

# ROS2 entity robot dog APP navigation

## Quick use

### 1. Power up the robot dog

Press the power switch on the side of the robot dog and wait for the robot dog to finish starting up. And connect the WiFi of the robot dog to the same LAN environment as your computer.



After the robot dog startup is complete, the lidar, imu, and robot dog joint status nodes have been automatically started.

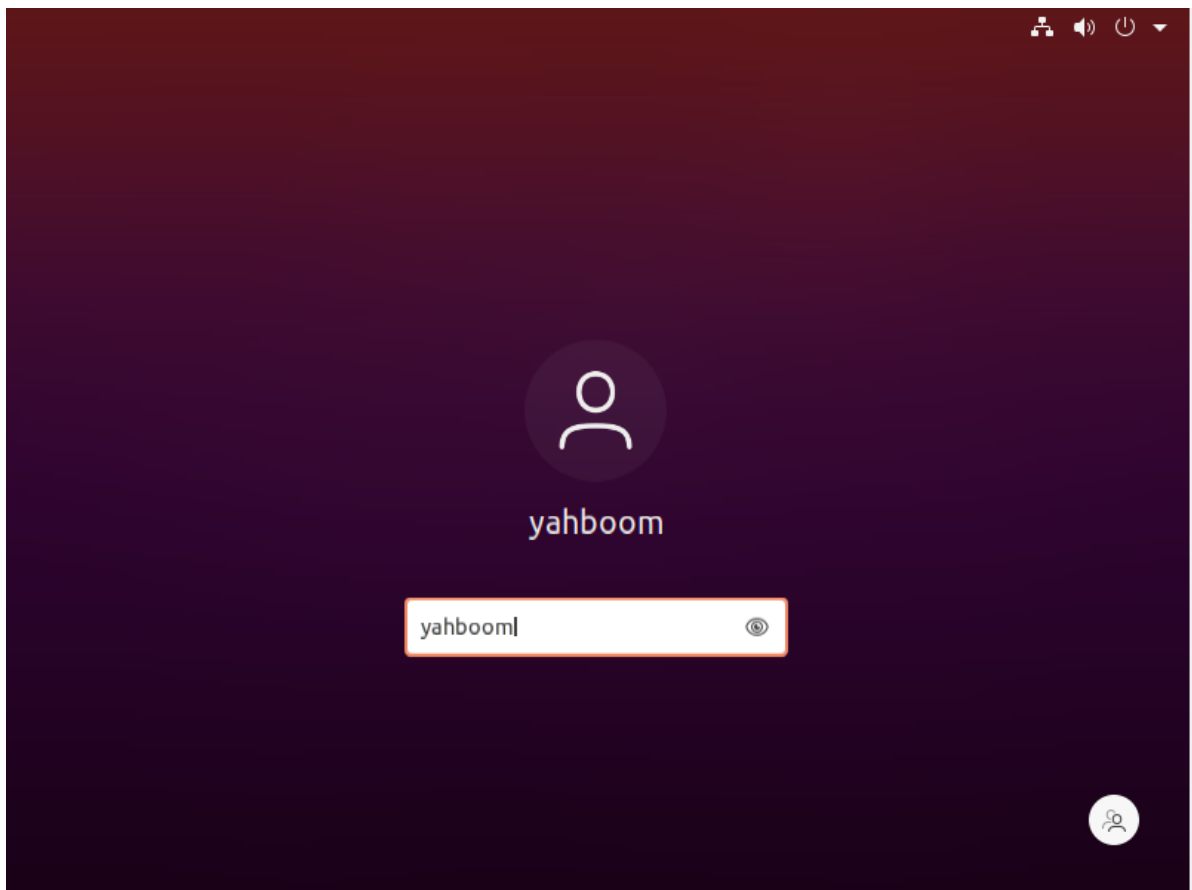
**If you find that you are unable to obtain data such as LIDAR, please close the Mechanical Dog Large programme and restart the chassis programme.**

**Close the big programme, restart the chassis as well as multi-level communication id modification can refer to the tutorial: 14. Lidar mapping navigation \6. ROS2 environment entity robot dog state acquisition \ ROS2 environment to obtain the real joints of the robot dog data.pdf**

