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# Home Automation using Google Assistant

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***Abstract :*** The Internet of Things (IoT) has revolutionized the way we interact with our homes, providing us with the ability to control and monitor our devices from anywhere in the world. In this paper, we propose an IoT home automation system using Amazon Alexa that allows home owners to control their smart devices with voice commands. The proposed system uses a combination of smart devices, a central hub, and the Alexa voice assistant to provide an intuitive and seam less home automation experience. The system also includes a mobile application that allows home owners to monitor and control their devices remotely. We believe that the proposed system has the potential to enhance home automation and improve the quality of life for home owners.

***Index Terms*** **- Alexa, Amazon, Voice commands, IoT.**

## I. INTRODUCTION

Home is the place where personal and confidential information of each individual can be found, and it represents one of the greatest investments in life. It is an essential part of people's lives and an improvement in this area means more comfort for any individual. People always try to find new methods to increase their comfort. This includes ideas for making daily tasks easier or even eliminating some of the duties. Nowadays people can install smart appliances inside their homes in order to control some of the house tasks. Home automation has been a popular trend in recent years, with many homeowners looking for ways to make their homes smarter and more convenient. The emergence of IoT technology has made it possible to connect a wide range of devices, including lighting, HVAC systems, security systems, and appliances, to a central hub, enabling homeowners to control and monitor them remotely. Amazon Alexa, the voice assistant developed by Amazon, has become a popular platform for home automation due to its ease of use and ability to integrate with a wide range of devices. Home Automation achieving popularity Day by day, because of large usage of smart devices. We can achieve home automation simply by using home gadgets to the internet.

## II. LITERATURE REVIEW

A literature review on home automation utilizing ESP8266 reveals a burgeoning field at the intersection of technology and household management. Over the past decade, the proliferation of smart home devices has transformed the way we interact with our living spaces, with voice-controlled assistants like ESP8266 playing a central role. Existing literature showcases the versatility of ESP8266 in orchestrating various tasks within the home environment, from adjusting lighting and temperature to managing entertainment systems and security devices. Studies highlight the convenience and efficiency brought about by voice command integration, enabling users to control their homes effortlessly. However, challenges such as interoperability issues, security concerns, and voice recognition accuracy persist, warranting further investigation. Despite these challenges, user acceptance remains high, with positive feedback regarding usability and convenience. Future research directions may focus on addressing technical challenges, enhancing user experience, and exploring innovative applications of ESP8266 in home automation. Overall, the literature underscores the significance of home automation systems in shaping the future of domestic living.

## III. PROBLEM STATEMENT

The conventional method of manually controlling household devices poses limitations in terms of convenience, energy efficiency, and accessibility. Residents often face challenges in remotely managing electrical appliances and systems, leading to inefficiencies and inconvenience. Home automation system that seamlessly integrates with popular voice assistants, such as Google Assistant, to provide intuitive and hands-free control over various household devices.

## IV. OBJECTIVES

Currently, our work revolves around developing a home automation system that lever ages the capabilities of Google voice assistant. By integrating ESP8266 with various smart home devices and systems, our goal is to create a seamless and intuitive user experience for controlling and managing household tasks. The project involves designing and implementing custom voice commands to control lighting, thermostats, security cameras, and other smart devices commonly found in modern homes. We are also exploring ways to enhance the functionality of ESP8266 by integrating it with machine learning algorithms for personalized automation routines and predictive analytics. Our research aims to address challenges such as interoperability, security, and user privacy while maximizing the potential of voice-controlled home automation. Through this work, we seek to contribute to the advancement of smart home technology and improve the quality of life for users by simplifying everyday tasks and enhancing home comfort and security.

