


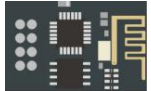


Lesson 8 Remotely controlling the Servo with ESP8226

In this lesson, we will learn how to use the ESP8266 module to establish a wireless connection and remotely control the servo.

8.1 Components used in this course

Components	Quantity	Picture
AdeptPixie Drive Board	1	
Micro USB Cable	1	
AD002 Servo	1	
ESP8266	1	

8.2 Introduction of ESP8266 Module

8.2.1 Introduction to ESP8266

ESP8266 is an ultra-low-power UART-WiFi transparent transmission module. It has a very competitive package size and ultra-low energy consumption technology in the industry. It is specially designed for mobile devices and IoT applications. The user's physical device can be connected to the Wi-Fi wireless network for Internet or local area network communication to achieve networking functions. ESP8266 can be widely used in smart grid, smart transportation, smart furniture, handheld devices, industrial control and other fields.

8.2.2 Main functions of ESP8266.

The main functions that ESP8266 can implement include: serial port transparent transmission, PWM control, and GPIO control. Serial port transparent transmission: data transmission, transmission reliability is good, the maximum transmission rate is: 460800bps.

PWM control: light control, three-color LED control, motor speed control, etc.

GPIO control: controlling switches, relays, etc.

8.2.3 ESP8266 working mode

The ESP8266 module supports three working modes: STA/AP/STA+AP.

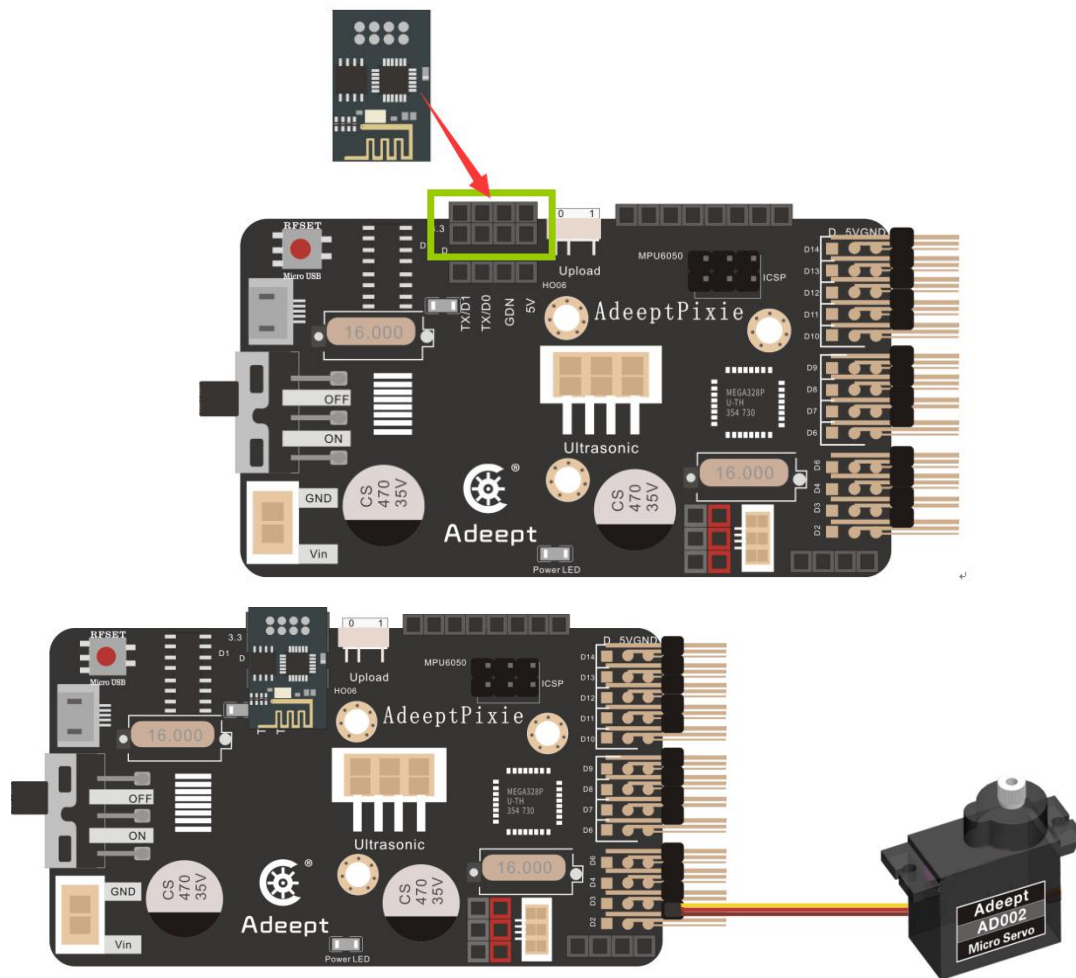
(1) STA mode: The ESP8266 module connects to the Internet by a router, and the mobile phone or computer realizes remote control of the device with the Internet.

