

# Rosmaster\_X3 uses APP to mapping

## Quick to use tutorial

### 1、Rosmaster\_X3 power on

Turn on the power of X3, as shown in the following figure, and turn it to the **ON** direction.。



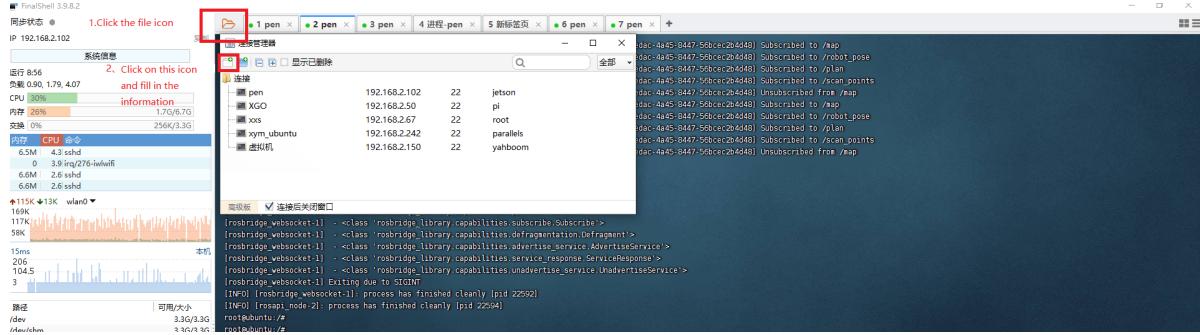
**Turn the switch to the on direction**

Connecting to the network can be visualized through the X3's built-in touch screen display, connecting to WiFi within the local area network

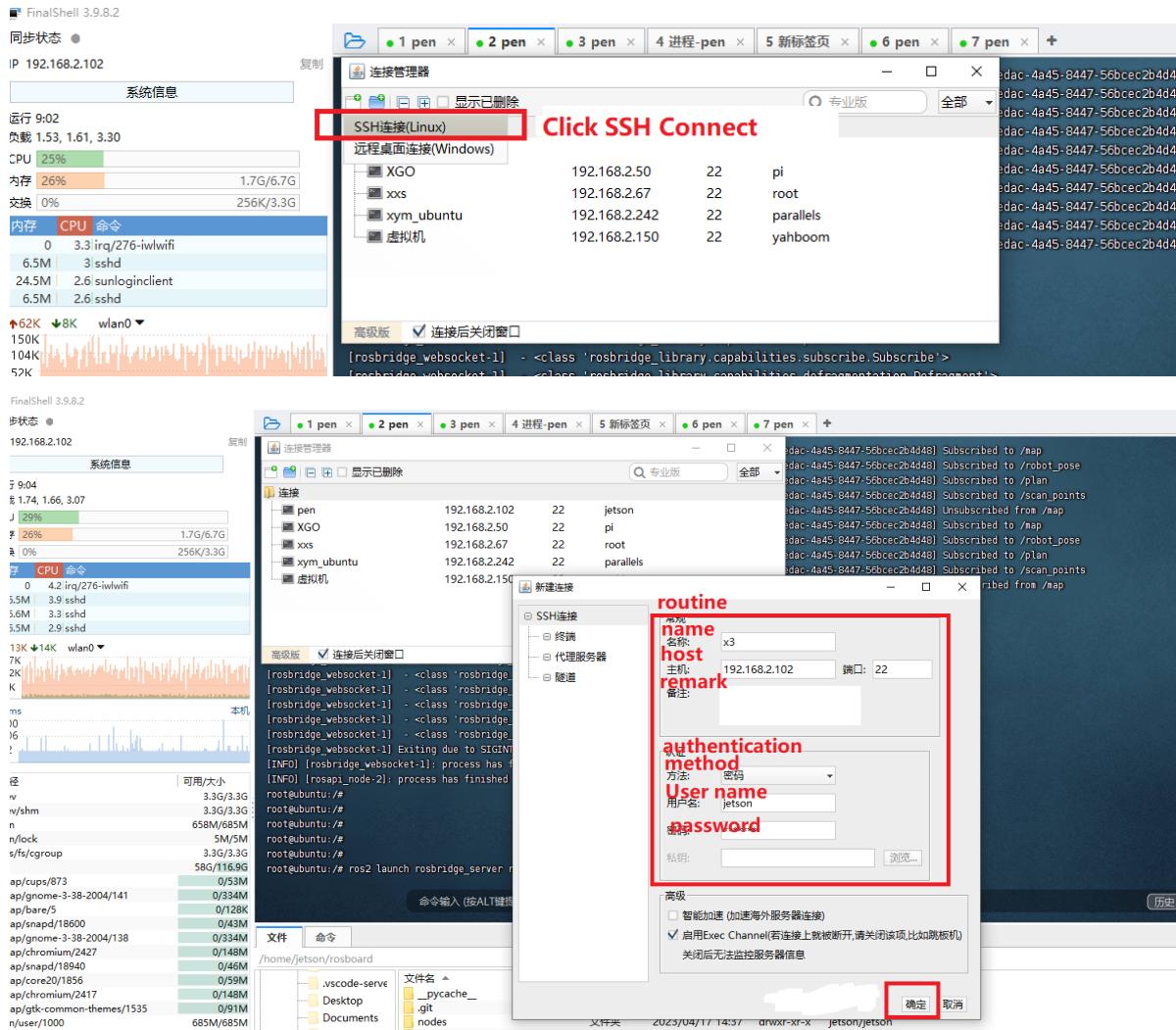
## 2. Open the shell tool to connect to Rosmaster\_X3

