9.ROS_APP mapping and navigation

The following workspace contains the function packages in the entire rplidar_ws. If you need to transplant it to your own development board, you need to copy all the function packages to the src of the workspace for compilation, and install the relevant environment.

Note: This course uses Rosmaster-X3 as an example. Users need to modify it according to their own motion model.

Different from the handheld lidar mapping content, this mapping adds odom data, so if you use your own motion model, you also need to have odom data.

Function package path: ~/oradar_ws/src/yahboomcar_nav

9.1 Mapping

9.1.1 Start

Input following command:

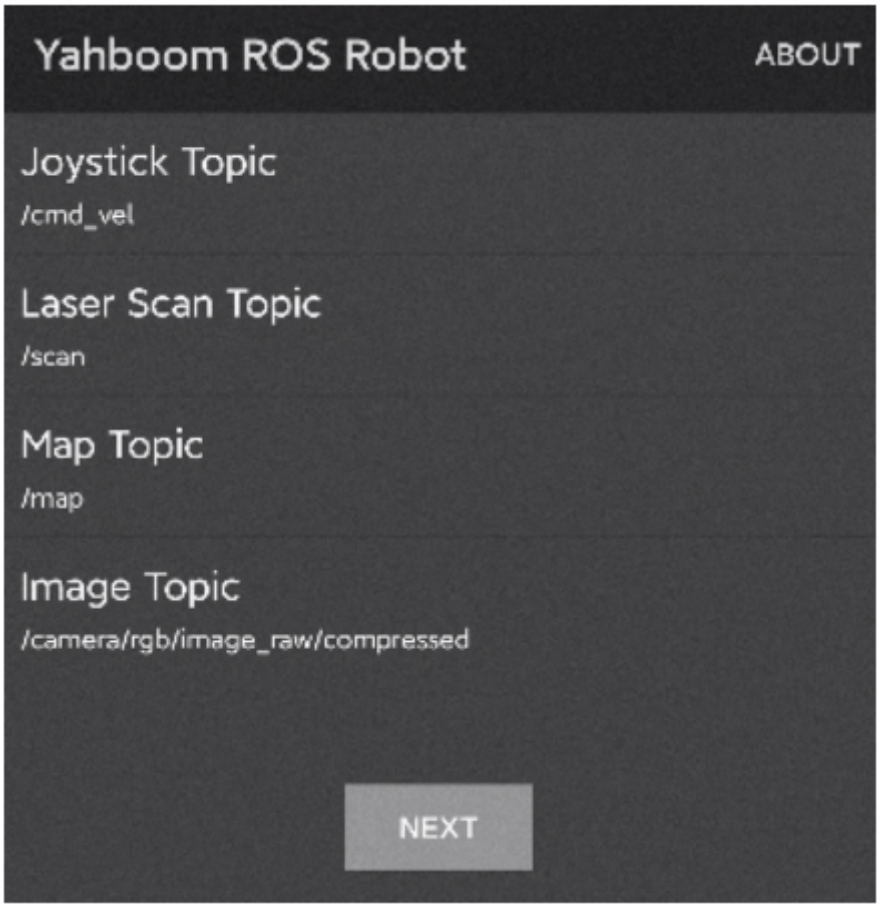
```
roslaunch yahboomcar_nav laser_bringup.launch
roslaunch yahboomcar_nav yahboomcar_map.launch map_type:=gmapping
```

