

# Control LED Through Nodemcu-Based Internet With Blynk Application

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## Abstract

*Internet (interconnected-networking) is a series of computers that are connected globally in several circuits and use TCP / IP as packet exchange communication protocol. The internet as part of the technological development that is very rapidly developing in people's lives today has been able to be used as a medium of communication and control of devices from a distance as long as they are still connected to each other. The internet is like virtual threads that connect with one another, forward data and convey data from one point to another. However, along with the development of increasingly advanced science and technology, the internet is no longer just to connect between humans but also to control between any object that can be connected. In this study there were 3 (three) problems and 3 (three) problem solving methods Electronic device control in the form of LED lights using an IoT platform that is open source. This study uses the NodeMCU module as a station, which will be controlled by the Blynk application with an internet connection. In this study using the NodeMCU module as a station, which will be controlled by the Blynk application by connecting to the internet.*

**Keywords:** LED, NodeMCU, Blynk Application

## 1. Introduction

The development of technology is currently developing rapidly and makes it easier for people to carry out various activities. Many community activities have begun to be carried out using smartphones, such as shopping, bank transactions, learning, and many more that use the internet<sup>[1]</sup>. Science and technology that develops very quickly cause various changes in social life to encourage human development to create new breakthroughs in various special fields of technology and information.

At this time many new breakthroughs have been created, such as tools or systems that ease the daily work of humans. Helping, many parties are trying to create benefits for humans such as systems, electronic or robotic devices.

The above is getting more attention as the development of surveillance or control applications such as traffic control applications, safety surveillance, and so on. With the development of science and technology, this certainly helps human life in controlling electronic devices. Internet of Things (IoT) was first introduced by Kevin Ashton in 1999. Although it was introduced 18 years ago, until now there has not been a global consensus on IoT<sup>[2]</sup>.

Basically, IoT is a remote control or monitoring technology that utilizes the internet network as its connector, and in general IoT uses gadgets or Android as a monitoring medium so that it also makes it easier for users to operate it<sup>[3]</sup>. With the IoT platform which is open source, NodeMCU uses a controller in the form of a smartphone via the blynk application because it can control the led lights with an internet connection.

Technological developments that can be utilized from the existence of this internet connection can access electronic equipment such as room lights that can be operated online via mobile. So, it can make it easier for users to monitor or control the lights whenever and

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wherever with notes on the location that will be applied to remote control technology has an adequate internet network<sup>[4]</sup>.

The remote control system that was built utilizes smartphone technology with the Android operating system. The number of sensors and wireless connections has become a standard smartphone facility. Smartphone facilities that are often used as robot controllers are position sensors and wireless connections<sup>[5]</sup>. The development of microcontroller technology can be matched with technological development<sup>[6]</sup>. Therefore, in this study found that controlling the LED can be facilitated with the help of an internet connection.

## 2. Research Method

In order to know the differences from previous studies, a literature review method was conducted in this study. Previously, there have been many studies conducted on the concept of using sensors to the Blynk application regarding Literature Review. Identifying gaps and identifying methods that have been carried out by several researchers, the 10 (ten) Literature Reviews are as follows :

