Doctors of Intelligence & Technology (DOIT)

User Manual for the 2nd Generation Smart WiFi Car

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Catalogue

Introduction

This manual presents the usage by mobile phone APP and wechat to control the car moving, e.g., Forward, Backward, Left and Right. More importantly, This document presents the detailed network configuration about the ESP8266 development board kit. Certainly, this application can be used widely in other fields, e.g., control of RGB light, household appliances, and the intelligent water flower system. So, this manual is very suitable for the learning of Internet of Things. More details, please visit www.doit.am.

1 Hardwares

The hardware is including as follows.
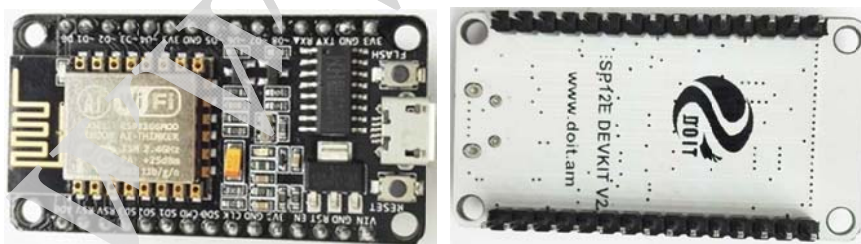
(1) ESP8266 development board

Figure 1 ESP8266 development board

(2) ESP8266 motor shield, compatible with ESP8266 development board.

Figure 2 Motor shield

Or the following ESP8266 development kit as shown in the following.

Note that, the ESP8266 development kit is built in the 2nd generation

smart car firmware.

Figure 3 ESP8266 development kit

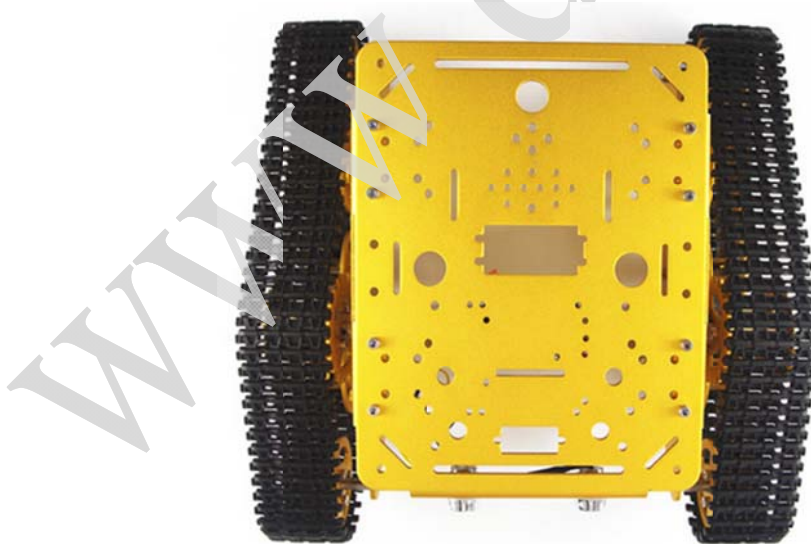(3) Chassis, it can be any other tank/car chassis.

Figure 4 T300 tank chassis

(4) Other

Including battery, battery box, lead, and screws, etc.

(5) Install ESP8266 development kit to the car chassis

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ESP8266 kit includes 2 boards: NodeMCU+motor shield. In the default, the power of these 2 pieces boards are connected together, i.e., is powered together. However, **the max voltage is 9V for ESP8266 development board (i.e., NodeMCU), while the max voltage is 36V for motor shield board. Therefore, if the voltage of motor is more than 9V. Please connect the power separately.** In the shortcut as the connection can be seen in the following Figure.
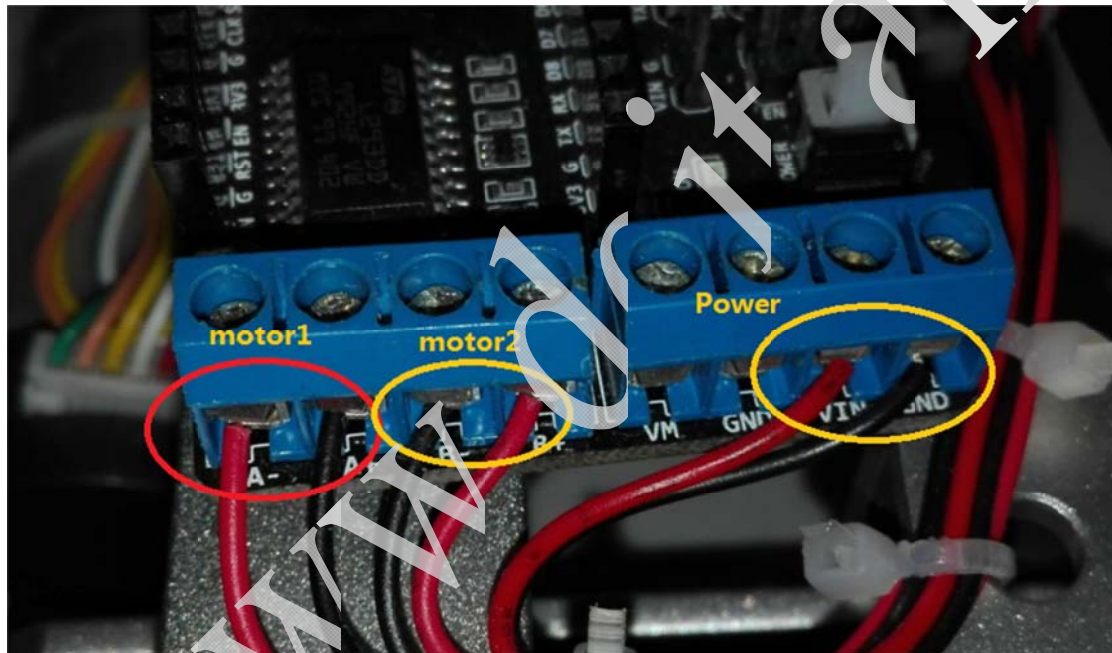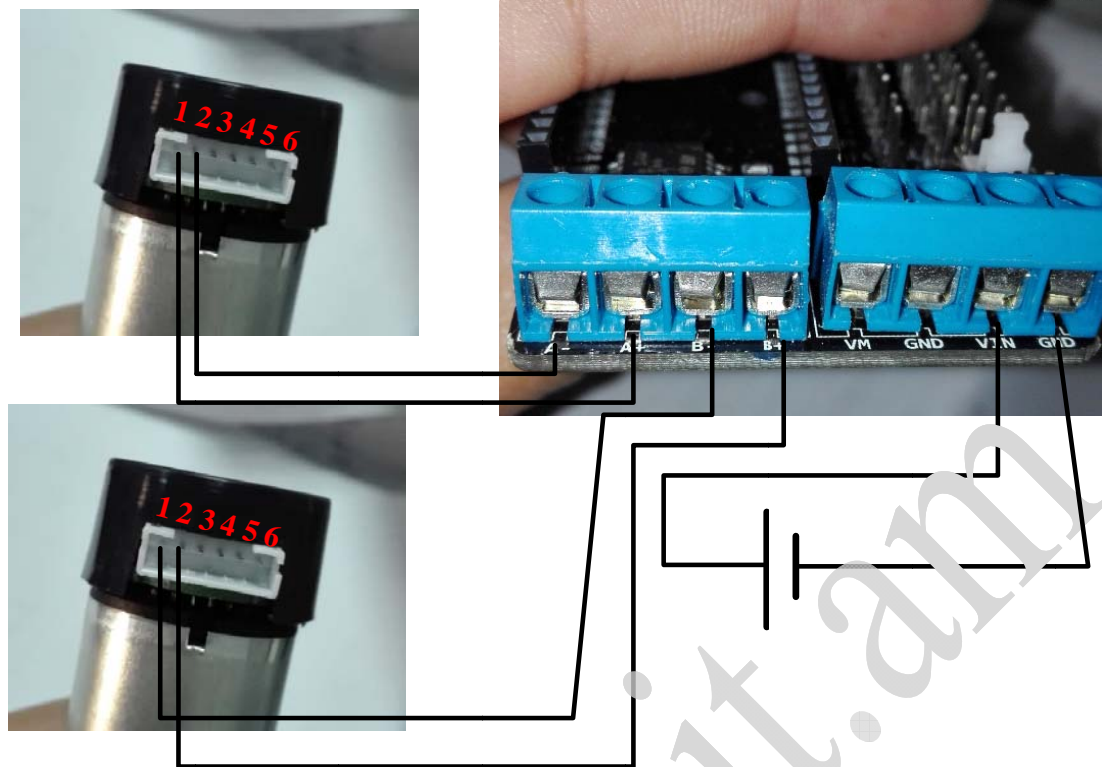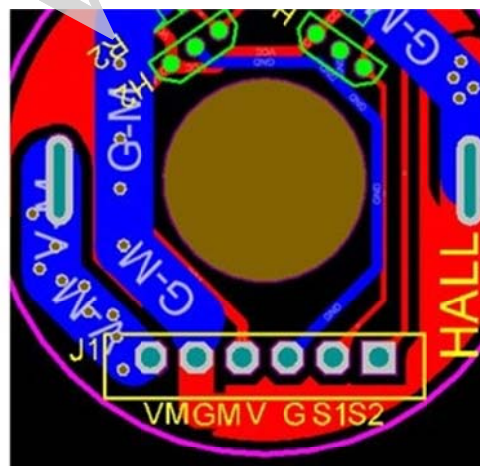

