

# QR code motion control

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Note: The VM and ROS-wifi image transfer module must be consistent with the microROS control board ROS\_DOMAIN\_ID and set the value to 20. You can check [MicroROS control board Parameter configuration] to set the microROS control board ROS\_DOMAIN\_ID. Check the tutorial Connecting to MicroROS Agents to see if the ids are the same.

## 1、Gameplay introduction

This course mainly uses the camera of the robot to obtain the picture of the camera, identify the two-dimensional code information, and control the robot movement according to the two-dimensional code information.

## 2、Program code reference path

After entering the docker container, the location of the feature source code is located,

```
/home/yahboom/yahboomcar_ws/src/yahboom_esp32ai_car/yahboom_esp32ai_car/qrTracker.py
```

## 3、Program initiation

### 3.1、Start command

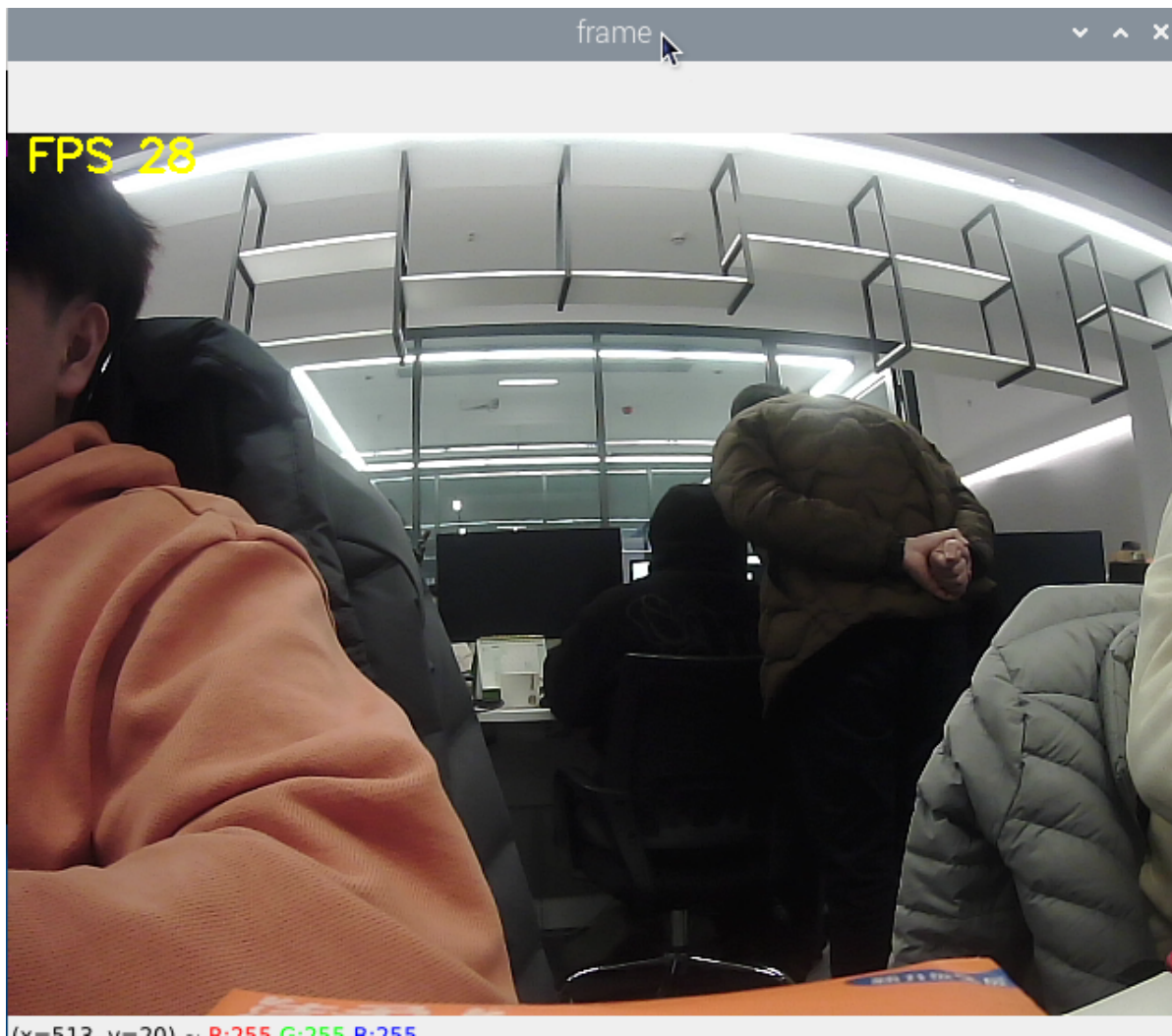
After entering the docker container, enter the terminal,

```
ros2 run yahboom_esp32ai_car qrTracker
```