## V. ANALYSIS AND DESIGN

### 5.1 Block Diagram

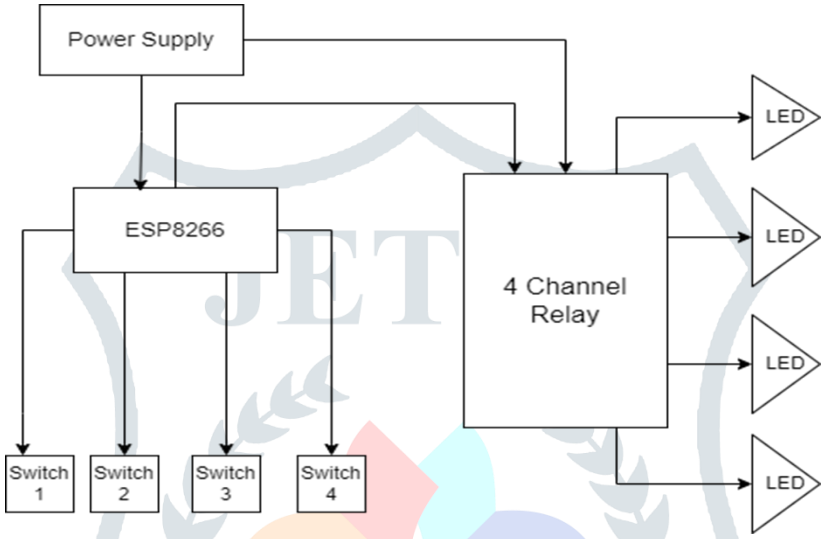


Fig. 1. BLOCK DIAGRAM

### 5.2 Hardware

1. ESP8266
2. 4 channel relay
3. Push Buttons
4. Power Supply
5. LED Bulb

#### 5.2.1 ESP8266

An ESP8266 Wi-Fi module is a SOC microchip mainly used for the development of end-point IoT (Internet of things) applications. It is referred to as a standalone wireless transceiver, available at a very low price. It is used to enable the internet connection to various applications of embedded systems Espressif systems designed the ESP8266 Wi-Fi module to support both the TCP/IP capability and the microcontroller access to any Wi-Fi network. It provides the solutions to meet the requirements of industries of IoT such as cost, power, performance, and design.

It can work as either a slave or a standalone application. If the ESP8266 Wi-Fi runs as a slave to a microcontroller host, then it can be used as a Wi-Fi adaptor to any type of microcontroller using UART or SPI. If the module is used as a standalone application, then it provides the functions of the microcontroller and Wi-Fi network.

The ESP8266 Wi-Fi module is highly integrated with RF balun, power modules, RF transmitter and receiver, analog transmitter and receiver, amplifiers, filters, digital base- band, power modules, external circuitry, and other necessary components A set of AT commands are needed by the microcontroller to communicate with the ESP8266 Wi-Fi module. Hence it is developed with AT commands software to allow the Arduino Wi-Fi functionalities, and also allows loading various software to design the own application on the memory and processor of the module.

The processor of this module is based on the Tensilica Xtensa Diamond Standard 106 micro and operates easily at 80 MHz. There are different types of ESP modules designed by third-party manufacturers. They are,

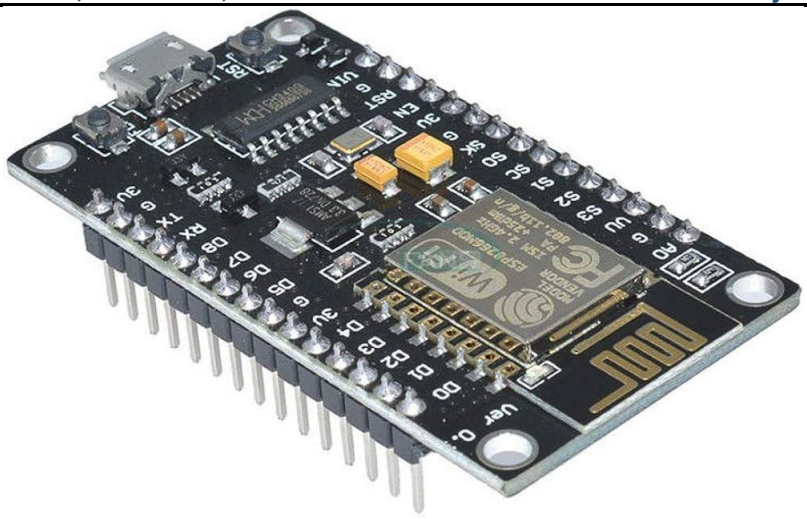

Fig. 2. ESP8266

1. ESP8266-01 designed with 8 pins (GPIO pins -2).
2. ESP8266-02 designed with 8 pins (GPIO pins -3).
3. ESP8266-03 designed with 14 pins (GPIO pins- 7).
4. ESP8266-04 designed with 14 pins (GPIO pins- 7).

