Multi-functional Service Robot

Amy Plus

User Operating Manual

Version:V6.0.1sp1

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Chapter 1 Preface

Thanks for purchasing our service robot Amy plus of Suzhou Pangolin Robot Corp., Ltd.!

This manual briefly introduces various functions, which will guide you well about the machine. At the same time, a series of high-quality and premium solutions will be provided to bring you a comprehensive service experience!
Please carefully review this manual before using the machine.

Chapter 2 Copyright Statement

Suzhou Pangolin Robot Corp., Ltd. (hereinafter referred to as “Pangolin Robot”) will reserve all rights to modify this manual and we insure the information offered is correct and reliable.

Please kindly be noted that:
1. This manual is compiled to fulfill company series of products and it is permissible that your purchased machine may not be equipped with all specified functions.
2. When it comes to patent, copyright, trademarks and some other intellectual properties, you shall not be allowed to use our products or related documents until or only if you get the approval or
authorization from Pangolin Robot, however, which don’t belong to Pangolin Robot’s responsibility.
3. Pangolin Robot will reserve all rights to this manual and users shouldn’t disseminate, copy or modify any contents of this manual.

Chapter 3 Product Introduction

3.1 Main Feature Description



3.2 Function Brief



3.2.1 Intelligent Voice Dialogue:

Humans communicate with robots, instead of relying solely on fixed sentences, they can randomly grab the answers to questions from the Internet——humans and robots can communicate at will.

3.2.2 Face Recognition:

After the robot can register with the user's face, it can perform the next recognition.

3.2.3 Touch Screen Human-Computer Interaction:

The screen can display the floor plan of the living room of the room, and the user can touch the touch screen to make the robot reach the designated point. The content of the communication between the user and the robot must be displayed on the screen. Various audio and video files can be played.

3.2.4 Intelligent Movement Of Arm Joints:

Not yet.

3.2.5 Trackless Navigation & Obstacle Avoidance:

Robot movement does not need to rely on external restrictions such as magnetic strips, and only uses laser sensors to achieve autonomous navigation and obstacle avoidance. The scanned map can be restored after the next start-up.

Chapter 4 Precautions for Use

1. Please do not cut off the power frequently during the operation of the system in case of any accidental failure of the product. Before shutting down the robot, please click the shutdown button on the software interface. Irregular operation can easily lead to product damage.
2. Only if or unless urgent situation, please DO NOT press the “Emergency Stop Switch” in protection of the machine life expectancy.
3. DO NOT assembly and disassembly the robot or any spare part of the robot by yourself due to its high precision.
4. When the robot is in the process of working, DO NOT open her outer shell lest any careless touching on the electronic moving parts will do unnecessary damage on people or products.
5. Avoid hitting or bumping this product.
6. When the robot is in the process of working, DO NOT force to change her moving way in case of any unnecessary damage on people or products.
7. It is a must that you should use the originally equipped charger and put the battery into the originally installed battery pack, all of which must also be under custody of somebody. DO NOT forget to unplug the charger after it finishes charging.
8. Manufacturer designated battery, charger and accessories can be used only. Any additional types of use, probably resulting in dangers, won’t fall within the range of warranty terms.
9. Any chemical cleaning is forbidden and you can use a dry clean cloth to wipe the surface dust out. This product contains built-in electronic components and should strictly be waterproof.
10. Please kindly deal with waste products and accessories in accordance with the relevant local environmental protection regulations.
11. In case of any data loss, it is recommended that the user backup the important documents, especially when software and firmware is about to upgrade. Our company shall not be responsible for any data loss caused herein.
12. During the process of repairing defective products, the company will root all of the data and back to manufacturer default settings.
13. There won’t be prior notice on any product changes. We apologize for any inconvenience caused.

14. Any problems please directly contact with our customer service.

Chapter 5 Safety Precautions

Before installing, using, carrying, maintenance and repairing, please make sure read carefully and master the content of this manual and relevant appendix. Make sure operate after you are fully familiar with all equipment, safety precaution and matters need attention. The following precaution is involved with five main categories: “Danger”,” Attention”,” Force”,” Prohibited”, “Important”.



Compulsory（Matters that must be observed）

(1) This user manual belongs to technical materials concerned with robot body content. In order to ensure the normal application of this system and the proper maintenance and repair, including product profile, precautions for use, safety precautions, product instructions, installation and so on, please make sure read carefully and fully understand this manual before using.

(2) In addition, details regarding safety precautions are stated in chapter of” Safety”, please read it carefully before using.



Danger (Wrong operation might cause injury or death to people)

(1) The product is supplied with 24V battery but it is unguaranteed that individual spare parts are within 36V that is affordable safety voltage for human. In the process of working, any touching to electron moving parts is strictly prohibited in case of unnecessary damage to robot or people.

(2) The product is charged with 220V AC. Watch out the electricity shock when plug in. Please be carefully noted that lithium battery is vulnerable and explosive. For the sake of your health and property, it is suggested that charging is under the guardianship of somebody to avoid any potentiality of explosion and fire. Remember to unplug the charger once the robot finished charging. DONOT shake the battery during the whole process above mentioned.

