

Voice Control Home Automation using Firebase and Raspberry Pi

Pravin Pardhi

Assistant Professor,

Department of Electronics and Telecommunication Engineering

S. B. Jain Institute of Technology, Management & Research, Nagpur

Kishori Bhongade , Khushbu Parate , Komal Bagde , Meghana Kamble , Priya Gajbhiye

Department of Electronics and Telecommunication Engineering

S. B. Jain Institute of Technology, Management & Research, Nagpur

Abstract: Home automation is being new popular thanks to the increasing communication technology advancement. Home automation basically refers to the devices that facilitate automation. This smart technology concept is really redefining all vital means to create an intelligent smart home. New technologies are constantly emerging to form life reception easier, more fun and safer. This project present the planning of low cost voice recognitions based home automation during this project the smart home space is that the prime Focus to create easier life reception. The main a part of this project is integrating home controls with the phone through a app. Once you get Home automation app on the Phone everything would be click, touch and voice command away. The aim to dominant of home appliances remotely once user is way from place.

Keywords: Home Automation, Voice control, Relay, Raspberry Pi, Firebase, Alexa, MIT inverter, VNC viewer

1. Introduction:

Home automation has been always around for several decades in terms of lighting and straightforward appliances control and it's still evolving as new technologies are emerging. Automation in technology is one of the central and crucial element amongst the numerous manufacturing unit. Automation play's important role in global economy. For development of smart cities there's need to automate everything. Home automation system means to grant the highest user to manage and hold handle electric appliances. If we glance at the difference home automation system overtime, they have always provided efficient, convenient and safe ways for the house inhabitants to access their homes regardless of changes within the users hopes, growing technology or change of times the looks of a home automation system remained same. Home automation is about you not wanting to manually control you home. It happens automatically. Home automation is fetching you all the comforts at just single touch on mobile screen as time saved is money saved at the last word end. Access, operate and control all the lights, fans, ACs from mobile phones with a solitary touch from inside also as anywhere on earth with net connectivity. Home automation refers to the automated and electronic control of household features, activity, and appliances. In simple terms, it means you'll easily control the utilities and features of your home via the web to form life more convenient and secure, and even spend less on household bills. It gives user remotely access to regulate household devices from mobile devices, including tablet or smartphone. Home automation allows user to be more mindful of your power usage. For instance, user can save on energy bills by reducing the length of your time that lights stay.

Home automation is that the automated control of electronic devices in your home. These devices are connected to the cloud which always them to be controlled remotely. With home automation devices can trigger each other so there is no need to control them manually. This project gives you access to manage devices in your home. From a mobile anywhere within the earth. It's provides comfort, security, energy efficiency and also convenience within all times. People often forget to switch off the devices once they're leaving for the work. Those devices consume the electricity whole day so it's leads to the massive amount of electricity loss. This project provide the user remotely accessed from anywhere by a phone. Home automation makes life more convenient and will even prevent the electricity so it's energy efficient.

2. Literature Review:

A. Android based Secure and Smart Home Application using IoT [1]

This paper presented the proposed system consists of Relays, Raspberry pi, database, various types of sensor, GSM module and Android application. This paper proposes a system for access monitoring and control on digital door lock that uses Bluetooth and server-based technology. This paper presents a flexible user-friendly method to implement the same by integrating relays to raspberry pi for controlling home appliances from a remote location in a real scenario. This system used in multiple scenarios like parking lots, cars, etc, apart from one's home.

B. Home Automation Control Using Raspberry Pi and Smart Phone Through IOT [2]

In this paper raspberry pi is used for making home automation. The proposed system consists of a microcontroller based that has like along with LCD display and wi-fi connector interfaced with raspberry pi. This systems receives the command over web server and also it operates the load using switches when you are at home.

C. AI based Home Automation System using Raspberry Pi [3]

The full system is based on intelligent home automation to control the home appliances and electrical and electronic equipment by using smartphone it will turn on or off the home appliances using relay with concept of artificial intelligence and iot. Google circuit assistant is used for controlling smart home in noisy background home automation can be connected through web based server. It is an affordable system.

D. Voice-Assistant based Home Automation System using Raspberry Pi [4]

They have presented a new system to overcome the limitation of the existing home automation system. Python is used as a main programming language that supports raspberry pi. Voice command are given through MIT app, voice app that is developed which connects through Wi-Fi and send the data through raspberry pi. The microcontroller undergoes the word matching: if the words match the raspberry pi performs the activity else the raspberry pi doesn't work. The system is easy to use as it is wireless easy to implement and saves power.

