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Osoyoo V2.1 Robot Car Lesson 6: Use WIFI to control an IoT Robot Car

Post Time: 2020-05-12 18:05:47   Category: V2.1 Robot car kit

NOTE: ALL OSOYOO PRODUCTS FOR ARDUINO ARE THIRD PARTY BOARD WHICH IS FULLY COMPATI ARDUINO

OSOYOO V2.1 Robot Car for Arduino Lesson 6 : WIFI IoT controlled

Authorized Online Retailers

Where to buy the set with 18650 batteriese and USB charger

| Buy from OSOYOO	Buy from US	Buy from UK	Buy from DE	Buy from IT	Buy from FR	Buy from ES	
OSOYOO Store	BUY NOW	BUY NOW	BUY NOW	BUY NOW	BUY NOW	BUY NOW	
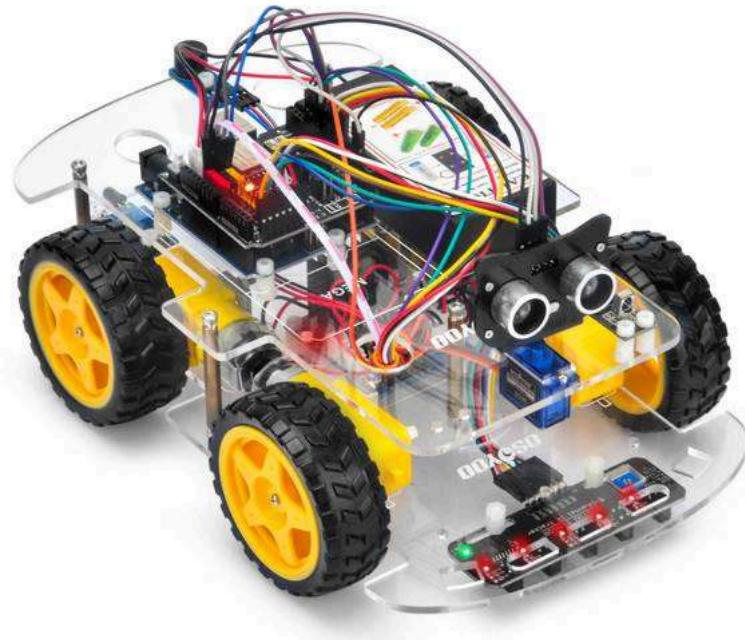
Buy the V2.1 Robot car without Battery and charger:

Buy from OSOYOO	Buy from US	Buy from UK	Buy from DE	Buy from IT	Buy from FR	Buy from ES	
OSOYOO Store	BUY NOW	BUY NOW	BUY NOW	BUY NOW	BUY NOW	BUY NOW	

Objective:

In this project we will connect Robot Car to WIFI and Use an APP to control the car through Internet. This is a typical Inte Things(IoT) Application.

You must complete **lesson 5** before you continue on with this lesson.

Parts and Devices:

No.	Picture	Device	Qty.	Accessories	Link
1		Ultrosonic Sensor	1	M1.4*8 Screw x 4 M1.4 Nut x 4	Click here to buy
2		Servo Motor	1	M2.2*8 Self Tapping Screw x 2 M2*4 Self Tapping Screw x 1	Click here to buy
3		Mount Holder for Ultrasonic Sensor	1	M1.4*8 Screw x 4 M1.4 Nut x 4 M2*4 Self Tapping Screw x 1	Click here to buy
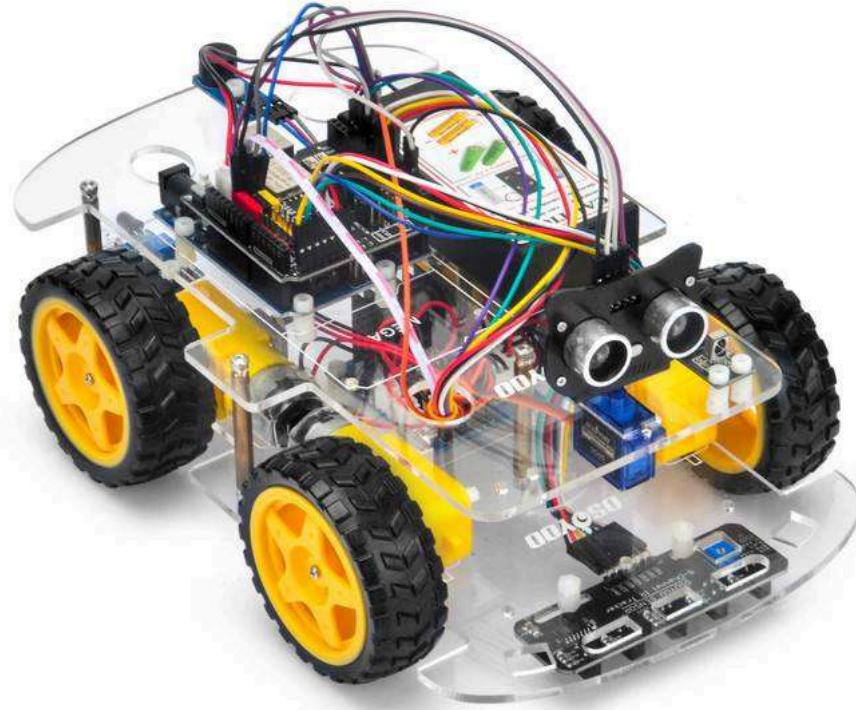
4		Buzzer Sensor Module	1	M3 Plastic Screw x 1 M3 Plastic Nut x 1 M3 Plastic Pillar x 1	Click here to buy
5		Tracking sensor module	1	M3 Plastic Screw x 2 M3 Plastic Nut x2 M3 Plastic Pillar x 2	Click here to buy
6		7pin 25cm Female to Female Cable	1		Click here to buy
7		20Pin jumper wire Male to female 20cm	some		Click here to buy
8		Philips screwdriver	1		Click here to buy
9		Hex Screwdriver	1		Click here to buy
10		M2*4 self tapping screw	1		

