3DUnify.in

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PREFACE

Have you ever wanted a system which send a notification to your phone , say when your pet goes out and comes back in? Or maybe you want some privacy and you would like to be notified when someone enters your main door.

The Arduino Motion Sensor Kit is just what you needed!

This kit allows you to use the engineer in you to assemble multiple Sensors and Wires and put it into a casing after all is done. Having said that, You do need some experience in coding and setting up connections and installing apps on your phone.

But not to worry, We at 3DUnify has created a highly detailed guide with step by step instructions to help even novices without any issue.

Even before purchasing the product , You can download the guide / manual for free , and go through it to decide for yourself if you have the experience to set it up. Setting up the Arduino Motion Sensor is similar to solving Puzzles, All you need is some patience and time to get it up running. After purchase , you can contact us for any issue you face , and we would do our best to help you.

FEATURES:

- Customizable Range , Sensitivity , Repeated Notifications , Single Notification , Time Delay.
- Can be powered through any mobile phone adapter (Minimum 5 Volts) but can also be powered through any power bank.
- The main components can be reused for numerous projects , Not only limited motion sensing.
- You can Purchase it as a Kit , Semi-Assembled & Assembled.
- Kit – All the parts are packed and the user is expected to assemble and setup everything.
- Semi-Assembled – Most of the components are fixed and the user should only Add the WiFi Details and Authentication Code.
- Assembled – All components are fixed using supports and WiFi Details and Authentication Code is added and tested before shipping.
- Fitting the modules and sensors into the casing has never been easier , No Glue or Screws required! Just push the two supports after placing the NodeMCU Sensor.

PREREQUISITES:

- Broadband Connection
- Smartphone (With Notification Enabled)
- Arduino IDE & Notepad ++ (Both Free)
- Any Smartphone Adapter with USB Cable and Screwdriver for adjusting the Sensitivity and Range
- This product requires intermediate experience , Example , Importing the .INO File and Installing Libraries and Editing the .INO File to Add your WiFi Details and Auth Code.
- Hence it requires tome and patience , But with the help of our 20+ Page Step By Step Instructions Guide / Manual , You will not face much difficulty.

CONTENTS:

- NodeMCU V.1 (1 Unit)
- SR-501 PIR Sensor (1 Unit)
- 6 Jumper Cables (3 Spares)
- 4 Supports to mount the NodeMCU (2 Spare)

Step By Step Instructions on Setting Up Motion Sensor by 3DUNIFY

1) Pinouts of NodeMCU:

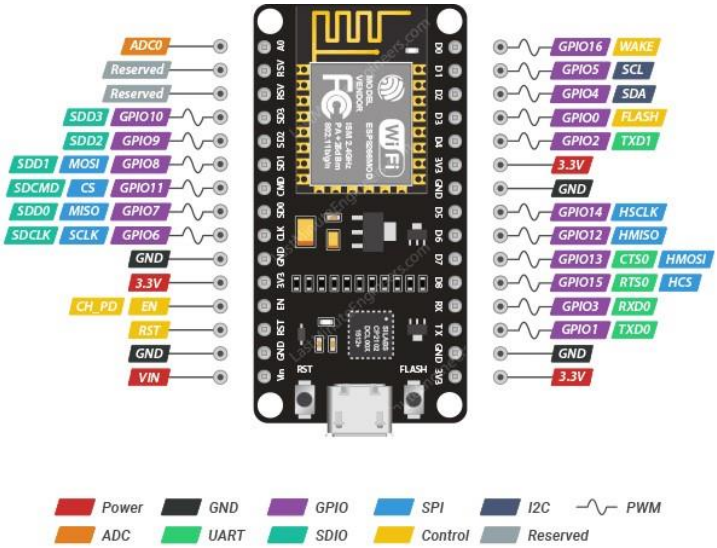

Figure 1NodeMCU V.1 Pinouts

1.1)

Pin Category	Name	Description
Power	Micro-USB, 3.3V, GND, Vin	**Micro-USB:** NodeMCU can be powered through the USB port. **3.3V:** Regulated 3.3V can be supplied to this pin to power the board **GND:** Ground pins **Vin:** External Power Supply
Control Pins	**EN, RST**	The pin and the button resets the microcontroller
Analog Pin	A0	Used to measure analog voltage in the range of 0-3.3V
GPIO Pins	GPIO1 to GPIO16	NodeMCU has 16 general purpose input-output pins on its board
SPI Pins	SD1,CMD,SD0, CLK	NodeMCU has four pins available for SPI communication.
UART Pins	TXD0, RXD0, TXD2, RXD2	NodeMCU has two UART interfaces, UART0 (RXD0 & TXD0) and UART1 (RXD1 & TXD1). UART1 is used to upload the firmware/program.
I2C Pins		NodeMCU has I2C functionality support but due to the internal functionality of these pins, you have to find which pin is I2C.

