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Domotics Using Node MCU

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Abstract: *Domotics is a growing field that aims to improve the automation and control of different aspects of a home. One of the most popular technologies used is the Nodemcu esp8266, which is a Wi-Fi enabled microcontroller board. The main objective of this project is to develop a smart home system that can be controlled using voice commands, IR, and manual switches with low cost. For the purpose of voice Command, we can use either Google voice assistant nor Alexa to accept the voice command. The system includes the Nodemcu board as the central controller, along with various sensors to automate and control different aspects of the home. The system includes, an IR remote control, manual switches,sensors, a cloud server, and an application.*

Key Word: *Home Automation With Blynk ; Domotics ; Smart Home ; Voice Controlled automation ; ESP8266 Control ; IR Home automation ; 4 Relay Control.*

I.INTRODUCTION

Domotics has become increasingly popular in recent years due to the many benefits it offers. One of the main reasons people choose to automate their homes is for the convenience it provides. With home automation, you can control your home appliances and systems from a single device, such as your smartphone, tablet or computer. This means you can turn lights on or off, adjust the temperature, lock or unlock doors, and even monitor your security cameras from anywhere,at any time. Another reason for the growing popularity of home automation is the potential for energy savings. With smart thermostats, for example, you can program your heating and cooling systems to automatically adjust to your schedule or preferences, reducing energy waste and lowering your bills. Similarly, automated lighting systems can turn off lights when no one is in a room, saving energy and reducing your carbon footprint.

II.MATERIAL AND METHODS

Voice-controlled home automation with Blynk, IR, and manual switches is a cutting-edge technology that allows you to control various home appliances using voice commands. With the help of the Blynk mobile application and additional components such as IR and manual switches, you can easily control all your home appliances with your voice. By integrating Blynk with voice control, you can command your appliances using simple voice commands, making your life more comfortable and convenient. IR switches enable you to control your appliances using an infrared remote control, while manual switches allow you to control them manually. By combining voice control, Blynk, IR, and manual switches, you can create a smart home that is easy to control and monitor, turning your home into a futuristic and convenient living space. This technology offers a range of benefits, from energy savings to improved home security and comfort, making itan increasingly popular choice for homeowners looking to modernize their homes.

Hardware Components

A. Node Mcu Esp8266

Node MCU is a low-cost open-source platform. It initially included firmware which runs on the ESP8266 Wi-Fi SOC, and hardware which was based on the ESP-12 module. Later, support for the ESP32 32-bit MCU was added. Node MCU is an open-source firmware for which open source prototyping board designs are available. The name "Node MCU" combines "node" and "MCU" (micro-controller unit). The term "Node MCU" strictly speaking refers to the firmware rather than the associated development kits both the firmware and prototyping board designs are open source. The firmware uses the Lua scripting language. The firmware is based on the Lua project, and built on the Express if Non-OS SDK for ESP8266. It uses many open-source projects, such as Lua-JSON and SPIFFS. Due to resource constraints, users need to select the modules relevant for their project and build a firmware tailored to their needs. Support for the 32-bit ESP32 has also beenimplemented.

B. Node Mcu Pins

Node MCU provides access to the GPIO (General Purpose Input/Output) anda pin mapping table is part of the API documentation. The Node MCU board has a number of pins that can be used to connect to various sensors, actuators, and other components.

VIN: This pin provides power to the board. It can accept a voltage between 4.5V and 9V DC.GND: This is the ground pin for the board.

D0-D8: These pins are general-purpose digital input/output (GPIO) pins that can be used for a variety of purposes, such as connecting to sensors, LEDs, switches, and other components.

RX and TX: These pins are used for serial communication with other devices.

A0: This is an analog input pin that can be used to read analog signals from sensors.SDA and SCL: These pins are used for I2C communication with other devices.

SPI pins: The NodeMCU board has SPI pins that can be used for connecting to SPI devices such as sensors, displays, and memory chips.

Reset: This pin is used to reset the board.

C. Four-Channel 5v Relay Module

A four-channel relay is an electronic device designed to control up to four separate circuits or devices using a single control signal. The device consists of four separate electromechanical relays, each capable of independently switching a different circuit The relay operates using a control signal input, which is typically a low voltage signal provided by a microcontroller, PLC, or other control device. When the control signal is applied to the relay, an electromagnetic mechanism is energized, which causes the relay's switch to change state. This switch mechanism is capable of either closing or opening the circuit, depending on the state of the relay. Each of the four relays in the device has its own output channel, enabling the control ofup to four separate circuits or devices. The relay is commonly used in various applications such as industrial automation, home automation, robotics, and many others. Four-channel relays offer numerous advantages, including space-saving design, versatility, and high switching capacity. Additionally, the device provides a cost-effective solution for controlling multiple circuits using a single control signal.