11		M2.2*8 self tapping screw	2		
12		M1.4*8 screw and nut	4		
13		M3 plastic screw	1		
14		M3 plastic pillar	1		
15		M3 plastic nut	1		

Hardware Installation :
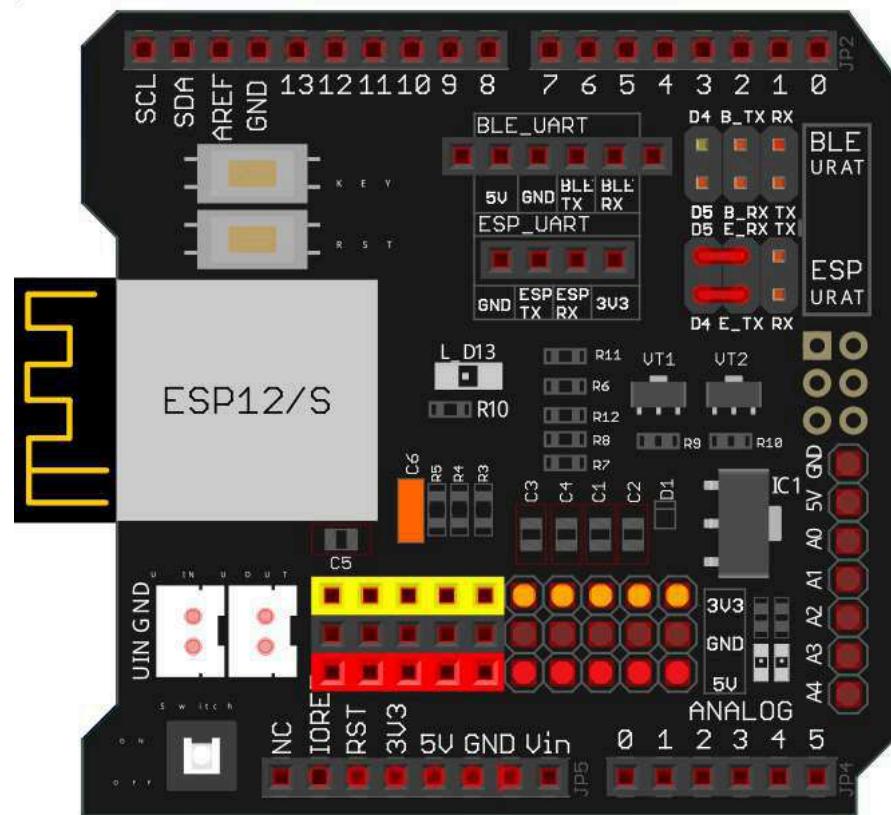
Step 1: Install the smart car basic frame work as per lesson 5. If you don't install tracking sensor module, please completed installatio
4.