E. Voice and Gesture Based Smart Home Automation using Raspberry Pi [5]

This paper proposes the design of Voice and Gesture Based Smart Home Automation using Raspberry PI. Programming is done using python programming and embedded C. This Android Application can be used to operate the home appliance anywhere from this world. This android application is connected to Firebase server. Firebase server is used to collect data transmitted by raspberry PI and android devices. In gesture mode camera will capture gesture in image format. This image is compared with picture data if a match is found then raspberry pi will send input to NodeMCU. Then it will check whether the input is high or low. It is reliable and scalable home automation system with low cost and easy to implement.

F. Home Automation using Arduino and Smart Phone [6]

This proposed a home automation system uses the voice recognition module for the voice recognition function, a microcontroller and relay module are used for the controlling functions like switching lights on and off etc. Google assistant is used to send these commands to the controller to control the various electrical devices. Wifi based devices have better bandwidth and also we can connect many peripherals. The Arduino receives the command from the voice recognition module and to control electrical devices. The commands format which are feeded while creating IFTTT applets should be pronounced correctly to get the output. The

resulting system can afford a great assistance to the physically handicapped people without any need of third person. It includes safety, convenience and control.

3. Proposed System:

In this system we are using IoT technology for the communication between the devices and Raspberry Pi. IOT stands for Internet of things. Means over internet devices are communicated and share information about the environment. Using IOT you'll not only control but monitor device status globally and consistent with your requirement you'll activate or off particular device remotely. A person can activate or deactivate home appliances using the web. Raspberry pi is employed to regulate four relays. This project is employed in controlling home appliances via Wi-Fi technology connected home appliances to the output Raspberry pi within the circuit receives IOT command sent by the user using Android interface then gives command to the output devices using relay interface. The simplest thanks to design an Android application is using MIT app inventor. We design an Android application which will send data to Google firebase. Firebase is that the real time database that's stored within the cloud and provides an API to stored and sync the info in real time. When User send command voice command or click ON or OFF button from Android application. Android application and Raspberry pi are connected to same firebase server. App sends the info to firebase then firebase sends data to Raspberry pi. Then it'll retrieve data from firebase server and can give 1 or 0 output to relay switch. Thus, the device are going to be turned ON or OFF. Python programming is employed for home automation. Raspberry pi computer that perform many of a task performed by the pc. The relay driver module is interfaced with Raspberry pi to regulate devices.

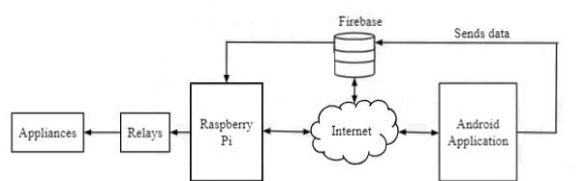


Fig-1:Block Diagram Of Proposed System

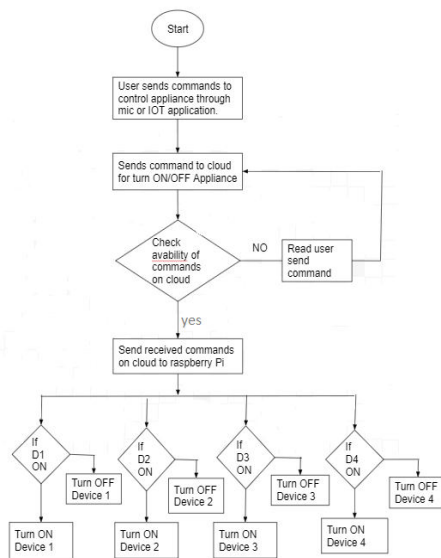


Fig-2: Flow Chart

3.1 Hardware :

Raspberry Pi 3B+ is used as the hardware component providing smart features . Raspberry Pi acts like a computer which reduces human interaction by supporting this system using IoT. The Raspberry Pi 3B+ is device with inbuilt Bluetooth and Wi-Fi supporting which is quite useful in home automation considering that these are some of the most commonly used and popular wireless communication technologies . Also automation with raspberry pi provides endless possibilities for the improvement in future.In this project we are using raspberry pi 3 model which acts because the brain for this system processing the user request , responding to the request . It helps in monitoring and controlling household object intelligently for effective usages. Raspberry Pi could also be a credit card-sized Computer originally designed for education, Inspired by the 1981 BBC micro. Raspberry Pi 3 issued which is installed within the house and each one the appliances are attached with it through the relay. Relay is connected to the electronic devices which does the main function of switching of/on .Raspberry pi runs a Python program to talk with each other and control the devices.

