2、Lidar avoiding

Function package：~/transbot_ws/src/transbot_laser

Introduction of lidar obstacle avoidance:

- Set lidar detection angle and response distance
- After turning on the robot, the trolley drives in a straight line without obstacles
- Based on the robot, determine the direction of the obstacle (front left, front right, straight ahead)
- Let the robot react according to the position of the obstacle (turn left, turn right, turn left for long time, turn right for long time)

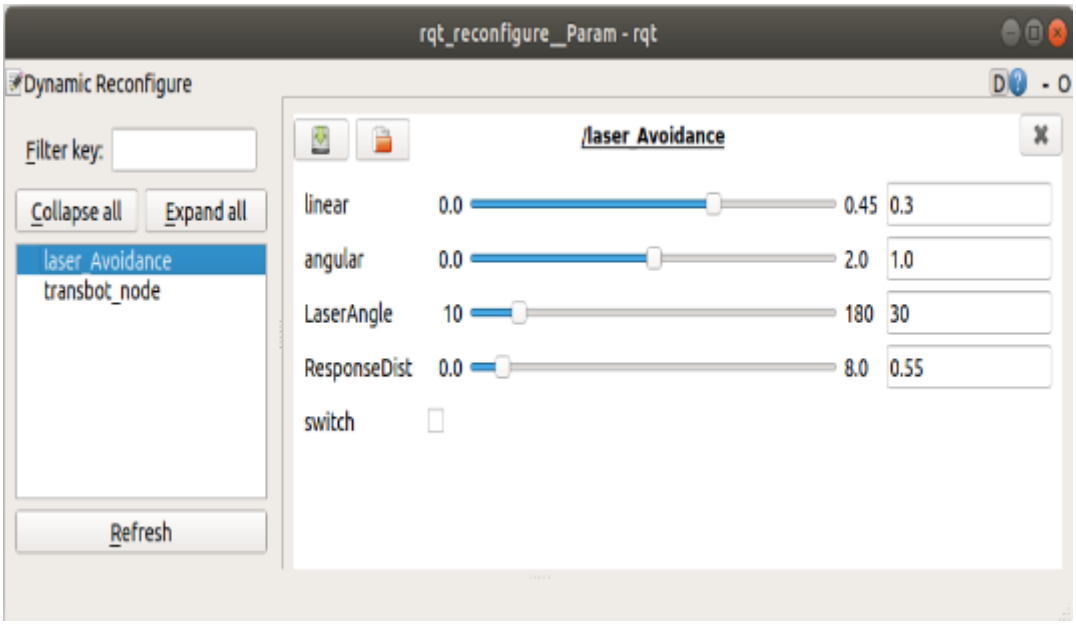
2.1、Instructions

Start up

```
roslaunch transbot_laser laser_Avoidance.launch
```

Dynamic debugging parameters

```
rosrun rqt_reconfigure rqt_reconfigure
```



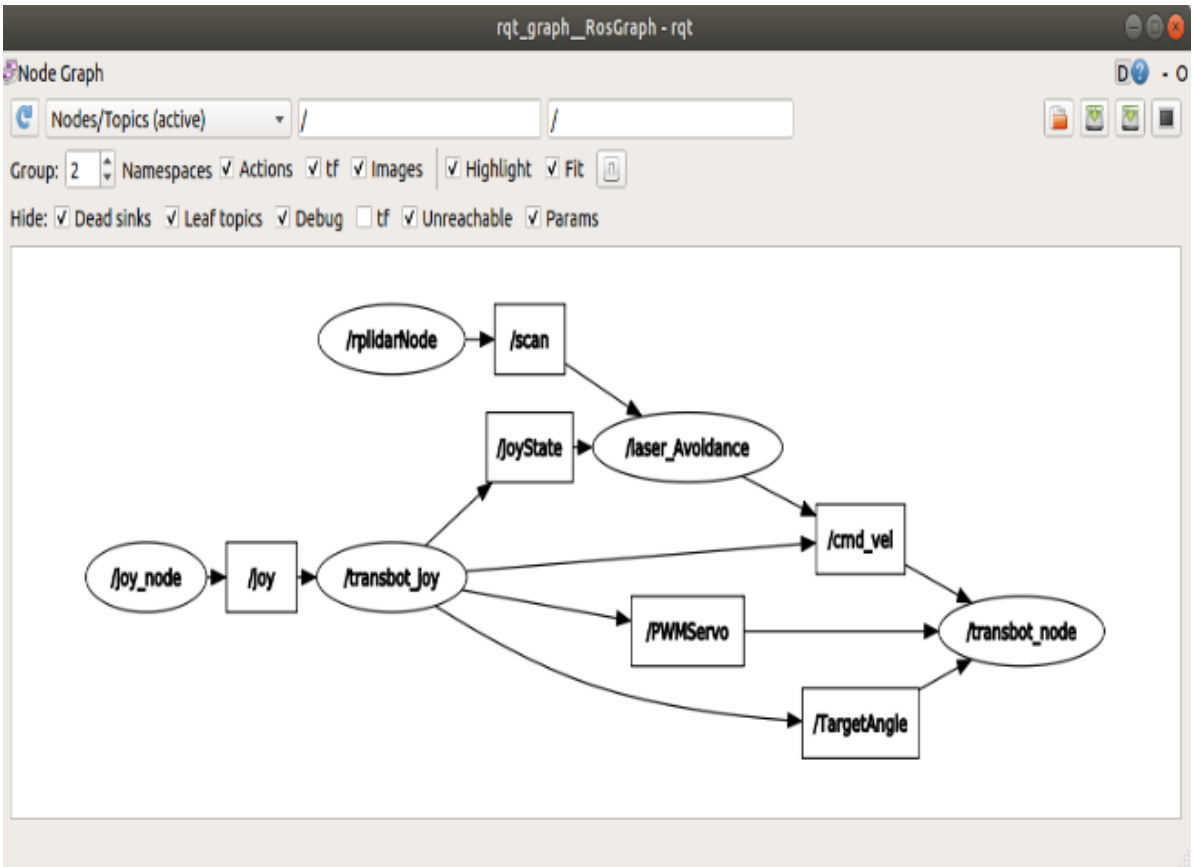
Parameter analysis:

Parameter	Range	Analysis
【linear】	【0.0，0.45】	Linear speed of robot
【angular】	【0.0，2.0】	Angular speed of robot
【LaserAngle】	【10，180】	Lidar detection angle (angle of left and right side)
【ResponseDist】	【0.0，8.0】	Robot response distance
【switch】	【False，True】	Robot movement【start/pause】

[Switch] Click the box in front of [switch], the value of [switch] is True, and the car will stop.
[Switch] The default is False, and the car moves.

View node

```
rqt_graph
```



2.2、Source code analysis

launch file

- base.launch

```
<launch>
    <!-- Start the lidar node-->
    <include file="$(find rplidar_ros)/launch/rplidar.launch"/>
    <!-- Dynamic debugging tool node -->
<!--    <node pkg="rqt_reconfigure" type="rqt_reconfigure" name="rqt_reconfigure"
output="screen"/>-->
    <!-- Start the car chassis drive node-->
    <node pkg="transbot_bringup" type="transbot_driver.py" name="transbot_node"
required="true" output="screen">
        <param name="imu" value="/transbot/imu"/>
        <param name="vel" value="/transbot/get_vel"/>
    </node>
    <!-- Handle control node -->
    <include file="$(find transbot_ctrl)/launch/transbot_joy.launch"/>
</launch>
```

- laser_Avoidance.launch

```
<launch>
    <!-- Start base.launch file-->
    <include file="$(find transbot_laser)/launch/base.launch"/>
    <!-- Start the lidar obstacle avoidance node -->
    <node name='laser_Avoidance' pkg="transbot_laser" type="laser_Avoidance.py"
required="true" output="screen"/>
</launch>
```

py code：~/transbot_ws/src/transbot_laser/scripts/laser_Avoidance.py

```
        if self.front_warning > 10 and self.Left_warning > 10 and
self.Right_warning > 10:
            # print ('1、turn right')
            ... ...
        elif self.front_warning > 10 and self.Left_warning <= 10 and
self.Right_warning > 10:
            # print ('2、turn left')
            ... ...
            if self.Left_warning > 10 and self.Right_warning <= 10:
                # print ('3、turn right')
                ... ...
        elif self.front_warning > 10 and self.Left_warning > 10 and
self.Right_warning <= 10:
            # print ('4、turn right')
            ... ...
            if self.Right_warning <= 10 and self.Left_warning > 10:
                # print ('5、turn left')
                ... ...
        elif self.front_warning > 10 and self.Left_warning < 10 and
self.Right_warning < 10:
            # print ('6、turn right')
            ... ...
        elif self.front_warning < 10 and self.Left_warning > 10 and
self.Right_warning > 10:
            # print ('7、turn right')
            ... ...
        elif self.front_warning < 10 and self.Left_warning > 10 and
self.Right_warning <= 10:
```

```
            # print ('8、turn right')
            ... ...
        elif self.front_warning < 10 and self.Left_warning <= 10 and
self.Right_warning > 10:
            # print ('9、turn left')
            ... ...
        else:
            # print ('10、advance')
            ... ...
```

According to the obstacle, the position of appearance, set up the different state of the trolley.

Source code parameter analysis:

Parameter	Defaults value	Judgment
self.front_warning	Defaults is 0	When the value is greater than 10, there is an obstacle ahead.
self.Left_warning	Defaults is 0	When the value is greater than 10, there is an obstacle in the front left.
self.Right_warning	Defaults is 0	When the value is greater than 10, there is an obstacle in the front right.