Raspberry Pi 2 WiFi RC Car

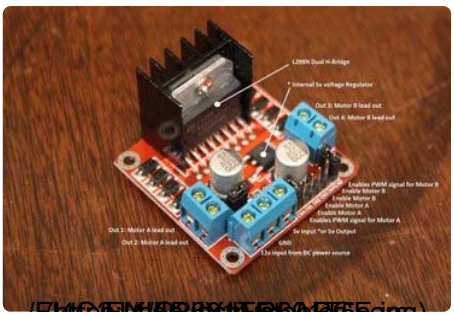
By CodeRewind (/member/CodeRewind/) in Technology (/technology/) > Raspberry-pi (/technology/raspberry-pi/)

38,273 85 32

In this tutorial we will go over how to convert an old RC car to work over WiFi or internet using Raspberry Pi 2. So you put geek hats on and lets get started. I have seen few RC Car projects on the web but they either were ESC (electronic speed controllers) based or 4 motor robotic type projects. This project uses 2 motors, one for throttle and the other for steer. You will be able to control this RC Car from any device (phone/tablet/laptop/desktop).

This is purely based on WebIOPi framework which provides easy HTML/JQuery based implementation to call Python scripts which contains the macros.

Step 1: Components We Need

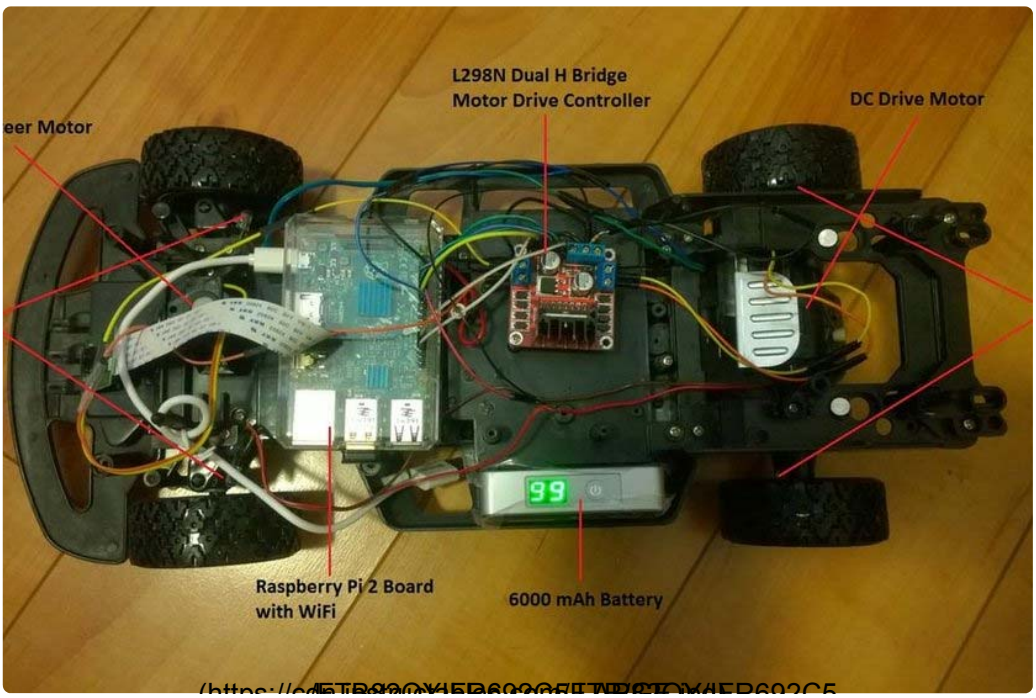


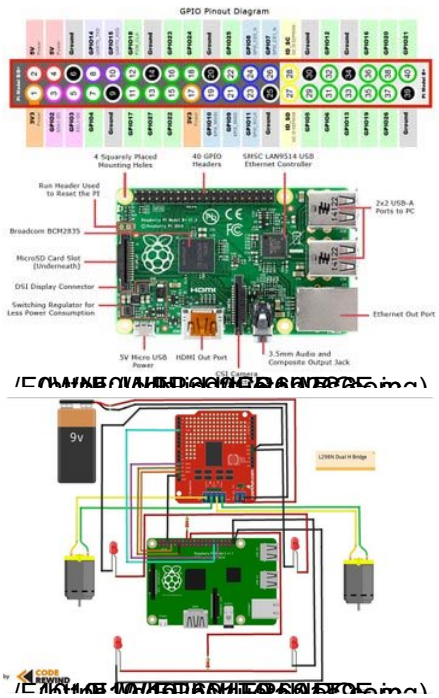
2 More Images

- Old RC Car
- Raspberry Pi 2 Board (http://www.amazon.com/gp/product/B008XVAVAW/ref=as_li_tl?ie=UTF8&camp=1789&creative=9325&creativeASIN=B008XVAVAW&linkCode=as2&tag=wwwcoderewinc-20&linkId=4PWATT35LJZHI4EX)
- Raspberry Pi 2 Case (http://www.amazon.com/gp/product/B00MQLB1N6/ref=as_li_tl?ie=UTF8&camp=1789&creative=9325&creativeASIN=B00MQLB1N6&linkCode=as2&tag=wwwcoderewinc-20&linkId=FLYQZ6ZBIVCRFW7Y)
- Heat Sinks x 2
- Micro SDHC Card (http://www.amazon.com/gp/product/B00MQLB1N6/ref=as_li_tl?ie=UTF8&camp=1789&creative=9325&creativeASIN=B00MQLB1N6&linkCode=as2&tag=wwwcoderewinc-20&linkId=FLYQZ6ZBIVCRFW7Y)
- Edimax Wireless Adapter (http://www.amazon.com/gp/product/B003MTTJOY/ref=as_li_tl?ie=UTF8&camp=1789&creative=9325&creativeASIN=B003MTTJOY&linkCode=as2&tag=wwwcoderewinc-20&linkId=XH3EKHFHQ2XK6VK2)
- L298N Motor Drive Controller Dual H-Bridge (http://www.amazon.com/gp/product/B00CAG6GX2/ref=as_li_tl?ie=UTF8&camp=1789&creative=9325&creativeASIN=B00CAG6GX2&linkCode=as2&tag=wwwcoderewinc-20&linkId=MRO7H6DXPBYJHAFL)
