

Cat and dog detection

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

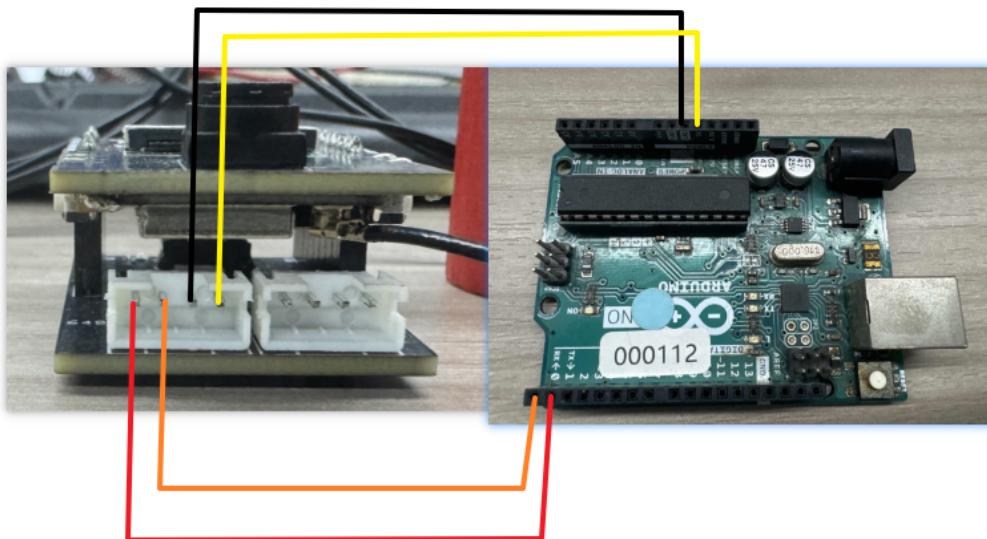
1. Experimental preparation

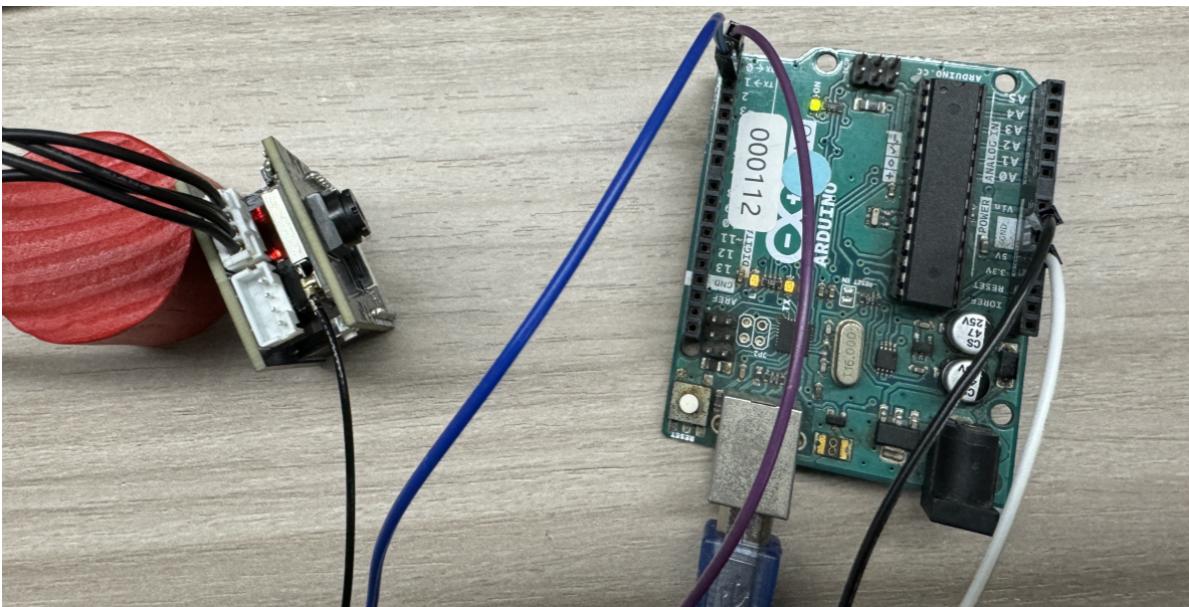
- One arduino board
- One esp32 camera

2. Wiring diagram

ARDUINO	esp32 camera
P1	RX
P0	TX
GND	GND
5V	5V

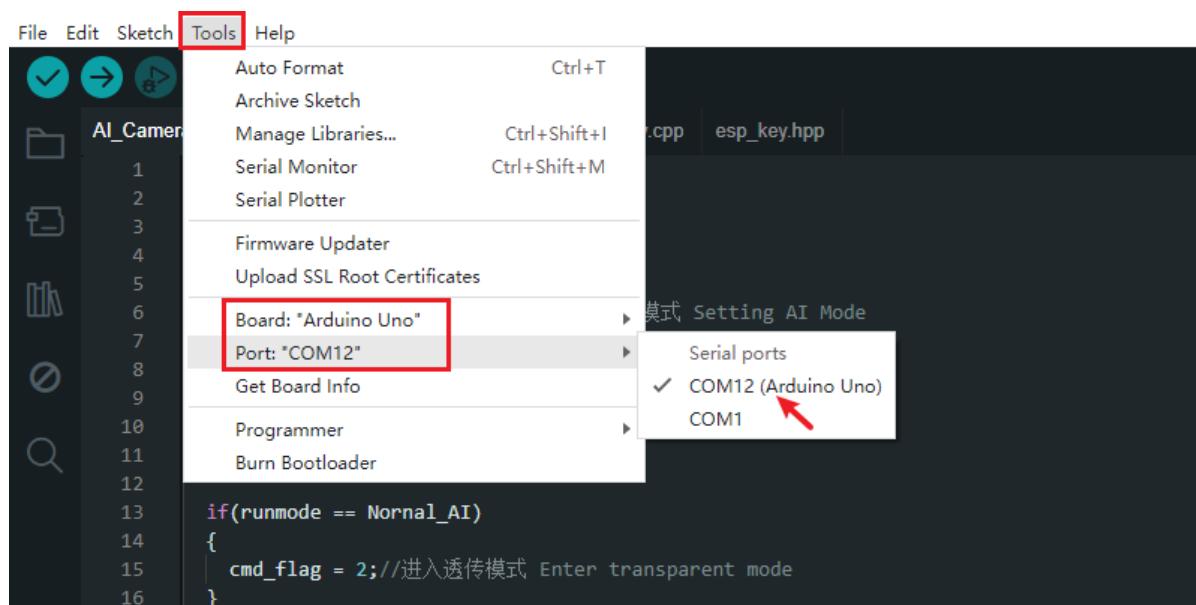
Actual wiring diagram:





3. Experimental steps and experimental results

1. Connect the Arduino device to the ArduinoIDE compilation platform. If you can see the serial port number, it is normal.