(2) AP mode: The ESP8266 module is used as a hotspot to realize the direct communication between the mobile phone or computer and the module, and realize the wireless control of the LAN.

(3) STA+AP mode: the coexistence mode of the two modes, which can realize seamless switching with Internet control, which is convenient for operation.

8.3 Wiring diagram (circuit diagram)

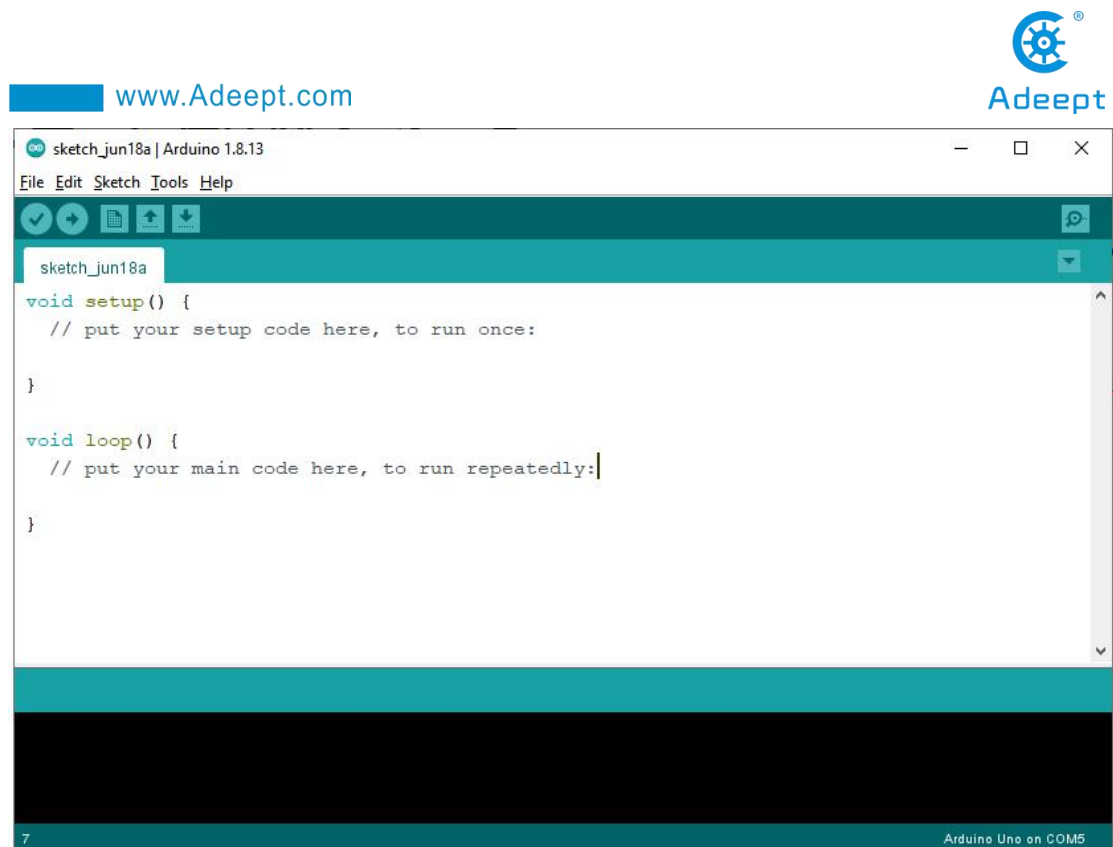
Connect the components used in this lesson to the circuit as shown in the figure below. Connect the ESP8266 module to the wifi port on the AdeeptPixie Drive Board. Pay attention to the corresponding pin numbers, as shown in the figure below



