IoT based Web Controlled Home Automation Using Raspberry Pi.

Installation Manual

Controlling AC appliances with the click of buttons on a webpage using internet. It is possible to control your Home appliances from anywhere in the world. This web server can be run from any device which can run HTML applications, like Smart Phone, tablet, computer etc.

Hardware Requirements

1. Raspberry Pi Model B/B+ 5v Relays
2. LEDs to test.
3. Breadboard
4. AC lamp to Test
5. Jumper wires

- **Software Requirements**

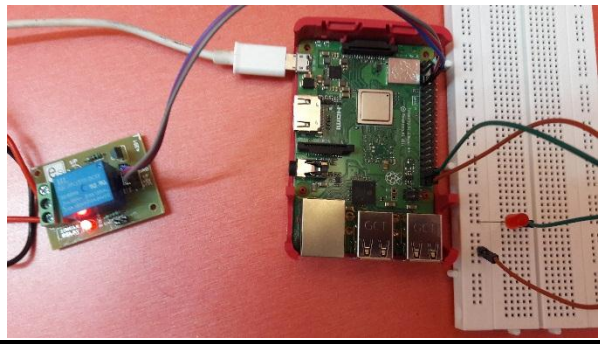
1. Raspbian Stretch OS
2. WebIOPi frame work

1. **Connect your 5v Relay with Raspberry Pi's GPIO Pins using Jumper wires (Female-Female).**

Relay Board Pin	Function	RPI Physical Pin	Raspberry Function
+5v	+ 5V Power	4	5V
I/P	Data In	7	GPIO 4
GND	Ground	6	GND

LED to Test : Connect LED to Raspberry Pi using breadboard

LED Terminal	RPI Physical Pin	LED Terminal	RPI Physical Pin
Positive	37	Negative	39

Step 1: Download the WebIOPi Framework file

Use wget command to get the installer file of WebIOPi framework from sourceforge page
Make sure you are in home directory.

```
pi@raspberrypi: ~
File  Edit  Tabs  Help
pi@raspberrypi:~ $ pwd
/home/pi
pi@raspberrypi:~ $ wget http://sourceforge.net/projects/webiopi/files/WebIOPi-0.
7.1.tar.gz
```

Extract the file using tar command.

```
pi@raspberrypi: ~
File  Edit  Tabs  Help
pi@raspberrypi:~ $ tar xvzf WebIOPi-0.7.1.tar.gz
```

Now, Go to the WebIOPi Directory.

```
pi@raspberrypi: ~/WebIOPi-0.7.1
File  Edit  Tabs  Help
pi@raspberrypi:~ $ cd WebIOPi-0.7.1/
pi@raspberrypi:~/WebIOPi-0.7.1 $ pwd
/home/pi/WebIOPi-0.7.1
```

Step 2: Install patch file

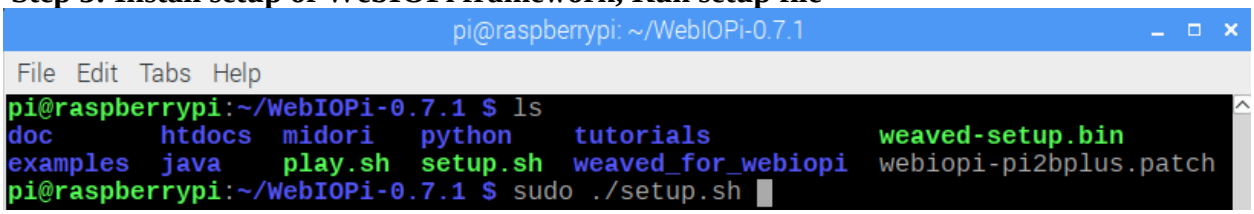
At this point before running the setup, we need to **install a patch as this version of the WebIOPi** does not work with the raspberry pi 3.
Download patch file using wget command

```
pi@raspberrypi: ~/WebIOPi-0.7.1
File  Edit  Tabs  Help
pi@raspberrypi:~/WebIOPi-0.7.1 $ wget https://raw.githubusercontent.com/doublebi
nd/raspi/master/webiopi-pi2bplus.patch
```