Figure 5 Connection of motors

Connection to motor for ESP8266 development board kit

VM is for the power of motor, and VIN is for the power of NodeMCU. So, if the max voltage is more than 9V for the motor, then please connect the power separately.

where, VM and GM are connected to motor, V and G is the power for sensor, S1 and S2 are the output signal.

Figure 6 Illustration of the code disc

The meaning for motor code disc is as follows. VM, GM are for the

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connection for motor, and V,G are the connection for sensor, S1, S2 are

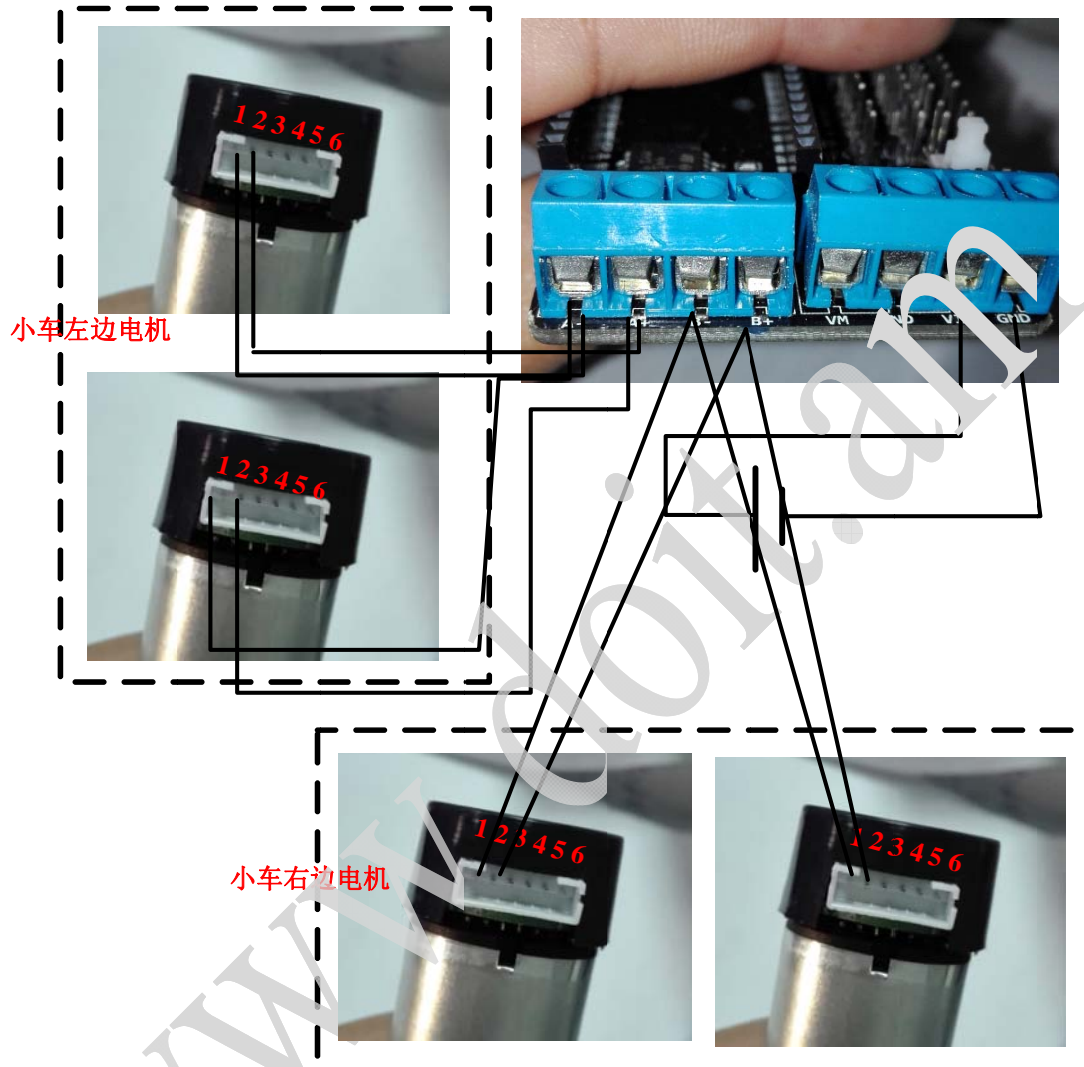the output signal for the 2 sensors, which are used for the feedback.

