

X5 camera configuration

Note: The esp32 camera needs to be burned with factory firmware. If you have not flashed the firmware after receiving the esp32 camera, it is not necessary. The factory default firmware, before using iic communication, you can use the serial port to configure the network for the esp32 camera, and iic is used for data reading

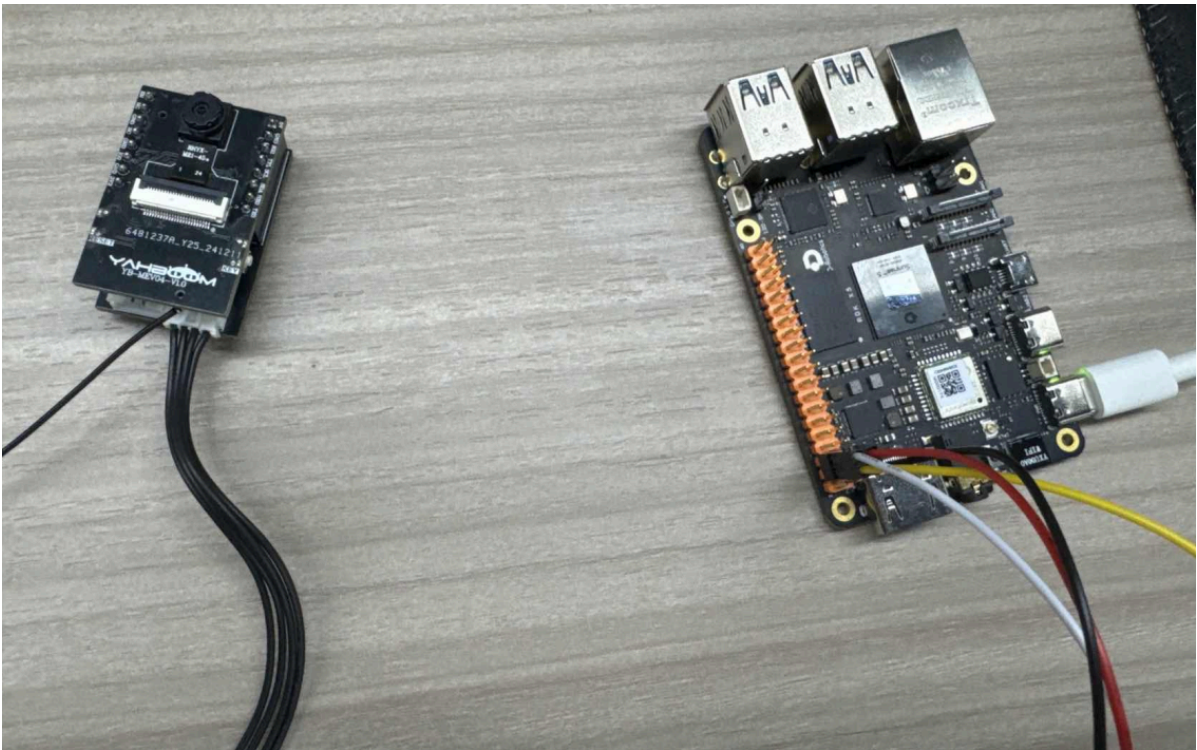
1. Experimental preparation

- A Raspberry Pi motherboard
- An esp32 camera

2. Wiring diagram

Raspberry Pi 5	esp32 camera
BOARD3	SDA
BOARD5	SCL
GND	GND
5V	5V

Physical connection diagram:



Pin diagram:

X5 RDK 40Pin 功能对照表

功能说明	X5 管脚号	BCM 编码	CVM 功能名	物理引脚 BOARD编码		CVM 功能名	BCM 编码	X5 管脚号	功能说明
3.3V电源信号			VDD_3V3	1	2	VDD_5V			5V电源信号
I2C5数据信号	387	2	I2C5_SDA	3	4	VDD_5V			5V电源信号
I2C5时钟信号	389	3	I2C5_SCL	5	6	GND			地信号
I2S1 MCLK时钟信号	420	4	I2S1_MCLK	7	8	UART_TXD	14	383	UART1发送信号
地信号			GND	9	10	UART_RXD	15	384	UART1接收信号
GPIO17信号	380	17	GPIO17	11	12	I2S1_BCLK	18	421	I2S1 BCLK时钟信号
GPIO27信号	379	27	GPIO27	13	14	GND			地信号
GPIO22信号	388	22	GPIO22	15	16	GPIO23	23	382	GPIO23信号
3.3V电源信号			VDD_3V3	17	18	GPIO24	24	402	GPIO24信号
SPI1 MOSI信号	398	10	SPI1_MOSI	19	20	GND			地信号
SPI1 MISO信号	397	9	SPI1_MISO	21	22	GPIO25	25	387	GPIO25信号
SPI1 SCLK信号	395	11	SPI1_SCLK	23	24	SPI_CSN0	8	394	SPI1 SSN1信号
地信号			GND	25	26	SPI_CSN1	7	396	SPI1 SSN0信号
I2C0数据信号	355	0	I2C0_SDA	27	28	I2C0_SCL	1	354	I2C0时钟信号
GPIO5信号	399	5	GPIO5	29	30	GND			地信号
GPIO6信号	400	6	GPIO6	31	32	PWM6	12	356	PWM6信号
PWM7信号	357	13	PWM7	33	34	GND			地信号
I2S1 WS信号	422	19	I2S1_LRCK	35	36	GPIO16	16	381	
GPIO26信号	401	26	GPIO26	37	38	I2S1_SDIN	20	423	I2S1 DI信号
地信号			GND	39	40	I2S1_SDOUT	21	424	I2S1 DO信号

3. Experimental steps and results

1. Open a new Raspberry Pi terminal and send the source code of this experiment to the Raspberry Pi
2. Open the code just uploaded and change the position of the arrow in the figure to the corresponding ai mode.

```

Normal = 0x00
Cat_Dog_Model = 0x01 #猫狗检测 Cat and Dog Detection
Face_Detection = 0x02 #人脸检测 Face Detection
Color_identify = 0x03 #颜色检测 Color Detection
Face_identify = 0x04 #人脸识别 Face Recognition

ai_mode = Cat_Dog_Model ← #修改这里的变量来切换模式 Modify the variables here to switch modes

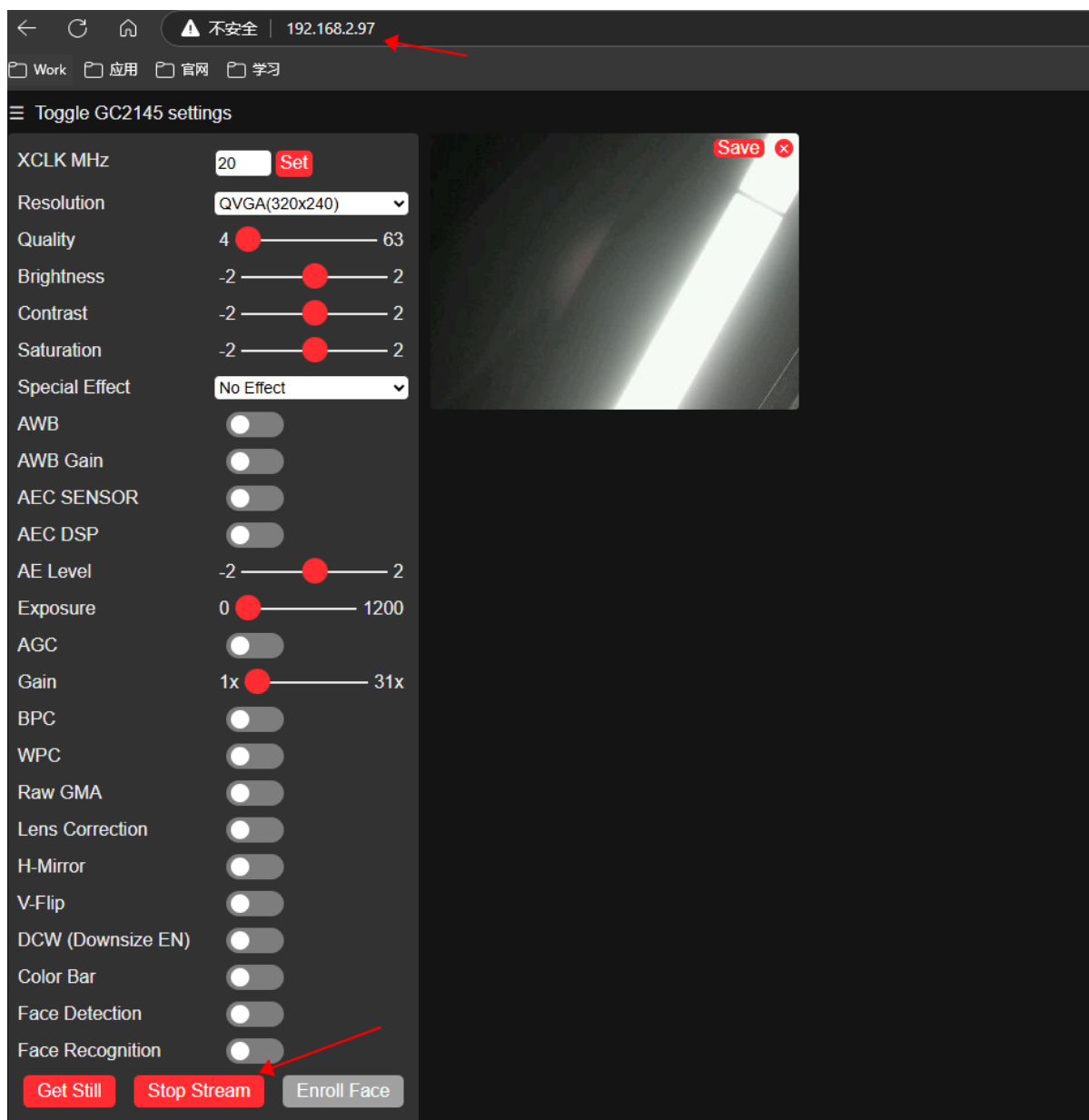
```

