2. Multi-robot queue performance(Optional)

Tips: Transbot SE packing list didn't include handle, if you need complete this function, please purchase handles additionally.

Handle Link: https://category.yahboom.net/products/usb-ps2

2.1 Achievement effect

After running this program, multiple transbot se will move according to the track we programmed and recorded before, excluding the movement of the robotic arm.

2.2 Preparations before implementation

Before realizing this function, it is necessary to allow the virtual machine and transbot se to realize multi-machine communication, let transbot se act as a slave, and the virtual machine act as a host. As the central conductor, the virtual machine issues instructions to run performances. Let's take two transbot se as an example to demonstrate this function.

2.3 Record the running track of transbot se1

2.3.1 virtual machine side

1. Start the roscore

```
roscore
```

2. Start the handle control node

```
roslaunch transbot_ctrl transbot_joy_multi_move.launch namespace:=robot1
```

2.3.2 transbot se1

1), start transbot1 chassis control node

jetson motherboard/Raspberry Pi 4B

```
roslaunch transbot_mulity transbot_mulity_control.launch namespace:=robot1
```

Raspberry Pi 5

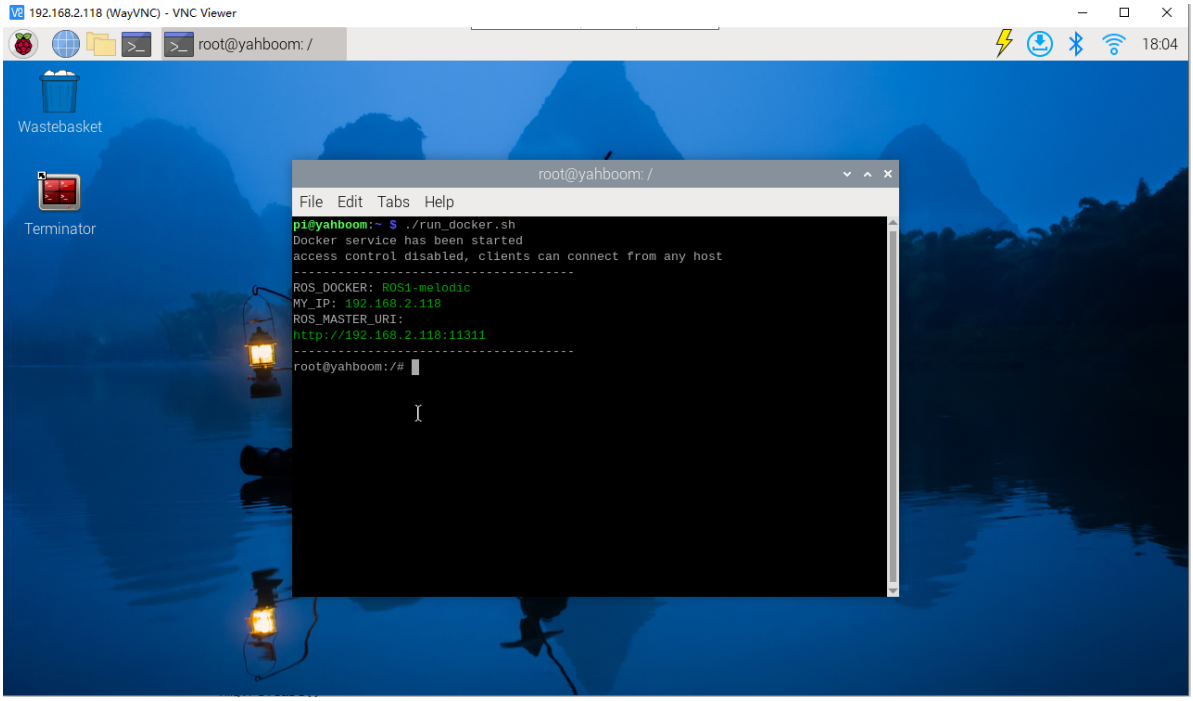
Before running, please confirm that the large program has been permanently closed

Enter docker

Note: If there is a terminal that automatically starts docker, or there is a docker terminal that has been opened, you can directly enter the docker terminal to run the command, and there is no need to manually start docker

Start docker manually

```
./run_docker.sh
```




```
roslaunch transbot_mulity transbot_mulity_control.launch namespace:=robot1
```

2.3.3. Start recording

In a new terminal of the virtual machine type

```
rosbag record /robot1/cmd_vel
```

This command will record the speed of transbot se1 at each moment, press ctrl+c after the recording, and a bag file named with the suffix .bag and the recording start time will be generated in the /home/yahboom directory.

```
1[ INFO] [1681283702.151758611]: Subscribing to /robot1/cmd_vel
1[ INFO] [1681283702.155487885]: Recording to '2023-04-12-15-15-02.bag'.
```

2.4 Record the running track of transbot se2

For the recording method, refer to 2.3, just replace robot1 with robot2.