### 2. Open the virtual machine

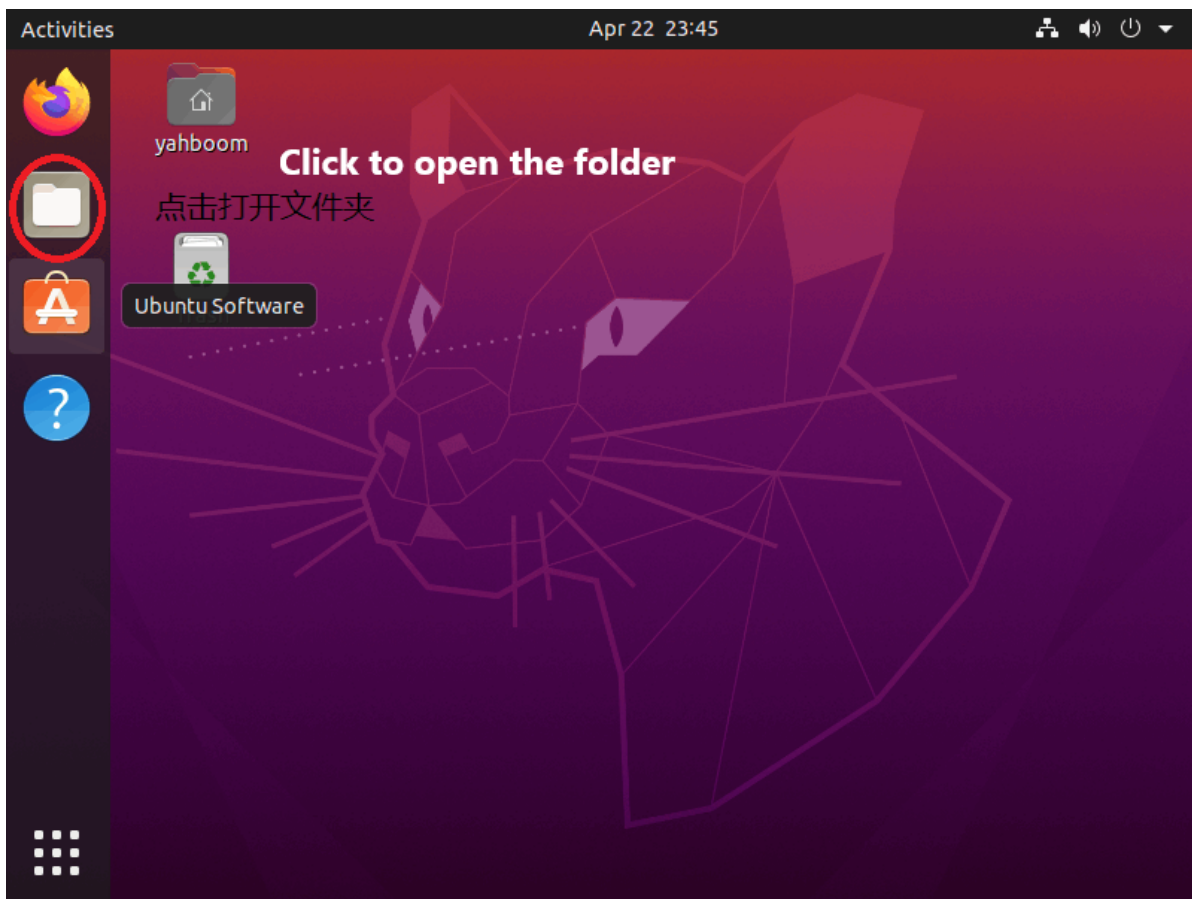
Note: Here the default virtual machine has been installed.

Open the virtual machine, enter the password: yahboom and then press the Enter key to enter the system desktop.