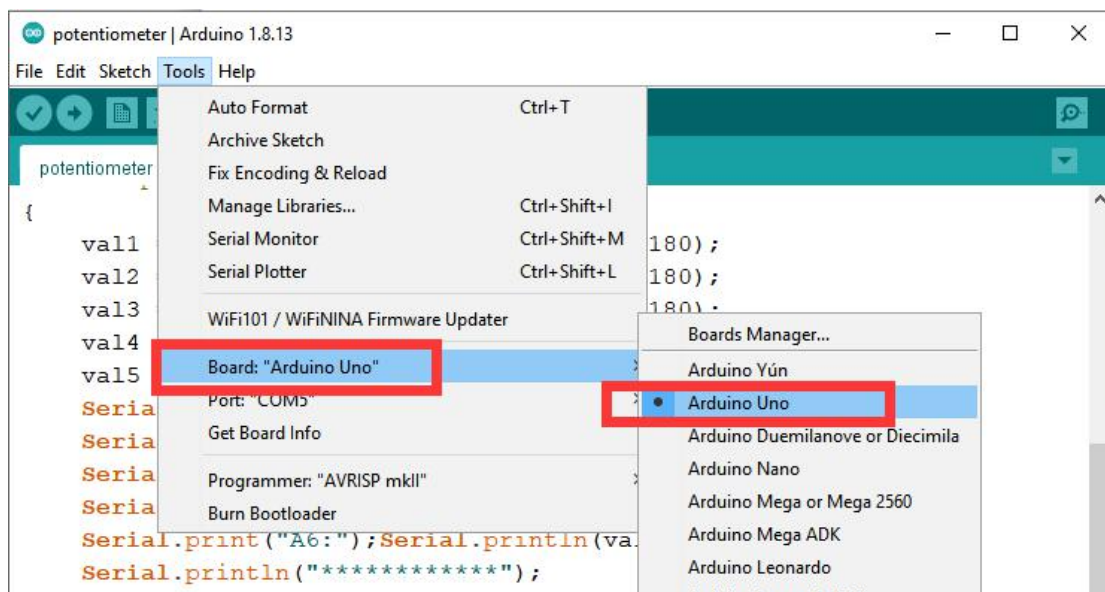
8.4 Learn the code program of ESP8266.ino

Let's first learn how to establish a wireless connection based on ESP8266 in the sample program provided in this course.

