VOICE BASED SMART HOME AUTOMATION USING INTERNET OF THINGS (IoT)

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ABSTRACT:

Home automation is becoming popular day by day due to numerous advantages. Until now, the current development shows that the home automation system is managed by Emails, texts or some other applications. However, in recent years, the field of Internet of Things (IoT) has seen significant investments made by the research community and the industry. Specifically, the Smart Home space has been a prime focus with the introduction of devices such as Amazon Echo, Google Home, and Samsung Smart Things among others. The growth of an industry results in innovative, economic, and advanced solutions. In this paper, we focus on making non-smart homes smart and how to build a robust, cost-effective system that can be widely used. We power our system using Amazon Echo, Amazon's cloud services, its speech services. Arduino and ESP8266 are used as the hardware component for providing smart features for non-smart homes. The voice command function will be given to control any appliances or devices at home. This will provide a better communication in automated home as compared to normal homes.

Keywords: *Alexa, Arduino, Nodemcu, Relay module, Amazon Echo Dot, LCD.*

EXISTING SYSTEM:

In Bluetooth based home automation system the home appliances are connected to the Arduino BT board at input output ports using relay. The program of Arduino BT board is based on high-level interactive C language of microcontrollers; the connection is made via Bluetooth. The password protection is provided so only authorized user is allowed to access the appliances. The Bluetooth connection is established between Arduino BT board and phone for wireless communication. In this system, the python script is used and it can install on any of the Symbian OS environment, it is portable. One circuit is designed and implemented for receiving the feedback from the phone, which indicate the status of the device.

PROPOSED SYSTEM:

The proposed system is Voice Based Smart Home Automation using NodeMcu and AMAZON Alexa. Alexa is a device that connects to the voice-controlled intelligent personal assistant service Alexa, which responds to the name "Alexa". It can also control several smart devices using itself as a home automation hub. We use the Amazon echo to develop a skill (app) that will communicate with our NodeMcu micro-controller to control our devices. Whenever we want to turn on or turn off our appliances, we ask the Amazon Echo to turn the appliance ON or OFF.

TECHNICAL FEASIBILITY:

This study is to carried out to check the technical feasibility, that is, the technical requirements of the system This project involves Alexa, which takes human voice commands as input, NodeMcu that is connected to Atmega8 for processing this Input and gives the output to Relay, LCD. LCD is the one that displays the status of devices and Relay is the one, which performs the operation given and controlled.

ECONOMIC FEASIBILITY:

This study is to carried out to check the economic impact that the system will have on the organization. This project needs few devices to connect to the system, which is the only cost, which the user is supposed to afford. Thus, the user can achieve the developed system within the budget.

PHYSICAL FEASIBILITY:

The user carries out this study to check the level of acceptance of the system. This includes the process of training the user with all the commands to use the system efficiently. The user must not feel nervous by the system, instead must use it as a chance to control the appliances. The level of acceptance by the users solely depends on the methods that are employed to educate the user about the system andto make him familiar with it.

LITERATURE SURVEY

Home automation is implemented in many ways but using voice module is the latest Technology

- Bluetooth based home automation system using cell phones
- ZigBee based home automation system using cell phones
- GSM based home automation system using cell phones

- Wi-Fi based home automation system using cell phones
- Home automation using RF module
- Cloud based home automation system
- Raspberry pie home automation with wireless sensors using smart phone
- Wireless home automation system using IoT

Voice Controlled Smart Home Automation Using Amazon Echo Dot

Amazon Echo is a voice enabled wireless

speaker developed by amazon. The device connects to the voice-controlled intelligent personal assistant service Alexa, which responds to the name "Alexa". The device is capable of voice interaction, music playback, making to-do lists, setting alarms, streaming podcasts, playing audiobooks, and providing weather, traffic and other real-time information. It can also control several smart devices using itself as a home automation hub. Home automation is a very expensive luxury that a lot of people in India and other countries cannot afford. The objective of my project is to provide a cheap and Inexpensive way to control non-smart devices using the power of voice. Amazon Echo is a smart speaker that has been developed by the Amazon Company that can be used to play music, listen to the news and control many smart devices. We use the Amazon echo to develop a skill (app) that will communicate with our Arduino micro- controller to control our devices.

Whenever we want to turn on or turn off our appliances, we ask the Amazon Echo to turn the appliance ON or OFF.

