Jetson Nano remote control servo gimbal

Note: ESP32 camera needs to be burned with factory firmware. If you have not flashed the firmware after receiving the ESP32 camera, you do not need to do so. The factory default firmware is used

1. Experimental preparation

- ESP32 camera
- Jetson Nano development board
- 2-DOF gimbal
- 24-way servo driver board
- USB to TTL

2. Wiring diagram

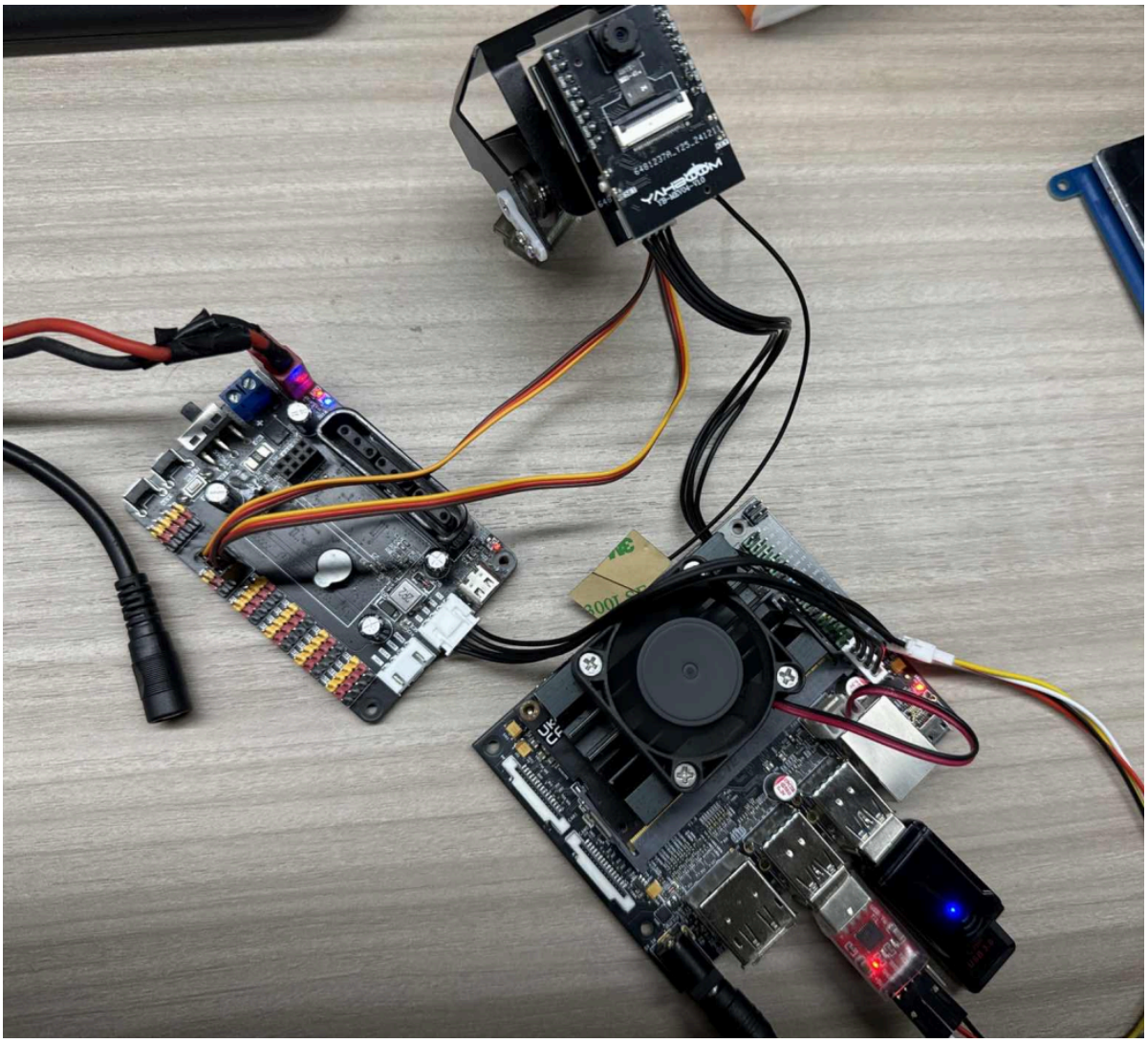
Note: Because Jetson Nano has only one serial port, an external USB to TTL converter is required. Because of insufficient voltage, ESP32 camera and 24-way servo driver board need additional power supply via type-c data cable