D .Jumper Wire

Jumper wires are an essential component in electronic projects that require the connection of different electronic components on a breadboard or a circuit board. They are short wires with pins or connectors at both ends used to make temporary connections between two points on a circuit. Jumper wires are used to connect various electronic components such as sensors, LEDs, resistors, and capacitors to a microcontroller board like the ESP8266. Jumper wires come in different lengthsand colors, allowing easy identification and organization of the connections in a project. The colors of the jumper wires typically signify their purpose, for example, red wires are used for power connections, while black wires are used for groundconnections. Jumper wires are also available in different gauges, indicating the thickness of the wire. Thicker wires can handle more current, while thinner wires are ideal for low current applications.

E. Switch

A switch is an electrical component used to open or close a circuit by breaking or establishing the flow of electrical current. It is a mechanical device that can be manually operated or activated by other means, such as light or sound. Switches are used in a variety of electronic applications, including home appliances, computers, automobiles, and industrial equipment. They can be classified into several categories, including toggle switches, rocker switches, slide switches, push-button switches, and rotary switches, among others. Toggle switches are the most common type of switch, and they have a lever that can be flipped up or down to switch the circuit on or off. Rocker switches are similar to toggle switches but have a different shape and are operated by rocking the switch back and forth. Slide switches are used for selecting between two ormore positions, and they have a small slider that moves back and forth to activate the different positions.

F. Ir Receiver

The TSOP1838 is a commonly used IR (infrared) receiver module that is designed to receive IR signals at a specific frequency of 38 kHz. This module is widely used in remote control systems, including TV remotes, DVD player remotes, and other similar devices. The metallic case on the TSOP1838 is an optional feature that can provide additional shielding against interference from external sources.

G.Ir Remote Control

A universal IR small remote is a small-sized remote control device that can be programmed to work with a wide range of infrared (IR) enabled devices, such as TVs, DVD players, and air conditioning units. These remotes typically come with pre programmed codes for various devices and can also be programmed with custom codes.

H.Temperature & Humidity Sensor

The DHT11 is a low-cost, digital temperature and humidity sensor that is widely used in electronic projects. It consists of a thermistor and a capacitive humidity sensor, both of which are integrated on a single chip. The module is designed to provide accurate and reliable measurements of temperature and humidity, making it a popular choice for

various applications. The DHT11 sensor module communicates with a microcontroller, such as an Arduino or Raspberry Pi, using a single-wire digital interface. It is easy to use and requires only a few connections to the microcontroller. Once connected, the module can provide temperature readings in the range of 0 to 50°C with an accuracy of ±2°C, and humidity readings in the range of 20% to 80% with an accuracy of ±5%. The module is compact in size and consumes very little power, making it suitable for battery-powered applications.

I. Power Adapter

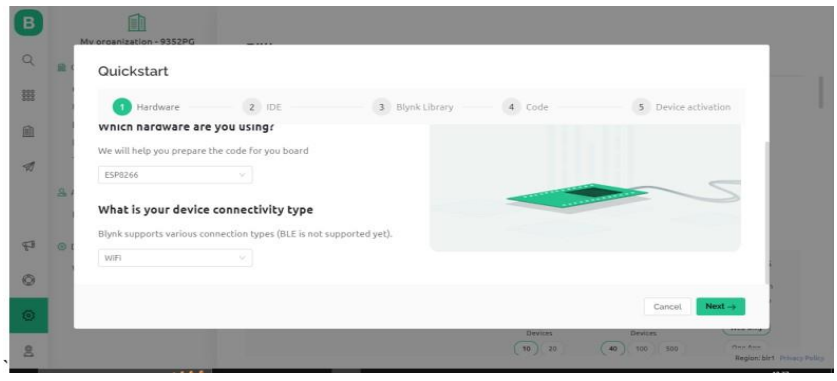
Power Adapter is a source of input supply to the project. It is an essential thing in any project. If we provide you all your project requirement how can miss the power adapter. Here in this category, we stock power Adapter/ DC power supply withdifferential power output ratings ranging from 5V to 12V dc @ 1A to 5A. You can also find the replacement cable for your charger or Adapter. This adapter is compatible to handle up to 3A current so applications like toy cars, CCTV Cameras, Routers, Modems, Cordless Phones, Set-Top Boxes, Wireless Devices, and POS Machines are compatible with this adapter.The power adapter usually consists of two main components: the transformer and the rectifier. The transformer converts thehigh-voltage AC power from the wall outlet to a lower voltage AC power, while the rectifier converts the AC power to DCpower. The power adapter may also include additional circuitry to regulate the voltage and current to ensure that the electronic device receives a stable and consistent power supply.