3. Execute the following command, and the default data will be returned. This is because the camera recognition is not turned on.

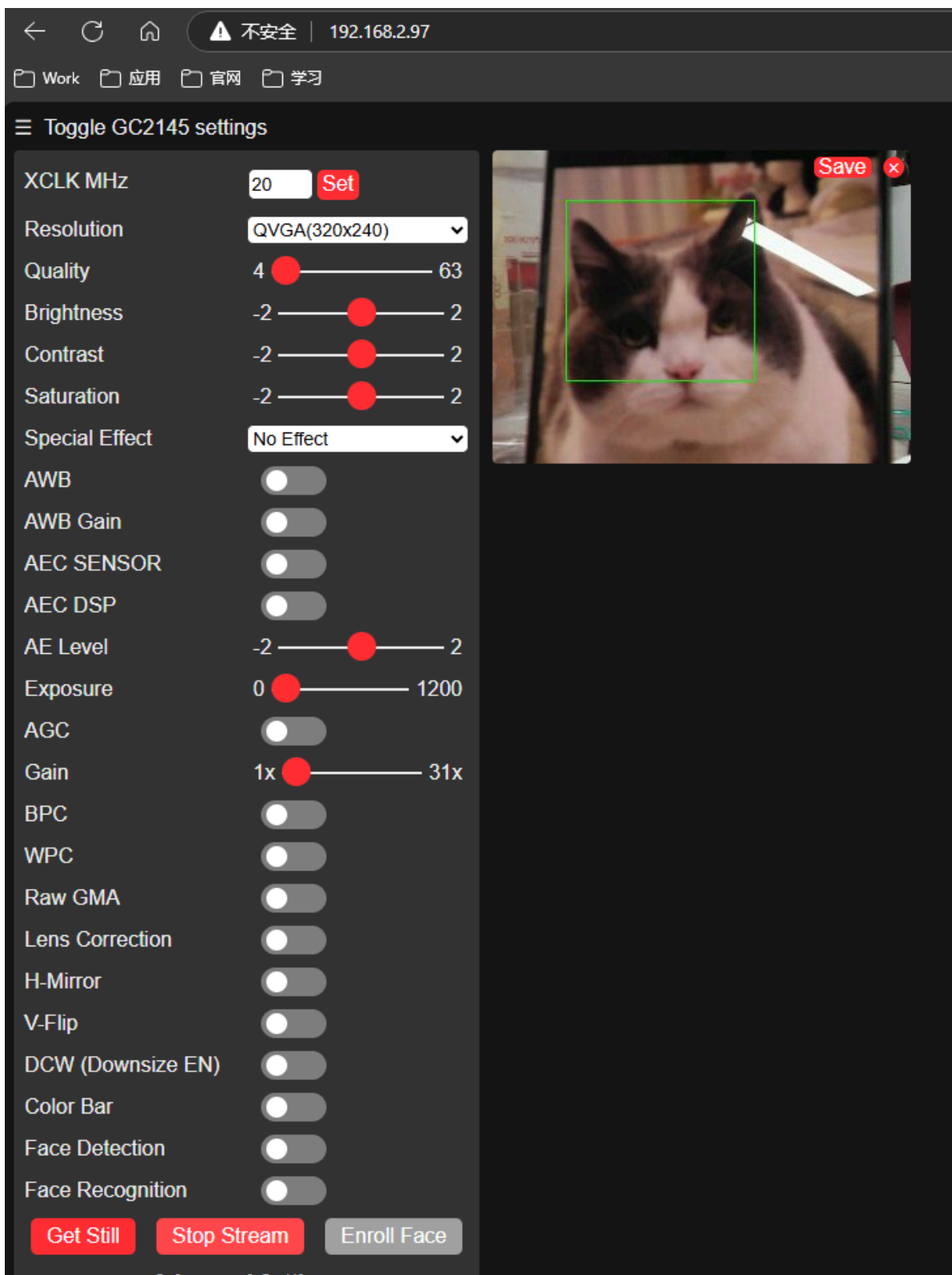
```
python3 I2C_TEST.py
```

```
sunrise@ubuntu:~$ python3 I2C_TEST.py
Read data: data0:0 data1:160 data2:0 data3:120
arear:0
Read data: data0:0 data1:160 data2:0 data3:120
arear:0
Read data: data0:0 data1:160 data2:0 data3:120
arear:0
Read data: data0:0 data1:160 data2:0 data3:120
arear:0
Read data: data0:0 data1:160 data2:0 data3:120
arear:0
Read data: data0:0 data1:160 data2:0 data3:120
arear:0
Read data: data0:0 data1:160 data2:0 data3:120
arear:0
Read data: data0:0 data1:160 data2:0 data3:120
arear:0
Read data: data0:0 data1:160 data2:0 data3:120
arear:0
Read data: data0:0 data1:160 data2:0 data3:120
arear:0
```

3. Log in through the wifi ip configured by the serial port, or through the hotspot connected to the camera. Because wifi has been configured before, the following figure directly uses the previously configured wifi ip address to log in to the webpage and open the camera



4. Because we set it to cat and dog mode, we put the cat or dog in front of the camera and the cat or dog will be selected.