1.2) Specifications:

- 802.11 b/g/n
- Integrated low power 32-bit MCU
- Integrated 10-bit ADC
- Integrated TCP/IP protocol stack
- Integrated TR switch, balun, LNA, power amplifier and matching network
- Integrated PLL, regulators, and power management units
- Supports antenna diversity
- WiFi 2.4 GHz, support WPA/WPA2
- Support STA/AP/STA+AP operation modes
- Support Smart Link Function for both Android and iOS devices
- SDIO 2.0, (H) SPI, UART, I2C, I2S, IR Remote Control, PWM, GPIO
- STBC, 1x1 MIMO, 2x1 MIMO
- A-MPDU & A-MSDU aggregation & 0.4s guard interval
- Deep sleep power <10uA, Power down leakage current < 5uA
- Wake up and transmit packets in < 2ms
- Standby power consumption of < 1.0mW (DTIM3)
- +20 dBm output power in 802.11b mode
- Operating temperature range -40C ~ 125C
- FCC, CE, TELEC, WiFi Alliance, and SRRC certified

2) Pinouts of SR501:

Figure 2 Front & Back View of SR-501 Sensor

2.1)

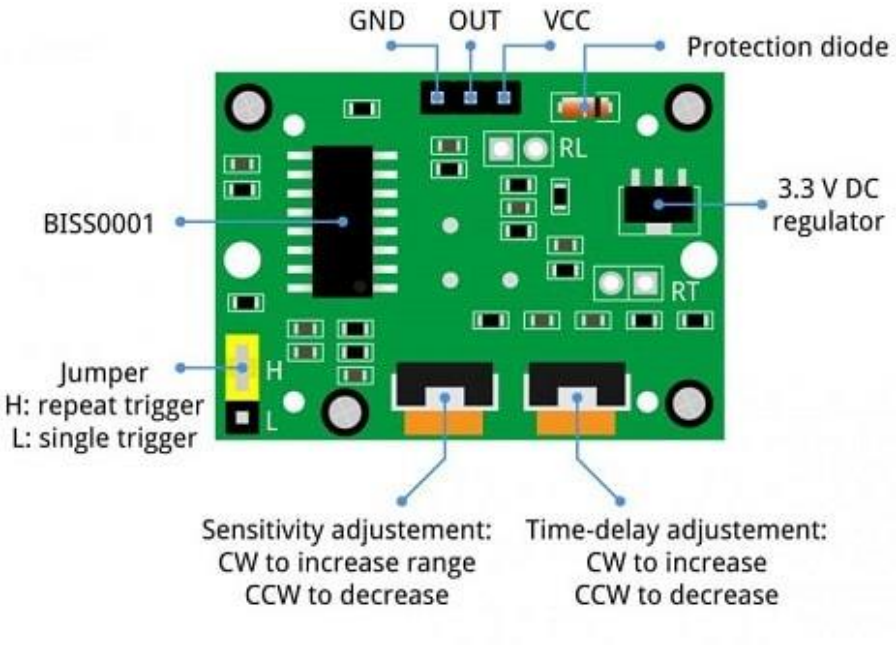

Figure 3 Rotated View of SR-501 Sensor

2.2) Pinout:

Pin Name	Description
Vcc	Input voltage is +5V for typical applications. Can range from 4.5V- 12V
High/Low Ouput (Dout)	Digital pulse high (3.3V) when triggered (motion detected) digital low(0V) when idle(no motion detected
Ground	Connected to ground of circuit

2.3) Specification:

Operating Voltage	4.5 – 20V (typically 5V)
Maximum Current Draw	< 2mA
Time Delay	~ 1 sec to 3 min
Detection Distance	3 – 7 meters (9 – 21 feet)
Detection Angle	120 degrees (typically)

3) Setup

Connection Between NodeMCU & SR501 PIR Sensor

3.1) Connection:

NodeMCU	PIR Sensor
GND	GND
Vin	VCC
D1	Out Pin

3.2) Schematics:

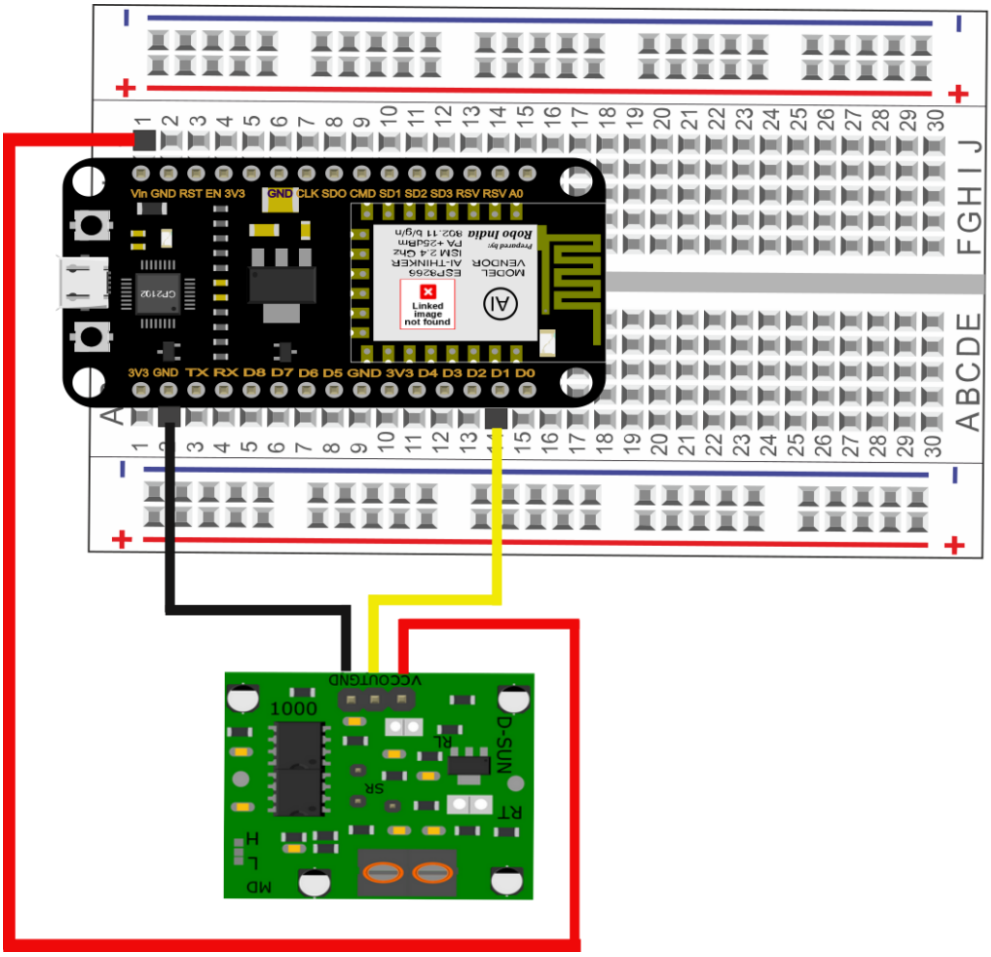

Figure 4 Schematics of NodeMCU & SR-501 Sensor

TIP: Use the Checkboxes next to each steps by clicking on them after completing them. Or if you're reading this on a physical copy just use a pen or pencil.

