Guard

1. Programme function description

After the programme starts, the trolley will track the target of the nearest point, when the target point moves laterally, it will move with the target point, when the target point is close to the trolley and less than the set distance, there will be a voice reminder until the target point is far away from the trolley's set distance.

2. Programme Code Reference Path

The location of the source code of this function is located at.

```
/home/pi/cartographer_ws2/src/yahboom_laser/laser_Warning_xgo_RS200.py
```

3. Program startup

3.1 Start command

Mechanical dog chassis and lidar has been set to boot self-start, if you find that it did not start please enter in the terminal.

```
sudo systemctl restart YahboomStart.service
```

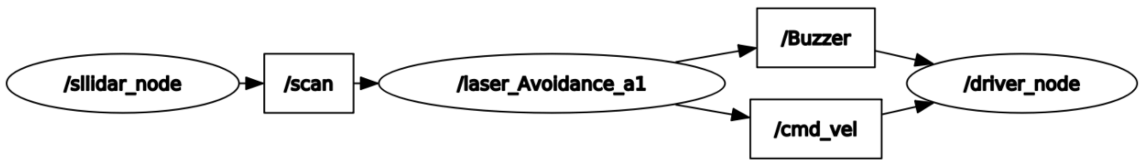
If the lidar and chassis start-up is complete then you need to enter it in the terminal:

```
cd /home/pi/cartographer_ws2
source install/setup.bash
# Activate lidar obstacle avoidance procedures lidar MS200
ros2 run yahboom_laser laser_Warning_RS200
```

3.2 Viewing the topic communication node map

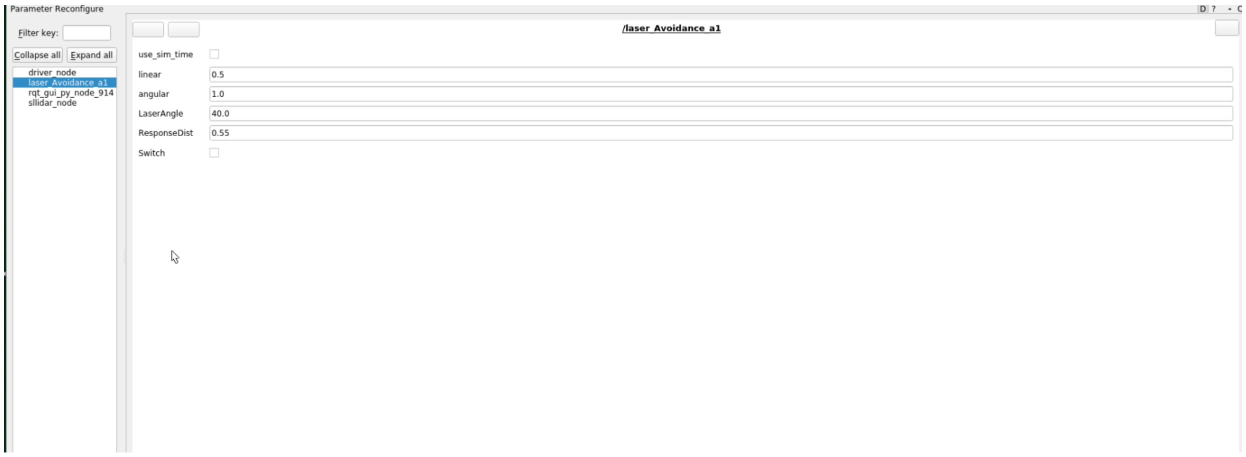
Terminal input.

```
ros2 run rqt_graph rqt_graph
```



It is also possible to set the size of the parameter, the terminal input, by means of a dynamic parameter regulator, the

```
ros2 run rqt_reconfigure rqt_reconfigure
```


Parameter Reconfigure

Filter key:

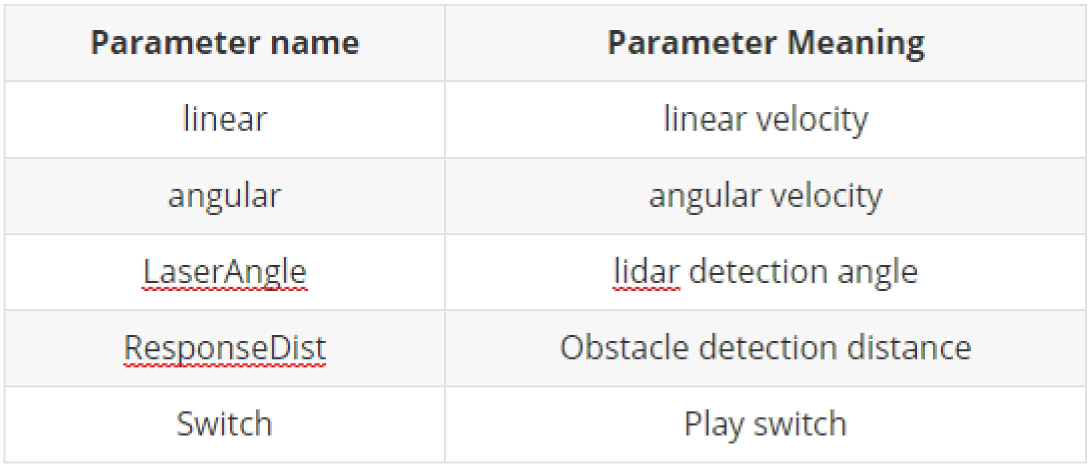
Collapse all | Expand all

driver_node
laser_Avoidance_a1
rqt_gui_py_node_914
sllidar_node

/laser_Avoidance_a1

use_sim_time ☐
linear 0.5
angular 1.0
LaserAngle 40.0
ResponseDist 0.55
Switch ☐

The meaning of each parameter is as follows.



Parameter name	Parameter Meaning
linear	linear velocity
angular	angular velocity
LaserAngle	lidar detection angle
ResponseDist	Obstacle detection distance
Switch	Play switch

4. Core source code analysis

Mainly look at the lidar's callback function, here explains how to get to each angle of the obstacle distance information, and then get the ID of the minimum distance, calculate the size of the angular velocity, and then the minimum distance and the set distance to compare, if it is less than the set distance, then let the buzzer ring, and finally release the speed topic data.

```
for i in range(len(ranges)):
    angle = (scan_data.angle_min + scan_data.angle_increment * i) * RAD2DEG
    if abs(angle) > (180 - self.LaserAngle):
        minDistList.append(ranges[i])
        minDistIDList.append(angle)
        if len(minDistList) == 0: return
    minDist = min(minDistList)
    minDistID = minDistIDList[minDistList.index(minDist)]
    if self.Joy_active or self.Switch == True:
        if self.Moving == True:
            self.pub_vel.publish(Twist())
```

```python
                self.Moving = not self.Moving
                return
         self.Moving = True
        if minDist <= self.ResponseDist:
            if self.Buzzer_state == False:
                b = Bool()
                b.data = True
                self.pub_Buzzer.publish(b)
                self.Buzzer_state = True
            else:
                if self.Buzzer_state == True:
                    self.pub_Buzzer.publish(Bool())
                    self.Buzzer_state = False
        velocity = Twist()
        ang_pid_compute = self.ang_pid.pid_compute((180 - abs(minDistID)) / 36, 0)
        if minDistID > 0: velocity.angular.z = -ang_pid_compute
        else: velocity.angular.z = ang_pid_compute
        if ang_pid_compute < 0.02: velocity.angular.z = 0.0
        self.pub_vel.publish(velocity)
```