2. You can modify the WiFi name and password you want to connect to, as well as the name of the hotspot in the esp32_wifi.cpp file

```

20 //自发热部分 Self-heating point
21 #define APIP "ap_ip"
22 #define AP_WIFI_SSID "ESP32_WIFI_TEST"      //wifi名称 Wi-Fi Name
23 #define AP_WIFI_PD "" // wifi密码 -无密码 也可在双引号里添加 Wifi password - no password can also be added in double quotes
24
25
26 //连接wifi部分 Connect to wifi
27 #define STAIP "sta_ip"
28 #define STA_WIFI_SSID "Yahboom2"      // wifi名称 Wifi Name
29 #define STA_WIFI_PD "yahboom890729" // wifi密码 Wifi password
30
31

```

3. In the .ino file, change it to the corresponding ai mode.

```

#define AI_set_mode Cat_Dog_AI //设置AI模式 Setting AI Mode

```

3. Click Compile and Download to download the program to the uno motherboard. The following picture will appear if the download is successful

```
#include <stdio.h>
#include "esp32_wifi.hpp"
#include "esp_key.hpp"

#define AI_set_mode Cat_Dog_AI //设置AI模式 Setting AI Mode

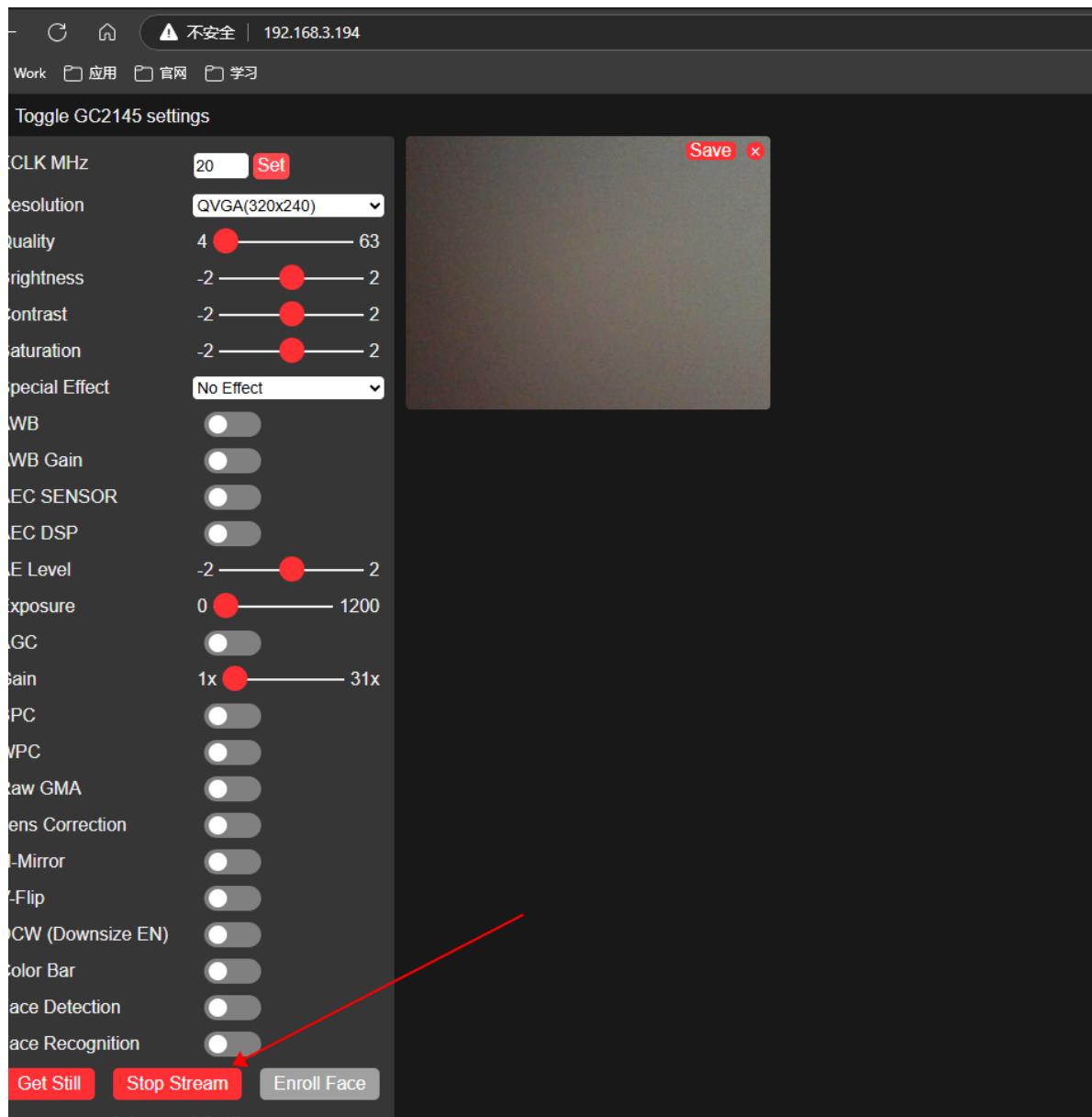
extern uint8_t cmd_flag;
void mode_change()
{
    if(runmode == Nornal_AI)
    {
        cmd_flag = 2;//进入透传模式 Enter transparent mode
    }
    else if(runmode == REFACE_AI )
    {
        cmd_flag = 3;//解析人脸识别数据 Parsing facial recognition data
    }
    else if(runmode == QR_AI )
    {
        cmd_flag = 4;//解析二维码数据 Parsing QR code data
    }
}

Sketch uses 9994 bytes (30%) of program storage space. Maximum is 32256 bytes.
Global variables use 750 bytes (36%) of dynamic memory, leaving 1298 bytes for local variables. Maximum is 2048 bytes.
```

