

# 21AIE114 Final project



**Topic :Pir sensor for home automation(Motion dectection)**

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# ABSTRACT

- For our Semester Project for the Principles of Measurements and Sensors, we are going to build an PIR sensor based security alarm using arduino. As we realize that programmed framework and computerization is the prerequisite of the present innovation. We are pushing toward computerization for quite a while. It is one of the trending subjects. So in this project we will provide automatic electronic appliance on/off using PIR sensor. In this project, a design is proposed using PIR sensor for automation of lights and fans using Arduino with Internet of Things for smart homes. Nowadays we're having automation of every little electrical device in our homes. Internet of Things is the physical thing embedded with sensors, softwares etc., without human interaction and computer interaction transaction of data over a network; however, it scales up to include smart cities with connected sensors. Utilizing PIR sensors, the lights will consequently turn on and off as indicated by the power of light

- This paper depicts a unique home automation system where its efficiency and accuracy can be improved by integrating the PIR motion sensor and google voice assistant. It comprises of Node MCU (esp8266) which is a Wi-Fi module used to transmit data over internet, electromagnetic relays, and the PIR sensor. This developed system works when there is any motion within the defined sensor range and it can also be controlled through the mobile application. Blynk application has been configured with the system so that it works flawlessly on both iOS and android devices. The developed microcontroller has been configured with the Blynk server which makes the home appliances work remotely and eliminates the need for a dedicated PC server. The final prototype is also configured with google assistant so that the relays can be triggered with the voice too and this system has been successfully developed, and the working prototype has been tested with various test cases.

### **Note:**

- **We are approaching the project in two ways**

**1)Method 1-----using web server**

**2) Method 2-----using Blynk app**

# **Hardware required**

- 1)Pir sensor
- 2)Esp8266 Nodemcu(wifi module)
- 3)Smart phone
- 4)Jumper wires
- 5)Bread board
- 6)resistor

# Software required:

- Blink.cloud
- Blinklot app(playstore)
- ThingSpeak
- ifttt

# Pir sensor

- PIR sensor detects surrounding characteristics (human) moving within 10 cm of the PIR sensor. Genuine identification range for PIR sensors is 5–12 cm. PIR sensors are fundamentally formed of pyroelectric sensors, which are used to differentiate between infrared radiation's different wavelengths. Finding out when someone enters or exits their home is crucial for many everyday tasks or activities. PIR sensors are incredible because they require little effort, have a large field of view, and are simple to interface with.
- Movement Detection utilizing PIR Sensor: To distinguish nearness of human beings, Passive Infrared Sensor is utilized in its proximity. To control the turning of fans, turn off light and turn off engine Output can be utilized.

# **ESP-8266 Nodemcu**

Movement Detection utilizing PIR Sensor: To distinguish nearness of human beings, Passive Infrared Sensor is utilized in its proximity. To control the turning of fans, turn off light and turn off engine Output can be utilized.

In this project, I have shown how to make home automation using IoT with ESP32 NodeMCU and Blynk app. With this IoT project, you can control all the home appliances from different rooms with the same Blynk account and manual switches. If there is no WiFi available then you can control the relay module manually with switches.

## Procedure(Method1-----Web server)

### .Using web server :

- First after construction of the circuit we need to create a channel
- Setup Iot using via thingspeak.
- Create channel named Motion detection with field name as pir in thingspeak.com
- Generate Api key
- Copy and paste it in the arduino code in arduino Ide
- Create a widget in channel and after giving widget configurations ,
- Select lamp as widget
- Then create applet using IFTTT website