Figure 4WD connection from motor to driven board
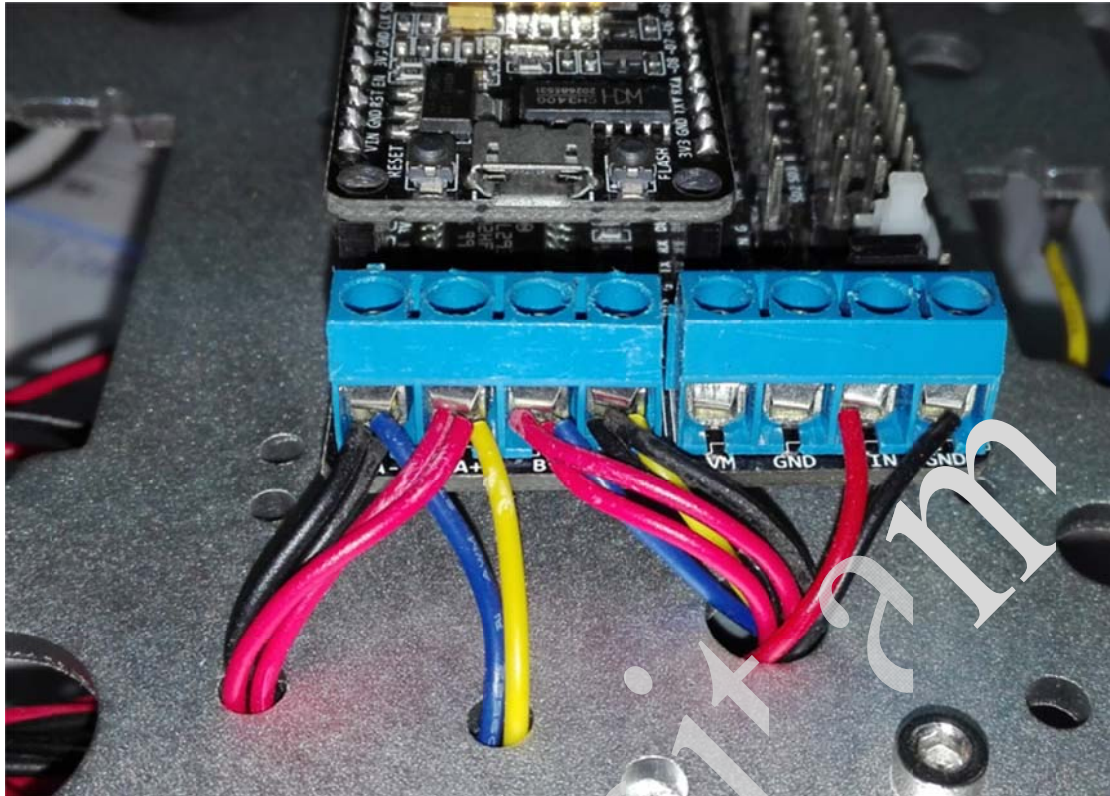
Figure the real connection from motors to driven board

(6)   Install mobile APP software

The   APP   software   and   source   code   can   be   downloaded   from   the

following link: (the direction:

http://www.smartarduino.com/->Forum->Robotics ->the 2nd generation

doit car.)

For Android App:

http://bbs.smartarduino.com/showthread.php?tid=1978.

Or the google play market:

https://play.google.com/store/apps/details?id=com.doit.carset

For IOS App:

https://itunes.apple.com/us/app/doit-car/id1072418610?l=zh&ls=1&mt=8

2 Car Control

To let us can control the car forward, backward, right and left turn, ESP8266 development board (nodemcu) should be configured to be suitable for the local network environment.

2.1 Network Configuration

This network configuration can be done by computer or mobile phone. But the recommended way is more convenient. After power ESP8266 development kit (**Note again, in the default case, the common power for ESP8266 and motor cannot higher than 9V voltage.** But can be power separately. More details, please see the link:

http://bbs.smartarduino.com/showthread.php?tid=6), then the board would generated a WiFi signal Doit_ESP_##### 的 WiFi. Before configuration, please firstly let the PC or mobile phone connect Doit_ESP_#####的 WiFi, as shown in the following Figure.

Figure 5 PC WiFi signal
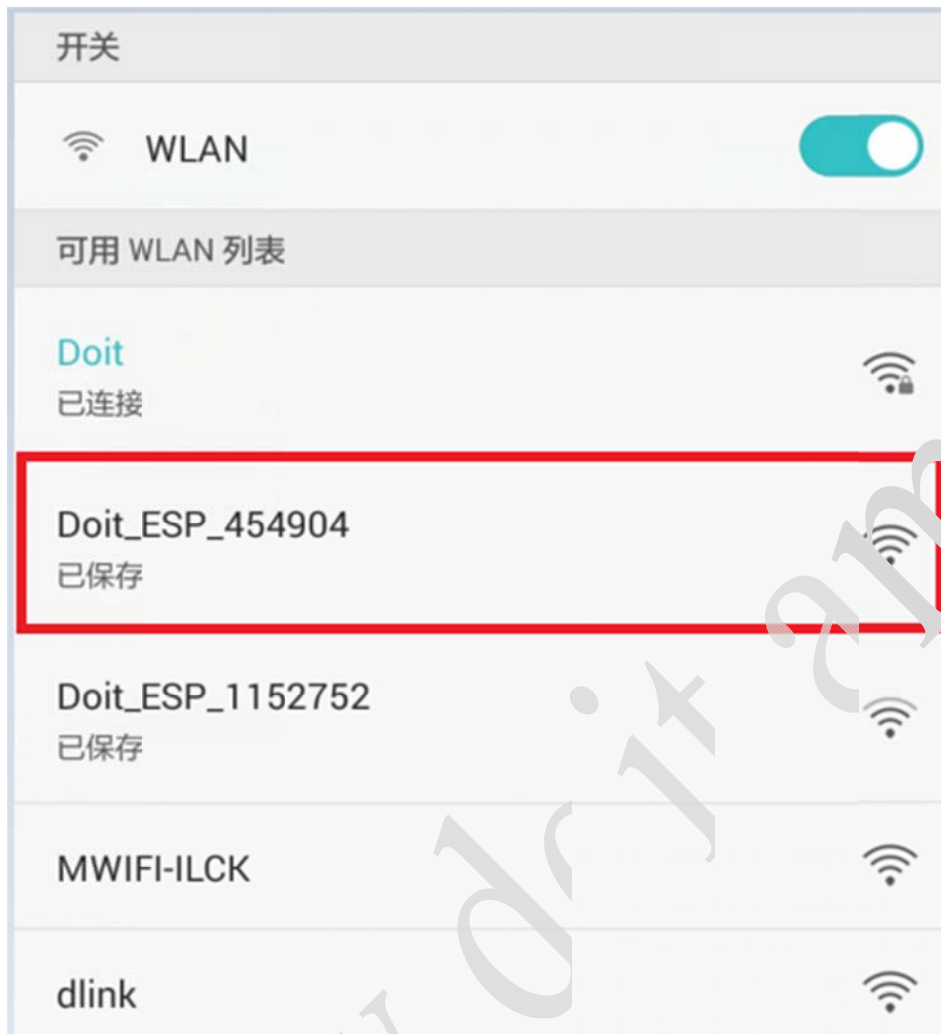
Or from mobile phone

Figure 6 Mobile WiFi signal list

After connect the WiFi signal named as Doit_ESP_#####, please input the IP address 192.168.4.1 for the ESP8266 development board, then you can access the configure page, as shown in the following picture.