4. Press the reset button on the uno and wait for a while to see the IP address and hotspot address of the network

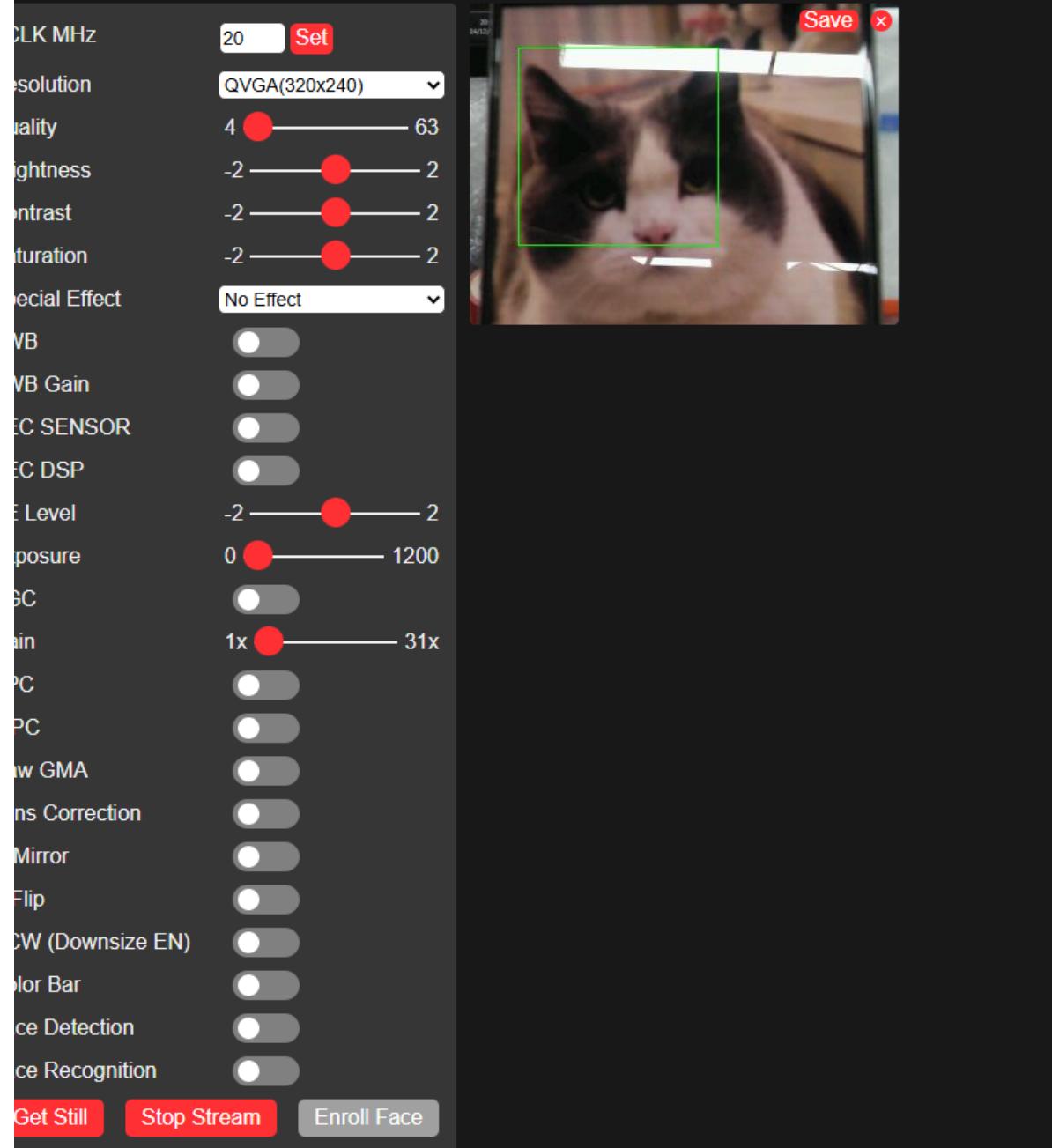
```
20:19:00.146 -> OK
20:19:00.146 -> sta_ip: 192.168^3.194
20:19:00.146 -> ap_ip: 192.068.4.1
```

5. You can view the camera screen on the web page according to the above two addresses. When using ap_ip, you need to connect to the hotspot of the esp32 camera. When using sta_ip, the computer needs to be in the same network. Enter the following through the browser **192.168.3.194** This access camera screen



6. Identify cats and dogs. If the recognition is successful, the current center coordinates will be printed out, and the cat image will be placed in front of the previous screen.

Toggle GC2145 settings



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

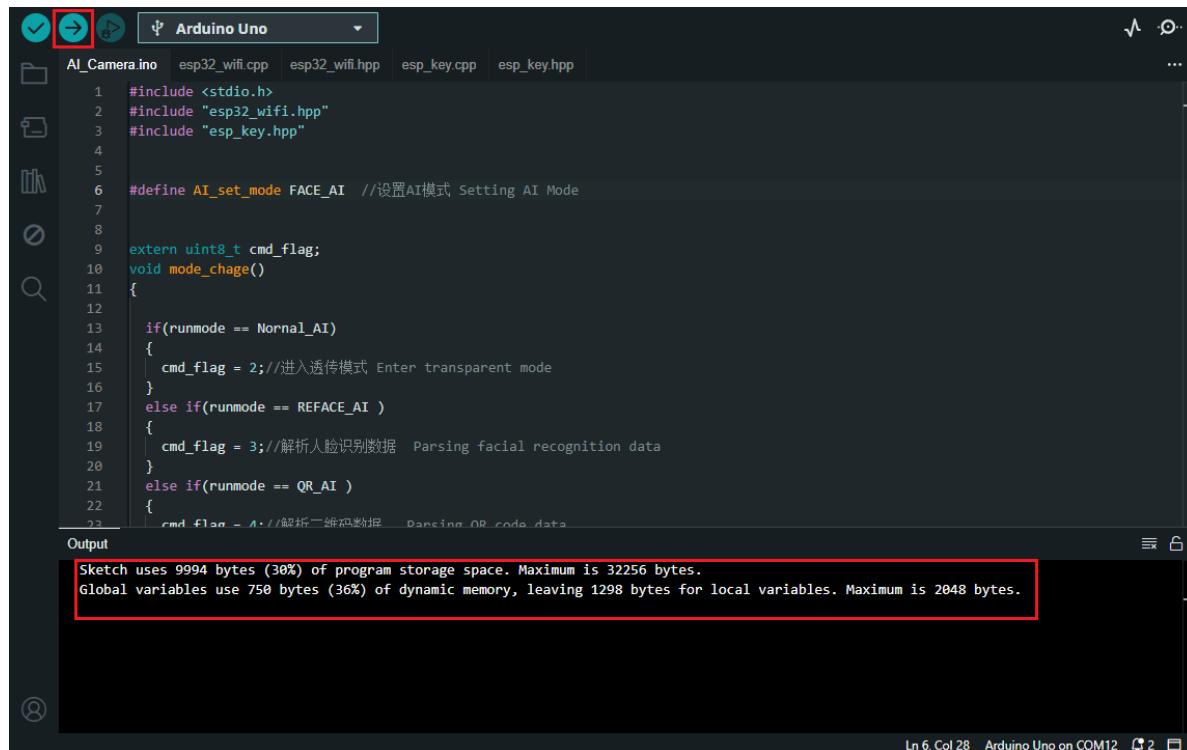
```
Output Serial Monitor ×  
Message (Enter to send message to 'Arduino Uno' on 'COM22')  
20:34:16.358 -> y: 78  
20:34:16.563 -> x: 185  
20:34:16.563 -> y: 79  
20:34:16.690 -> x: 185  
20:34:16.690 -> y: 78  
20:34:16.941 -> x: 183  
20:34:16.941 -> y: 80  
20:34:17.111 -> x: 183  
20:34:17.111 -> y: 80  
20:34:17.275 -> x: 184  
20:34:17.275 -> y: 78  
20:34:17.444 -> x: 184  
20:34:17.444 -> y: 77  
20:34:17.626 -> x: 184  
20:34:17.626 -> y: 77
```