9.1.2 Use

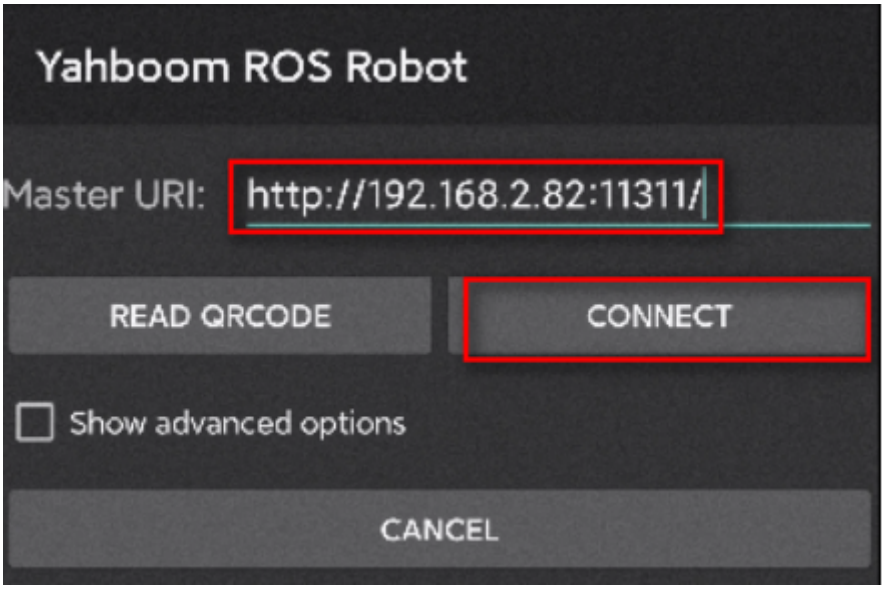
After the robot is started, click 【APP】.

Modify the corresponding topic name. If you do not modify it at this time, you can also enter the mapping function and then modify it.

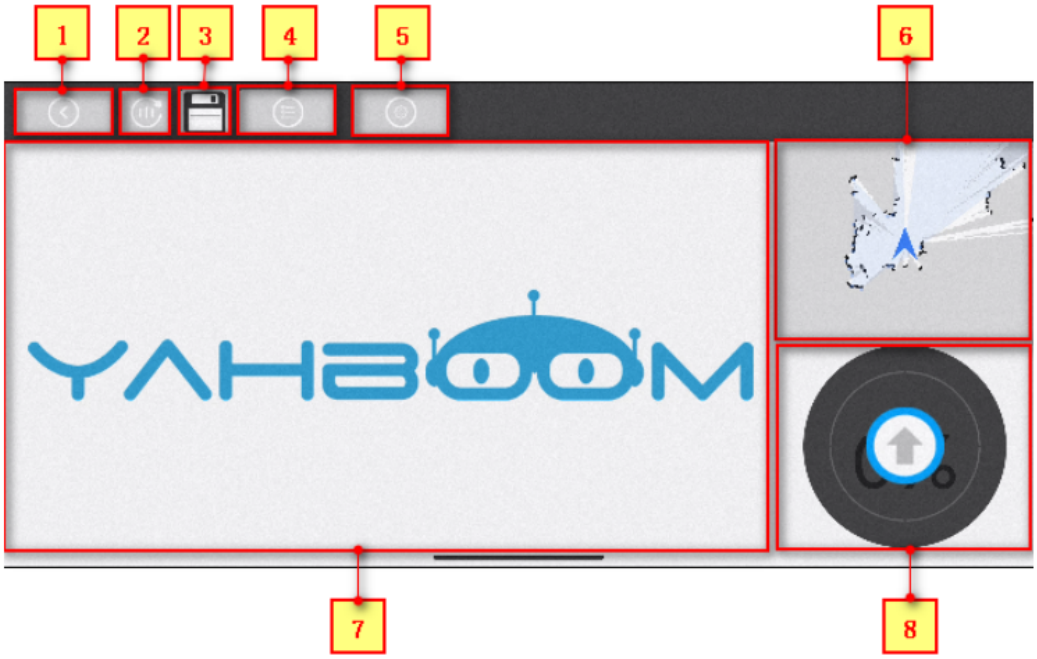
Do not modify it during the demonstration.



To ensure that the mobile phone and the robot are on the same network, enter the robot [IP] in [Master URI] and click [CONNECT] to log in.



Enter the mapping interface.