Note: As the limited Digital signal pins, you need to remove some wires of lesson 2 and lesson3. If you have already com
installation in Lesson 1 , Everything keep it as is except move ENA from D9 to D3(we need D9 for Servo control). If you h
installed Lesson 2 or 3, you have to remove the wires.
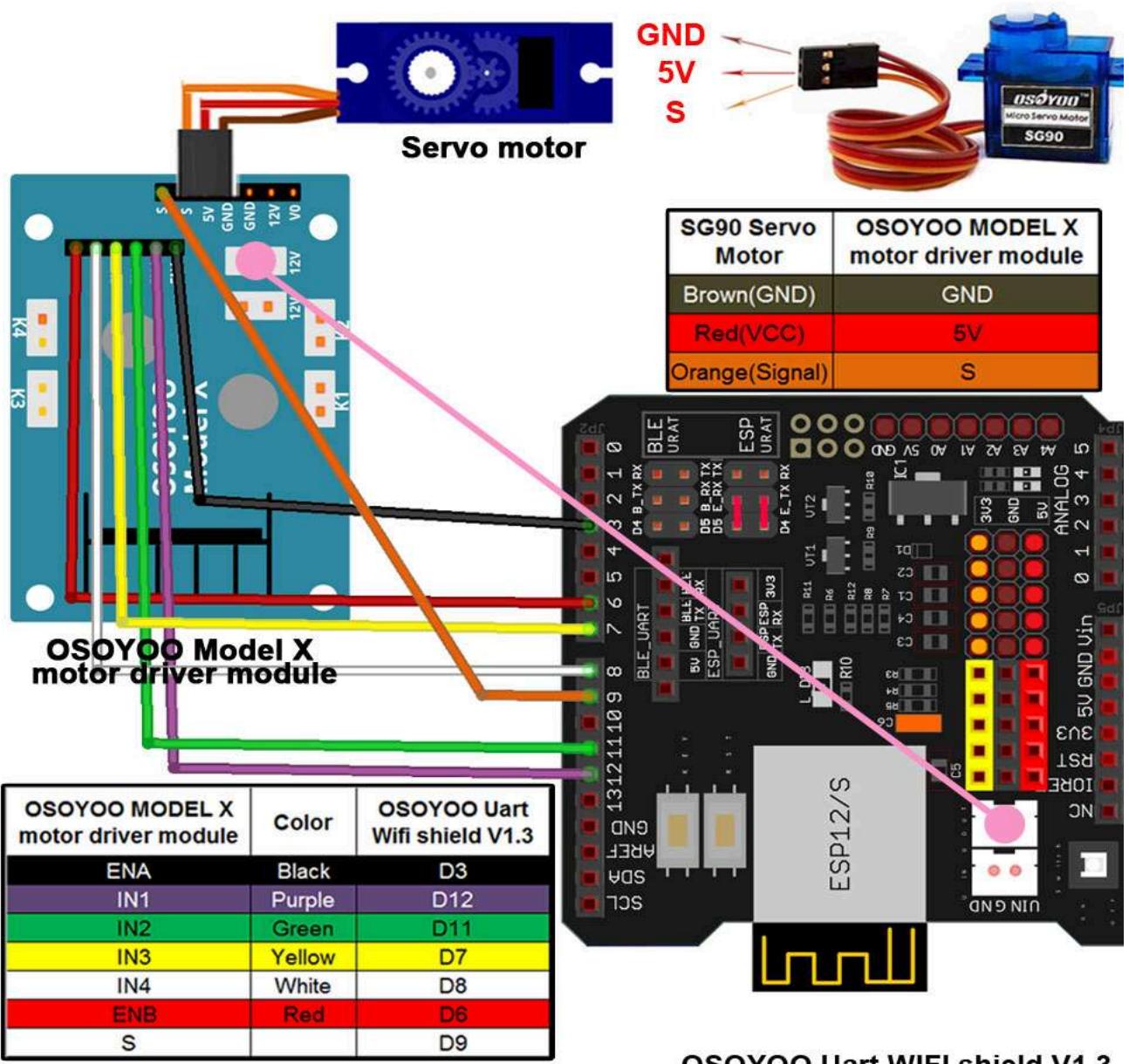
Step 2: Connect E_TX (Esp8266 TX) pin to D4(soft serial RX for UNO) and E_RX(ESP8266_RX) pin to D5(software serial TX for UNC following picture
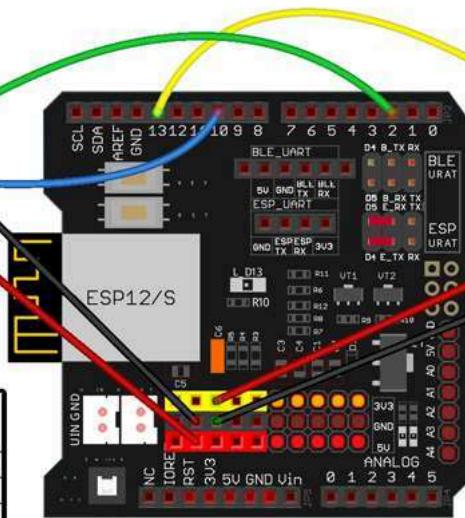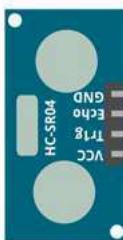
(**Note:** Our OSOYOO Uart WiFi shield V1.3 are connected BLE URAT TX/RX ports to D4,D5 with jumper caps by default. If you find th TX/RX ports are connected, you need remove these jumper caps and change to connect ESP URAT E-TX to D4 and E-RX to D5)

**Step 3:** Connect SG90 servo motor, OSOYOO MODEL X motor driver module and OSOYOO Uart WiFi shield V1.3 as following graph complete wires in lesson 5, please skip this step):

SG90 Servo Motor	OSOYOO MODEL X motor driver module
Brown(GND)	GND
Red(VCC)	5V
Orange(Signal)	S

OSOYOO MODEL X motor driver module	Color	OSOYOO Uart Wifi shield V1.3
ENA	Black	D3
IN1	Purple	D12
IN2	Green	D11
IN3	Yellow	D7
IN4	White	D8
ENB	Red	D6
S		D9
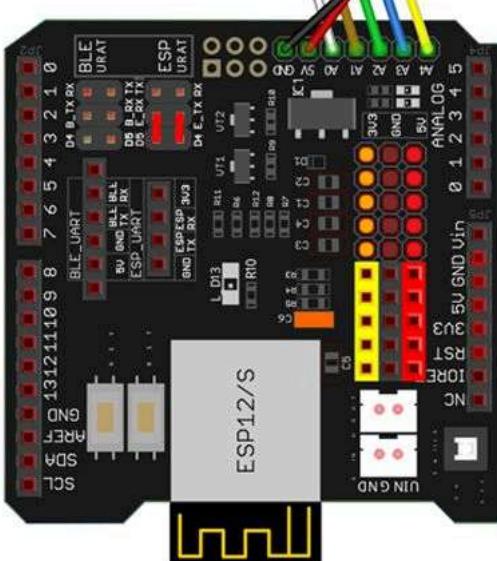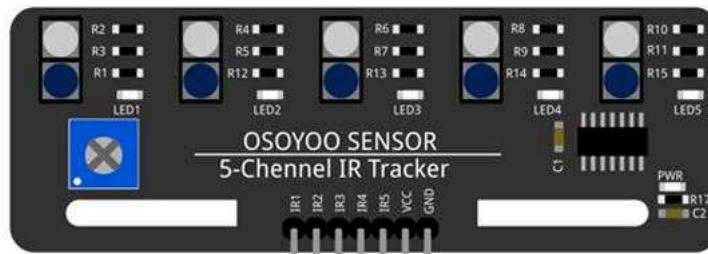
Step 4: Connect ultrasonic module, buzzer module with OSOYOO Uart WiFi shield V1.3 as below connection diagram (If you complet lesson 5, please skip this step)

