

# Automation Using Alexa and Raspberry Pi

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**Abstract:-** Internet of things (IOT) means learning and interacting with millions of things. This project explain how fast internet of things can connect with different things in different platform. The path of advancement has evolved through keyboard, mouse, touch to voice. Automation in technology is one of the central and crucial elements amongst the various manufacturing unit. In the centuries since, as technology has an advanced and new invention are made from automation device to voice command device. As the innovation is done we need storage as a backup for data collected while execution of the command. Amazon web services provides a facility to build your own way of computing the execution. Alexa voice services is the section of development which brought change in way of life. Combination of AVS and automation create a new instance of technology.

**Key Words:** Raspberry pi, Arduino, Alexa voice services, amazon web services, IOT

## 1. INTRODUCTION

The process of dominant or in operation varied instrumentation, machinery, industrial processes and alternative application victimization varied system and conjointly with less or no human intervention is termed as automation. There square measure varied forms of automation supported the applying they will be categorized as home automation may be a section of business acting on long length of your time. Home automation, industries automation, autonomous automation and building automation square measure the present system planned long. The applying of the services of this automation is that the work on the command given through system.

M2M (Machine to Machine) make a case for the technology that permits the devices to share information while not manual help of a person's. M2M refers to isolated instances of device-to-device communication, and IOT refers to a grander scale, synergizing vertical code stacks to modify and manage communications between multiple devices. There's lack of storage application on the services.

We square measure victimization Alexa voice services through that all the element and object of the services may be controlled via voice.

Cloud computing is that the on-demand delivery of computing power, information storage, applications, and alternative IT resources through a cloud services platform

via the net with pay-as-you-go valuation. Cloud computing provides an easy thanks to access servers, storage, databases and a broad set of application services over the net. The AWS Cloud provides a broad set of infrastructure services, like computing power, storage choices, networking, and databases that square measure delivered as a utility: on-demand, offered in seconds, with pay-as-you-go valuation.

Whereas AWS provides a reduced price of execution and hosting at high quantifiability and redundancy. Thence AWS is alleged to be the foremost cost-effective for the hosting and dominant the hosted information over numerous devices.

Conversational AI systems square measure computers that folks will move with just by having a language, our most natural sort of interaction. With colloquial AI, voice-enabled devices like Amazon Echo square measure finally getting down to alter the type of supernatural interactions we've unreal of for many years (think: Jarvis computer). Through a voice computer program (VUI), voice services like Alexa will communicate with folks in ways in which feel easy, solve issues, and obtain smarter over time.

### 1.1 Literature Survey

#### 1.1.1 AWS Lambda

AWS Lambda may be a serverless cipher service that runs your code in response to events and mechanically manages the underlying cipher resources. AWS has restricted storage capability. Memory allocation vary Minimum = 128 MB / most = 3008 MB (with sixty four MB increments). If the utmost memory use is exceeded, perform invocation are going to be terminated. It's beneath free tier and pay per specific usage.

#### 1.1.2 Alexa Voice Services

Alexa is Amazon's cloud-based voice service offered on tens of ample devices from Amazon and third-party device makers. With Alexa, you'll be able to build natural voice experiences that supply customers a additional intuitive thanks to move with the technology they use daily.

Our assortment of tools, APIs, reference solutions, and documentation build it simple for anyone to create with Alexa. It's freed from value. Its have constitutional voice services on sever thus want for external unit.

### 1.1.3 Raspberry Pi

Raspberry Pi may be a Mastercard size board with the potential to perform varied operation. It provides the atmosphere to make own virtual pc services. Its facilitate to explore and learn a programming language like scratch and python.

## 2. PROPOSED MODELLING

Automation module used is simple to implement and might be simply changed as per needed. Automation exploitation voice services are often enforced in any sector of business and residential automation.

This can be system is supplied with Alexa voice services and every one the sensors area unit connected to the raspberry pi. All the information from mechanism or sensors are sent to the server using a raspberry pi. The computation unit performs the operation on the info server. The output knowledge is analyzed on the premise of given voice knowledge command.

