

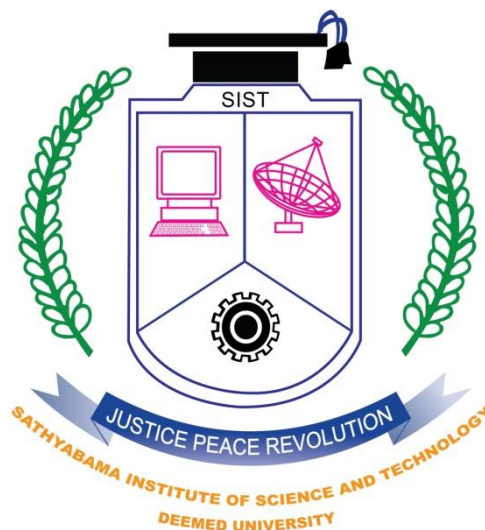
Voice Recognition Based Examination Portal for Visually Challenged People

Submitted in partial fulfillment of the requirements for the award of
Bachelor of Engineering Degree in
Electrical and Electronics Engineering

By

G.JOSHUA ABHISHEK KUMAR (Register No. 37140030)

E.HARSHA VARDHAN (Register No. 37140034)



**DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING
SCHOOL OF ELECTRICAL AND ELECTRONICS ENGINEERING**

**SATHYABAMA INSTITUTE OF SCIENCE AND TECHNOLOGY
(DEEMED TO BE UNIVERSITY)**

**Accredited with Grade “A” by NAAC | 12B Status by UGC |
Approved by AICTE JEPPIAAR NAGAR, RAJIV GANDHI SALAI,
CHENNAI - 600 119**

APRIL 2021



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Jeppiaar Nagar, Rajiv Gandhi Salai, Chennai –
600 119

www.sathyabama.ac.in



DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

BONAFIDE CERTIFICATE

This is to certify that this Project Report is the bonafide work of **G.JOSHUA ABHISHEK KUMAR** (Reg. No. 37140030) and **E.HARSHA VARDHAN** (Reg. No. 37140034) who carried out the project entitled "**Voice Recognition Based Examination Portal for Visually Challenged People**" under our supervision from December 2020 to April 2021.

Mr.D.N.S.Ravi Kumar
Internal Guide

Dr. V. SIVACHIDAMBARANATHAN
Head of the Department

Submitted for Viva voce Examination held on_____

Internal Examiner

External Examiner

DECLARATION

We **G.JOSHUA ABHISHEK KUMAR** (Reg. No.37140030) and **E.HARSHA VARDHAN** (Reg. No. 37140034) hereby declare that the Project Report entitled “**Voice Recognition Based Examination Portal for Visually Challenged People**” done by us under the guidance of **Mr.D.N.S.Ravi Kumar** is submitted in partial fulfillment of the requirements for the award of Bachelor of Engineering degree in Electrical and Electronics Engineering.



1. G.Joshua Abhishek Kumar (37140030)



2. E.Harsha Vardhan (37140034)

DATE:14.04.2021

PLACE: Chennai

SIGNATURE OF THE CANDIDATES

ACKNOWLEDGEMENT

We are pleased to acknowledge our sincere thanks to Board of Management of **SATHYABAMA** for their kind encouragement in doing this project and for completing it successfully. We are grateful to them.

We convey our thanks to **Dr. N. M. Nandhita., Dean, School of Electrical and Electronics Engineering** and **Dr. V. Sivachidambaranathan, Head of the Department, Dept. of Electrical and Electronics Engineering** for providing us necessary support and details at the right time during the progressive reviews.

We would like to express our sincere and deep sense of gratitude to our Project Guide **Mr.D.N.S. RAVI KUMAR** his valuable guidance, suggestions and constant encouragement paved way for the successful completion of our project work.

We wish to express our thanks to all Teaching and Non-teaching staff members of the Department of Electrical and Electronics Engineering who were helpful in many ways for the completion of the project.