(3) Any individual part isn’t so safe up to food grade that please DO NOT devour it and keep spare parts away from food material.

(4) Please keep the minors and the elderly out of reach the product unless being under the custody.



Attention（Wrong operation may cause irreversible or serious damage to robot）

(1) Some of the illustrations in this manual are drafted upon uncovering the robot shell to more specify the robot, therefore when you are working with this kind of parts, ensure to recover the shell and operate it adhere to the specification.

(2) Graph and pics in this manual is only for your reference and there might be slightly different from the real purchased product on hand.

(3) Manuals are sometimes modified appropriately due to product improvements, specification changes, and easier use of the manuals. The revised manual will be issued in a revised version.

(4) Perhaps due to loss or damage, please directly contact with the sales person if you need to book the manual and follow the material No to purchase.

(5) We won't be responsible for any alternation without authorization which as well shall not fall within the range of warranty.



Prohibited（Matters excluded from use）

(1) The product shell is made from ABS plastic. Please keep it from metal components or sharp object.

(2) When the robot is in the process of working, DO NOT strongly force her to change the moving way.

(3) The product is equipped with server and IPC so those non-professional people is prohibited from opening the back cover or plug and unplug the electric wire.

(4) Please keep customers away from touching ON/OFF switch and Emergency Stop switch.

(5) Please leave it in a dry, cool dark place. DO NOT put it lean or upside down.



Important

(1) Encountering emergent circumstances, quickly press the emergency stop button so that electricity is cut out from the movable parts and robot stops. Only after the emergency solved can you free emergency stop button and back to normal work. Way to relieve the emergency stop as following: Right turn the emergency stop button.

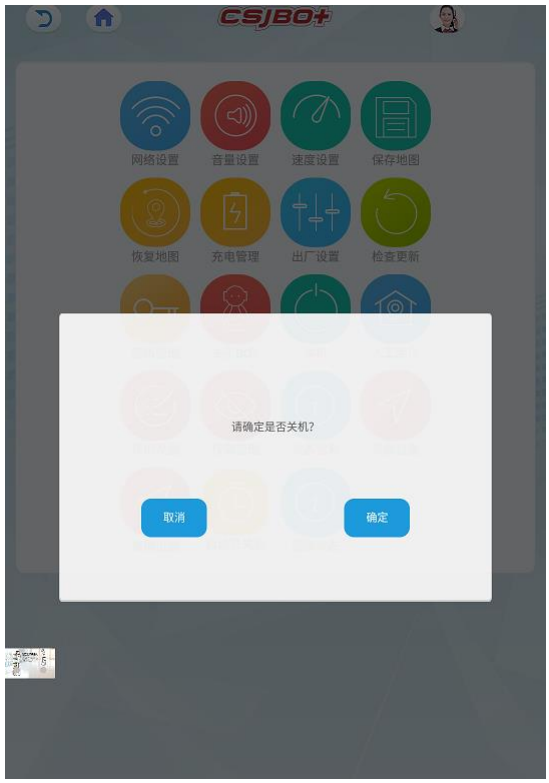
Chapter 6 Switch＆Mapping

6.1 ON/OFF

(1) Confirm that the "emergency stop switch" on the back of the robot is released from the emergency stop state. If not, turn the red "emergency stop switch" on the back of the robot to release the emergency stop.

(2) Press the robot's chest "start and stop switch" to achieve the robot boot.

(3) Click the shutdown icon on the system settings page, and click OK in the pop-up window, shown as below:



6.2 Emergency stop

（1）When an emergency occurs, press the emergency stop switch to achieve the movement part of the power cut-off, the robot stops all the action.

（2）Turn emergency stop switch right to release the emergency stop function.

6.3 Map Building

6.3.1 Preparation:

(1) Make sure it a vacant area or with limited people within the area.

(2) Clear up all the frequently movable objects in the area.

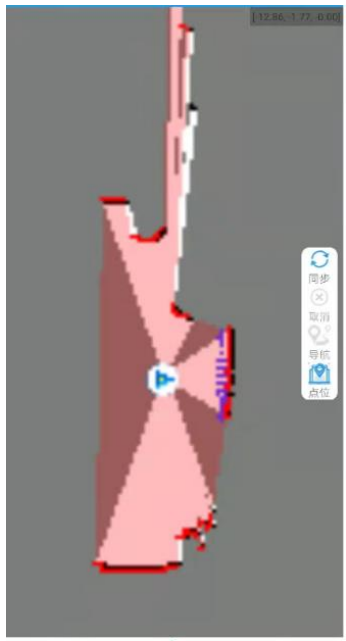
(3) Regarding to those objects may reflect, transmit and absorb lights, under some conditions permissible, stick several ordinary materials on the plane domain area where laser radar may reflect.