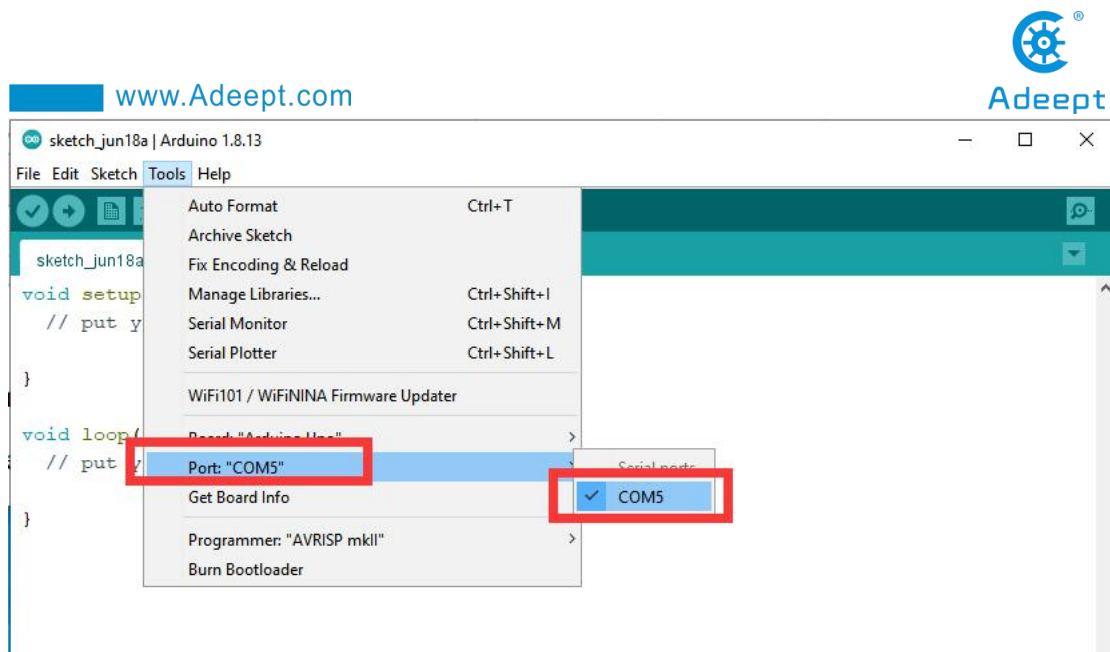
1. You need to use Micro USB Cable to connect AdeptPixie Drive Board to your computer, and then open the Arduino IDE, as shown below:



2. In the Tools toolbar, find Board and select Arduino Uno, as shown below:



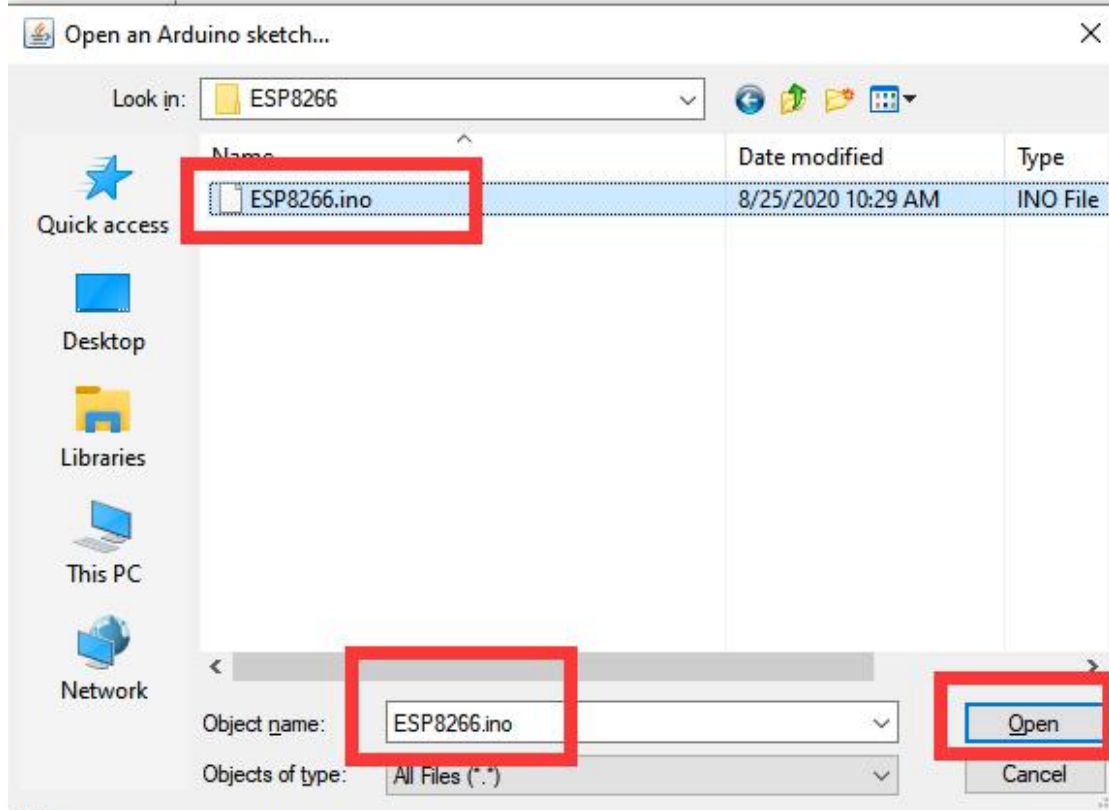
3. Click "Tools" and select the port number of the connected AdeeptPixie Drive Board in "Port": COM5, as shown in the figure below:



4. You need to open the code program of this lesson. In the File in the upper left corner, click Open, as shown below:



5. Find the file information provided by Adept: Hexapod 6 Legs Spider Robot Kit for Arduino\03Course code, open the Lesson8_ESP8266 folder, select ESP8266.ino, this file is the code program we need to use in this lesson, and then click Open.



6. After opening, you will see the code inside. The following is an explanation of the code:

The most core code program is in the loop() function.

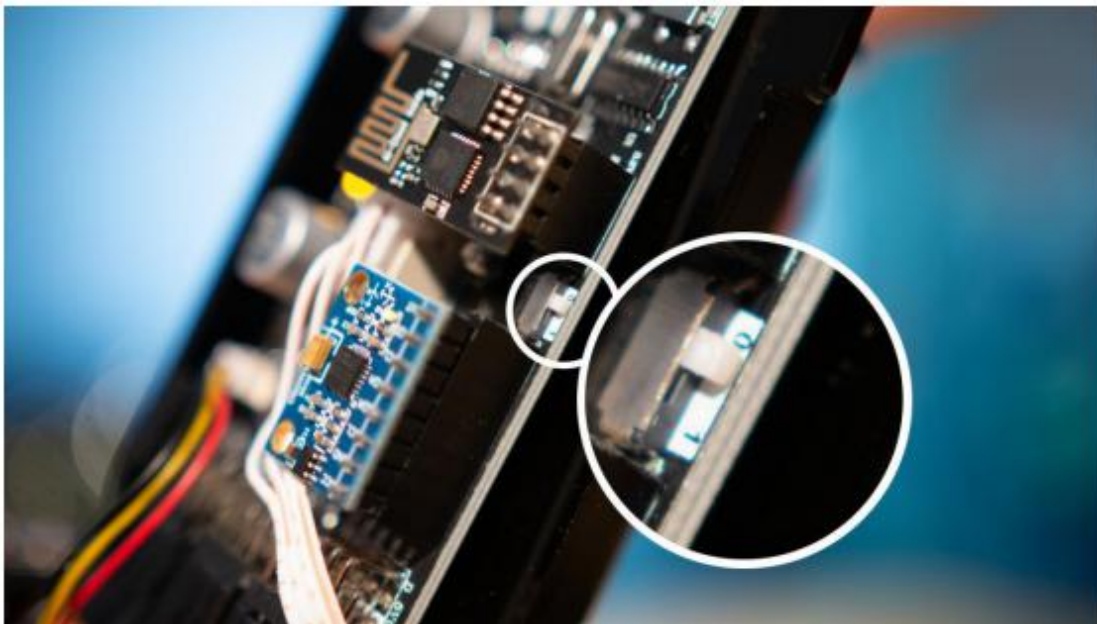
```
void loop()
{
    while (Serial.available() > 0)
    {
        comdata += char(Serial.read());
        delay(1);
    }
    judgement();
    switch (judge)
    {
```