4) Instructions on connecting the NodeMCU and SR-501 Sensor:

4.1)

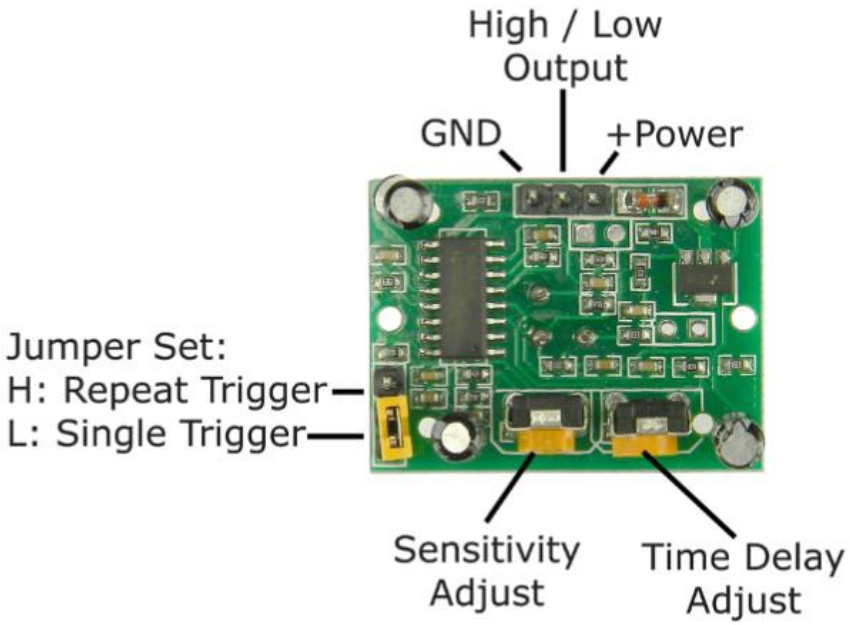

Figure 5 Pinouts of SR-501 Sensor

4.2) ☐ 1) Using the above images as reference connect the ground or GND wire from the SR-501 sensor to the Ground or GND wire on the NodeMCU, The NodeMCU will have two GND wires , you can connect it to any one of them.

☐ 2) Just like the above step , Now connect the VIN or Positive of the SR-501 sensor to the VIN or Positive on the NodeMCU.

☐ 3) Lastly, Connect the OUT or Middle PIN on the SR-501 to the D1 ON the NodeMCU.

The connection part is complete. The next step is to download Arduino IDE.

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5) Downloading and Installing Arduino IDE:

Visit this link below to download install the Arduino IDE.

https://www.arduino.cc/en/software

☐ 1) Use any browser of your choice and visit the above link and depending on your platform select either Windows, MAC OS or Linux.

☐ 2) Then download and install the Arduino IDE on any location or Drive and start the installation process and launch it when its completed.

☐ 3) Launch the Arduino IDE.

Now before completing the connection process we need to install something called a Library in the Arduino IDE,

5.1) Installing Library (s):

5.2) Installing NodeMCU Library:

Installing with Boards Manager

- ☐ Start Arduino and open the Preferences window.
- ☐ Enter `https://arduino.esp8266.com/stable/package_esp8266com_index.json` into the *File>Preferences>Additional Boards Manager URLs* field of the Arduino IDE. You can add multiple URLs, separating them with commas.
- ☐ Open Boards Manager from Tools > Board menu and install *esp8266* platform (and don't forget to select your ESP8266 board from Tools > Board menu after installation).

5.3) Installing BLYNK Library in 2 Methods:

Method 1:

Install Blynk as ZIP file in Arduino IDE

☐ Blynk library is available as a downloadable ZIP. Starting with Arduino IDE version 1.0.5, you can install 3rd party libraries in the IDE.

☐ Download Blynk Library by clicking this link : https://github.com/blynkkk/blynk-library/releases/tag/v1.1.0.

☐ In the Arduino IDE, navigate to Sketch > Include Library > Add .ZIP Library. At the top of the drop down list, select the option to "Add .ZIP Library".

☐ Return to the Sketch > Include Library menu. menu. You should now see the library at the bottom of the drop-down menu. It is ready to be used in your sketch. The zip file will have been expanded in the libraries folder in your Arduino sketches directory.

Method 2:

☐ Install Blynk Library using built-in library manager in Arduino IDE

☐ To install a new library into your Arduino IDE you can use the Library Manager (available from IDE version 1.6.2). Open the IDE and click to the "Sketch" menu and then Include Library > Manage Libraries.

☐ Then the Library Manager will open and you will find a list of libraries that are already installed or ready for installation. Search for **Blynk** library and in the version selection choose the latest version to date.

☐ Finally click on Install and wait for the IDE to install the new library. Downloading may take time depending on your connection speed. Once it has finished, an Installed tag should appear next to the Bridge library. You can close the library manager.