The ESP8266 Wi-Fi module comes with a boot ROM of 64 KB, user data RAM of 80 KB, and instruction RAM of 32 KB. It can support 802.11 b/g/n Wi-Fi network at 2.4 GHz along with the features of I2C, SPI, I2C interfacing with DMA, and 10-bit ADC. Interfacing this module with the microcontroller can be done easily through a serial port. An external voltage converter is required only if the operating voltage exceeds 3.6 Volts. It is most widely used in robotics and IoT applications due to its low cost and compact size.

### 5.2.2 4 channel relay

Figure 3.3shows the 4 Channel Relay. The four-channel relay module contains four 5V relays and the associated switching and isolating components, which makes interfacing with a microcontroller or sensor easy with minimum components and connections. The contacts on each relay are specified for 250VAC and 30VDC and 10A in each case, as


Fig. 3. CHANNEL RELAY.

marked on the body of the relays. This is a LOW Level 5V 4-channel relay interface board, and each channel needs a 15-20mA driver current. It can be used to control various appliances and equipment with large current. It is equipped with high-current relays that work under AC250V 10A or DC30V 10A. It has a standard interface that can be controlled directly by micro controller. This module is optically isolated from high voltage side for safety requirement and also prevent ground loop when interface to micro controller.

### 5.2.3 Push Button

Most push button switches function in the same way. Pressure is placed on the button or actuator, resulting in the depression of the internal spring and contacts and the touching of stable contacts at the bottom of the switch. This process will either close or open the electrical circuit.

Fig. 4. PUSH BUTTON.

### 5.2.4 Power Supply


Fig. 5. POWER SUPPLY.

An electrical equipment that provides electricity to an electrical load is called a power supply. A power supply's primary function is to transform electric current from a source into the proper voltage, current, and frequency so that the load can be powered.A small 5V dc power supply is used to power the controller, sensor.12V dc power supply is used to power the stepper motor.

### 5.2.5 LED Bulb

LEDs are incorporated into bulbs and fixtures for general lighting applications. Small in size, LEDs provide unique design opportunities. Some LED bulb solutions may physically resemble familiar light bulbs and better match the appearance of traditional light bulbs. Some LED light fixtures may have LEDs built in as a permanent light source. There are also hybrid approaches where a non-traditional "bulb" or replaceable light source format is used and specially designed for a unique fixture. LEDs offer a tremendous opportunity for innovation in lighting form factors and fit a wider breadth of applications than traditional lighting technologies.

Fig. 6. BULB

**5.3 Software**

1.Python
2.Arduino IDE

**5.3.1 Python**

The project uses Python as its programming language, which improves the functionality and usability of the elevator system by enabling smooth integration and control of several components, including the motor driver, GPIO pins, and speech recognition algorithms on the ESP8266.Python is a high-level interpreted programming language that is well-liked by be- ginners as well as experts due to its ease of use and readability. It is compatible with several programming paradigms, such as functional, object-oriented, and procedural programming. Third-party libraries are less necessary with Python's vast standard library, which offers built-in modules and functions for activities like file I/O, networking, and web development. Its dynamic typing and automatic memory management add to its user-friendliness, freeing developers to concentrate more on problem-solving than on handling linguistic difficulties. Python's use cases, which span from scientific computing and web programming to automation and artificial intelligence, demonstrate how versatile the language is.

**5.3.2 Arduino IDE**

The Arduino IDE is an open-source software, which is used to write and upload code to the Arduino boards. The IDE application is suitable for different operating systems such as Windows, Mac OS X, and Linux. It supports the programming languages C and C++. Here, IDE stands for Integrated Development Environment.
The program or code written in the Arduino IDE is often called as sketching. We need to connect the Genuino and Arduino board with the IDE to upload the sketch written in the Arduino IDE software. The sketch is saved with the extension '.ino.'

