Home Automation Using Alexa

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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 homeowners 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 seamless home automation experience. The system also includes a mobile application that allows homeowners 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 homeowners.

Keywords-

IR: Infrared Radiation.
IoT: Internet of things.
GSM: Global System for Mobile Communication.
IDE: Integrated Development Environment.

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.[1] 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 eveneliminating some of the duties. Nowadays people can install smart appliances inside their homes in order to control some of the house tasks [1].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.[3] 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 SmartDevices. We can achieve Home Automation simply by connecting the home gadgets to the internet.

II. SYSTEM ARCHITECTURE

The proposed system consists of fourmain components: smart devices, a centralhub,Alexa voice assistant& Mobile Application.

Smart Devices:

The smart devices are the core of the system. They are connected to the central hub via Wi-Fi or Bluetooth and can be controlled by the Alexa voice assistant. Examples of smart devices that can be integrated with the system include smart lights, thermostats, security cameras, and smart locks.

Central Hub:

The central hub acts as the bridge between the smart devices and the Alexa voice assistant. It is responsible for communicating with the devices and sending commands to them. The central hub can be a standalone device, it can be a smart home automation controller that supports Alexa integration.[4]

Alexa Voice Assistant:

The Alexa voice assistant is the interface between the homeowner and the smart devices. It allows homeowners to control their devices using voice commands, such as "Alexa, turn on the living room lights" or "Alexa, lock the front door." The Alexa voice assistant can be accessed using an Amazon Echo device, a smartphone, or a tablet.

Mobile Application:

The system also includes a mobile application that allows homeowners to monitor and control their devices remotely. The mobile application can be used to turn devices ON or OFF, adjust settings, and receive notifications.

III. FLOWCHART OFHOME AUTOMATION USING ALEXA
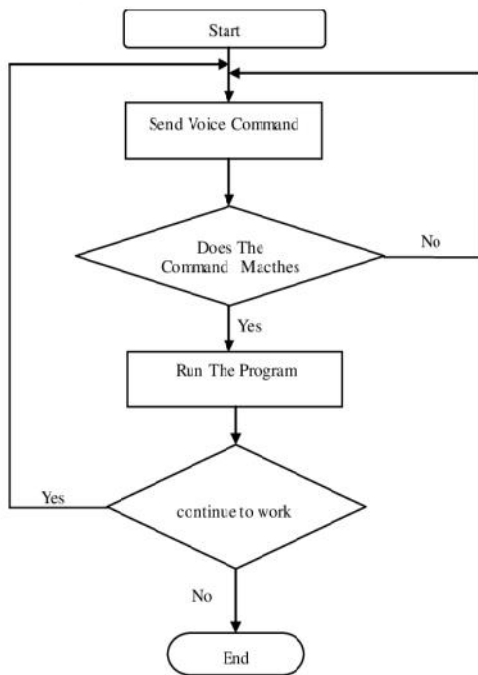
IV. HARDWARE REQUIREMENTS

1. ESP32 DEV KIT V1
2. 4-channel 5V SPDT Relay Module
3. DHT11 temperature sensor
4. TSOP 1838 IR receiver IC
5. Push Buttons
6. Any IR remote

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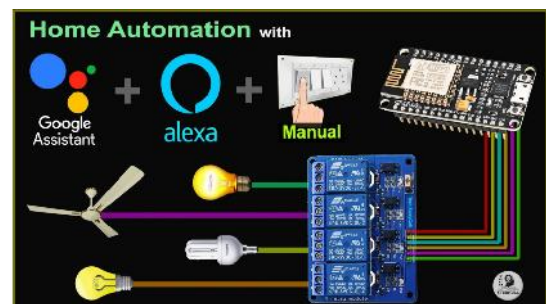### 3. DHT11 temperature :

4.TSOP 1838 IR receiver IC

5.Any IR Remote


6.Push Buttons

V. CIRCUIT DIAGRAM

SOFTWARE DESCRIPTION

In the presented system different Software for programming and controlling of Smart Home Automation is used. IDE which stands for the integrated development environment is an open-source software which is used for writing program and for uploading code into Arduino and ESP8266 Wi-Fi Module.[5] An application named "Smart Home Automation" is created using ESP8266 and IOT Remote app which provides a platform for controlling

purpose. This will only work if the system is connected to Wi-Fi as shown in fig 1.

VI. BLOCK DIAGRAM
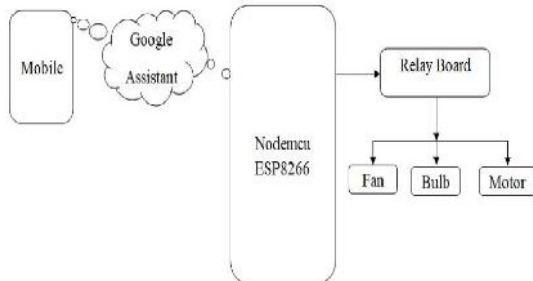
VII. IMPLEMENTATION SETUP

 The Implementation of Home Automation can be divided into two parts. Hardware and Software Implementations.

