintenance base station **100**, and the second man-machine interaction signal indicates that the device task type may be starting air purification, stopping air purification, increasing air speed of air purification, or decreasing air speed of air purification.

(40) For example, in a case that the speech input by the user includes a speech keyword (e.g., the speech includes a keyword such as “start illumination”, “stop illumination”, “increase brightness”, “decrease brightness”, or “switch lighting color”), the maintenance base station **100** determines the second man-machine interaction signal by parsing the speech through the speech parsing component **80**, the second man-machine interaction signal indicates that the device type is the illumination component of the maintenance base station **100**, and the second man-machine interaction signal indicates that the device task type may be starting illumination, stopping illumination, increasing brightness, decreasing brightness, or switching lighting color.

(41) For example, in a case that the user sends speech (e.g., the speech includes a keyword “start playing music”, “stop playing music”, “increase volume”, or “decrease volume”) to the maintenance base station **100**, the maintenance base station **100** determines the second man-machine interaction signal by parsing the speech through the speech parsing component **80**, the second man-machine interaction signal indicates that the device type is the loudspeaker component of the maintenance base station **100**, and the second man-machine interaction signal indicates that the device task type may be starting playing music, pausing playing music, switching music, increasing volume, and decreasing volume, so that the loudspeaker component of the maintenance base station **100** can be controlled to start playing music, pause playing music, increase volume, and decrease volume.

(42) For example, in a case that the user sends speech (e.g., the speech includes a keyword such as “start mop cleaning”, “stop mop cleaning”, “clean the mop with detergent”, or “clean the mop with water”) to the maintenance base station **100**, the maintenance base station **100** determines the second man-machine interaction signal by parsing the speech through the speech parsing component **80**, the second man-machine interaction signal indicates that the device type is the mop cleaning component of the maintenance base station **100**, the second man-machine interaction signal indicates that the device task type may be starting mop cleaning, stopping mop cleaning, cleaning the mop with detergent, or cleaning the mop with water. In some embodiments, in a case that the user sends speech (e.g., the speech includes a keyword such as “start mop cleaning”, “stop mop cleaning”, “clean the mop with detergent”, or “clean the mop with water”) to the maintenance base station **100**, the cleaning robot can automatically return to the maintenance base station for maintenance, and the maintenance base station **100** can control the mop cleaning component to start mop cleaning, stop mop cleaning, clean the mop with detergent, or clean the mop with water based on the second man-machine interaction signal, thus achieving the purpose of mop cleaning according to user's needs and helping to improve the mopping cleanliness. The cleaning robot can then proceed with the previous cleaning work after the maintenance is completed.

(43) It is to be understood that the speech keyword is not limited to the above examples. Those skilled in the art may set the speech keyword according to the work tasks that the maintenance base station **100** can perform, and set the speech keyword according to the work tasks that the cleaning robot **200** can perform.

(44) Referring to FIGS. 1 to 5, the maintenance base station **100** further includes a first wireless

communication component **92** configured to establish a wireless communication link with the cleaning robot **200**; the controller **400** is electrically connected to the first wireless communication component **92**, and the controller **400** is further configured to: in a case that the device type indicated by the man-machine interaction signal is the cleaning robot **200**, determine a first device task instruction based on the man-machine interaction signal, control the first wireless communication component **92** to work, and transmit the first device task instruction to the cleaning robot **200** by means of the first wireless communication component **92** to control the cleaning robot to perform a corresponding task, the first device task instruction being associated with a preset type of cleaning robot **200**.

(45) In this embodiment, the first wireless communication component **92** may be an infrared communication component, a 433 MHz wireless communication component or a Bluetooth component, etc. The cleaning robot **200** is provided with a second wireless communication component **220**. The second wireless communication component **220** may be an infrared communication component, a 433 MHz wireless communication component or a Bluetooth component, etc. The second wireless communication component **220** and the first wireless communication component **92** are the same wireless communication components, so that the first wireless communication component **92** can establish a wireless communication link with the second wireless communication component **220** under the same communication protocol to enable the maintenance base station **100** to establish a wireless communication link with the cleaning robot **200**, thereby bringing convenience for the cleaning robot **200** to perform wireless communication to exchange data with the maintenance base station **100** at a location far away from the maintenance base station **100**.