**5.4 Flow Chart**

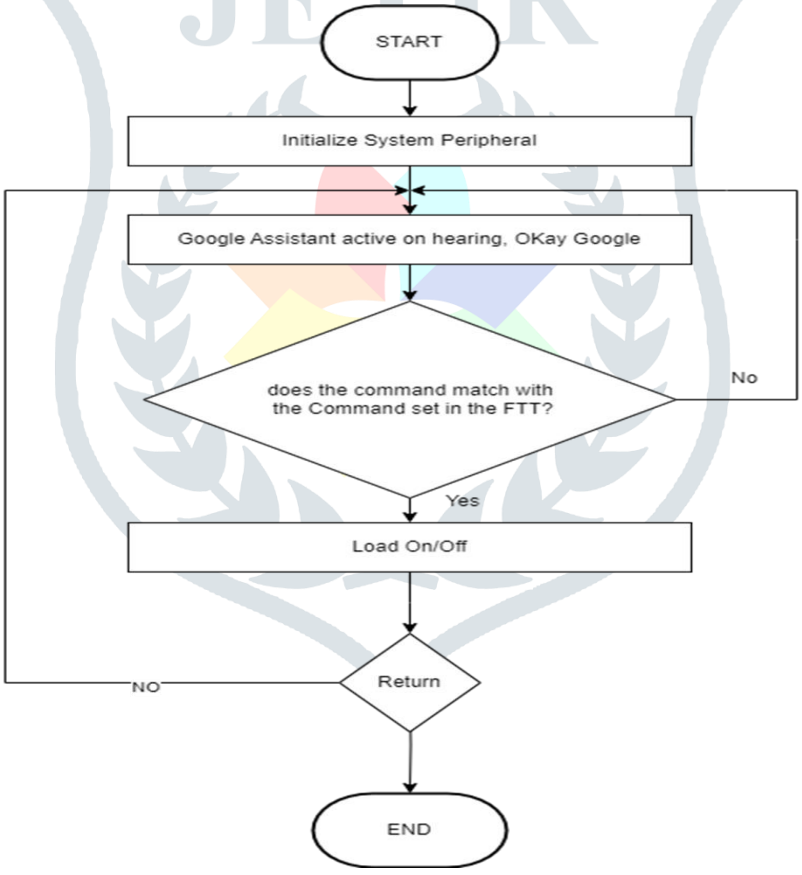


Fig. 7. FLOW CHART

**5.5 Working.**

Start by initializing your ESP8266 micro-controller.

1) Install the necessary libraries for controlling devices, and upload the code to your ESP8266.
2) After connecting to your Wi-Fi network, trigger a beep sound using a buzzer to indicate the connection status.
3) Connect your ESP8266 to the devices you want to control, such as lights, switches, or sensors. This involves wiring of relays or smart home modules.
4) Use the Google Assistant SDK to enable voice control. Set up a project on the Google Cloud Platform, register your device, and configure O Auth 2.0 authentication. Implement the necessary code on the ESP8266 to communicate with Google Assistant and execute commands.

5) Create a new skill, define the voice commands, and handle requests using AWS Lambda or your own server. Integrate this with your ESP8266 setup to control devices via ESP8266 commands.
6) Sinric Pro is a service that allows you to integrate smart home devices with various platforms, including Google Assistant and ESP8266. Sign up for a Sinric Pro account, add your devices, and generate API keys. Implement Sinric Pro API calls in your ESP8266 code to enable control through this platform.
7) Once you've updated the Sinric Pro app key and appeared key in the code, upload it to your ESP8266 and ensure successful deployment.
8) Test each integration to ensure that voice commands are correctly recognized and devices respond accordingly.
9) Once the basic setup is working, you can further enhance your home automation project by adding features such as scheduling based on the real-time clock, remote access via mobile apps, or integration with other smart home platforms.

