

Turn Any Switch Smart Using ESP8266 + Servo Motor

A Simple IoT-Based Smart Home Automation Project

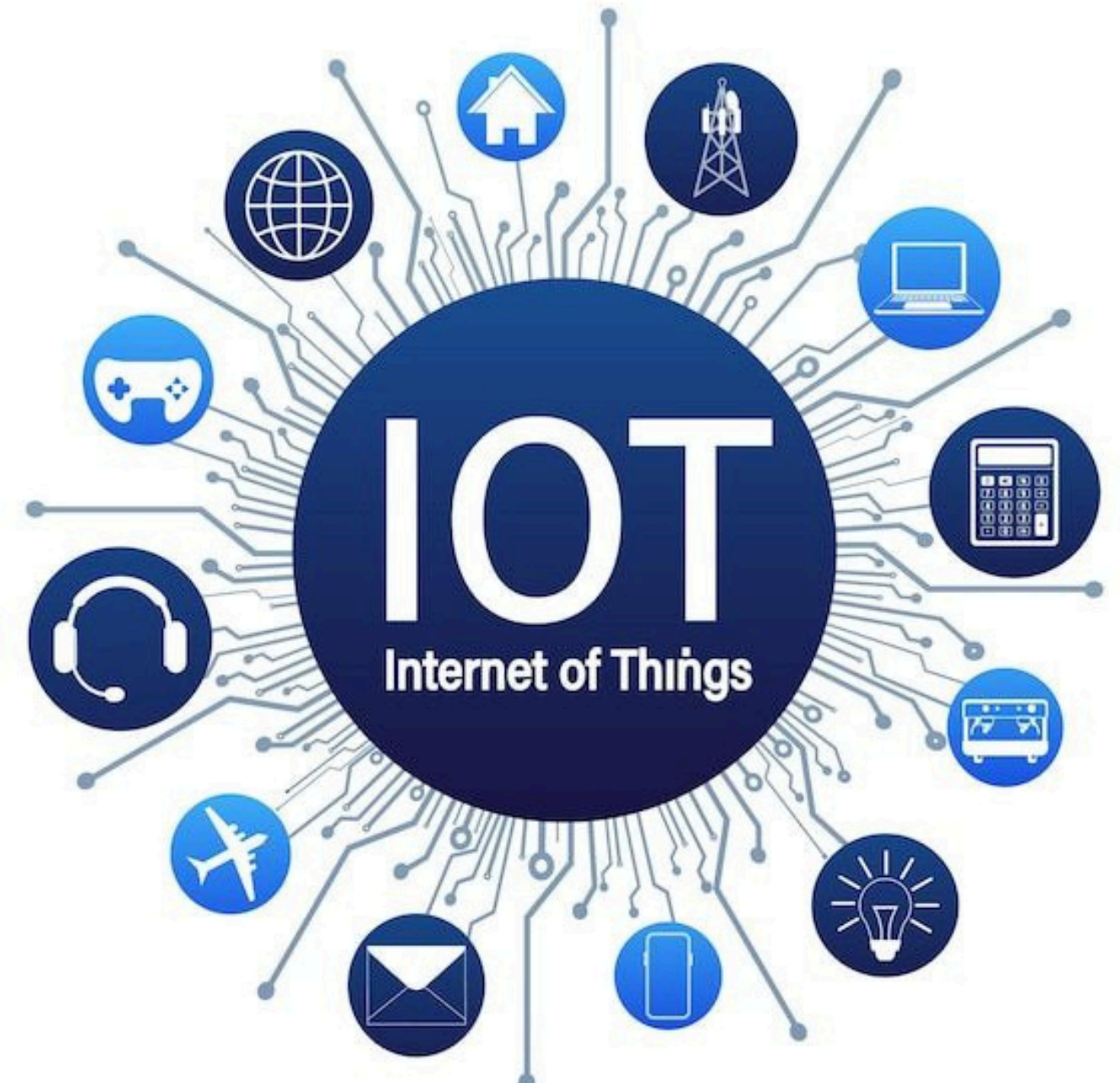