Ultrasonic sensor

OSOYOO Uart Wifi shield V1.3	Ultrasonic Module
GND	GND
D2	Echo
D10	Trig
5V	VCC

OSOYOO Uart WiFi shield V1.3

Buzzer sensor modul

OSOYOO Uart Wifi shield V1.3	Buzzer Module
GND	GND
3.3v	VCC
D13	I/O

Step 5: Connect tracking sensor module with OSOYOO Uart WiFi shield V1.3 as below connection diagram (If you complete wires in l please skip this step)

Tracking sensor module

OSOYOO SENSOR
5-Chennel IR Tracker

7pin 25cm Female to Female Cable

OSOYOO Uart WiFi shield V1.3

Tracking sensor module	IR1	IR2	IR3	IR4	IR5	VCC	GND
Color	White	Ochre	Blue	Green	Yellow	Red	Black
OSOYOO Uart Wifi shield V1.3	A0	A1	A2	A3	A4	5V	GND

Note：

1) Please remember to adjust the sensitivity of tracking sensor modules as per link lesson 4
2) Please remember to do Ultrasonic sensor direction alignment as per link lesson 5

Software Installation:
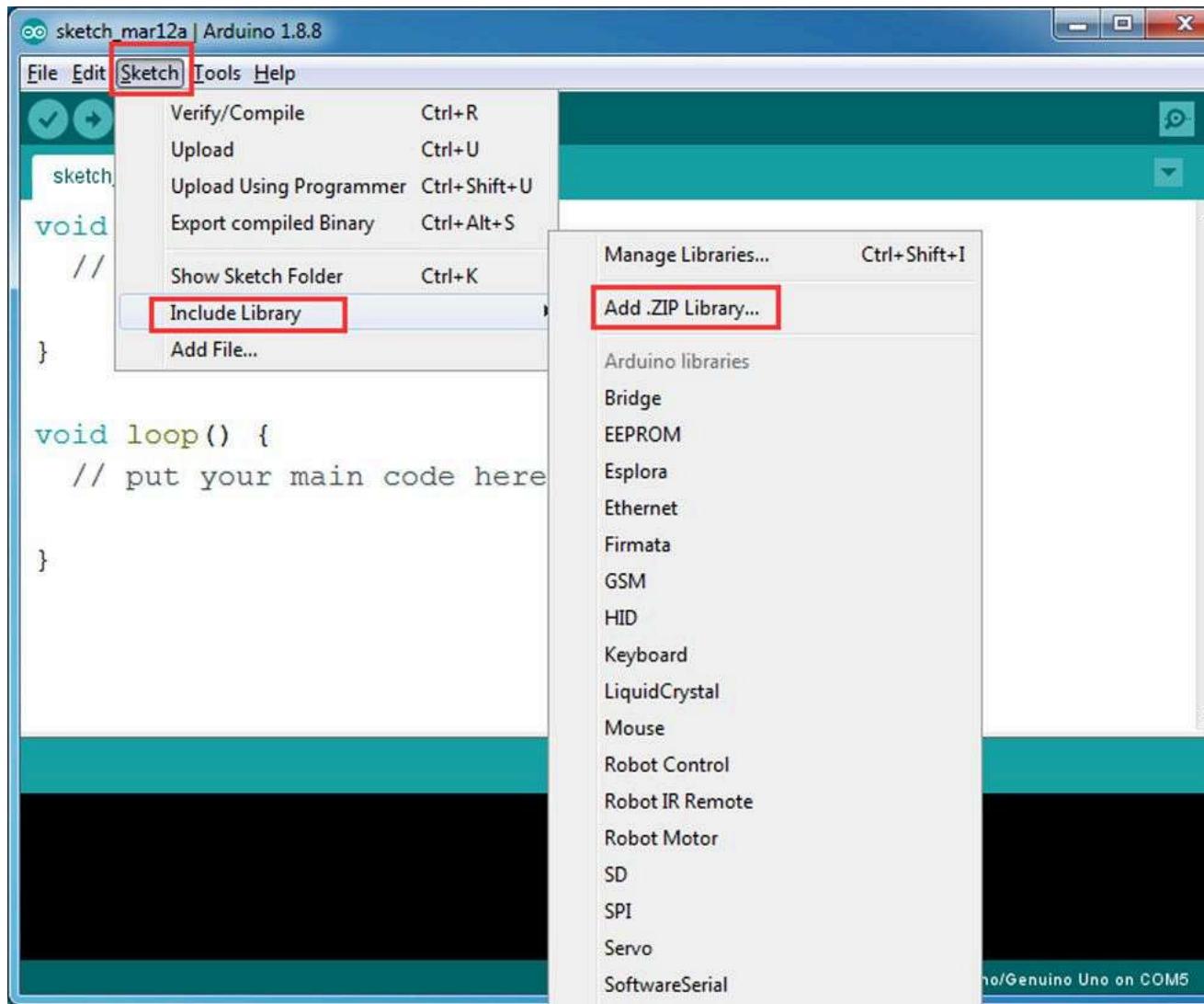
Open-source Arduino Software(IDE)		Download IDE here: https://www.arduino.cc/en/Main/Software?setlang=en
7 zip is a free zip utility that un-zips zip files		Download 7zip here for free https://www.7-zip.org/
Osoyoo WIFI Robot APP		search "Osoyoo IoT UDP Robot APP" in Google Play or Apple Store(If you can not find this APP in Google you can directly download the APP from following link: https://osoyoo.com/driver/udp-app.apk)

Step 1) Download OSOYOO Wi-Fi UDP Robot Car control APP
In Google Play or Apple Store, please search keywords "OSOYOO IoT UDP Robot APP", you will find a red as following (Note: If you can not find this APP in Google Play, you can directly download the APP from foll link: https://osoyoo.com/driver/udp-app.apk):