Use the endsWith() function in the judgement() function to judge whether the received string is followed by the keywords we need, because the string sent through TCP communication is in this format: "\r\n+IPD, 0,1:forwardStart\n", the final string forwardStart\n is what we want. So we use endsWith() to get and make a judgment, judge which button is clicked, and then execute the program to make the servo move.

```
void judgement(){  
  if (comdata.length() > 0)  
  { if(comdata.endsWith(text1) || comdata.endsWith(phone1)) { //forward  
    judge=1;  
  
    }  
    if(comdata.endsWith(text2) || comdata.endsWith(phone2)) { //backward  
    judge=2;  
    }  
    if(comdata.endsWith(text3) || comdata.endsWith(phone3)) { //right  
    judge=3;  
    }  
    if(comdata.endsWith(text4) || comdata.endsWith(phone4)) { //left  
    judge=4;  
  }  
}
```

8.5 Remotely controlling servo

1. In the Arduino IDE of the opened ESP8266.ino, you need to turn the "Upload 0 RUN 1" switch on the AdeeptPixie Drive Board to the 0 position. Then upload this program to AdeeptPixie Drive Board, as shown below:

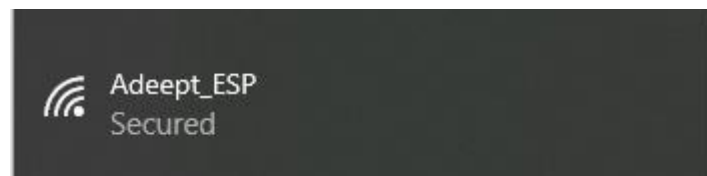


2. Click the button  to upload the ESP8266.ino program to the AdeeptPixie Drive Board. If the upload is successful, there will be no red warning on the console, and the prompt text "Done uploading" appears in the upper left corner, as shown below:

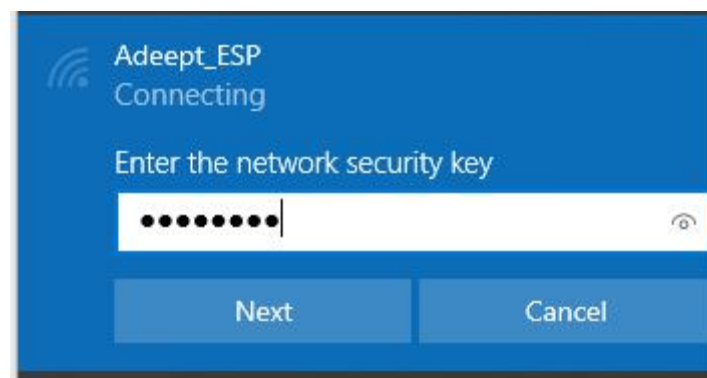


3. After the download is complete, you also need to turn the "Upload 0 RUN 1" switch to the 1 position.

4. After the upload is successful, the ESP8266 module will generate a Wifi hotspot by default. You can check the name with "ESP" in the WIFI list. This hotspot is generated by ESP8266.



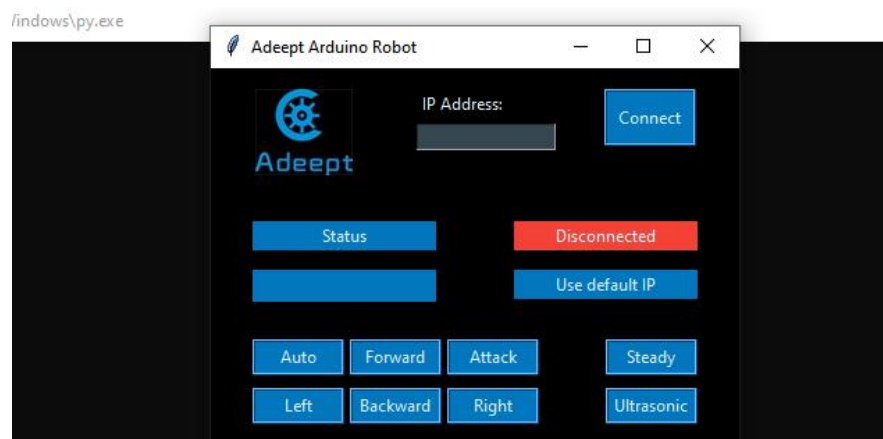
5. Now you need to connect to the WIFI hotspot generated by the ESP8266 module with your computer. The initial password of this hotspot is 12345678.



