Multi-functional Service Robot Alice (Android Version)

User Operating Manual

Version:2.4

Suzhou Pangolin Robot Corp., Ltd.

Directory

Chapter 1 Preface

Thanks for purchasing our service robot Alice 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

Expression Display: According to different occasions, robot can show different face expressions to enhance Human-Robot-Interaction effect. Expression can be changed as you wish in the setting.

Human-Robot Interaction Interface:

1. According to customer requirements, different interactions can be operated in different scenes;

2. Show display the Floor Plan for one room or one floor, users touch the room name or points to let robot arrive the relevant place;

3. Play videos or photos as requested;

4. Power, date, settings and other displayable items could be one part of HRI functionalities (e.g. Network Settings);

5. Voice Interaction& Control: People communicate with robot through intelligent interaction not only by fixed-statement, also by intelligent response. For example, then robot will implement your instructions.

6. Head& Arm Joint Intelligently Move: Joints of both arms and head can move intelligently.

7. Trackless Navigation& Obstacle Avoidance:

8. Robot moves based on laser sensor, which can not only navigate between fixed points but also designated points to points;

9. There would be two ways of obstacle avoidance; bypass or stop, robot will choose the right one smartly and continue her way ahead after the obstacle avoidance.

10. Initiative Guest Function: Proactively say hello to customers when his/her face is detected.

11. Route Directions, Guide to Points: When there is someone asking her in front or click on her display, robot shall show them to the designated place.

12. Introduction＆Narrating: Let robot introduce or teach you the things by touch screen interface, as well setting the targeted points and specified dialogue.

13. Printing Tickets (Customized): With Bluetooth printer, Robot can print the receipt, ticket, etc.

14. Slot Card (Customized): collect the information of VIP members, bank cards and ID cards, with which information to achieve certain functions.

15. Emergency Stop Switch：Press this button to cut off part of electricity so that robot will stop action.

16. On/Off Button: Turn it on or off to start or shut down the robot.

17. Charging Socket: Plug in to charge the robot

18. Charging Automatically: Equipping with charging pile,robot will charge automatically when low power.

Chapter 4 Precautions for Use

1. Before press the OFF button, please turn off the computer via screen. Please DO NOT frequently cut the power voltage during the system starts up in case of any machine breakdown. Non-standard operation will cause the damage of the product.

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 human body.

5. Avoid any strong collision impact or man force on the robot.

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 human body.

7. Please use the original charger and make sure it's under the guardianship of somebody. Remember to unplug the charger once the robot finished charging. DO NOT shaking the battery during the whole process above mentioned.

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 should and 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"," Compulsory"," Prohibited", "Important".

! Compulsory: Rules must abide by.

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 hurt or cause causality

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 human body.

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 the 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. Sometimes due to product improvement, spec change and utilizing, there should be times of modification which edition will be followed by hereafter.

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.
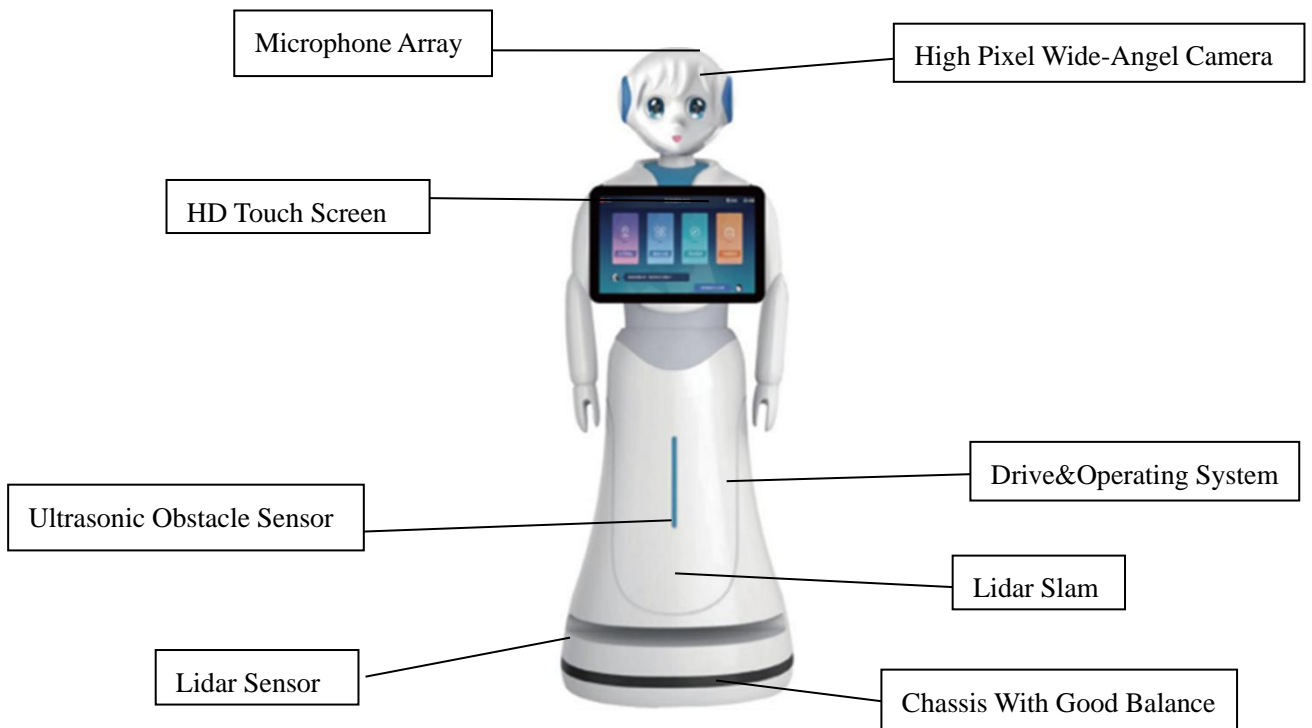
重要 Important