Step 2) Please download the library zip file from WiFiEsp-master .Open IDE ->click Sketch ->Include Library ->Add .ZIP library above zip file into sketch.
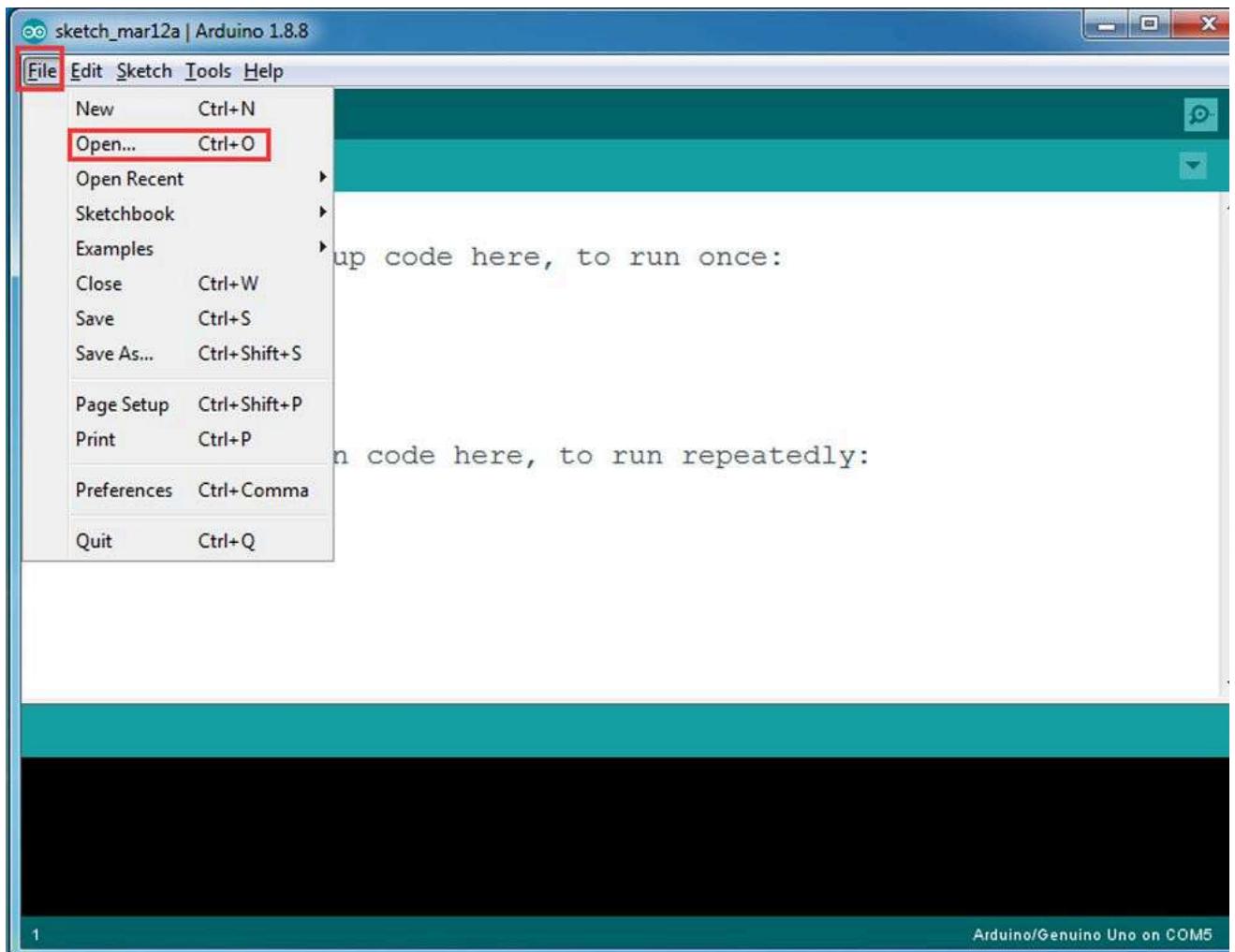
Step 3) Sketch code Installation:

Osoyoo V2 Robot Car can work in two WIFI modes: STA mode and AP mode. The sketches for these two modes are different. Let's ex two modes one by one

A)STA mode

In STA mode, V2.1 Robot Car will be a client device of your LAN router. You need save the SSID name and password of your LAN rou Once the sketch is running, your router DHCP service will assign an IP address to your robot car and your APP will use this IP addres your car.

1) Please download STA mode sketch code from v2smartcar-lesson6A . Unzip the file, you will see a folder "v2smartcar-lesson IDE -> click file -> click Open -> choose code "v2smartcar-lesson6A.ino" in v2smartcar-lesson6A folder, load the code into your board

2) You need change the code Line 96 and Line 98 :

char ssid[] = "YOUR_ROUTER_SSID"; // replace this with your router wifi SSID

*char pass[] = "YOUR_ROUTER_WIFI_PASSWORD"; //* replace with your wifi *password*

