

## 8. Raspberry Pi platform ----- light\_follow

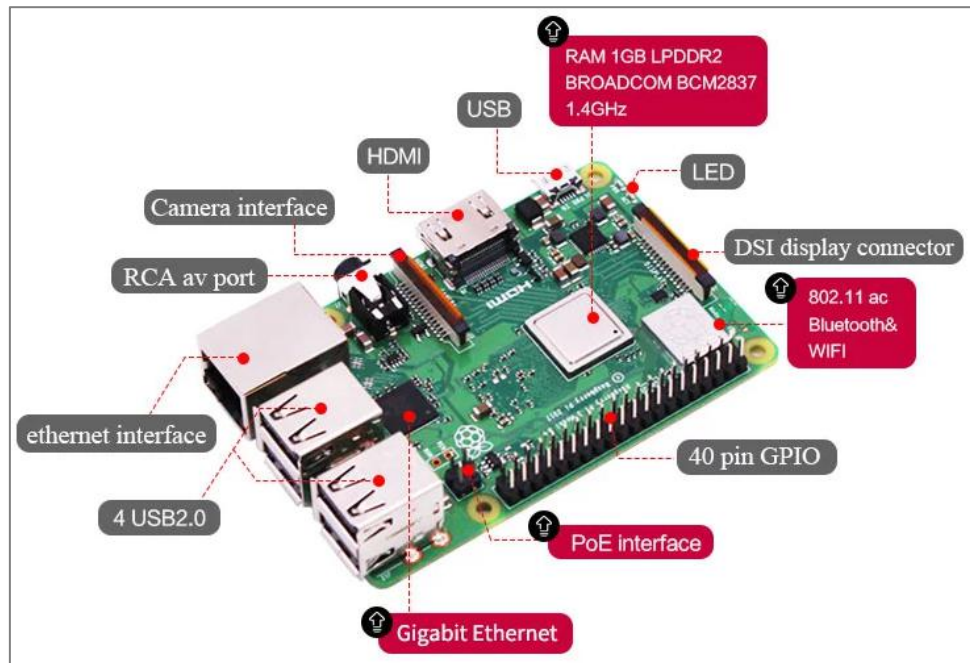
### Note:

A. Before this experiment, we can adjust the sensitivity of the infrared seeking-light by rotating the potentiometer on the infrared seeking-light module to achieve better experimental results. Please refer to the manual for specific operations.

B. This experiment needs to start the car by pressing the button KEY.

C. You need to remove the upper acrylic plate to ensure that the sensor can receive the light.

### 1) Preparation



1-1 Raspberry Pi board



1-2 Infrared obstacle avoidance module

### 2) Purpose of Experimental

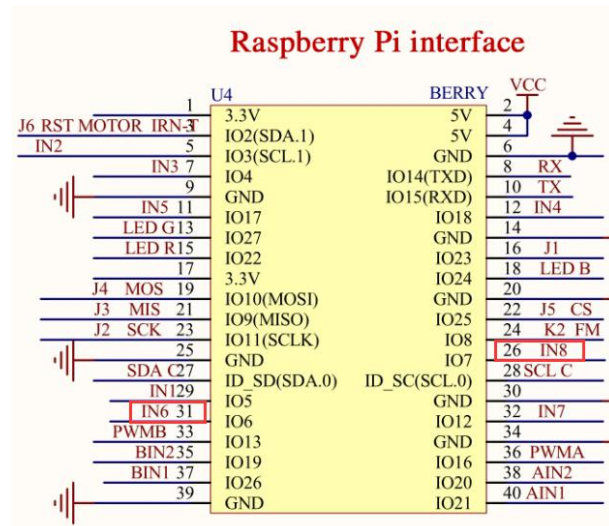
After running the light\_follow executable in the Raspberry Pi system, you need to press the K2 to start the car, and the light follow function is started. When both light-sensitive resistors detect light, the car advance; when there is light detected on the left side, the car turn left; when light is detected on the right side, the car turn right; when no light is detected on the left and right sides, the car stopped.