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 can you free emergency stop button (shown as Pic a) and back to normal work. Way to relieve the emergency stop as following: Right turn the emergency stop button (shown as Pic b):

旋转

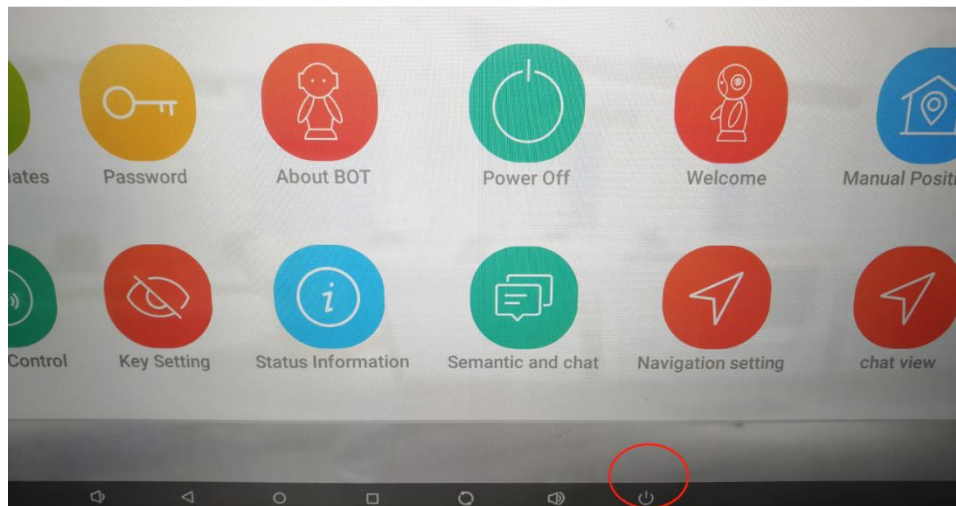a) Emergency Stop   b) Free Emergency Stop

| Microphone Array | | High Pixel Wide-Angel Camera |

HD Touch Screen

Drive&Operating System

Ultrasonic Obstacle Sensor

Lidar Slam

Lidar Sensor

Chassis With Good Balance

Robot Preview

Chapter 6 Switch＆Mapping

6.1 On/Off

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

2) Press the robot's chest "On/off" to achieve the robot boot, shown as below Pic 3;

3) When the robot is turned on, if you need to shut down, please shut down according to the Android host shutdown - click the "Power Off" button on the host page of IPC until the screen is black and display "no signal input", press the "On/Off" switch to achieve complete robot Power Off.

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, make sure the direction to which robot is facing towards a vertical straight wall (not a curve wall or closed loop area) among the area, no obstacles surround the robot within 1m in case of not interrupt robot to get more valid points, shown as below:
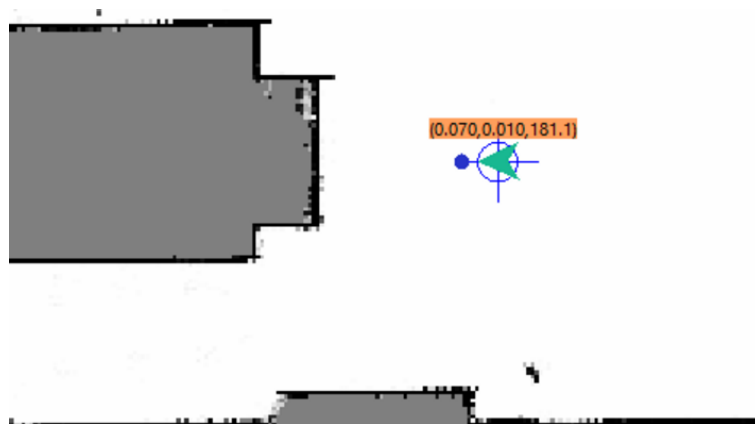