3) Upload the sketch to your board. Finally, click the Serial monitor window in upper right corner of IDE, you will see follo
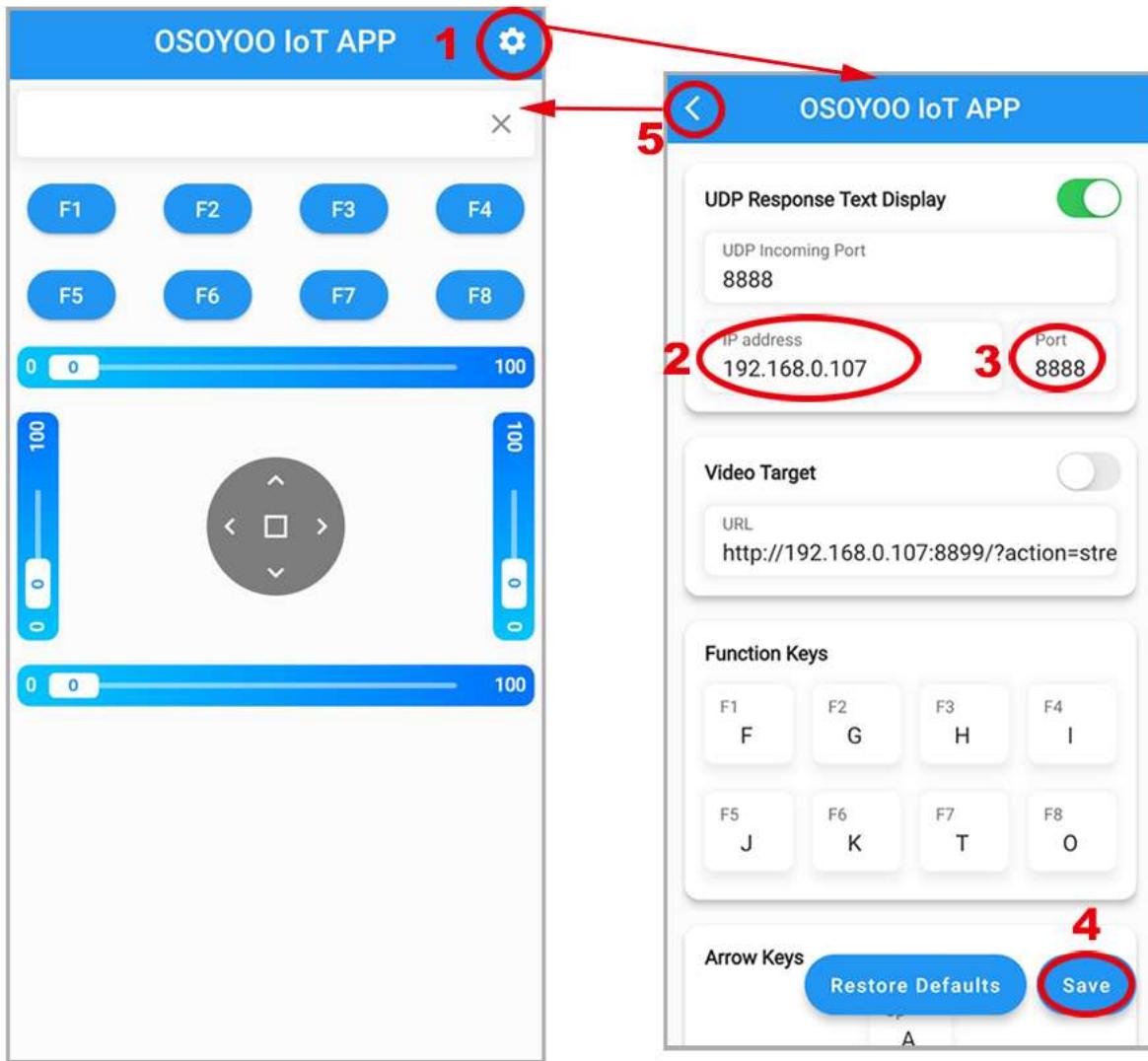
In above picture, the 192.168.0.117 is your robot car IP address. We will set this IP address to your APP so that APP can data with the robot car.

4) Connect your phone with the same router Wi-Fi SSID as the Arduino board. Open the APP, click "**settings icon(1)**" to setting UI, enter your robot car **IP address** and **Port** to **8888,** click **Save**, then click **back icon(5)** to back control UI. Example: If your Robot Car IP is 192.168.0.107, you can set the APP as following pictures:

Now your Robot car is connected to your LAN, you can use Mobile phone under same LAN to control the robot car. If your APP is in W
need to go to your Router Control Panel, forward Port 80 to Robot car LAN IP address, then you can use Router IP to control the car. T
makes our robot car A REAL INTERNET OF THING device

B)AP mode

Sometimes we do not have a LAN or WIFI Router. In order to control the car, we need to use AP mode.

When working in AP mode, our robot car itself will become a WIFI Hot Spot. Our cell phone can connect to Robot Car as
client. The IP address of Robot is fixed as 192.168.4.1 and It is not connected to WAN.

1) Please download sketch from following link: v2smartcar-lesson6B. Unzip the file, you will see a folder "v2smartcar-lesson6B"
> click file -> click Open -> choose code "v2smartcar-lesson6B.ino" in v2smartcar-lesson6B folder, load the code into your board

2) Open Serial monitor, and you will see a similar result as STA mode. A new WIFI SSID "osoyoo_robot" with IP address 192.168.4.1 w
the window. This means your Robot car has a WIFI Hot Spot name "osoyoo_robot" , its IP address is 192.168.4.1

3) Connect your cell phone to "osoyoo_robot" wifi hot_spot, and set IP address as "192.168.4.1" and port to 8888 to your APP Setting :

Now your Robot car become a WIFI Hot Spot, you can use Mobile phone control the robot car.

FINAL TESTING:

Trun on the car. Now click Setting to set up robot IP address.

A) In STA mode, you need connect cell phone to the same LAN ssid of your robot car and set IP address same as the Robot IP showe
Monitor.

B) In AP mode , you need contact your cell phone to "osoyoo_robot" wifi hot_spot and set IP address as 192.168.4.1

you can click the ◄ ► ▲ ▼ direction keys to make the car move. Use || pause key to stop the car movement.