(46) The man-machine interaction signal indicates the device type is the cleaning robot **200** or the function component **101** of the maintenance base station **100**. The man-machine interaction component **300** includes a key component **91**, or/and a speech recognition component **500**. The key component **91** triggers the first man-machine interaction signal and the second man-machine interaction signal through the first key portion **91a** and the second key portion **91b**, respectively. The first man-machine interaction signal indicates that the device type is the cleaning robot **200** and the second man-machine interaction signal indicates that the device type is the function component **101** of the maintenance base station **100**. The maintenance base station **100** can acquire the speech input by the user through the first microphone **501**. The maintenance base station **100** determines the first man-machine interaction signal or the second man-machine interaction signal by parsing the speech through the speech parsing component **80**. The first man-machine interaction signal indicates that the device type is the cleaning robot **200** and the second man-machine interaction signal indicates that the device type is the function component **101** of the maintenance base station **100**. Working principles of the key component **91** and the speech recognition component **500** can be referred to the previous descriptions, which will not be repeated herein. By means of the key component **91**, the user can control the cleaning robot **200** and the maintenance base station **100** through the first key **91a** and the second key **91b** respectively when the user is close to the maintenance base station **100**. By means of the speech recognition component **500**, the user can control the cleaning robot **200** and the maintenance base station **100** through the speech respectively when the user is close to or far from the maintenance base station **100**.

(47) The first device task instruction includes at least one of starting cleaning, pausing cleaning, starting recharging, and pausing recharging. For example, when the user needs to start an indoor cleaning task, the user interacts on the man-machine interaction component **300** of the maintenance base station **100** to trigger the man-machine interaction component **300** to send the first man-machine interaction signal, where the device type indicated by the man-machine interaction signal is the cleaning robot **200** and the device task type indicated by the man-machine interaction signal is starting cleaning, so that the maintenance base station **100** can transmit the first device task instruction including the starting cleaning to the cleaning robot **200** by means of the first wireless

communication component **92**, and then the cleaning robot **200** can start the cleaning task based on the received first device task instruction. When the user needs to recall the cleaning robot **200**, the user interacts on the man-machine interaction component **300** of the maintenance base station **100** to trigger the man-machine interaction component **300** to send the first man-machine interaction signal, where the device type indicated by the man-machine interaction signal is the cleaning robot **200** and the device task type indicated by the man-machine interaction signal is starting recharging, so that the maintenance base station **100** can transmit the first device task instruction including the starting recharging to the cleaning robot **200** by means of the first wireless communication component **92**, and then the cleaning robot **200** can start the recharging task based on the received first device task instruction.

(48) Further, the step that the controller **400** controls the first wireless communication component **92** to work based on the first device task instruction includes: in a first step, the controller **400** determines a robot identification code based on the first device task instruction, and the robot identification code is configured to indicate the preset type of cleaning robot **200**; and in a second step, the controller **400** controls the first wireless communication component **92** to transmit a broadcast signal to the outside based on the first device task instruction and the robot identification code such that the cleaning robot **200** receives the broadcast signal and then determines whether to perform a task corresponding to the first device task instruction based on the robot identification code.

(49) In this embodiment, the robot identification code is used for identifying a preset type of cleaning robot **200**. A plurality of types of device identification codes are pre-stored in a memory of the maintenance base station **100**, and the plurality of types of device identification codes include a robot identification code. The robot identification code is associated with the first device task instruction. The controller **400** searches the robot identification code from the plurality of types of device identification codes based on the first device task instruction. A preset robot identification code is pre-stored in the memory of the cleaning robot **200**. The cleaning robot **200** determines whether the robot identification code in the broadcast signal matches the preset robot identification code. If yes, the cleaning robot **200** determines to perform a task corresponding to the first device task instruction, and if not, the cleaning robot **200** refuses to perform a task corresponding to the first device task instruction, so that it is possible to ensure that the preset type of cleaning robot **200** is paired with the maintenance base station **100**, and avoid misoperation of the cleaning robot **200** after receiving an irrelevant task instruction. The first device task instruction includes at least one of starting cleaning, pausing cleaning, starting recharging and pausing recharging. Those skilled in the art can set the content of the first device task instruction based on the function of the cleaning robot **200**.