2) Connect your PC to the WIFI released by the robot router;

3) Then open the software: Robot_studio.exe, shown as below, click" Connect Robot", enter the IP address: 192.168.99.2(shown as below Pic 14), then make it connected to enter the mapping page:
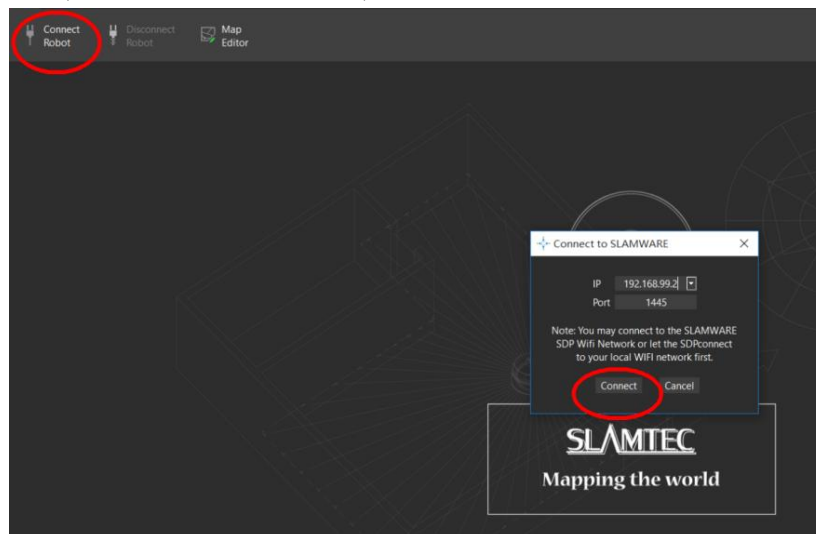

4) Should you need to map a large vast area, it is better to control robot walk to the closed loop area, then

scan the details within the area, shown as below:
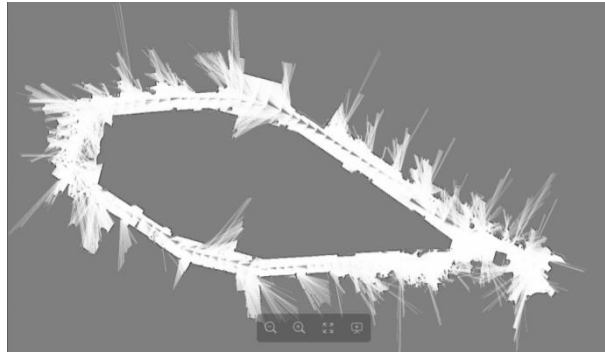
5) Erase Undetected Area：It probably will show some incompletely detected area with her walking space, which will appear gray in the Robot Studio (Shown as pic 4.1). Should you double confirm there is none obstacles, wipe the gray area (red circle) off with the help of white eraser to manually render it a detected area, shown as below:
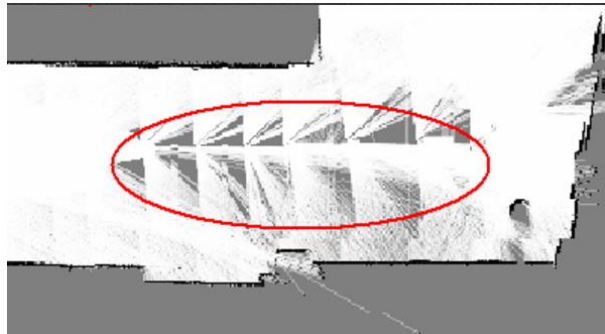

6) Use eraser to clear movable objects (people or physical objects), shown as below:

7) In order to make sure the map keep in a full completeness, laser radar should have detected all possible walking road ahead in all 360°so that laser will be in match up with as more reference points as possible, which will eventually enhance the completeness of mapping, shown as below:
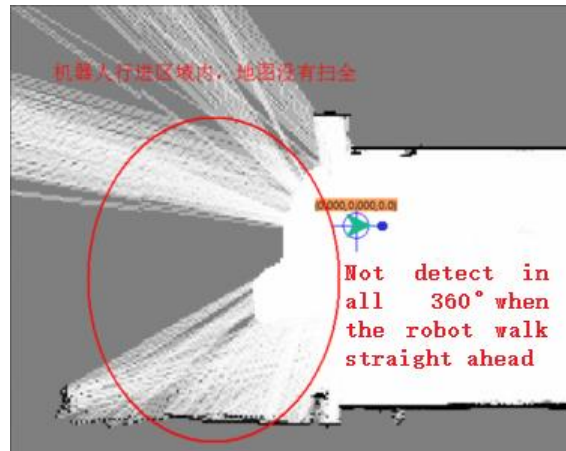
8) When it finished map scanning, please save it before you are about to walk here and there in the mapping area. Click Robot Studio to sync up the map, then click "Pause Mapping" to stop her continuous mapping, shown as below:
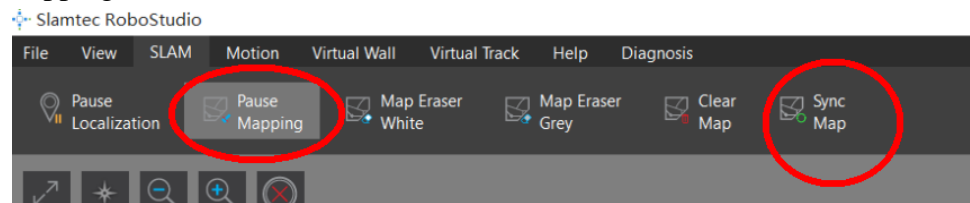
9) After mapping, please draw a virtual wall(for the guidance of the robot to follow up) according to your real situation, shown as below:
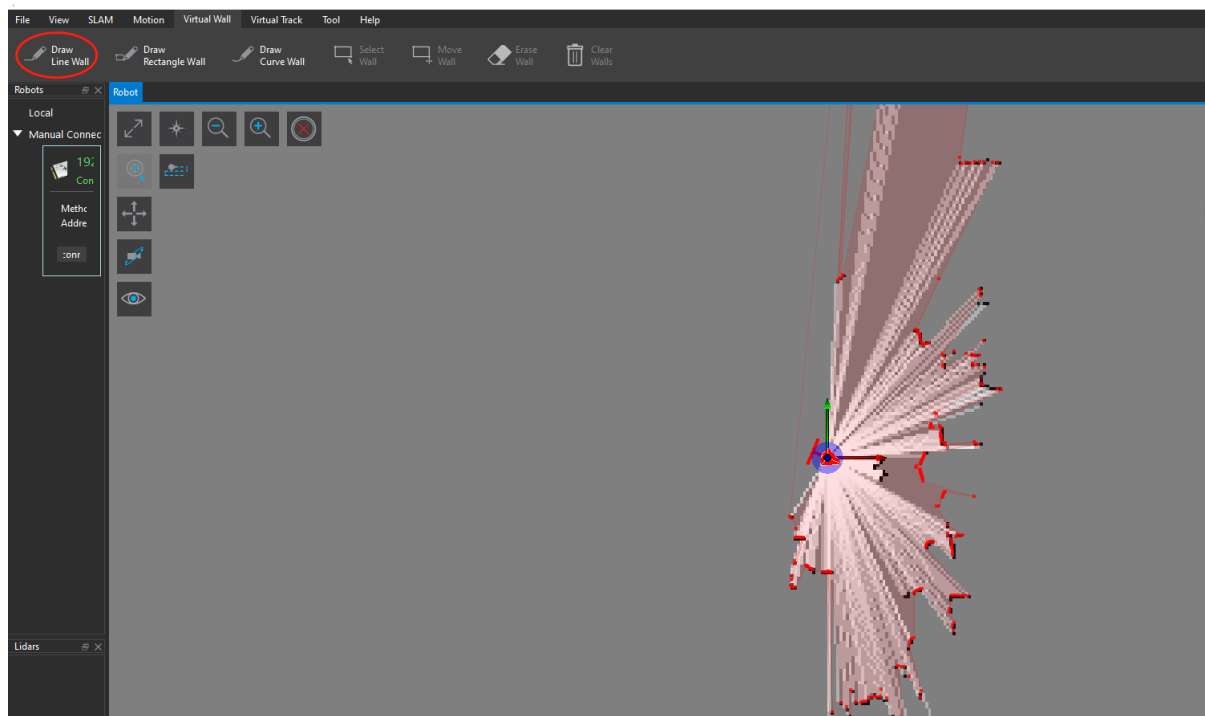
10) At last, save the map.