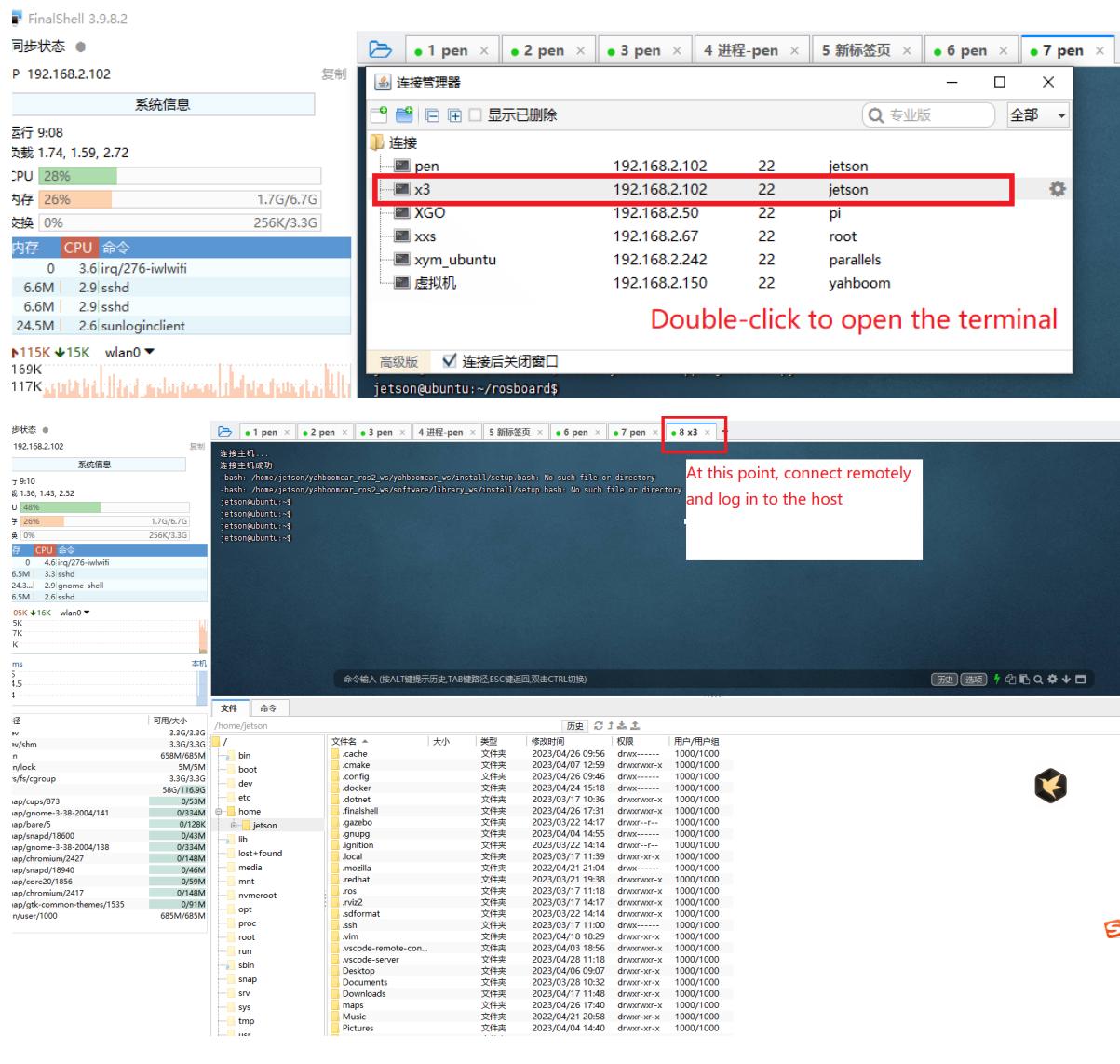
Note: The IP address used during the writing of this tutorial is 192.168.2.102. The username is: **jetson**, and the password is: **yahboom**. The actual IP address used in this tutorial shall prevail.