(4) Make sure the objects as below are not in the area : Low reflective objects, e.g. black, dark objects; Glasses; Mirror, stainless steel that reflects the objects.

6.3.2 Mapping Steps：

(1) Push robots to the Starting Point where you turn on the robot. In order to generate a high-quality map, it is best for robot to face a straight

wall when scanning the map, and the radar can scan as many effective points as possible, shown as below:



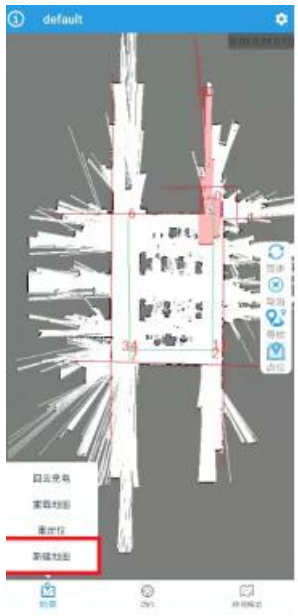
(2) Select the hotspot of the robot on the WIFI of mobile phone and connect.

(3) Open the CsjRobotStudio.apk software on the mobile phone, click "Connect to Robot" after opening, enter the IP address 192.168.99.2, and click the Connect Robot button to enter the map page,shown as below:

If the scanned map is tilted, please turn off the robot and push it to the charging pile to restart it. If you continue to scan the map, the scanned map will be of poor quality and it is easy to lose its positioning.



(4) After clicking the build map button, you can start to create a new map, shown as below:

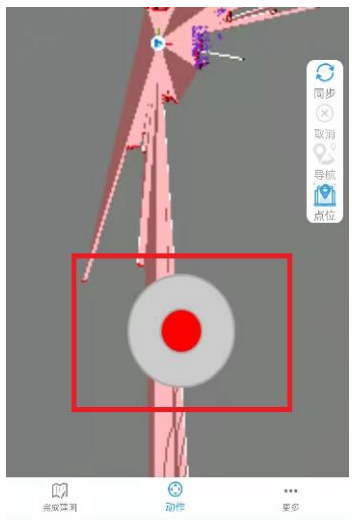


(5) Build New map

After entering the [Map Scan] page, you can use the joystick to control the robot, slide the joystick to control the robot to walk, shown as below:

When encounter a turn, you need to wait for a while, let the map refresh in RobotStudio, and then control the walking.

Try to ensure the integrity of the map. On the possible walking path of the machine, all the surrounding 360-degree areas need to be detected by radar. The purpose is to increase the integrity of the map and make more reference points for laser matching.





(6) Save The Map

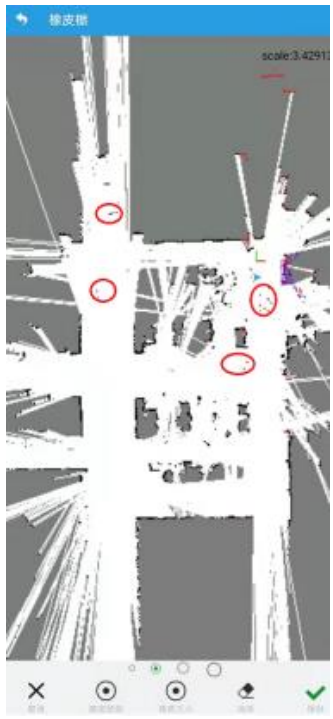
After the map has been scanned, make the robot run to the vicinity of the charging station, and then press the emergency stop button to slowly push the robot to the charging station. Click the [Save Map] button in the upper right corner, and you can fill in the required map name in the input box. The default is default. If it prompts [the map already exists, please check overwrite], you need to check the [overwrite map] radio button.



(7) Edit Map: Eraser Operation

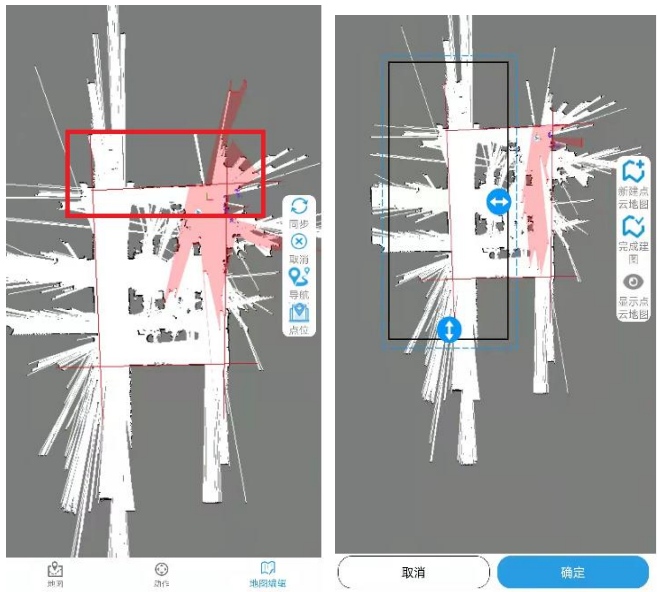
On the homepage (Navigation Mode), click the [Map Edit] button, click [Eraser], the white eraser will erase the moving objects (people in the known area, moving objects), shown as below:

Drag and drop on the screen to set certain grid areas as black, white or gray areas. At the same time, you can also choose the size and color of the eraser.



