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IR based Voice Automated Appliance Control

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Abstract: ***As technology is advancing, houses are also getting smarter. Presently, many devices like TV, set-top box, air conditioner, home theater etc. have an IR based remote and makes it difficult to maintain various remotes. As the number of electrical devices are increasing day by day there is a great inconvenience to control every device with its own remote having unique frequency. The proposed smart device can control all remote based devices through voice commands. Introducing a smart Infrared device which has an embedded IR transmitter that can control all home appliances. It is a smart device a smart home must have.***

Keywords: IoT, IR smart devices, NEC values, Amazon Voice Services (AVS), Voice Assistant.

I. INTRODUCTION

A. Background

Remote control for home appliances is a necessity in our fast-moving life. As technologies are growing rapidly, humans comfort have been developed drastically during the last few decades and as a consequence of it we most of the time either forget or neglect some of the basic things which can cause serious problems after a long period of time. Switching "ON" the electrical appliances as per the usage and also switching it "OFF" when not in use is an ideal behavior for a better future. So, this situation can be managed by making some device which is mobile and does not need any locomotion of the whole body for switching ON/OFF the home appliances. Also the maintenance of different remote for different devices is quite hectic to manage. There comes a need for all devices to be controlled by one device without any physical intervention.

B. Proposed Device

The proposed device will control infrared based devices through voice commands. This is the smart IR device which can control all devices like Television, setup box, AC, DVD, Home theater etc. This device is compatible with Amazon Alexa, Google mini and similar such devices so you can control this through voice. The skills of these devices can allow document to be created faster because the software generally produces words as fast as they are spoken, it is generally much faster than a person can type.

The objective of this proposed device is:

1) Controlling the devices by human voice is becoming more of a necessity due to the advancement of technology.
2) A generation in which people are completely relying on technology, anything which improves their comfort will be of a great value.
3) Though we have remotes for almost all devices seeking them during requirement is a hassle at least for elderly people, which calls for a single device that can assist them in various regard.

II. LITERATURE SURVEY

Home Automation implies controlling of home appliances and features automatically. Speech based home automation utilizes human voice orders to operate the electrical appliances in the home as in [1]. The implementation of a smart infrared (IR) remote control enables the user to operate the home appliances from about 10 meters away. This Smart remote control can incorporate all infrared remote controls in the room or office into ones smart phone as in [2]. Recent advances in speech recognition technology have made voice-controlled smart homes attainable, and many companies and communities are providing interfaces or home boxes to make this voice control available as in [3]. IR-Based Home Appliances Control System is a control system using which the user can control different home appliances with a remote controller. The remote controller can be used to switch on/off different home appliances like a light bulb, fan, television, etc. which are connected to the circuit as in [4]. The system will voice control the home appliances and also provide security against intrusion when the home owner is not in home It is used to save the electric power and human energy as in [5].

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III. SYSTEM DESCRIPTION

A. Hardware Module

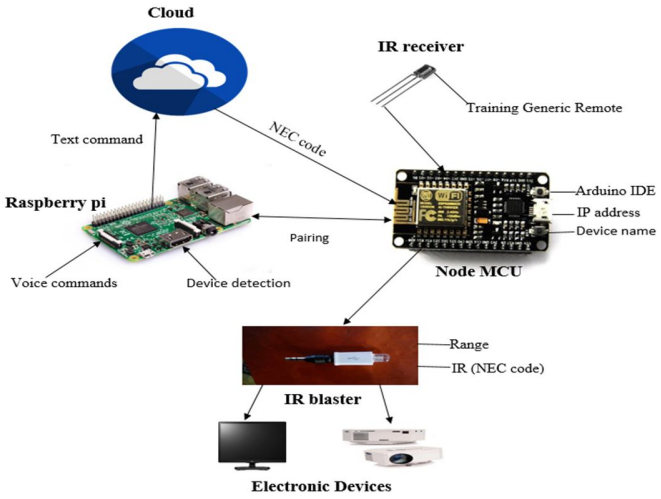


Fig. 1 System Architecture

Raspberry Pi and Node MCU has its own IP address and for pairing they must be present in same network. Initially, device detection will scan for the devices in the network and will get paired with Node MCU when it has been detected in that network. The proposed device gets activated through a wake word. Once it is activated, users voice command is taken as a input. Raspberry pi will detect this command and converts it to text using speech to text module which will thereby be sent to cloud. The NEC values corresponding to these keywords are fetched from the cloud. The following table shows the list of NEC values for some of the IR remote buttons. These NEC values are then sent to the Node MCU wherein the code is acknowledged and signal is sent to IR blaster. The IR blaster will blast this code to the respective devices within the range. The electronic device will acknowledge this code and act accordingly.

Table I
NEC Values of A Remote

Key Function	NEC Hex Code
Power	807F02FD
Volume Up	807FAF50
Volume Down	807F2FD0
Channel Up	807F6897
Channel Down	807F58A7
Mute	807F827D

B. Software Module

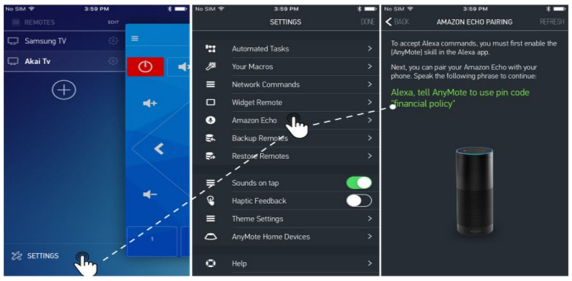


Fig. 2 Alexa Android Application

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The Alexa Voice Service enables you to access cloud-based Alexa capabilities with the support of AVS APIs, hardware kits, software tools, and documentation. It simplifies building voice-forward devices with Alexa built-in by handling complex speech recognition and natural language processing in the cloud, reducing your development costs and accelerating your time to market. Best of all, regular Alexa updates bring new features to your device and add support for a growing assortment of compatible smart home device.