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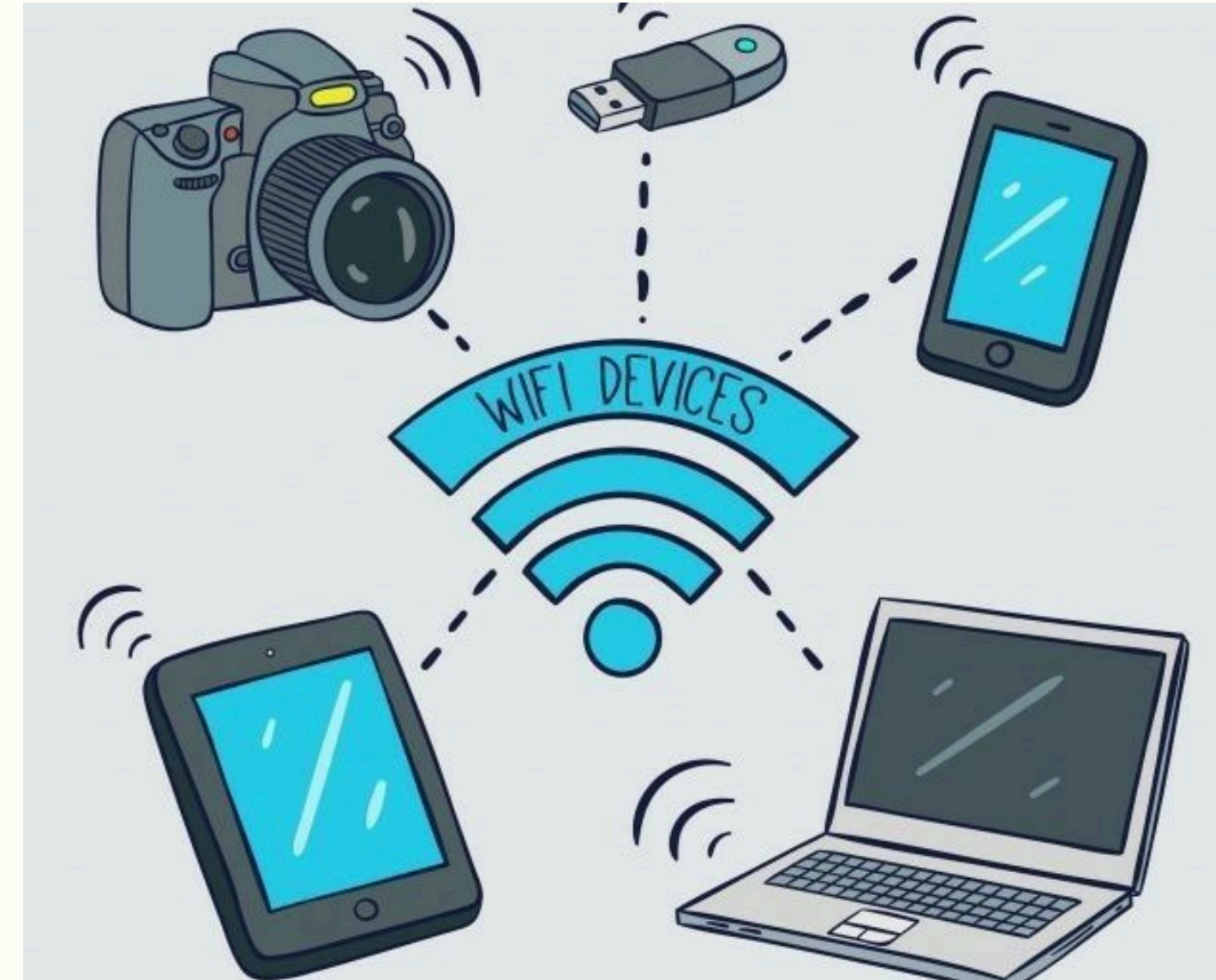
Internet Of Things