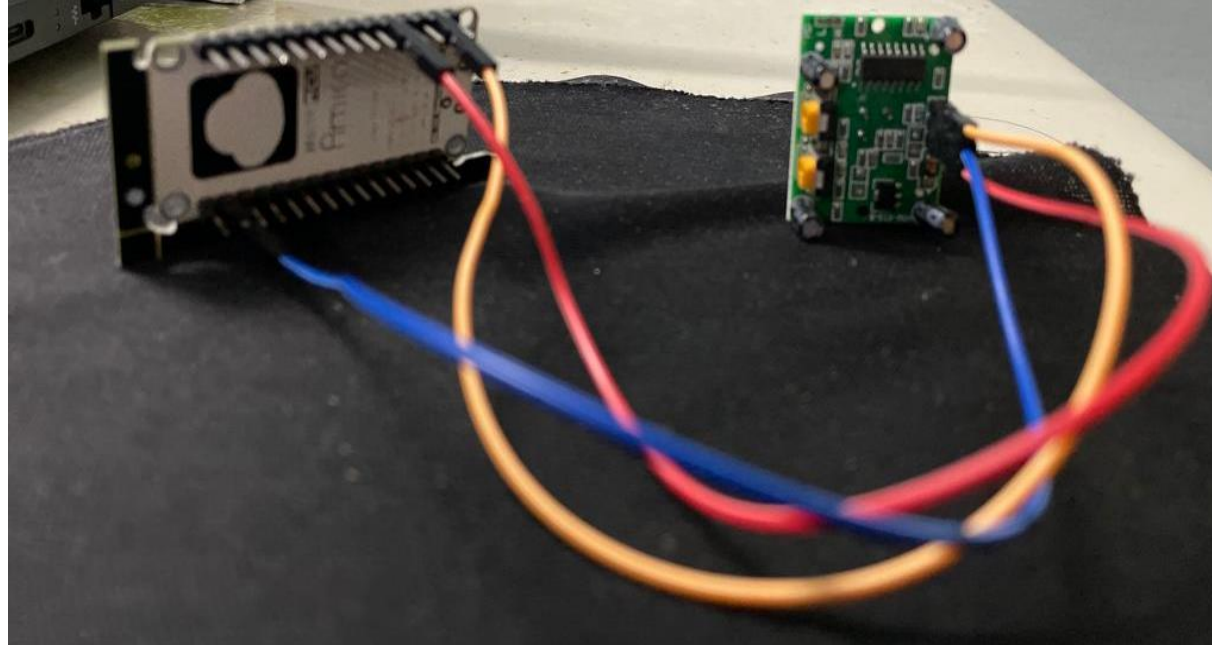
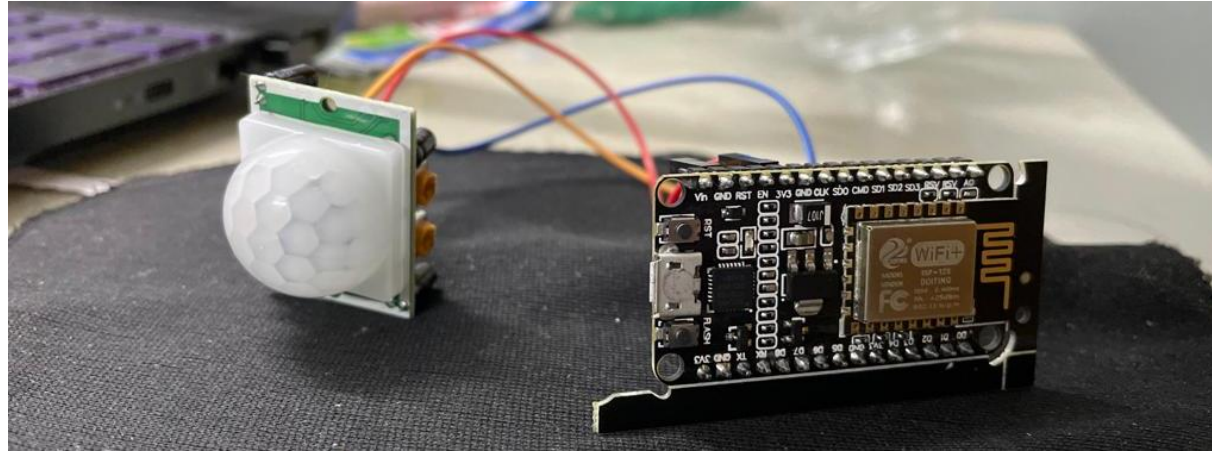