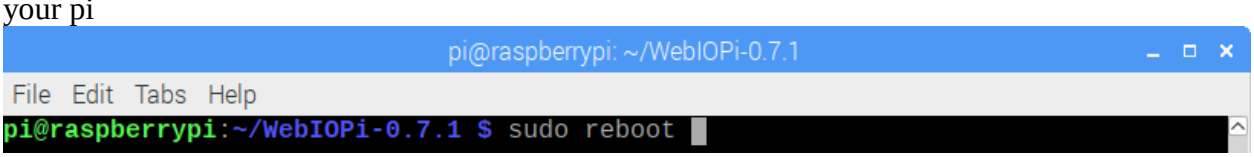
Install patch file using patch command

```
pi@raspberrypi: ~/WebIOPi-0.7.1
File  Edit  Tabs  Help
pi@raspberrypi:~/WebIOPi-0.7.1 $ patch -p1 -i webiopi-pi2bplus.patch
```

Step 3: Install setup of WebIOPi framework, Run setup file



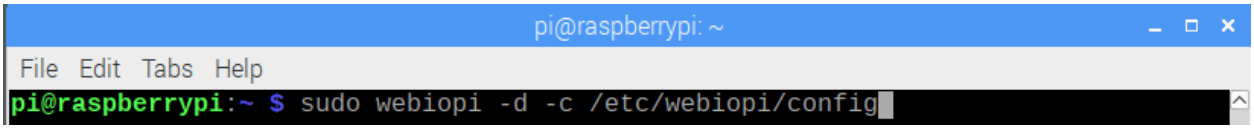
Keep saying yes if asked to install any dependencies during setup installation. When done, reboot your pi



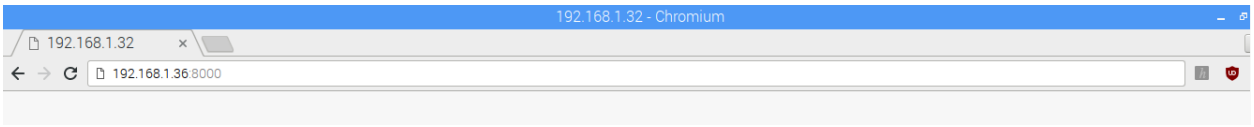
Step 4: Test WebIOPi Installation

We will need to test our WebIOPi installation to be sure everything works fine as desired.

Run following command on terminal



Now, open web browser and connect to http://PI's **IP address:8000**



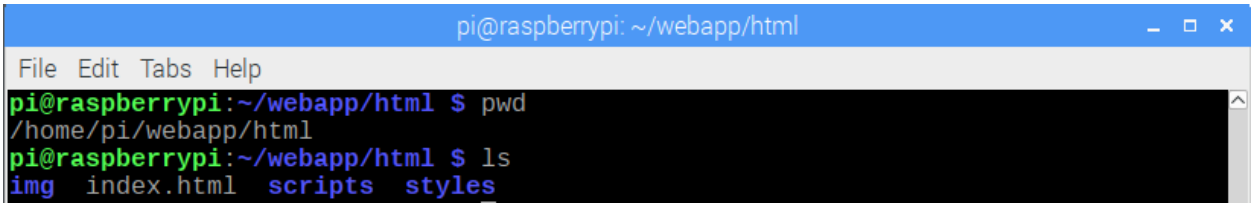
The system will prompt you for username and password.
Username: webiopi
Password: raspberry

After the login, **click on the GPIO header link**. Test your LED which is connected to raspberry Pi's GPIO Pins. In my case, I have used Physical Pin no 37 of Pi. So set it as **output. Click the pin 37 button to turn on or off the LED**. This way we can control the Raspberry Pi GPIO using WebIOPi.

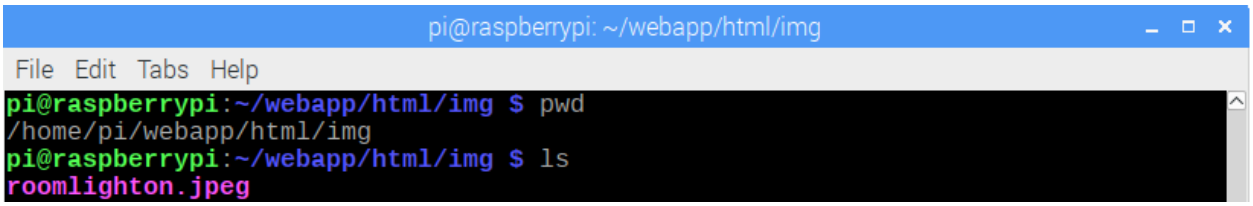
After the test, if everything worked as described, then we can go back to the terminal and stop the program with CTRL + C.