ABSTRACT

AI (Artificial Intelligences) is used everywhere and it is adapted in every sector of our daily life. As we know AI is playing a major role in our new technologies. We use Alexa as an intermediate between user and AI, to communicate or to do tasks. Alexa is a virtual assistant like Siri and Google Assistant to perform a particular task given by the user. By using Amazon Web services which help to crate skills set for customizing Alexa to do acts what user wants to hear.

By creating a new skill set we can command Alexa about what are the inputs given by the user to activate the skill to perform the task. We use the Lambda function for creating handler functions with the help of python programming for input and speak out. And upload the skillset in the AWS console to testing the functions as a developer. Then we upload the skillset in Alexa to perform the task which we wanted. After that Alexa is skilled up with the new skill.

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CHAPTER 1

INTRODUCTION

Online Examination through voice recognition portal process aims to conduct exams through only voice commanding process. Usually, Competitive exams are conducted on online or offline portals for everyone. The main subject to conduct the exam with a voice command-like command given to the Google Assistant to perform a task. Alexa is used as an intermediate between the student who is appearing for the exam and the AI (Artificial Intelligences) behind the process. The AI behind the Alexa helps us to build skills for Alexa to perform various activities like call me with my nickname which is not inbuilt with the Alexa server. So here Lambda functions are been used to make the Alexa take the inputs and speak out to the user or from the user. Then we create the skills set in the console and connect the lambda functions to the AWS console to update the program. By creating the intents and slot in the skillset as inputs and keywords help Alexa to pick up the lines faster than mentioning. After completion of the skillset, uploading the skillset to the Amazon AWS server by using the AWS console. Later uploading the skillset through in-person accounts the Alexa can perform the particular task made by the user.

CHAPTER 2

LITERATURE SURVEY

2.1 Research and Development of Online Examination System

Zhao Qiao-fang et.al (2012), Examination System was helpful to separate teaching and testing. It promoted teacher to make the lesson planning and teach in the class carefully. It was also an important means of evaluating the teaching effect. Otherwise, it stimulated students to conscientiously study and attend a lecture, to do their homework independently. Therefore, the Examination System could improve the teaching level by providing better technical support. Within the Examination System we developed, the teacher could set the score and number of different types of question according to their need. And then, the Examination System generated an exam paper randomly in accordance with the requirements. Finally, the paper in standard format and its answer could be outputted. Taking into account the development of course content, the Examination System could easily update and add questions, to make the teaching content developing with the technology synchronously. The Examination System also provided online testing capability for students. Students could log in the system at any time in the campus network, test themselves, understand their learning level, and adjust their learning progress.

2.2 A study on Web based Online Examination System

Anjali Choubey et.al (2020), Examination System was helpful to separate teaching and testing. It promoted teacher to make the lesson planning and teach in the class carefully. It was also an important means of evaluating the teaching effect. Otherwise, it stimulated students to conscientiously study and attend a lecture, to do their homework independently. Therefore, the Examination System could improve the teaching level by providing better technical support. Within the Examination System we developed, the teacher could set the score and number of different types of question according to their need. And then, the Examination System generated an exam paper randomly in accordance with the requirements. Finally, the paper in standard format and its answer could be outputted. The Examination System also provided online testing capability for students. Students could log in the system at any time in the campus network, test themselves, understand their learning level, and adjust their learning progress.

CHAPTER 3

AIM AND SCOPE

The present work aims to construct an AI for conducting online exams for visually challenged people. Amazon Web Services (AWS) Skill set is used for customizing the AI through programming the handler functions for the output to be heard.

