Home Automation System Using ESP8266

SamruddhiFase[1] ,Neha Khanaj[2],PratikshaLokare[3] , PoorvaShreshthi[4] , Ms.S.B.Magdum[5].

*1,2,.3,4, Diploma Student, Department of Computer Engineering, Sharad Institute of Technology Polytechnic, Yadrav, Maharashtra, India.

*5. Lecturer computer Engineering, Sharad Institute of Technology Polytechnic, Yadrav, Maharashtra, India.

A B S T R A C T

The Internet of Things (IoT) connects devices and tools to the Internet to remotely manage websites and smartphone applications, and use code and algorithmic structures to control tools and tools related to artificial intelligence topics. Through Python algorithm, Wi-Fi or Ethernet connection, it connects to our instruments, devices and devices they control through smartphone apps or websites on the Internet. This is actually a simplified definition of the Internet of Things. In addition to using the Internet of Things as a smart home to control lamps or Other household equipment, it can be used as a security system or industrial use system, such as opening or closing the gates of buildings, controlling fully automatic industrial machines, and even controlling communication connections and the Internet. There are many lamps in large industrial plants or government offices. Sometimes employees forget to close them at the end of the day. This research proposes a solution that can save energy. The security service can use your smart home to control the lighting of the building through the Blynk app. Lights can be controlled simultaneously with specific electrical installations through switches and Blynk applications distributed throughout the building.

1. INTRODUCTION

Compared with manually controlled loads, computer-controlled loads have many advantages. There are many programs and applications today that can help you use Python code or algorithms in artificial intelligence projects to better control things. This study recommends using smart homes to save energy and easily track your downloads. Projects based on Internet of Things technology. This smart home is an Internet of Things (IoT) project that manages the load connected to the Internet via a WIFI wireless fidelity connection. A networked smartphone with the Blynk app as the control panel. Controller and NodeMCU Microcontroller KitA controller that receives control commands via Wi-Fi signals. The NodeMCU kit is equipped with an ESP8266 WIFI receiver, which can process and analyze the WIFI signal input by the microcontroller. The WIFI receiver and microcontroller are built into the kit and used as IoT projects. It is called NodeMCU. To connect the system to the Internet, you need a WiFi receiver. In my case, I used the ESP8266 embedded in the NodeMCU board, which contains the firmware to make it workESP8266. The firmware is low-level computer software. The NodeMCU is coded through the Arduino Integrated Development Environment (IDE) with a USB (Universal Serial Bus) port to tell the NodeMCU what to do. I want NodeMCU to control the Blynk four-way relay kit. It is suitable for portable phones and displays the temperature measured by the LM35 sensor.

The detailed information of creating the project:

 1) NodeMCU board. An open source IoT platform.

2) Step-down converter ACDC.The switching power supply supplies power to the project. This project requires 5 volts.

. 3) The DCDC step-down converter is used as a voltage regulator to convert the output voltage of the 12 V power supply unit into a 5 V regulated voltage.

 * *Corresponding author.*

  E-mail address: nehakhanaj413@gmail.com

4) Four-channel relay kit digital output contact NodeMCU

5) Temperature sensor LM35. Measure the ambient temperature

6) A computer with the Arduino program (IDE) installed for one-time encoding of the NodeMCU

7) An Android smartphone with the Blynk app installed, used as a control panel.

2. METHODOLOGY
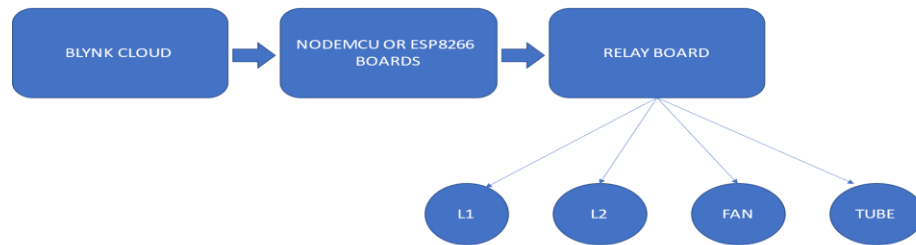
Fig.1 Block diagram of home automation system.

Here we use the MCU node based on ESP8266 as the IoT development board, in this case, we first upload the code to the esp8266 wifi board, and then configure our virtual buttons in blynk, here we use the MCU node based on ESP8266 Digital pin. Pass blynk on our virtual button, and then blynk sends a signal to the MCU node to turn the device on or off. The goal of a home automation system is to optimize the performance of your home. Check out some of these advantages: Remote access: Control your home from a mobile device (including a laptop, tablet, or smartphone).

 Comfort: Use home automation to make your home more comfortable and livable. At a comfortable temperature, you can set up your smart speakers to play music when you get home from get off work, or dim or brighten the lights according to the time of day.

Convenience-Schedule the device to turn on automatically at a specific time, or access your settings from anywhere with an internet connection. When you need to remember to close the door behind you or turn off the lights, you can focus on more important things.

Higher security: Smart fire alarms, carbon monoxide monitors, pressure sensors and other home automation features can protect your home from natural disasters.

Energy efficiency: With home automation, you can focus on energy consumption, for example, you can save energy costs by shortening the lighting time or lowering the temperature when leaving the room.

Blynk application and Arduino IDE Preparation and Running
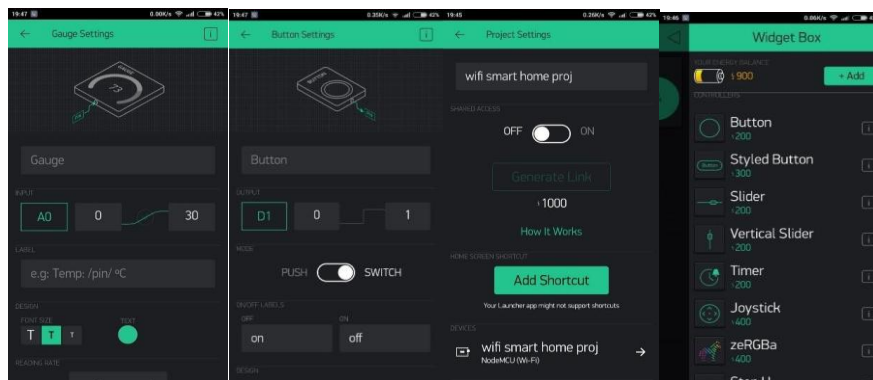
Fig .blynk application screenshot

This project was completed through the Blynk application. Download the app from the Google Play store to your smartphone, then create a project with four switches and a display to convert it to a temperature scale. Set the buttons to the switch positions on D1, D2, D3, and D4. Then set the flag to A0

because the output is on A0 on the NodeMCU board. shows a screenshot of the Blynk application.

3. METHODOLOGY

In this home automation system, we will use the Blynk application to control 4 kinds of electrical appliances connected to the relay, such as TV, fan, light bulb, motor and refrigerator. The NodeMCU ESP8266 Wi-Fi module wirelessly receives commands from the smartphone via the Internet. In order to encode the on/off signal and send it to the server and ESP8266 board, we need a better IoT platform.

4. CONCULSION

The NodeMCU ESP8266 module of the Internet of Things (IoT) smart home can be designed with various hardware and software auxiliary components so that it can be organized into a smart home system as needed, controlled by the Android Blynk application.

2) Smart home and this Internet of Things (IoT)-based The NodeMCU ESP8266 module can be used to monitor some household electronic operations, including lighting control, fan control, temperature monitoring, and early warning.

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