Figure 7 ESP8266 development board network configuration

In the configuration page, you just input the STA SSID, and the password. Note that, the STA SSID can be selected from the AP List. After that, please click "Submit". If return the message "Submit successfully", Then the network configuration is successful. Say again, if you use the mobile or browser cannot configure the network successfully, please do it in the computer or change the browser. In general, the network configuration can be successful for the most browsers, like the newest

safari, Firefox, Chrome. If you cannot set it successfully, please contact us: skype: yichone, Email: yichoneyi@gmail.com.

Certainly, there are many other configuration methods. For more details, please see the Section **3**.

2.2 Control the Car by Wechat

Before use this function, please download the Wechat software producted by Tecent Company. After installation, please scan the following Two-Dimension Code.

Figre 8 Two-dimension code for Doit

Then, the phone would display "您好，设备绑定成功", and click "我的设备"， shown in the following Figure.

Figure 9 Band by Wechat

Then you can find a device named as ESP8266-微信小车 is already

adde, shown in the following Figure.

右边的红点显示设备在线

Figrue 10 The online device by Wechat

Then, click the online device (e.g., ESP8266-微信小车), would pop-up

the Wechat-control car manager interface. Therefore, you can control

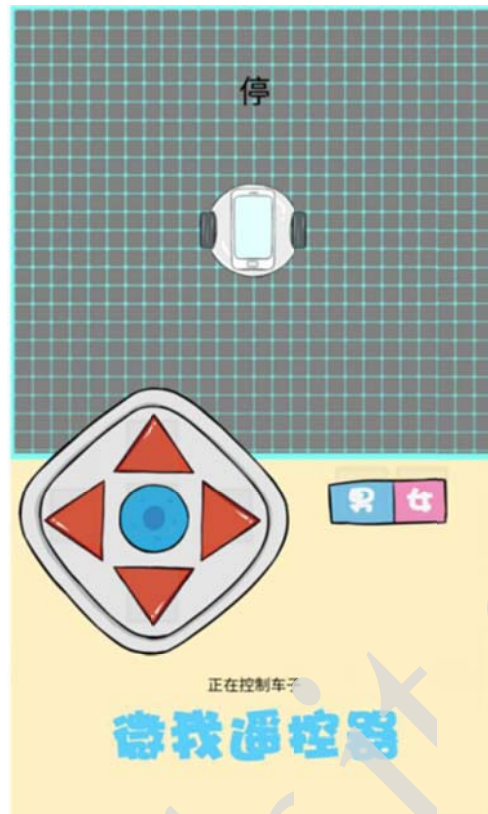the car to forward, backward, left and right turn.

Figure 11 Car-control mage interface by Wechat

2.3 Control the Car by APP

At first, please visit the Doit Company official site http://bbs.smartarduino.com/showthread.php?tid=1978 to download the car control software APP (DoitCar_2016_0115.apk), and install it to your phone. Open it, the VI can be shown in the following Figure.
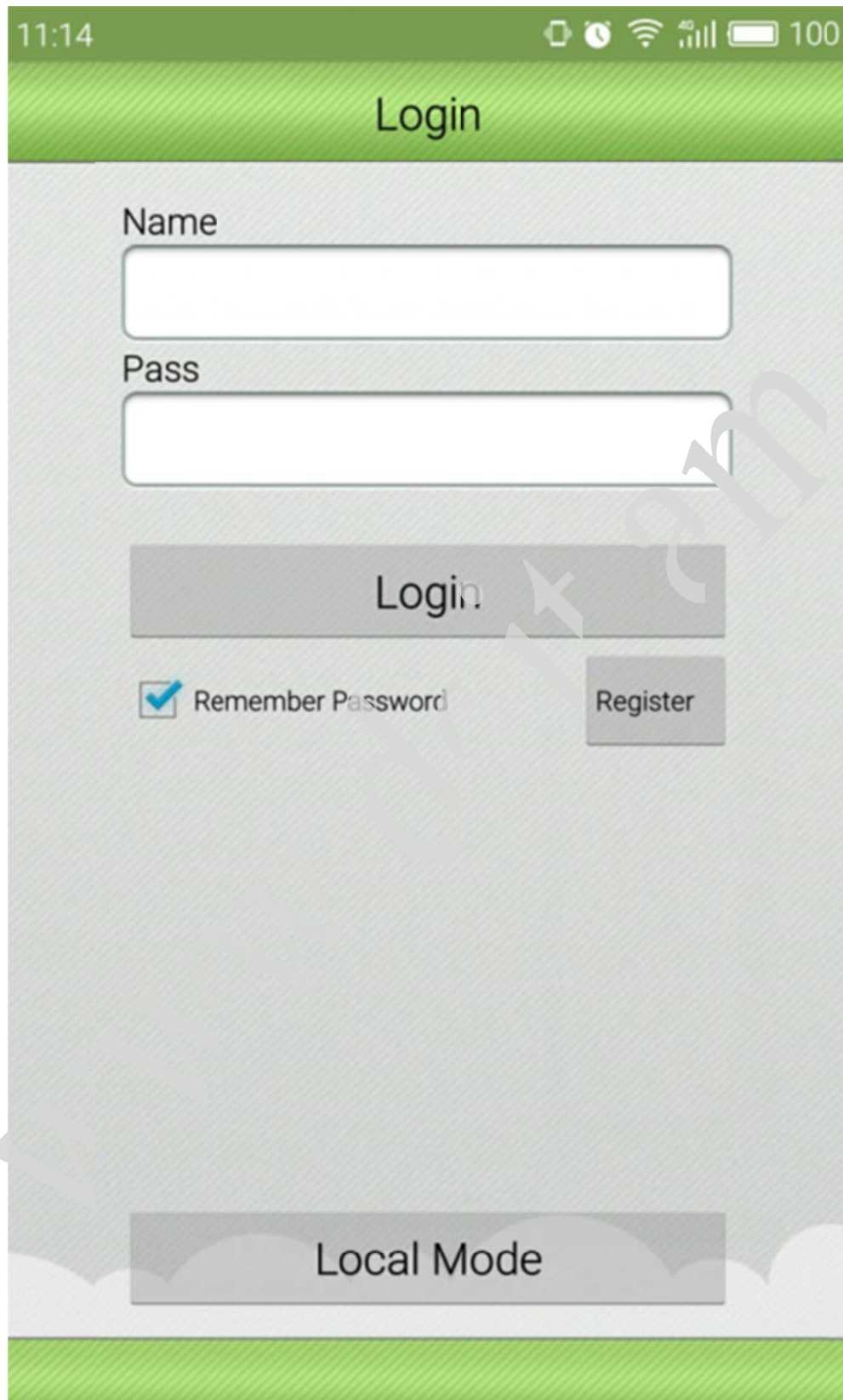
Figure 12 APP VI

This APP has three methods to control the car by the phone, which are

listed as follows.