- Give if and then condition
- Select the service in which we need to receive a motion alert.
- Use webhooks as a service
- Click, receive a web request (if condition)
- Then choose send me an email( Then condition)
- Now we have created a IOT cloud .
- Run the arduino code in Arduino IDE platform
- Select ESP8266 board
- Then select port as COM5
- Verify the code and upload it to ESP8266
- We get output in serial monitor
- After 15 secs we get an email alert to the given email

# Smartphone,jumperwires,resistor,Breadboard

- **JUMPER WIRES** :Jumper wires are electrical wires with connector pins at each end. They are used to connect two points in a circuit without soldering. we can use jumper wires to modify a circuit or diagnose problems in a circuit.
- **SMARTPHONE**:A smartphone is a cellular telephone with an integrated computer, controlling device for ESP8226 and to receive sms alert.
- **RESISTOR**:It is a Component is to limit the current or regulate the flow of electrical current in an electronic circuit.
- **BREADBOARD**:A breadboard is a solderless device for temporary prototype with electronics and test circuit designs. Most electronic components in electronic circuits can be interconnected by inserting their leads or terminals into the holes and then making connections through wires where appropriate and it is a solderless construction base used for developing an electronic circuit and wiring for projects with microcontroller boards like Arduino.

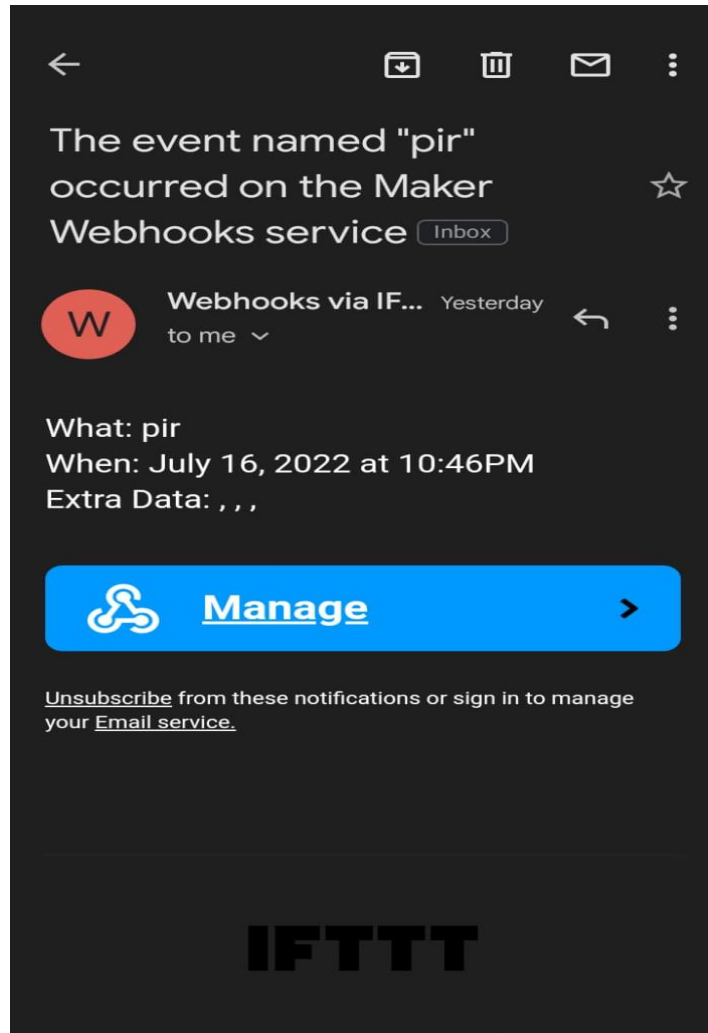
# Method 1-(Circuit diagram)-----Web server