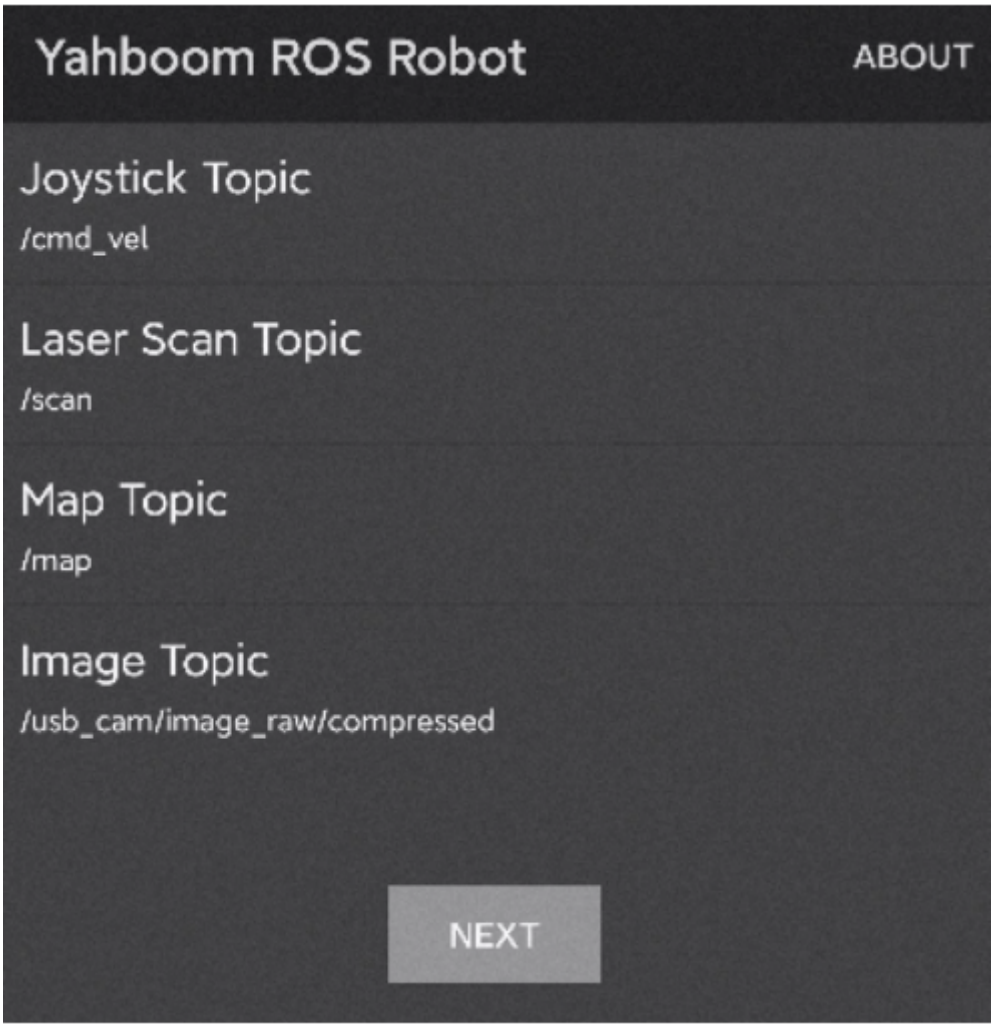
- 1: Return to the previous step
- 2: Refresh the map
- 3: Save map
- 4: Navigation function
- 5: Settings
- 6: Mapping area
- 7: Camera screen display area
- 8: Joystick

Click area 【6】 to switch to the area 【7】interface. Since there is no subscription topic for the image, only the YAHBOOM logo is displayed.