(50) In some embodiments, the plurality of types of device identification codes include a smart device identification code, the smart device identification code is associated with a smart device task instruction. When the user interacts on the man-machine interaction component **300** of the maintenance base station **100** to trigger a third man-machine interaction signal from the man-machine interaction component **300**, the device type indicated by the third man-machine interaction signal is a preset smart device, the controller **400** determines the smart device task instruction based on the third man-machine interaction signal, and then the controller **400** determines the smart device identification code based on the smart device task instruction, and the smart device identification code is associated with the smart device task instruction. The controller **400** controls the first wireless communication component **92** to transmit a broadcast signal to the outside based on the smart device task instruction and the robot identification code such that the preset smart device receives the broadcast signal and then determines whether to perform a task corresponding to the smart device task instruction based on the smart device identification code. The preset smart device may be any one of a smart TV, a smart refrigerator, a smart air conditioner or a smart lamp. Those skilled in the art can set the content of the smart device task instruction based on the function

of the preset smart device.

(51) Referring to FIGS. **1** and **6**, in some embodiments, the function component **101** of the maintenance base station **100** includes an air purification component **600**, and the controller **400** is electrically connected to the air purification component **600**.

(52) In a case that the device type indicated by the man-machine interaction signal is the air purification component **600** of the maintenance base station **100**, the controller **400** determines a second device task instruction based on the man-machine interaction signal, and the controller **400** controls the air purification component **600** to perform a corresponding task based on the second device instruction. The second device task instruction is associated with the air purification component **600**, and including at least one of starting air purification, pausing air purification, increasing air speed and decreasing air speed.

(53) Referring to FIGS. **6** to **12**, in some embodiments, the maintenance base station **100** includes a first carrier base **16**, a second carrier base **17** and a first supporting assembly **18**. The first carrier base **16** is located at the bottom of the maintenance base station **100**. The first carrier base **16** is configured to carry the cleaning robot **200**. The second carrier base **17** is spaced apart from the first carrier base **16** in a height direction of the maintenance base station **100**. The second carrier base **17** is configured to carry a first function component. The first supporting assembly **18** is fixedly connected to the first carrier base **16** and the second carrier base **17** and separates the first carrier base **16** from the second carrier base **17** to enable the first function component to work at the position with a preset height. The first function component includes the air purification component **600**. The first carrier base **16** includes a first platform **161**, a second platform **162** disposed opposite the first platform **161**, and a shell structure **163** connecting the first platform **161** and the second platform **162**. The first platform **161** is used for the cleaning robot **200** to dock, and the second platform **162** is spaced apart from the first platform **161** in the height direction of the maintenance base station **100**. A spacing between the second platform **162** and the first platform **161** forms a storage space **163d**. The cleaning robot **200** can be accommodated in the storage space **163d** between the first platform **161** and the second platform **162** when the cleaning robot **200** is docked on the first platform **161**. The second platform **162** extends substantially in a horizontal direction, that is, the second platform **162** is substantially parallel to the ground. The shell structure **163** is fixedly connected between the first platform **161** and the second platform **162**. The shell structure **163**, the first platform **161** and the second platform **162** enclose to form the storage space **163d**. The shell structure **163** is substantially “U” shaped. The shell structure **163** includes a first side shell **163a** and two opposite second side shells **163b**. The first side shell **163a** and the two the second side shells **163b** form the “U” shaped shell structure **163**, so that the first carrier base **16** has a sufficient structural strength to carry the second carrier base **17** and the first supporting assembly **18** stably. An entrance **163c** is formed between the two second side shells **163b**. The entrance **163c** is disposed opposite the first side shell **163a**. The entrance **163c** communicates with the storage space **163d**. The cleaning robot **200** can enter the storage space **163d** through the entrance **163c**. The charging device **16b** includes a pair of charging electrode plates, the pair of charging electrode plates may be arranged on the first platform **161**, or, the pair of charging electrode plates may be disposed on the first side shell **163a**. The pair of charging electrode plates is configured to dock with a pair of charging contacts of the cleaning robot **200** to charge the cleaning robot **200**.