Jetson Nano motherboard ----> USB to TTL	**ESP32 camera**
TX	RX
RX	TX
GND	GND
NC	5V

Jetson Nano motherboard	**24-channel servo driver board**
GPIO8	RX
GPIO10	TX
GND	GND
5V	5V

24-channel servo driver board	**Servo**
s5	Vertical servo
s6	Horizontal servo

Physical connection diagram:



Pin diagram:

BCM编码	功能名	物理引脚		功能名	BCM编码
	3V3	1	2	5V	
2	SDA	3	4	5V	
3	SCL	5	6	GND	
4	D4	7	8	D14(TXD)	14
	GND	9	10	D15(RXD)	15
17	D17	11	12	D18	18
27	D27	13	14	GND	
22	D22	15	16	D23	23
	3V3	17	18	D24	24
10	D10	19	20	GND	
9	D9	21	22	D25	25
11	D11	23	24	D8	8
	GND	25	26	D7	7
0	D0(ID_SD)	27	28	D1(ID_SC)	1
5	D5	29	30	GND	
6	D6	31	32	D12	12
13	D13	33	34	GND	
19	D19	35	36	D16	16
26	D26	37	38	D20	20
	GND	39	40	D21	21

3. Experimental steps and results

Quick method: You can directly connect to the wifi opened by esp32. This experiment is named ESP32_WIFI_TEST. Then the IP address camera information of the mobile app is 192.169.4.1, and you can use the app to control the servo

1. Upload the provided program source code "nano_servo.py" file to your own x5 motherboard.
2. The official image of the nano motherboard needs to give serial port permissions every time it is turned on (note that this permission will also be closed after shutdown). Enter in the terminal,

```
sudo chmod 777 /dev/ttyTHS1
sudo chmod 777 /dev/ttyACM0
```

3. Open the code just uploaded and modify it to the wifi name and password you want to connect to. The hotspot name can also be modified, as well as the corresponding wifi mode.

```
Sta_wifi_ssid = "Yahboom2"        #sta的wifi名称 wifi name of sta
Sta_wifi_pd = "yahboom890729"          #sta的wifi名称 wifi name of sta

AP_wifi_ssid = "ESP_WIFI_TEST"  #ap的WiFi名称 The WiFi name of the ap
AP_wifi_pd = ""                 #ap的wifi密码 ap's wifi password
```

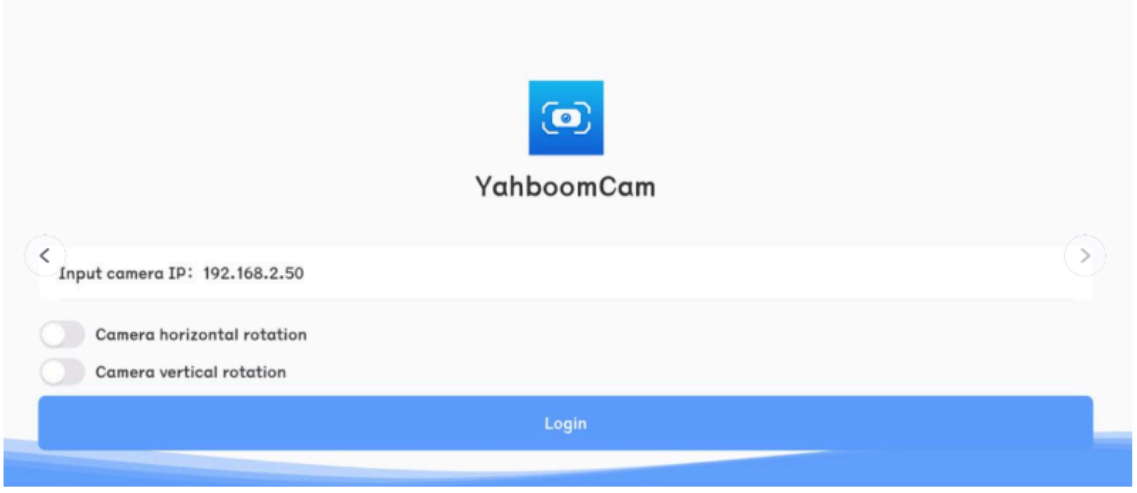
4. Run the program in the terminal, and the IP address of the current network connection and the address of the hotspot will be returned

```
python3 nano_servo.py
```