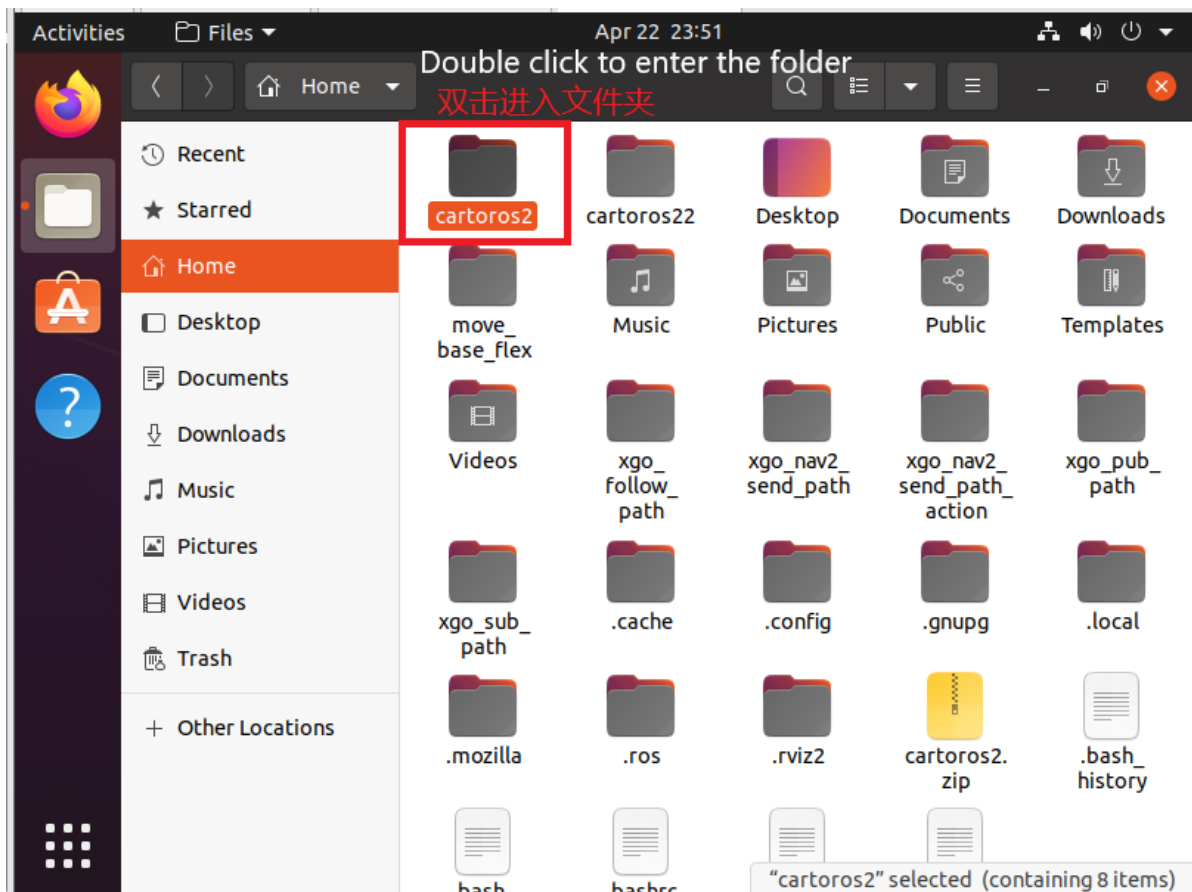


### 3. Starting ROSBridge

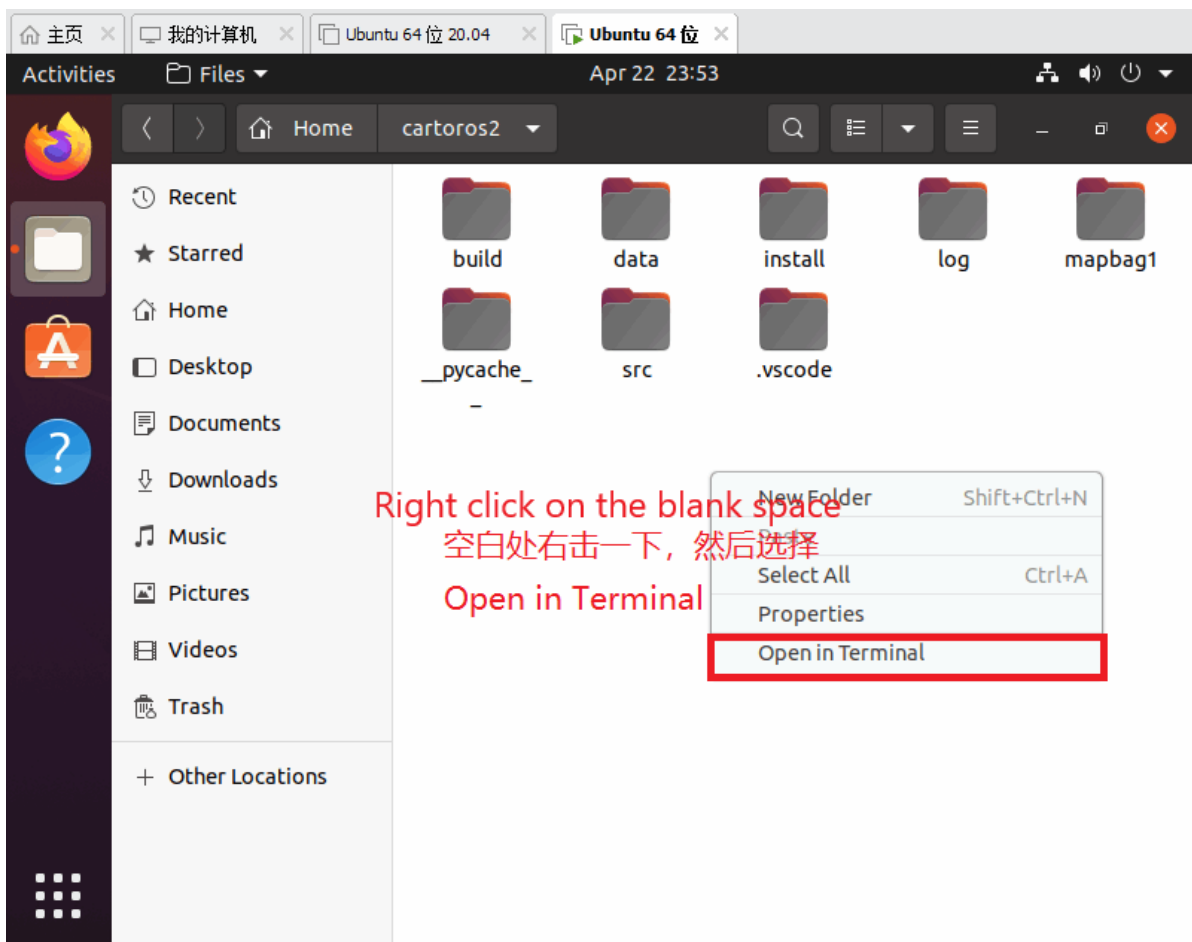
Go to the desktop system and open the folder.