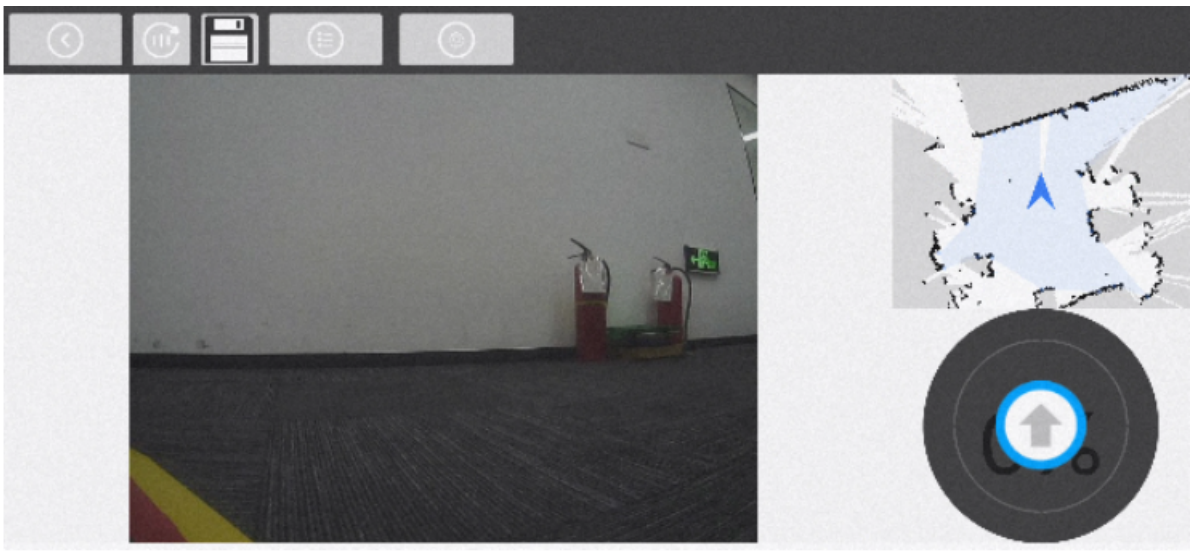
If the camera node is enabled, view the Image topic.

```
rostopic list
```

Choose an image topic.



At this point, there is an image in the interface.

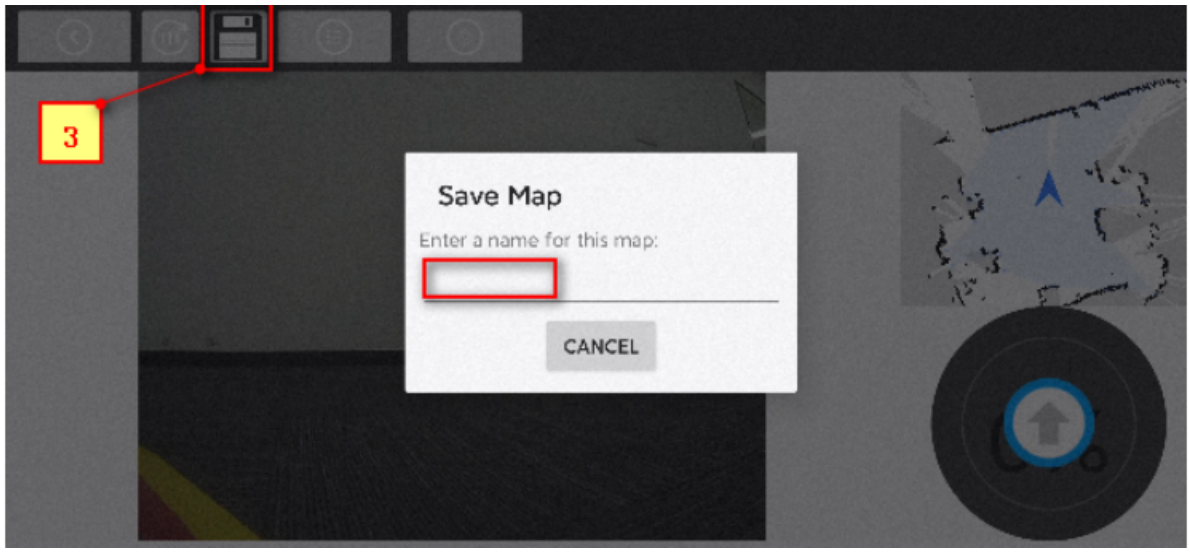


Slide the joystick in the [8] part.

When sliding the joystick, the slower the speed, the better the effect (especially the rotation speed), and control the robot to move until the map is created.