That's it!

Final Steps

Now only two simple steps remain, Setting up BLYNK APP and Importing the Arduino Project.

Please follow the below steps before moving on to setting up BLYNK on your phone,

6) Downloading and Installing BLYNK App,

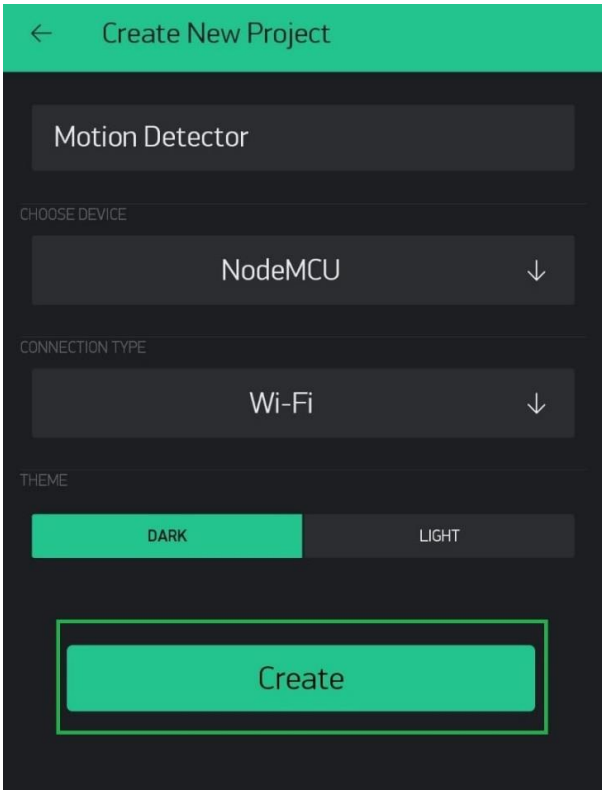
☐ Please visit the below link and install either the Android or iOS

https://docs.blynk.io/en/downloads/blynk-apps-for-ios-and-android

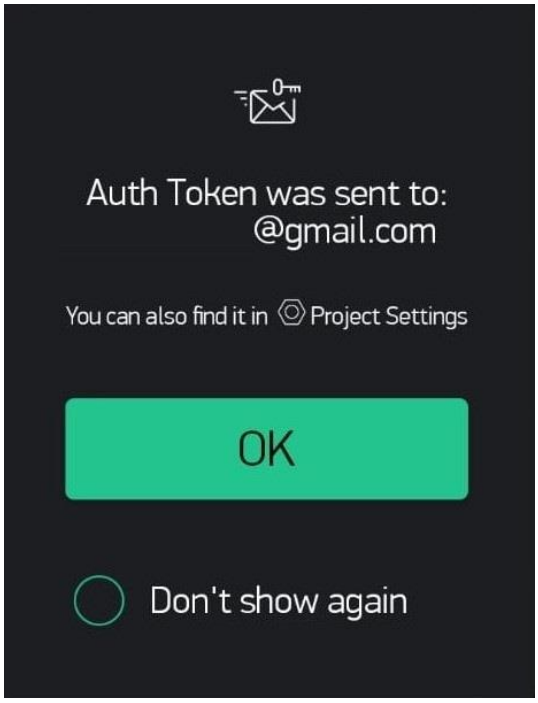
6.1) Setting up BNYNK on your Phone:

Use the screenshots below as reference,

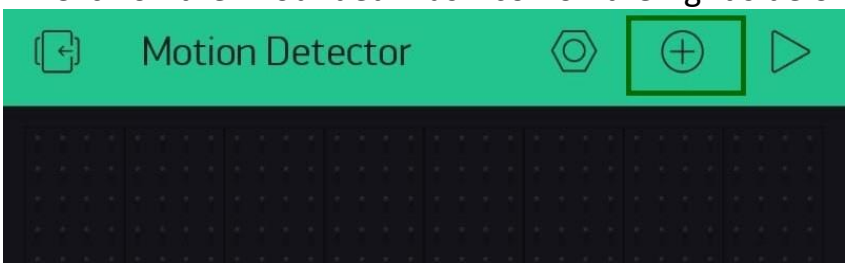
1. ☒ Click on **New Project**.
2. ☐ Give it a name (in my case "**Motion Detector**")
3. ☐ Click on “Choose Device” and scroll down and click on “NodeMCU” and click on WiFi as Connection Type and finally click Create.



4. ☐ Copy the **AUTH TOKEN** or send the code to your email. Copy this 35 Character code and keep it safe, we will be needing this when editing the Arduino Project file.

