1. Infrared line patrol of the car

1. Learning objectives

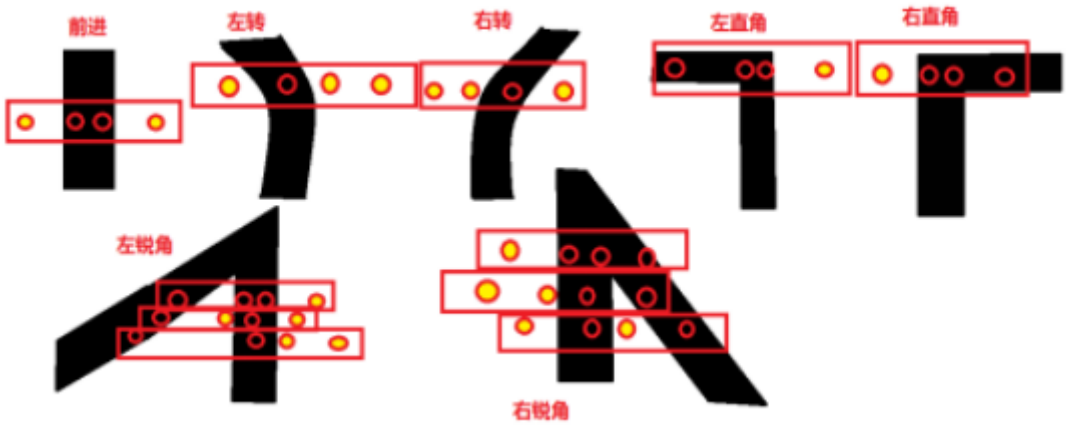
Take the Mailun car drive as an example, and combine the four-way line patrol module with the car to realize the car patrolling the black line.

2. Experimental preparation

1. The car wiring has been installed
2. Debug the four-way patrol module. Adjust the knob of the four-way tracking module so that the indicator light is on when encountering a black line; when it is not a black line, the indicator light is off.

3. Implementation principle

When detecting tracks of different shapes, the status of the four-way patrol sensor is as shown in the figure below. Control the car to perform different movements according to the sensor status.



4. Code Analysis

Source code path:

/home/pi/project_demo/05.Comprehensive_gameplay/1.infrared_patrol_line.ipynb

```
import sys
sys.path.append('/home/pi/project_demo/lib')
#导入麦克纳姆小车驱动库 Import Mecanum Car Driver Library
from McLumk_Wheel_Sports import *

speed =40
try:
```

```
    while True:
        # 从I2C读取巡线传感器数据 Read line sensor data from I2C
        track_data = bot.read_data_array(0x0a, 1)
        track = int(track_data[0])

        # 解析巡线传感器的状态 Analyze the status of the line patrol sensor
        x1 = (track >> 3) & 0x01
        x2 = (track >> 2) & 0x01
        x3 = (track >> 1) & 0x01
        x4 = track & 0x01
        """
        X2 X1 X3 X4
        |  |  |  |
        L1 L2 R1 R2
        """
        lineL1=x2
        lineL2=x1
        lineR1=x3
        lineR2=x4

        if lineL1 == 0 and lineL2 == 0 and lineR1 == 0 and lineR2 == 0:  # 都是黑色，加速前进 All black, speed up
            print("1")
            print(lineL1,lineL2,lineR1,lineR2)
            move_forward(int(speed*3/4))
        elif( (lineL2 == 0 or lineL1 == 0) and lineR2 == 0):#右锐角：右大弯,0表示检测到黑线 Right acute angle: right big bend, 0 means black line is detected
            print("2")
            print(lineL1,lineL2,lineR1,lineR2)
            rotate_right(speed)
            time.sleep(0.02)
        elif lineL1 == 0 and (lineR2 == 0 or lineR1 == 0):  # 左锐角或左大弯 Left sharp angle or left sharp bend
            print(lineL1,lineL2,lineR1,lineR2)
            rotate_left(int(speed*1.5))  # 左急转弯 Sharp left turn
            time.sleep(0.15)
        elif lineL1 == 0:  # 左最外侧检测 Left outermost detection
            print("4")
            print(lineL1,lineL2,lineR1,lineR2)
            rotate_left(speed)  # 左急转弯 Sharp left turn
            time.sleep(0.01)
        elif lineR2 == 0:  # 右最外侧检测 Right outermost detection
            print("5")
            print(lineL1,lineL2,lineR1,lineR2)
            rotate_right(speed)
            time.sleep(0.01)
        elif lineL2 == 0 and lineR1 == 1:  # 中间黑线上的传感器微调车左转 The sensor on the middle black line fine-tunes the car to turn left
            print("6")
            print(lineL1,lineL2,lineR1,lineR2)
            rotate_left(int(speed/3))  # 左转 Turn left
        elif lineL2 == 1 and lineR1 == 0:  # 中间黑线上的传感器微调车右转 The sensor on the middle black line fine-tunes the car to turn right
            print("7")
            print(lineL1,lineL2,lineR1,lineR2)
            rotate_right(int(speed/3)) #右转
        elif lineL2 == 0 and lineR1 == 0:  # 都是黑色，加速前进 All black, speed up
            print("8")
```

```
            print(lineL1,lineL2,lineR1,lineR2)
            move_forward(speed)

        # 等待一段时间再进行下一次检测 Wait for a while before the next test
        time.sleep(0.01)

except KeyboardInterrupt:
    # 当用户中断程序时，确保所有电机停止 Ensure that all motors stop when the user
interrupts the program
    stop()
    print("Ending")
```

5. Experimental results

We put the car on the patrol track, confirm that the module knob has been adjusted, and when it encounters a black line, the indicator light turns on. After running the code block, the car will patrol the black line.