Face recognition mode

When switching to face recognition mode,

```
#define AI_set_mode REFACE_AI //设置AI模式 Setting AI Mode
```

Click Compile and Download, download the program to the uno motherboard, and the following picture will appear if the download is successful



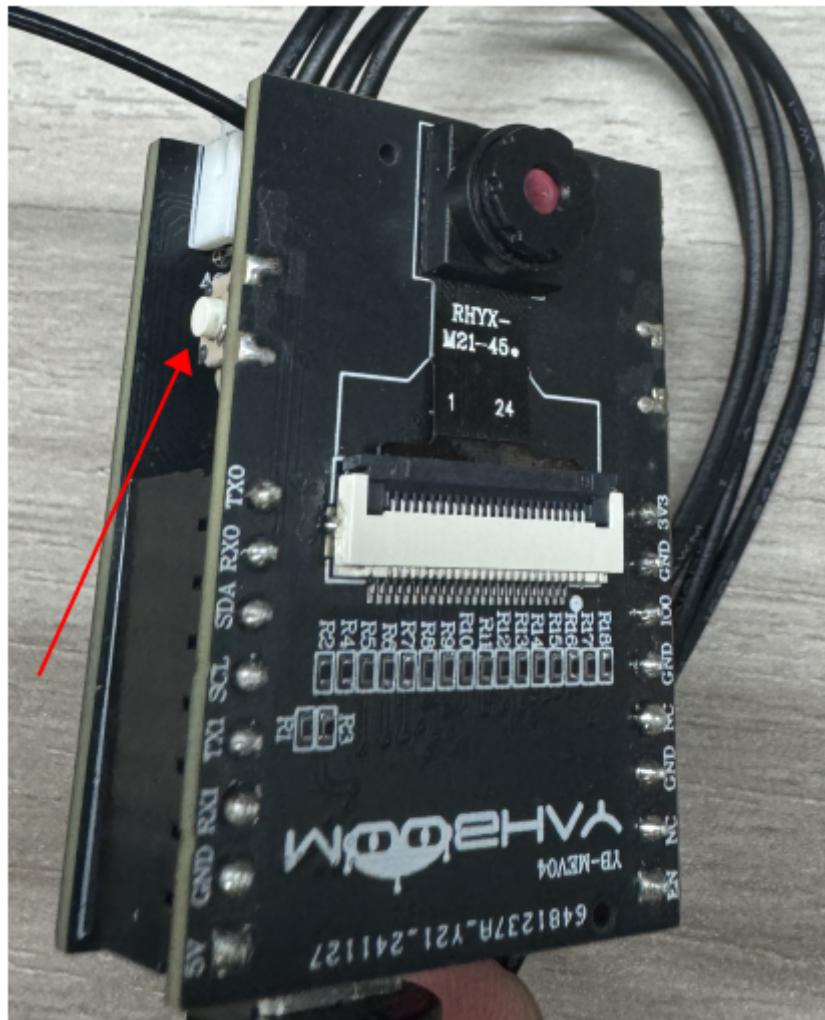
Press the reset button on the uno, wait for a while and you can see the IP address of the network and the address of the hotspot

```
Output Serial Monitor X

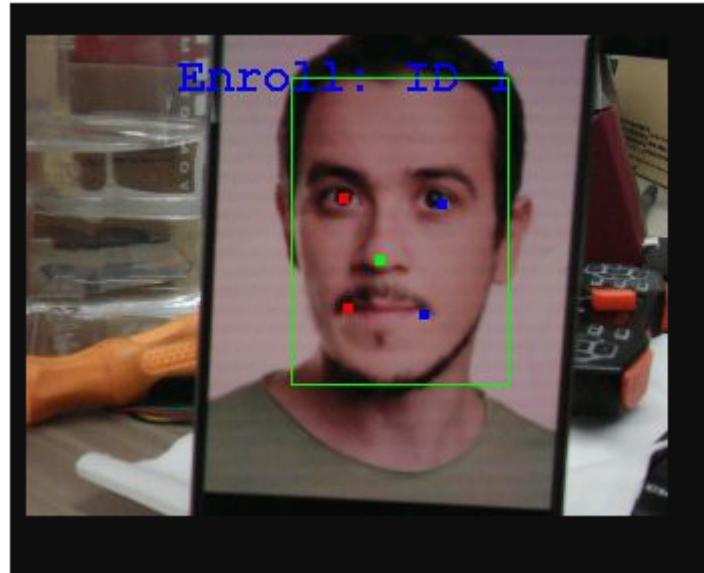
Message (Enter to send message to 'Arduino Uno' on 'COM22')

20:19:00.146 -> OK
20:19:00.146 -> sta_ip: 192.168^3.194
20:19:00.146 -> ap_ip: 192.068.4.1
```