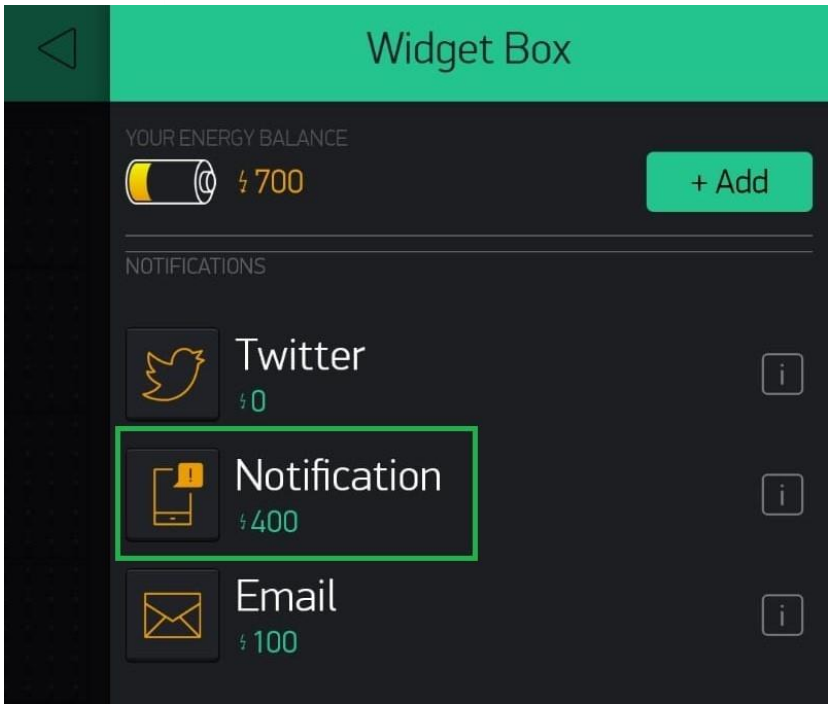


5. ☐ Click on the “Rounded Plus” icon on the right side of the top bar.

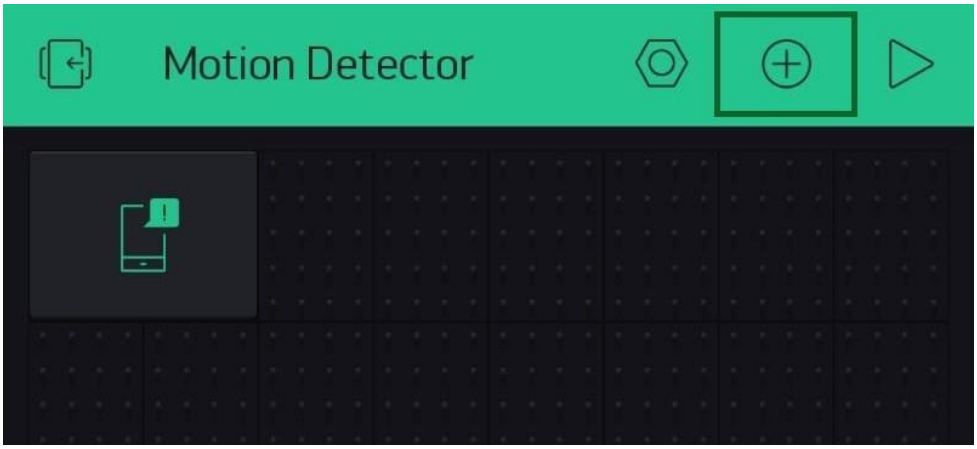


6.

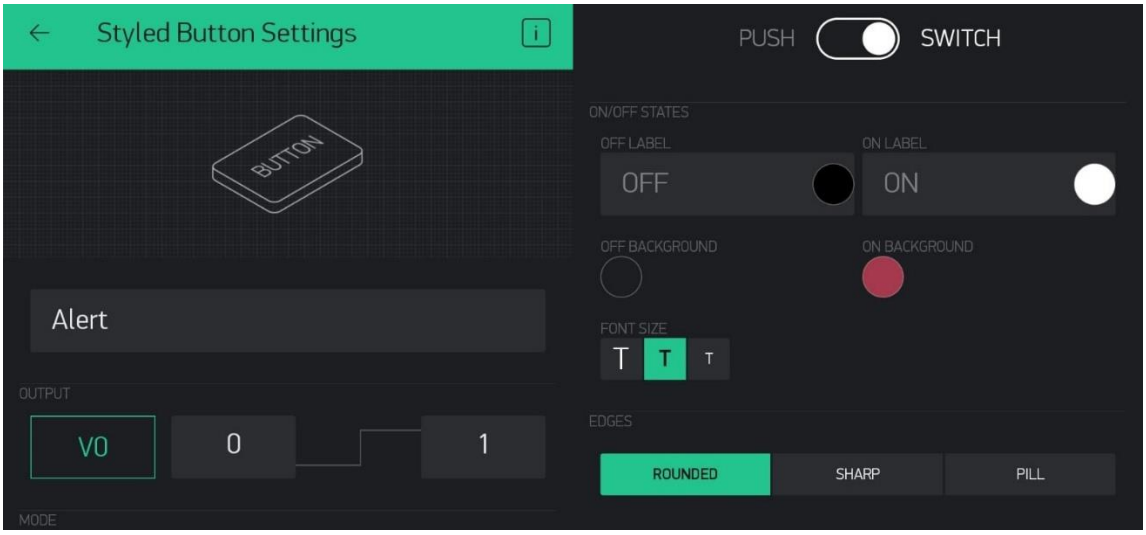
7. Keep scrolling down until you find “Notifications” , and then click on “Notification” which is under “Twitter”.



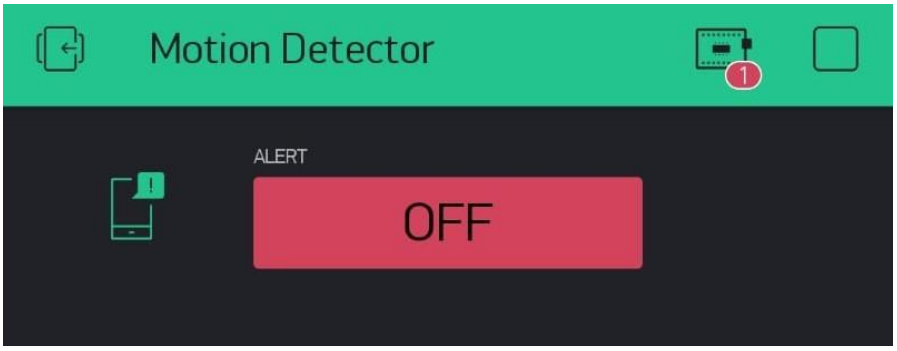
8. Then again click on the “Rounded Plus” symbol and now scroll and find “Controllers” and click on “Styled Button”.