(54) The air purification component **600** includes a fan device **30**. The fan device **30** is configured to implement air purification. The fan device **30** is maintained on the second carrier base **17**. An air inlet end of the fan device **30** is disposed downward and an air outlet end of the fan device **30** is disposed upward. It is to be understood that the fan device **30** needs to be mounted at a suitable height to meet the flow requirements of air sucked into the space below by the air inlet end of the fan device **30**. The air sucked by the fan device **30** is discharged upwards from the air outlet end. An accommodating space **16a** is formed by the spacing between the second carrier base **17** and the first carrier base **16**, thereby providing a mounting space for the installation of a filter screen **40**.

The filter screen **40** is in the form of a hollow cylinder. Two ends of the filter screen **40** are sealed and fit to the first carrier base **16** and the second carrier base **17** respectively. The hollow portion of the filter screen **40** is communicated to the air inlet end of the fan device **30**. When the fan device **30** is started, the fan device **30** generates a negative vacuum pressure in the hollow portion of the filter screen **40** to suck outside air to pass through the filter screen **40** to enter the hollow portion of the filter screen **40**, to enter the air inlet end of the fan device **30**, and then is discharged upwardly to the outside from the air outlet end of the fan device **30**. In the process of air passing through the filter screen **40**, the filter screen **40** filters the air to intercept impurities in the air, so as to achieve an air purification effect. The purified air is discharged through the air outlet end of the fan device **30**. The filter screen **40** is in the form of a hollow cylinder. The filter screen **40** can receive the surrounding air in all directions and filter the air. The filter screen **40** has a relatively large filtering area. The second carrier base **17** and the first carrier base **16** are spaced apart in the height direction of the maintenance base station **100**, so that the filter screen **40** with a certain height can be mounted between the second carrier base **17** and the first carrier base **16**. This is conducive to further increasing the filtering area of the filter screen **40**, thereby helping to increase a flow rate of air intake of the fan device **30**, and facilitating rapid purification of indoor air.

(55) It is to be understood that the air purification component **600** may also be in other structural forms. Those skilled in the art can adjust it with reference to the design of existing air purifiers.

(56) Referring to FIGS. **1** and **6**, in some embodiments, the function component **101** of the maintenance base station **100** includes an illumination component **20**, and the controller **400** is electrically connected to the illumination component **20**.

(57) In a case that the device type indicated by the man-machine interaction signal is the illumination component **20** of the maintenance base station **100**, the controller **400** determines a third device task instruction based on the man-machine interaction signal, and the controller **400** controls the illumination component **20** to perform a corresponding task based on the third device instruction. The third device task instruction is associated with the illumination component **20**, and including at least one of turning on the light, turning off the light, increasing illuminating brightness, decreasing illuminating brightness, and changing lighting color.

(58) Referring to FIGS. **6** to **12**, in this embodiment, the maintenance base station **100** includes a base station body **10** and an illumination component **20**. The illumination component **20** includes a diffuser **21** and a light source assembly **22**. The diffuser **21** covers the base station body and is provided with a cavity **211**, and the light source assembly **22** is configured to emit light toward the cavity **211** of the diffuser **21**.

(59) The base station body **10** has a bottom and a top disposed relative to the bottom. The base station body **10** is provided with a docking platform **13** at the bottom. The docking platform **13** is used for the cleaning robot **200** to dock, thus facilitating maintenance of the cleaning robot **200** by the maintenance base station **100** during the period when the cleaning robot **200** is docked. The top is located at the highest position of the base station body **10**. The diffuser **21** covers the top of the base station body **10** such that the diffuser **21** is located at the highest position of the maintenance base station **100**. The light source assembly **22** projects light to the outside through the diffuser **21** to illuminate a larger area, so that the light emitted by the light source assembly **22** is reflected and scattered in the cavity **211** of the diffuser **21**, and finally refracted to the outside through the diffuser **21**. This enables the light emitted by the light source assembly **22** to be diffused in the diffuser **21**, so that the diffuser **21** can present an ambient lighting effect.