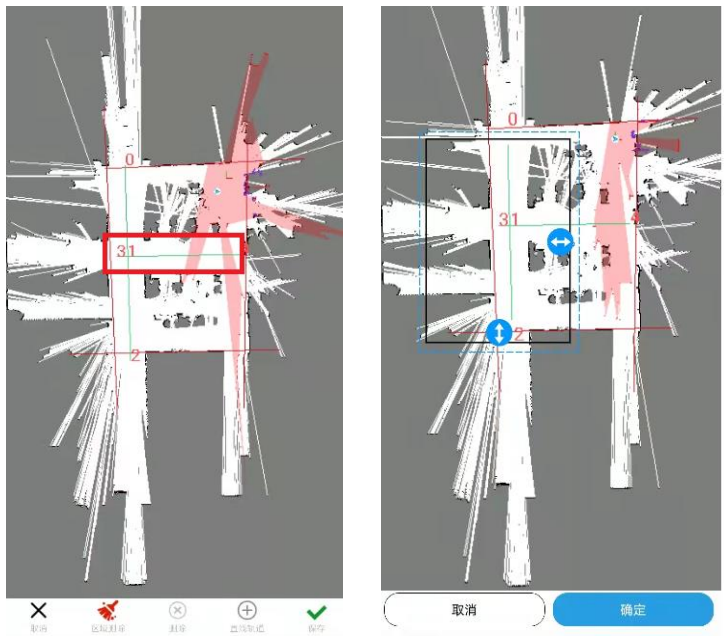
(8) Edit Map: Virtual Wall Operation

Click the [Virtual Wall] button to operate the virtual wall, add or delete the virtual wall, shown as below:



(9) Edit Map: Virtual Track (Optional)

Click the [Virtual Track] button to operate the virtual track, add or delete a linear virtual track, shown as below:



(10) After completing the above, please return to the navigation page and start navigation.

Click the return in the upper left corner, or the system's [Return] to switch the mode to [Navigation Mode].



Chapter 7 Software Function

The robot software function will be upgraded regularly, and the operation method of the software may change after the upgrade. If you have any questions about the robot software operation after receiving the robot, please contact the customer service staff to obtain the latest electronic version of the software operation manual. The operating instructions of the customized software refer to the requirements of the customized software. This manual will focus on the basic functions of the software.

7.1 Member Registration

Enter the member registration interface through the [Member Registration] button on the main interface, and follow the registration process below to register as a member user. The robot recognizes a registered member user and will actively greet the user with the registered member's name.

Registration Steps:

Stand directly in front of the robot, aim your face at the viewfinder frame of the screen, click the camera button on the screen, or use the voice command "photograph" to take a photo.



After the photo is taken, the collected face information will be displayed. If the user is satisfied with the taken photo, click “YES” to confirm the taken face information; if the user is not satisfied with the taken photo, click “RETAKE” to collect the face information again.



After the photo is taken, the user enters the relevant information, and then clicks “YES”.



After the registration is completed, the user is prompted that the registration is successful.



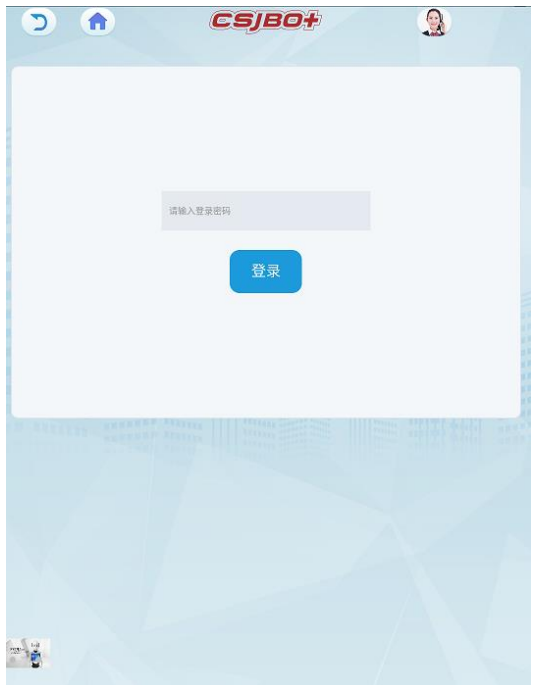
7.2 Auto Navigation

To use the robot's navigation function, you need first use Robostudio software to scan the indoor map. Make a picture corresponding to the indoor map based on the scanned map on the front-end page, and upload it to the front-end through the navigation setting page.

Click the navigation button on the main interface to enter the navigation interface. The first time you enter the navigation interface after booting up, you need to restore the map information. Click OK to restore the map, and then you can use the robot navigation function normally.



