Smart Home Automation Using Google Assistant And Alexa

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ABSTRACT

The rapidly evolving world with over 50 billion internet-connected devices has led to new inventions driven by necessity. IoT is becoming prevalent globally, not just for convenience but also due to its efficiency. Breakthrough technologies are emerging, leveraging IoT capabilities for innovative solutions. A prototype home automation system allows remote control of devices like fans and lights via button press. To optimize wireless connectivity and reduce sensor usage, APIs (Sinric Pro) and wireless modules are introduced. APIs facilitate communication with Node MCU and Relay modules, enabling machine-to-machine communication over Wi-Fi. Google's Voice Assistant enhances remote control capabilities, allowing up to 4 appliances to be controlled via Wi-Fi.

KEYWORDS

Node MCU, 4-channel 5V SPDT, Relay Module, Manual Switches.

1 INTRODUCTION

IoT revolutionizes daily life, offering both convenience and efficiency. Constant innovations in IoT lead to groundbreaking technologies. Our project combines daily appliances with the internet for electric machines communication advancement. Prototype home automation system controls lights, fans, and more via smartphone taps. Utilizes wireless fidelity and APIs to minimize sensor usage on individual appliances. The objective is to develop voice controlled home automation using ESP8266 Node MCU. Modern houses shift to centralized control, replacing conventional switches. Imagine commanding appliances with your voice for efficient living. Reasonable prototype converts TV, fans, lights, offering voice control over the internet. Home automation enhances convenience and efficiency in lighting, heating, and appliances usage. Focus on wireless technologies for easy retrofitting without new wiring or major installations.

1.1 METHODOLOGY OF THE PROPOSED SYSTEM

This project aims to create a smart home automation system. Home automation involves controlling lighting, entertainment systems, and appliances without manual switches. It also includes features like home security, such as access control and alert systems.

The system connects devices like fans, light bulbs and connectors to a relay module for controlling four appliances. These devices are configured with an API called Sinric Pro, enabling the software to recognize and set up
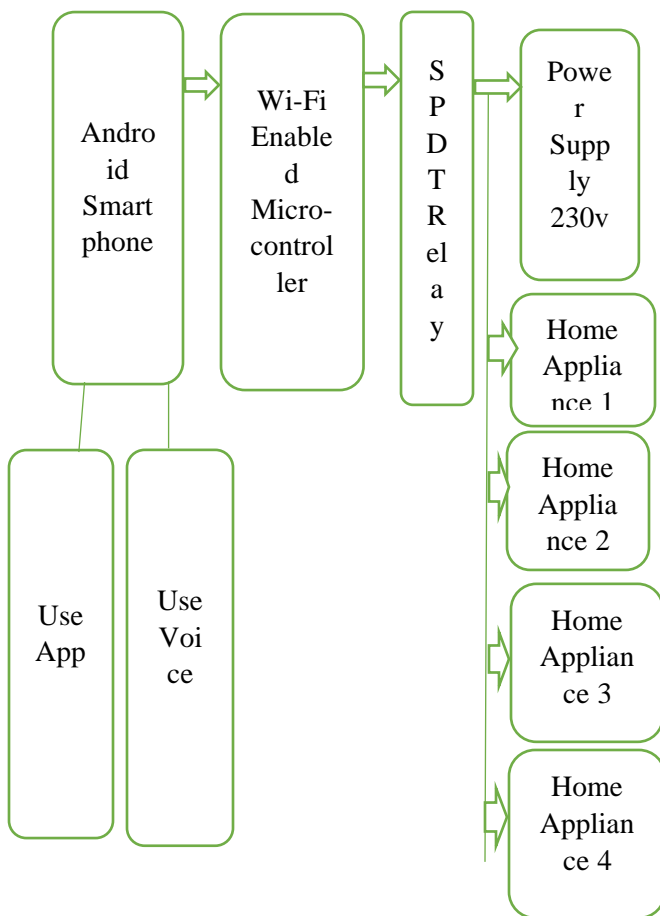
them up. The Google Home app is used to send commands, and a Node MCU ESP8266 Wi-Fi module receives wireless commands from a smartphone over the internet.

For functionality, the Google Home App encodes ON/OFF signals, which are then sent to the server and the ESP8266 board. It's essential to note that this setup requires an internet

connection to work. All configurations are programmed into the Node MCU.

When powered by at least 3.3V, the ESP8266 Node MCU allows voice command control through Google Voice Assistant. Moreover, the system provides monitoring capabilities for device status, power consumption, online status, and network details. This monitoring is accessible through both Web API and mobile application.