If you click Obstacle key, the car will do obstacle avoidance auto driving similar to Lesson 5

If you click Tracking key, the car will do link tracking auto driving similar to lesson 4

Note: F1~F6 are further development functions in the future.

FAQ:

Q1) How to tune the robot car speed?

A: If you want change the speed performance of the robot car, please following parameters in line 11 to 13:

```
#define SPEED 85
#define TURN_SPEED 90
#define SHIFT_SPEED 130
```

SPEED value determines forward moving speed
TURN_SPEED value determines turning speed
SHIFT_SPEED value determines parallel shifting speed

Q 2) What happened when you press buttons in OSOYOO WiFi UDP Robot Car APP ?

A: When you press a button of the APP, APP will send a single-letter message through UDP protocol to target device (in example, our WIFI Shield)

Button	UDP message
F1	F
F2	G
F3	H
F4	I
F5	J
F6	K
▲	A
▼	B
►	R
◄	L
square	E
obstacle	O
tracking	T

Q3) How does the board handle the UDP command?

Following switch(c) statements in v2smartcar-lesson6 sketch file are handling the UDP command

```
switch (c)     //serial control instructions
{

    case 'A':Drive_Status=MANUAL_DRIVE; Drive_Num=GO_ADVANCE;  WorkMode="GO_ADVANCE";b
    case 'L':Drive_Status=MANUAL_DRIVE; Drive_Num=GO_LEFT; WorkMode="GO_LEFT";break;
    case 'R':Drive_Status=MANUAL_DRIVE; Drive_Num=GO_RIGHT;WorkMode="GO_RIGHT";break;
    case 'B':Drive_Status=MANUAL_DRIVE; Drive_Num=GO_BACK;WorkMode="GO_BACK";break;
    case 'E':Drive_Status=MANUAL_DRIVE; Drive_Num=STOP_STOP;WorkMode="STOP_STOP";break
    case 'O':Drive_Status=AUTO_DRIVE_UO;Serial.println("go OBSTACLE");WorkMode="OBSTAC
    case 'T':Drive_Status=AUTO_DRIVE_LF;WorkMode="line follow";break;
    case 'G':track_speed=track_speed+10;
```

```
            if(track_speed>200) track_speed=200
              ;break;
      case 'J':track_speed=track_speed-10;
              if(track_speed<80) track_speed=80
              ;break;
      default:break;
    } //END OF ACTION SWITCH
```

In above code, **c** in switch() brackets is the UDP data sent from cell phone APP. Once APP ▲ key is pressed, then *case* will handle the command and make car move ahead.

Q4) The serial window show error " [WiFiEsp] >>> TIMEOUT>>>"

```
-> [WiFiEsp] Initializing ESP module
-> [WiFiEsp] >>> TIMEOUT >>>
-> [WiFiEsp] >>> TIMEOUT >>>
-> [WiFiEsp] >>> TIMEOUT >>>
-> [WiFiEsp] >>> TIMEOUT >>>
-> [WiFiEsp] >>> TIMEOUT >>>
-> [WiFiEsp] Cannot initialize ESP module
-> [WiFiEsp] >>> TIMEOUT >>>
-> [WiFiEsp] No tag found
-> WiFi shield not present
```

A: Please check the jumper caps and make sure that Jumper caps connect E_TX pin to D4 and E_RX pin to D5 as the Step 2 i installation

PREVIOUS LESSON   ROBOT CAR V2 HOME   NEXT LESSON

DownLoad Url :   osoyoo.com

15 Comments

hamtech says:
December 31, 2021 at 10:51 am

I am trying to use the first version of the WIFI code (STA Mode). I got the code to compile and load into the robot, however, I am getting an error stating -Cannot initialize ESP module, WIFI Shi

Log in to Reply

elaine says:
December 31, 2021 at 11:35 am

1. Please confirm that connect E_TX (Esp8266 TX) pin to Arduino D4(UNO soft serial RX) and E_RX(ESP8266_RX) pin to D5(UNO software serial TX) as the step 2 in the installation
2. Please check that you change the ssid and psw to your own before uploading the code.
3. Please confirm that the voltage is more than 7.2V.

Log in to Reply

James Robb says:
December 11, 2022 at 5:05 am

Still waiting on answer to my question for Lesson 5. So now I have moved on to Lesson 6A. All connections made and sketch installed in board. I have entered my router ssid and password int chosen STA mode. When I open the serial monitor I get the following message. "W[WIFIESP} Initializing ESP Module"
"WiFi ESP TIMEOUT" "cannot initialize ESP module" "WiFi Shield not present" . I have checked the router but it does not show the Shield as a connected device. Can you help? I have both 5G available.
Regards, Jim Robb

Log in to Reply

James Robb says:
December 13, 2022 at 9:16 pm

I have moved on to Lesson 6A. All connections made and sketch installed in board. I have entered my router ssid and password into sketch. I have chosen STA mode. When I open the serial m following message. "W[WIFIESP} Initializing ESP Module, W[WiFiESP] Initilization successful, W[WiFiESP] Attempting to connect to [ssid] , w[WiFiESP] failed connecting to [ssid]. etc ——

The router does not show the Shield as a connected device. Can you help? I have both 5G and 2.4G available.
Regards, Jim Robb

Log in to Reply

James Robb says:
December 16, 2022 at 2:15 am

I refer to my question of December 13th at 9.16pm. Have you any suggestions why my Shield will not connect to my WiFi ESP?
Regards, Jim Robb

Log in to Reply

admin says:
December 16, 2022 at 12:21 pm

hi, James Robb,

based on your description, you are very very very very likely to have written wrong SSID or PASSWORD in the sketch code. Please double check every letter of your SSID and passw
include space and everything. Also make sure your robot car is connecting to a wifi router, not to a cell phone hotspot. Cell phone hotspot might block ESP8266 as STA client.