3.2 Software :

Raspbian is a Debian-based engineered especially for the Raspberry Pi and it is the perfect general-purpose OS for Raspberry users.[7] The easiest way to design an Android application is using MIT app[8] we design an Android application that can send data to Google firebase. Firebase is the real time database that is stored

in the cloud and provides an API to stored and sync the data in real time. Create account on firebase and create project.[9] When User send command voice command or click ON or OFF button from Android application .Android application and Raspberry pi are connected to same firebase server. App sends the data to firebase then firebase sends data to Raspberry pi. Then it will retrieve data from firebase server.

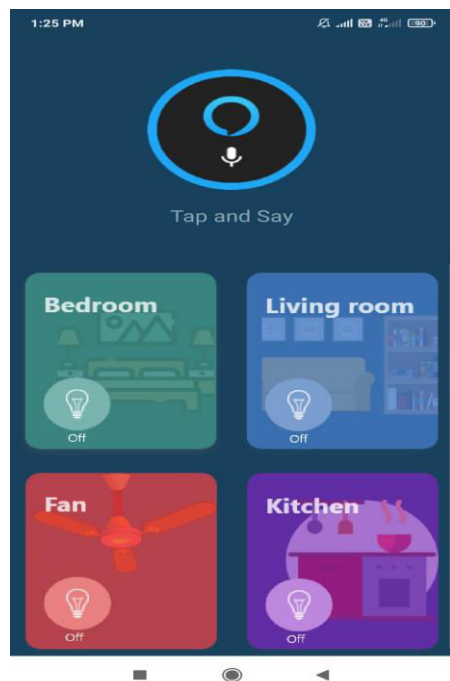


Fig-3: The Main Page of the App

4. Conclusion:

The purpose of this paper is to form homes simpler, better, or more accessible. With the assistance of this project , managing home appliances better in order that users can enjoy higher comfort. It also allows the automated and timed operation of devices consistent with users' preference. With that, this technology also reduces the general living space's energy consumption by providing essential data about the consumption pattern, which helps the users make better decisions to scale back costs. While people with disabilities can use this technique to supply comfort and safety. It's make living easier and promises better outcomes. Using this technique users can control household devices from one app. If you came out from your home without turning-off your home appliances then you'll still control them due to remote access features.

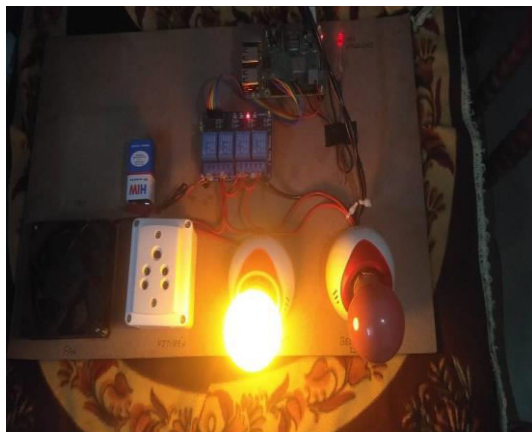


Fig 4: Proposed System

References:

- [1] Sandhya Patil, Muhammad Tabish, Riya John, Sanket Said, Ranjita Gaonkar, “Android based Secure and Smart Home Application using IoT”, International Research Journal of Engineering and Technology (IRJET) Volume: 07 Issue: 03, Mar 2020
- [2] Radhika S, Nisha P, “Home Automation Control Using Raspberry Pi and Smart Phone Through Iot”, International Research Journal of Engineering and Technology (IRJET) Volume: 07 Issue: 04, Apr 2020
- [3] Ms Anjali Patil, Mr Torvi H.B, “AI based Home Automation System using Raspberry Pi” , International Research Journal of Engineering and Technology (IRJET) Volume: 07 Issue: 09, Sep 2020
- [4] M. Pavithra, Shaik Fahad, Mopireddygari Mahesh Kumar Reddy, Devarasetty Venkata SREE Charan, Prof. Roshan Zameer Ahmed, “Voice-Assistant based Home Automation System using Raspberry Pi”, International Research Journal of Engineering and Technology (IRJET) Volume: 07 Issue: 05, May 2020
- [5] Rajendra Patil, Aakash Yadav, Sujeet Prajapati, Sagir Khan, Prof. Khalil Pinjari, “Voice and Gesture Based Smart Home Automation using Raspberry PI”, Journal of Emerging Technologies and Innovative Research (JETIR) May 2019, Volume 6, Issue 5
- [6] Mr. T. M.Senthil Ganesan, M. Rama Jothi, R. S. Sangavi, L. Umayal, “Home Automation using Arduino and Smart Phone”, International Journal of Engineering Research & Technology (IJERT) 2019
- [7] <https://www.raspberrypi.org/downloads/>
- [8] <https://appinventor.mit.edu>
- [9] <https://console.firebase.google.com/>