To use the robot navigation function, you need to preset the navigation point corresponding to the indoor map and the robot's welcome point information. Please check the navigation setting instructions in the latter part of this section. Click the "Map Management" button in the upper right corner of the navigation interface to enter the navigation settings page.



Enter the correct password to enter the navigation setting page.

Indoor Map Setting: If you need to replace the indoor map, you can click the "upload map" button in the lower left corner of the interface, and select the correct indoor map to replace the existing map. When choosing to upload, you need to save the indoor map that needs to be uploaded to the robot storage or removable storage device in advance (connect the robot and the removable storage device).



Navigation Point Setting: Set the navigation point information corresponding to the indoor map area. The information of the navigation point includes the name, description, X coordinate, Y coordinate and R coordinate of the navigation point. Before setting the navigation point, click and drag the red coordinate icon in the upper left corner of the figure to move to the area of the navigation point to be set, and enter the relevant information in the navigation point information; you can also place the robot on the navigation point, and then click " Get the coordinate point" button to get the coordinate information of the current location (navigation point), and then click the save button to save the navigation point information.

Welcome Point Setting: Click and drag the red coordinate icon in the upper left corner of the figure to move to the area of the welcome point to be set, and enter relevant information in the welcome point information; you can also prevent the robot from being at the welcome point, Click the "Get Coordinate Point" button to obtain the coordinate information of the current location (welcome point), and then click the Save button to save the welcome point information.

One-key Guidance Setting: Click on the desired navigation point and add it in order. When the robot is guided by one-click, it will navigate in the order of addition. After the navigation is over, return to the welcome point.





7.3 Nearby Service

When you enter the main interface of the program, click Peripheral Services to enter the Peripheral Services page. You can query the location information of nearby hotels, attractions, etc. by voice or by clicking a button. The detection distance of the peripheral services is changed to 5 kilometers, and if there is none within 5 kilometers, the location of Kunshan will be found. information.



7.4 Interactive Entertainment

When you enter the main interface of the program, click Interactive Entertainment, you can enter the interactive entertainment page, you can tell stories, sing, dance, etc. Resources are obtained from the backend of Little Bee. You can use voice control or manually click the button to control the robot to sing, dance, and tell stories.



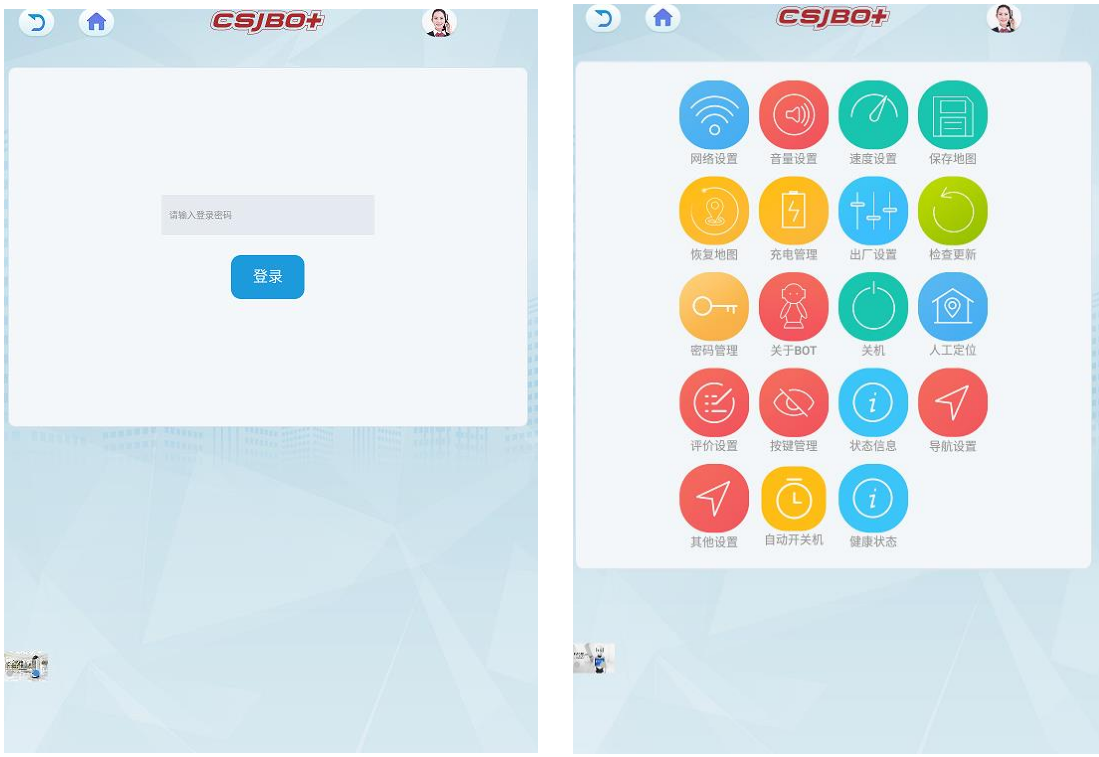
7.5 Manual Customer Service

Click the manual customer service icon at the top right of the main program page to connect to the background manual customer service, which is convenient for handling customer problems in a timely manner. The background customer service can also directly control the robot to do a series of operations: such as forward, backward, broadcast speech, interactive chat, and so on. For details, please refer to Little Bee background settings.