# Connections of the circuit----Web server

S.No.	NodeMCU	PIR Sensor
1	GND	GND
2	Vin	VCC
3	D1	Out Pin

# Output for web server(Method 1)----in email



**We get this email, when the motion is detected in pir sensor.**

# Output for web server(Method 1)---in serial monitor

```
22:49:51.990 -> motion : 0 , Send to Thingspeak.  
22:49:53.816 -> motion : 0 , Send to Thingspeak.  
22:49:55.373 -> motion : 0 , Send to Thingspeak.  
22:49:57.130 -> motion : 0 , Send to Thingspeak.  
22:49:58.957 -> motion : 0 , Send to Thingspeak.  
22:50:04.721 -> motion : 0 , Send to Thingspeak.  
22:50:07.735 -> motion : 0 , Send to Thingspeak.  
22:50:09.602 -> motion : 0 , Send to Thingspeak.  
22:50:11.639 -> motion : 0 , Send to Thingspeak.  
22:50:13.675 -> motion : 0 , Send to Thingspeak.  
22:50:15.526 -> motion : 0 , Send to Thingspeak.  
22:50:17.793 -> motion : 0 , Send to Thingspeak.  
22:50:20.032 -> motion : 0 , Send to Thingspeak.  
22:50:23.314 -> motion : 0 , Send to Thingspeak.  
22:50:26.402 -> motion : 1 , Send to Thingspeak.  
22:50:29.669 -> motion : 1 , Send to Thingspeak.  
22:50:32.728 -> motion : 1 , Send to Thingspeak.  
22:50:34.594 -> motion : 1 , Send to Thingspeak.  
22:50:37.025 -> motion : 1 , Send to Thingspeak.  
22:50:38.894 -> motion : 1 , Send to Thingspeak.  
22:50:40.483 -> motion : 1 , Send to Thingspeak.  
22:50:42.075 -> motion : 1 , Send to Thingspeak.  
22:50:43.986 -> motion : 1 , Send to Thingspeak.  
22:50:45.850 -> motion : 1 , Send to Thingspeak.  
22:50:47.670 -> motion : 1 , Send to Thingspeak.  
22:50:49.539 -> motion : 1 , Send to Thingspeak.
```

**We get 0 in serial monitor, when the motion is not detected in pir sensor, where as we get 1 in serial monitor when the motion is detected in pir sensor.**

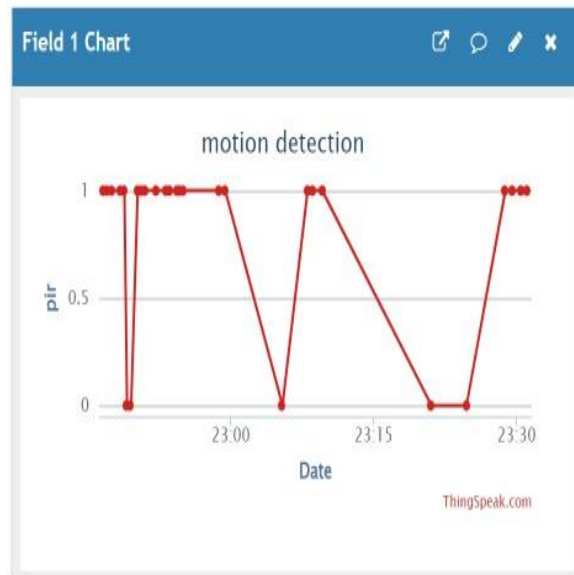
# Output for web server(Method 1)---in thingspeak

## Channel Stats

Created: [a day ago](#)

Last entry: [about 23 hours ago](#)