9. Now tap on the Button symbol and leave the name default and tap on “Output” and scroll down to “Virtual” and select “V0”, You can customize the button as you wish.



10. When everything is done , it should look like this image below.



Setting up BLYNK is now complete! Now we move on to Importing the Arduino Project.

7) Project File Link:

https://github.com/3dunify/arduino_motion_sensor/blob/main/Motion_Sensor_501.ino

7) Importing Arduino Project:

1) ☒ Launch Arduino IDE.
2) ☐ Go to File and click on Open.
3) ☐ Then go to Downloads or wherever you saved the project .INO file and click on it.

7.1)

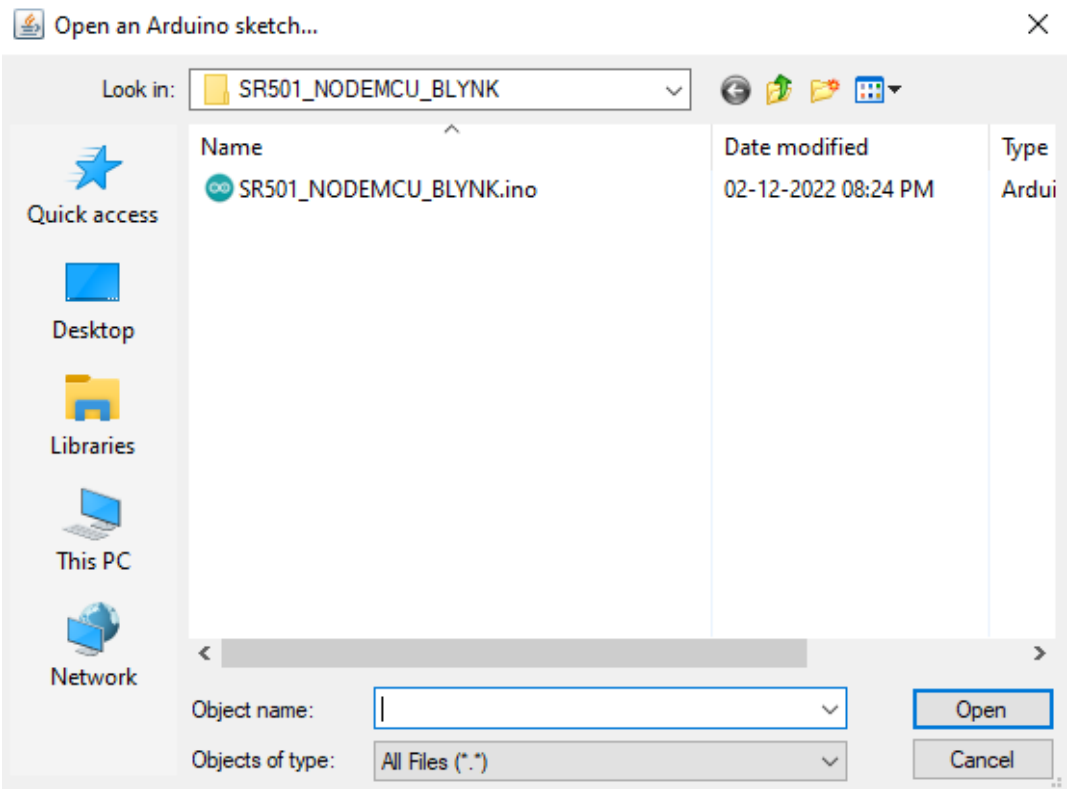


Figure 6 Locate the .INO Project File and click on Open to Import the Code.

4) ☐ Click on Open
5) ☐ Now, Hold Ctrl + F and in the dialog box copy and search this keyword "char auth[]" without the commas, And now paste your generated Auth code within the highlighted area.

Example:

char auth[] = "f1_dJF0xnTnRELQjAjRDvJLZOq_96Q23e";

6) ☐ Now again Hold Ctrl + F and copy and paste these texts individually one by one , First start with char ssid[] and then char pass[] and replace them with your WiFi Password and SSID / WiFi Name.

Example:

char ssid[] = "Your-WiFi-Name";

char pass[] = "Your-Wifi-Pass";

7.2) Compiling and Uploading:

Now all there is left to do is Verify and Upload the code to your NodeMCU. Here is a step by step instruction.

1) ☐ After you completed adding your Auth , SSID & Pass , Now simply find the below buttons and first click on the “Tick” Symbol and wait for it to complete.

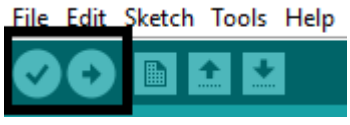


Figure 7 The first "Tick" is for Compiling and the 2nd "Arrow" starts the uploading process to the NodeMCU.

2) ☐ If successful , it should display a message like this below,

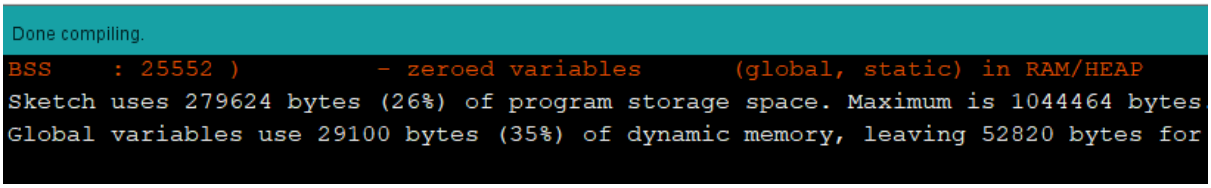


Figure 8 After successfully uploaded it shows these lines in the output panel.