Then double click on the cartoros2 folder



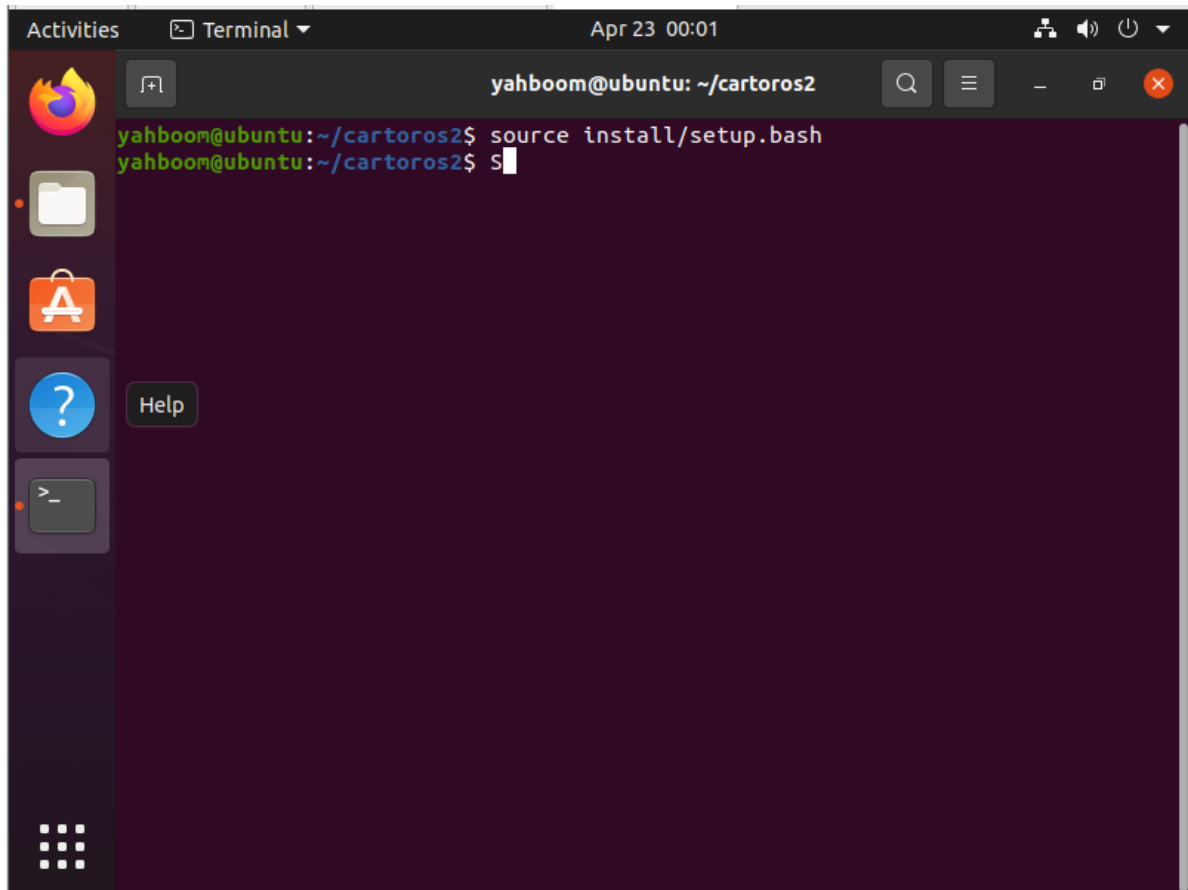
Then right-click in a blank space in the folder and select Open in Terminal



Then activate the environment by typing the following command in the terminal

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

Press the Enter key when you have finished typing.