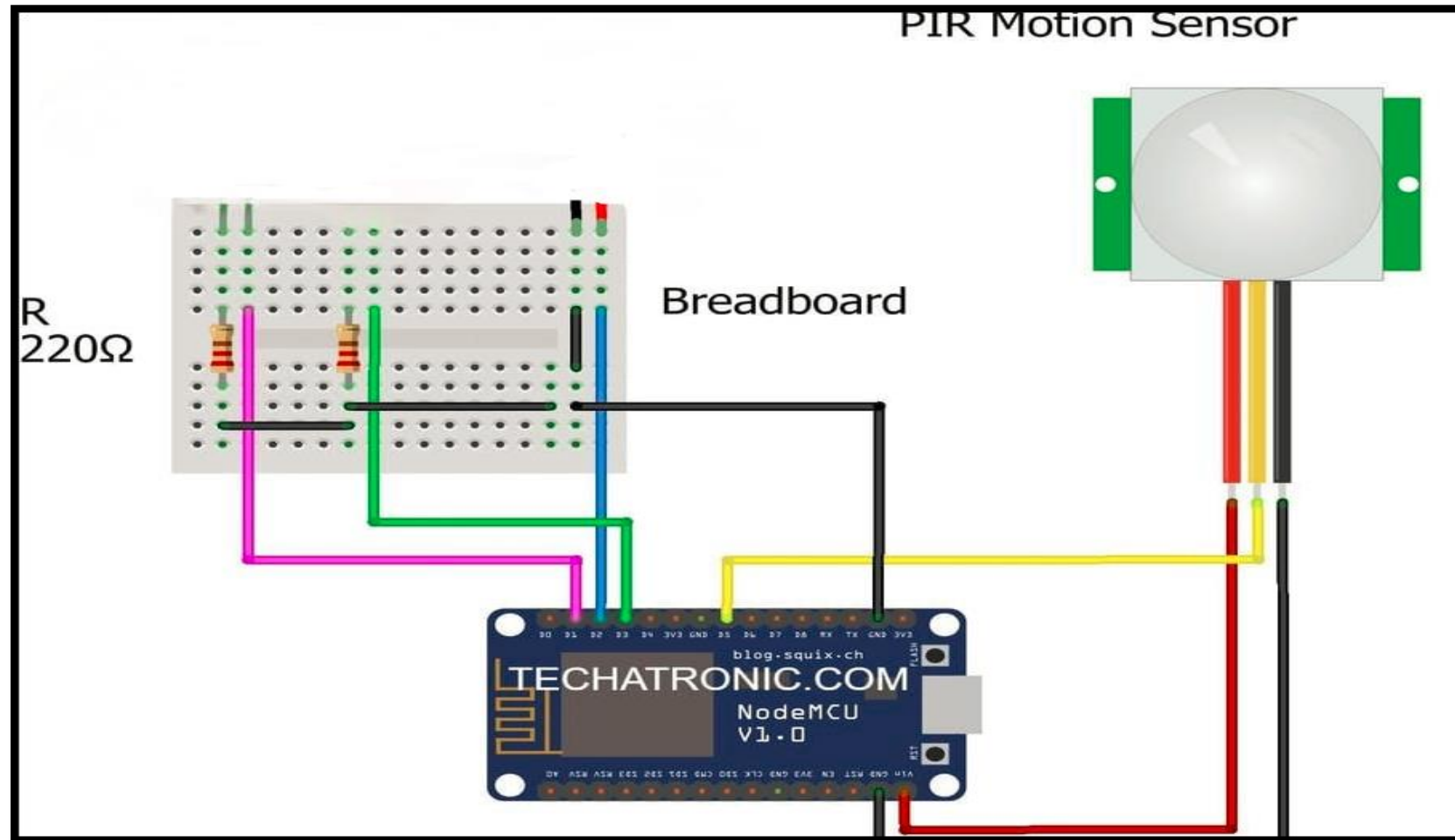
Entries: 28



**We get a red line here if  
the motion is detected in  
pir motion sensor**



## Circuit Diagram for Method - 2: -





## Connection for method - 2: -

S.No.	ESP 8266 Node mcu	PIR Sensor
1.	GND	GND
2.	Vin	Vcc
3.	D5	Out pin

## **Procedure for Method – 2: -**

**Using blynk IOT app The PIR sensors allow you to sense motion, almost always used to detect whether a human has moved in or out of the sensors range. They are small, inexpensive, low-power, easy to use. They are commonly found in appliances and gadgets used in homes or businesses. The PIR motion sensor is ideal to detect movement. anytime when the movement is detected by the sensor, a message is provided by Blynk App. Set up the Blynk app You have to install the Blynk IoT app and then open the app. Create a new project by clicking on the box whose image is given below. Then name the project as you want and select NodeMCU as the device. Choose WiFi as the connection type. Tap on create to create your project. The Blynk app will send a unique authentication code automatically to your given email address.**