3) ☒ Now Open Device Manager, And Under Ports you should find a device called "Silicon Labs CP210x USB to UART Bridge" or similar, Note down the COM Port number next to it.

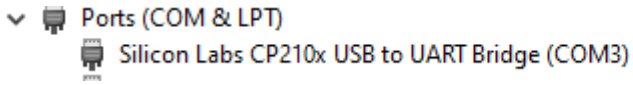


Figure 9 In Device Manager, Sometimes you have to Refresh and Unplug and Replug to make it appear, When successful you should see something similar to this image.

4) ☐ Now lastly, Go to Tools-> Boards, And verify that its showing NodeMCU.

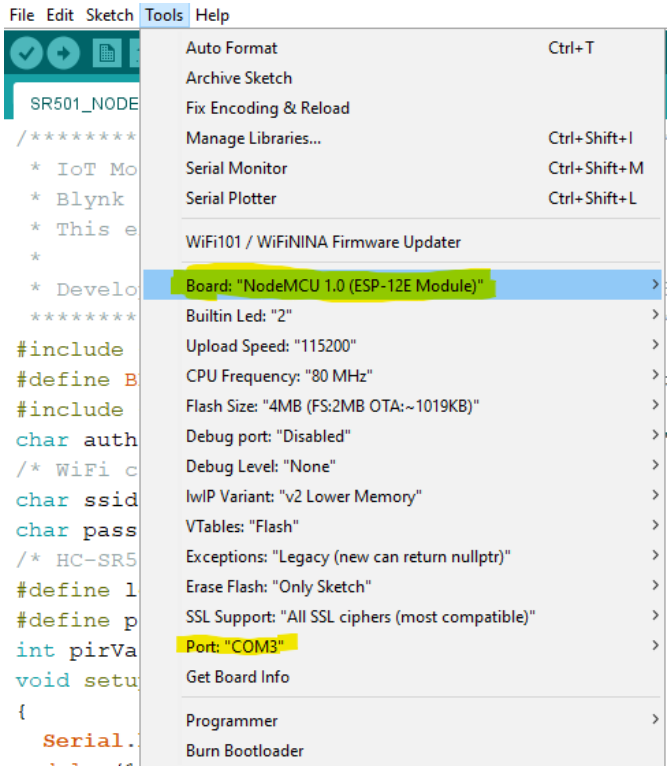


Figure 10 Verify that your screen matches with the highlighted lines, Port maybe different but the Board should be exactly same.

5) ☐ And confirm the COM Port number and click on the right arrow icon which will start the uploading process.

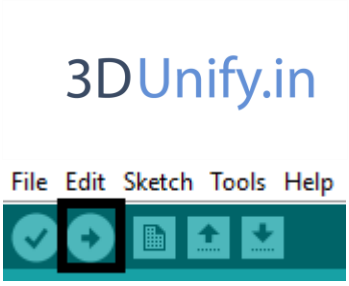


Figure 11 Clocking the "Arrow" will start uploading the code.

6) ☐ When successful, It should look like this,

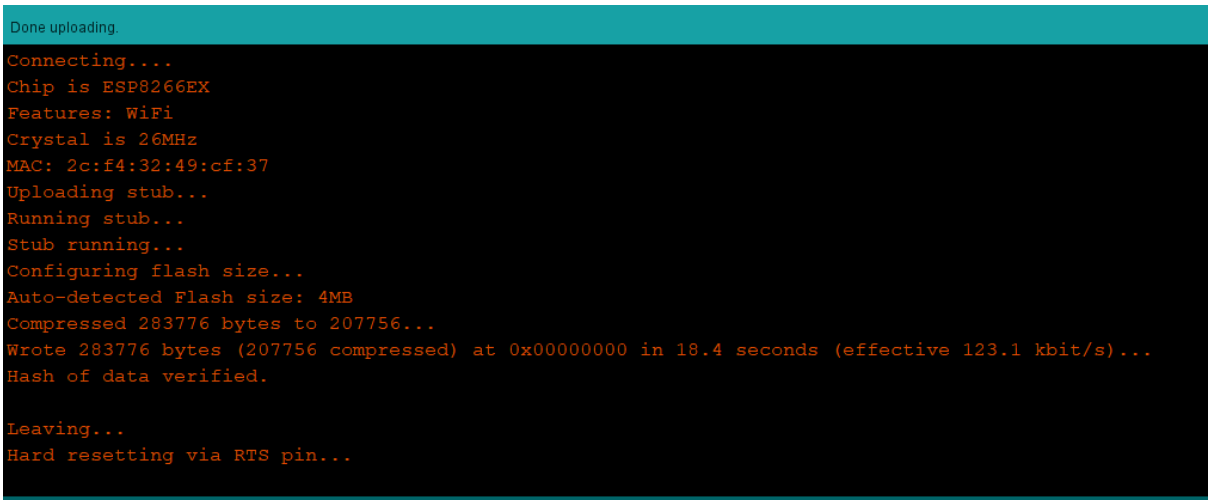


Figure 12 Upon Successful Completion you will be greeted with this image, And should show "Done Uploading" like here.

That's it! Now the last step is setting up BLYNK.

You have successfully completed all the steps to setup and get your Motion Sensor working!