- Eachine Mini Y5 6000mAH Battery Bank (http://www.amazon.com/gp/product/B00NUS0BQW/ref=as_li_tl?ie=UTF8&camp=1789&creative=9325&creativeASIN=B00NUS0BQW&linkCode=as2&tag=wwwcoderewinc-20&linkId=BMHJGQSIAPM6STG3)
- Jumper Wires x 16
- HDMI Cable (optional)

- HDMI Monitor (optional)
- Resistors x 2
- LED's x 4

Step 2: Wiring Pi and Components



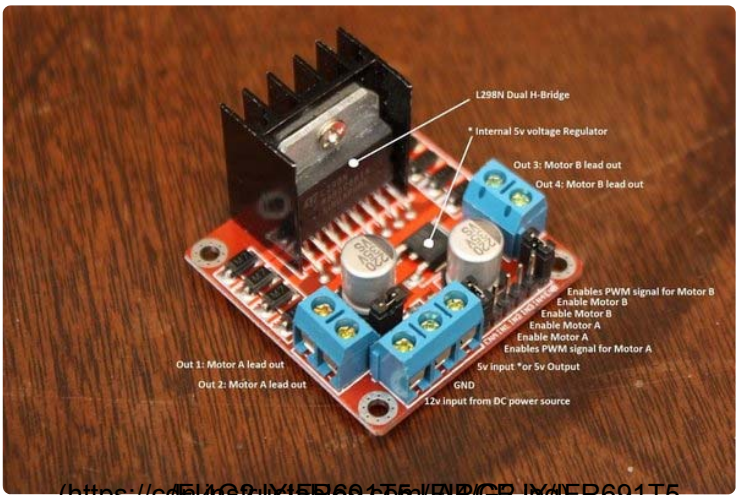


In order to correctly complete the wiring we need to understand the Raspberry Pi 2 GPIO pins which are used to connect various components to the Pi. These pins send the signals to the components connected, which could be turning on a light to driving a motor or reading data from a temperature or proximity sensor.

The ones highlighted in green are the 17 basic GPIO pins which is what we are going to use in our project. These pin can be configured in either input or output mode.

I connected the Anode (+ve) of 2 sets of LED's for left and right turn signals with one 330Ω resistor each. Resistors help keep the amount of current passing through the LED's at a correct level, otherwise you could burn out the LED very quickly.

Step 3: Connecting Pi and L298N Motor Drive Controller



	Header Pin	BCM
	Pin 7	Pin
	Pin 11	Pin
	Pin 29	Pin
	Pin 13	Pin
	Pin 15	Pin
	Pin 31	Pin
	Pin 16	Pin
	Pin 18	Pin
	Pin 6	-

If you look at the above wiring you will notice that i connected the 9V supply to the L298N Dual H Bridge which will further power up the 9V Motors. Now, you may ask why do i need this additional component to power motors. Can I connect the motors to the Raspberry Pi GPIO pins? The answer is yes and no. The reason why we rely on a motor drive controller is because this can handle two motors up to 35V. Raspberry Pi only sends a maximum of 3.3V as its high signal. It not only provides enough power but controls direction and speed as i explained earlier.

