

Lesson 2 Group Control

1. Getting Ready

- 1) Prepare at least two or more TonyPi Pro (this lesson takes two robots as example).
- 2) Set development environment. Please refer to file in “3.AI Vision Games -> Lesson 1 Set Development Environment” and download and install VNC remote connection tool .

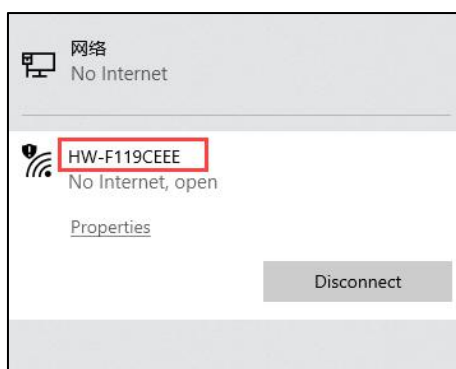
2. Working Principle

Through configuring the mast robot and the slave robot in the same network, the master sends the commands to the group sending program to achieve the effect of controlling the slave.

3. Operation Steps

3.1 Configure the Master Robot

- 1) Firstly, choose a robot as the master. After booting up the robot, connect it to the remote desktop. Take the robot whose hotspot is “HW-F199CEEE” as example.



Note: Please remember the name of the connected hostpot and it will be used in the following steps.

- 2) Open the terminal and enter the WiFi configuration directory. Then enter command “cd /boot/” and press “Enter”.

```
pi@raspberrypi:~ $ cd /boot/
```

- 3) Open WiFi configuration file via vi editor, and then enter command “sudo vim hiwonder_wifi_conf.py” and press “Enter”.

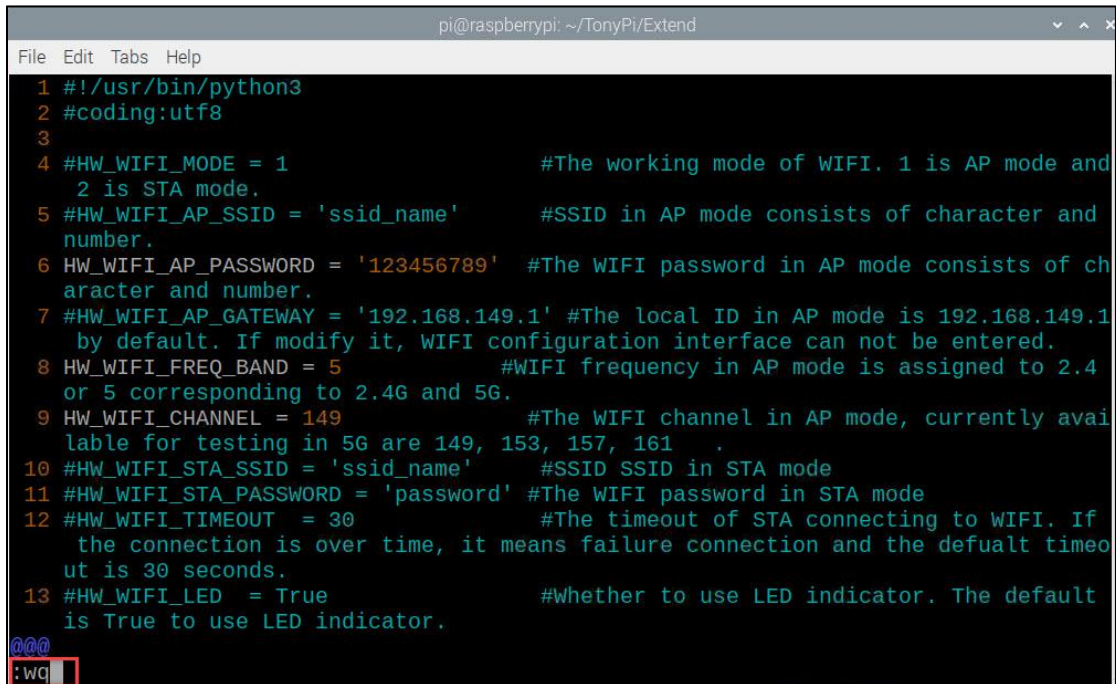
```
pi@raspberrypi:~ $ cd /boot/  
pi@raspberrypi:/boot $ sudo vim hiwonder_wifi_conf.py
```