1. Research conducted by Budi Arton and Rachmat Gusta Putra, from Madiun State Polytechnic in 2017 with the title "Penerapan Internet of Things (IOT) Untuk Kontrol Lampu Menggunakan Arduino Berbasis Web" with ISSN: 235-838X. This research explains about lighting control using Arduino which is displayed in cayenne applications<sup>[7]</sup>.
2. Research conducted by Azharul Fuad from Raharja University with the title "Sistem Monitoring Pergerakan Objek Pada Ruang Menggunakan Aplikasi Blynk" This research explains about monitoring the movement of objects using the blynk application<sup>[8]</sup>.
3. Research conducted by Ariefcha Anugrah Adi Wibowo from the AKAKOM Yogyakarta School of Information and Computer Management in 2018 with the title "Sistem Kendali dan Monitoring Peralatan Elektronik Berbasis NodeMCU ESP8266 dan Aplikasi blynk" This research is about using blynk application to control and monitor electronic devices with NodeMCU <sup>[9]</sup>.
4. Research conducted by Anggy Fatillah from Raharja University in 2017 with the title "Prototype Sistem Pengontrolan dan Monitoring Rumah Pintar Menggunakan Aplikasi Blynk Berbasis Raspberry PI 3 Pada Perguruan Tinggi" This study explains the basic concepts of breadboard and blynk applications <sup>[10]</sup>.
5. Research conducted by Arafat from Kalimantan Islamic University in 2017 with the title "Desain Dan Implementasi Sistem Smart Home Berbasis WI-FI" This study describes the use of the Blynk application to control and monitor IoT Smart Home<sup>[11]</sup>.
6. Research conducted by Rizqi Ramadhan from Gunadarma University in 2012 with the title "Pendeteksi Objek Di Dalam Ruang Menggunakan Sensor Infra Merah" This study describes a tool that can detect an object in a room by using infrared<sup>[12]</sup>.
7. Research conducted by Fina Supegina and Eka Jovi Setiawan from Mercu Buana University in 2017 with the title "Rancang Bangun IOT Temperature Controller Untuk Enclosure BTS Berbasis Microcontroller Wemos dan Android" this research explains about controlling temperature wirelessly using wemos and android manually<sup>[13]</sup>.
8. Research conducted by Agus Wagya, Zulhelman in 2016 with the title "Prototipe Smart Power Outlet Untuk Pencegahan Kebakaran Akibat Arus Listrik" This study describes a tool for monitoring excess current based on the Blynk application on the socket to prevent fires<sup>[14]</sup>.
9. Research conducted by Nur Yogi in 2017 with the title "Sistem Peringatan Dini Banjir Berbasis Protocol MQTT Menggunakan NodeMCU ESP8266" This research describes the use of NodeMCU to provide warning and send flood early warning information<sup>[15]</sup>.

10. Research conducted by Jimy Harto Saputro, Tejo Sukmadi, Karnoto Karnoto in 2013 with the title "Analisa Penggunaan Lampu LED Pada Penerangan Dalam Rumah"
11. This study explains the efficiency and advantages and ease of using LED lights in home lighting<sup>[16]</sup>.

From 10 (ten) review literature. So in this project the author makes LED control via the internet based on NodeMCU with the blynk application. In this study the control system was made to make it easier to turn on or turn off the LED in the Blynk application.

### **3. Findings**

This section will discuss about the workings of the tool and an explanation of its design and 3 (three)

problems that will be solved in 3 (four) ways including:

#### 3.1 Design

The prototype has 4 (four) uses including:

1. Make it easy to control LED lights for the room.
2. There are LED displays in the blynk application to turn on or turn off the LED lights.
3. Accessed in real time remote monitoring from cell phones or gadgets via the internet network.
4. The price of NodeMCU is quite cheap compared to other microcontrollers.

In this study the authors found 2 (two) deficiencies in this prototype, including:

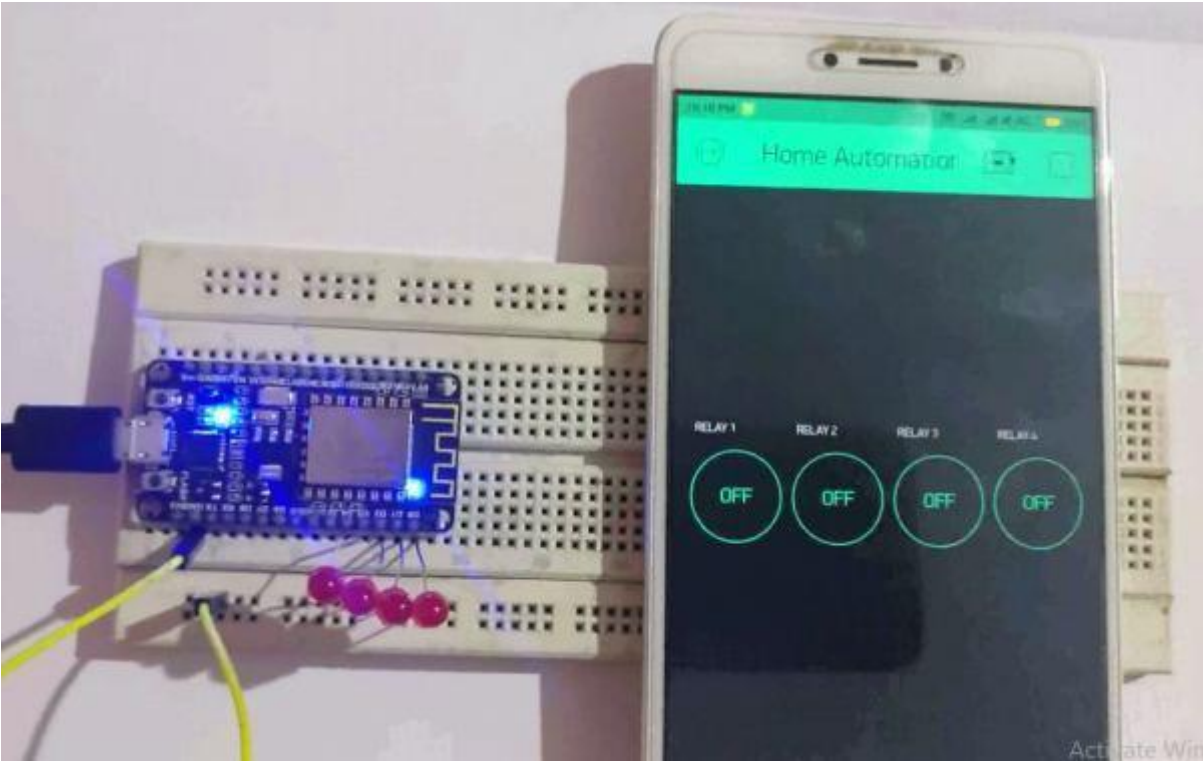
1. Need a lot of breadboard if you want a lot of LED lights.
2. The LED used must still use NodeMCU as an intermediary.

In this design consists of 2 (two) parts, namely hardware and software, consisting of 3 (three) hardware and 2 (two) software. These components include:

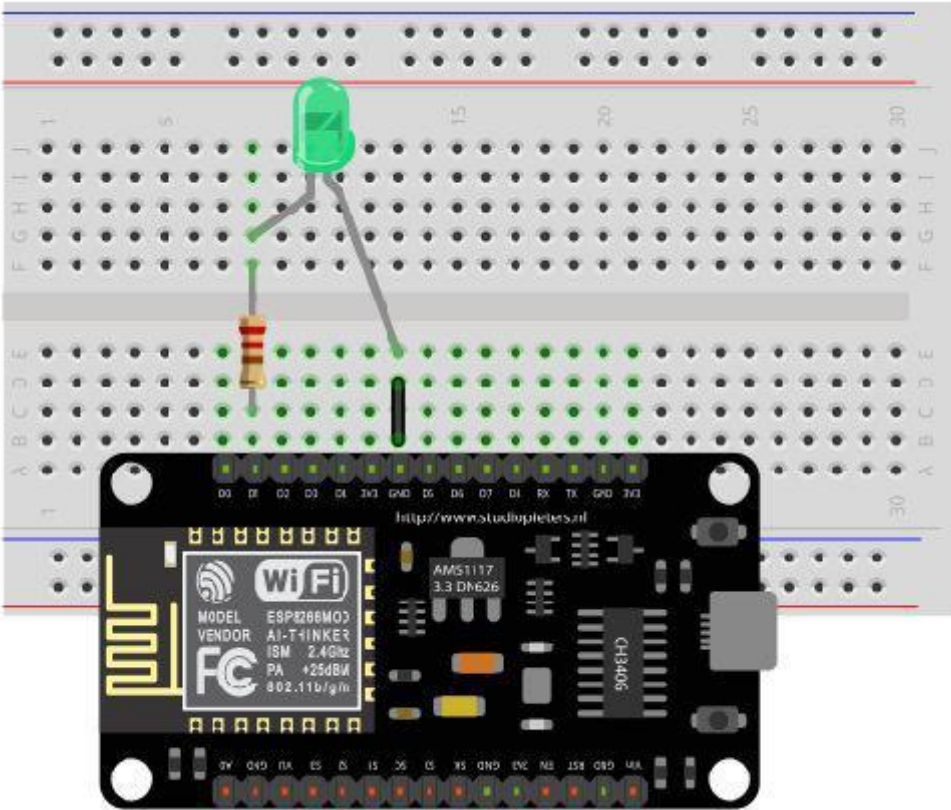
1. NodeMCU
2. Kabel Micro USB
3. LED
4. Resistor 220 Ohm
5. Projectboard/Bre

#### adboard A. Hardware

The design concept is to add a microcontroller component, namely NodeMCU. With a resistor connected LED. The way the tool works can be shown in Picture 1 and the tool set in Picture 2.