Open the shell tool, and the shell tool I am using here is FinalShell. Enter information such as username, password, port, and connection name.



The connection steps are as follows:





### 3. Start ROSBridge and web service

For Raspberry Pi P15 controller, you need to enter the docker container first. For Orin controller, you do not need to enter the docker and do not need to do these four steps. You can just run the command directly.

1. Enter the command in the terminal to create a docker environment.

```
~/run_docker.sh
```

2. Then enter the command:

```
docker ps
```

3. View the docker environment just created.



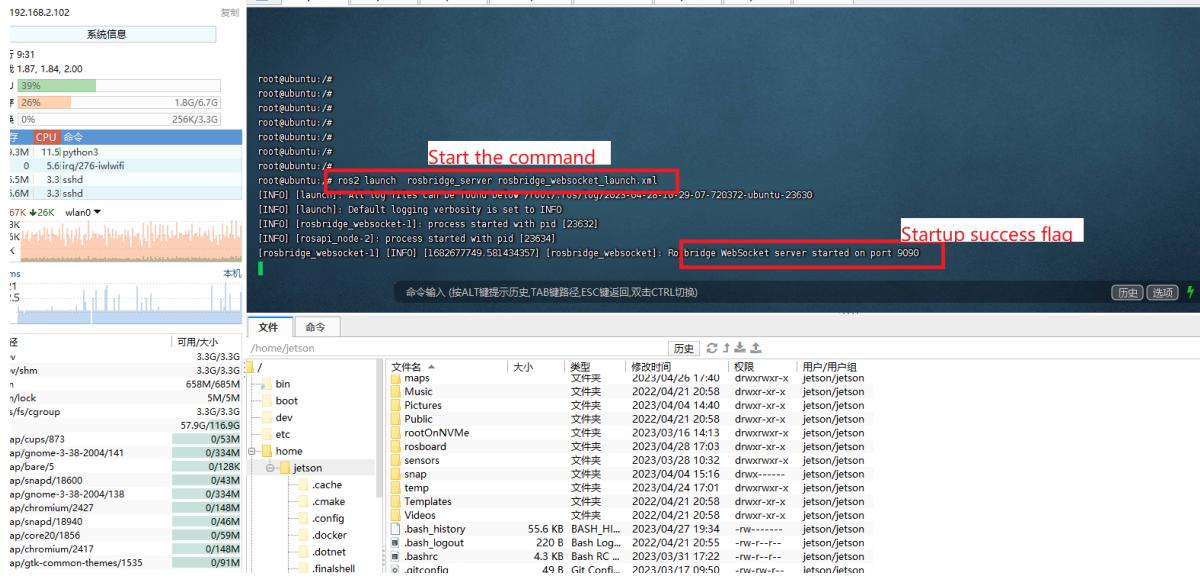
4. Find the docker environment just created and find the CONTAINER ID. Enter the command in the terminal:

```
docker exec -it CONTAINER_ID bash
```

Note: CONTAINER ID is the ID of the latest docker environment just found.

