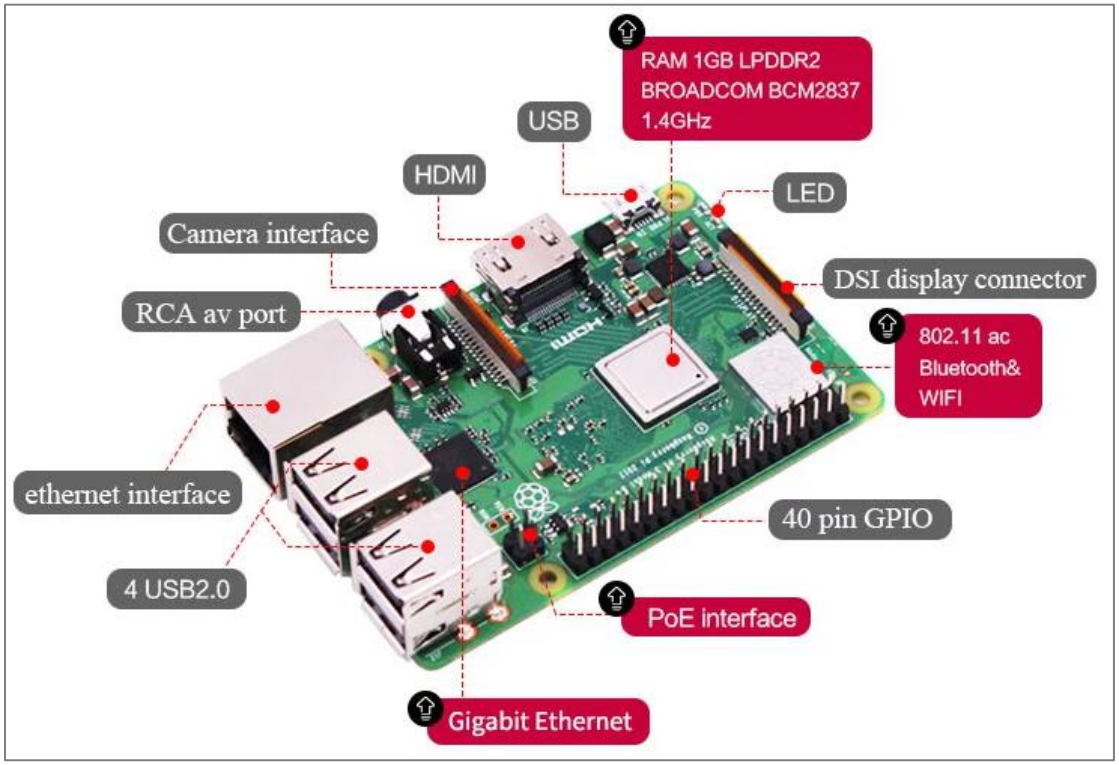
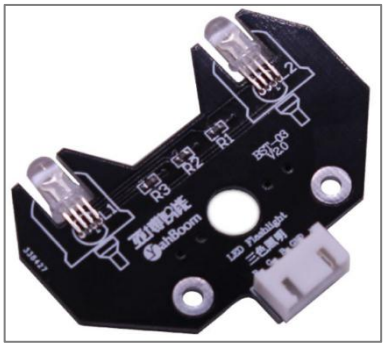
2.Raspberry Pi platform-------Color_LED

1) Preparation



1-1 Raspberry Pi board



1-2 RGB module

2) Purpose of Experimental

After running the Color_LED executable in the Raspberry Pi system and you can see the lights in 7 different colors.