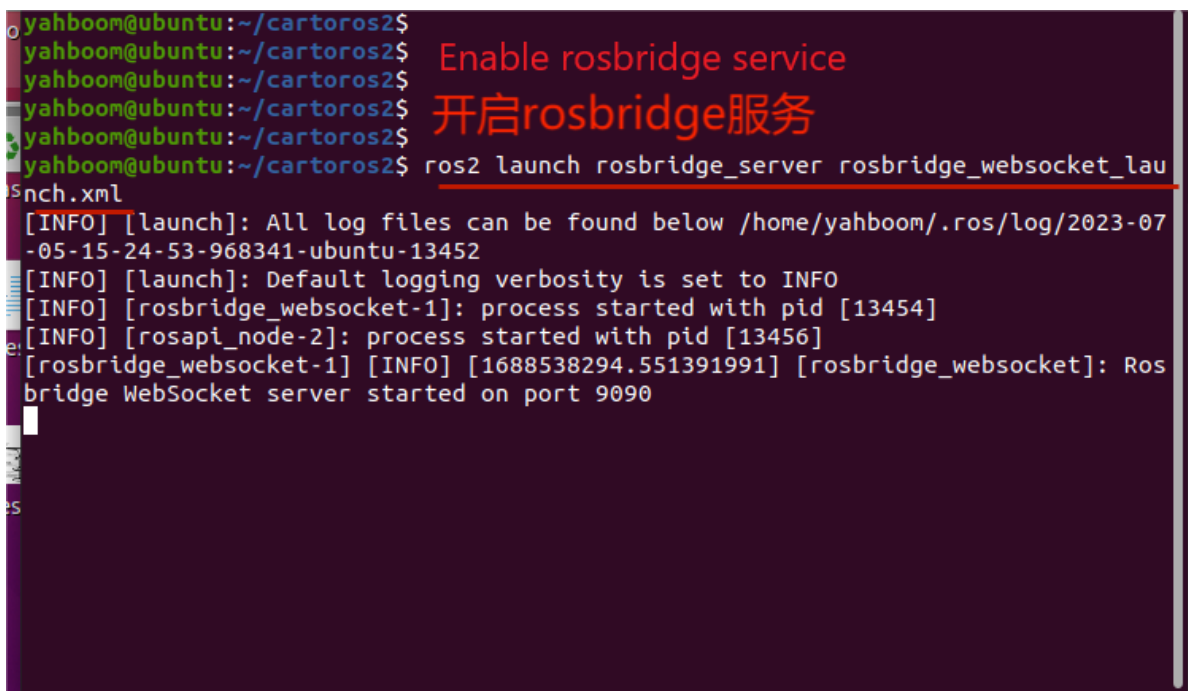


A terminal window titled 'Terminal' with a dark background. The window shows the user 'yahboom@ubuntu' in the directory '~/cartoros2'. The command 'source install/setup.bash' has been executed, and the prompt has changed to 'yahboom@ubuntu:~/cartoros2\$'. The left sidebar of the Ubuntu desktop is visible, showing icons for Firefox, Files, App Store, and Help.

```
yahboom@ubuntu:~/cartoros2$ source install/setup.bash
yahboom@ubuntu:~/cartoros2$
```

Then type the following command and press enter to start rosbridge

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



A terminal window showing the output of the 'ros2 launch' command. The command 'ros2 launch rosbridge\_server rosbridge\_websocket\_launch.xml' has been executed. The output shows information about log files, logging verbosity, and the successful start of the 'rosbridge\_websocket' process on port 9090. Red text overlays are present: 'Enable rosbridge service' and '开启rosbridge服务'.

```
yahboom@ubuntu:~/cartoros2$
yahboom@ubuntu:~/cartoros2$
yahboom@ubuntu:~/cartoros2$
yahboom@ubuntu:~/cartoros2$
yahboom@ubuntu:~/cartoros2$ ros2 launch rosbridge_server rosbridge_websocket_launch.xml
[INFO] [launch]: All log files can be found below /home/yahboom/.ros/log/2023-07-05-15-24-53-968341-ubuntu-13452
[INFO] [launch]: Default logging verbosity is set to INFO
[INFO] [rosbridge_websocket-1]: process started with pid [13454]
[INFO] [rosapi_node-2]: process started with pid [13456]
[rosbridge_websocket-1] [INFO] [1688538294.551391991] [rosbridge_websocket]: Ros
bridge WebSocket server started on port 9090
```

