Voice Controlled Home Automation for People With Disabilities

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Abstract

"Voice Controlled Home Automation for People with Disabilities" is designed to assist the people with physical disabilities, bedridden or elderly to control the electrical home appliances using android application. Mostly the bedridden and elderly people find it difficult to operate the home appliances. This system uses voice commands as well as the switches to operate the electrical appliances in home. An android application is used to get the voice commands from user. A Wi-Fi enabled WEMOS D1 Mini board is used and the home appliances are connected to this board using relays. The cloud service is used to link the android application and the WEMOS board. Hence the entire system is very cheap, it can be used by every people to reduce their effort and time.
Keyword- WEMOS, Voice Commands, Android Application, Cloud Service, Relay

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I. INTRODUCTION

Home automation focuses on making it possible for older adults and people with disabilities to remain at home, safe and comfortable. Home automation is becoming a viable option for older adults and people with disabilities who would prefer to stay in the comfort of their homes. Most of the people choose an easy way to reduce the time and effort. Automating the home is the easiest method to reduce the time and effort of the peoples. This system uses voice commands to operate the electrical home appliances. An android application is used to capture the voice commands using googles voice assistant. A Wi-Fi enabled WEMOS D1 Mini board is used to connect the home appliances via relay. Googles firebase is used as the cloud service that connect between android application and the WEMOS board.

It helps those people who are sick, bedridden, physically disabled or elderly to easily operate the home appliances. It will be an easiest method for them to turn on/off the home appliances from where they are. Mostly the people find it difficult and lazy to walk near the switch, when they are busy, to turn on light, fan or any other home appliances. With voice commands it is easy for the users, even the blinds, to operate the home appliances from the android phone. It is an easy, cheap and efficient method which will attract the customer's attention. This product can be made available in the market and the installation is very simple, even the customers can install it by themselves.

In this paper we discus about the voice-controlled home automation which use the concept of IOT. Remote access to home appliances are made possible with the help of IOT. In this modern world all the people are having internet enabled mobile phone and home. A very small Wi-Fi enabled WEMOS board is connected with the home appliances by using relay. Firebase which is mobile and web application development platform which provides a link between the android application and the WEMOS. The users of this product can remotely access their home appliances from anywhere in the world. While travelling if the people forget to turn off any of the home appliances it's possible that they can turn them off remotely. It provides a complete remote access to the home appliances.

II. LITERATURE SURVEY

Voice Controlled Robot (VCR) is a mobile robot whose motions can be controlled by the user by giving specific voice commands [1]. The development of appliances based on voice command using android. The system has been designed to assist and provide the support to elderly disabled people at home [2]. Home automation system which would use a smartphone to enable any user to operate all the appliances [3]. The implementation of home automation and security system using Arduino microprocessor and android smartphone [4]. The system is created to control two of the most human interactive activities, switching on and off of lights and fans using microcontroller and android speech recognition application [5]. The system is divided in to three main parts namely voice train process, voice recognition process and integration of hardware with MATLAB. The system used speaker dependent method [6]. The system is about home automation system which would use a smartphone with running the android application. Android application decodes the user's voice command and extracts the exact meaning of his command [7]. It mainly
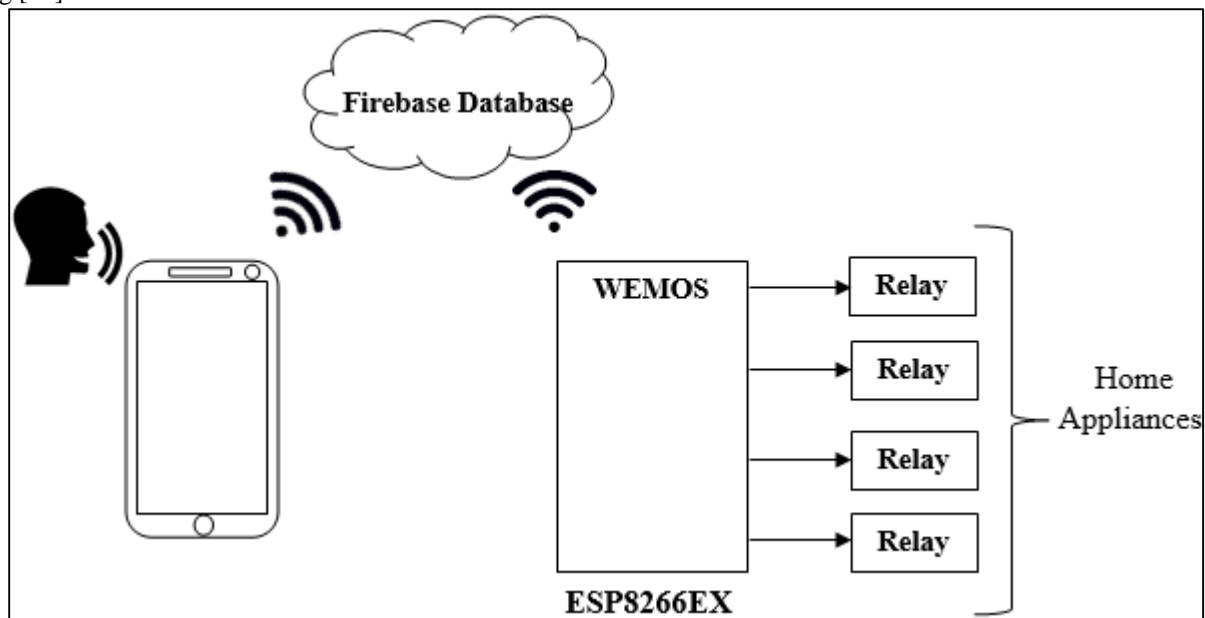
used Wi-Fi as a medium for communication between software and hardware component. The main drawback was the range, as the range of Wi-Fi was limited hence the user has to be within the range. An android-based home automation was then developed [8].