Open the terminal and enter the following command to start rosbridge

```
ros2 launch rosbridge_server rosbridge_websocket_launch.xml
```



**Raspberry Pi 5 master control**, Follow the above steps, reopen a terminal, and enter the docker environment. The docker entered is newly created, and there is no need to execute the `~run_docker.sh` command. **Orin master control does not need to enter docker**

Enter the command:

Start cartographer mapping

```
ros2 launch yahboomcar_nav map_cartographer.launch.py
```

Or start gmapping to create images

```
ros2 launch yahboomcar_nav map_gmapping.launch.py
```

```
ROS_DOMAIN_ID: 112
my_robot_type: r2 | my_lidar: a1 | my_camera: astraplus
-----
root@ubuntu:/# cd ~/yahboomcar_ros2_ws/yahboomcar_ws
root@ubuntu:~/yahboomcar_ros2_ws/yahboomcar_ws#
root@ubuntu:~/yahboomcar_ros2_ws/yahboomcar_ws#
root@ubuntu:~/yahboomcar_ros2_ws/yahboomcar_ws#
root@ubuntu:~/yahboomcar_ros2_ws/yahboomcar_ws# source install/setup.bash
root@ubuntu:~/yahboomcar_ros2_ws/yahboomcar_ws#
root@ubuntu:~/yahboomcar_ros2_ws/yahboomcar_ws#
root@ubuntu:~/yahboomcar_ros2_ws/yahboomcar_ws#
root@ubuntu:~/yahboomcar_ros2_ws/yahboomcar_ws# ros2 launch yahboomcar_nav map_cartographer.launch.py
```

Reopen a terminal and enter Docker, enter the following command.

Start publishing robot position nodes

```
ros2 launch robot_pose_publisher_ros2 robot_pose_publisher_launch.py
```

```
root@ubuntu:~/yahboomcar_ros2_ws/yahboomcar_ws#
root@ubuntu:~/yahboomcar_ros2_ws/yahboomcar_ws#
root@ubuntu:~/yahboomcar_ros2_ws/yahboomcar_ws#
root@ubuntu:~/yahboomcar_ros2_ws/yahboomcar_ws# ros2 launch robot_pose_publisher_ros2 robot_pose_publisher_launch.py
[INFO] [launch]: All log files can be found below /root/.ros/log/2023-06-09-09-33-0596-ubuntu-1943
[INFO] [launch]: Default logging verbosity is set to INFO
/root/yahboomcar_ros2_ws/yahboomcar_ws/install/robot_pose_publisher_ros2/share/robot_pose_publisher_ros2/launch/robot_pose_publisher_
' instead
  Node(
/root/yahboomcar_ros2_ws/yahboomcar_ws/install/robot_pose_publisher_ros2/share/robot_pose_publisher_ros2/launch/robot_pose_publisher_
  Node(
```

**Note: If the point cloud information is not displayed after full startup, wait for the mapping module to start before restarting the robot position node**

Reopen a terminal and enter Docker, enter the following command

Start the node for publishing laser data transfer points.

```
ros2 run laserscan_to_point_publisher laserscan_to_point_publisher
```

```
root@ubuntu:~/yahboomcar_ros2_ws/yahboomcar_ws#
root@ubuntu:~/yahboomcar_ros2_ws/yahboomcar_ws#
root@ubuntu:~/yahboomcar_ros2_ws/yahboomcar_ws#
root@ubuntu:~/yahboomcar_ros2_ws/yahboomcar_ws# source install/setup.bash
root@ubuntu:~/yahboomcar_ros2_ws/yahboomcar_ws# ros2 run laserscan_to_point_publisher laserscan_to_point_publisher
^CTraceback (most recent call last):
```

命令输入 (按ALT键提示历史,TAB键路径,ESC键返回,双击CTRL切换)

Reopen a terminal , and enter the following command

Open another terminal and start the camera

```
ros2 launch usb_cam demo.launch.py #pi5 motherboard
```

```
ros2 launch usb_cam camera.launch.py #orin motherboard
```

Re-open a terminal , enter the following command

```
cd ~/yahboomcar_ros2_ws/yahboomcar_ws
```

```
source install/setup.bash
```

Start Save Map Service Node

```
ros2 launch yahboom_app_save_map yahboom_app_save_map.launch.py
```