2.3.1 Local Mode (e.g., Point to Point)

The Local Mode (e.g., point to point, phone to ESP8266 shown in the Figure 13) is very simple. After installation of the car (the installation method can be seen at http://bbs.smartarduino.com/showthread.php?tid=2024) and power the car, the ESP8266 development board would generate a WiFi signal named as Doit_ESP_####. Click it and let the phone connect this WiFi signal.
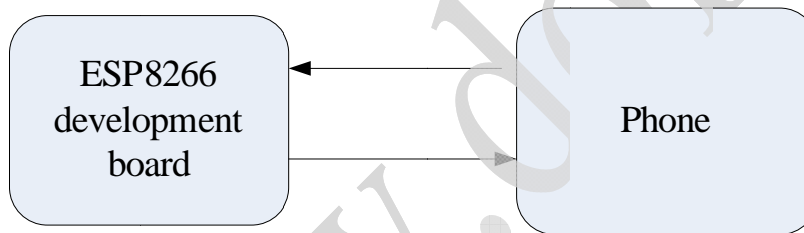

Figre 13 Piont to Point Communication

Then, Clik the Local Mode, would pop a message shown that phone connection car is successful, so, you can control the car.
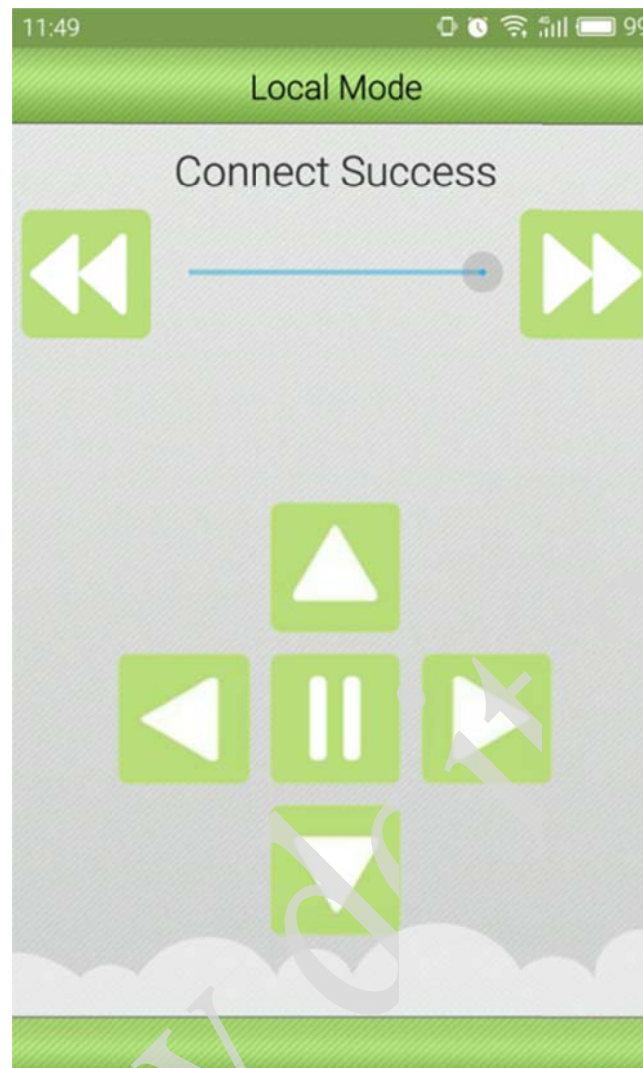
Figure 14 Phone APP connection success

Note that, this Local Mode cannot configure the network by the way presented in Subsection 2.1. Just do it by the following steps.

1)   Download the APP and software.

http://bbs.smartarduino.com/showthread.php?tid=1978;

2)   Find and connect the WiFi signal named as Doit_ESP_####
from the ESP8266 development board on the car;

3)   Open the APP, and click the Local Mode. Then can control the
car.

2.3.2 Local Mode (Local Area Network)

This Local mode is different form the one presented by Subsection 2.3.2. This mode has 3 points: ESP8266 development board+Local WiFi router+phone, which are organized a small local network. That is, the WiFi signal from ESP8266 is relayed by the local WiFi router, and to the phone, as shown in the following Figure.
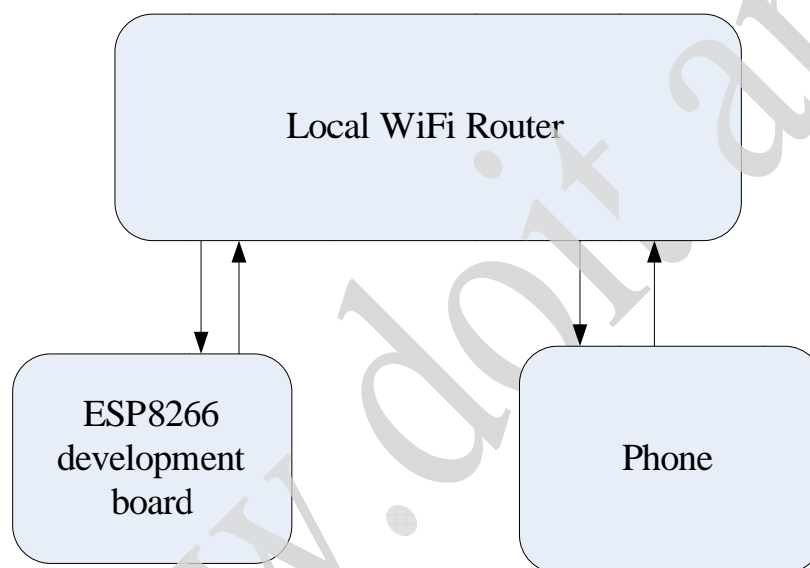
Local WiFi Router

ESP8266 development board

Phone

Figure 15   Three points relay in the local network

Note that, **this local mode just can be usable when the network configuration is successful, and the phone must connect the WiFi router**. After connection success, you can clik the "Local Mode", then can control the car. In summary, this mode includes the following steps.