L298N Motor Drive Controller Dual H-Bridge is the key component of my Raspberry Pi WiFi RC Car which powers all the motors and sends signal to controls the direction and speed of the motors. This controller can drive 2 motors with PWM (Pulse Width Modulation) signal. PWM in itself is a vast topic so we won't cover it here. Think of this as a technique to control the amount of power going through pretty much anything you want.

Step 4: Software Required

- Raspbian Wheezy (This is the Linux OS flavor) – http://bit.ly/1KWbtrE (http://bit.ly/1KWbtrE)
- WiringPi (This is used to see all the GPIO's) – http://bit.ly/1DIFwkR (http://bit.ly/1DIFwkR)
- WebIOPi (For developing web apps) – http://bit.ly/1GsnctO (http://bit.ly/1GsnctO)
- Weaved IoT Kit (For controlling the device from anywhere) – http://bit.ly/1TQ5UIR (http://bit.ly/1TQ5UIR)
- Fritzing – (For creating wiring schematics) – http://bit.ly/1jOBcTZ (http://bit.ly/1jOBcTZ)
- PiCar Script (This is my custom scripts and UI files) – http://bit.ly/1jKk87n (http://bit.ly/1jKk87n)
- Any Text Editor (Notepad++ or Sublime Text)

Step 5: Installing Prerequisites

Format the SD card and install Raspbian Wheezy using Noobs or directly – https://www.raspberrypi.org/help/noobs-setup/ (https://www.raspberrypi.org/help/noobs-setup/)

Update your Raspberry Pi using the script by Rob Seder (http://blog.robseder.com/2015/09/29/scripts-to-update-the-raspberry-pi-and-debian-based-linux-distros/)

Install the WiFi adapter and connect to your wireless network

Now install WiringPi using the following commands

```
sudo apt-get install git-core
sudo git clone git://git.drogon.net/wiringPi
cd wiringPi
sudo git pull origin
sudo ./build
```

To use WiringPi to help you make proper GPIO connection type the following commands

```
gpio -v
gpio readall
```

To install WebIOPi type the following commands

```
$ sudo wget  http://sourceforge.net/projects/webiopi/files/Web... (http://sourceforge.net/projects/webiopi/files/WebIOPi-0.7.1.tar.gz/download)
$ sudo tar xvzf WebIOPi-x.y.z.tar.gz
$ cd WebIOPi-x.y.z
$ sudo ./setup.sh
```


Step 6: Confgiuring WebIOPi and Weaved

The basic configuration required is to tell where our custom python script will reside which can be done by editing the config file under HTTP section using the following command.

```
$ sudo nano /etc/webiopi/config
//Edit this section of the config, mainly the doc-root and welcome-file attributes.
[HTTP]
enabled = true
port = 8000
doc-root = /home/pi/picar
welcome-file = index.html
```

To start webiopi service with verbose output and the default config file. This is recommended when developing and debugging your scripts.

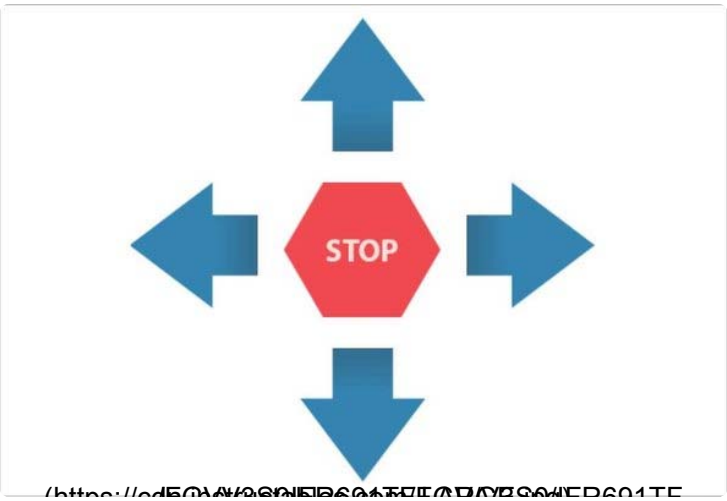
You can also start/stop the background service, the configuration will be loaded from /etc/webiopi/config.

```
$ sudo /etc/init.d/webiopi start
$ sudo /etc/init.d/webiopi stop
//To check if the service is running or not
$ sudo /etc/init.d/webiopi status
```

Once you are done building your project you should put this service to auto start when the Pi boots. To manage service at boot here are the commands.

```
//To setup your system to start webiopi at boot:
$ sudo update-rc.d webiopi defaults
//To remove webiopi start from boot:
$ sudo update-rc.d webiopi remove
```


Step 7: Building User Interface



To access the pi over local network open a browser and navigate to http://ipAddressOfPi:8000/ (http://ipAddressOfPi:8000/)from any device in your

network. Make sure to type the ip address of the Pi in the url. Default user “webiopi” and password is “raspberry“.