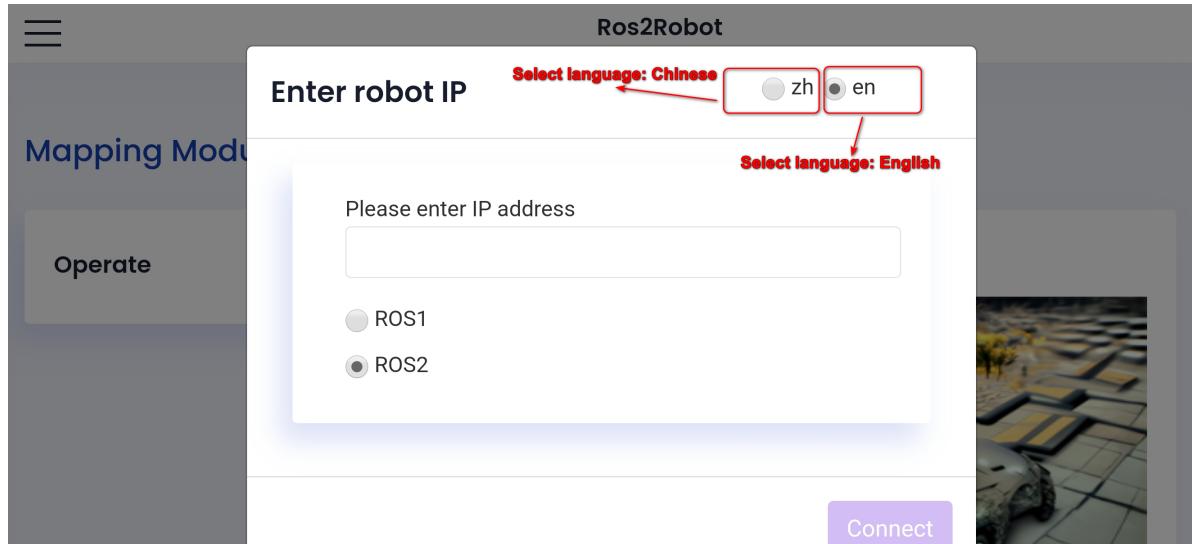
```

root@ubuntu:~/yahboomcar_ros2_ws/yahboomcar_ws#
root@ubuntu:~/yahboomcar_ros2_ws/yahboomcar_ws# source install/setup.bash
root@ubuntu:~/yahboomcar_ros2_ws/yahboomcar_ws#
root@ubuntu:~/yahboomcar_ros2_ws/yahboomcar_ws#
root@ubuntu:~/yahboomcar_ros2_ws/yahboomcar_ws# ros2 launch yahboom_app_save_map yahboom_app_save_map.launch.py
[INFO] [launch]: All log files can be found below /root/.ros/log/2023-06-05-09-39-42-588278-ubuntu-1319
[INFO] [launch]: Default logging verbosity is set to INFO
[INFO] [server-1]: process started with pid [1326]
[server-1] [INFO] [1685959096.093496564] [minimal_service]: Incoming request
[server-1] mapname: test.yaml
[server-1] [INFO] [1685959099.852408712] [map_saver]:
[server-1]     map_saver lifecycle node launched.
[server-1]     Waiting on external lifecycle transitions to activate

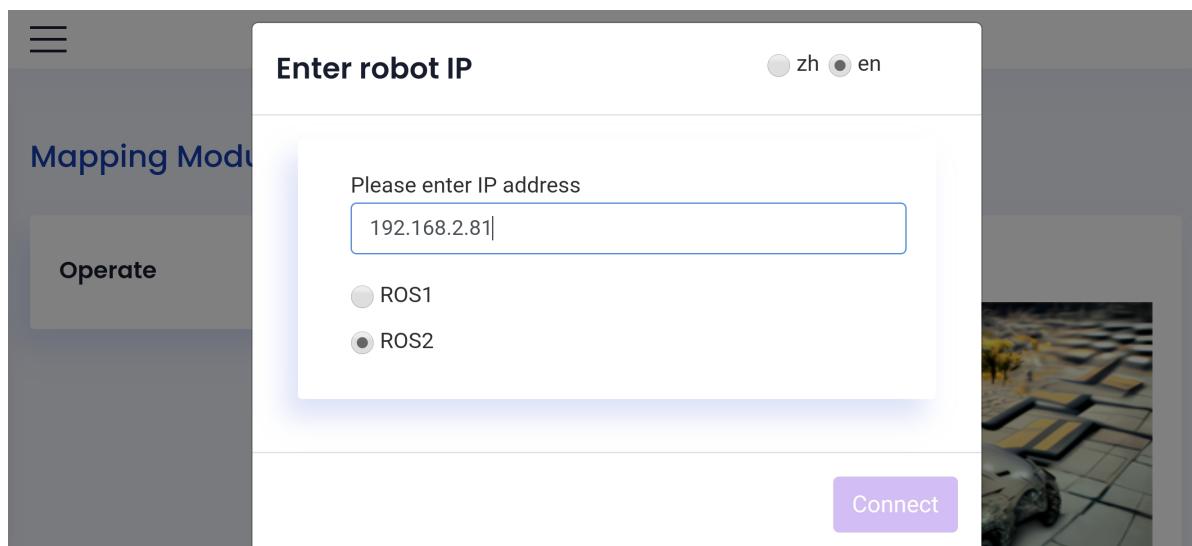
```