Alexa here work as the auditor of command and convert the command in JSON code to urge the specified output. If Alexa is asked to perform automation then appliance connected to the raspberry pi is controlled using GPIO.

By this principle, it implements voice command within the automation to cut back the manually controlled automation that reduces the time and manpower.

The idea behind the project was to make associate surroundings to implement voice command operation with automation.

### 2.1.1 Alexa Skill Kit

The Alexa Skills Kit is a software system development kit (SDK) that allows a developer to create skills, conjointly known as colloquial applications, on the Amazon Alexa artificial intelligence assistant.

The Alexa Skills Kit is comprised of tools, programme interfaces (APIs), code samples and documentation that allows a developer to add skills to the 10,000-plus voice recognition capabilities available on Alexa.

### 2.1.2 AWS Lambda

Amazon Alexa depends on the Amazon Web Services (AWS) public cloud. A developer can upload Alexa ability code to AWS Lambda functions to execute code that is triggered by voice interactions.

AWS mechanically manages the cipher resources for Lambda. A developer will certify, publish and update skills, that are created out there through the Alexa Skills Store.

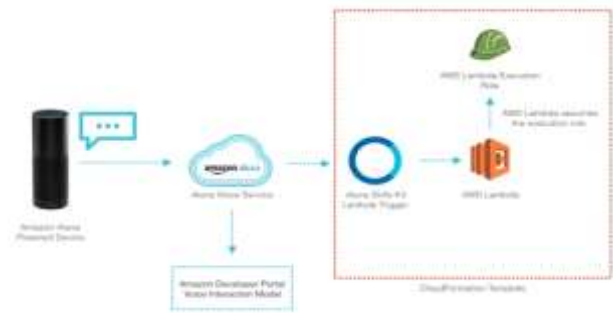


Fig -1: ALEXA SKILL DEVELOPMENT

### 2.1.3 Raspberry pi

The Raspberry Pi encompasses a Broadcom BCM2835 system on a chip (SoC), which incorporates an ARM1176JZF-S 700 megacycle per second processor, Video Core IV GPU and was originally shipped with 256 megabytes of RAM, later upgraded (Model B & Model B+) to 512 MB. It doesn't embrace a inbuilt disc or solid-state drive, however it uses an SD card for booting and persistent storage, with the Model B+ employing a MicroSD. The muse provides Debian and Arch Linux ARM distributions for transfer. Tools square measure on the market for Python because the main artificial language, with support for BBC BASIC (via the reduced instruction set computing OS image or the hard liquor Basic clone for Linux), C, Java, and Perl.

### 2.1.4 Sensor and Actuator

A sensor could be a device that receives and responds to a sign. This signal should be made by some style of energy, like heat, light, motion, or reaction. Once a detector detects one or additional of those signals (an input), it converts it into an analog or digital illustration of the input. Based on this explanation of a sensor, it must see that sensors live} utilized in all aspects of life to observe and/or measure many alternative conditions. An actuator is something that actuates or moves something. Additional specifically, Associate in nursing mechanism could be a device that converts energy into motion or energy. Therefore, an mechanism could be a specific kind of electrical device.

## 3. Result and Discussion

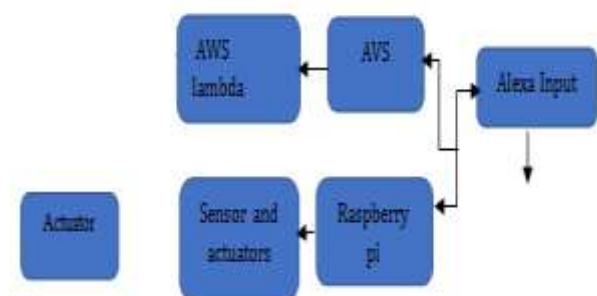


Fig -2: BLOCK DIAGRAM

Alexa work as input mode where the command is given by actuators and voice commands. These commands are executed in the raspberry pi using the python script. Commands are converted into JSON program to execute output stored in AWS lambda Service. AWS provides the service to execute serverless compute facilities. Required output operation is performed using the output appliance or voice output from the Alexa.