At the same time, the terminal will print out the current center coordinates and the area has been selected.

```

0
读取的数据: data0:0 data1:160 data2:0 data3:80
14200
读取的数据: data0:0 data1:139 data2:0 data3:109
17040
读取的数据: data0:0 data1:129 data2:0 data3:101
16520
读取的数据: data0:0 data1:126 data2:0 data3:100
16497
读取的数据: data0:0 data1:125 data2:0 data3:100
15340
读取的数据: data0:0 data1:120 data2:0 data3:109
14272
读取的数据: data0:0 data1:129 data2:0 data3:118
16779
读取的数据: data0:0 data1:126 data2:0 data3:106
16874
读取的数据: data0:0 data1:127 data2:0 data3:108
17545
读取的数据: data0:0 data1:131 data2:0 data3:108
16166
读取的数据: data0:0 data1:130 data2:0 data3:118
18056
读取的数据: data0:0 data1:130 data2:0 data3:107
17190
读取的数据: data0:0 data1:126 data2:0 data3:106
16844
读取的数据: data0:0 data1:131 data2:0 data3:108
15295
读取的数据: data0:0 data1:131 data2:0 data3:115
16029
读取的数据: data0:0 data1:130 data2:0 data3:118
14888
读取的数据: data0:0 data1:118 data2:0 data3:158
21546
读取的数据: data0:0 data1:118 data2:0 data3:158
21546
读取的数据: data0:0 data1:118 data2:0 data3:158
21546
读取的数据: data0:0 data1:118 data2:0 data3:158
21546
读取的数据: data0:0 data1:118 data2:0 data3:158
21546
读取的数据: data0:0 data1:118 data2:0 data3:158
21546
读取的数据: data0:0 data1:118 data2:0 data3:158
21546