Enable rosbridge service  
开启rosbridge服务

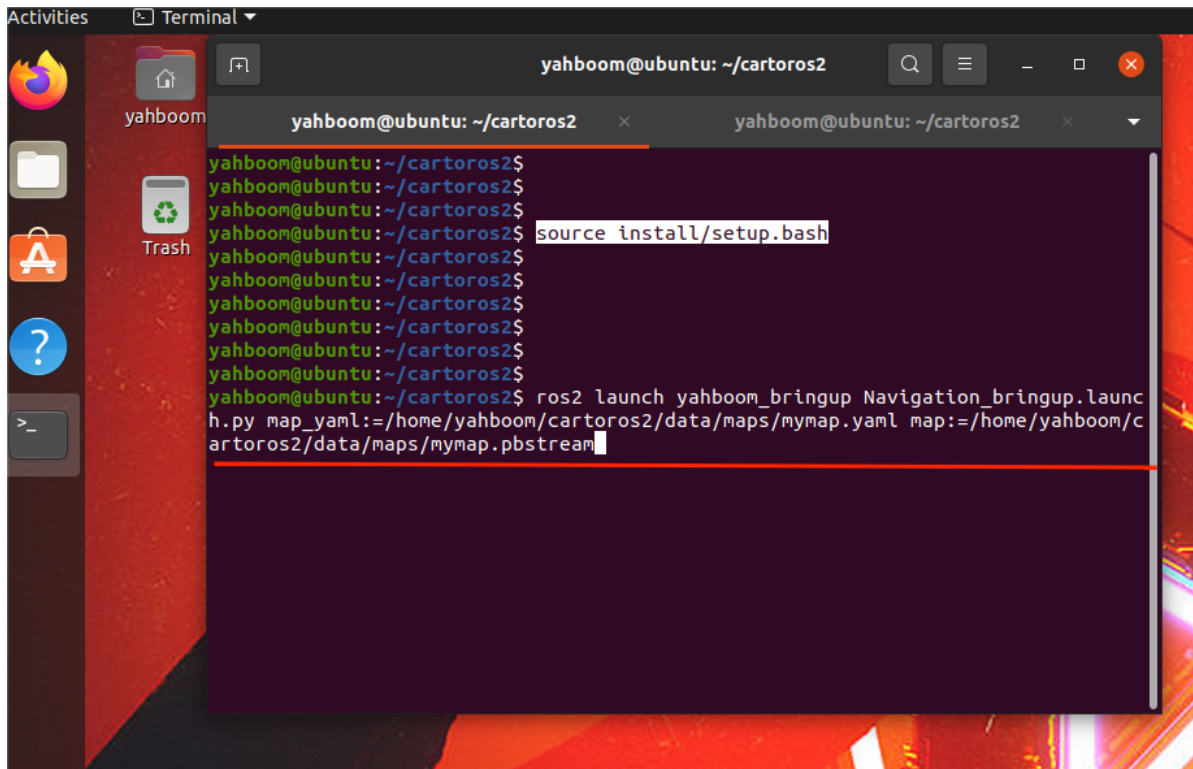
## 4. Launch navigation

Then press the shortcut key: ctrl + shift + t

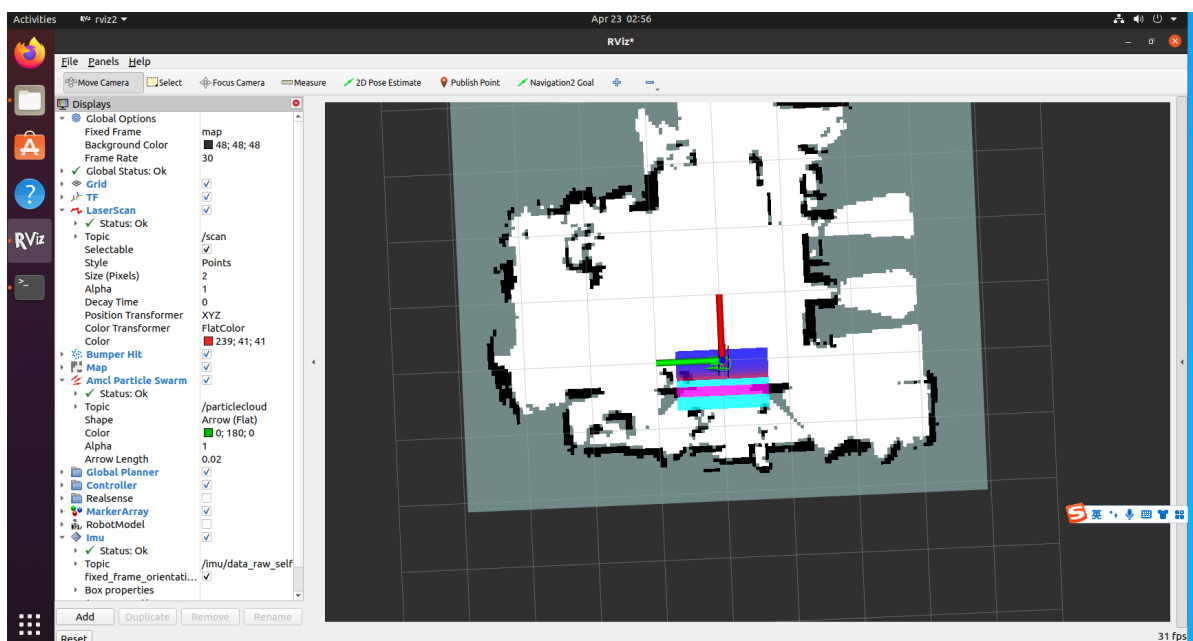
In the newly opened terminal enter the command

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

```
ros2 launch yahboom_bringup Navigation_bringup.launch.py  
map_yaml:=/home/yahboom/cartoros2/data/maps/mymap.yaml  
map:=/home/yahboom/cartoros2/data/maps/mymap.pbstream
```



Then pressing the enter key can will allow you to navigate.



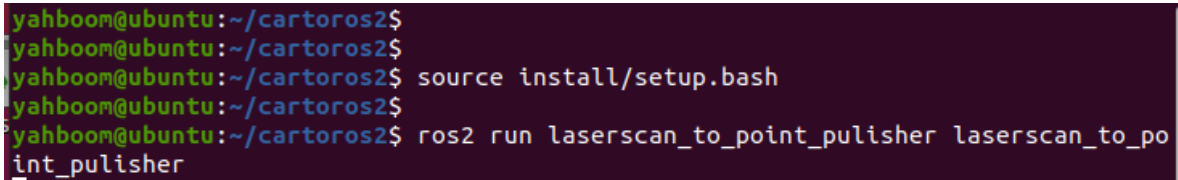
Press the enter key, at this time the robot dog urdf is activated.

## 5. APP control robot dog walking and navigation

Click the terminal and press the shortcut key: ctrl + shift + t

In the terminal, enter the command to start the point cloud publishing node:

```
source install/setup.bash
ros2 run laserscan_to_point_publisher laserscan_to_point_publisher
```

