4. Voice control of car color tracking

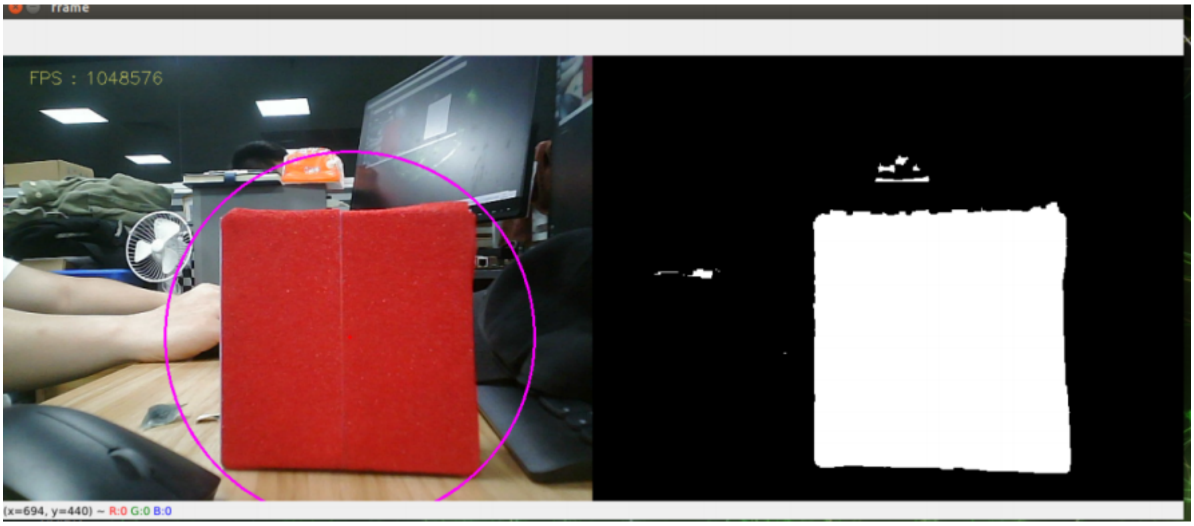
This course requires the combination of Rosmaster-X3 car hardware, and only code analysis is done here. First, let's look at the built-in voice commands,

Function words	Speech recognition module results	Voice broadcast content
Start tracking yellow	72	OK, start tracking yellow
Start tracking red	73	OK, start tracking red
Start tracking green	74	OK, start tracking green
Start tracking blue	75	OK, start tracking blue
Cancel Tracking	76	OK, Cancel Tracking

1. Program startup

Terminal input,

```
#Start the handle control node
ros2 run yahboomcar_ctrl yahboom_joy_X3
ros2 run joy joy_node
#Start the voice control color tracking node
ros2 run yahboomcar_voice_ctrl Voice_Ctrl_colorHSV
ros2 run yahboomcar_voice_ctrl Voice_Ctrl_colorTracker
#Start the car chassis
ros2 run yahboomcar_voice_ctrl Voice_Ctrl_Mcnamu_driver_X3
#Start the depth camera and get the depth image
ros2 launch astra_camera astra.launch.xml
```



Take tracking red as an example. After waking up the module, tell it "start tracking red" and press the R2 button on the remote control. After receiving the command, the program starts processing the image, then calculates the center coordinates of the red object and publishes the center coordinates of the object; combines the depth information provided by the depth camera, calculates the speed, and finally publishes it to drive the car.

2. Core code

Code path: ~/driver_ws/src/yahboomcar_voice_ctrl/yahboomcar_voice_ctrl/Voice_Ctrl_colorHSV.py

This part mainly parses voice commands and image processing, and finally publishes the center coordinates.

```
#定义一个发布者，发布检测物体的中心坐标 Define a publisher to publish the center
coordinates of the detected object
self.pub_position = self.create_publisher(Position,"/Current_point", 10）
#导入语音驱动库 Import the voice driver library
from Speech_Lib import Speech
#创建语音控制对象 Creating a Voice Control Object
self.spe = Speech()
#以下是获取指令，然后对识别结果进行判断，加载相对应的HSV的值 The following is to obtain
the instruction, then judge the recognition result and load the corresponding HSV
value
command_result = self.spe.speech_read()
self.spe.void_write(command_result)
if command_result == 73 :
self.model = "color_follow_line"
print("tracker red")
self.hsv_range = [(0, 175, 149), (180, 253, 255)]
#处理图像，计算检测物体的中心坐标，进入execute函数，发布中心坐标 Process the image,
calculate the center coordinates of the detected object, enter the execute
function, and publish the center coordinates
rgb_img, binary, self.circle = self.color.object_follow(rgb_img, self.hsv_range)
if self.circle[2] != 0: threading.Thread(
    target=self.execute, args=(self.circle[0], self.circle[1],
self.circle[2])).start()
if self.point_pose[0] != 0 and self.point_pose[1] != 0: threading.Thread(
    target=self.execute, args=(self.point_pose[0],
self.point_pose[1], self.point_pose[2])).start()
```

Code path:
~/driver_ws/src/yahboomcar_voice_ctrl/yahboomcar_voice_ctrl/Voice_Ctrl_colorTracker.py

This part receives the topic data and depth data of the center coordinates, then calculates the speed and publishes it to the chassis.

```
#定义一个订阅者，订阅深度信息 Define a subscriber to subscribe to depth information
self.sub_depth = self.create_subscription(Image,"/camera/depth/image_raw",
self.depth_img_Callback, 1)
#定义一个订阅者，订阅中心坐标信息 Define a subscriber to subscribe to the center
coordinate information
self.sub_position =
self.create_subscription(Position,"/Current_point",self.positionCallback,1）
#回调者函数 Callback function
def positionCallback(self, msg)#获取中心坐标值 Get the center coordinates
def depth_img_Callback(self, msg) #获取深度信息 Get depth information
#传入中心坐标的X值以及深度信息，计算出速度发布给底盘 The X value of the center coordinate
and the depth information are passed in, and the speed is calculated and released
to the chassis.
def execute(self, point_x, dist)
```