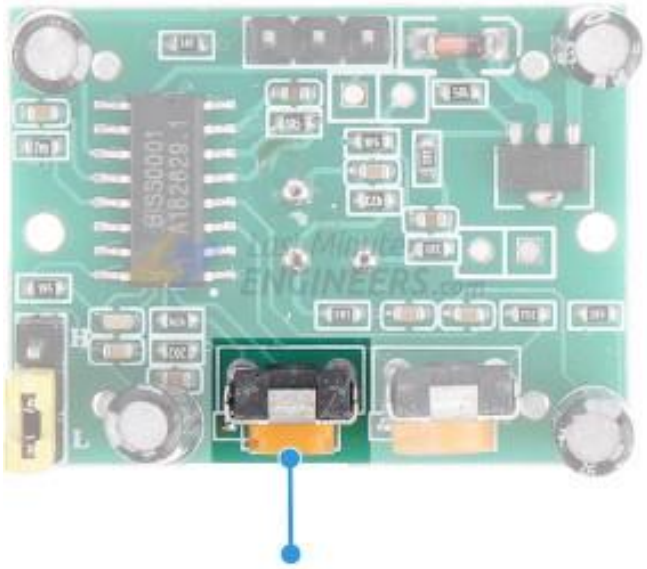
TIP: This is optional , but it lets you control how many times you want to be notified when motion is detected and how much range in which you want the detection to be active.

8) Calibration OF SR-501:

You can also calibrate the SR-501 Sensor by turning the potentiometers using a screwdriver ,

8.1) Sensitivity Adjustment

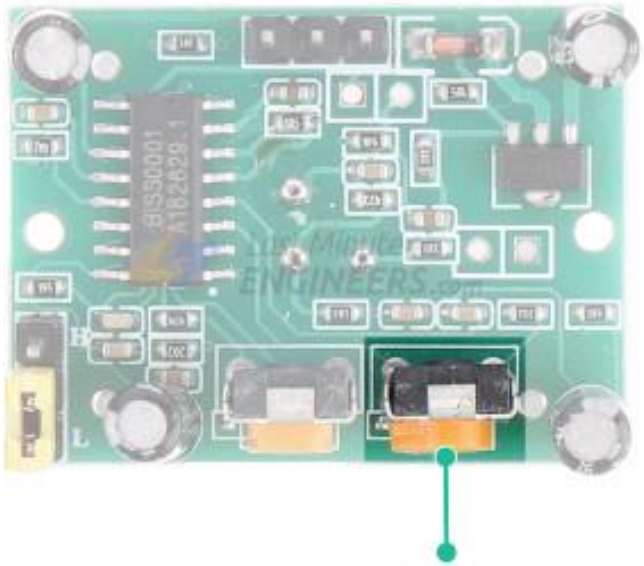
The PIR sensor has a potentiometer on the back to adjust the sensitivity.



This potentiometer sets the maximum detection range. Sensitivity can be adjusted over a range of approximately 3 meters to 7 meters (9 to 21 feet). However the topology of your room can affect the actual range you get. Rotating the pot clockwise will increase the sensitivity and thus the range, and vice versa.

8.2) Time-Delay Adjustment

There is another potentiometer on the back of the PIR sensor to adjust the Time-Delay.



This potentiometer sets how long the output will remain HIGH after motion is detected. It can be adjusted from 1 second to about 3 minutes. Turning the potentiometer clockwise increases the delay, while turning the potentiometer counter-clockwise decreases the delay.

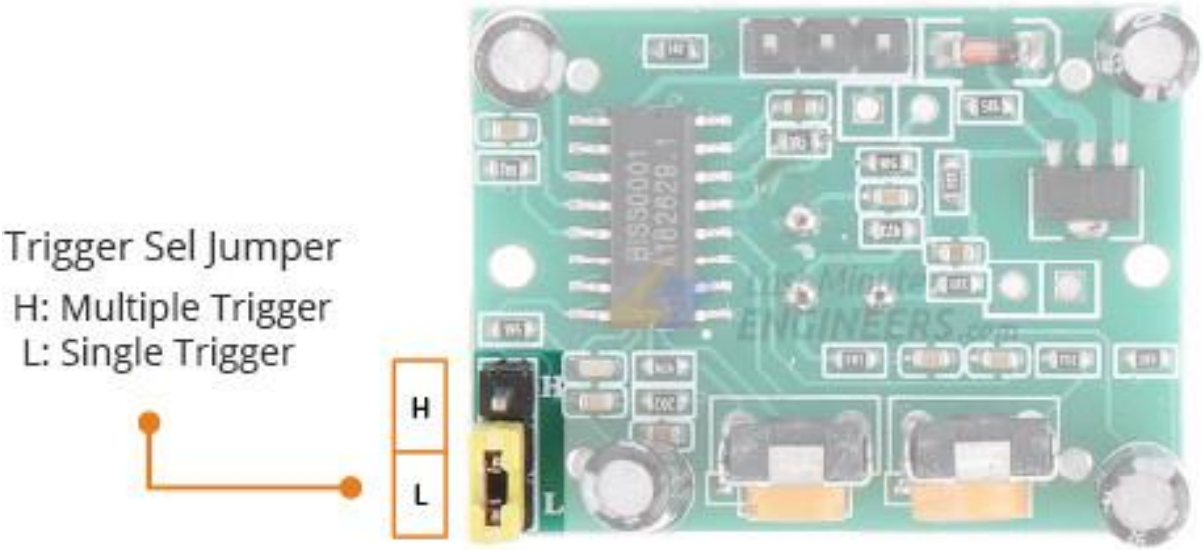
8.3) Trigger Selection Jumper

There are two trigger modes that determine how the sensor will react when motion is detected.

Single Trigger Mode (L): The constant motion will cause a single trigger.

Multiple Trigger Mode (H): The constant motion will cause a series of triggers.

The board comes with a berg jumper (some modules have a solder bridge jumper) allowing you to choose one of two modes.



9) For any more help,

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Website:	https://www.3dunify.in

Thank You for being a valuable customer to 3DUnify!