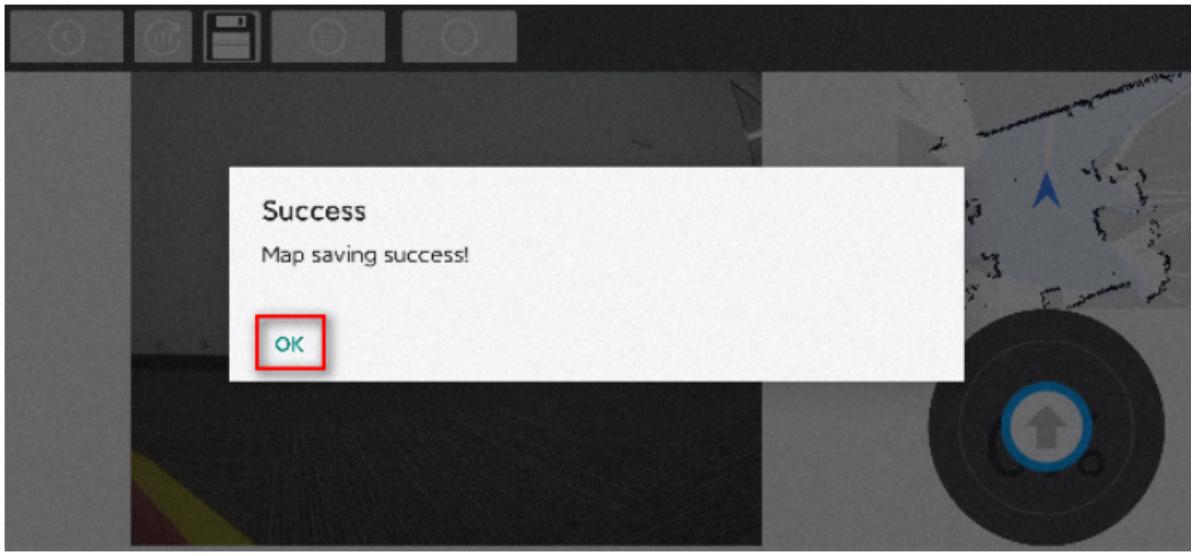
9.1.3 Save map

After the map is created, click [3] to save the map.



Click above the horizontal line, enter the name of the saved map [my], and click [Finish] (only English, no symbols).

A dialog box showing successful map saving will pop up, click [OK] to complete.



9.2 Navigation and obstacle avoidance

9.2.1 Start

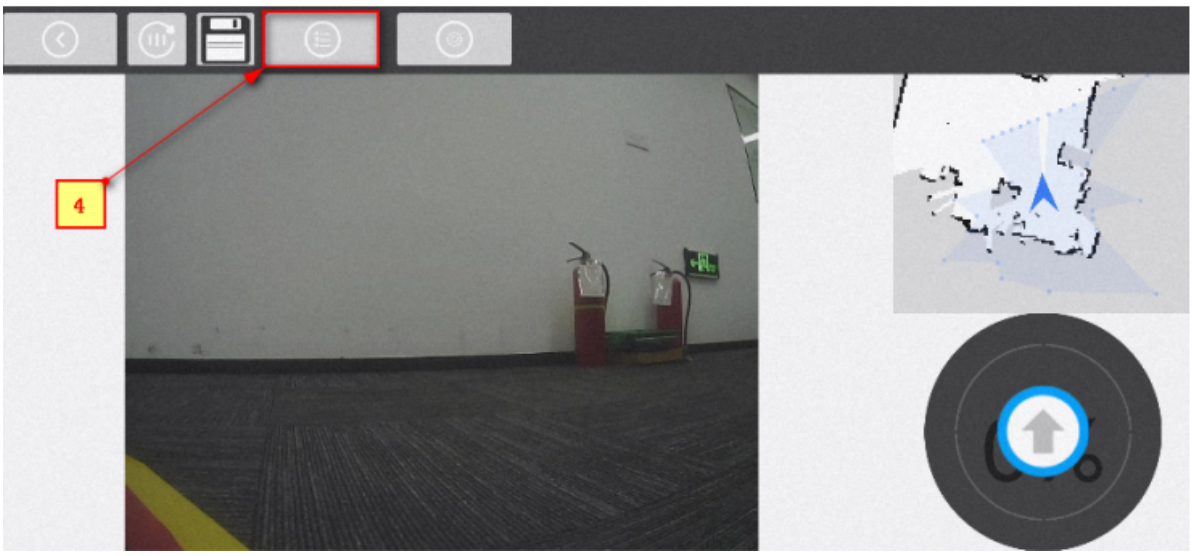
Input following command:

```
roslaunch yahboomcar_nav laser_bringup.launch
roslaunch yahboomcar_nav yahboomcar_navigation.launch use_rviz:=false map:=my
```