1) Configure the network paramters by the methods presented in Subsection 2.1;

2) Let phone connect the local WiFi router;

3) Download   and   install   the   software:

http://bbs.smartarduino.com/showthread.php?tid=1978

4) Open the APP, and click "Local Mode" to control the car.

2.3.3 Remote Mode (e.g., control the car by internet)

Before using the mode, ESP8266 development board must be configured by the method presented by Subsection 2.1, and the WiFi router must be connected to the internet. Then, open the APP, and register a new account, as shown in the following Figure. The new user name: doit_demo, and the password: 123456.
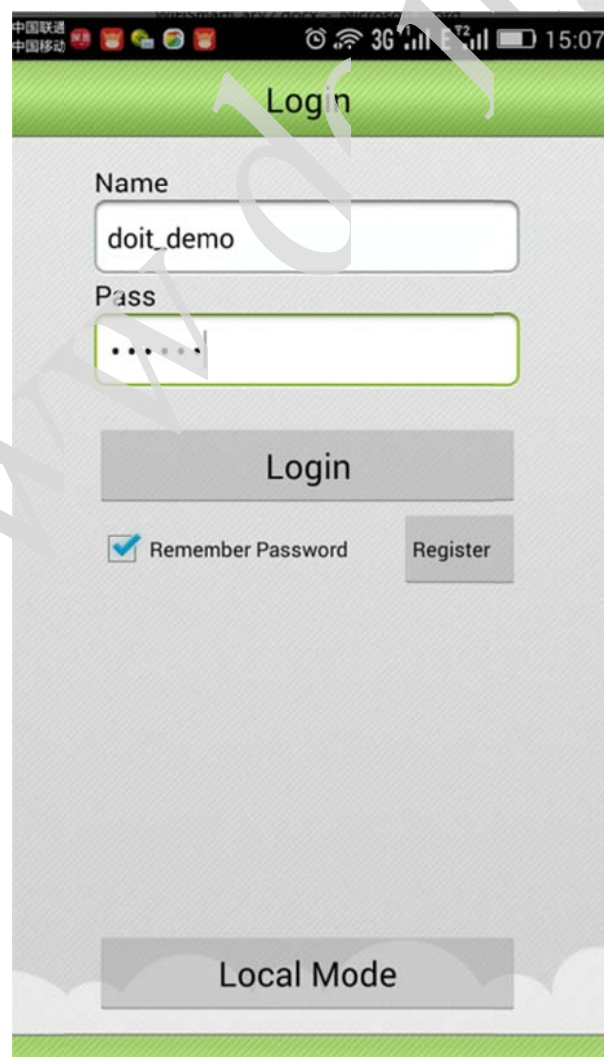

Figure 16 Register a new account in the phone

Then input the user name and password, you can find an **OLINE** car, as shown in the following Figure. The green light means that the car is on the internet.

Figure 17 The online device.

Finally, click the online device, would pop the control manager interface, then you can control the car freely, as shown in Figure 18.

Figure 18 Real-time control the car

This mode is summarized as follows.

1) Configure the network parameters for ESP8266 presented in Subsection 2.1;

2) Let phone connect the WiFi router;

3) Download and install the APP;

4) Register a new account;

5) Login in the system with registered account;

6) Click the online device to pop the control manage interface.

This mode can control the car freely by the internet.

3 Attachment

There are two configuration methods listed as follows.

3.1 ESPTouch

Register a new account (if you already have the account, don't register), and login it, as shown in the following Figure.
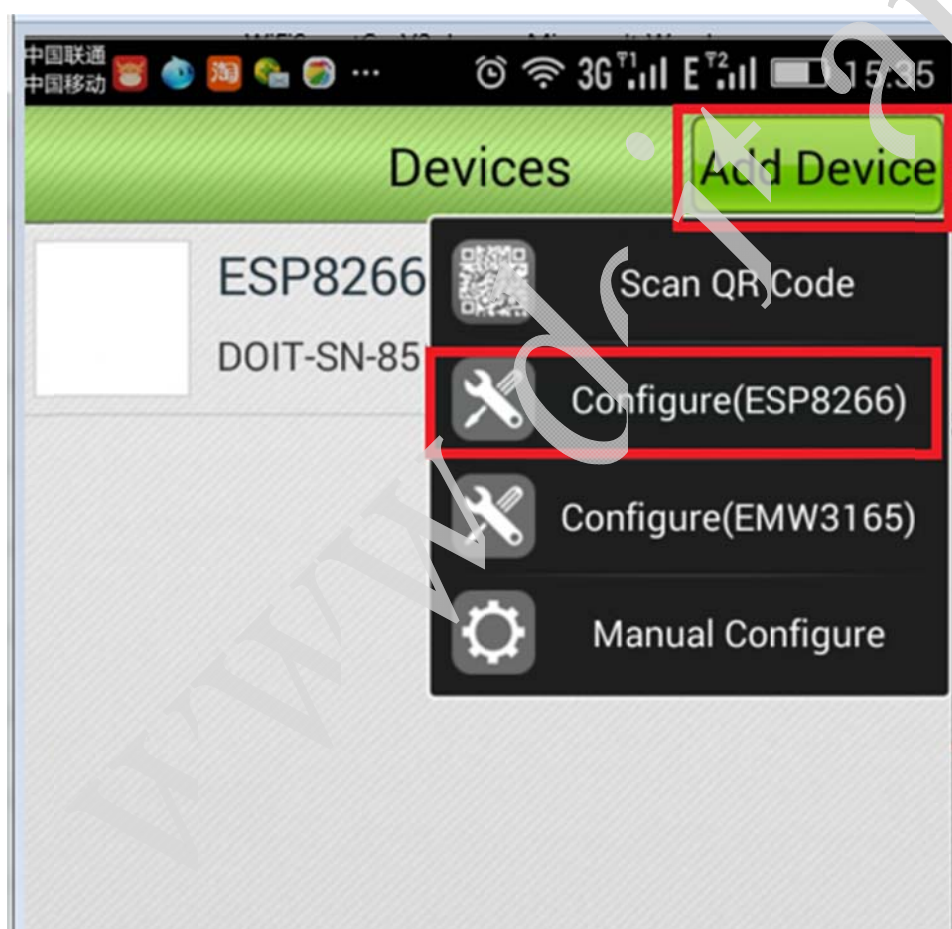