Step 4: Building the Web Application for Raspberry Pi Home Automation

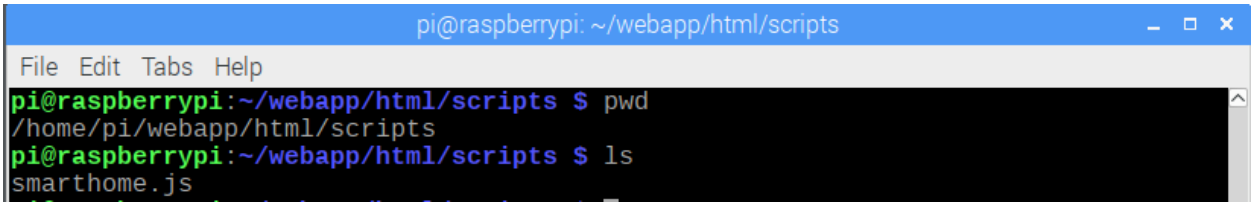
Create below directory structure



Place image inside **img** folder



Create **smarthome.js** file inside **scripts** folder

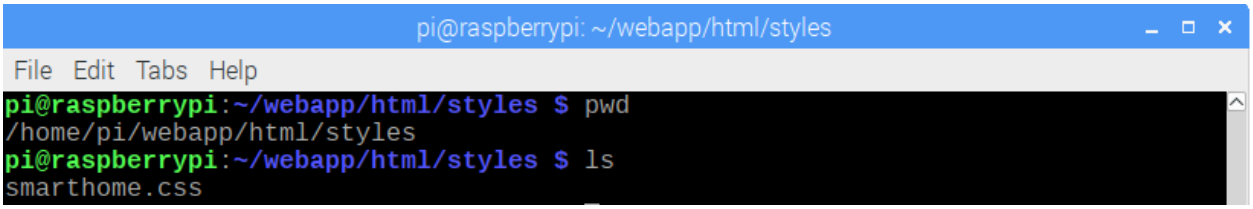


Smarthome.js file

```
webiopi().ready(function() {
                webiopi().setFunction(4,"out");
                var content, button;
                content = $("#content");

                button = webiopi().createGPIOButton(4,"Room 1");
                content.append(button);
});
```

Create **smarthome.css** file inside **styles** folder



Smarthome.css file

```
body {
                        background-color:#fff;
                        background-repeat:no-repeat;
                        background-position:center;
                        background-size:cover;
                        font: bold 18px/25px Arial, sans-serif;

        }

h1 {
font: bold 40px Arial, sans-serif;
background-color:#000;
```

```
color:white;
}

 button {
                                display: block;
                                position: absolute;
                                margin: 40px 610px;
                                padding: 0 10px;
                                text-align: center;
                                text-decoration: none;
                                width: 130px;
                                height: 40px;
                                font: bold 18px/25px Arial, sans-serif;
                                color: black;

                                text-shadow: 1px 1px 1px rgba(255,255,255, .22);
                                -webkit-border-radius: 30px;
                                -moz-border-radius: 30px;
                                border-radius: 30px;

-webkit-box-shadow: 1px 1px 1px rgba(0,0,0, .29), inset 1px 1px 1px rgba(255,255,255,
.44);
 -moz-box-shadow: 1px 1px 1px rgba(0,0,0, .29), inset 1px 1px 1px rgba(255,255,255, .44);
  box-shadow: 1px 1px 1px rgba(0,0,0, .29), inset 1px 1px 1px rgba(255,255,255, .44);

                                -webkit-transition: all 0.15s ease;
                                -moz-transition: all 0.15s ease;
                                -o-transition: all 0.15s ease;
                                -ms-transition: all 0.15s ease;
                                transition: all 0.15s ease;
      }

      input[type="range"] {
                                        display: block;
                                        width: 160px;
                                        height: 45px;
      }

      #gpio4.LOW {
                                        background-color: White;
                                        color: Black;
                        }
      #gpio4.HIGH {
                                        background-color: Black;
                                        color: LightGray;
                        }
```

