

Node Extension Board Control Through Alexa

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Abstract Smart home devices allow us to monitor our homes, buildings, and other structures. It is one of the solutions for maximizing energy efficiency. Many techniques and models are proposed to keep track of electricity and home appliances. The majority of the models are too expensive for most users to afford. Here in this project, I have explained how to make a Node Extension Board device connected with Alexa and home appliances automation system with Siniric and manually, to control home appliances from the Amazon Alexa app and manual switches which are user-friendly. The implemented technique reached the goals which effectively allow users to control different devices used for household appliances from anywhere, wherever the internet is present.

Key Words: Automation, node extension, alexa, smart home

1. INTRODUCTION

Home automation is a setup designed to provide comfort and peace of mind. It typically consists of integrated technology, smart wiring, smart lighting, control system and internet connectivity. Smart wiring and control systems are the backbone of home automation. As we all know, there are so many technologies which have been introduced in the market with which we can go for home automation for better homes, for people with disability, for saving electricity and for a better future. There are devices like Amazon Echo Family, Google Nest Hub Family, Sonos One, Smart Plugs, Kasa Smart Wifi Outdoor Plug etc are in the market which are user-friendly but can be afforded by every body, as there are many families which can't afford expensive setups.

In this IoT project, I have explained how to make a Node Extension Board Device Connect. We can use Alexa and Siniric's home appliance automation system, as well as manually, to control our appliances. Using it, we can control 4 home appliances from the Amazon Alexa App and manual switches. You can control the Node Extension Board from the manual switches if there is no internet available. It is not very expensive and can be affordable for ordinary men and families. And you don't need an Amazon Echo Dot device or any smart device for this voice control home automation project. With this IoT project, home appliances can be controlled and monitored with the monitor, the real-time feedback of the

Node The Extension Board will automatically connect with the WiFi and the red LED will turn off. Here we can easily control lights, fans, and other home appliances with the voice command.

To connect the Echo Dot or any devices of Alexa platform smart speaker with the Node Extension Board. I have used only the Amazon Alexa app on my mobile to control the home..

2. RELATED WORK

- (1) IFTTT is kind of a mobile app and a website. It has made life easy by introducing a technology which helps to work for you with the internet. IFTTT, connects all the "services, devices connection" together so all the work can be done automatically and on time. There are various ways in which we connect all our services to get output and the resulting combinations are called "Applets". This emerging technology helps to automate our daily workflow. IFTTT is an acronym for If This Then That where several services provide robust solutions.
- (2) Applets automate our daily workflow; they can be used to automate our homes, offices, or websites. There are many smart home products available on the market.
- (3) Lix Color 1000: Lix's led to improved bulbs significantly bright and much more effective than their predecessors. It includes a simple option, connections with IFTTT and Alexa, as well as the fact the Lix bulbs do not necessitate a hub.
- (4) Philips Hue Wireless Dimming Kit: The Philips Hue Wireless Dimming Kit is indeed a successful technique to begin using smart lighting. It enables you to manage your home's lights via speech and the internet. Thus it makes it possible to control the brightness of the light.
- (5) Voice assistant is a type of device that features a voice command device including a virtual assistant that enables users to access. The digital assistant enables smart speakers to respond to consumer commands such as playing music, answering inquiries, ordering meals, and so forth. The majority of smart speakers can be used to manage home automation devices such as smart lights, smart locks, and smart thermostats. Many manufacturers have produced their own smart speakers, such as Amazon's Amazon Echo, and Google and Apple's Google Home and Apple HomePod, respectively. In contrast to the benefit of being simple to use, voice controls utilised in Smart Speakers are becoming extremely prevalent

because they have the potential to profoundly simplify daily chores for all users, including vulnerable populations (e.g., the elderly and the disabled).