2 BLOCK DIAGRAM

```
┌──────────┐   ┌──────────┐   ┌─────┐   ┌──────────┐
│ Android  │──▶│ Wi-Fi    │──▶│  S  │──▶│ Power    │
│ Smart    │   │ Enabled  │   │  P  │   │ Supply   │
│ phone    │   │ Micro-   │   │  D  │   │ 230v     │
│          │   │ control  │   │  T  │   └──────────┘
│          │   │ ler      │   │  R  │
│          │   └──────────┘   │  el │   ┌──────────┐
│          │                  │  a  │──▶│ Home     │
│          │                  │  y  │   │ Appliance│
└──────────┘                  └─────┘   │ 1        │
┌─────┐  ┌─────┐                        └──────────┐
│ Use │  │ Use │                        ┌──────────┐
│ App │  │ Voi │                     ──▶│ Home     │
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│     │  │     │                        │ 2        │
│     │  │     │                        └──────────┘
│     │  │     │                        ┌──────────┐
│     │  │     │                     ──▶│ Home     │
│     │  │     │                        │ Appliance│
│     │  │     │                        │ 3        │
└─────┘  └─────┘                        └──────────┘
                                        ┌──────────┐
                                     ──▶│ Home     │
                                        │ Appliance│
                                        │ 4        │
                                        └──────────┘
```

3 HARDWARE USED

1. ESP8266 Node MCU
2. SPDT Relay Module
3. Electric Appliances
4. Connecting Components.

3.1 SOFTWARE USED

In this project we used Google Home app and Sinric Pro API and Arduino IDE as programming interface.

3.2 API- Sinric Pro

Sinric Pro is the API used in this project, allowing developers to link IoT development boards like Raspberry Pi with third party apps, Amazon Alexa, and Google Home. With features like REST architecture, token-based authentication and JSON responses, it enables tasks such as retrieving device logs, finding devices, updating devices, and accessing account details.

To set up a device using Sinric Pro, you choose "add a device" and specify the type of device you want to add like switch for controlling a relay channel. Each device gets a unique ID, crucial for real-time identification and initialization. This device ID is then included in the code uploaded to

the ESP8266 Node MCU for proper integration.

3.3 GOOGLE HOME

The Google Home app helps you to set up and control Nest or Home speakers, displays and Chromecast. It works on Android and iOS devices. You can control thousands of compatible lights, cameras, and more. In the app, your home's name is at the top, and you can switch between multiple homes. Quick actions in the app control devices, services, or device groups with different capabilities based on their states.

3.4 ARDUINO IDE

The Arduino IDE is free software for coding and uploading to Arduino boards. Code in the IDE is called sketches. To upload a sketch, connect your Arduino boards and click and Upload button. Make sure to choose the right boards and port. The button compiles, executes, and uploads the code. For some boards, the reset happens automatically; for others, press the reset button before uploading.

4 OPERATION AND WORKING

Our project can be controlled through voice commands, a mobile app, a web API (Sinric Pro), and manual controls. We've set up devices using the API, programmed them into our software, and configured our Node MCU accordingly. This let us control our devices online and in real-time as circuit boards.

4.1 GOOGLE HOME AND WEB API

Once you configure devices through our API, you can link them to the Google Home app. This app offers a great feature for managing API-configured devices. When Sinric pro is connected to Google Home, they seamlessly share data. This means the devices you set up in our API will appear in the Google Home app just as you arranged them. After connecting, you can easily control these devices, turning them on or off both from the app and through the web browser using our web API.

4.2 VOICE CONTROL

Our projects integrates with Google Assistant, allowing Google Home and Assistant to respond your commands. However, without an internet connection, Google Home's capabilities are limited. While it's a decent speaker, there are more cost-effective options if internet connectivity isn't priority. Once connected to the internet, unleashes the power of Google Assistant. You initiate commands by saying "OK Google" or "Hey Google" and interact with devices as if it were a person. For example, saying "turn on Relay one" activates the corresponding relay. It's important to note that Google Assistant recognizes devices based on how they are set up in our API, so naming is crucial for accurate identification.

5 RESULT AND ANALYSIS

We tested and implemented smart automation approach in this system, and the results matched our expectations. When a voice command was given to Google Voice Assistant, it executed seamlessly, turning on the desired device as requested. The System was tested in two activities: first, controlling it through voice commands, and second, using Google Home. The Google Home app allows us to link to the API (Sinric Pro) where we configured our devices. Connecting our Sinric Pro to Google Home app, provide user-friendly interface for control.

6 CONCLUSION

The demand for smart home automation is rising due to busy lifestyles. Daily tasks consume time that could be better spent elsewhere. Smart home apps offers a stress-free way to manage activities effortlessly. Developing such an app is complex and time-consuming, requiring a holistic approach and a skilled development team. These developers use the latest tools and cloud-based technologies to create performance-driven IoT applications, simplifying the management if connected devices. Our home automation prototype model helps understand the concept and workings of this technology, providing insight for future project developments.

7 REFERENCES

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