START PRESENTATION



Introduction :



In this project, a traditional electrical switch is converted into a smart Wi-Fi-controlled switch using the NodeMCU ESP8266 microcontroller and a Servo Motor.

The servo motor physically toggles the switch ON or OFF, while the NodeMCU receives commands from the Blynk IoT App.

This provides an easy and low-cost way to automate existing switchboards without changing their internal wiring.

Objective of the Project

**TO AUTOMATE ANY NORMAL SWITCH USING IOT
TO ENABLE ON/OFF CONTROL THROUGH A
SMARTPHONE
TO CREATE A LOW-COST SMART SWITCH
ALTERNATIVE
TO AVOID ELECTRIC HAZARDS BY KEEPING ALL
WIRING UNTOUCHED
TO DEMONSTRATE REAL-LIFE IMPLEMENTATION
OF INTERNET OF THINGS (IOT)**



Components Used and Their Purpose



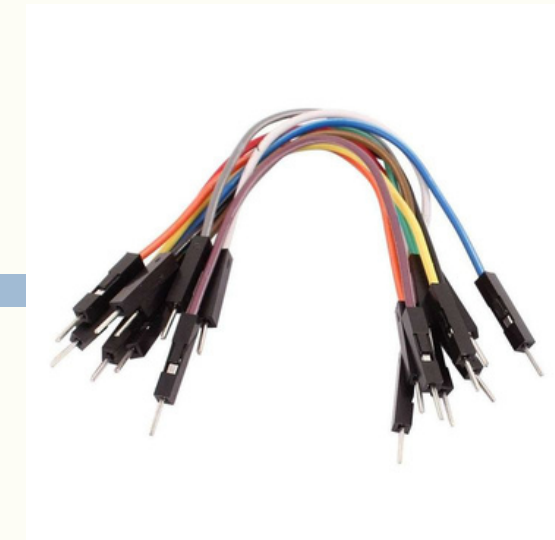
NodeMCU ESP8266

A Wi-Fi-enabled microcontroller
Communicates with the Blynk cloud
Controls the servo motor according to commands



SG90 Micro Servo Motor

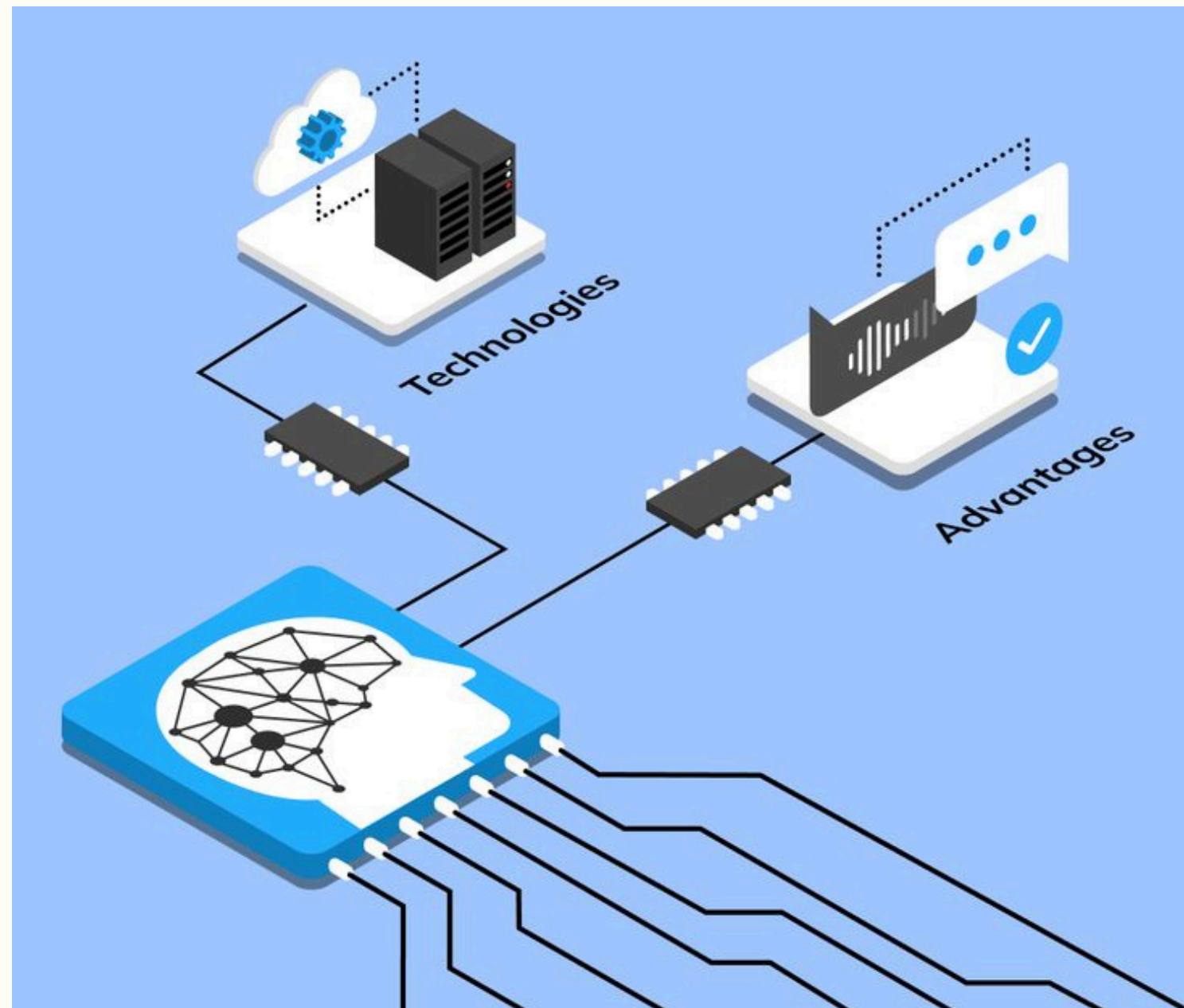
Rotates between 0° to 180°
Used to physically push/pull the switch