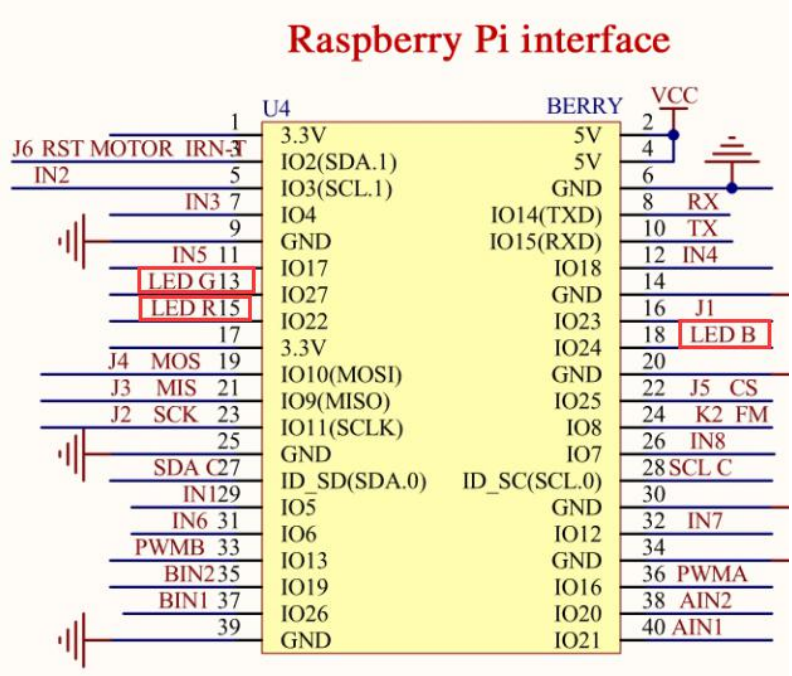
3) Principle of experimental

3 LEDs (red, green, blue) are packaged in the RGB lamp module. We can mix different colors(256*256*256) by controlling the brightness of the three LEDs. According to the circuit schematic, the RGB lamp is a common cathode LED, one pin is connect to GND, and the remaining three pins are respectively connected to the

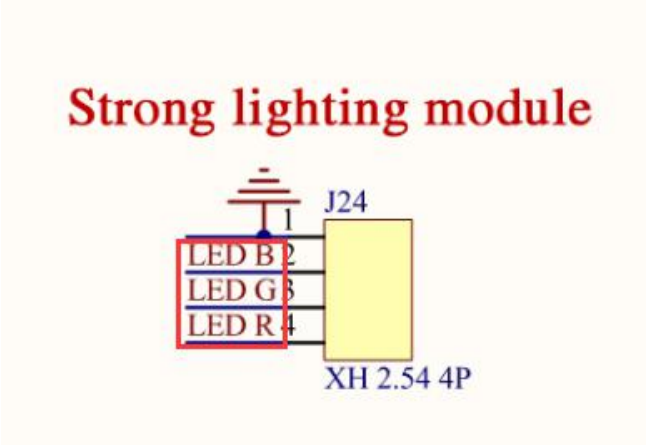
wiringPi port 3, 2, 5 on the Raspberry Pi board. Each LED needs to be connected in series with a 220Ω resistor as the current limiting resistor. We can control the LED by controlling the corresponding pin to be high level of Raspberry Pi board.

4) Experimental Steps

4-1 About the schematic



4-1 Raspberry Pi interface circuit diagram



4-2 RGB module interface circuit diagram

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

4-3 Raspberry Pi 40 pins comparison table

4-2 According to the circuit schematic:

LED_R-----15(Physical pin)----- 3(wiringPi)

LED_G-----13(Physical pin)----- 2(wiringPi)

LED_B-----18(Physical pin)----- 5(wiringPi)

4-3 About the code

Please view .py and.c file

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 ColorLED.c -o ColorLED -lwiringPi

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

As shown in the figure below.

```
pi@raspberryPi:~/TrikeBotCar $ gcc ColorLED.c -o ColorLED -lwiringPi
pi@raspberryPi:~/TrikeBotCar $ ./ColorLED
```

3) We can input: ctrl+c to stop this process, which mean is 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 TrikeBotCar/python_code

directory.)
You need to input:
sudo chmod 777 initpin.sh
./initpin.sh

```
pi@yah~ $ sudo chmod 777 initpin.sh
pi@y $ ./initpin.sh
```

B. For python code

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

```
pi@raspberryPi:~/python_code $ python ColorLED.py
```

2) We can input: ctrl+c to stop this process, which mean is 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@yah~ $ sudo chmod 777 initpin.sh
pi@y $ ./initpin.sh
```

After completing the above steps, the experiment is over.

5) Experimental phenomenon

When we run the program, you can see the RGB lights will become 7 different colors.