**Then press ok to continue. Add token to mail Copy paste the auth token in the code Open Blynk. ConsoleNavigate to Templates -> Your Template Click Edit button Switch to Events tab Click Add New Event Select the type of event: Content Fill in the fields: Name – name of the Event Subtitle – (e.g. category name, content type)Image Link – URL to an image that will be shown on the event card Description – event's reason and/or purpose, other information Action Title – description or appeal (e.g. “Get update”, “Proceed to the shop”) to Action Link Action Link – URL to new library, firmware, application version, your/partner's website, etc. Apply Tag – enable for the Device to be tagged when this Event is recorded. The tag can't be removed manually.**

**When event is resolved, the tag will be removed automatically. Switch to Notifications tab Enable Notifications – lets you set notifications about events occurred to Devices so you get them via SMS, Push or E-mail Select the type of notification (email, push, sms) and recipients Set Notifications Limit if necessary and turn on Notifications management Click Create button Save Template Send API request The event content can be sent using the API by placing a request in the browser line now: HTTPS API for Log event**

**testing:https://{server\_address}/external/api/logEvent?token={token}&code={event\_name}https://{server\_address}/external/api/logevent?token={token}&code={event\_name}&description={event\_description}C**

**heck Content EventEmail: Check specified emailCheck your Device's**

**Timeline: Web application** Navigate to the Device which token you've specified in the request, switch to Timeline tab specify the time period you want to view and select the Content type of event click Action Link. You have to provide your network's SSID and PASSWORD so that the NodeMCU can send data over the internet. Also, specify your authentication token number.

## **BLYNK(.ino) Code for Motion Detection: -**

```
#define BLYNK_TEMPLATE_ID "TMPLnTkcjjCR"  
#define BLYNK_DEVICE_NAME "motion detection01"  
#define BLYNK_AUTH_TOKEN  
"eZoKVB0BgOc8I4xKUHJXC3OF_Y90UQw0"  
#define BLYNK_PRINT Serial  
#include <ESP8266WiFi.h>  
#include <BlynkSimpleEsp8266.h>  
char auth[] = BLYNK_AUTH_TOKEN;  
char ssid[] = "Team16";  
char pass[] = "12345kkk";  
int pinValue = 0;
```