3.1 BLOCK DIAGRAM

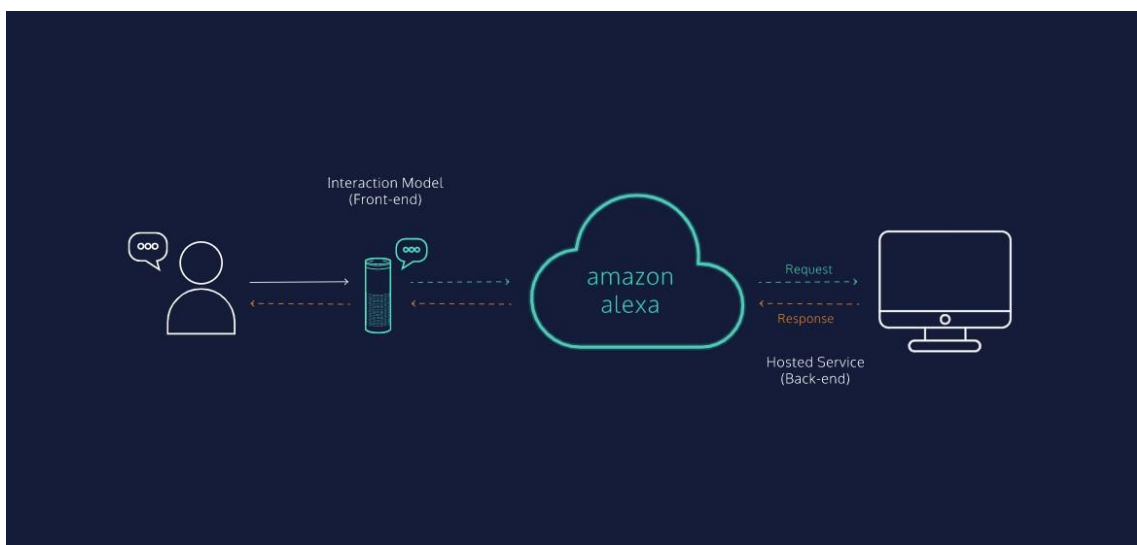


Fig no.3.1 Block Diagram

3.2 PROPOSED SYSTEM

This aims to help visually challenged people to appear for competitive exams. The main hardware used here is Amazon Alexa through which we can conduct various exams and quizzes. Alexa is an AI (Artificial intelligence) made for assisting the work which the user orders. As we know AI and ML are booming the whole world with new technologies. So we use the AI to assist the user with the help of Alexa to write exams through the internet. This helps a lot of visually challenged people to appear for exams with the help of Alexa. In Alexa, we create some skills and train the module for directing exams without any imposture during the examination duration. Behind Alexa Skillset the AI is the main support to proceed with the task. It's a good choice

to pick Alexa as an intermediate between the user and AI. Using AI as the Assistant helps to get accurate output and a proper conversation with the user. We skill up the Alexa to perform the task which the user wants. By using the lambda function of python and skillset for updating the new skill made by the user to perform a particular task as the user needed. So Amazon web services AWS created AWS Console for the developers to upgrade the skills for the people's choice.

3.2.1 Advantages

- The proposed system consists of Alexa skill set.
- Voice commanded.