Chapter 7 Software Function

The robot software function will be upgraded regularly. The operation of the software may be changed after the upgrade. If you have any query about the software after receiving the robot, please contact our customer service to get the new manual. The operation of customized software please refer to the software customization requirements. This manual will focus on the software basic functions.

7.1 VIP

Under this part, users shall be recognized after being registered by face recognition, which enables robot welcome and say hi to users initiatively when robot next time detect the same person. Click the "VIP" of the Homepage, sign in then you will be the member.

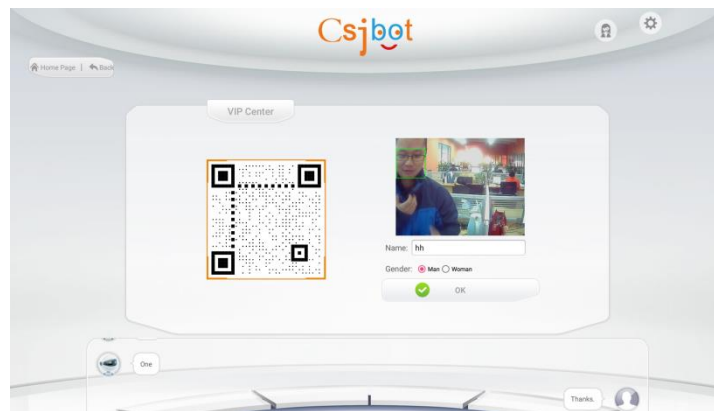Steps on how users manage registration are referred as following:

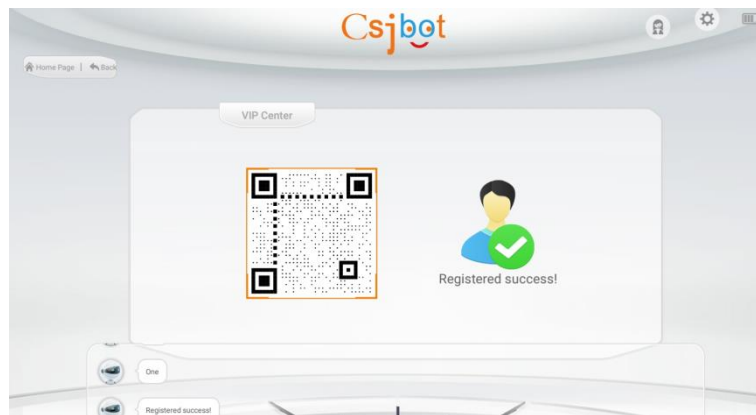1) Stand in front of robot and turn your face towards the camera aperture:

2) When you feel satisfied with the photo, click "YES" to proceed, shown as; Or else, choose "TAKE AGAIN":


3) Input your information then click "YES".

4) Registered done, shown as below:

7.2 Navigation

1) Before entering this function, please make the room map scanned by Robo Studio and saved. Upload one indoor layout picture in the navigation setting page so that you will see the room frame at front end. Then click Navigation app. If it is initially restarting, first of all restore the map, shown as below:
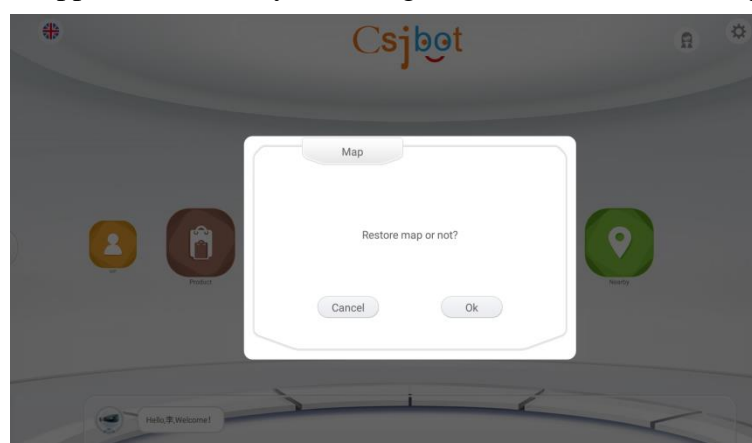
2) Restore finished, then this function works now, shown as below

3) Please be carefully noted that preset the indoor navigation point and HOME (the place where robot will welcome and guest). Please refer to the following manual for more details.