**BlynkTimer timer;**

**// This function is called every time the Virtual Pin 0 state changes**

**BLYNK\_WRITE(V0)**

**{**

**// Set incoming value from pin V0 to a variable**

**int value = param.asInt();**

**// Update state**

**Blynk.virtualWrite(V1, value);**

**if(value==1){**

**Serial.println("System is OFF");**

**digitalWrite(2, LOW);**

**}**

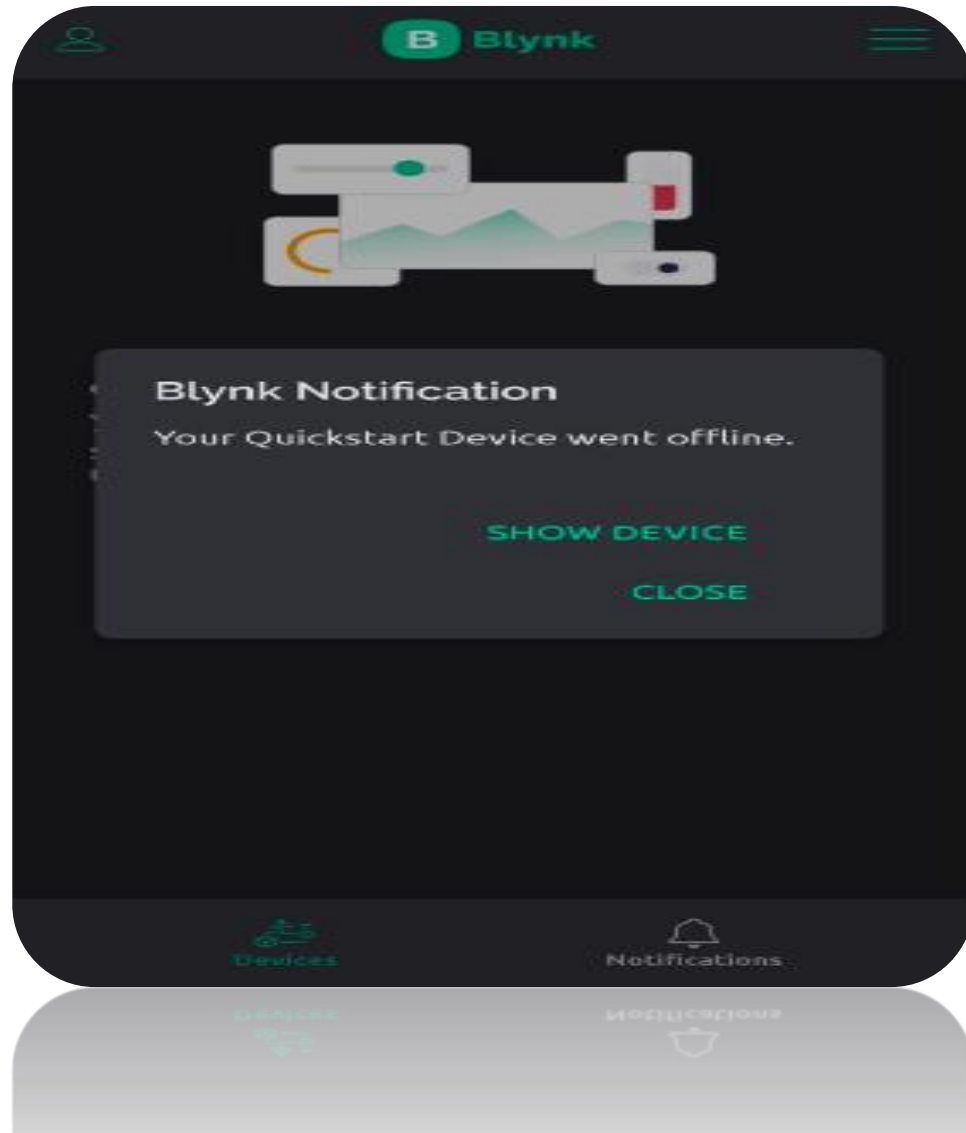
```
else{  
    Serial.println("System is ON");  
    digitalWrite(2, HIGH);  
}  
}  
  
void motionDetection()  
{  
    bool sensor = digitalRead(14);  
    if(sensor==1){  
        Blynk.logEvent("motion_detected");  
        Serial.println("motion detected");  
        digitalWrite(4, HIGH);  
    }  
}
```