## 4、Open the APP and start the Graphical model

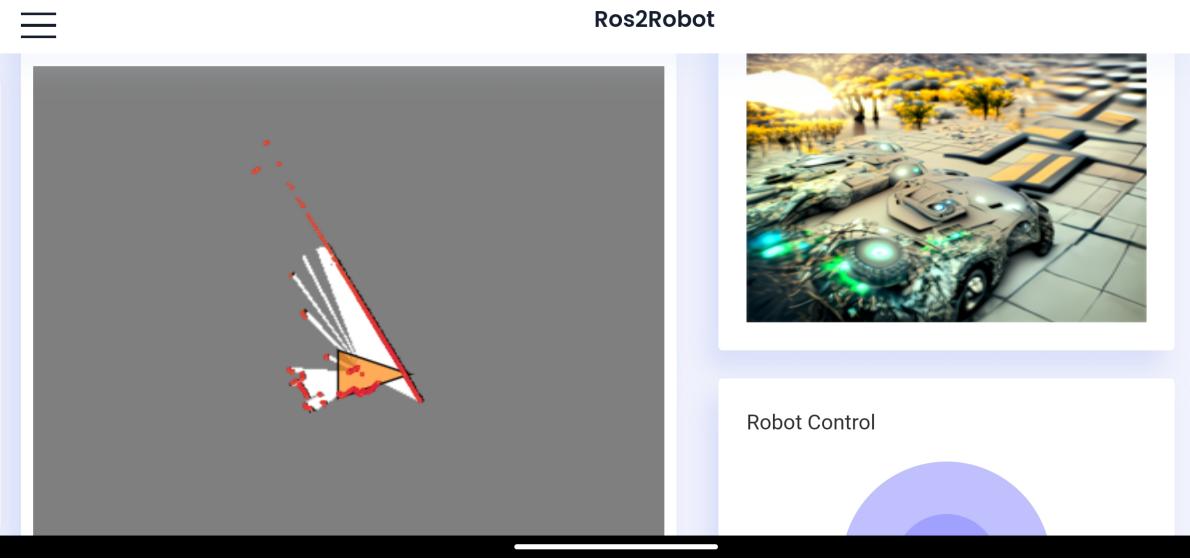
Install the app on your phone and open it. The following figure shows the APP opening interface:



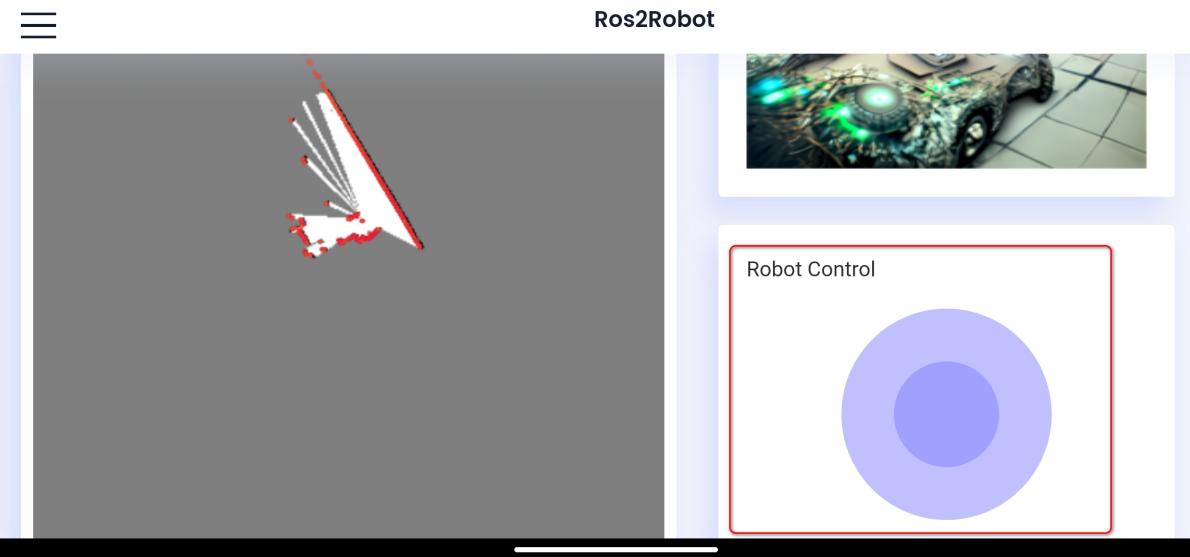
Enter the IP address in the input box. The IP address here is the IP address of the car, such as 192.168.2.81. This address is the actual IP address of the car. Please enter it according to the actual situation during operation. After completing the input, click the Next button.