Log in to Reply

James Robb says:
December 17, 2022 at 8:49 pm

Hi,
You were correct I had missed out one of the letters in the password. The print is so small my old eyes are not so good for that.
Many thanks for your help.
Regards, Jim.

Log in to Reply

Dejavous says:
January 8, 2023 at 1:28 pm

when I try to sketch lesson 6 I get the following error message
C:\Users\Steve\Desktop\v2smartcar-lesson6A\v2smartcar-lesson6A.ino:11:10: fatal error: WiFiEspUdp.h: No such file or directory
#include
^~~~~~~~~~~~~~
compilation terminated.

exit status 1

Compilation error: WiFiEspUdp.h: No such file or directory
Did I miss something?

Log in to Reply

Dejavous says:
January 8, 2023 at 1:44 pm

I redownloaded the first set and sketched it now I'm getting
[WiFiEsp] >>> TIMEOUT >>>
[WiFiEsp] >>> TIMEOUT >>>
[WiFiEsp] >>> TIMEOUT >>>
[WiFiEsp] >>> TIMEOUT >>>
[WiFiEsp] Cannot initialize ESP module
[WiFiEsp] >>> TIMEOUT >>>
[WiFiEsp] No tag found
WiFi shield not present

Log in to Reply

elaine says:
January 9, 2023 at 10:42 am

1. Please confirm that connect E_TX (Esp8266 TX) pin to Arduino D4(UNO soft serial RX) and E_RX(ESP8266_RX) pin to D5(UNO software serial TX) as the step 2 in the in
2. Please check that you change the ssid and psw to your own before uploading the code.
You need change the code Line 96 and Line 98 :
char ssid[] = "YOUR_ROUTER_SSID"; // replace this with your router wifi SSID
char pass[] = "YOUR_ROUTER_WIFI_PASSWORD"; // replace with your wifi password
3. Please confirm that the voltage is more than 7.2V.

Log in to Reply

DriveBlind says:
March 3, 2024 at 6:52 pm

I have uploaded this sketch ok. However how can I see the debug output in the Serial Monitor ?

When connected via a USB cable the serial monitor shows output. However, as soon as the car is untethered the connection is lost.

When connected the monitor say to open a browser window, which is where I assume I will see the monitor, however, the browser does not find a page at the location stated.

9:48:21.699 -> [WiFiEsp] Initializing ESP module
09:48:26.458 -> [WiFiEsp] Initilization successful – 1.5.4
09:48:26.525 -> Attempting to connect to WPA SSID: BT-XXXXXX
09:48:31.543 -> [WiFiEsp] Connected to BT-XXXXX
09:48:31.607 -> You're connected to the network
09:48:31.642 ->
09:48:31.642 -> IP Address: 192.168.1.220
09:48:31.677 ->
09:48:31.677 -> To see this page in action, connect to BT-6MA89Q and open a browser to http://192.168.1.220
09:48:31.772 ->
09:48:31.772 -> Listening on port 8888

This web address just doesn't load http://192.168.1.220 – Any Ideas ?

Log in to Reply

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michaeljon says:
March 22, 2024 at 9:18 am

I'm running into the same problem that many others seem to have hit. I can't get the wifi module to connect at all. I've swapped two different UNOs, two different Mega2560s, and all the wiring Arduino powered from a 12V wall wart (I had everything on the robot, but pulled it apart to make sure that wasn't the issue).

The code stops running after the WiFi.init call returns with a WL_NO_SHIELD value, so this isn't an issue with the network settings. I've even tried the network scanner example from the wifi lib might be an issue.

On the UNO I leave the jumpers in place across D4/E_TX and D5/E_RX. On the 2560 I've various pairings of E_RX/D1[89] and E_TX/D1[89]. I'm stuck here. Do I have a bad board or is there do?

[WiFiEsp] Initializing ESP module
[WiFiEsp] >>> TIMEOUT >>>
[WiFiEsp] >>> TIMEOUT >>>
[WiFiEsp] >>> TIMEOUT >>>
[WiFiEsp] >>> TIMEOUT >>>
[WiFiEsp] >>> TIMEOUT >>>
[WiFiEsp] Cannot initialize ESP module
[WiFiEsp] >>> TIMEOUT >>>
[WiFiEsp] No tag found
WiFi shield not present

Log in to Reply

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michaeljon says:
March 23, 2024 at 3:27 am

Ok, got thru the first part. The shield starts out at 115200bps and without that there's no communication. Now I can get the shield connected to my local wifi. But, the part that says cor to http://addr:8888 doesn't work. Shouldn't the shield be using TCP here? I can see the device on my local network.

11:30:34:179 -> [WiFiEsp] Connected to xxxxx
11:30:34:215 -> You're connected to the network
11:30:34:251 ->
11:30:34:251 -> IP Address: 192.168.54.36
11:30:34:280 -> 3C:E9:0E:E5:4D:44
11:30:34:301 ->
11:30:34:301 -> To see this page in action, connect to xxxxx and open a browser to http://192.168.54.36:8888
11:30:34:407 -> Listening on port 8888

Log in to Reply

Maldo says:
July 3, 2024 at 6:31 pm

Do you have a model for App inventor as a guide

Log in to Reply

admin says:
July 4, 2024 at 12:33 am

what kind of model do you need?please email to support@osoyoo.com

Log in to Reply

Leave a Reply

You must be logged in to post a comment.