4) Click top right corner Manage Map to enter Navigation Setting, shown as below:
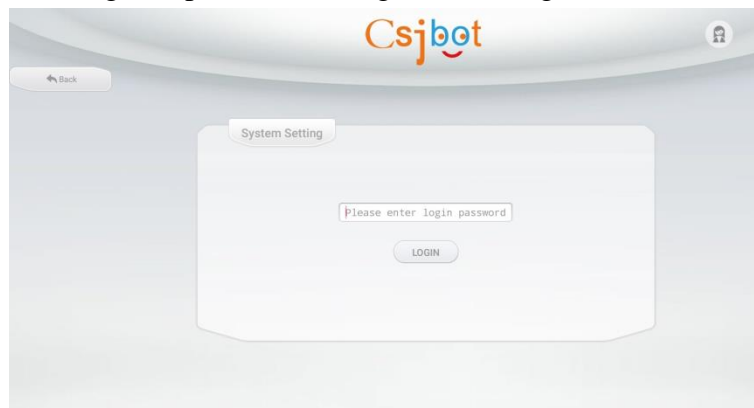
5) Enter the password: csjbot, then Navigation Setting is shown as below:

6) Indoor Layout Map:

Click "UPLOAD MAP" in the left bottom to replace one photo layout of your own room. Please make sure you have pre-saved the layout map photo in either the robot internal storage or USD drive.

7) To set the navigation point information, which is corresponding to the indoor map area. Navigation point information include the navigation point name, description, Axis X Y R.

Setting Step: Click and drag red logo on the map to set the relevant point, then input her location data; Or click "GETTING AXIS POINT" to get the location to automatically generate the location axis, then save it.

HOME Setting (welcome point):

Click and drag red logo on the map to set the relevant point, then input her location data;

Or click "GETTING AXIS POINT" to get the location to automatically generate the location axis, then save it, referring to below

7.3 Language Setting

Enter the homepage of the system, choose one language. Alternatively, choose one national flag of relative country.
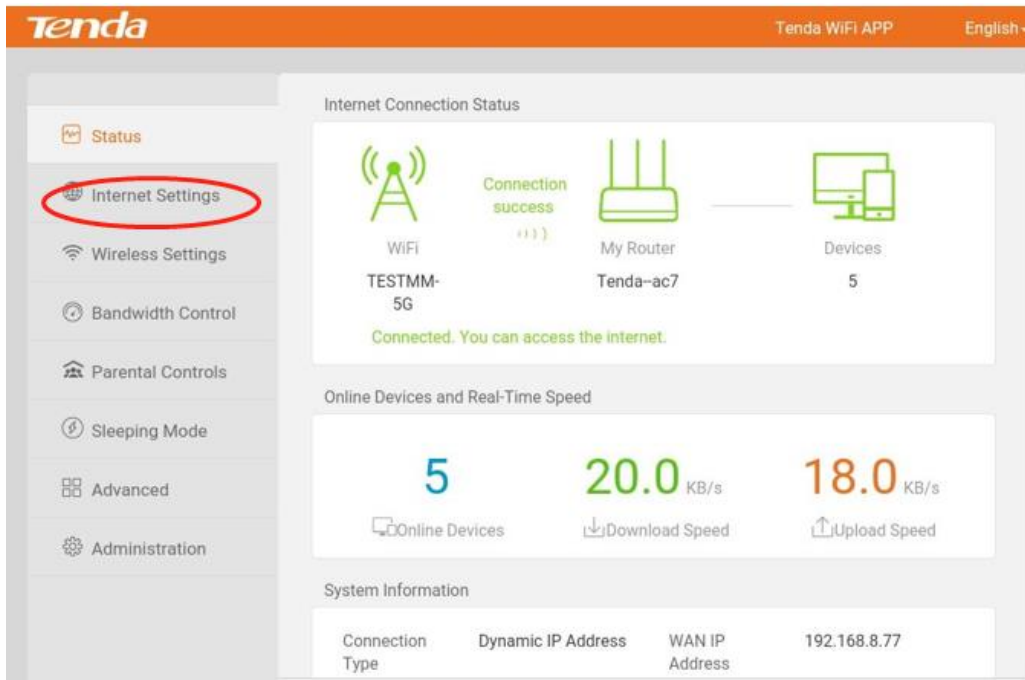
7.4 System Setting

