



IOT Based Home Automation Using NodeMCU and Blynk Application

P.Sujidha¹ | P.Radha¹ | T.Shanmuga Priya¹ | A.Usha² | M.Sarojini Devi³

¹Assistant Professor, Mohamed Sathak Engineering college, kilakarai-623806, India.

³Associate Professor, Mohamed Sathak Engineering college, kilakarai-623806, India.

⁴ Professor, Mohamed Sathak Engineering college, kilakarai-623806, India.

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ABSTRACT

The Internet of Things (IoT) refers to a system of interrelated, internet-connected objects that are able to collect and transfer data over a wireless network. It used to be controlled by websites and smart phone applications remotely, also, to control tools and instruments by codes and algorithms structures for artificial intelligence issues. In case we want to create advanced systems using different algorithms, Wi-Fi or Ethernet connection is connected to our tools, equipment, and devices controlling them by smart phone applications or internet websites. A smart home to operate lamps or other home-use devices, it can be used as a security system or an industrial-use system, for example, to open or close the main building gate, to operate full automatic industrial machine, or even to control internet and communication ports using IoT technology. A huge industrial facilities or governmental institutions have much of lamps. Employees sometimes forget to turn them off in the end of the day. This research suggests a solution that can save energy by letting the security to control lighting of the building with his smart home by Blynk application. The lamps can be controlled by switches distributed in the building and Blynk application at the same time with a certain electrical installation. This research presents a simple prototype of smart home, or the easy way and low cost to control loads by Wi-Fi connection generally.

KEYWORDS: Blynk, Ethernet, IOT, Wi-Fi

INTRODUCTION

Here introduce the paper, A load controlled by computer systems has many advantages compared with manual controlled loads. Nowadays there are many programs and applications help to control things better using codes or python algorithms in artificial intelligence projects. In order to save energy and make loads monitored easily, this research suggests smart home project based on IoT technology. This smart home is an Internet of Things (IoT) project that controls loads with internet connection via Wireless Fidelity WIFI

connection. A smart phone connected to internet with Blynk application as a control panel, and NodeMCU microcontroller kit in other side as a controller that receives control commands via WIFI signal. NodeMCU kit is built with ESP8266 WIFI receiver that able to process and analyze WIFI signal to input the microcontroller. The WIFI receiver and microcontroller are built in one kit to be used as IoT project. It's called NodeMCU. To connect the system to the Internet, needs a WiFi receiver. In my case I used ESP8266 that is connected as built-in in the NodeMCU board that

contains a firmware runs with the ESP8266. The firmware is a low-level control computer software.

II. FEATURES OF NODEMCU MODULE

NodeMCU is an open-source Lua based firmware and **development board** specially targeted for IoT based Applications. It includes firmware that runs on the ESP8266 Wi-Fi SoC from Espressif Systems, and hardware which is based on the ESP-12 module. The **NodeMCU ESP8266 development board** comes with the ESP-12E module containing ESP8266 chip having Tensilica Xtensa 32-bit LX106 RISC microprocessor. This microprocessor supports RTOS and operates at 80MHz to 160 MHz adjustable clock frequency. NodeMCU has 128 KB RAM and 4MB of Flash memory to store data and programs. Its high processing power with in-built Wi-Fi / Bluetooth and Deep Sleep Operating features make it ideal for IoT projects. NodeMCU can be powered using Micro USB jack and VIN pin (External Supply Pin). It supports UART, SPI, and I2C interface.