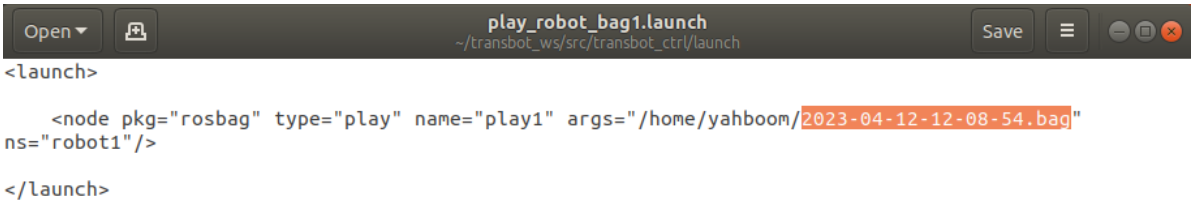
more bots and so on

2.5 Modify the launch file

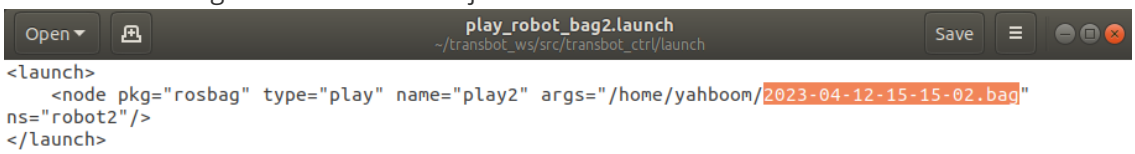
launch file location:

```
/home/yahboom/transbot_ws/src/transbot_ctrl/launch/play_robot_bag1.launch
/home/yahboom/transbot_ws/src/transbot_ctrl/launch/play_robot_bag2.launch
```

1. In play_robot_bag1.launch, replace the .bag file inside with the .bag file generated when transbot1 running track was recorded just now



2. In play_robot_bag2.launch, replace the .bag file inside with the .bag file generated when transbot2 running track was recorded just now



3. More robots can create more play_robot_bag.launch files in the /home/yahboom/transbot_ws/src/transbot_ctrl/launch/ directory. Refer to the launch files of robot1 and robot2 for the naming method and content.

2.6 Start

2.6.1 If you want robot1 and robot2 to start separately

Start robot1, enter the virtual machine terminal,

```
roslaunch transbot_ctrl play_robot_bag1.launch
```

Start robot2, virtual machine terminal input

```
roslaunch transbot_ctrl play_robot_bag2.launch
```

More bots and so on.

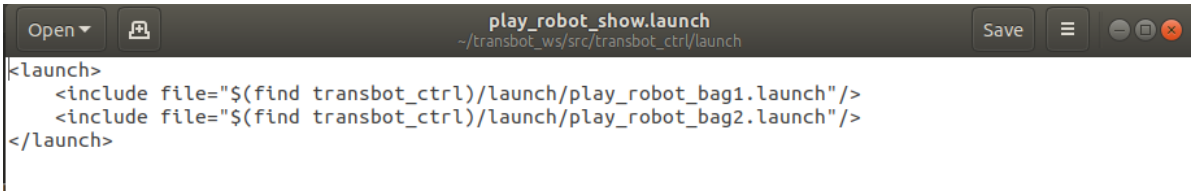
2.6.2 If you want to start all at once, enter the virtual machine terminal

```
roslaunch transbot_ctrl play_robot_show.launch
```

If you want to start more than 2 robots, you need to modify the files in the following directory

```
/home/yahboom/transbot_ws/src/transbot_ctrl/launch/play_robot_show.launch
```

Refer to the contents of robot1 and robot2 to add the robots that need to be started.



2.7 Actual effect

After starting, the transbot se will move according to the previously recorded trajectories.

2.8 Realization principle

Use the rosbag record to record the speed of each car at each moment, and then use the rosbag play command to play the data packets. At this time, each car will receive the speed command and move according to the original trajectory.

2.8.1 Introduction to rosbag

The commonly used commands of rosbag are as follows (fix and filter are not used for the time being):

- `record`: Record a bag package with the specified topic, you can record the contents of multiple topics in one package
- `info`: Display basic information about a bag, such as which topics are included
- `play`: Play back one or more bag packages
- `check`: Check whether a bag can be played back and migrated in the current system
- `compress`: Compress one or more bag packages
- `decompress`: Unzip one or more bag packages
- `reindex`: Reindex one or more broken bags