```

Face recognition mode

When switching to face recognition mode, the terminal will additionally print the current face id

```

3
0 ai_mode = Face_identify #修改这里的变量来切换模式
1
2 def get_level_mode(data):

```

```
python3 I2C_TEST.py
```

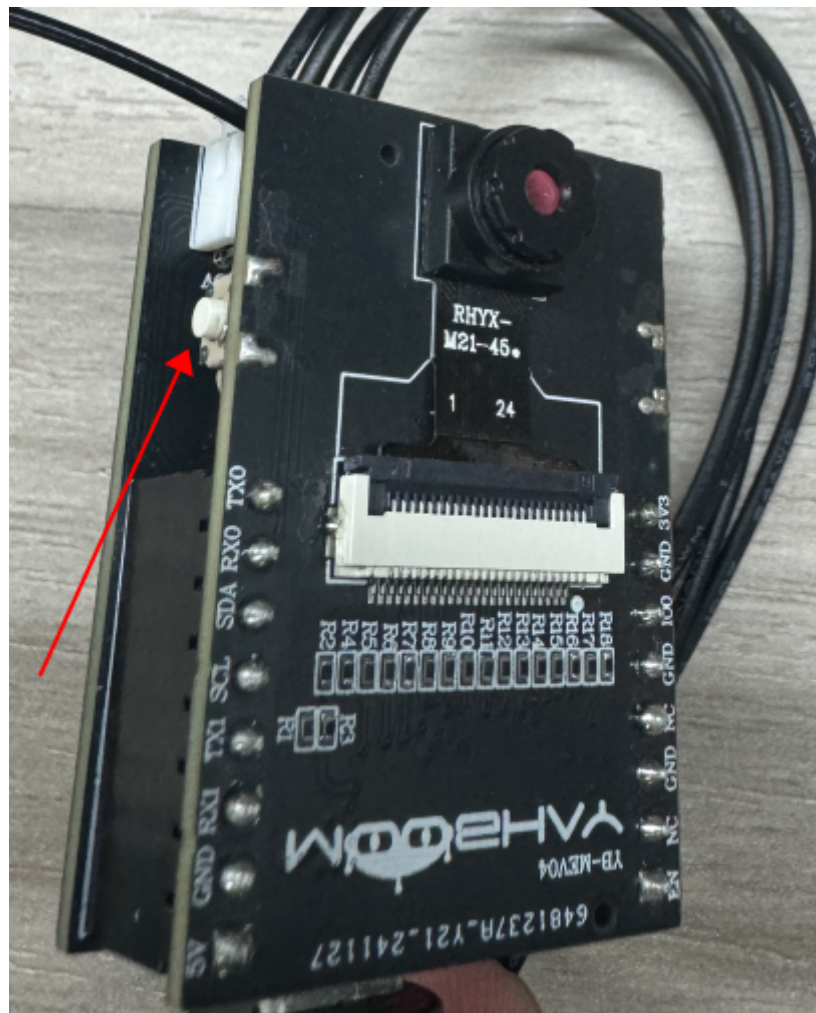


```

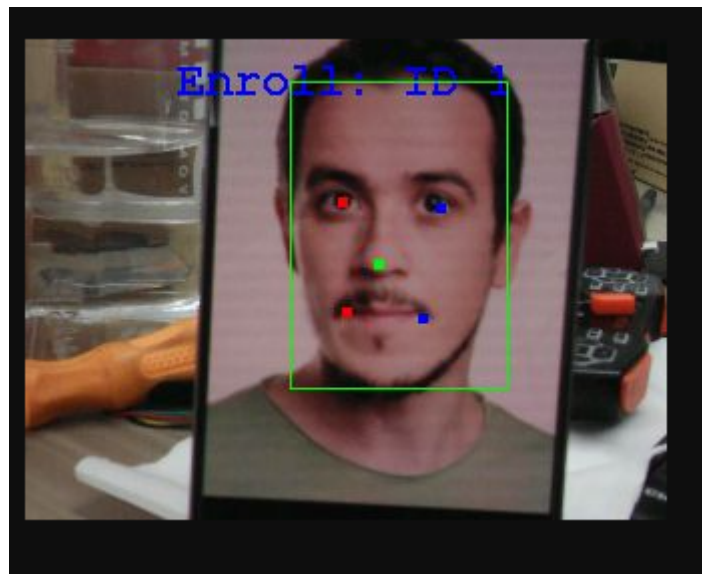
读取的数据: data0:-121 data1:-121 data2:-121 data3:-121
arear:-30873
id:0
读取的数据: data0:0 data1:160 data2:0 data3:120
arear:0
id:0
读取的数据: data0:0 data1:160 data2:0 data3:120
arear:0
id:0
读取的数据: data0:0 data1:160 data2:0 data3:120
arear:0
id:0
读取的数据: data0:0 data1:160 data2:0 data3:120
arear:0
id:0
读取的数据: data0:0 data1:160 data2:0 data3:120
arear:0
id:0
读取的数据: data0:0 data1:160 data2:0 data3:120
arear:0
id:0
读取的数据: data0:0 data1:160 data2:0 data3:120
arear:0
id:0
读取的数据: data0:0 data1:160 data2:0 data3:120
arear:0
id:0
读取的数据: data0:0 data1:160 data2:0 data3:120
arear:0
id:0