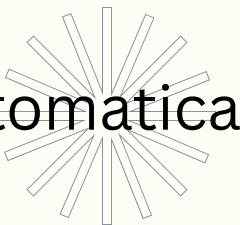
Jumper Wires

For connecting servo to NodeMCU

Working Principle



1. User presses ON/OFF button inside the Blynk App.
2. Blynk Cloud sends the signal to the NodeMCU ESP8266 through Wi-Fi.
3. NodeMCU receives the command and moves the servo motor to a particular angle.
4. Servo motor physically presses the switch lever up or down.
5. The electrical switch turns ON or OFF automatically.



Circuit Connection Details

Servo → NodeMCU Connections:

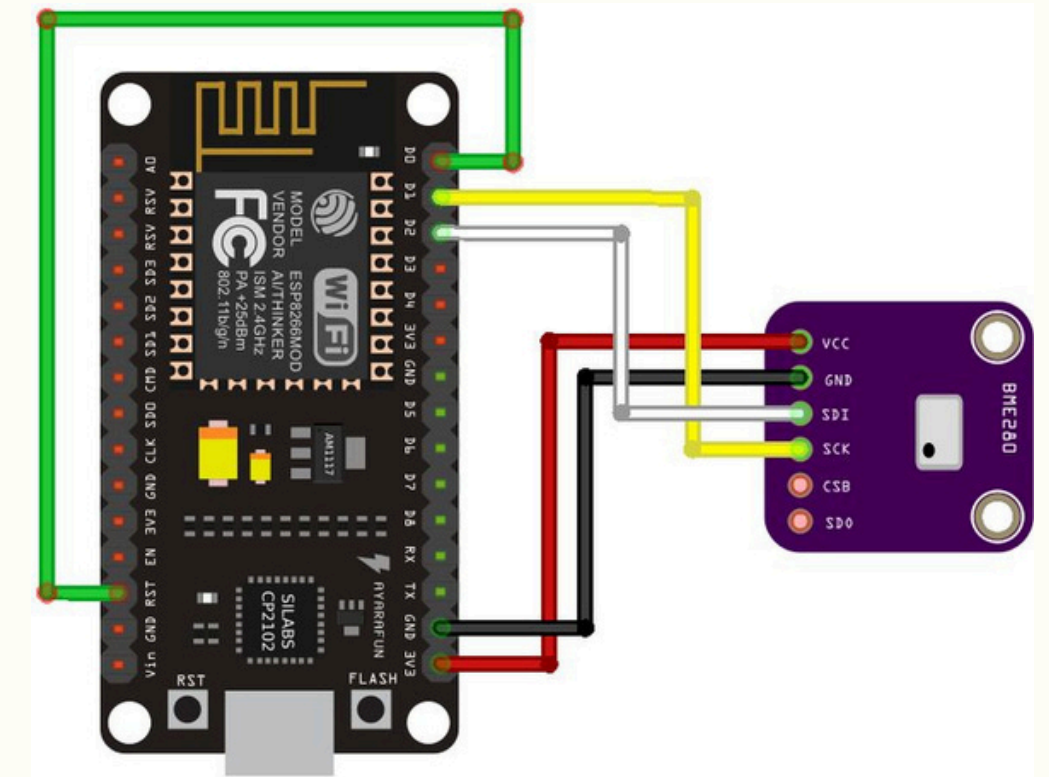
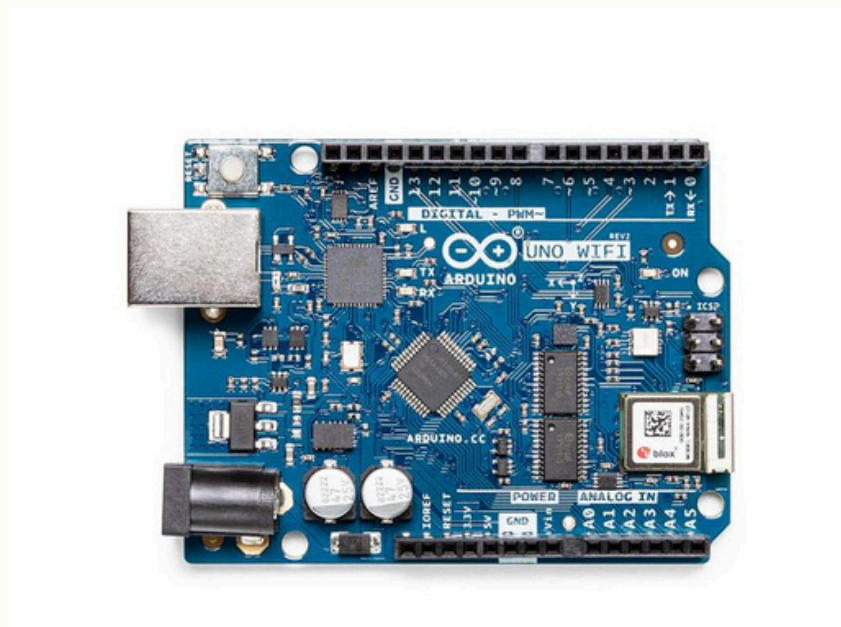
VCC → 5V / VIN

GND → GND

Signal → D4

NodeMCU → Wi-Fi

Connects to your Wi-Fi using SSID and Password inside the code



Mechanical Setup:

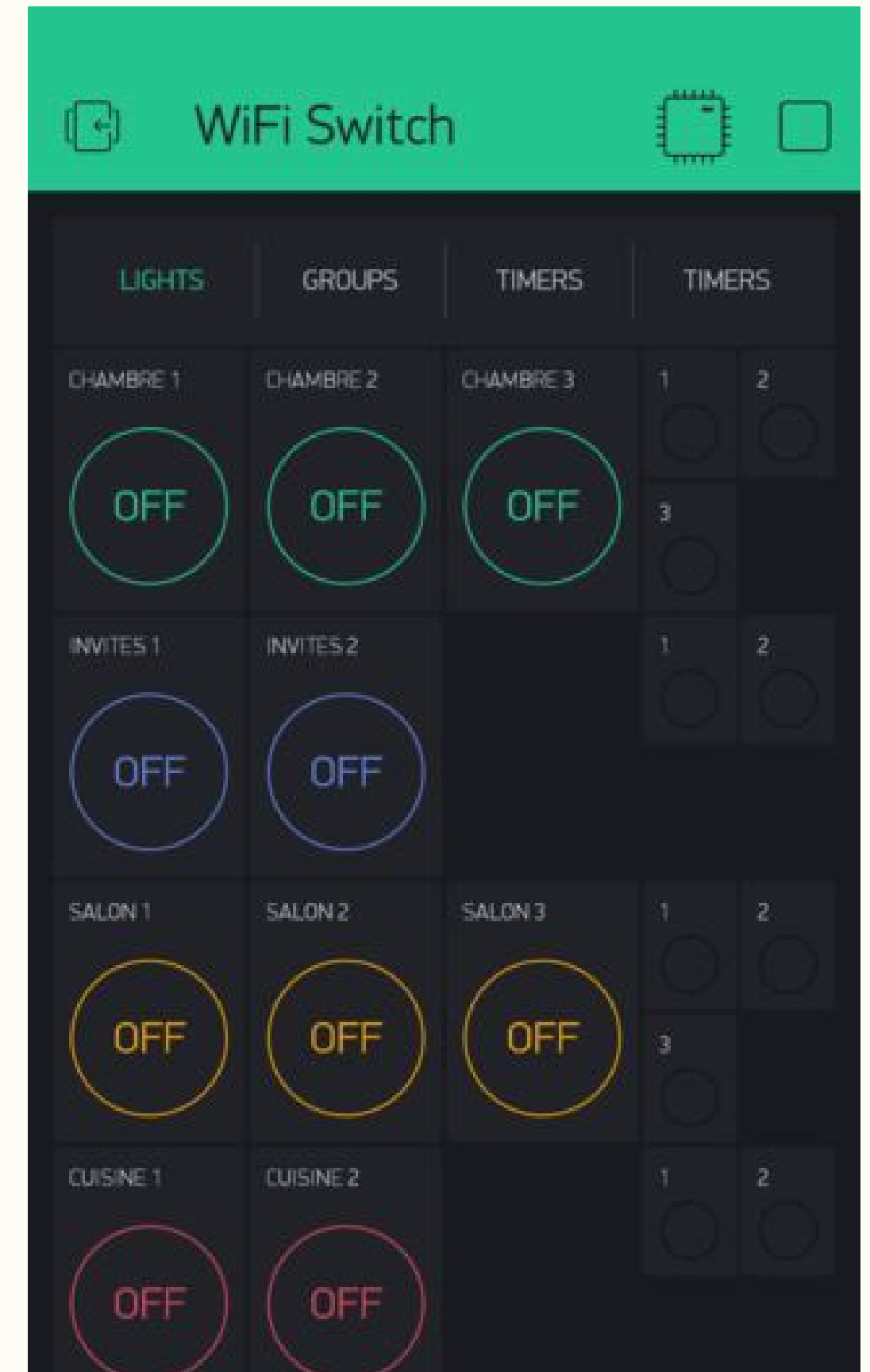
Servo motor is mounted beside the switch with glue/tape
Servo horn touches the switch lever