7.6 System Settings

On the interface with the setting icon, click the setting icon in the upper right corner of the page to enter the system setting page. This page needs to enter the setting password (the password used for system settings, the factory default password is csjbot), if the password is correct, enter the setting item page, you can select the corresponding setting item to set.



7.7 Network Settings

7.7.1 Connect To An External Wireless Network

Click the network settings icon (the first icon on the "Settings" interface) to enter the page as shown in the figure below.



Step 1: Click "Internet Settings" on the left.

Step 2: In the "Please select the wireless signal you want to amplify" that appears at the bottom right, select the wireless network you will connect to (it is recommended to select a network with a strength greater than 90%), click the small dot on the left, and click In the pop-up box, enter the correct password, click "Connect", and enter the next step after success.

Step 3: Click "OK" at the bottom right, and the external wireless network is connected successfully.

7.7.2 Check Outgoing Network Status

Click "Wireless Settings" on the left, and the status of the robot router will be displayed on the right page. In the case of 2.4G network and 5G

network, it will display the wireless name, encryption method, wireless password and other information, as shown in the figure below.

Note: This is the wifi signal sent by the robot router. It is mainly used by the user to connect to the Robot_studio.exe software to scan the picture. It is recommended that the user does not need to adjust the "wireless name" and "wireless password".



7.7.3 View The Network Status Of The Robot

Click "Routing Status" on the left, and the network connection status will be displayed on the right page.If the prompt is abnormal, return to the "Wireless Settings" interface to confirm whether the connection is successful.



7.8 Volume Setting

Click the volume setting icon on the system settings page to enter the volume setting interface. Click and drag the volume setting icon in the figure to set the volume of the robot. You can set the system volume, media volume, and call volume, as well as whether to interrupt wake-up.



7.9 Speed Setting

Click the speed setting button to enter the speed setting page, the default speed is 0.7m/s, and the speed setting range is 0.4m/s-1.2m/s.



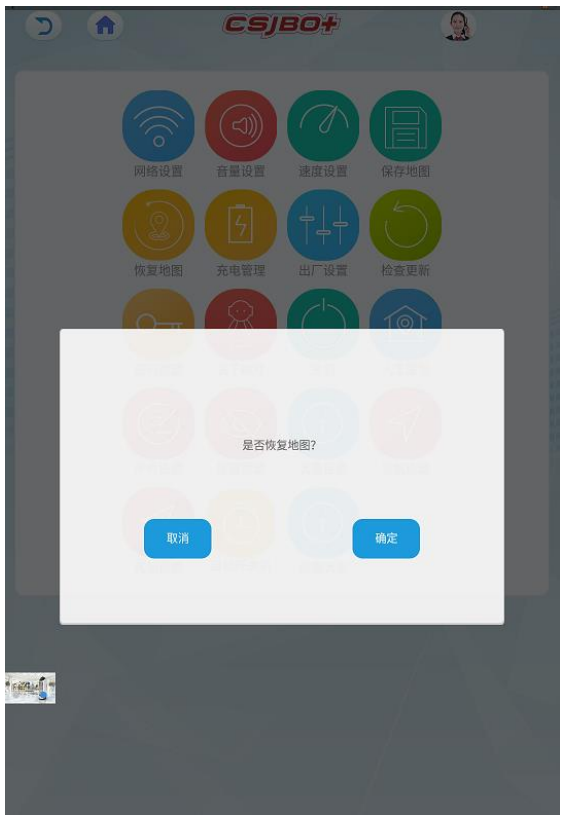
7.10 Save The Map

Click the save map icon on the system settings page, and click OK or Cancel to save the map in the pop-up dialog box. The password is the default "csjbot".



7.11 Restore Map

Click the restore map icon on the system settings page, and click OK or Cancel in the pop-up dialog box to restore the map information. This function is effective when the map is restored without entering the navigation interface after booting.



7.12 Charge Management

Click the charging management icon to enter the charging management page, set the low battery threshold, and automatically return to the charging pile when the battery is low, or click charge now, and the robot will directly return to charging.



7.13 Factory Reset

Click the factory reset icon on the system settings page to enter the factory reset page. After entering the correct setting password, click the restore button to restore the factory settings. If you restore the factory settings, all current data will be erased and cannot be restored. Please use it with caution.



7.14 Check For Updates

Click the check update icon on the system settings page to enter the check update page, which displays the robot model, UI version number, and algorithm version number. Click the update button to check if there is an update. If there is an update, update the system to the latest version.



7.15 Password Management

Click the password management icon on the system settings page to enter the password management page, enter the current password, enter the new password twice, and then click Save to change the settings password.