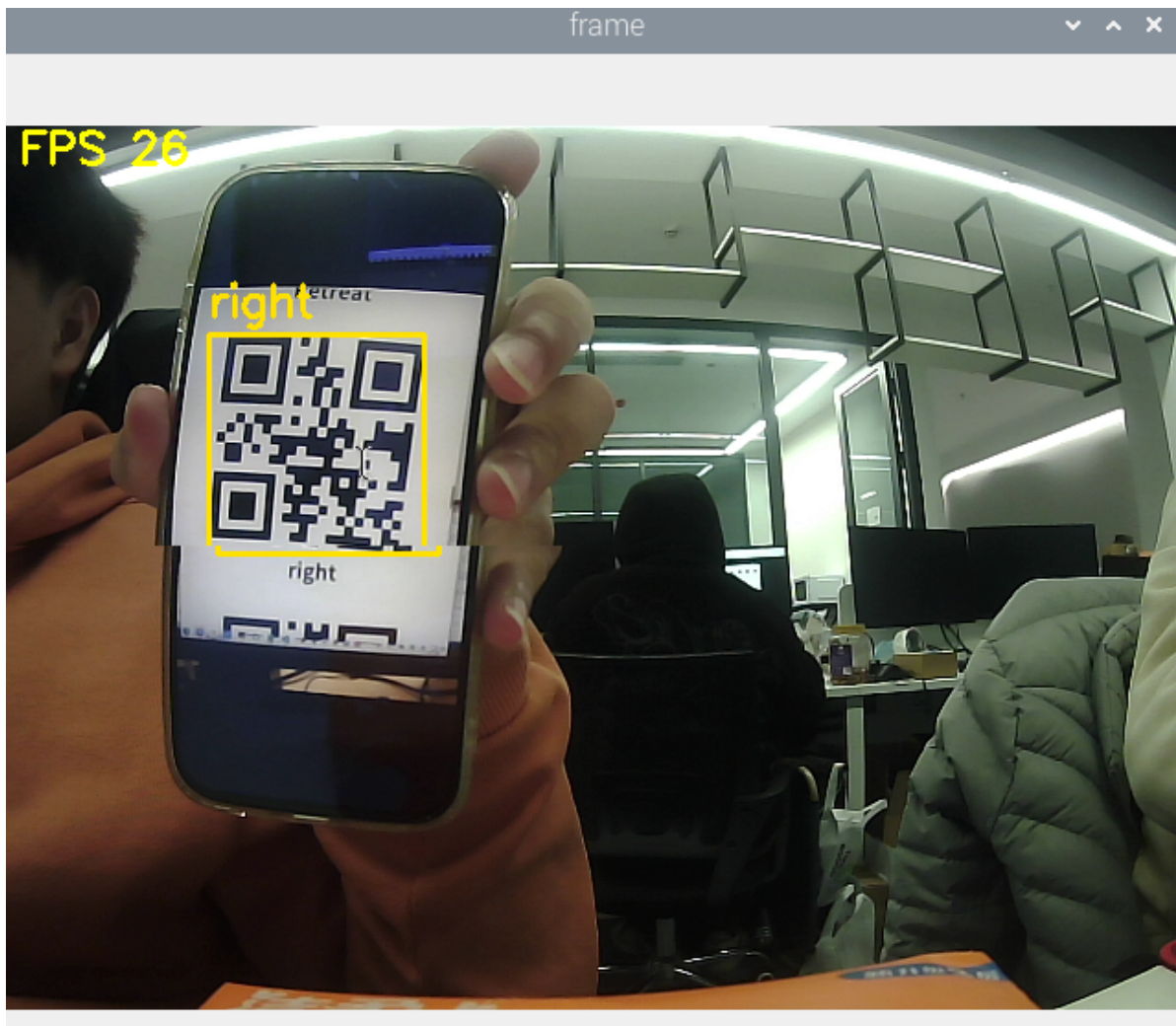
**If the Angle of the camera is not at this Angle, please press CTRL+C to end the program and run again, this is because the network delay causes the Angle of sending the steering gear to lose packets**