UI is pretty much a basic HTML page with images mapped for directions and stop commands that are wired to the onmousedown event. Those events are then mapped to the python macros which are exposed by the webiopi framework.

Step 8: Conclusion

I hope you enjoyed this tutorial and will try to build something interesting. Let me know what you think about this project. Further I plan add the following features to this project.

- Adding Telemetry Support – includes reading temperature, speed of the motors, real time battery status
- Low Battery Notification
- Integrate Pi Camera Module
- Remove UI lag and make it more responsive
- Allow Device Accelerometer

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(/member/bunty1328/) bunty1328 (/member/bunty1328/) 10 months ago Reply Upvote

Hi Carlos! Nice to meet you!!! I'm too new to the rpi and I am trying to make this project from this guide. actually i'm facing a problem to edit sudo nano /etc/webiopi/config
please share exact codes if possible

(/member/junhyoung/) junhyoung (/member/junhyoung/) 1 year ago Reply Upvote

i install & starting webiopi. but when i connected Webpage, This phenomenon occurs. I definitely put a png files in /home/pi/picar . please help me ..

(https://cdn.instructables.com
/F77/3N1H/J6WGOOLH
/F773N1HJ6WGOOLH.LARGE.jpg)

3 replies

(/member/WhitneyD11/) WhitneyD11 (/member/WhitneyD11/) 12 months ago Reply Upvote

So i have the html page up when my pi turns on but when i push one of the buttons all it does is load the same html page in a new tab and doesnt want to make the connection between the html and the python script to tell the motors when to turn on. Help!

(/member/Dabnug/) Dabnug (/member/Dabnug/) 1 year ago Reply Upvote

I cannot get the custom HTML page to load. Was getting some compatibility errors from the python

script when I loaded the verbose webservice, so I stripped the python script down to basics, the errors went away, but the HTML page still will not load.

My config file has saved into two versions, config and config.save. I updated both with the path for the python script and the HTML page. I tried both standard and fully qualified path. No success. I do not have my files in the same folder as the example solution specifies.

Is there somewhere else that references the path that I am missing?

Do we need a def destroy(): in the python script?

1 reply

(/member/Dabnug/) Dabnug (/member/Dabnug/) 1 year ago

Reply Upvote

also, the folder name I created originally had a space. I used "rename" in the file browser to remove the space, but I am wondering is there is some aliasing for the UI that is causing the path to the HTML file to not be found?

(/member/AndrewB201/) AndrewB201 (/member/AndrewB201/) 1 year ago

Reply Upvote

Getting this error, where are the macros supposed to be located?

jquery.js:4 POST http://192.168.1.108:8000/macros/ButtonTurnRight/... (http://192.168.1.108:8000/macros/ButtonTurnRight/) 404 (ButtonTurnRight Not Found)

(/member/Th%25C3%25A1iN18/) ThάiN18 (/member/Th%25C3%25A1iN18/) 1 year ago

Reply Upvote

Very cool but Connecting Pi and L298N Motor Drive. Board in picture very different with board L298N. Can you help me connect ?

2 replies

(/member/eddyuhl/) eddyuhl (/member/eddyuhl/) 1 year ago

Reply Upvote

Hi,

i try to realize that project, but i have a problem. I have installed the software and changed the config file. I also can reach the webinterface. I now try to measure some signals at the pi gpio when i hit any button on my smartphone but nothing happens. When i

start Webiopi by "sudo webiopi -d -c /etc/webiopi/config" i can see that a button was pressed but then it shows an error "post /macros/buttonStop/ HTTP/1.1"- 404 not found.
the picar.py and index html are in "/home/pi/picar".
Please help me whats wrong?

1 reply

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(/member/CarlosM175/) CarlosM175 (/member/CarlosM175/) 1 year ago

Reply Upvote

Amanhã já vo tentar criar o meu próprio RC

1 reply

(/member/adashh/) adashh (/member/adashh/) 2 years ago

Reply Upvote

hey are the connections to Rpi3 same too as of Rpi2 which you used? i m trying to make the same using Rpi3 !

1 reply

(/member/firedl/) firedl (/member/firedl/) 1 year ago

Reply Upvote

hi what HTML editor did you use there are none installed on my Pi 3 can you help?

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