(60) The light source assembly **22** includes a light emitting surface **22a**, and the light emitting surface **22a** may be a flat surface, or a curved surface. Those skilled in the field can adjust the specific shape of the light emitting surface **22a** according to actual needs. The light source assembly **22** emits light to the inside of the diffuser **21** through the light emitting surface **22a**. In this embodiment, the light emitting surface **22a** of the light source assembly **22** is shaped as an annular conical surface, which allows the light source assembly **22** to have a larger light emitting

area, thereby providing more light into the cavity **211** of the diffuser **21** to achieve a better ambient lighting effect.

(61) The diffuser **21** includes a first half-shell **212** and a second half-shell **213**, the first half-shell **212** and the second half-shell **213** being enclosed to form the cavity **211**. The light source assembly **22** is located outside the diffuser **21**, the light source assembly **22** is arranged on the top position of the base station body **10**, the diffuser **21** covers the top position of the base station body **10**, and the diffuser **21** covers the light source assembly **22**, so that all the light emitted by the light source assembly **22** can enter the inside of the cavity **211** of the diffuser **21**, making the surface light ray further uniformly dispersed in the three-dimensional space of the cavity **211** of the diffuser **21**. Thus, a uniform three-dimensional light effect is formed in the diffuser **21**, which is conducive to improving the illumination effect, helping to achieve the ambient lighting effect in a larger projection range.

(62) Referring to FIGS. **6** to **12**, in some embodiments, the light source assembly **22** includes a light emitting device **221** and a light guide **222**. The light emitting device **221** is configured to emit light to the light guide **222** to uniformly scatter the light emitted by the light emitting device **221** through the light guide **222**. The light guide **222** directs the scattered light into the cavity **211** of the diffuser **21**.

(63) The light emitting device **221** includes a circuit board **223** and a plurality of light beads **224** arranged on one side of the circuit board **223**. The plurality of light beads **224** on the circuit board **223** form a dot-matrix light source. The light guide **222** is disposed opposite the light emitting device **221**, and a surface of one side of the light guide **222** is used for receiving light from the plurality of light beads **224** so that the light of the dot-matrix light source composed of the plurality of light beads **224** is evenly dispersed on the light guide **222**. A surface of the light guide **222** on the side away from the plurality of lamp beads **224** forms the light emitting surface **22a**, and the light guide **222** directs the light of the plurality of lamp beads **224** out through the light emitting surface **22a** to form an surface light source, so that a uniform surface light ray can be provided to the diffuser **21**. The circuit board **223** is disposed substantially parallel to a horizontal direction, so that it is easy to arrange the circuit board **223** horizontally on the top of the base station body **10**. The circuit board **223** occupies little space and does not occupy the internal space of the base station body **10**.

(64) The light guide **222** has a shape set corresponding to a distribution shape of the plurality of light beads **224**. In this embodiment, the plurality of light beads **224** are arranged in a ring shape, and correspondingly, the light guide **222** is disposed in a ring shape. Of course, in other embodiments, those skilled in the art can adjust the shape of the light guide **222** and the distribution shape of the plurality of light beads **224** according to the actual needs, which are not limited to the above-mentioned shapes.

(65) Referring to FIGS. **1** and **6**, in some embodiments, the function component of the maintenance base station **100** includes a loudspeaker component **60**, and the controller **400** is electrically connected to the loudspeaker component **60**.

(66) In a case that the device type indicated by the man-machine interaction signal is the loudspeaker component **60** of the maintenance base station **100**, the controller **400** determines a fourth device task instruction based on the man-machine interaction signal, and the controller **400** controls the loudspeaker component **60** to perform a corresponding task based on the fourth device instruction. The fourth device task instruction is associated with the loudspeaker component **60**, and including at least one of starting playing music, pausing playing music, switching music, increasing volume, and decreasing volume.

(67) Referring to FIGS. **1** to **5**, further, the cleaning robot **200** includes a second microphone **210**, and the second microphone **210** is configured to acquire speech input by a user. The man-machine interaction component **300** includes a speech parsing component **80**, and the controller **400** is electrically connected to the speech parsing component **80**.

(68) The controller **400** receives the speech acquired by the second microphone **210** through the first wireless communication component **92**, and parses the speech acquired by the second microphone **210** through the speech parsing component **80** to determine the man-machine interaction signal.