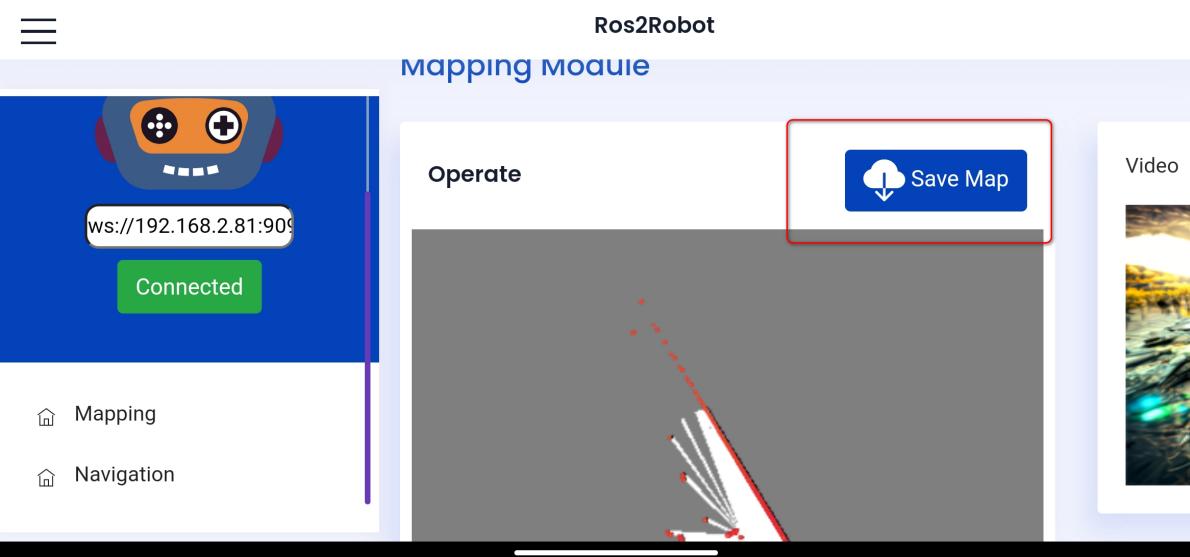
After starting the Graphical model, you can see the current laser point cloud and the laser scanned map



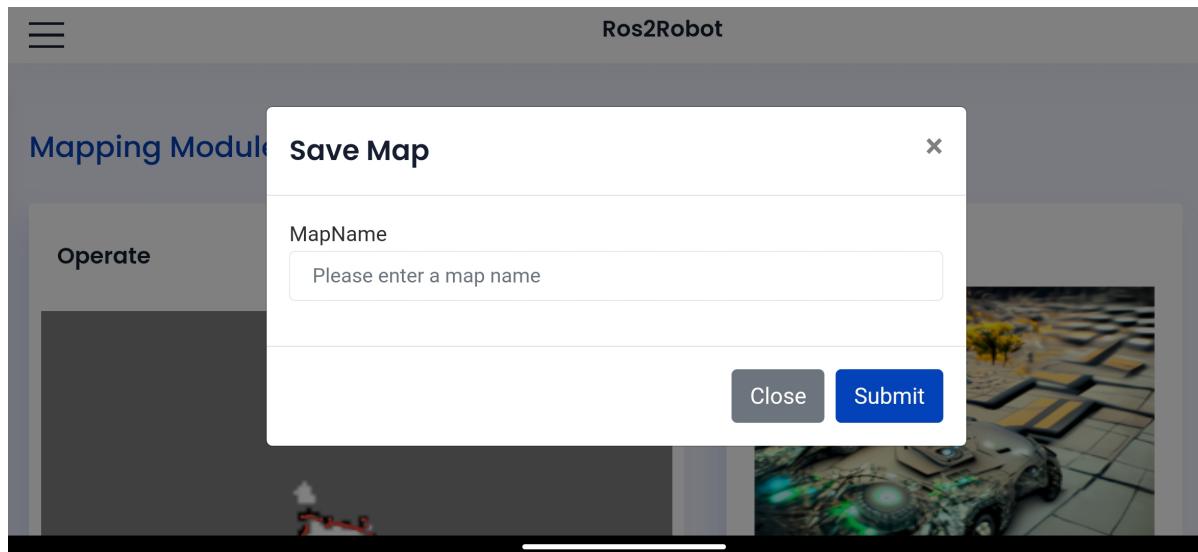
The right robot control area can be controlled by a joystick to move the robot forward, backward, left, and right.