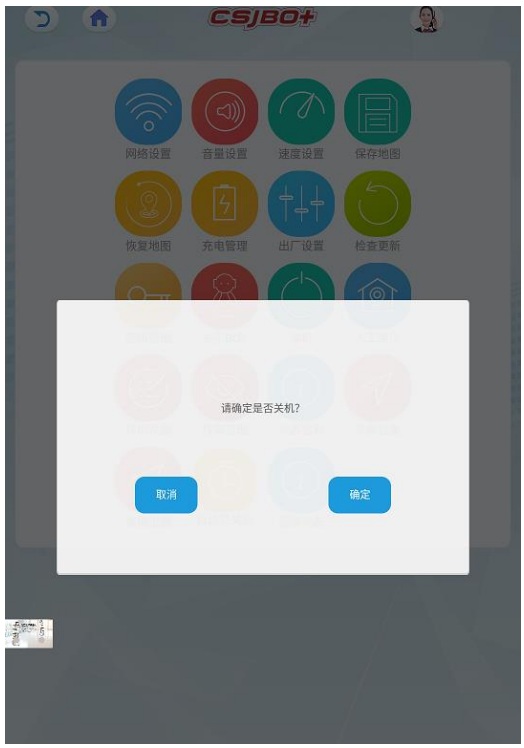
7.16 About BOT

Click the About BOT icon on the system settings page to enter the About BOT page to view the robot model, SN, version number, etc.



7.17 Power Off

Click the shutdown icon to shut down normally.



7.18 Manual positioning

Click the manual positioning icon to locate normally.



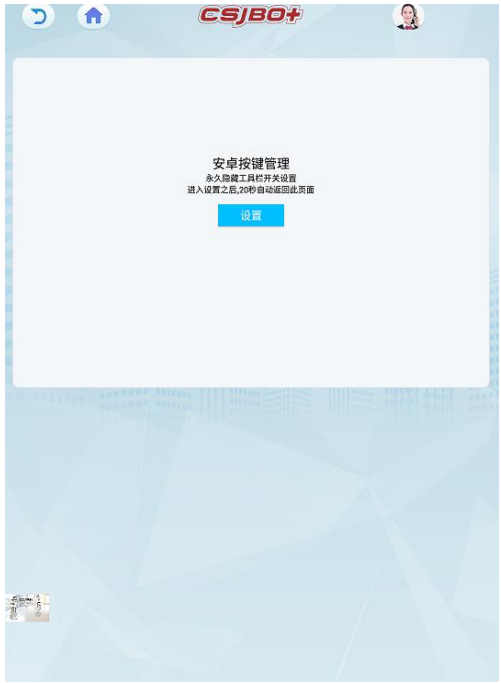
7.19 Evaluation Settings

Click the evaluation setting icon to enter the evaluation setting page, and you can set the navigation evaluation.



7.20 Button Management

Click the button management icon to enter the button management page and set the Android button.



7.21 Status Information

Click the status information icon to enter the status information page, you can view the firmware information.



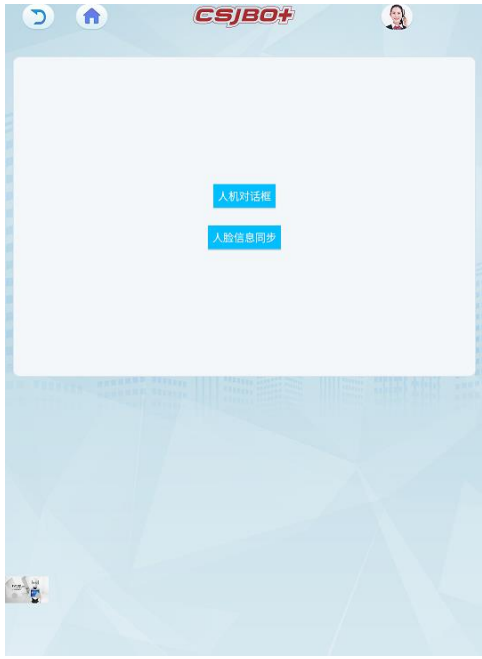
7.22 Navigation settings

Click the navigation setting icon to enter the navigation setting page, you can set whether to automatically exit the navigation page after the navigation is completed.



7.23 Other Settings

Click the other setting icon to enter the other setting page, set whether to open the man-machine dialog box, and set the face information synchronization.



7.24 Automatic Switch

Click the auto power on/off icon to enter the settings page. You can set the time to turn the machine on and off. The robot will close and open at a fixed time. If you check the return to welcome point, it will automatically return to the welcome point after it is turned on.



7.25 Health Status

Click the health status icon to enter the health status display page, which displays the health status of radar, odom, imu, and ir.



7.26 Voice Interaction

Establish a network connection to ensure normal network communication and voice human-computer interaction can proceed normally.In the robot's "visual range" (according to the face detection range where the camera is installed), when a human face is recognized, a human-computer interaction program is started to actively greet the user.