3. PROPOSED WORK

Like earlier said, the objective of this IoT project, is to demonstrate how else to connect a Node Extension Board Device. To manage domestic appliances, we must employ Alexa and Sinric's home appliance automation technology as well as manually. The suggested system makes use of Alexa's services and home appliances automation system with Sinric, devices Node12, 4-channel Relay Module (5V), AC switch 4nos, 5pin sockets 2nos, 2pin sockets 2nos, Handmade water proof box, Amazon Alexa Echo Dot / Amazon app and services.

The node-wifi module enables macOS, Windows, and Linux users to communicate with nearby wifi networks via a variety of techniques. These approaches involve looking for and connecting to wifi network spots (Connect, Scan, List current wifi connections, Disconnect, Delete connection information).

NodeMCU is an open-source Lua-based firmware and development board designed specifically for Internet of Things (IoT) applications. It comprises firmware that works on Espressif Systems' ESP8266 Wi-Fi SoC and hardware that is based on the ESP-12 module. Which has Microcontroller: Tensilica 32-bit RISC CPU Xtensa LX106, Operating Voltage: 3.3V, Input Voltage: 7-12V, Digital I/O Pins (DIO): 16, Analog Input Pins (ADC): 1, UARTs: 1, SPIs: 1, I2Cs: 1, Flash Memory: 4 MB, SRAM: 64 KB, Clock Speed: 80 MHz, USB-TTL based on CP2102 is integrated onboard, enabling plug and play, PCB Antenna, Small Sized module to fit intelligently within your IoT applications. To be clear, this module is inspired by node-wifi-control, but with some minor changes to some functions, such as the different OS-specific parsers for terminal output, which we discovered did not perform well on certain operating systems.

4-channel Relay Module (5V) module is 5V active low. Low active means that the relay will be triggered when a low voltage or signal is applied to the IN pin. This is a 5v 4-channel relay interface board that can operate various appliances and other equipment with high current. It can be controlled directly by a microcontroller (Arduino, 8051, Avr, Pic, Dsp, Arm, Arm, Msp430, Ttl Logic). It has a fixed bolt hole and is easy to install. Power Indicator (Green), Two Ways Of Relay Status Indicator Light, Small Board Pcb Size: 7.2 Cm * 4.8 Cm (Red) Microcontroller-Direct Controlled Standard Interface (Avr, Pic, Dsp, Arm, Arm, Msp430, Ttl Logic) Leds To Indicate Relay Output Status.

12V Power Supplies This project makes use of 12V power supplies (or 12VDC power supplies). A combination of

transformers, diodes, and transistors produce a 12VDC output from a 120VAC or 240VAC input. There are two types of 12V power supplies: 12V regulated power supplies and 12V unregulated power supplies. Switching regulated 12VDC power supplies, also known as SMPS power supplies, switchers, or switched mode power supplies, use a sophisticated high frequency switching method that includes pulse width modulation and feedback to control the 12VDC output voltage. To reduce common and differential mode noise transmitted to the line and load, Acopian switching regulated power supply use substantial EMI filtering and shielding.

The ESP8266 is a microcontroller that is used as a WiFi module. The microcontroller created by Espressif Systems, a firm located in Shanghai, is known as the ESP8266. The ESP-01 is the ESP8266 family's initial Wi-Fi module. This little board only have two GPIOs, but that doesn't mean it can't perform well. It also be used independently to control 1-2 devices. It is powered by a 3.3 volt battery. The ESP8266-12 is the one we'll be utilising in this lesson. In our last post, we discussed the ESP8266-01. However, all ESP modules use the same type of ESP processor; the only difference is the breakout board used.

The 4 Channel Relay Module I've used the 4 Channel Relay Module to control high voltage, high current loads including motors, solenoid valves, lights, and AC loads. It's made to work with microcontrollers like Arduino, PIC, and others. Screw terminals are used to connect the relays' terminals (COM, NO, and NC). It also has an LED, fan, and other indicators to show the state of the relay.