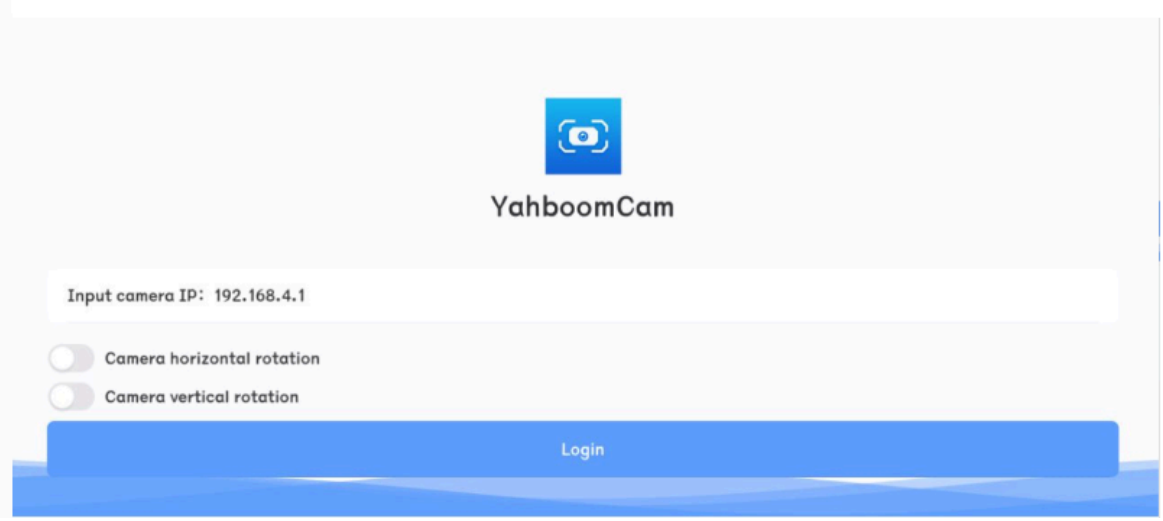
```
jetson@jetson-desktop:~$ python3 nano_servo.py
serial start ...
set_wifi_mode
set_ai_mode
set_sta_wifi
ap_ip:192.168.4.1

sta_ip:192.168.2.97
```

5. Use the app to control the movement of the car. After installing the "ESP32Cam" app, open it.

- On the login page, set it according to the IP obtained by the serial port assistant. If the IP obtained by the serial port assistant is "192.168.2.50", then the configuration is as follows

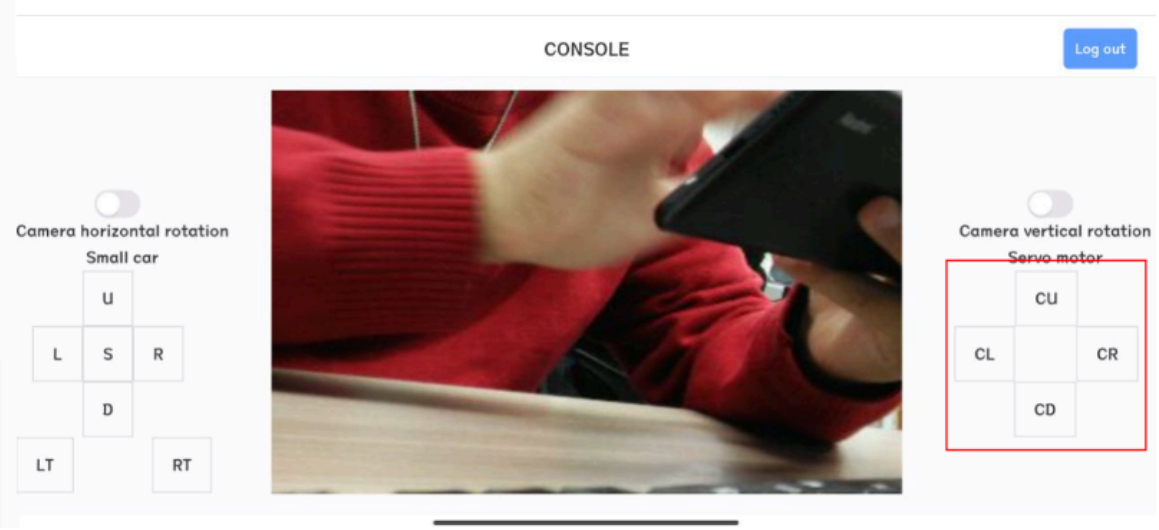


- Then click login directly
- (Optional) If you want to connect to the hotspot of the wifi camera, the IP address must be set to 192.168.4.1, as shown in the figure



- When the IP address is configured correctly and connected successfully, you can control the servo gimbal through the app console page

Horizontal screen



Note: Every time you restart the app, you need to click the exit button in the upper right corner, then exit and reconfigure the IP address information before logging in