(69) In this embodiment, the first wireless communication component **92** may be an infrared communication component, a 433 MHz wireless communication component or a Bluetooth component, etc. The cleaning robot **200** is provided with a second wireless communication component **220**. The second wireless communication component **220** may be an infrared communication component, a 433 MHz wireless communication component or a Bluetooth component, etc. The second wireless communication component **220** and the first wireless communication component **92** are the same wireless communication components, so that the first wireless communication component **92** can establish a wireless communication link with the second wireless communication component **220** under the same communication protocol to enable the maintenance base station **100** to establish a wireless communication link with the cleaning robot **200**, thereby bringing convenience for the cleaning robot **200** to perform wireless communication to exchange data with the maintenance base station **100** at a location far away from the maintenance base station **100**. The cleaning robot **200** may forward the speech acquired by the second microphone **210** to the first wireless communication component **92** of the maintenance base station **100** by means of the second wireless communication component **220**, that is, the maintenance base station **100** receives the speech acquired by the second microphone **210** through the first wireless communication component **92**, and then the controller **400** parses the speech acquired by the second microphone **210** through the speech parsing component **80** to determine whether the man-machine interaction signal is a first man-machine interaction signal or a second man-machine interaction signal. The first man-machine interaction signal indicates that the device type is the cleaning robot **200** and the second man-machine interaction signal indicates that the device type is the function component **101** of the maintenance base station **100**. Working principles of the first man-machine interaction signal and the second man-machine interaction signal are described in the previous description, which will not be repeated here.

(70) Referring to FIG. **13**, an embodiment of the present application further provides a cleaning robot system **1000**. The cleaning robot system **1000** includes the cleaning robot **200** and the maintenance base station **100** as described above.

(71) It is to be understood that the cleaning robot **200** may be a sweeping robot, a sweeping and mopping integrated robot, a mopping robot, a floor scrubbing robot, a floor washing robot, or an air purification robot, etc. The cleaning robot **200** is configured to perform surface cleaning tasks, can clean dust and debris on the floor in an all-round manner, thus improving the cleanliness of an indoor environment in an all-round manner. The surface cleaning tasks may include any one or a combination of some of sweeping, vacuuming, scrubbing, washing and mopping.

(72) The foregoing descriptions are merely preferable embodiments of the present application, but are not intended to limit the present application. Any modifications, equivalent substitutions, or improvements made within the spirit and principle of the application shall fall within the scope of protection of the present application.

Claims

1. A maintenance base station, configured to cooperate with a cleaning robot, and comprising: at least one function component; a man-machine interaction component configured to receive a user input and determine a man-machine interaction signal based on the user input, and the man-machine interaction signal indicates a device type and a device task type, wherein a device indicated by the device type at least comprises the cleaning robot or the function component of the maintenance base station; and a controller electrically connecting the function component and the

man-machine interaction component, wherein the controller is configured to receive the man-machine interaction signal and call the corresponding device to work based on the man-machine interaction signal; wherein the maintenance base station includes a first carrier base, a second carrier base and a first supporting assembly, and the first carrier base is located at the bottom of the maintenance base station and configured to carry the cleaning robot, and the second carrier base is spaced apart from the first carrier base in a height direction of the maintenance base station, and the first supporting assembly is fixedly connected to the first carrier base and the second carrier base and separates the first carrier base from the second carrier base, and the the first carrier base is used for the cleaning robot to dock.

2. The maintenance base station according to claim 1, further comprising a first wireless communication component configured to establish a wireless communication link with the cleaning robot, wherein the first wireless communication component at least comprises one of an infrared communication component, a 433 MHz wireless communication component or a Bluetooth; wherein the controller is electrically connected to the first wireless communication component; and the controller is further configured to: in a case that the device type indicated by the man-machine interaction signal is the cleaning robot, determine a first device task instruction based on the man-machine interaction signal, control the first wireless communication component to work, and transmit the first device task instruction to the cleaning robot by means of the first wireless communication component to control the cleaning robot to perform a corresponding task, wherein the first device task instruction is associated with a preset type of cleaning robot.

3. The maintenance base station according to claim 2, wherein the first device task instruction comprises at least one of starting cleaning, pausing cleaning, starting recharging and pausing recharging.