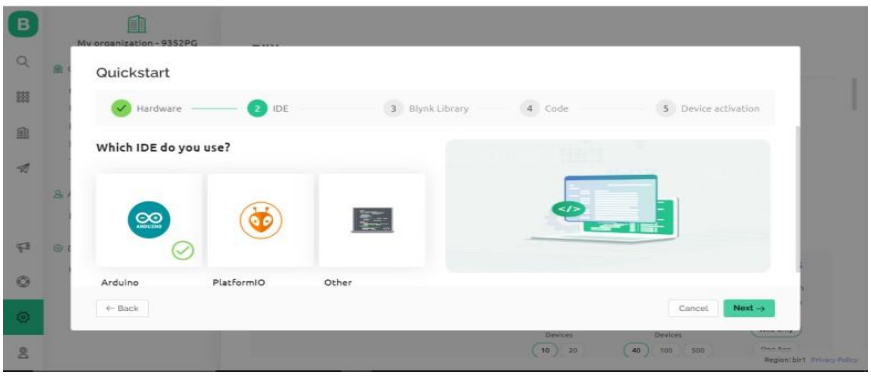
III. RESULT

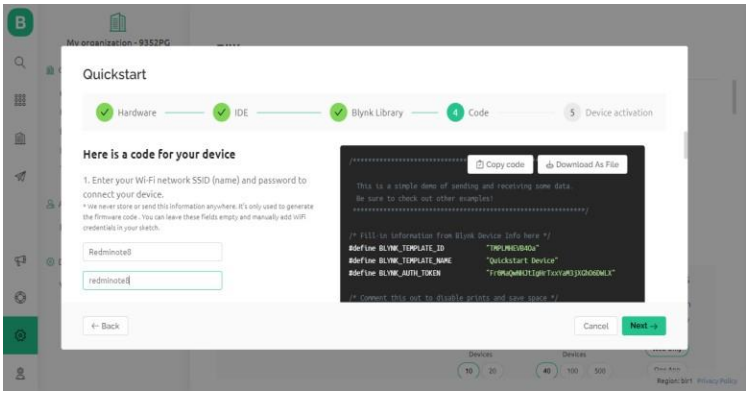
Blynk is a popular IoT platform that enables users to easily connect and control a wide range of devices and sensors through a user-friendly mobile app or web interface. Blynk provides a suite of tools and APIs that make it easy for developers to build connected devices and IoT applications, without the need for complex programming or hardware configuration. Froma cloud perspective, Blynk uses a cloud-based infrastructure to provide a reliable and scalable platform for IoT applications.When a device is connected to Blynk, it sends data to the Blynk cloud, where it is stored and processed. The Blynk app or web interface can then be used to visualize this data and control the device remotely.

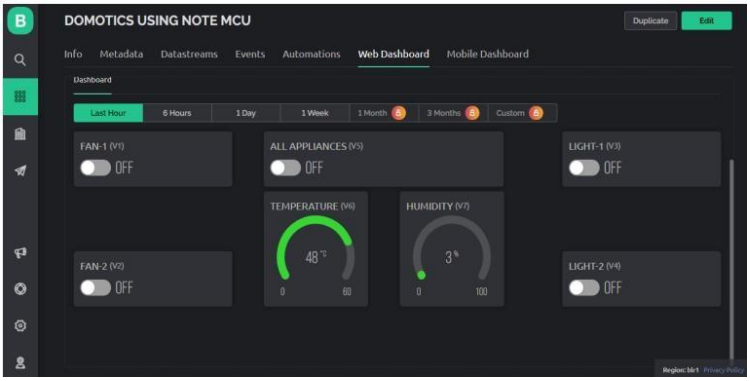
Blynk Cloud is a subscription-based service, with different pricing plans available depending on the number of devices and data usage required. Additionally, Blynk provides open-source libraries and supports a variety of hardware platforms, making it easy for developers to build their own IoT solutions using Blynk Cloud. The Blynk Cloud servers are located in various data centers around the world. Blynk uses Amazon Web Services (AWS) to host its cloud infrastructure, and AWShas data centers located in many different regions, including the United States, Europe, Asia, and Australia. When you create a Blynk account and select a server location, Blynk will automatically select the closest server to your location for the best performance.

With Blynk you can connect your development boards and control it using your iPhone or iPad. Blynk supports all IoT device types and offers Python, C++, Node JS libraries with examples to get you up-and-running within minutes. For advanced users, you can create your own custom devices, set up rooms and routines, and monitor all your devices via REST API. Unlock high-availability, highly secure, and well-documented integration
for the project.









IV.CONCLUSION

A system integrates electrical devices in a house with each other. The techniques which are going to use in automation include those in building automation as well as the control of domestic activities, such as TV, fan, electric tubes, refrigeratoretc. After studying and understanding literature survey and other existing works, we proposed a technique that will gives usbetter understanding of the Environmental conditions in home. We also provide notification to the user about any error occurs in the devices. In this paper we are planning to eliminate most of the human interaction by providing intelligent system. By using this system, we can actually manage to make low cost, flexible smart homes to adjust its environmental conditions and resolve its errorswith energy saving.

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