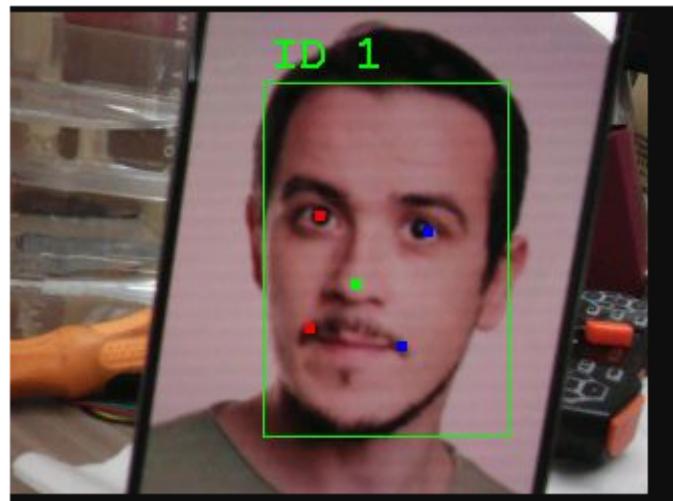
Recognize face. When you see a face, press the key button to record the face



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

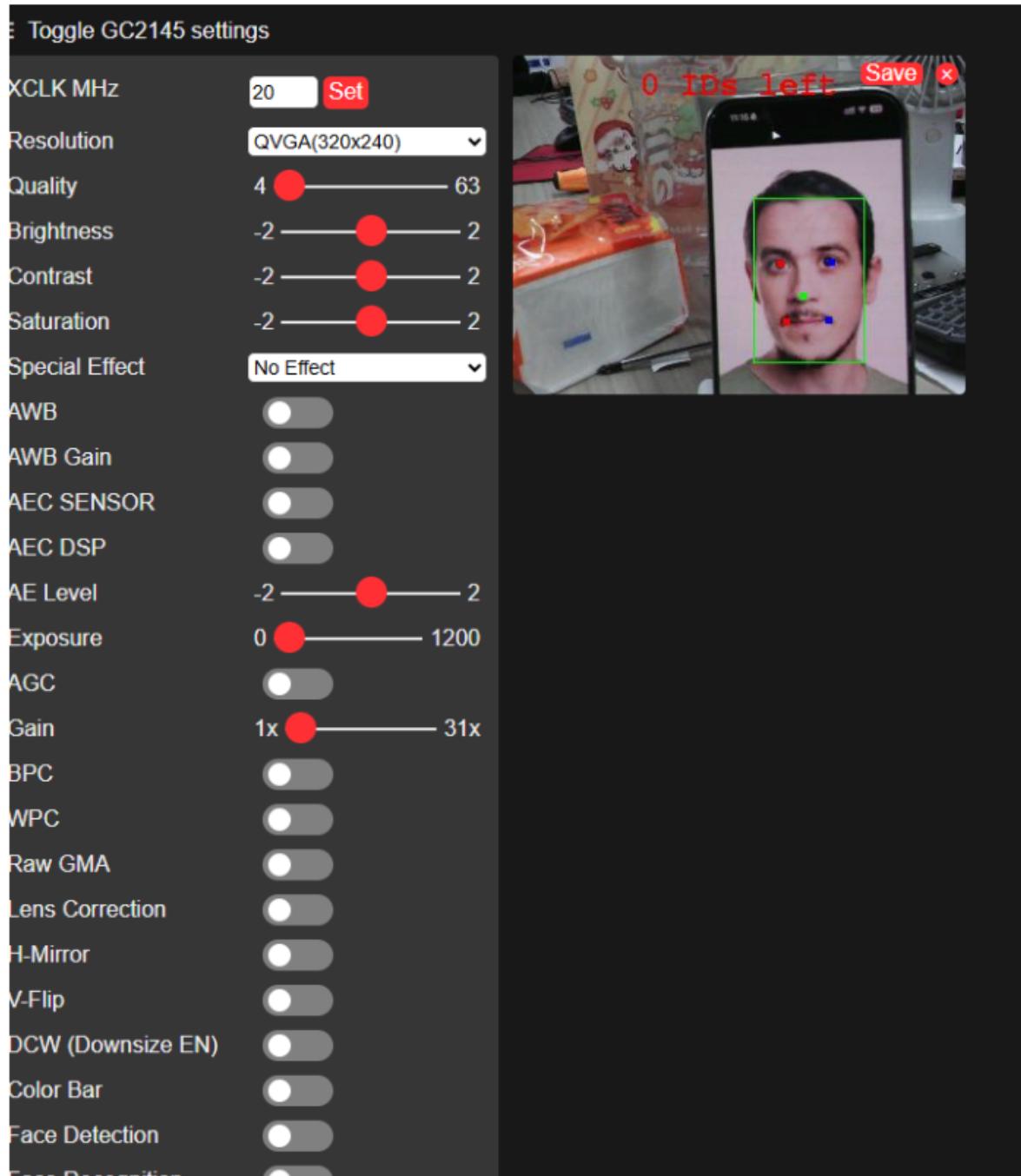


At the same time, the terminal will print out the current center coordinates and the recognized face.

Message (Enter to send message to 'Arduino Uno' on 'COM22')

```
11:10:17.043 -> OK
11:10:17.043 -> OK
11:10:17.061 -> OK
11:10:17.061 -> sta_ip:192.068.2.97
11:10:17.061 -> ap_ip:1y2.168.4.1$1x: 165
11:13:27.887 -> y: 116
11:13:27.887 -> y: 0
11:13:32.408 -> x: 177
11:13:32.408 -> y: 131
11:13:32.408 -> y: 1
11:13:35.268 -> x: 176
11:13:35.268 -> y: 129
11:13:35.268 -> y: 1
11:13:38.145 -> x: 175
11:13:38.145 -> y: 133
11:13:38.145 -> y: 1
11:13:41.245 -> x: 189
11:13:41.245 -> y: 132
11:13:41.245 -> y: 1
```

To delete a face, press and hold the button for two seconds again, release it and press it again to delete it.