The output of the Home Automation Using Google Assistant shown below.[5]
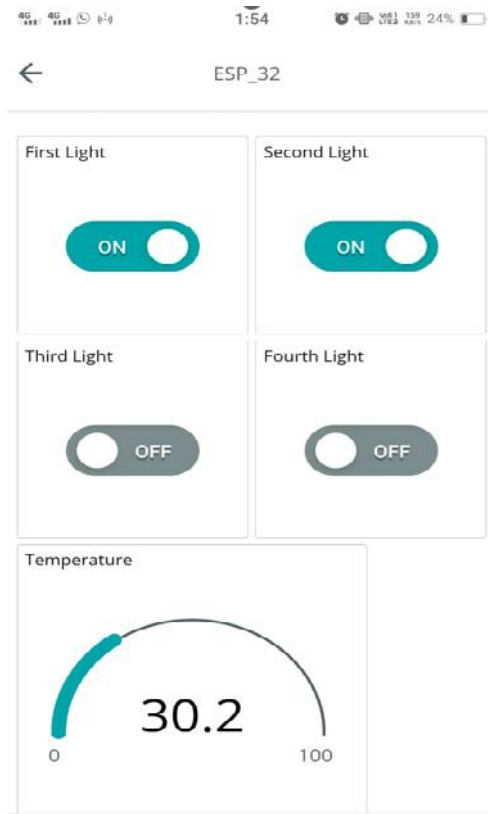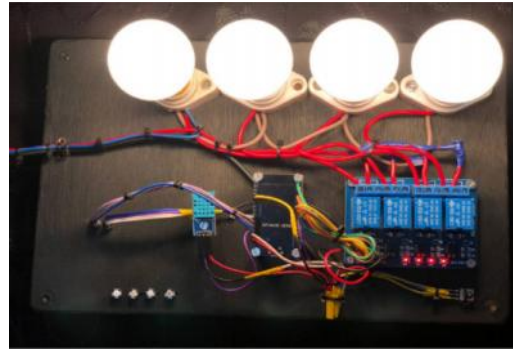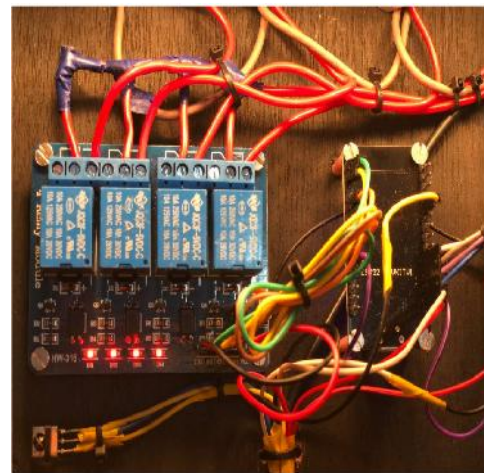

Fig 1

Figure 2

Figure 3

Figure 4

VIII. CONCLUSION

　In conclusion, the proposed IoT home automation system using Amazon Alexa 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.[7]

We believe that this system has the potential to improve the quality of life for homeowners and pave the way for futuredevelopments 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.

Figure 7.1: Test case

Tester:	Tejashree Jain
Test Case ID:	Automation
Related UC/FR/NFR	Light On/Off
Date:	04/07/2022
Purpose:	Testing The System To Automate Light On/off Via Button, Personal Mobile Voice Assistant, Mobile Remote
Pre-Req:	Light Connected To System, Esp32 Dev Kit V1 Connected To Network, 4-channel 5v Spdt Relay Module Connected To Esp32 Dev Kit V1 And Light, Push Buttons Connected To System, Mobile Ready To Operate
Test Data:	Mobile/buttons To Perform Functions For Light.
Steps:	Steps To Carry Out The Test. See The Step Formatting Rules Below.
	1. Press Buttons Or Command The Voice Assistant
	2. The Command Sends To Esp32 Dev Kit V1 And It Receives The Signal And Sends It To 4-channel 5v Spdt Relay.
	3. Relays Are Attached To Esp32 Dev Kit V1 And Perform The Function.
Status:	Pass

Test Case

IX. RESULTS AND EVALUATION

Throughout this paper it has been described how to obtain a smart home project which integrates the functionalities of several types of sensors, buzzers and motors. This system can be controlled from a mobile device with Internet access.

It exposes all the available commands in the cloud. Since it is an open-source project, any individual can integrate this system inside their house without having to pay for it.

Using this project, the user must configure only a single application for setting up the smart home environment, so they can access the Smart devices from any location.[9] Although some of the appliances used have separate configuration applications on the market, the usage is simplified with the solution presented in this paper.[10]

In addition, it offers the possibility of remote home control. The board application runs on a fast and light operating system designed especially for embedded products.

It starts in a few seconds so the user can immediately use its features by connecting the smart appliances and then controlling them. The configuration steps include Internet communication and obtaining the secure parameters for the

gadget's registration. Then, users can start exploring the smart home application features. This solution offers security as well by using Weave protocol for all exchanged data between the board and the web client application. Users must register and then authenticate before accessing the smart home product that is associated with their account. Such a product must be assigned to only one user and then it can be shared with others if this is desired by the main account.[6] The outcome of the proposed home solution has been analysed based on the interaction between the user and the end elements: sensors, buzzers, motors and smart appliances.

The chosen components behaved as expected during tests. Figure 2&3 is a proof-of-concept implementation of a miniature smart home system which can be integrated inside a real house.

With the help of this smart home project, the user has a single application for monitoring light, temperature or other presences inside the house.[9] In addition to this a user can control or monitor the devices from any location using the same controlling device that is mobile application.

X. LIMITATIONS

1. when electricity supply is off then we cannot operate the home appliances using google assistant.
2. for using Home Automation we need Wi-Ficonnection, it is not affordable for everyone
3. Smart home devices are usually linked to companion apps that can be used to control the devices. [8]
4. If hackers gain access to these apps, then it could have considerable security implications, as they will be able to control access to your home.
5. Although a lot of smart home devices are not affordable for many, but still, it is extremely expensive to fully equipment a home with smart devices.

XI. FUTURE WORK

- 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.[8] The system can be integrated closely with home security solutions to allow greater control and safety for homeowners.[9] The next step would be to extend this system to automate a large-scale 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

sensor that can be put outside the home to detect that someone will enter the home.[10]

- Changing the way of the automated notifications by using the GSM module to make this system more professional.

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