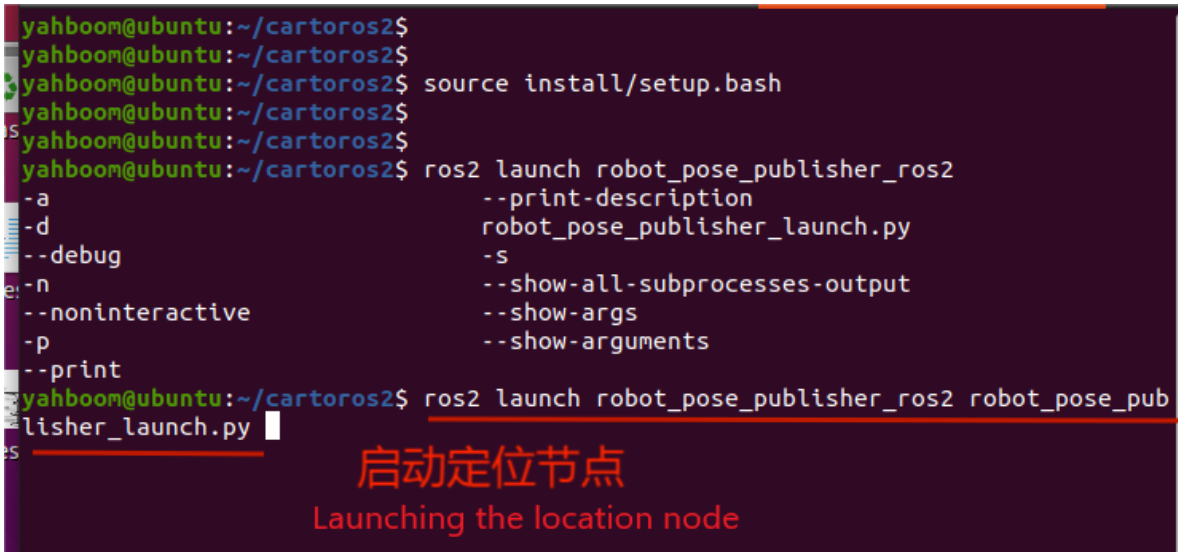


```
yahboom@ubuntu:~/cartoros2$
yahboom@ubuntu:~/cartoros2$
yahboom@ubuntu:~/cartoros2$ source install/setup.bash
yahboom@ubuntu:~/cartoros2$
yahboom@ubuntu:~/cartoros2$ ros2 run laserscan_to_point_publisher laserscan_to_point_publisher
```

Click on the terminal and press the shortcut key: ctrl + shift + t

Enter the command in the terminal to launch the Locate Publishing node:

```
source install/setup.bash
ros2 launch robot_pose_publisher_ros2 robot_pose_publisher_launch.py
```



```
yahboom@ubuntu:~/cartoros2$
yahboom@ubuntu:~/cartoros2$
yahboom@ubuntu:~/cartoros2$ source install/setup.bash
yahboom@ubuntu:~/cartoros2$
yahboom@ubuntu:~/cartoros2$ ros2 launch robot_pose_publisher_ros2
-a --print-description
-d robot_pose_publisher_launch.py
--debug -s
--show-all-subprocesses-output
--noninteractive --show-args
-p --show-arguments
--print
yahboom@ubuntu:~/cartoros2$ ros2 launch robot_pose_publisher_ros2 robot_pose_publisher_launch.py
```

启动定位节点  
Launching the location node

Click on the terminal and press the shortcut key: ctrl + shift + t.

In the terminal, enter the command to remotely connect to the Mechanical Dog, the current Mechanical Dog and the virtual machine are in the same LAN, the IP of the Mechanical Dog is: 192.168.2.79, in practice, it depends on the specific IP address of your own Mechanical Dog.

```
ssh -p 22 pi@192.168.2.79
```

Press enter and type yes, then enter the login password of Robotics Dog: yahboom.



```
yahboom@ubuntu:~/cartoros2$  
yahboom@ubuntu:~/cartoros2$ ssh -p 22 pi@192.168.2.79  
The authenticity of host '192.168.2.79 (192.168.2.79)' can't be established.  
ECDSA key fingerprint is SHA256:nnxe1N28uLZhcJSY+K9f1Yh8oUcGfNSxKAcZhlVz79o  
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes  
Warning: Permanently added '192.168.2.79' (ECDSA) to the list of known hosts.  
pi@192.168.2.79's password:  
Welcome to Ubuntu 20.04.4 LTS (GNU/Linux 5.4.0-1089-raspi aarch64)  
  
* Documentation:  https://help.ubuntu.com  
* Management:    https://landscape.canonical.com  
* Support:       https://ubuntu.com/advantage  
  
System information as of Wed 05 Jul 2023 08:06:45 PM CST  
  
System load:  1.47           Temperature:   80.3 C  
Usage of /:   43.3% of 58.22GB Processes:    265  
Memory usage: 17%          Users logged in: 1
```

远程登陆机械狗

Remote Login Mechanical Dog

Then enter the command to start the camera in the terminal:

```
ros2 launch usb_cam demo_launch.py
```

```
pi@yahboom:~$  
pi@yahboom:~$ ros2 launch usb_cam demo_launch.py  
[INFO] [launch]: All log files can be found below /home/pi/.ros/log/2023-07-05-20-13-03-911670-yahboom-89445  
[INFO] [launch]: Default logging verbosity is set to INFO  
/opt/ros/foxy/share/usb_cam/config/params.yaml  
[INFO] [usb_cam_node_exe-1]: process started with pid [89529]  
[usb_cam_node_exe-1] [INFO] [1688559184.442941567] [usb_cam]: camera_name value: test_camera  
[usb_cam_node_exe-1] [WARN] [1688559184.443275107] [usb_cam]: framerate: 30.000000  
[usb_cam_node_exe-1] [INFO] [1688559184.461739301] [usb_cam]: camera calibration URL: package://usb_cam/config/camera_info.yaml  
[usb_cam_node_exe-1] [INFO] [1688559184.464124605] [usb_cam]: Starting 'test_camera' (/dev/video0) at 640x480 via mmap (mjpeg2rgb) at 30 FPS  
[usb_cam_node_exe-1] [swscaler @ 0xaaaf30867f0] No accelerated colorspace conversion found from yuv422p to rgb24.  
[usb_cam_node_exe-1] [INFO] [1688559184.545634240] [usb_cam]: This devices support
```