Color detection mode

When switching to color detection mode,

```
#define AI_set_mode COLOR_AI //设置AI模式 Setting AI Mode
```

Click Compile and Download, download the program to the uno motherboard, and the download will be successful. Now the picture below

```
#include <stdio.h>
#include "esp32_wifi.hpp"
#include "esp_key.hpp"

#define AI_set_mode COLOR_AI //设置AI模式 Setting AI Mode

extern uint8_t cmd_flag;
void mode_change()
{
    if(runmode == Normal_AI)
    {
        cmd_flag = 2;//进入透传模式 Enter transparent mode
    }
    else if(runmode == REFACE_AI )
    {
        cmd_flag = 3;//解析人脸识别数据 Parsing facial recognition data
    }
    else if(runmode == QR_AI )
    {
        cmd_flag = 4;//解析二维码数据 Parsing QR code data
    }
}

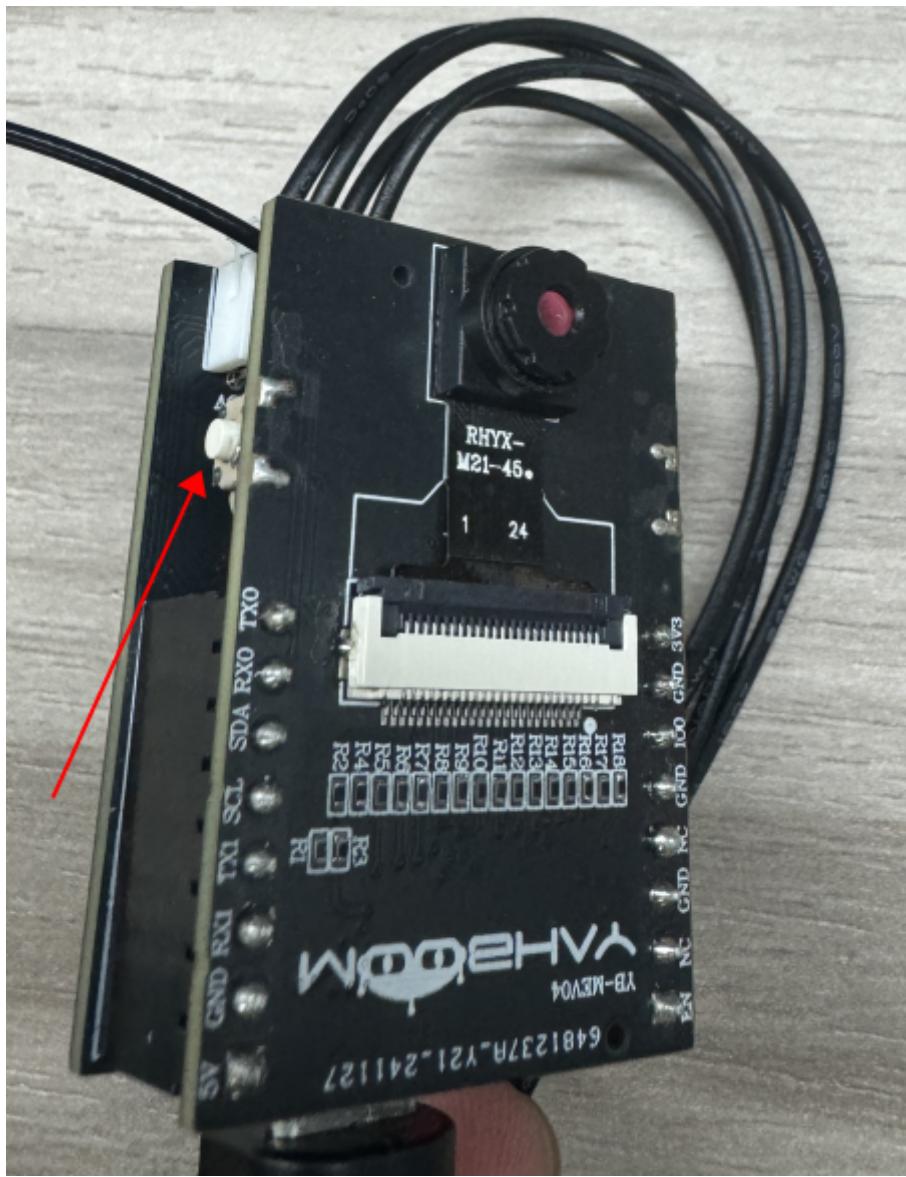
Sketch uses 9994 bytes (30%) of program storage space. Maximum is 32256 bytes.
Global variables use 750 bytes (36%) of dynamic memory, leaving 1298 bytes for local variables. Maximum is 2048 bytes.
```

Press the reset button on the uno, wait for a while and you can see the IP address of the network and the address of the hotspot

```
Message (Enter to send message to 'Arduino Uno' on 'COM22')

20:19:00.146 -> OK
20:19:00.146 -> sta_ip: 192.168^3.194
20:19:00.146 -> ap_ip: 192.068.4.1
```

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



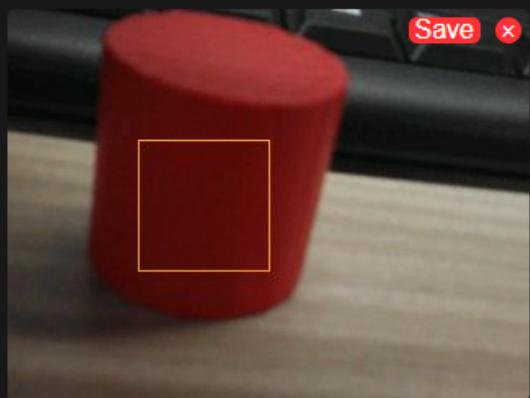
≡ Toggle GC2145 settings

XCLK MHz	20	Set
Resolution	QVGA(320x240)	
Quality	4	63
Brightness	-2	2
Contrast	-2	2
Saturation	-2	2
Special Effect	No Effect	
AWB	<input type="checkbox"/>	
AWB Gain	<input type="checkbox"/>	
AEC SENSOR	<input type="checkbox"/>	
AEC DSP	<input type="checkbox"/>	
AE Level	-2	2
Exposure	0	1200
AGC	<input type="checkbox"/>	
Gain	1x	31x
BPC	<input type="checkbox"/>	
WPC	<input type="checkbox"/>	
Raw GMA	<input type="checkbox"/>	
Lens Correction	<input type="checkbox"/>	
H-Mirror	<input type="checkbox"/>	
V-Flip	<input type="checkbox"/>	
DCW (Downsize EN)	<input type="checkbox"/>	
Color Bar	<input type="checkbox"/>	
Face Detection	<input type="checkbox"/>	
Face Recognition	<input type="checkbox"/>	