Figure 19 Add the device

Click "Confiure (ESP8266)", then do it by the warm prompt in the APP, as shown in the following three prompts in Figure 20.
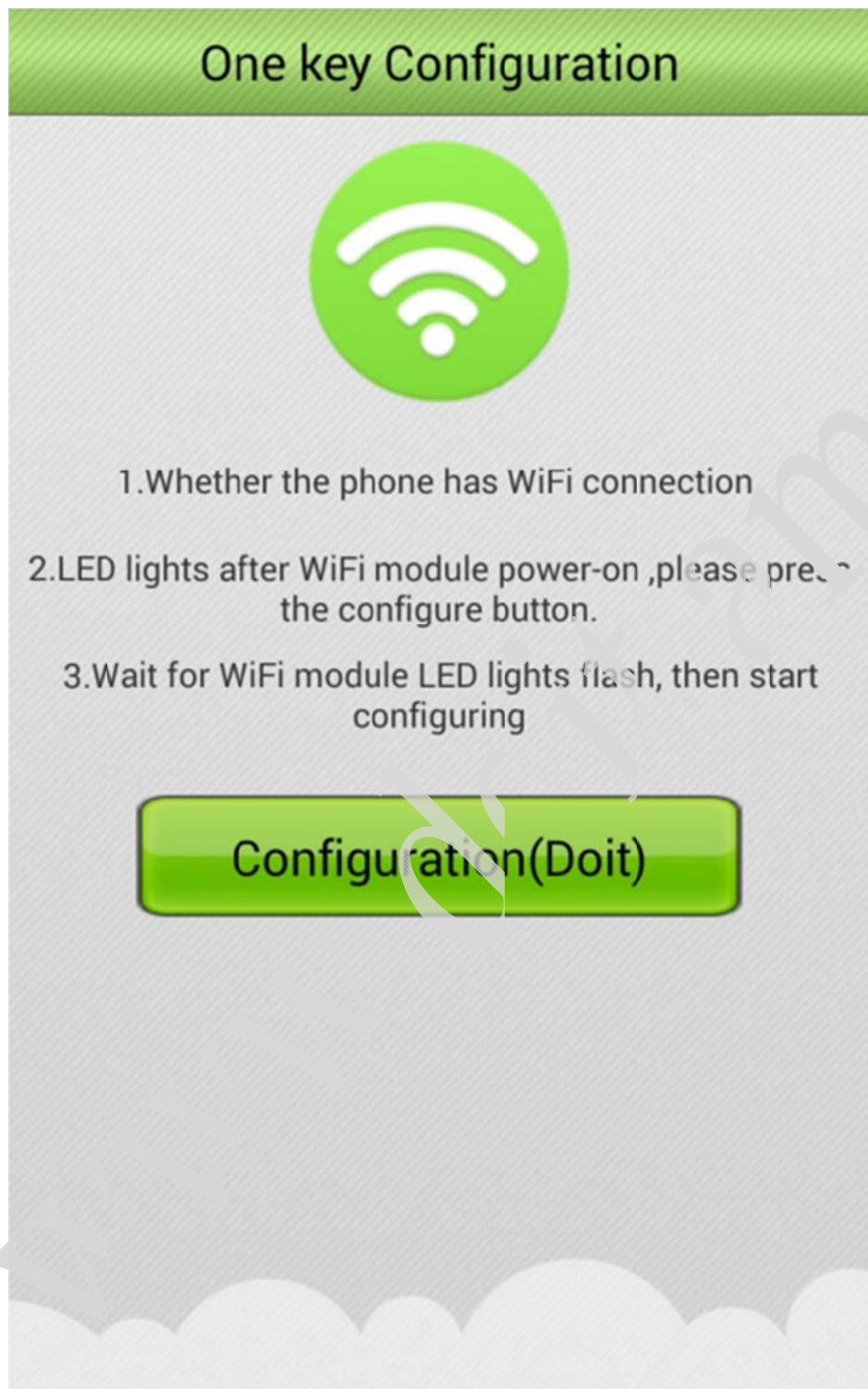
Figure 20 One key configuration

Please do it by the above three prompts in Figure 20. Or the network configuration would be failure.

Configuration steps.

1) Click "Configuration (Doit)", then would need you input the local

network WiFi password, as shown in the Figure 21. **Very Important,**

please don't click "Start" at this time. You should step in the next.

Figure 21 Input your WiFi password

2) Press button

Return to the ESP8266 development board, as shown in Figure 22. It has two buttons: FLASH and RESET. Press firstly RESET button to let LED brighten. At this time, press FLASH button at once for about 1s, at most 3s. If more than 3s, this configuration would be failure, and the ESP8266 board would recover the default setting.

Figure 22 ESP8266 buttons

3) Click the "Start" in the APP, after a while, you would receive the information about configuration success, as shown in Figure 23.
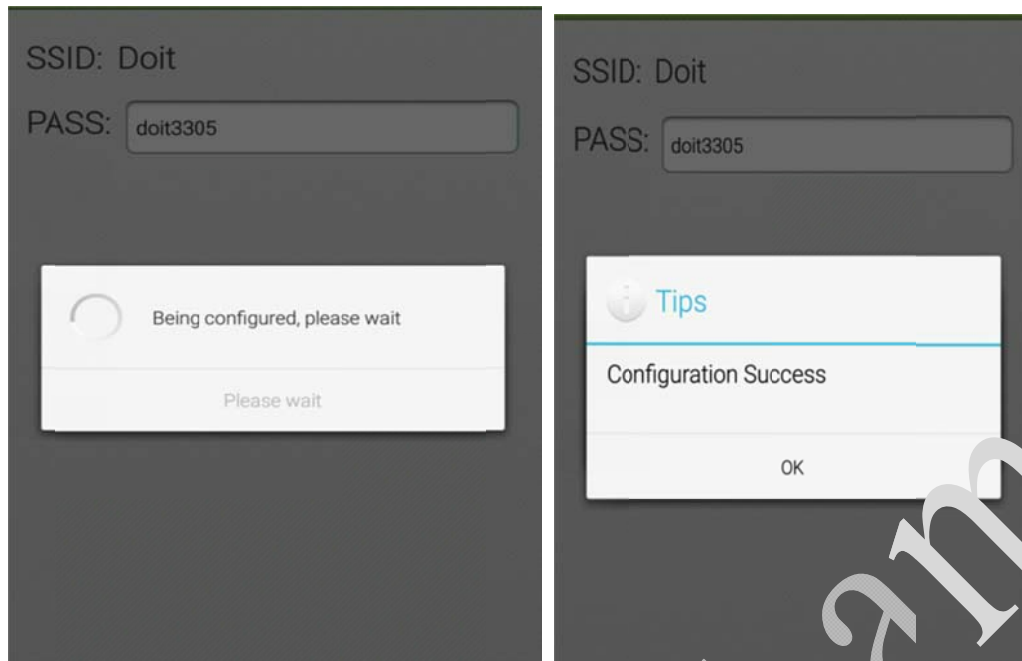
Figure 23 One key configuration

If configure successfully, ESP8266 board would save the parameters and restart. Next time, the board would be connected the WiFi router automatically and start to work.

3.2   Manual Configure

This way is relative simple by the following steps.