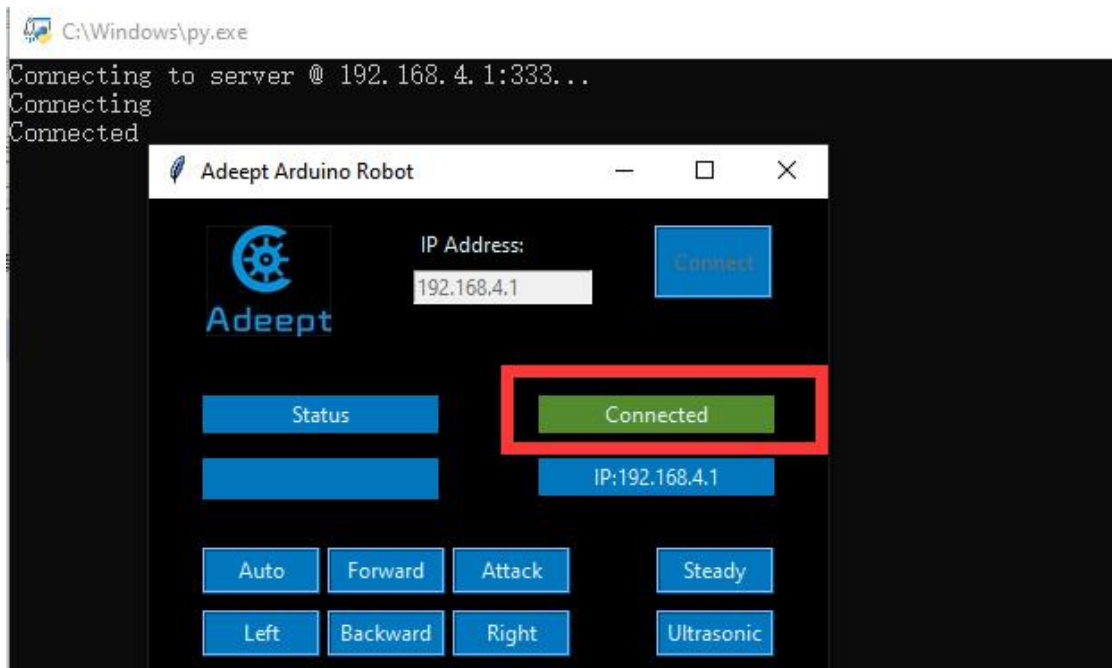
【Pay attention】

1. If you are using a desktop computer, you need to purchase an additional USB wireless network card device. With this device, the desktop computer can be connected to the WIFI hotspot of the ESP8266 module.

6. Find the file information provided by Adeept for users: Hexapod 6 Legs Spider Robot Kit for Arduino\03Course code, open the Lesson8_ESP8266 folder, double-click to open GUI info v1.0.py (the computer needs to be installed with Python runtime environment), as shown in the figure below:



7. You need to enter the default IP address of the ESP8266 module in the "IP Address" input field: 192.168.4.1, this IP address is universal in the world, and it is generated by the ESP8266 module by default. Click the Connect button, after the connection is successful, the interface will display a green "Connect button".



8. By clicking the "Forward" and "Backward" buttons in the GUI interface, the servo can be controlled. In Lesson 12, we will teach you in detail how to use this GUI application to control the robot.

