Face recognition tracking

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、Program specification

After running the program, when the face is displayed in the picture, when there is a box surrounding the face, the PTZ camera will follow the movement of the face and move.

2、Operation procedure

Program code reference path：

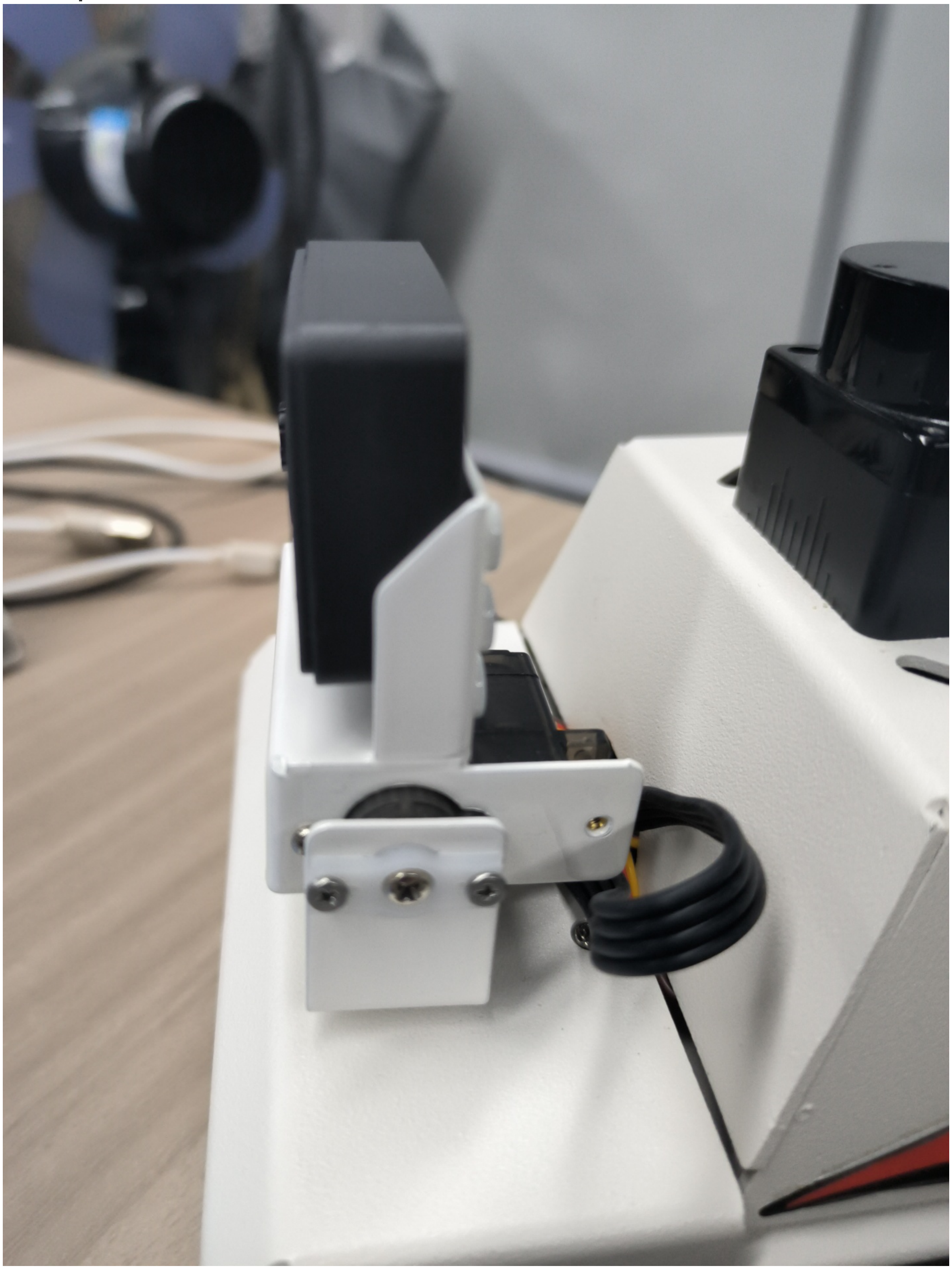
```
/home/yahboom/yahboomcar_ws/src/yahboom_esp32ai_car/yahboom_esp32ai_car/face_fllow.py
```