```

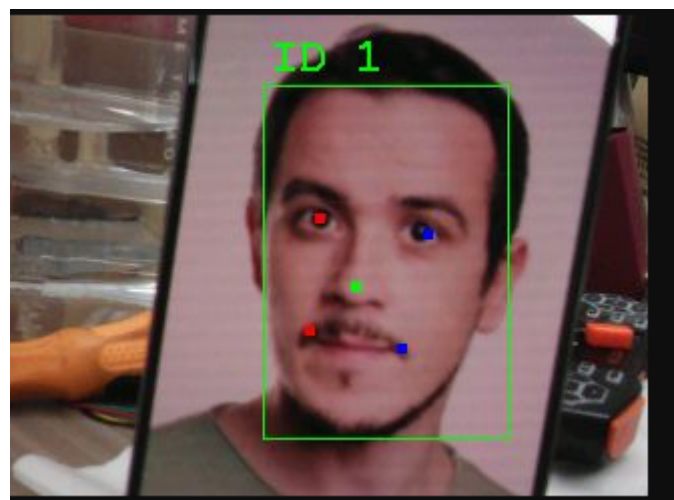
Recognize face. When you see a face, press the key button to record the face



The following picture appears, which means the recording is successful, and the face 1 is recorded



At this time, you can press and hold the button for two seconds, then release it and press the button again to recognize the current face



At the same time, the terminal will print out the current center coordinates and the recognized face.

```
读取的数据: data0:0 data1:142 data2:0 data3:102
arear:20196
id:1
读取的数据: data0:0 data1:142 data2:0 data3:102
arear:20196
id:1
读取的数据: data0:0 data1:142 data2:0 data3:102
arear:20196
id:1
读取的数据: data0:0 data1:142 data2:0 data3:102
arear:20196
id:1
读取的数据: data0:0 data1:142 data2:0 data3:102
arear:20196
id:1
读取的数据: data0:0 data1:142 data2:0 data3:102
arear:20196
id:1
读取的数据: data0:0 data1:142 data2:0 data3:102
arear:20196
id:1
读取的数据: data0:0 data1:142 data2:0 data3:102
arear:20196
id:1
```