0° → OFF position
90°/180° → ON position

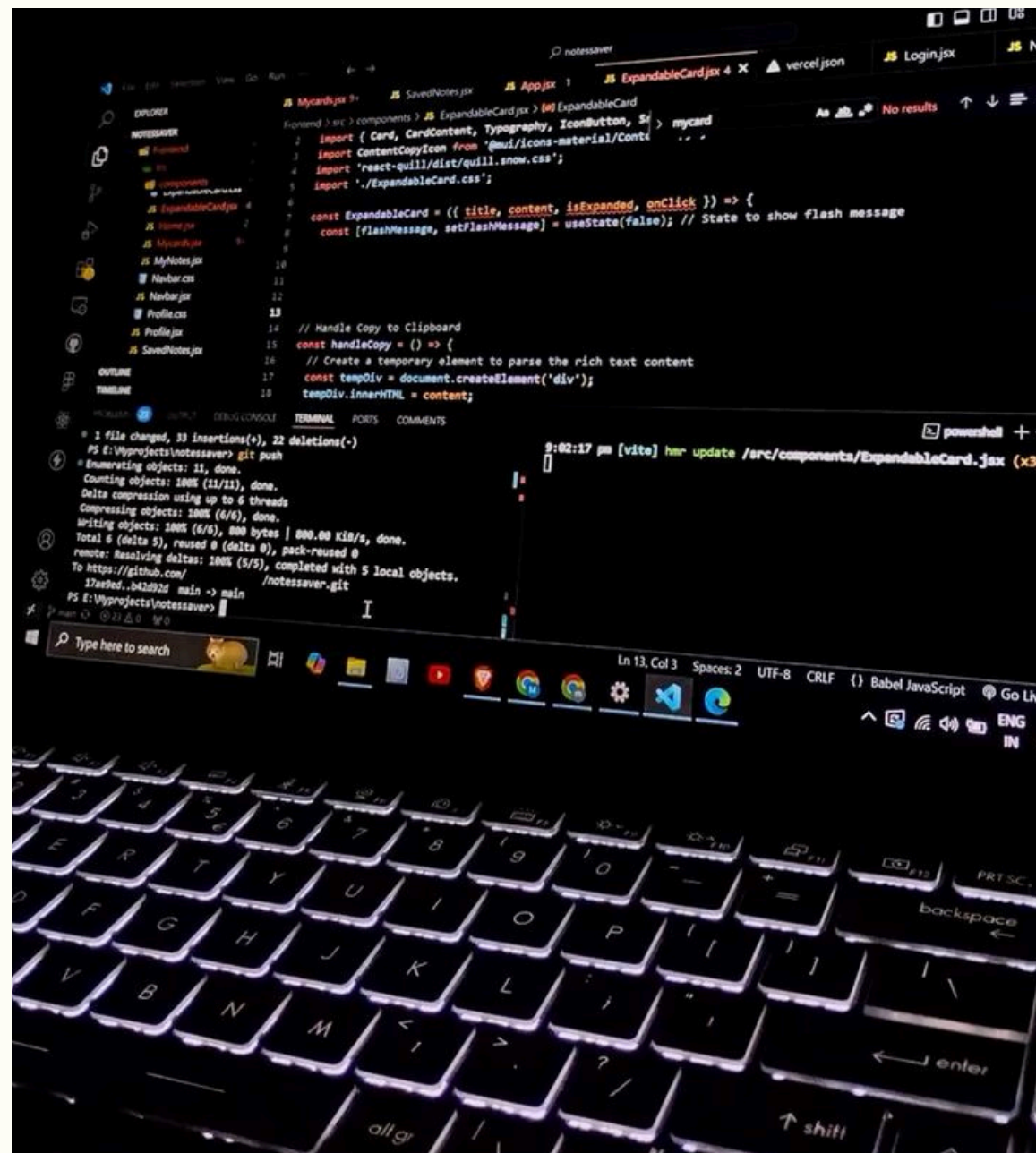
Blynk App Setup

1. Install Blynk IoT App
2. Create a New Device → Select NodeMCU ESP8266
3. Add a Button Widget
4. Set Button Mode → Switch
5. Select Data Stream / Virtual Pin → V1
6. Copy the Auth Token received via email
7. Paste this Auth Token in your code

Now your phone will control the servo motor through the internet.



Full Source Code



```
#define BLYNK_TEMPLATE_ID "YourTemplateID"
#define BLYNK_DEVICE_NAME "SmartSwitch"
#define BLYNK_AUTH_TOKEN "YourAuthToken"
```

```
#include <ESP8266WiFi.h>
#include <BlynkSimpleEsp8266.h>
#include <Servo.h>
```

```
char ssid[] = "YourWiFiName";
char pass[] = "YourWiFiPassword";
```

```
Servo myservo;
int servoPin = D4;
```

```
BLYNK_WRITE(V1)
{
    int value = param.asInt();
    if (value == 1) {
        myservo.write(90); // Switch ON
    } else {
        myservo.write(0); // Switch OFF
    }
}
```

```
void setup()
{
    Serial.begin(9600);
    myservo.attach(servoPin);
    myservo.write(0);

    Blynk.begin(BLYNK_AUTH_TOKEN, ssid, pass);
}
```

```
void loop()
{
    Blynk.run();
}
```


Results, Advantages, and Applications

Results

Switch can be turned ON/OFF from anywhere
No need to manually touch the switch
Works on any traditional switchboard

Advantages

Very low-cost DIY smart switch
Safe (no internal wiring changes)
Easy to install and modify
Internet-based remote control
Expandable for multiple switches

Applications

Home Automation
Office Automation
Smart classrooms
Automating lights, fans, chargers, etc.
Useful for elderly or disabled people

This project successfully demonstrates how IoT can be used to convert any normal switch into a smart Wi-Fi-controlled switch using:

NodeMCU ESP8266 for connectivity

Servo Motor for physical movement

Blynk App for mobile control

It is an innovative, inexpensive, and practical solution for upgrading traditional homes into smart homes.

THANK YOU!