2.1、Start command

After entering the docker container, enter the terminal according to the actual vehicle type

```
ros2 run yahboom_esp32ai_car face_fllow
```

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

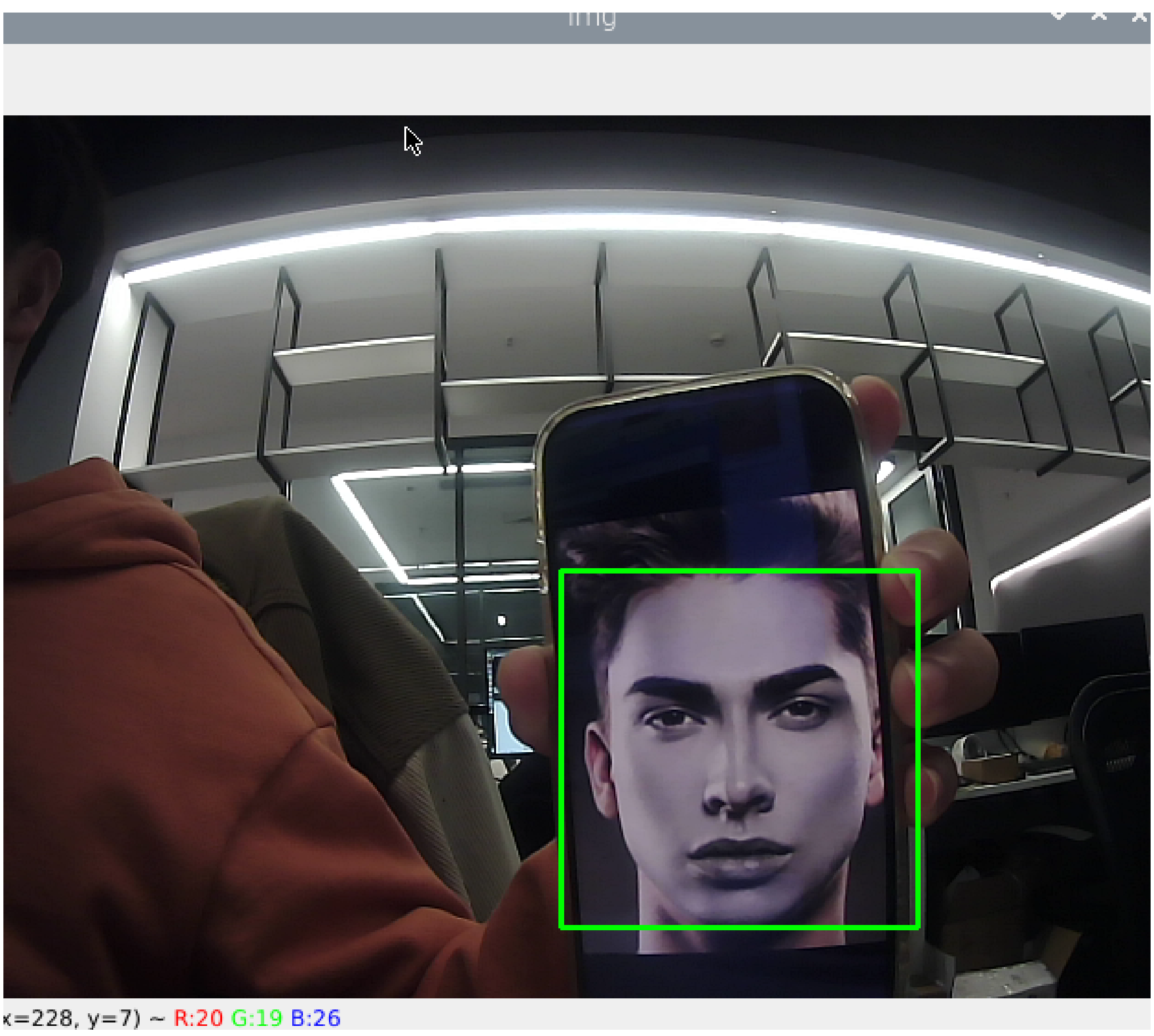


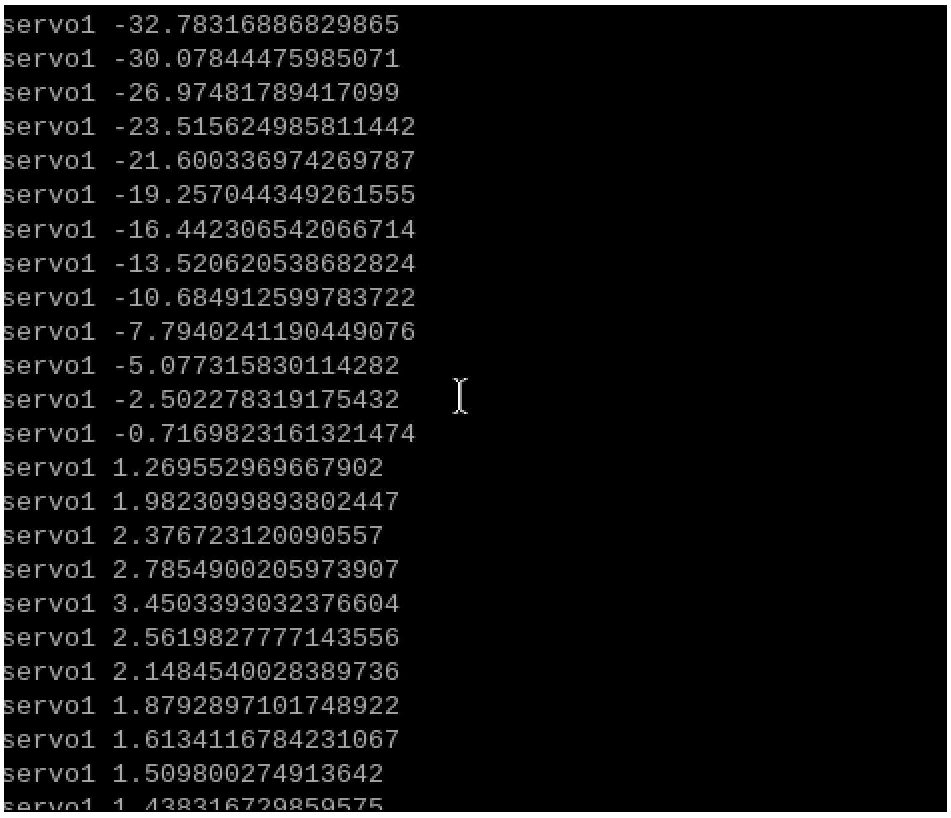
** If the camera picture image appears upside down **, you need to see** 3. Camera picture correction (must see)** document itself correction, the experiment is no longer described.

After the program starts, the following camera screen will appear,

(x=513, y=142) ~ R:93 G:105 B:101

When the face is recognized, the box is selected, and the two-dimensional head moves with the face, and the terminal prints the moving Angle