- 4) Press “i” on keyboard to enter the editing mode.

```
1 #!/usr/bin/python3  
2 #coding:utf8  
3  
4 #HW_WIFI_MODE = 1 #The working mode of WIFI. 1 is AP mode and  
5   2 is STA mode.  
6 #HW_WIFI_AP_SSID = 'ssid_name' #SSID in AP mode consists of character and  
7   number.  
8 #HW_WIFI_AP_PASSWORD = 'password' #The WIFI password in AP mode consists of ch  
9   aracter and number.  
10 #HW_WIFI_AP_GATEWAY = '192.168.149.1' #The local ID in AP mode is 192.168.149.1  
11   by default. If modify it, WIFI configuration interface can not be entered.  
12 HW_WIFI_FREQ_BAND = 5 #WIFI frequency in AP mode is assigned to 2.4  
13   or 5 corresponding to 2.4G and 5G.  
14 HW_WIFI_CHANNEL = 149 #The WIFI channel in AP mode, currently avai  
15   labile for testing in 5G are 149, 153, 157, 161 .  
16 #HW_WIFI_STA_SSID = 'ssid_name' #SSID SSID in STA mode  
17 #HW_WIFI_STA_PASSWORD = 'password' #The WIFI password in STA mode  
18 #HW_WIFI_TIMEOUT = 30 #The timeout of STA connecting to WIFI. If  
19   the connection is over time, it means failure connection and the default timeo  
20   ut is 30 seconds.  
21 #HW_WIFI_LED = True #Whether to use LED indicator. The default  
22   is True to use LED indicator.  
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```

Note: The password cannot less than 8 digits.

- 6) After modification, press “Esc” and then enter “:wq” (Please note that the colon is in front of wq). Then press “Enter” to save and exit the modified content.