Color detection mode

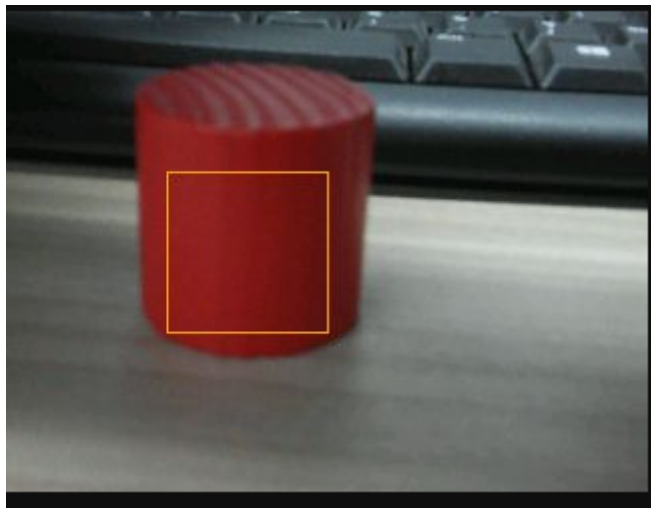
When we switch to color detection mode,

```
ai_mode = Face_identify #ai模式选择 AI mode selection
```

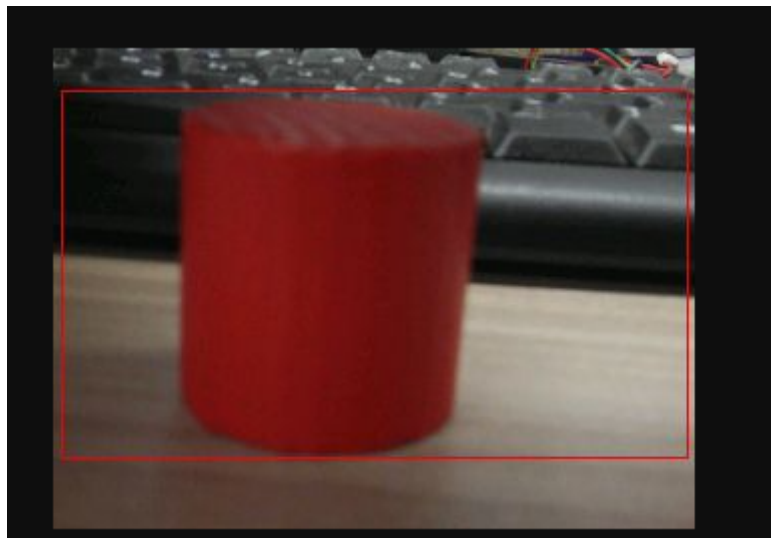
```
python3 I2C_TEST.py
```

```
读取的数据: data0:-121 data1:-121 data2:-121 data3:-121
arear:-30976
读取的数据: data0:0 data1:160 data2:0 data3:120
arear:0
读取的数据: data0:0 data1:160 data2:0 data3:120
arear:0
读取的数据: data0:0 data1:160 data2:0 data3:120
arear:0
读取的数据: data0:0 data1:160 data2:0 data3:120
arear:0
读取的数据: data0:0 data1:160 data2:0 data3:120
arear:0
```

Recognize the color. Press the button and a box will appear. You can use this box to select the color you want to use.



Press and hold the button for two seconds, release it and press it again to identify the currently selected color, and a red frame will appear.



At the same time, the terminal will print out the current center coordinates.

```
读取的数据: data0:0 data1:160 data2:0 data3:135
arear:33708
读取的数据: data0:0 data1:112 data2:0 data3:141
arear:32128
读取的数据: data0:0 data1:108 data2:0 data3:139
arear:30880
读取的数据: data0:0 data1:174 data2:0 data3:144
arear:38916
读取的数据: data0:0 data1:132 data2:0 data3:147
arear:30804
读取的数据: data0:0 data1:106 data2:0 data3:120
arear:36556
读取的数据: data0:0 data1:100 data2:0 data3:129
arear:16200
读取的数据: data0:0 data1:116 data2:0 data3:150
arear:22380
读取的数据: data0:0 data1:90 data2:0 data3:150
arear:40200
读取的数据: data0:0 data1:138 data2:0 data3:150
arear:38340
读取的数据: data0:0 data1:100 data2:0 data3:151
arear:48184
读取的数据: data0:0 data1:114 data2:0 data3:147
arear:17516
读取的数据: data0:0 data1:96 data2:0 data3:157
arear:42660
读取的数据: data0:0 data1:90 data2:0 data3:157
arear:42660
读取的数据: data0:0 data1:90 data2:0 data3:157
arear:42660
读取的数据: data0:0 data1:90 data2:0 data3:157
arear:42660
读取的数据: data0:0 data1:90 data2:0 data3:157
arear:11264
```