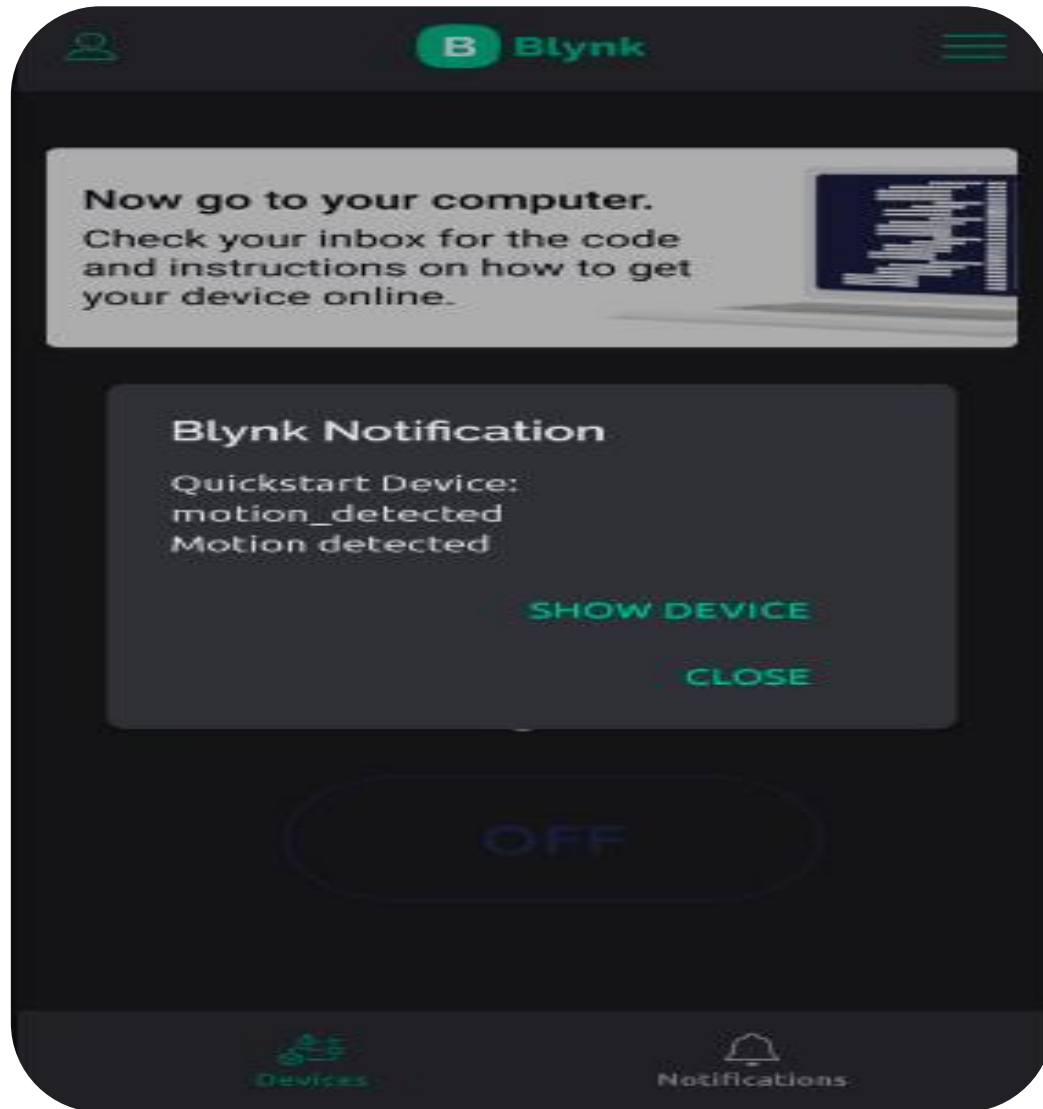
```
while(sensor==1){  
    digitalWrite(2, LOW);  
    delay(500);  
    digitalWrite(2,HIGH);  
    delay(500);  
}  
}  
else{  
    digitalWrite(2,HIGH);  
}  
}
```

```
void setup()  
{  
  // Debug console  
  Serial.begin(115200);  
  pinMode(14, INPUT); //PIR SENSOR  
  Blynk.begin(auth, ssid, pass);  
  timer.setInterval(1000L, motionDetection);  
}  
void loop()  
{  
  Blynk.run();  
  timer.run();  
}
```

## Output Or Notification in Blynk App: -



**When Node mcu is offline or disconnected, we get a notification in Blynk App stating that “Device went offline”.**



**When a motion is detected by pir sensor, we get a notification in Blynk App stating that “Motion detected”.**

## Output Or Notification in Serial Monitor In Arduino IDE: -

```
21:52:56.445 ->
21:52:56.445 ->  / _ ) / / _ _ _ _ / / _
21:52:56.445 ->  / _ / / // / _ \ / ' /
21:52:56.445 ->  / _ _ / _ \ , / // / _ \ \
21:52:56.445 ->      / _ / v1.1.0 on ESP8266
21:52:56.445 ->
21:52:56.445 -> #StandWithUkraine  https://bit.ly/swua
21:52:56.445 ->
21:52:56.445 ->
21:52:56.445 -> [9811] Connecting to blynk.cloud:80
21:52:56.690 -> [10088] Redirecting to sgpl.blynk.cloud:80
21:52:56.741 -> [10090] Connecting to sgpl.blynk.cloud:80
21:52:56.903 -> [10263] Ready (ping: 86ms).
21:52:57.977 -> motion detected
```

**We get notified in serial monitor in Arduino IDE that “motion detected”, when pir senses any motion.**

THANK YOU

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