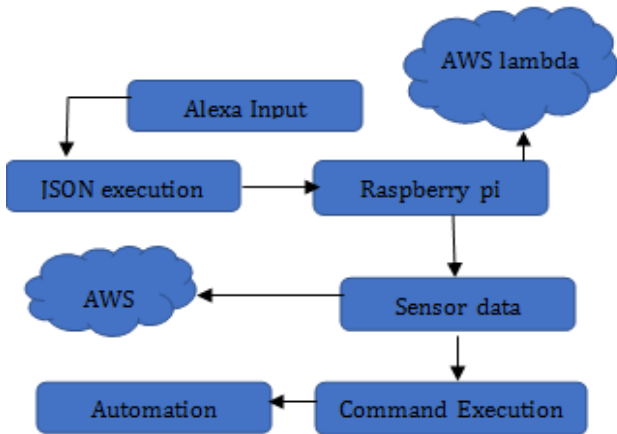


Fig -3: Module Flow

Alexa performs input operation and processes the data to AWS Lambda serverless compute service for storage and JSON execution. The command data are converted to JSON and required output is executed else if automation the command is processed to actuators or appliance via raspberry pi. At same time sensors data are stored on the AWS RDS Relational Database System for further reference. Amazon Developer account is used to create a product to implement automation like Echo Dot of Amazon. The product can be used as naming the AVS.

```

$ vi nano 2.7.6 File: ~/unattended-install.sh
#!/bin/bash
#-----
# Paste from developer.amazon.com below
#-----
# This is the name given to your device or mobile app in the Amazon developer portal. To look this up, nav
ProductID=YOUR_PRODUCT_ID_HERE
# Retrieve your client ID from the web settings tab within the developer console: https://developer.amazon
ClientID=YOUR_CLIENT_ID_HERE
# Retrieve your client secret from the web settings tab within the developer console: https://developer.am
ClientSecret=YOUR_CLIENT_SECRET_HERE
#-----
# No need to change anything below this...
#-----
# Pre-populated for testing. Feel free to change.
#-----
# Your Country. Must be 2 characters!
Country="US"
  