Picture 1. How the tool works

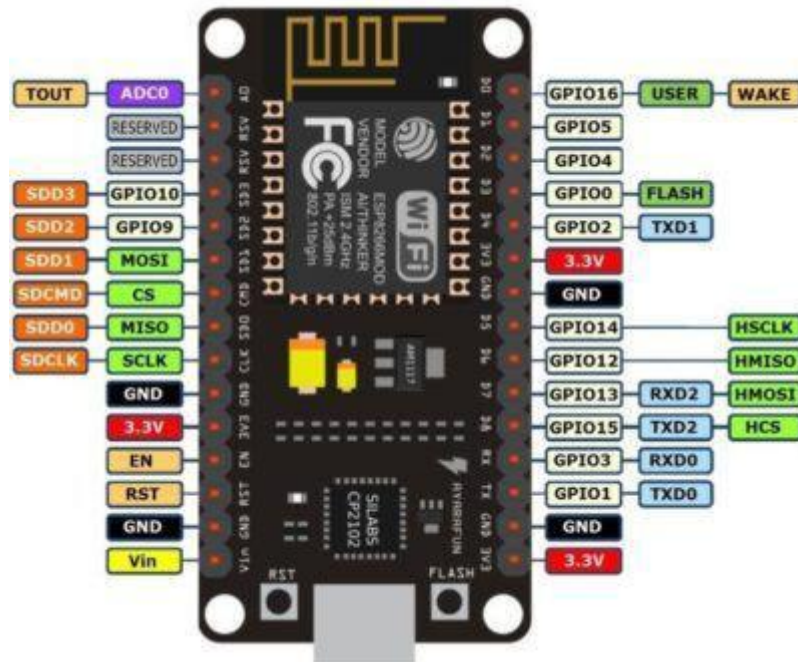


Picture 2. Tool set

### Mikrokontroler

**NodeMCU** is an open-source single-board micro controller, derived from the Wiring platform, designed to facilitate the use of electronics in various fields. The hardware has a processor **Atmel AVR** and the software has its own programming language<sup>[17]</sup>.

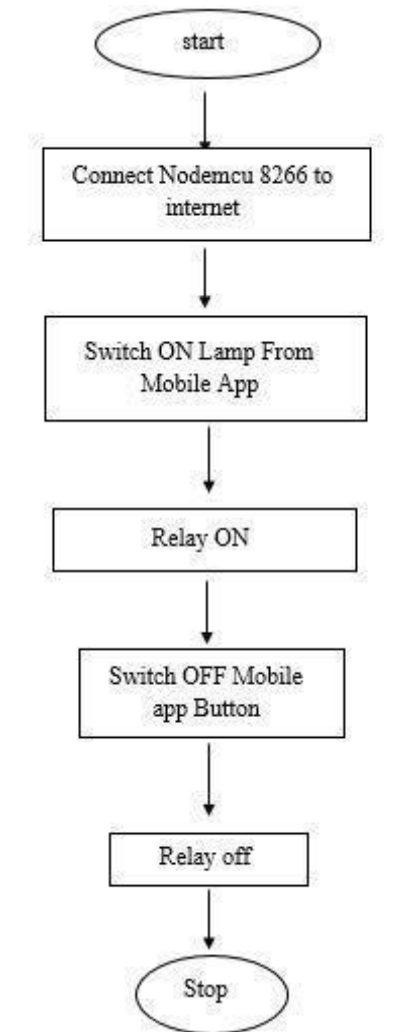
The reason for choosing NodeMCU is because it is easy to use programs that are open source and have adequate I / O pins. The NodeMCU board pin is shown in Picture 3.