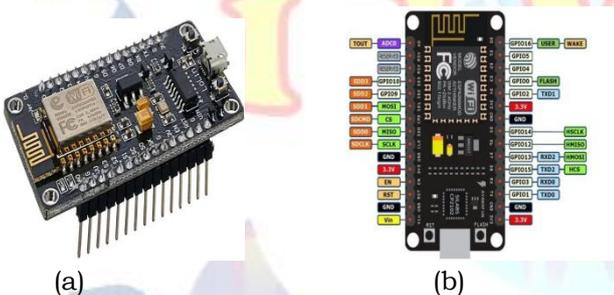


Fig. 1 - (a) NodeMCU ESP8266; (b) NodeMCU ESP8266 Pinout

III. PROPOSED METHODOLOGY

Internet of Things permits us to manage connected devices from anyplace and exchange information over the devices. The house automation system controls home appliances mechanically and once this technique is connected to the internet it becomes a locality of IoT. There is a unit of three main generations of home automation. First is, the various wireless technology with proxy servers, second is computing (AI) controlled home automation and last robots that directly communicate with humans. Our project is that the 1st generation automation. Implementing the primary generation of the house automation appliances have to connect with the web, therefore, users will manage the system from any remote place. That's why IoT has become a desire for automation.

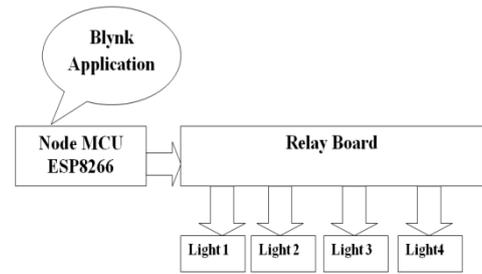


Fig. 2 - Block Diagram of Proposed Methodology

IV. IMPLEMENTATION

The home automation circuit is built around ESP8266, Blynk Android App, and a 4-channel relay board. The hardware set up should be according to the circuit diagram. AC mains appliances (Bulbs) will be connected to relays which are controlled by the ESP8266. Once Arduino IDE is installed on the computer, connect the board with the computer using the USB cable. Now open the Arduino IDE and choose the correct board by selecting Tools>Boards>NodeMCU1.0 (ESP-12E Module), and choose the correct Port by selecting Tools>Port. To get it started with the NodeMCU board and blink the built-in LED, load the example code by selecting Files>Examples>Basics>Blink. Once the example code is loaded into your IDE, click on the 'upload' button given on the top bar. Once the upload is finished, you should see the built-in LED of the board blinking. User has to install and configure the Blynk App as per the above instructions. NodeMCU to 4- Channel Relay Board Connect D0 pin of NodeMCU to D1 pin of 4- Channel Relay board, Connect D1 pin of NodeMCU to D2 pin of 4- Channel Relay board, Connect D2 pin of NodeMCU to D3 pin of 4- Channel Relay board, Connect D3 pin of NodeMCU to D4 pin of 4- Channel Relay board, Connect 3.3V of NodeMCU to Vcc pin of 4- Channel Relay board, Connect GND pin of NodeMCU to GND pin of 4- Channel Relay board. We are including ESP8266 WiFi library which provides ESP8266 specific WiFi routines and we are calling it to connect to the network. BlynkSimpleEsp8266 library establishes the communication between Blynk App and ESP8266.

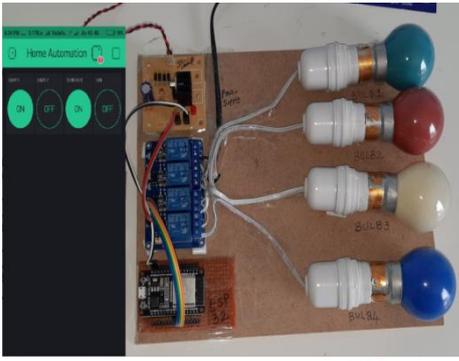


Fig. 3 Working setup of the system

V. CONCLUSION

In our planned model a high proportion of accuracy has been achieved through implementation. This method is capable of dominating the house appliances supported the user's desired mode. All the modes work with sensible accuracy that was found throughout implementation. Users solely ought to choose modes from their smartphones and our system can do the remainder of controlling the appliances. This planned project is extremely reliable. Therefore it is aforesaid that this system has higher accuracy with nice potency. This system has immense opportunities to upgrade within the future. As mentioned earlier this is often the primary generation of home automation. It might be upgraded to the second generation by storing and analyzing knowledge on the cloud servers. Then victimization machine learning algorithms, we have a tendency to even ought not to select modes from smartphones. Rather it'd be ready to switch modes with its own computer science.

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