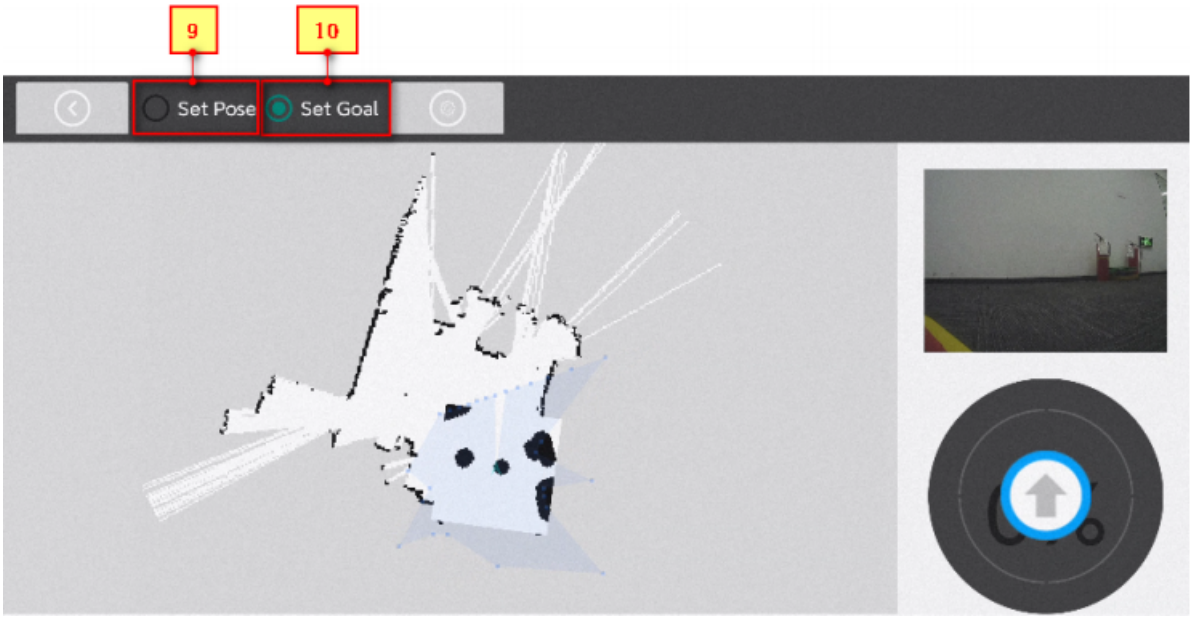
- use_rviz parameter: whether to open rviz.
- map: map name, load the map file named [my].

9.2.2 Use

The login method is the same as above. After logging in, you will directly enter the mapping interface. At this time, you need to click [4] to enter the navigation interface and switch screens.



Enter the navigation interface.