Create **index.html** file inside **html** folder

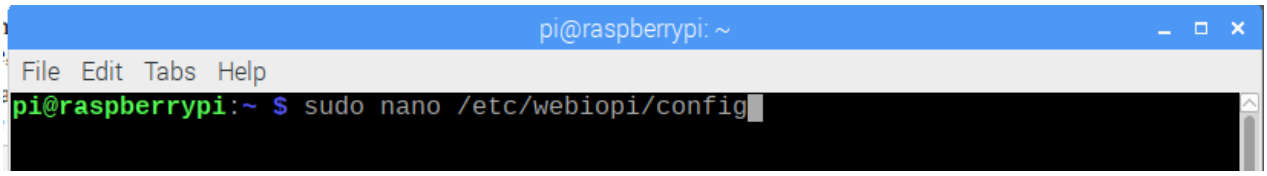
```
<html>
<head>
	<meta http-equiv="Content-Type" content="text/html; charset=UTF-8">
	<meta name="mobile-web-app-capable" content="yes">
	<meta name="viewport" content = "height = device-height, width = device-width,
user-scalable = no" />
	<title>Smart Home</title>
	<script type="text/javascript" src="/webiopi.js"></script>
	<script type="text/javascript" src="/scripts/smarthome.js"></script>
	<link rel="stylesheet" type="text/css" href="/styles/smarthome.css">
	<link rel="shortcut icon" sizes="196x196" href="/img/roomlighton.jpeg" />
</head>
<body>
<h1 align=center>Web Based Controlled Home Automation using Raspberry Pi </h1>

<div id="content" align="center"></div>
		<center><img src="/img/roomlighton.jpeg" height="500px" width="800px"
id='pic1' /></center>

</body>
</html>
```

Step 5: WebIOPi Server Edits for Home Automation

We need to **edit the config file of the webiopi** service so it's pointed to use data from our html folder instead of the config files that came with it.



Under http section of the config file, comment out doc-root line and change the path to your project file

```
# Use doc-root to change default HTML and resource files location
doc-root = /home/pi/webapp/html
```

Step 6: Change the username & password of the WebIOPi service

Note that you can change the password of the WebIOPi service using the command if you want. Or skip this step.

```
pi@raspberrypi: ~
File  Edit  Tabs  Help
pi@raspberrypi:~ $ sudo webiopi-passwd
WebIOPi passwd file generator
Enter Login: msd
Enter Password:
Confirm password:

Hash: c4ff3a08020aced1863600d87594b9e94a2d0131309ea48be3059f3c8729f6aa
Saved to /etc/webiopi/passwd
```

Step 7: Run the WebIOPi service

Start the WebIOPi service

```
pi@raspberrypi: ~
File  Edit  Tabs  Help
pi@raspberrypi:~ $ sudo /etc/init.d/webiopi start
```

Restart the WebIOPi service

```
pi@raspberrypi: ~
File  Edit  Tabs  Help
pi@raspberrypi:~ $ sudo /etc/init.d/webiopi restart
```

Status the WebIOPi service

```
pi@raspberrypi: ~
File  Edit  Tabs  Help
pi@raspberrypi:~ $ sudo /etc/init.d/webiopi status
```

Stop the WebIOPi service

```
pi@raspberrypi: ~
File  Edit  Tabs  Help
pi@raspberrypi:~ $ sudo /etc/init.d/webiopi stop
```

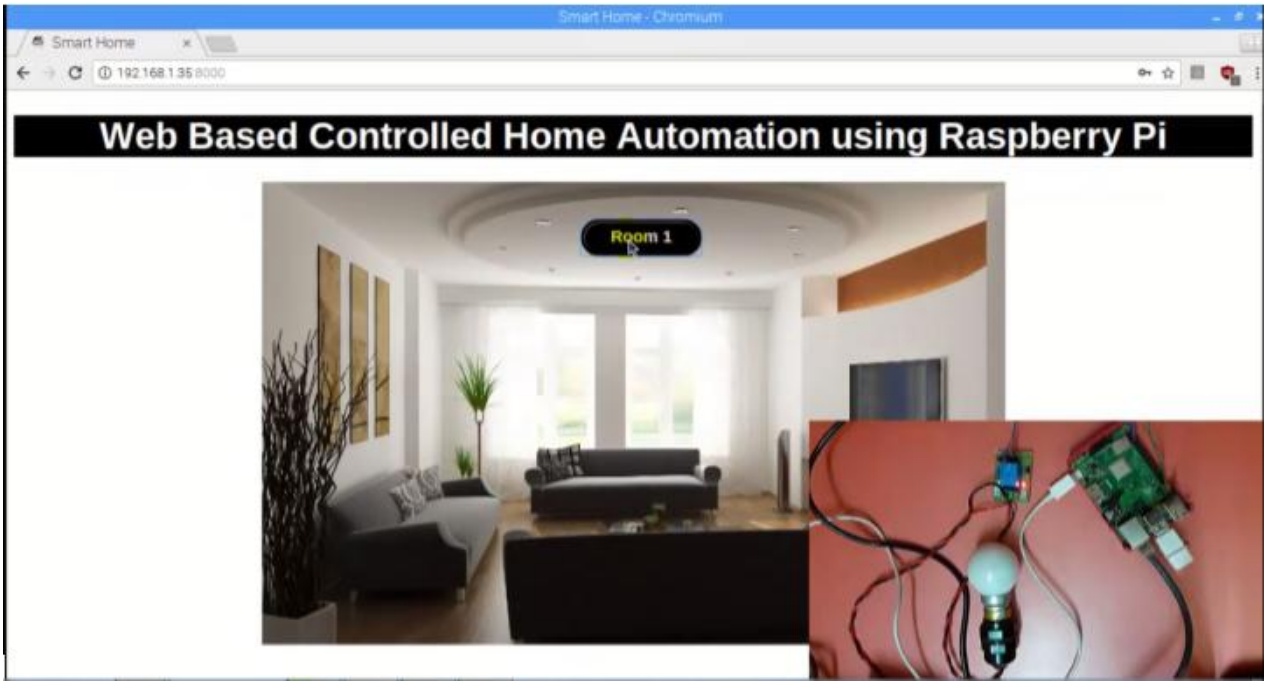
To setup WebIOPi to run at boot, use:

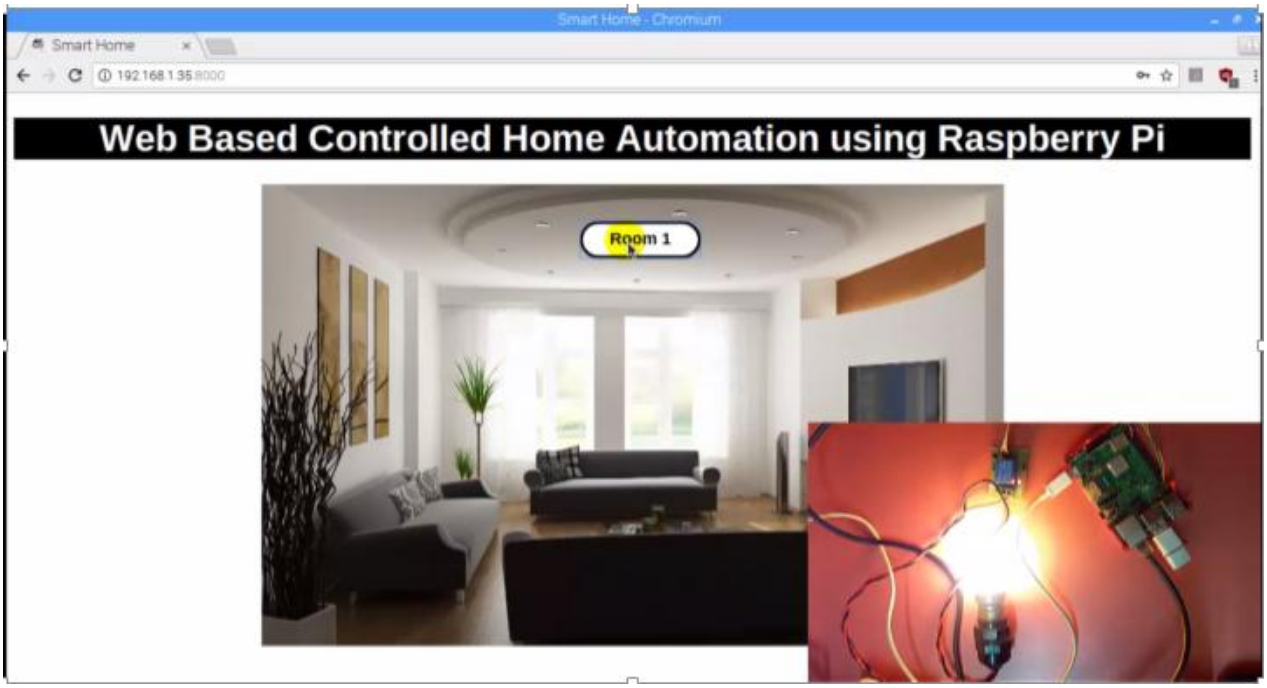
```
pi@raspberrypi: ~
File  Edit  Tabs  Help
pi@raspberrypi:~ $ sudo update-rc.d webiopi defaults
```

To reverse and stop it from running at boot, use

```
pi@raspberrypi: ~
File  Edit  Tabs  Help
pi@raspberrypi:~ $ sudo update-rc.d webiopi remove
```

When you Click on button Room1 ,it switch on AC Lamp, again clicking on same button ,it will switch off AC Lamp.





Note : It is possible to open same URL http://PI's IP address:8000 on smart phone , tablet over local network.

That's all !!!

Thank you….