1) Download and install the APP software;

2) Let Phone connect the Local WiFi network;

3) Open the APP and login with the registered account;
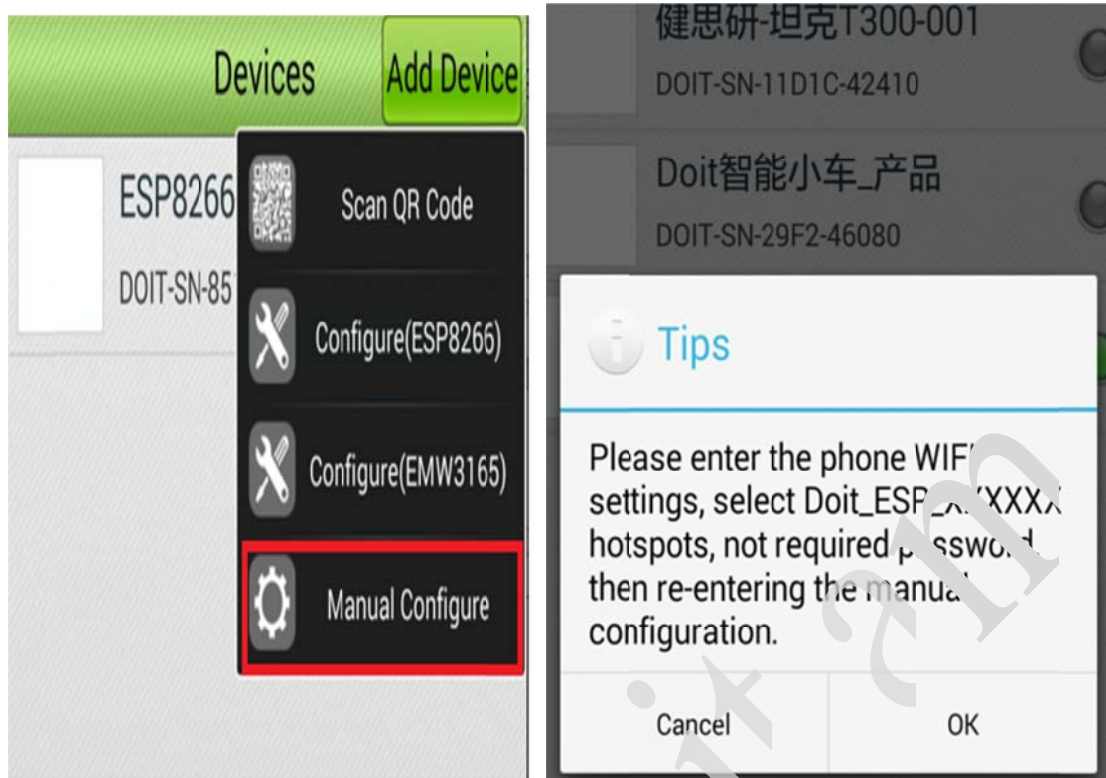
4) Click "Add device";

Figure 24 Manual Configure

5) Do it by the prompt, and click "ok". Then find the WiFi signal named as Doit_ESP_### form ESP8266 development board, as shown in Figure 25, and connect Doit_ESP_###.

Figure 25 Connect to the Doit_ESP_#### siganl

6) After connect Doit_ESP_### succefully. Return the APP software interface, and click "Manual Configure". Then would pop to the following interface shown in Figure 26.
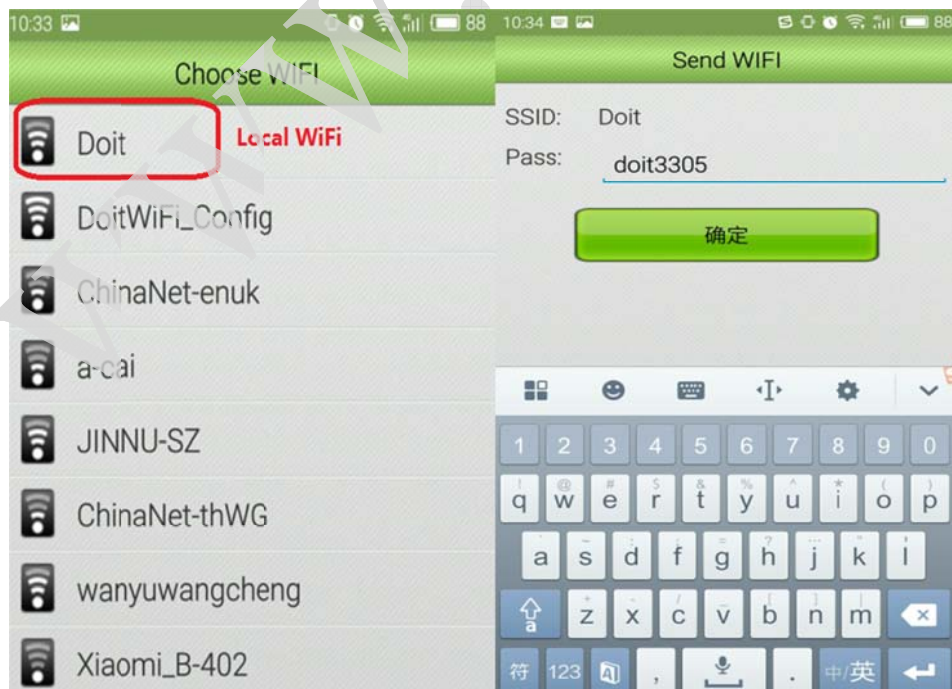

Figure 26 WiFi configure

7) When come to the interface shown in Figure 26, please select the

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local WiFi router, and input password. After that, ESP8266 board would restart. This configuration way is completed.

4 Conclusions

1) When configure the network parameter for SP8266 board by using web page, please choose computer to configure it;

2) In summary, there are two ways to control the car: Remote Mode (internet) and Local Mode, in which, Local Mode has 2 types: Point to Point, and Local area network;

3) There are many network configuration methods, e.g., Web page configuration, ESPTouch, Manual configure, etc., where Web page configuration and manual configuration are the simplest；

4) If you want to control the car by the internet, you must do it by the way presented in Subsection 2.3.3;

5) Although the max voltage of motor shield is 36V, but the voltage of ESP8266 board is just 9V. In the default, the voltage is the same for the motor shield and control board. So, please promise the max voltage is no more than 9V, or the ESP8266 board would be burn down.

5 Support and Download Resources

1) Android software and source cdoe
http://bbs.smartarduino.com/showthread.php?tid=1978

2) Firmware:
http://bbs.smartarduino.com/showthread.php?tid=2013

3) NodeMCU development kit code for smart car
http://bbs.smartarduino.com/showthread.php?tid=2015

4) IOS App
https://itunes.apple.com/us/app/doit-car/id1072418610?l=zh&ls=1&mt=8

skype: yichone
Email: yichoneyi@163.com
WhatsApp: +8618676662425

http://bbs.smartarduino.com/showthread.php?tid=2015