FLOW DIAGRAM:
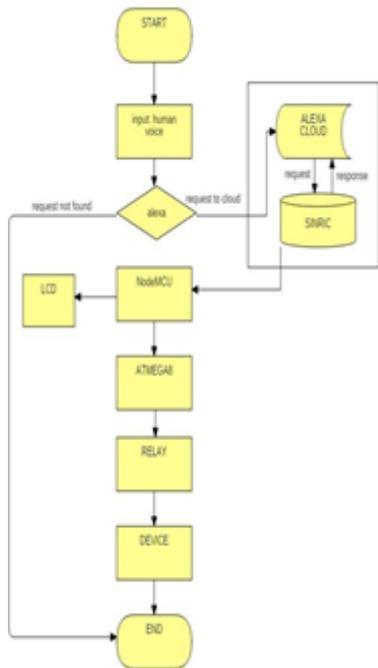
WORKING PRINCIPLE:

Voice Command from the user is given to Alexa, like Turn on Fan1, Turn off Bulb 2 etc., Then Alexa searches for the command in its available cloud (The cloud available here is Sinric).

If the command is found in the cloud then it sends that command to NodeMcu. Important thing to be noticed here is that the operation is carried only if there is an updated operation on device but not the same as previous. NodeMcu is associated with the code written in Embedded C that display the status of the

devices based upon the command on LCD and also sends the same request to Atmega8 which processes the request and sends to Relay.

Relay responds to the request made and perform appropriate operation on the devices. The device then turns on or off based on the request. Block diagram is as follows
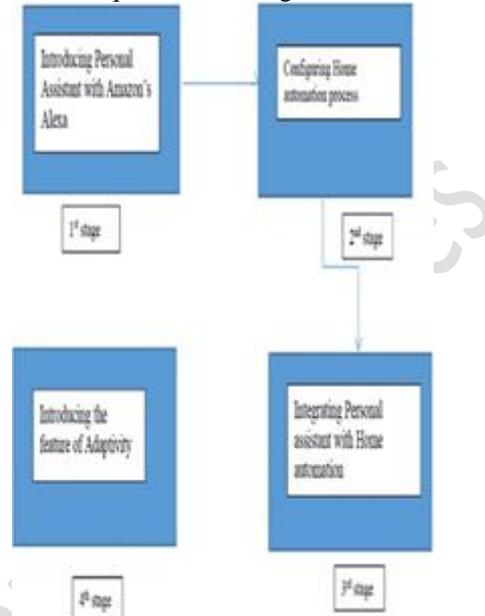
SYSTEM OVERVIEW

Our system as shown below UsesESP8266 NodeMCU, Amazon Echo Dot and Alexa Voice Service. In this section, we will explain briefly about each component's role to make the system function.

SAMPLE CODE

```
void turnOn(String deviceId)
{
if (deviceId == "5c6e2945f7552455de554cea")
{
Serial.begin(9600);
delay(100);
Serial.print("@@A");
delay(10);
Serial.begin(115200);
delay(10);
lcd.setCursor(0,0);
lcd.print("Fan 1 ON ");
}
else if (deviceId ==5c6e2955f7552455de554cf0")
{
Serial.begin(9600);
delay(100);
Serial.print("@@B");
delay(10);
Serial.begin(115200);
delay(10);
lcd.setCursor(10,0);
lcd.print("Bulb 1 ON ");
}
}
```

COMMANDS USED FOR AMAZON ECHO

We have used SINRIC for communicating with Alexa cloud. In the Sinric we have registered, the devices that are need to be controlled and then below commands are used for writing the code in NodeMCU that help to control the devices.

- Alexa turn ON fan1
- Alexa turn OFF fan1
- Alexa turn ON bulb1
- Alexa turn OFF bulb1
- Alexa turn ON socket1
- Alexa turn OFF socket1
- Alexa turn ON socket2
- Alexa turn OFF socket2
- Alexa turn ON bulb2
- Alexa turn OFF bulb2
- Alexa turn ON fan2
- Alexa turn OFF fan2
- Alexa turn on all ON
- Alexa turn on all OFF

CONCLUSION AND FUTURE SCOPE

We have successfully done this project and controlled the home appliances by using Amazon Echo. We have controlled six devices. Echo catches the voice very fast and responds to the commands very quickly. We have used SINRIC for the communication with Echo. One very important problem that we tried to address in this paper is that of non-smart. We made use of one of the smart devices available today in the market, Amazon Echo and coupled it with the Arduino NodeMCU. The module we used for performing home automation tasks worked well. Further, on testing the application on Amazon Echo in real- time, we obtained promising results. We believe that this step towards a cost-effective smart home. We aim to build similar applications in the future for Google Home and other personal assistants that can revolve around using simple voice commands to provide a cost-effective solution for non-smart homes.

OUTPUT

Below figure shows the output of the command "Alexa turn on all ON"

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