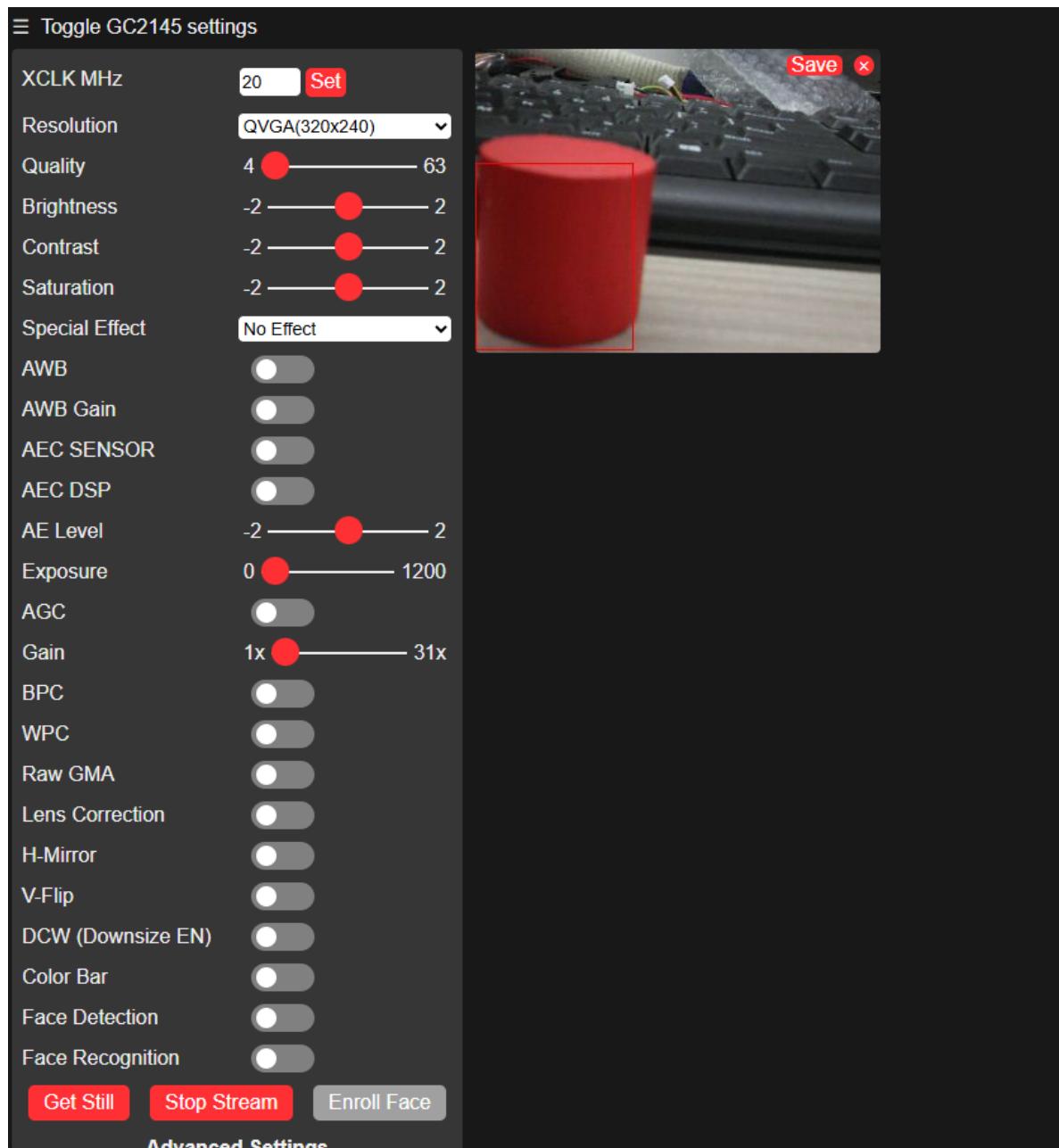
Get Still

Stop Stream

Enroll Face



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



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

```
Output  Serial Monitor ×

Message (Enter to send message to 'Arduino Uno' on 'COM22')

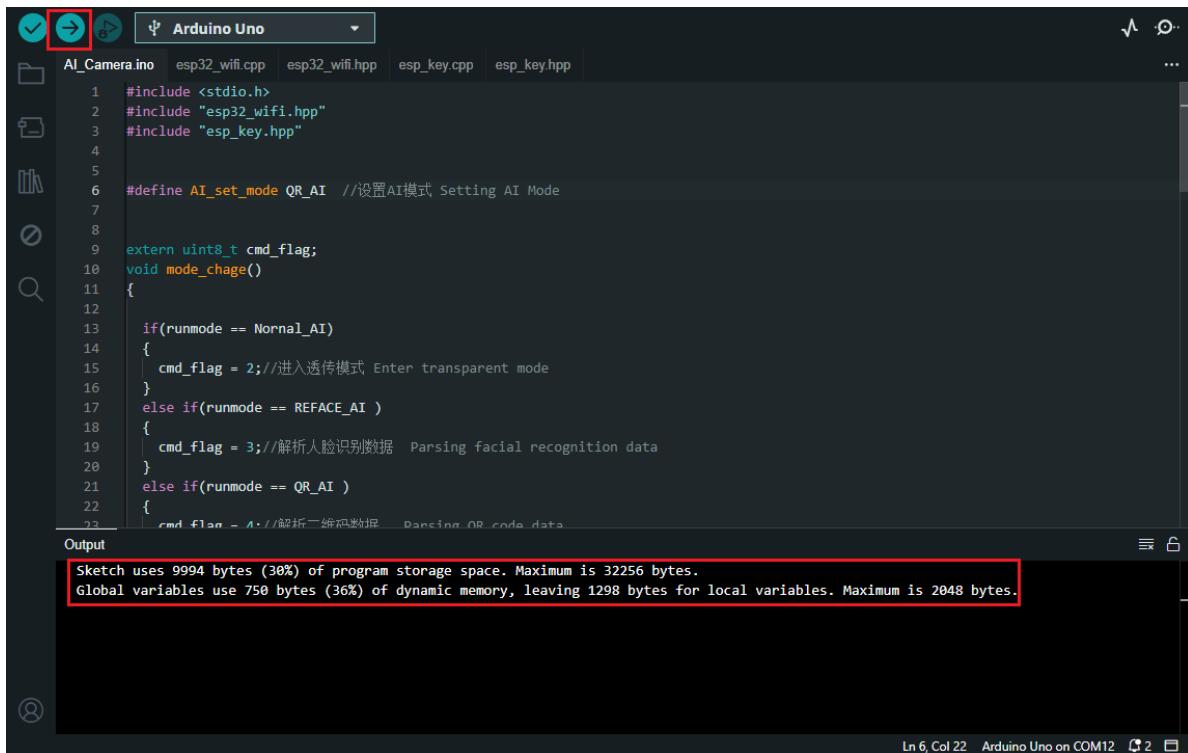
11:26:02.000 -> x: 100
11:26:02.000 -> y: 147
11:26:02.219 -> x: 158
11:26:02.219 -> y: 115
11:26:02.347 -> x: 0
11:26:02.389 -> y: 133
11:26:02.530 -> x: 80
11:26:02.530 -> y: 138
11:26:02.802 -> x: 78
11:26:02.802 -> y: 139
11:26:02.966 -> x: 7
11:26:02.966 -> y: 138
```