启动相机节点

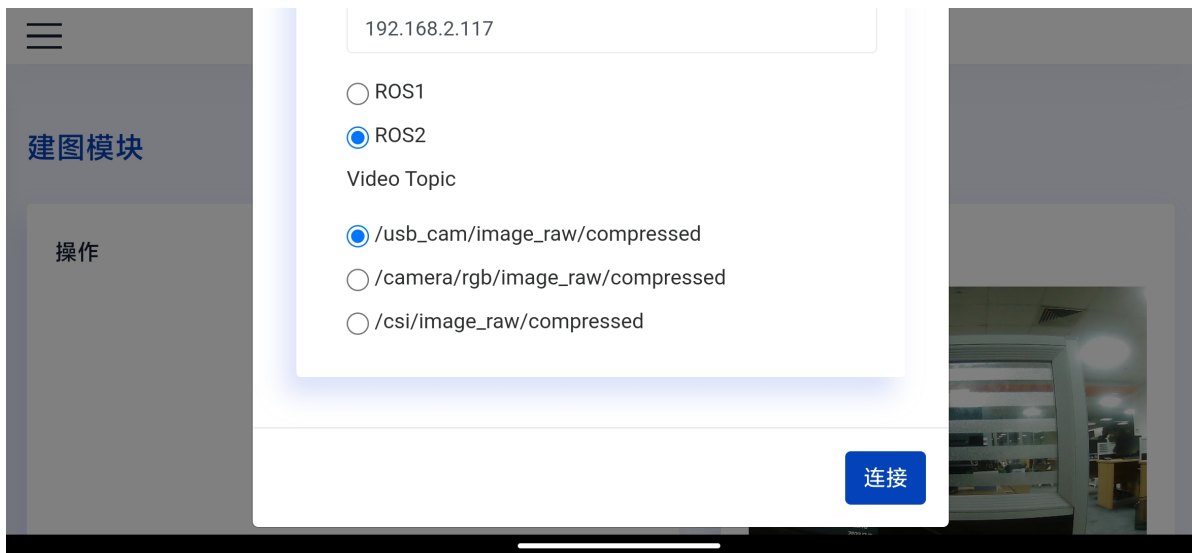
Starting the camera node

Open mobile app ROS Robot



Enter the IP address of the VM, take the current VM IP as: 192.168.2.117 as an example, and also select the camera topic of the Mechanical Dog as /usb\_cam/image\_raw/compress and select ros2.

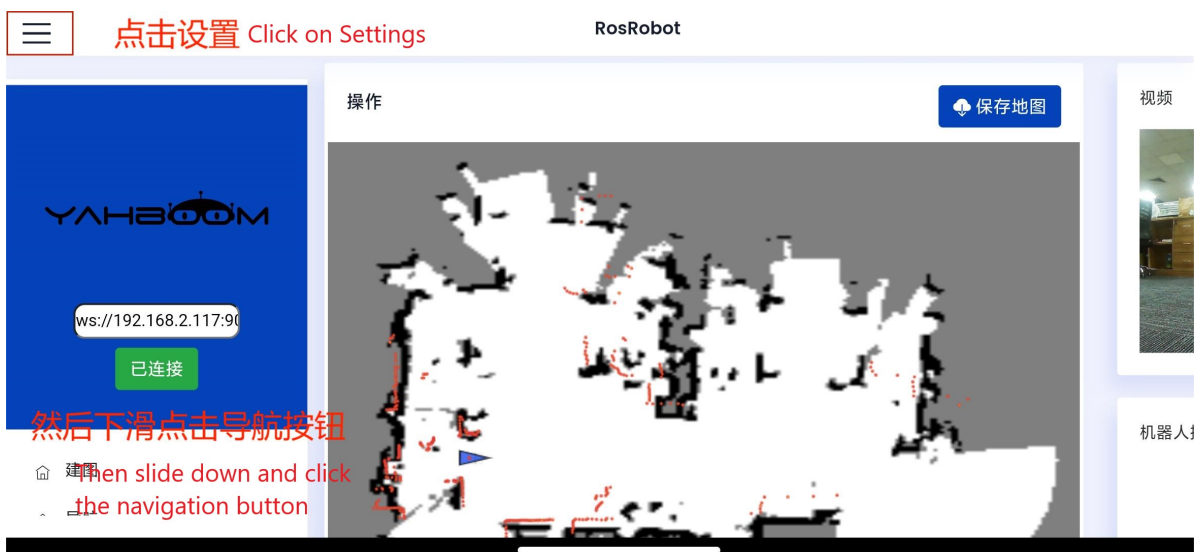
Then scroll down a bit and click Connect.



Once you enter the map screen, you can see the map of the radar scan as well as the camera feed.



Click the Settings button to slide down the pop-up screen and click the Navigation button.



The following picture shows the screen to enter the navigation mode





Then click a target point on the underground and the robot dog can navigate normally. Where the yellow line bit navigation path.