System Setting is on the top right corner, enter the default password: csjbot, then set the options that you are intended for, shown as below
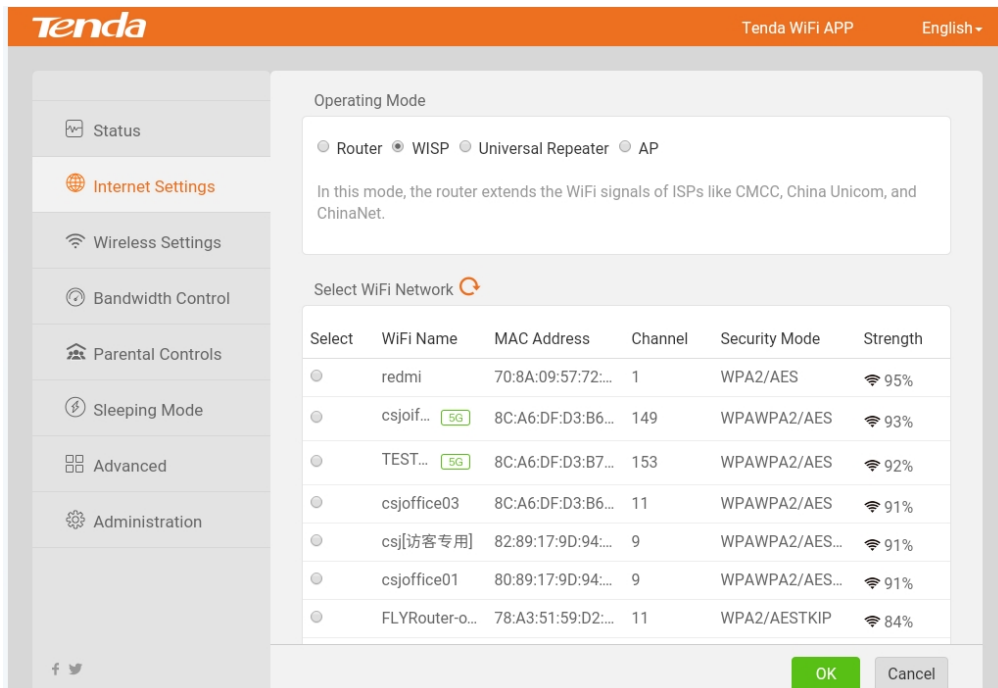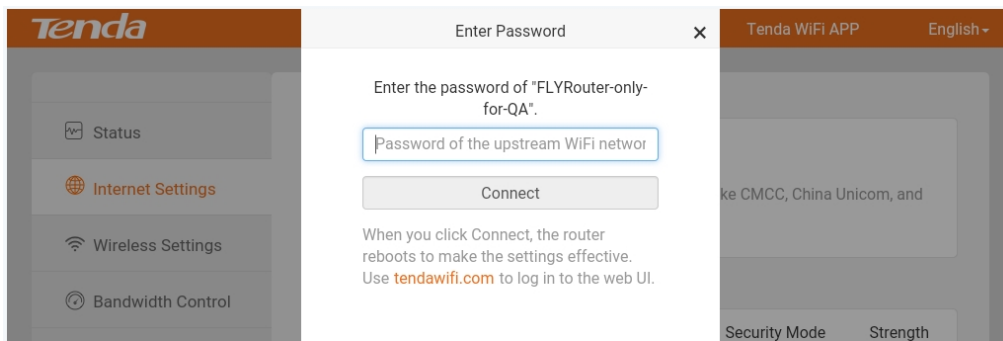
7.5 Network Setting

Click the Wireless Relay, shown as below

Choose a WIFI of best quality in your room as below:

Enter the password and saved.

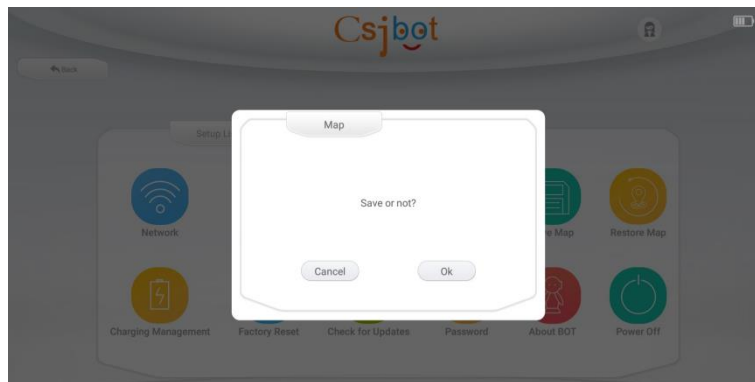## 7.6 Volume Setting

Drag and adjust as below：

7.7 Sync Data

Click the button to sync data backend as below

7.8 Save Map

Save the map or not, shown as below:

7.9 Restore Map

Please restore the map before you enter the navigation page when you are turning the robot on every time, shown as below:
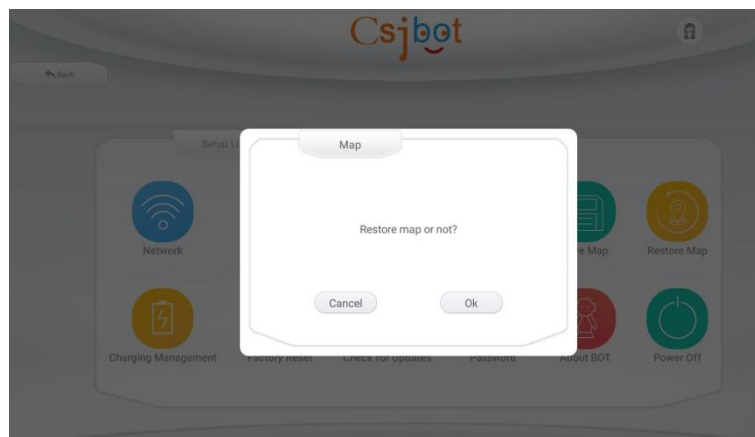
7.10 Factory Reset

Click Factory Reset, and enter the password (default: csjbot, you could also change it in the Settings). Once it was done, it will start restoration, all data will be cleared and irrevocable, shown as below:

7.11 Check for Updates

Click and check the system update, shown as below:

7.12 Password

Enter this page, you will get access to changing the old password, show as below:

7.13 About BOT

Click the icon and see the basic information as below:

7.14 Voice Interaction

1) One precondition is that please make sure you are connected to the network properly;
2) In the "visible range" of the robot (according to the face detective range of the camera), robot will say hi to the user initiatively when she detects someone.
3) users can sign in the VIP member center and shall be recognized after being registered by face recognition, which enables robot welcome and say hi to users initiatively when robot next time detect

the same person.

4) Robot can respond the user intelligently when they interact with each other, robot's arms will have simple action while she answers the questions, at the same time she will have the expression on her face, e.g. blink.

7.15 Video Advertising Playback

For the horizontal screen (e.g. 13.3 inch/15.6 inch), advertainments would be displayed in full screen when there is no task in action;

For the vertical screen (e.g. 23.8inch), advertising interface would be at the bottom of the software and when robot detects someone interacting with robot, video sound is prohibited. Users could custom his own video ads through back end cloud platform.

Chapter 8 Maintenance

8.1 Charge

1) It is a must that you should use the originally equipped charger. If the robot is in idle for long time, please fully charge the robot once a month.
2) When you charge the robot directly with charger, please plug the charger network power supply firstly, wait for 2-3 seconds till the charger is stable, then plug the power output into the charging port at the rear bottom of the robot.
3) When you charge the robot with the charger pile, please put the charger pile against the wall, plug the charger network power supply firstly, wait for 2-3 seconds till the charger is stable, then plug the power output into the charging port at the side of the charger pile. The robot will be back to the charger pile to charge herself automatically when the power is low.

8.2 Wheel Clean

In the robot's normal walking process, it is inevitable to stick debris on robot's wheels which shall kill the service life of motor.

Therefore, general cleaning cycle is accumulated working for one week.

Chapter 9 Packaging and Transport

9.1 Short Distance Transport（including city chartered vehicle）

1) Only on the level cement floor or ground floor can manually push the robot to walk forward, at a walking speed max. 15 m / min.

Note: It is strictly forbidden to manually drive the machine while the robot is power on or working.

2) When loading and unloading the truck, up and down the stairs or steps (more than 2mm), slope (more than 10 °), or passing by outdoor asphalt road, please use our special company handling equipment. Attention that DO NOT do the transferring and loading &unloading work unless make sure the robot fixed on the handling equipment according to the following operating practices and procedures

3) Drop lock four universal wheel brakes to ensure it safe and solid.

a). Two adult men (height 1.6 meters above) from both sides of robot, with one hand holding the shelf bracket, the other hand holding the robot shoulder at the same time to raise it up to 15 ~ 25cm high, then move on top middle of the special handling tools.

b). One man is holding the robot in case of sliding from the handling tool, while another man gets four bandages from the corner of shelf bracket both sides binding to four fixed collars of the handling tool, tie them up through hasp one by one and at last loose all universal wheel brakes.

c). Two adult men (height 1.6 meters above) from both sides of robot, with one hand holding the shelf bracket, the other hand holding the robot shoulder and handling tool at the same time to carefully get it through steps and up& down stairs, when on the level ground you can put it down to push it ahead via universal wheels at the bottom of the handling equips.

d). When loading, internal height of the vehicle must be over 1800mm, then fix the robot and truck interior carriage together through rope, however make sure the machine and interior wall filled with 2cm thick bubble cotton to prevent damages on the way.

9.2 Long Distance Transport (including logistic transport and chartered vehicle)

It requires using the special outer carton and solid filling, which are company exclusively provided, for the long-distance transport.