**If the camera picture image appears upside down, you need to see 3. Camera picture correction (must see) document itself correction, the experiment is no longer described.**

The camera screen is displayed successfully



Turn on the QR code and execute the command. At present, the QR code that can be recognized in the routine is QRCode, and the information is "forward" for forward, "back" for backward, "left" for left translation, "right" for right translation, and "stop" for stop. "turnleft" indicates left rotation, "turnright" indicates right rotation, and "stop" indicates stop.



Press q to turn off the camera.

## 4、Core code

Import two-dimensional code parsing library pyzbar

```
import pyzbar.pyzbar as pyzbar
from PIL import Image
```

If pyzbar is not installed, open the terminal and run the following command to install it.

The factory docker has already configured the environment, and this step is suitable for your own development.

```
pip3 install pyzbar
sudo apt install libzbar-dev
```

The gray image is analyzed, and the information of two-dimensional code and image position in the image are extracted. If there is no QR code in the image, the message is None.

```

def detect_qrcode(image):
    # 转为灰度图像 Convert to grayscale image
    gray = cv2.cvtColor(image, cv2.COLOR_BGR2GRAY)
    barcodes = pyzbar.decode(gray)
    for barcode in barcodes:
        # 提取二维码的数据和边界框的位置 The data of the QR code and the position of
        the bounding box are extracted
        (x, y, w, h) = barcode.rect
        barcodeData = barcode.data.decode("utf-8")
        barcodeType = barcode.type
        # print("[INFO] Found {} barcode: {}".format(barcodeType, barcodeData))
        car_control(barcodeData)
        return barcodeData, (x, y, w, h)
    return None, (0, 0, 0, 0)

```

Control robot movement according to the string command of info.

```

def robot_action(self, data):
    if data == "forward":
        self.pub_vel(0.3, 0.0, 0.0)
    elif data == "back":
        self.pub_vel(-0.3, 0.0, 0.0)
    elif data == "left":
        self.pub_vel(0.0, 0.0, 1.0)
    elif data == "right":
        self.pub_vel(0.0, 0.0, -1.0)
    elif data == "stop":
        self.pub_vel(0.0, 0.0, 0.0)
    elif data == "turnright":
        self.pub_vel(0.3, 0.0, -0.5)
    elif data == "turnleft":
        self.pub_vel(0.3, 0.0, 0.5)
    elif data == "stop":
        self.pub_vel(0.0, 0.0, 0.0)

```

Image processing program

```

ret, frame = capture.read()
action = cv2.waitKey(10) & 0xFF
payload, (x, y, w, h) = QRdetect.detect_qrcode(frame.copy())
if payload != None:
    cv2.rectangle(frame, (x, y), (x + w, y + h), (0, 225, 255), 2)
    cv2.putText(frame, payload, (x, y - 10),
cv2.FONT_HERSHEY_SIMPLEX, 0.8, (0, 225, 255), 2)
    QRdetect.robot_action(payload)
else:
    QRdetect.pub_vel(0.0, 0.0, 0.0)

```

**Appendix (QR code picture):**