4. The maintenance base station according to claim 2, wherein the step that the controller controls the first wireless communication component to work based on the first device task instruction comprises: determining a robot identification code based on the first device task instruction, wherein the robot identification code is configured to indicate the preset type of cleaning robot; and controlling the first wireless communication component to transmit a broadcast signal to the outside based on the first device task instruction and the robot identification code such that the cleaning robot receives the broadcast signal and then determines whether to perform a task corresponding to the first device task instruction based on the robot identification code.

5. The maintenance base station according to claim 1, wherein the function component of the maintenance base station comprises an air purification component, and the controller is electrically connected to the air purification component; and wherein in a case that the device type indicated by the man-machine interaction signal is the air purification component of the maintenance base station, the controller determines a second device task instruction based on the man-machine interaction signal, and the controller controls the air purification component to perform a corresponding task based on the second device instruction, wherein the second device task instruction is associated with the air purification component, and the second device task instruction comprising at least one of starting air purification, pausing air purification, increasing air speed and decreasing air speed.

6. The maintenance base station according to claim 1, wherein the function component of the maintenance base station comprises an illumination component, and the controller is electrically connected to the illumination component; and wherein in a case that the device type indicated by the man-machine interaction signal is the illumination component of the maintenance base station, the controller determines a third device task instruction based on the man-machine interaction signal, and the controller controls the illumination component to perform a corresponding task based on the third device instruction, wherein the third device task instruction is associated with the illumination component, and the third device task instruction comprising at least one of turning on the light, turning off the light, increasing illumination brightness, decreasing illumination

brightness, and changing lighting color.

7. The maintenance base station according to claim 1, wherein the function component of the maintenance base station comprises a loudspeaker component, and the controller is electrically connected to the loudspeaker component; and wherein in a case that the device type indicated by the man-machine interaction signal is the loudspeaker component of the maintenance base station, the controller determines a fourth device task instruction based on the man-machine interaction signal, and the controller controls the loudspeaker component to perform a corresponding task based on the fourth device instruction, wherein the fourth device task instruction is associated with the loudspeaker component, and the fourth device task instruction comprising at least one of starting playing music, pausing playing music, switching music, increasing volume, and decreasing volume.

8. The maintenance base station according to claim 1, wherein the man-machine interaction component comprises a key component or a speech recognition component; wherein the first key portion and the second key portion are both electrically connected to the controller, wherein the first key portion is configured to trigger a first man-machine interaction signal and the second key portion is configured to trigger a second man-machine interaction signal, wherein the first man-machine interaction signal indicates that the device type is the cleaning robot, and the second man-machine interaction signal indicates that the device type is the function component of the maintenance base station; and wherein the speech recognition component comprises a first microphone and a speech parsing component electrically connected to the first microphone, and the speech parsing component is electrically connected to the controller, wherein the first microphone is configured to acquire speech input by a user, and the controller parses the speech acquired by the first microphone through the speech parsing component to determine the man-machine interaction signal.

9. The maintenance base station according to claim 1, wherein the man-machine interaction component comprises a first key portion and a second key portion and a speech recognition component; wherein the first key portion and the second key portion are both electrically connected to the controller, wherein the first key portion is configured to trigger a first man-machine interaction signal and the second key portion is configured to trigger a second man-machine interaction signal, wherein the first man-machine interaction signal indicates that the device type is the cleaning robot, and the second man-machine interaction signal indicates that the device type is the function component of the maintenance base station; and wherein the speech recognition component comprises a first microphone and a speech parsing component electrically connected to the first microphone, and the speech parsing component is electrically connected to the controller, wherein the first microphone is configured to acquire speech input by a user, and the controller parses the speech acquired by the first microphone through the speech parsing component to determine the man-machine interaction signal.

10. The maintenance base station according to claim 2, wherein the cleaning robot comprises a second microphone configured to acquire speech input by a user, wherein the man-machine interaction component comprises a speech parser, and the controller is electrically connected to the speech parser; and wherein the controller receives the speech acquired by the second microphone through the first wireless communication component, and the controller parses the speech acquired by the second microphone through the speech parser to determine the man-machine interaction signal.