```

Fig -3: RASPBERRY PI SDK AVS

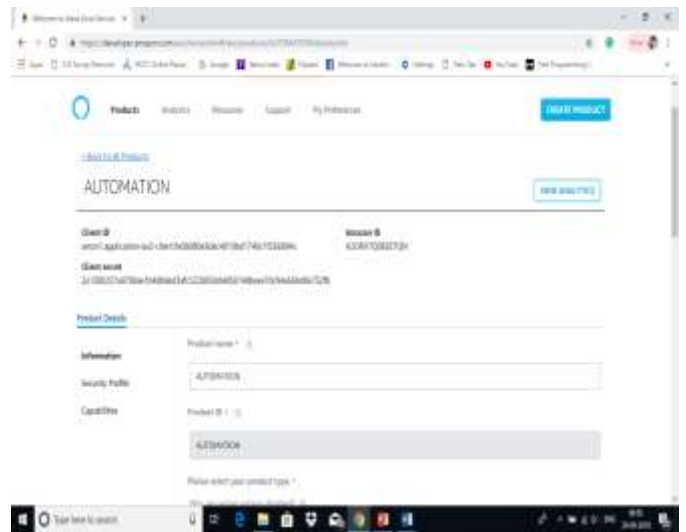


Fig -4: ALEXA DEVELOPERS DEVICE

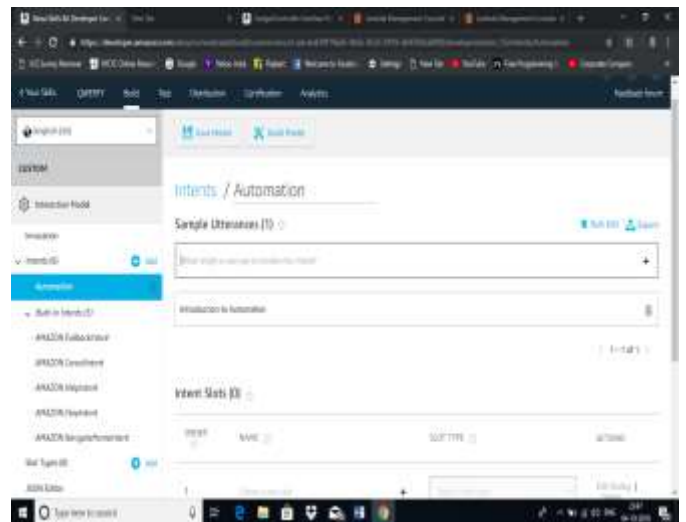


Fig -5: INTENT CREATION

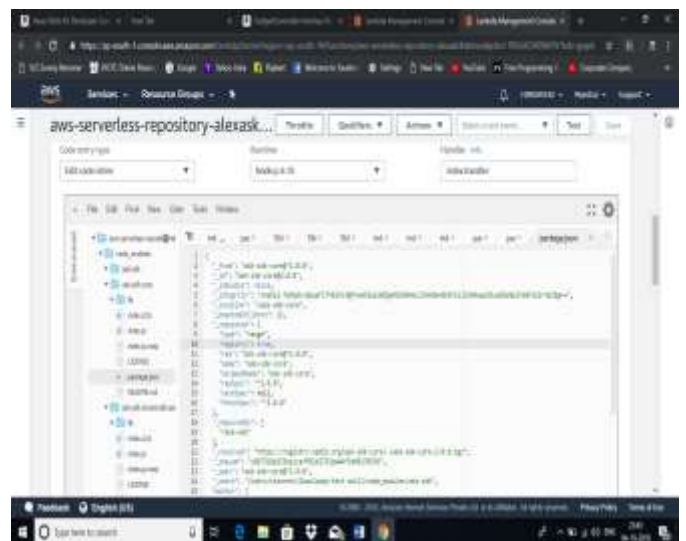
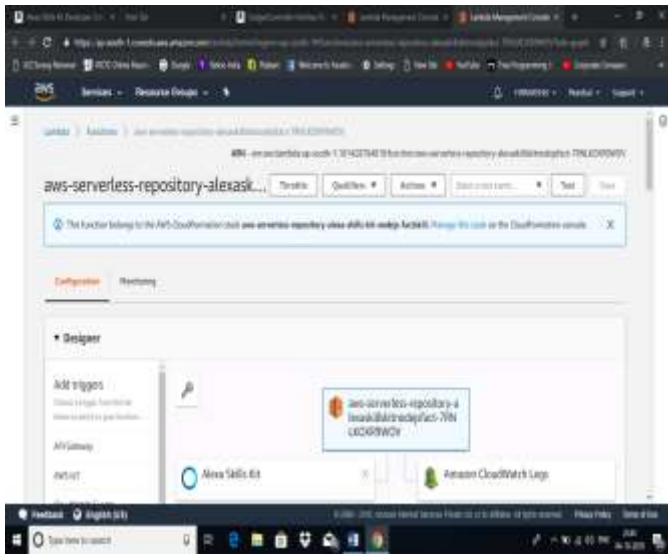


Fig -6: JSON EDITOR



**Fig -7: ALEXA AWS ALEXA SKILL KIT**

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### 3. CONCLUSION

Hence machine-controlled workplace could be a place with all the automation created to cut back the ability consumption and to create it economical to figure. Alexa Voice Services build the workplace a lot of fascinating and useful with an introduction to the automation. Voice controlling automation creates the working environment more virtual and imaginative, which ease to work also reduce the time consumption.

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