### 3) Principle of experimental

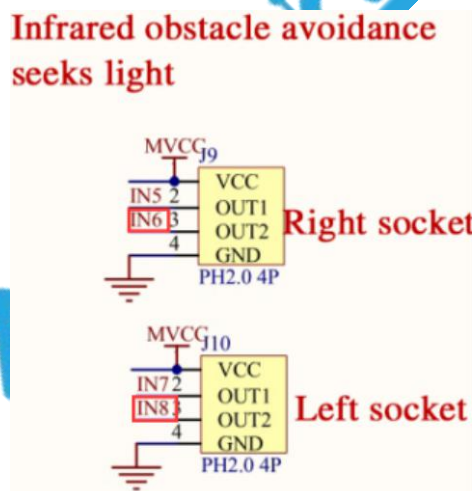
The photoresistor is a resistor made by utilizing the photo-conductivity of the semiconductor to change the resistance value according to the intensity of the incident light. The incident light intensity, the resistance is reduced, the incident light is weak, and the resistance is increased. If there is light, the level of the pin connected to the photoresistor becomes high level.

#### 4)Experimental Steps

##### 4-1 About the schematic



4-1 Raspberry Pi interface circuit diagram



4-2 Left and right infrared sensor interface

wiringPi	BCM	Function	Physical pin	Function	BCM	wiringPi
		3.3V	1	2	5V	
8	2	SDA.1	3	4	5V	
9	3	SCL.1	5	6	GND	
7	4	GPIO.7	7	8	TXD	14
		GND	9	10	RXD	15
0	17	GPIO.0	11	12	GPIO.1	18
2	27	GPIO.2	13	14	GND	
3	22	GPIO.3	15	16	GPIO.4	23
		3.3V	17	18	GPIO.5	24
12	10	MOSI	19	20	GND	
13	9	MISO	21	22	GPIO.6	25
14	11	SCLK	23	24	CE0	8
		GND	25	26	CE1	7
30	0	SDA.0	27	28	SCL.0	1
21	5	GPIO.21	29	30	GND	
22	6	GPIO.22	31	32	GPIO.26	12
23	13	GPIO.23	33	34	GND	
24	19	GPIO.24	35	36	GPIO.27	16
25	26	GPIO.25	37	38	GPIO.28	20
		GND	39	40	GPIO.29	21

4-3 Raspberry Pi 40 pins comparison table

4-2 According to the circuit schematic:

Left infrared sensor-----26(Physical pin)----- 11(wiringPi)

Right infrared sensor-----31(Physical pin)----- 22(wiringPi)

4-3 About the code

#### A. For .c code

(1) We need to compile this file in the Raspberry Pi system. (Note: we need to add -lwiringPi to the library file.)

We need to input: `gcc light_follow.c -o light_follow -lwiringPi`

(2) We need to run the compiled executable file in the Raspberry Pi system. We need to input: `./light_follow`

```
pi@yahboom4wd:~/SmartCar $ gcc light_follow.c -o light_follow -lwiringPi
pi@yahboom4wd:~/SmartCar $ ./light_follow
```

(3) We can input: `ctrl+c` to stop this process, which means to send a signal to the linux kernel to terminate the current process, but the state of the relevant pin is uncertain at this time, we also need to run a script to initialize all pins.

(Note: The `initpin.sh` script file is included in the SmartCar/python directory.)

You need to input: `chmod 777 initpin.sh`

`./initpin.sh`

```
pi@yahboom4wd:~/SmartCar $ sudo chmod 777 initpin.sh
pi@yahboom4wd:~/SmartCar $ ./initpin.sh
```

#### B. For python code

(1) We need to input following command to run python code.

`python light_follow.py`

```
pi@yahboom4wd:~/python $ python light_follow.py
```

(2) We can input: `ctrl+c` to stop this process, which means to send a signal to the linux kernel to terminate the current process, but the state of the relevant pin is uncertain at this time, we also need to run a script to initialize all pins.

(3) You need to input: `sudo chmod 777 initpin.sh`  
`./initpin.sh`

```
pi@yahboom4wd:~/SmartCar $ sudo chmod 777 initpin.sh
pi@yahboom4wd:~/SmartCar $ ./initpin.sh
```

After completing the above steps, the experiment is over.

## 5) Experimental phenomenon

After running the programs. **You need to press the K2 to start the car**, and the light follow function is started.

When both light-sensitive resistors detect light, the car advance;  
 when there is light detected on the left side, the car turn left;  
 when light is detected on the right side, the car turn right;  
 when no light is detected on the left and right sides, the car stopped.