```
pi@raspberrypi: ~/TonyPi/Extend
File Edit Tabs Help
1 #!/usr/bin/python3
2 #coding:utf8
3
4 #HW_WIFI_MODE = 1          #The working mode of WIFI. 1 is AP mode and
   2 is STA mode.
5 #HW_WIFI_AP_SSID = 'ssid_name' #SSID in AP mode consists of character and
   number.
6 HW_WIFI_AP_PASSWORD = '123456789' #The WIFI password in AP mode consists of ch
   aracter and number.
7 #HW_WIFI_AP_GATEWAY = '192.168.149.1' #The local ID in AP mode is 192.168.149.1
   by default. If modify it, WIFI configuration interface can not be entered.
8 HW_WIFI_FREQ_BAND = 5      #WIFI frequency in AP mode is assigned to 2.4
   or 5 corresponding to 2.4G and 5G.
9 HW_WIFI_CHANNEL = 149      #The WIFI channel in AP mode, currently avai
   lable for testing in 5G are 149, 153, 157, 161
10 #HW_WIFI_STA_SSID = 'ssid_name' #SSID SSID in STA mode
11 #HW_WIFI_STA_PASSWORD = 'password' #The WIFI password in STA mode
12 #HW_WIFI_TIMEOUT = 30      #The timeout of STA connecting to WIFI. If
   the connection is over time, it means failure connection and the default timeo
   ut is 30 seconds.
13 #HW_WIFI_LED = True        #Whether to use LED indicator. The default
   is True to use LED indicator.
:~:~:~
:wq
```

- 7) Enter command “sudo reboot” to reboot the robot (this step can not skip!).

3.2 Configure the Slave Robot

Note: Take configuring a slave as example to illustrate. Multiple slaves can refer to the same configuration method.

- 1) Open the terminal and enter the WiFi configuration directory. Then enter command “cd /boot/” and press “Enter”.

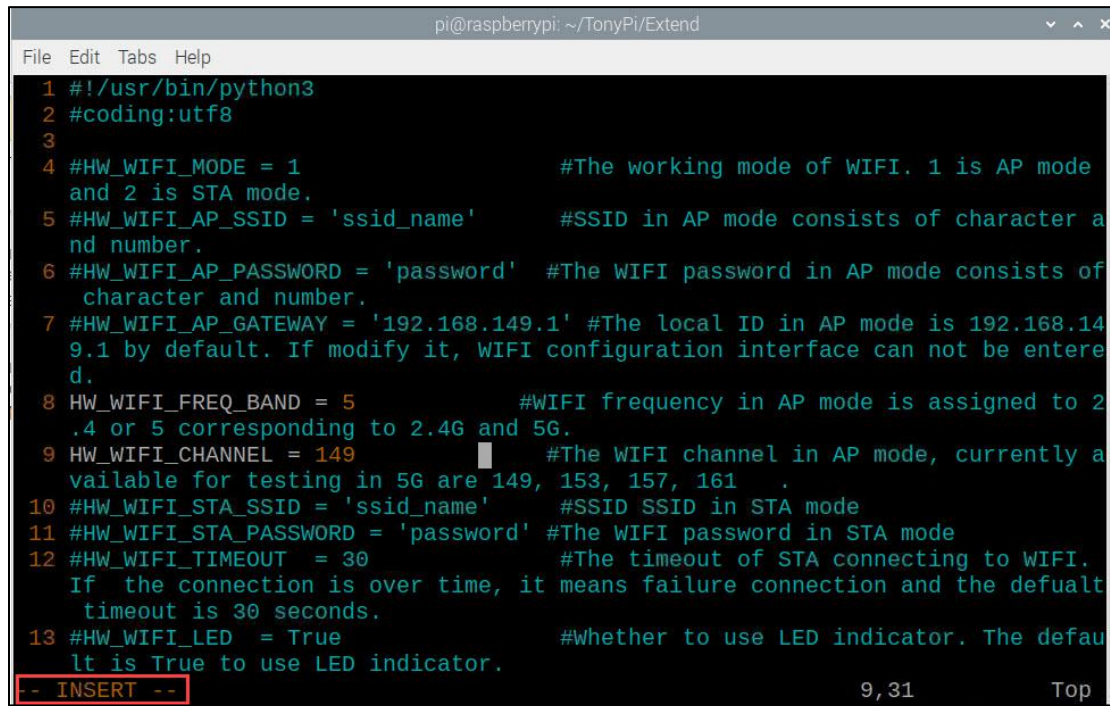


```
pi@raspberrypi:~ $ cd /boot/
```

- 2) Open WiFi configuration file via vi editor, and then enter command “sudo vim hiwonder_wifi_conf.py” and press “Enter”.

```
pi@raspberrypi:~ $ cd /boot/  
pi@raspberrypi:/boot $ sudo vim hiwonder_wifi_conf.py
```

3) Press “i” on keyboard to enter the editing mode.



```
pi@raspberrypi: ~/TonyPi/Extend  
File Edit Tabs Help  
1 #!/usr/bin/python3  
2 #coding:utf8  
3  
4 #HW_WIFI_MODE = 1 #The working mode of WIFI. 1 is AP mode  
   and 2 is STA mode.  
5 #HW_WIFI_AP_SSID = 'ssid_name' #SSID in AP mode consists of character a  
   nd number.  
6 #HW_WIFI_AP_PASSWORD = 'password' #The WIFI password in AP mode consists of  
   character and number.  
7 #HW_WIFI_AP_GATEWAY = '192.168.149.1' #The local ID in AP mode is 192.168.14  
   9.1 by default. If modify it, WIFI configuration interface can not be entere  
   d.  
8 HW_WIFI_FREQ_BAND = 5 #WIFI frequency in AP mode is assigned to 2  
   .4 or 5 corresponding to 2.4G and 5G.  
9 HW_WIFI_CHANNEL = 149 #The WIFI channel in AP mode, currently a  
   vailable for testing in 5G are 149, 153, 157, 161 .  
10 #HW_WIFI_STA_SSID = 'ssid_name' #SSID SSID in STA mode  
11 #HW_WIFI_STA_PASSWORD = 'password' #The WIFI password in STA mode  
12 #HW_WIFI_TIMEOUT = 30 #The timeout of STA connecting to WIFI.  
   If the connection is over time, it means failure connection and the default  
   timeout is 30 seconds.  
13 #HW_WIFI_LED = True #Whether to use LED indicator. The defau  
   lt is True to use LED indicator.  
-- INSERT -- 9,31 Top
```

4) The hotspot name and password of the slave are set to be the same as the hotspot name and password of the master (this lesson takes “ID: HW-F119CEEE” as example). Then uncomment the code and the operation is as the figure shown below:


```

pi@raspberrypi: ~/TonyPi/Extend
File Edit Tabs Help
1 #!/usr/bin/python3
2 #coding:utf8
3
4 HW_WIFI_MODE = 2 #The working mode of WIFI. 1 is AP mode and 2 is STA mode.
5 #HW_WIFI_AP_SSID = 'ssid_name' #SSID in AP mode consists of character and number.
6 #HW_WIFI_AP_PASSWORD = 'password' #The WIFI password in AP mode consists of character and number.
7 #HW_WIFI_AP_GATEWAY = '192.168.149.1' #The local ID in AP mode is 192.168.149.1 by default. If modify it, WIFI configuration interface can not be entered.
8 #HW_WIFI_FREQ_BAND = 5 #WIFI frequency in AP mode is assigned to 2.4 or 5 corresponding to 2.4G and 5G.
9 #HW_WIFI_CHANNEL = 149 #The WIFI channel in AP mode, currently available for testing in 5G are 149, 153, 157, 161.
10 HW_WIFI_STA_SSID = 'HW-F119CEEE' #SSID SSID in STA mode
11 HW_WIFI_STA_PASSWORD = '123456789' #The WIFI password in STA mode
12 #HW_WIFI_TIMEOUT = 30 #The timeout of STA connecting to WIFI. If the connection is over time, it means failure connection and the default timeout is 30 seconds.
13 #HW_WIFI_LED = True #Whether to use LED indicator. The default is True to use LED indicator.
-- INSERT -- 11,1 Top

```

- 5) After modification, press “Esc” and then enter “:wq” (Please note that the colon is in front of wq). Then press “Enter” to save and exit the modified content.

```

1 #!/usr/bin/python3
2 #coding:utf8
3
4 HW_WIFI_MODE = 2 #The working mode of WIFI. 1 is AP mode and 2 is STA mode.
5 #HW_WIFI_AP_SSID = 'ssid_name' #SSID in AP mode consists of character and number.
6 #HW_WIFI_AP_PASSWORD = 'password' #The WIFI password in AP mode consists of character and number.
7 #HW_WIFI_AP_GATEWAY = '192.168.149.1' #The local ID in AP mode is 192.168.149.1 by default. If modify it, WIFI configuration interface can not be entered.
8 #HW_WIFI_FREQ_BAND = 5 #WIFI frequency in AP mode is assigned to 2.4 or 5 corresponding to 2.4G and 5G.
9 #HW_WIFI_CHANNEL = 149 #The WIFI channel in AP mode, currently available for testing in 5G are 149, 153, 157, 161.
10 HW_WIFI_STA_SSID = 'HW-F119CEEE' #SSID SSID in STA mode
11 HW_WIFI_STA_PASSWORD = '123456789' #The WIFI password in STA mode
12 #HW_WIFI_TIMEOUT = 30 #The timeout of STA connecting to WIFI. If the connection is over time, it means failure connection and the default timeout is 30 seconds.
13 #HW_WIFI_LED = True #Whether to use LED indicator. The default is True to use LED indicator.
:wq

```

- 6) Enter command “sudo reboot” to reboot the robot (this step can not skip!).

3.3 Group Control

Note: When controlling the group of robots, the slave can be turned on after the master robot is boot up successfully.

- 1) Place the master robot and the slave robot on a clean and flat ground, and keep a certain distance from each other.
- 2) Plug the handle receiver into the USB port of the master, and then switch on the handle to control the group of robots.

4. Project Outcome

After the program is started, the master and the slave will perform the same action group at the same time.