IV. EXPECTED OUTCOME

A. Multiple physical remotes are replaced by a single voice automated remote control.
B. Electronic devices can be functioned through voice commands.
C. Highly reliable device supporting wide range of brands.
D. A device with features of virtual assistant.

V. CONCLUSION AND FUTURE ENHANCEMENT

The proposed system is a well-engineered device that has a set of capabilities. This system has main feature for smart speech detection, which would decode user's sentences into appropriate commands. It is user friendly and helps in a better home automation. It does not require a lot of technical expertise to begin enjoying its functionality. Since we use IR remotes to control the electronic appliances, the existing remote can be replaced with this smart device. As long as the human comforts are not met there is a great room for improvement in this device. This device can be enhanced further by adding specific features to the proposed system. Some future enhancement can be as follows:

A. Range of any IR device is always a concern and there is a huge scope in improving the range of this device.
B. The device can be trained to learn the NEC values from the custom built remotes.

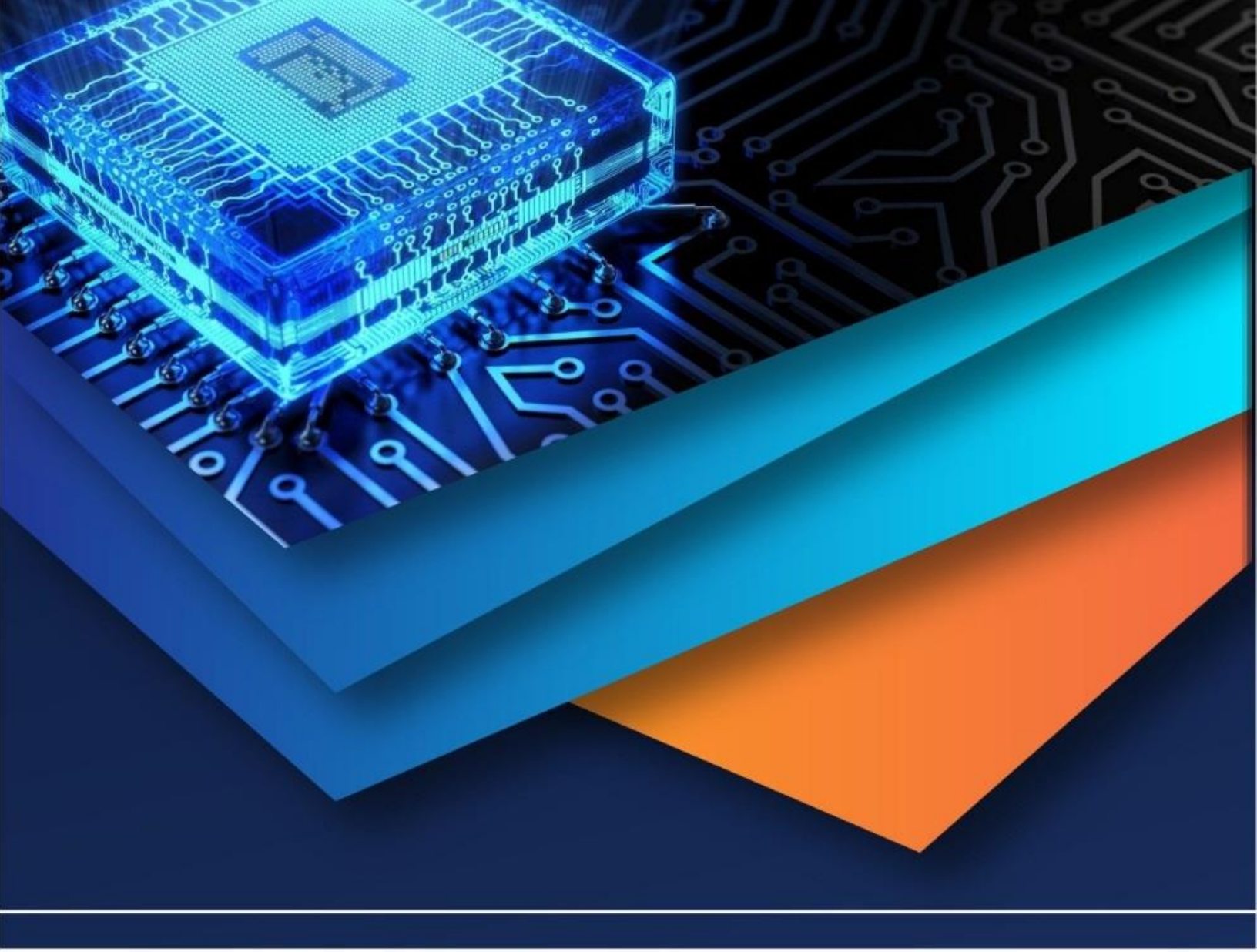
VI. ACKNOWLEDGMENT

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