QR code detection

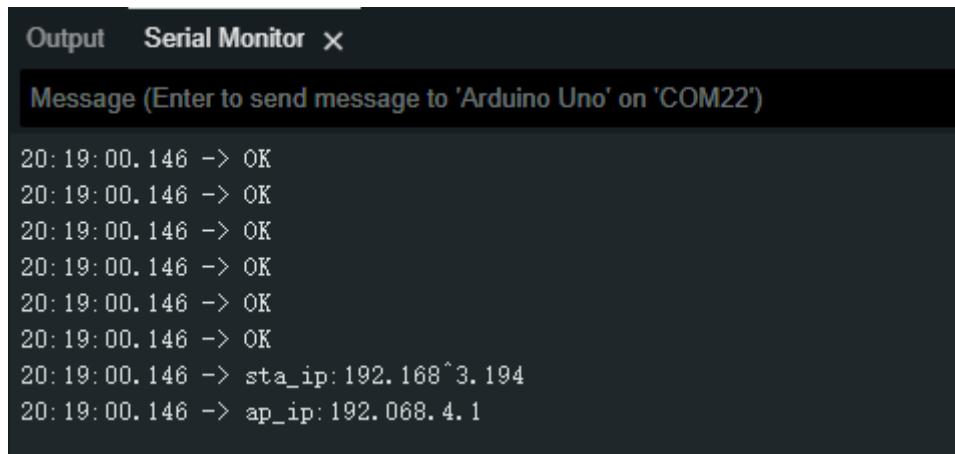
When switching to QR code detection mode,

```
#define AI_set_mode QR_AI //设置AI模式 Setting AI Mode
```

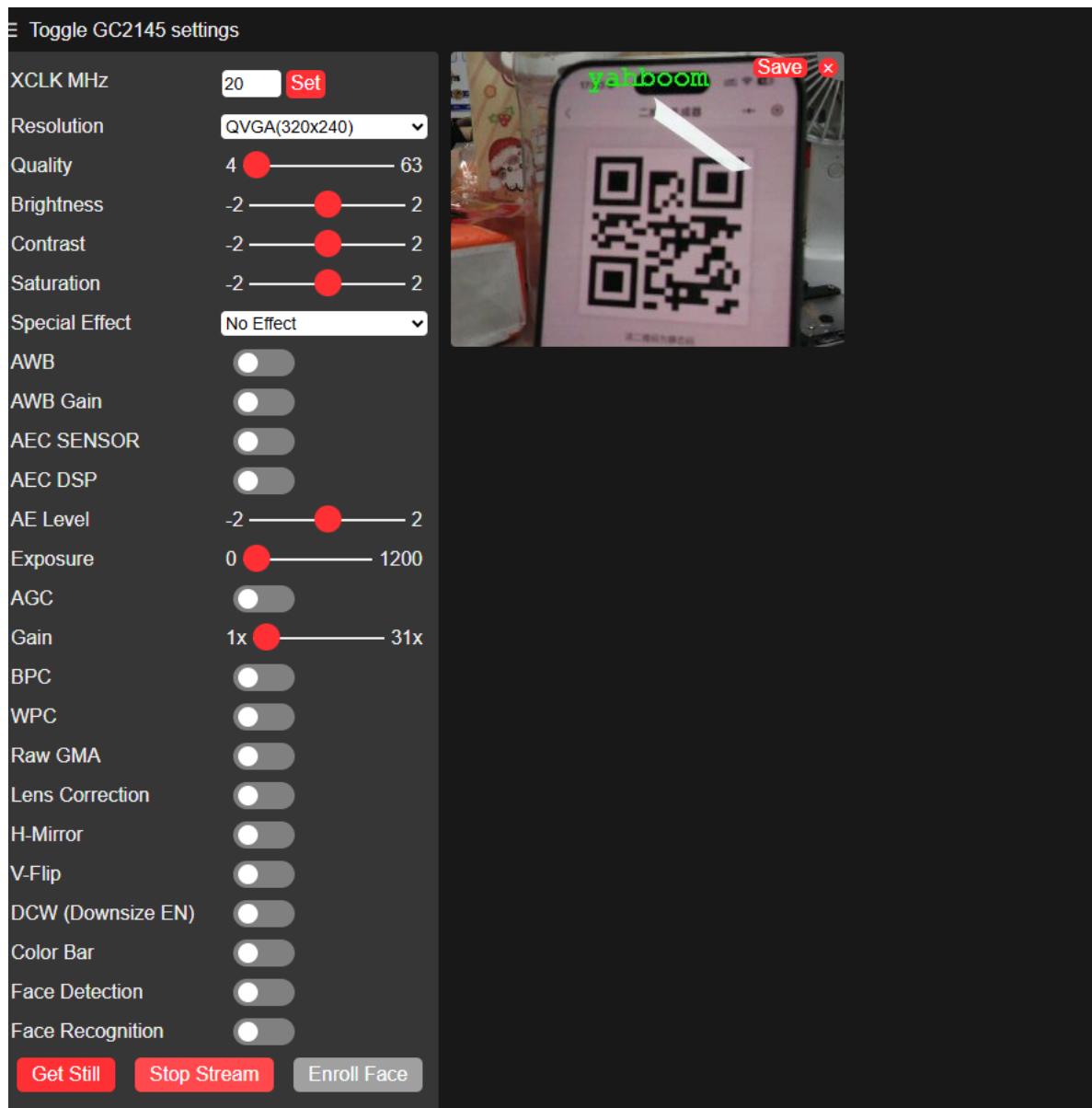
Click Compile and Download, download the program to the uno motherboard, and the following picture will appear if the download is successful



Press the reset button on the uno, wait for a while and you can see the IP address of the network and the address of the hotspot



Use the WeChat applet on your mobile phone to search for the QR code generator, and a QR code will be generated for the corresponding text and saved to the album. The following is the identification QR code.



At the same time, the uno terminal will print out the recognized text.

```

Output  Serial Monitor ×

Message (Enter to send message to 'Arduino Uno' on 'COM3')

10:42:40.955 -> yahboom
10:42:41.190 -> yahboom
10:42:41.470 -> yahboom
10:42:41.705 -> yahboom
10:42:41.976 -> yahboom
10:42:42.201 -> yahboom
10:42:42.517 -> yahboom
10:42:42.796 -> yahboom
10:42:43.074 -> yahboom
10:42:43.254 -> yahboom

```