4. CONCLUSIONS

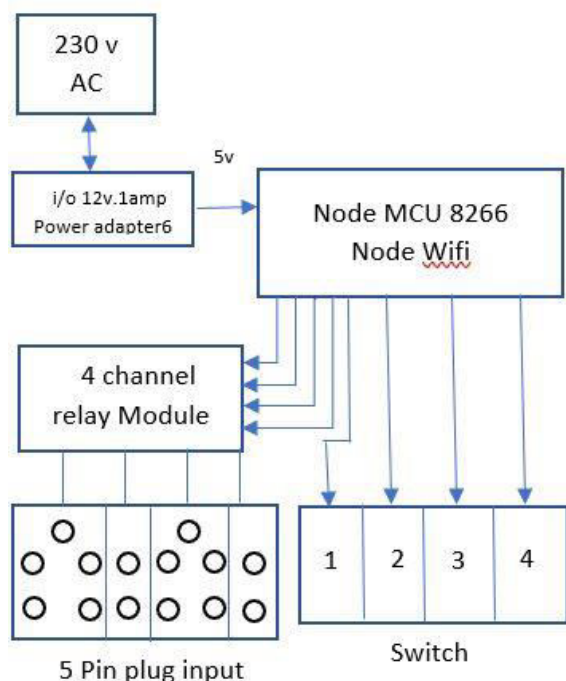
For setup, remote control, and additional functionality, we have use the Alexa App is a companion to our Amazon Echo, Dot, Tap, and Show. Amazon Echo is a hands-free, voice-controlled device that never has to be charged and can be used in the kitchen or any area. Alexa is constantly available to play music, offer weather and news updates, answer questions, generate lists, and much more. In this IoT project, I've demonstrated how to connect a Node Extension Board Device to Alexa and set up a home appliances automation system using Sinric. We can manage four home appliances using the Amazon Alexa App and manual switches. If you don't have access to the internet, you can use the manual switches to control the Node Extension Board.

This voice control home automation solution does not require an Amazon Echo Dot device. You can manage and monitor the real-time feedback of the relays in the Alexa App from anywhere in the globe with this IoT project. The Node Extension Board will automatically connect to the WiFi if it is available, and the red LED will turn off. With the voice command, we can simply operate the light, fan, and other home appliances. The Node Extension Board may be used to connect the Echo Dot or any other Alexa platform smart speaker to the Node Extension Board. I've only used the Amazon Alexa app on my phone to control my household appliances.

How to utilise Alexa, Amazon Lab126's intelligent personal assistant popularised via the Amazon Echo and Echo-Dot

Alexa can communicate with you via speech, play music, create to-do lists, set alarms, stream podcasts, play audiobooks, and provide weather, traffic, and other real-time information. Alexa can also act as a home automation centre, allowing her to manage a variety of smart gadgets. The “Echo-Dot,” which allows users to activate the gadget with a wake-word, will be used on this project (such as “Alexa”).

Alexa can communicate with a variety of home automation devices, including Philips Hue, Belkin Wemo, SmartThings, and others. In our instance, we'll follow in the footsteps of the WeMo. Belkin International, Inc.'s WeMo line of devices allows customers to operate their home gadgets from anywhere. A switch, motion sensor, Insight Switch, light switch, camera, and app are all part of the product package. The WeMo Switch (in our instance) may be connected into any house outlet and operated through home WiFi by an iOS or Android smartphone running the WeMo App or mobile phone network.



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REFERENCES

- [1] Hill, Jim (12 September 2015). ["The smart home: a glossary guide for the perplexed"](#). T3. Retrieved 27 March 2017
- [2] Rout, Kshirod Kumar; Mallick, Samuchita; Mishra, Sivkuinar (July 2018). ["Design and Implementation of an Internet of Things based Prototype for Smart Home Automation System"](#). *2018 International Conference on Recent Innovations in Electrical, Electronics & Communication Engineering (ICRIEECE)*. Bhubaneswar, India: IEEE: 67–