11. The maintenance base station according to claim 1, wherein the first carrier base includes a first platform, a second platform disposed opposite the first platform, and a shell structure connecting the first platform and the second platform, and the first platform is used for the cleaning robot to dock, and the second platform is spaced apart from the first platform in the height direction of the maintenance base station, the first platform is used for the cleaning robot to dock.

12. The maintenance base station according to claim 11, wherein the shell structure includes a first

side shell and two opposite second side shells, and the first side shell and the two the second side shells form a “U” shaped shell structure, and the maintenance base station is provided with a charging device, and the charging device includes a pair of charging electrode plates arranged on the first platform or the first side shell, the pair of charging electrode plates configured to dock with a pair of charging contacts of the cleaning robot to charge the cleaning robot.

13. The maintenance base station according to claim 1, wherein the function component of the maintenance base station includes an air purification component, the controller electrically connected to the air purification component, and the second carrier base is configured to carry the air purification component.

14. The maintenance base station according to claim 13, wherein the air purification component includes a fan device configured to implement air purification and maintained on the second carrier base, an air inlet end of the fan device disposed downward and an air outlet end of the fan device disposed upward, and an accommodating space is formed by the spacing between the second carrier base and the first carrier base, providing a mounting space for the installation of a filter screen, and the filter screen is in the form of a hollow cylinder, two ends of the filter screen sealed and fit to the first carrier base and the second carrier base respectively, and the hollow cylinder of the filter screen is communicated to the air inlet end of the fan device.

15. A cleaning robot system, comprising a cleaning robot and a maintenance base station, wherein the maintenance base station comprising: at least one function component; a man-machine interaction component configured to receive a user input and determine a man-machine interaction signal based on the user input, and the man-machine interaction signal indicates a device type and a device task type, wherein a device indicated by the device type at least comprises the cleaning robot or the function component of the maintenance base station; and a controller electrically connecting the function component and the man-machine interaction component, wherein the controller is configured to receive the man-machine interaction signal and call the corresponding device to work based on the man-machine interaction signal; wherein the maintenance base station includes a first carrier base, a second carrier base and a first supporting assembly, and the first carrier base is located at the bottom of the maintenance base station and configured to carry the cleaning robot, and the second carrier base is spaced apart from the first carrier base in a height direction of the maintenance base station, and the first supporting assembly is fixedly connected to the first carrier base and the second carrier base and separates the first carrier base from the second carrier base, and the first carrier base is used for the cleaning robot to dock.

16. The cleaning robot system according to claim 15, wherein the maintenance base station further comprising a first wireless communication component configured to establish a wireless communication link with the cleaning robot, wherein the first wireless communication component at least comprises one of an infrared communication component, a 433 MHz wireless communication component or a Bluetooth; wherein the controller is electrically connected to the first wireless communication component; and the controller is further configured to: in a case that the device type indicated by the man-machine interaction signal is the cleaning robot, determine a first device task instruction based on the man-machine interaction signal, control the first wireless communication component to work, and transmit the first device task instruction to the cleaning robot by means of the first wireless communication component to control the cleaning robot to perform a corresponding task, wherein the first device task instruction is associated with a preset type of cleaning robot.

17. The cleaning robot system according to claim 16, wherein the first device task instruction comprises at least one of starting cleaning, pausing cleaning, starting recharging and pausing recharging.

18. The cleaning robot system according to claim 16, wherein the step that the controller controls the first wireless communication component to work based on the first device task instruction comprises: determining a robot identification code based on the first device task instruction,

wherein the robot identification code is configured to indicate the preset type of cleaning robot; and controlling the first wireless communication component to transmit a broadcast signal to the outside based on the first device task instruction and the robot identification code such that the cleaning robot receives the broadcast signal and then determines whether to perform a task corresponding to the first device task instruction based on the robot identification code.

19. The cleaning robot system according to claim 15, wherein the function component of the maintenance base station comprises an air purification component, and the controller is electrically connected to the air purification component; and wherein in a case that the device type indicated by the man-machine interaction signal is the air purification component of the maintenance base station, the controller determines a second device task instruction based on the man-machine interaction signal, and the controller controls the air purification component to perform a corresponding task based on the second device instruction, wherein the second device task instruction is associated with the air purification component, and the second device task instruction comprising at least one of starting air purification, pausing air purification, increasing air speed and decreasing air speed.