## VI. Result and Discussion

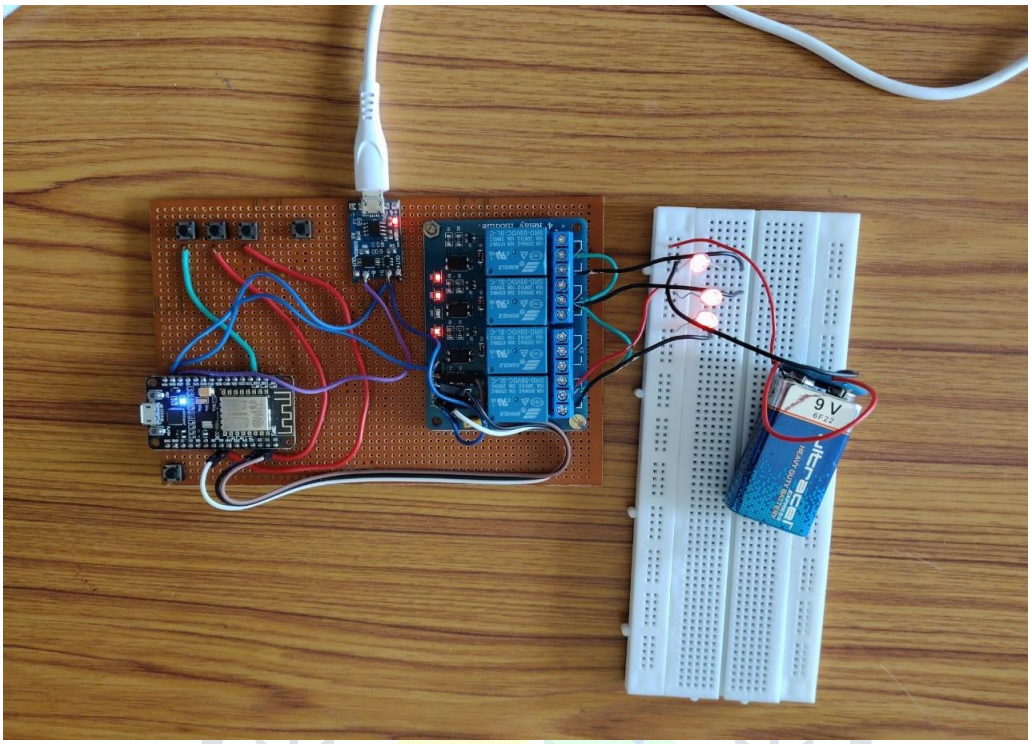


Fig. 8. MODEL

The Home automation using google assistant project outcome shows, how the com- bination of voice-controlled features with automated lighting enhances user accessibility, convenience and safety. This creative method improves the light switch system user experience overall by illustrating how the modern technologies can improve urban infrastructure and mobility solutions.

## VII. Conclusion and Future Scope

### Conclusion

In conclusion, the proposed IoT home automation system using ESP8266 has the potential to enhance the convenience and functionality of home automation. The system provides an intuitive and seamless home automation experience, allowing homeowners to control and monitor their devices with ease from any location. We believe that this system has the potential to improve the quality of life for home owners and pave the way for future developments in home automation technology. Home appliances like Bulb, Fan and Motor etc., are controlled according to the given commands. The device connected to the respective relay turned On or OFF as per the users request to the Alexa.

### Future Scope

Well, no system is ever perfect. It always has a scope for improvement. One just needs to put on a thinking cap and try and make the system better. Future scope for the home automation systems involves making homes even smarter. The system can be integrated closely with home security solutions to allow greater control and safety for hometown. The next step would be to extend this system to automate a environment, such as offices and factories. There are a lot of other sensors that can be used to increase the security and control of the home like pressure that can be put outside the home to detect that someone will enter the home. Changing the way of the automated notifications by using the GSM module to make this system more professional.

## VIII. References

1]Home Automation Using Google Assistant, Author: Mudasir M, Neha V, Nihaal Thathir K, Yadav M Journal: Journal of Emerging Technologies and Innovative Research (JETIR) Year: 2021

2]Voice Controlled Home Automation System using Google Assistants Author: Ajmera Kiran, G. R. Sakthidharan, D Divya Priya, B. Uma Mahesh, K. Prem Kumar Journal: International Journal of engineering research Technology (IJRET) Year: 2022

3] Automation of Smart Home using Smart Phone via Google Assistant Author: S Imran Hussain, S Deepa Lakshmi, R J Benalla, V Charu Nivetha Journal: IOSR Journal of Engineering (IOSRJEN) Year: 2020