Picturer 3. Pin board NodeMCU

### B. Software

Blynk application program on the microcontroller chip using the NodeMCU development board application that has been installed ESP8266 for Arduino, Flowchart control application is shown in Picture 4.



Picture 4. FlowChart Application

In the flowchart (Picture 3), the program will send data in the form of digital output from the RCWL 0516 module through the ESP8266 module.

Software specifications used, as follows:

- a. The Arduino microcontroller program uses Arduino language with a number of related libraries, such as ESP8266 and Blynk Library.
- b. The program on smartphones uses applications available to control devices via the internet (based on ESP8266), namely Blynk.

### 3.2 Sketch Program

To be able to connect the microcontroller with the blynk module and can be connected using a special library that was added to the Arduino IDE, namely Blynk and ESP8266. This library functions to connect with the Blynk server that uses the internet on the ESP8266 module. The use of the library in sketch (source code) is shown in the following script.

```
#define BLYNK_PRINT Serial
```

```
y#include <ESP8266WiFi.h>
#include <BlynkSimpleEsp8266.h>
char auth[] = "YourAuthToken";

char ssid[] = "YourNetworkName";
char pass[] = "YourPassword";

void setup()
{
  Serial.begin(9600);
  Blynk.begin(auth, ssid, pass);
}

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

### 3.3 Controller application

Control is carried out from a cellphone via the internet using the Blynk application. This application can be used to control hardware devices, display sensor data, store data, visualization, and others.

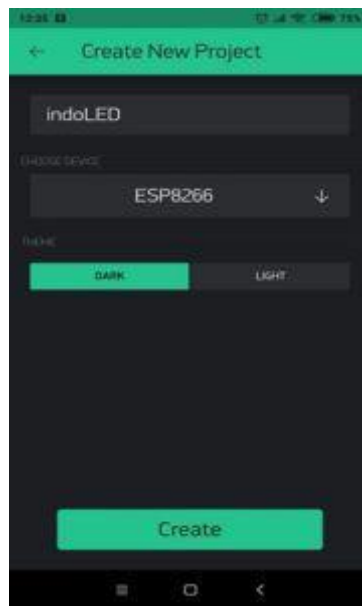
#### Blynk application

Blynk is a platform for Mobile OS applications (iOS and Android) that aims to control the Arduino, Raspberry Pi, ESP8266, WEMOS D1, and similar modules via the Internet.<sup>[18]</sup> This application is a container for creativity to create a graphical interface for projects that will be implemented only by the drag and drop widget method. Blynk works over the Internet<sup>[19]</sup>. Tampilan Blynk's application is shown in Picture 5.

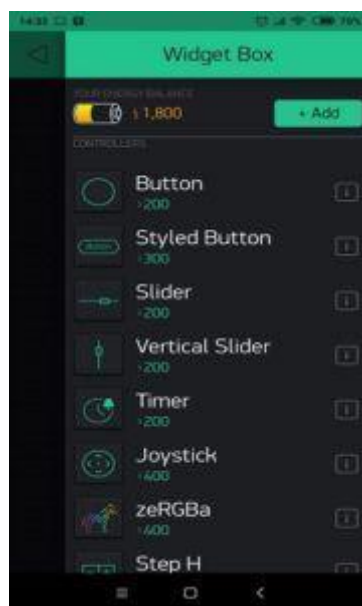


Picture5. Display of Blynk on the gadget

Upload sketch via NodeMCU to the Blynk application connected to a micro USB cable to the laptop, then upload the program. To add a button to the blynk application and run the program, it can be seen in Picture 6, Picture 7 and Picture 8.



Picture 6. Adjusting the Pin



Picture 7. Set Button





Picture 8. Blynk application switch mode

#### 4. Conclusion

Based on the above problems, there are 3 (three) problems that have been resolved with 3 (three) methods used in between

1. This tool can control the LED remotely in the internet connected.
2. This tool can be easily accessed using applications from gadgets.
3. This tool can simplify the LED lighting settings.

#### 5. Suggestion

Based on the research results described above, the author concludes 2 (two) suggestions for further development, specifically:

1. This tool can still be developed in terms of design and components used.

The development of LED control can still be implemented using other microcontrollers

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