Users can register through the robot member center page. After the robot collects the user's avatar information, the user can enter the name and select the gender. After clicking OK, if the registration is successful, the user's registration information will be automatically saved. When the user appears in front of the robot again, the robot will recognize the user and proactively greet the user. When the user interacts with the robot face-to-face, the robot can intelligently answer the user's questions, and while answering, the facial expressions will also change accordingly.

7.27 Video Ad Play

When the robot is not performing a task, it will play the user's advertisement in full screen, and the user can upload the video advertisement that needs to be played through the background.

Chapter 8 Best Practices

8.1 The Robot Starts On The Charging Pile

The charging pile is placed against the wall, and the robot is placed on the charging pile to start. It is recommended that the charging pile be fixed in place and do not move, so as not to affect the charging or navigation or map building functions. It will automatically start to enter the Android APP, the BOT option in the settings, confirm that the robot information is correct, refer to 7.16.

8.2 New Map

Open the mobile phone scanning software, create a new map, save the map, and edit the map. Refer to 6.3 for the detailed process.

8.3 Lead The Way

1. After booting, it will automatically start to enter the main program page, click the guide icon to set the navigation point and welcome point, select the navigation point, click the Go Now button, and the robot will start to lead the way.
2. After booting, it will automatically start to enter the main program page, click the guide and guide icon, set the navigation point and welcome point, set the one-key navigation task, click the start one-key navigation button, and the robot will start to lead the way.

8.4 Human-computer Interaction

Establish a network connection to ensure normal network communication and voice human-computer interaction can proceed normally. In the robot's "visual range" (according to the face detection range of the installed camera), when recognizing human faces,start the human-computer interaction program and actively greet the user. The robot can chat with the user in normal voice.

Chapter 9 Maintenance

9.1 Charge

You must use the robot's original charger or matching charging station to charge. If you do not use the robot for a long time, please fully charge the robot once a month.When using the charger to directly charge the robot, please insert the network power plug of the charger into the

network power supply, wait for the charger to stabilize for 2-3 seconds, and then insert the charger output port into the charging hole on the back of the robot to start charging.

When using the charging pile to directly charge the robot, please place the charging pile against the wall first, insert the charger network power plug into the network power supply, wait for the charger to stabilize for 2-3 seconds, then plug the charger output port into the side of the charging pile to charge. When the robot detects that the battery is low, it will automatically return to the charging station for charging.

9.2 Wheel Cleaning

When the robot is walking, debris will inevitably stick to it, which will affect the service life of the motor. Please clean up in time.

Chapter 10 Packing and Handling

10.1 Short-distance Transportation (including chartered vehicles in the city)

On level concrete or the ground, the robot can be manually pushed to walk, and the walking speed should not exceed 15 m/min. It is strictly forbidden to push the machine to walk when the robot is powered on or at work.

When loading and unloading trucks, going up and down stairs or steps (above 2mm), slope (above 10°), and crossing outdoor asphalt pavements, please use our company's special packaging. Pay attention to the following operating specifications and steps, fix the robot on the special handling tool, and then carry out the corresponding handling and loading and unloading work.

1、Fixed special transportation vehicles.

2、Two adult men (above 1.6 meters tall) support the bottom of the box with one hand and the middle of the box with the other from both sides of the robot, and at the same time raise them 15~25cm for a period of time, and move them to the top of the special handling tool. And place them on the tool plane.

3、Two adult men (above 1.6 meters in height) from both sides of the robot, holding the bottom of the packing box with one hand and the middle of the packing box with the other hand, while lifting and getting on and off the car on the car and on the steps.

4、When loading and transporting, the height inside the vehicle must be greater than 1800mm, and the robot and the truck inner box must be fixed with ropes. The machine and the inner wall of the carriage, and between the machine and the machine, need to be filled with 2cm thick foam cotton to prevent bumps.

10.2 Long-distance Transportation (including logistics transportation, chartered vehicles)

Transportation needs to use the special packaging outer box and fixed filling method provided by our company.

Chapter 11 Common Faults & Solutions

Serial number	Failure phenomenon	Possible reasons for failure	Solution
1	The robot cannot be turned on	Robot battery is too low	Charge the robot (more than half an hour) and restart
2	The robot cannot access the Internet, or cannot search for wireless networks	Desktop settings, wireless network is turned on, router ip configuration is changed	Turn off the wireless network set on the desktop, reset the router, and reconfigure
3	Robot does not go fault	Emergency stop button is triggered	Check the emergency stop button behind you, turn it to the right to release the emergency stop
4	The robot occasionally fails to recharge	The map is too large or the starting point is not suitable	Change the starting position of the map to reduce the use area of the robot
5	The bottom layer of the robot is not connected	There is no communication on the router, and the motherboard does not start	Shut down and restart the robot, wait about 3 minutes，
6	The robot failed to restore the map	The bottom layer is not connected, save the map failed	Turn on the machine and wait for about 3 minutes to restore the map

For more information, please refer to the company website http://www.csjbot.com