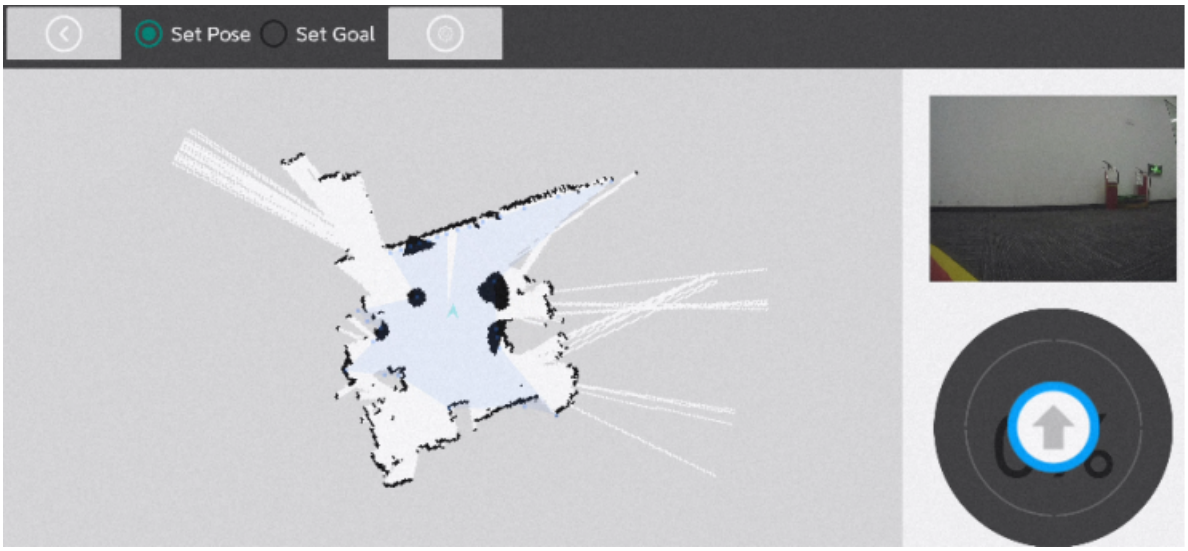


- 9: Set the initial pose of the robot
- 10: Set target pose

As you can see in the picture above, the robot is at the origin when building the map, but we have not placed the robot at the origin, so the scanned points do not coincide with the map.

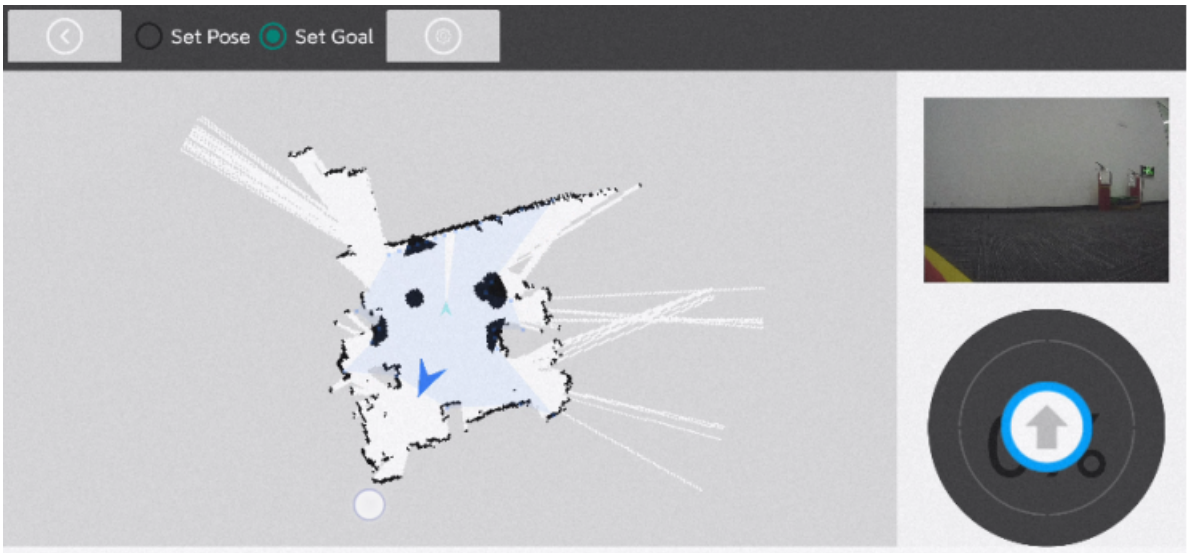
At this time, we need to set the initial pose of the robot. First, click [9] to select the approximate position of the robot on the map. Do not let go and continue sliding towards the approximate pose of the robot.

Try to make the scanned points coincide with the map as much as possible.



Click [10] to select the target position of the robot on the map.

Do not let go, and continue to slide towards the posture that the robot wants to maintain. After releasing, the robot will drive to the target posture.



9.3 app related startup files

app.launch

```
<launch>
    <!-- 启动APP相关接口服务 || Start APP related interface services -->
    <include file="$(find rosbridge_server)/launch/rosbridge_websocket.launch"/>
    <node pkg="world_canvas_server" type="world_canvas_server"
name="world_canvas_server">
        <param name="start_map_manager" value="true"/>
        <param name="auto_save_map" value="false"/>
    </node>
    <node pkg="world_canvas_server" type="map_manager.py" name="map_manager"/>
    <node pkg="yahboomcar_nav" type="save" name="save_map"/>
</launch>
```

Code path:

~/oradar_ws/src/yahboomcar_nav/launch/library