After we control the robot to create the map, click the Save Map button.



Then enter the saved name in the pop-up box and click submit.



After saving, you can see the path of the map saved file printed by the terminal.

```
[server-1] [INFO] [1685959096.093496564] [minimal_service]: Incoming request
[server-1] mapname: test.yaml
[server-1] [INFO] [1685959099.852408712] [map_saver]:
[server-1]     map_saver lifecycle node launched.
[server-1]     Waiting on external lifecycle transitions to activate
[server-1]     See https://design.ros2.org/articles/node_lifecycle.html for more information.
[server-1] [INFO] [1685959099.880322944] [map_saver]: Creating
[server-1] [INFO] [1685959099.880322944] [map_saver]: Saving map from 'map' topic to '/root/maps/test.yaml' file
[server-1] [WARN] [1685959099.883806976] [map_saver]: Free threshold unspecified. Setting it to default value: 0.250000
[server-1] [WARN] [1685959099.888187899] [map_saver]: Occupied threshold unspecified. Setting it to default value: 0.650000
[server-1] [INFO] [1685959100.610790729] [map_saver]: Map saved successfully
[server-1] [INFO] [1685959100.613162552] [map_saver]: Destroying
```

命令输入 (按ALT键提示历史, TAB键路径, ESC键返回, 双击CTRL切换)

文件名	大小	类型	修改时间	权限	用户/用户组
test.yaml.pgm	12.6 KB	PGM 图片...	2023/06/05 17:58	-rw-r--r--	root/root
test.yaml.yaml	137 B	Yaml 源文...	2023/06/05 17:58	-rw-r--r--	root/root
xgo.db	20 KB	SQLite	2023/04/18 20:58	-rw-r--r--	pi/pi

If an error is reported when saving the map, it may be due to the incorrect map path in the code and the missing xgo.db file in the folder.

```
cd
~/yahboomcar_ross2_ws/yahboomcar_ws/src/yahboom_app_save_map/yahboom_app_save_map/
```

```
vim yahboom_app_save_map.py
```

Move the cursor to line 26 to see two paths, then press the button i to modify the two paths in the frame according to the path shown in the figure.

```
possess = subprocess.Popen(args, stdout=subprocess.PIPE)
return possess

def add_three_int_callback(self, request, response):
    map_name = request.mapname
    map_path = "/home/yahboom/cartoos2/data/maps/" + map_name
    now = datetime.datetime.now()
    str_time = now.strftime("%Y-%m-%d %H:%M:%S.%f")
    map_namestr = str_time + map_name
    map_id = hashlib.md5(map_namestr.encode()).hexdigest()
    response.response = request.mapname
    try:
        conn = sqlite3.connect('/home/yahboom/cartoos2/data/xgo.db')
        c = conn.cursor()
```

Change the path to: /root/maps/

Change the path to: /root/maps/xgo.db

After completing the modifications, press the ESC button and then enter: wq to save the file.

Then enter the command:

```
cd ~/yahboomcar_ross2_ws/yahboomcar_ws/
```

```
colcon build --packages-select yahboom_app_save_map
```

```
source install/setup.bash
```

```
ros2 launch yahboom_app_save_map yahboom_app_save_map.launch.py
```

Just save the map again.