All the existing systems are either using Bluetooth or local Wi-Fi network to give commands to the controller. The proposed system is using voice commands so that even a blind can use this service and it can be controlled from anywhere in the world. This is the emerging technology which is future of home automation. It is very cost efficient and simple to install as compare to other existing methods.

III. PROPOSED SYSTEM

In this system we have proposed an easy way of controlling the home appliances by using the voice commands. Even the blinds can make use of this to control the home appliances. An android app is used to receive the voice commands. This voice commands are then converted into text using speech to text converter. While designing the app particular commands will be assigned with some values. Firebase is used as the Real-time Database to link the android app with the WEMOS D1 Mini Wi-Fi module. The app is the user end in which the voice commands are given. The assigned values in the app are stored in the Firebase database. While designing the android app Firebase block is used and the project URL and server key from the Firebase project is added. The app is designed using MIT App Inventor. MIT App Inventor is an intuitive, visual programming environment that allows everyone, even children, to build fully functional apps for smartphones and tablets. Blocks based tool facilitates the creation of complex, high impact apps in significantly less time than traditional programming environments [9].

Firebase is used as the Real-time Database in which the values from the android app is stored. A project is created in the Firebase. A project URL, server key and a secret key is generated while creating the project. The project URL and the server key are given in the app so that the values from it can be stored in the Database. The project URL and the secret key is added in to the WEMOS program to access the Firebase project. Firebase is a mobile and web application development platform developed by Firebase Inc. in 2011 and then acquired by Google in 2014. IT gives functionality like analytics, databases, messaging, and crash reporting [10].

The home appliances are connected to the WEMOS Wi-Fi module using relay. ESP8266EX is the microcontroller used in the WEMOS D1 Mini board. It enables Wi-Fi connectivity to WEMOS. The Arduino IDE is used to upload program to the WEMOS. The program contains three sessions. First one is to connect the Wi-Fi to the WEMOS, second is to authenticate the Firebase project and third is the main control for the hardware. The data stored in the Firebase from the app is read by the program uploaded to the WEMOS. Firebase library functions are used in the program to read the data from the Database. Home appliances will be connected to the WEMOS using relay. When the voice commands are received through the app, the assigned value will be changed in the Firebase Database. When the values are changed in the Database, the program reads the value and check for the condition to be true. If the condition is true, then the relay connected to the particular pin will be turned on/off. This controls the home appliances connected to the relay. The relay act as a switch, which makes switching process automatic. A DC 5V relay coil is used here to control 230V AC power supply. Total of eight relays can be connected to a single WEMOS. That means eight appliances can be controlled using a single WEMOS. WEMOS D1 Mini is a WI-FI module with 16 pins. There are eight digital I/O pins available in it. This I/O pins will be connected with the relay. This makes it possible to control the home appliances using voice commands.

IV. CONCLUSION

Voice Controlled Home Automation for People with Disabilities helps disabled people even the blind to control the home appliances. It is the future of home automation. This method is more efficient and cheaper than other existing methods. The user can control the home through the android app from anywhere. This can be made available in the market by making it more compact. This product will be helpful for those people who are physically disabled or those who are bed ridden to control the home appliances without the help of others. WEMOS and the Firebase Database makes it extremely cheaper product. Thus, a totally new efficient system have been introduced here which could cover the whole market in coming future.

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