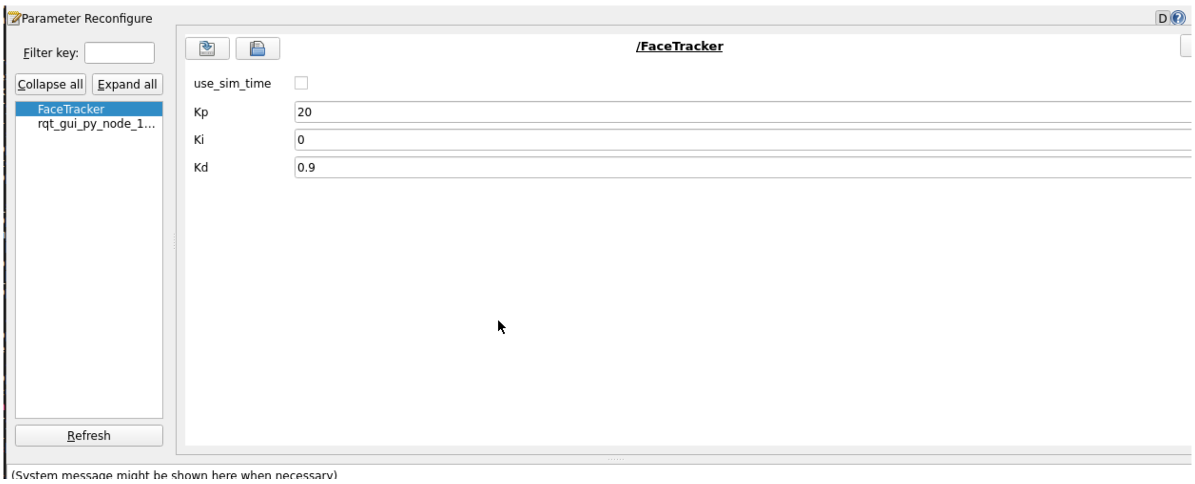


```
servo1 -32.78316886829865
servo1 -30.07844475985071
servo1 -26.97481789417099
servo1 -23.515624985811442
servo1 -21.600336974269787
servo1 -19.257044349261555
servo1 -16.442306542066714
servo1 -13.520620538682824
servo1 -10.684912599783722
servo1 -7.7940241190449076
servo1 -5.077315830114282
servo1 -2.502278319175432
servo1 -0.7169823161321474
servo1 1.269552969667902
servo1 1.9823099893802447
servo1 2.376723120090557
servo1 2.7854900205973907
servo1 3.4503393032376604
servo1 2.5619827777143556
servo1 2.1484540028389736
servo1 1.8792897101748922
servo1 1.6134116784231067
servo1 1.509800274913642
servo1 1.438316729859575
```

2.2、Dynamic parameter regulation

terminal input,

```
ros2 run rqt_reconfigure rqt_reconfigure
```


Parameter Reconfigure

Filter key:

Collapse all Expand all

FaceTracker
rqt_gui_py_node_1...

Refresh

/FaceTracker

use_sim_time
Kp 20
Ki 0
Kd 0.9

(System message might be shown here when necessary)

After modifying the parameters, click the blank area of the GUI to write the parameter value. As can be seen from the figure above,

- faceTracker The main adjustment PID three parameters to make the head more sensitive

3、Core code

3.1、face_fllow .py

The principle of functional implementation is similar to that of object tracking, which is to calculate the rotation Angle of the steering gear according to the central coordinates of the target, and then release it to the chassis, and part of the code is put under,

```

 cv.putText(frame, text, (20, 30), cv.FONT_HERSHEY_SIMPLEX, 0.9, (0, 0, 255), 1)
        face_patterns = 
cv2.CascadeClassifier('/home/yahboom/yahboomcar_ws/src/yahboom_esp32ai_car/yahboom_esp32ai_car/haarcascade_frontalface_default.xml')
        faces = face_patterns.detectMultiScale(frame , scaleFactor=1.1, 
minNeighbors=5, minSize=(100, 100))
        if len(faces)>0:
            for (x, y, w, h) in faces:
                m=x
                n=y
                cv2.rectangle(frame, (x, y), (x + w, y + h), (0, 255, 0), 2)
            self.execute(m,n)


 [x_Pid, y_Pid] = self.PID_controller.update([point_x - 320, point_y - 240])
        if self.img_flip == True:
            self.PWMServo_X += x_Pid
            self.PWMServo_Y += y_Pid
        else:
            self.PWMServo_X  -= x_Pid
            self.PWMServo_Y  += y_Pid
```

```python
        if self.PWMServo_X  >= 40:
            self.PWMServo_X  = 40
        elif self.PWMServo_X  <= -40:
            self.PWMServo_X  = -40
        if self.PWMServo_Y >= 40:
            self.PWMServo_Y = 40
        elif self.PWMServo_Y <= -90:
            self.PWMServo_Y = -90
```