CHAPTER 4

METHODS, ALGORITHMS AND MATERIALS

4.1 FLOW CHART:

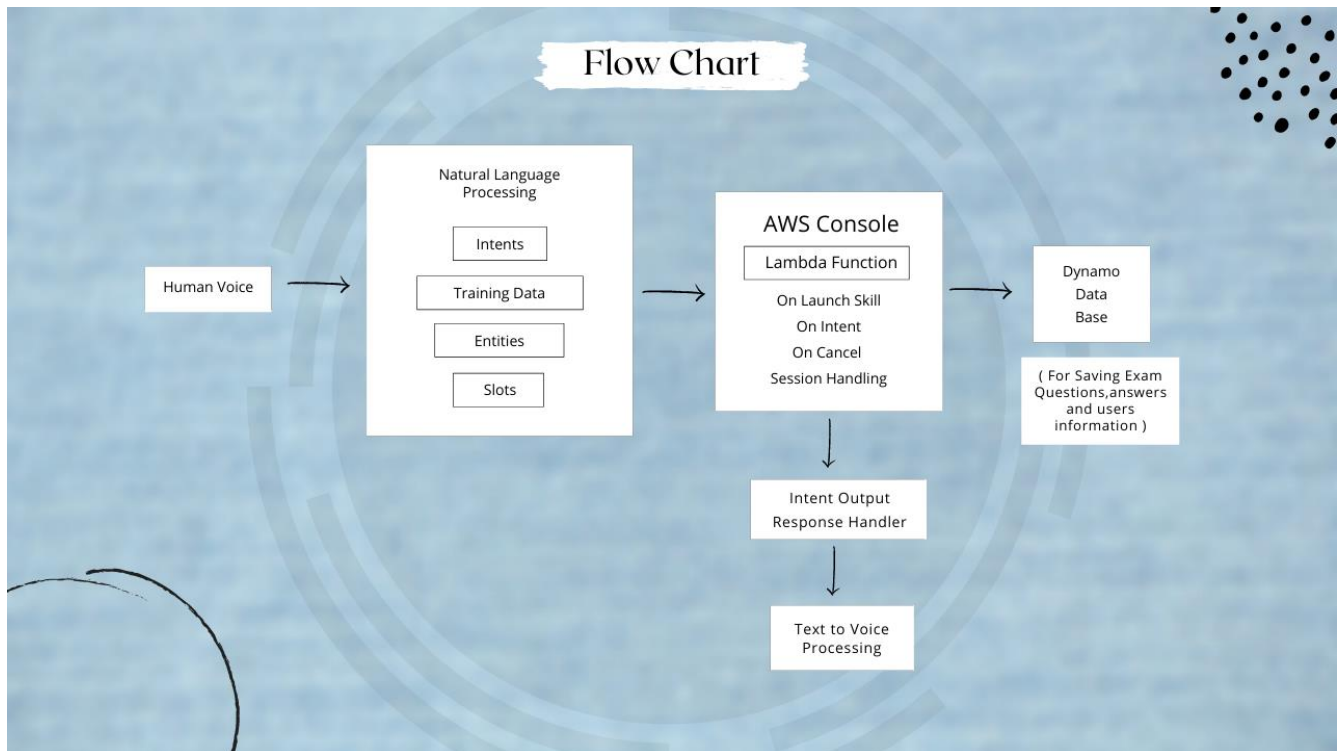


Fig No.4.1 Flow Chart

4.2 HARDWARE REQUIREMENT

4.2.1 Amazon Alexa

Amazon Alexa, also known simply as **Alexa**, is a virtual assistant AI technology developed by Amazon, first used in the Amazon Echo smart speakers developed by Amazon Lab126. It is capable of voice interaction, music playback, making to-do lists, setting alarms, streaming podcasts, playing audiobooks, and providing weather, traffic, sports, and other real-time information, such as news. Alexa can also control several smart devices using itself as a home automation system. Users are able to extend the Alexa capabilities by installing "skills" (additional functionality developed by third-party vendors, in other settings more commonly called apps) such as weather programs and audio features.



Fig No.4.2 Amazon Alexa

You may have heard of *Amazon Echo*, the voice-enabled speaker from Amazon that allows you to get things done, by using your voice.

The brain behind Echo and other Amazon voice-enabled devices like Echo Show, Echo Dot, Echo Spot, and Amazon Tap is *Alexa* — the cloud based service that

handles all the speech recognition, machine learning, and Natural Language Understanding for all Alexa enabled devices.

Alexa provides a set of built-in capabilities, referred to as *skills* that define how you can interact with the device. For example, Alexa's built-in skills include playing music, reading the news, getting a weather forecast, and querying Wikipedia. So, you could say things like:

Alexa, play Michael Jackson

Alexa, what's the weather in New York

In addition to these built-in skills, you can program custom skills by using the *Alexa Skills Kit (ASK)*. An Alexa user can then access these new abilities by asking Alexa questions or making requests.

In this lesson, you will create an Amazon developer account and use it to create your own skill!

Most devices with Alexa allow users to activate the device using a wake-word (such as *Alexa* or *Amazon*); other devices (such as the Amazon mobile app on iOS or Android and Amazon Dash Wand) require the user to push a button to activate Alexa's listening mode, although, some phones also allow a user to say a command, such as "Alexa" or "Alexa wake". Currently, interaction and communication with Alexa are available only in English, German, French, Italian, Spanish, Portuguese, Japanese, and Hindi. In Canada, Alexa is available in English and French (with the Quebec accent).

As of November 2018, Amazon had more than 10,000 employees working on Alexa and related products. In January 2019, Amazon's devices team announced that they had sold over 100 million Alexa-enabled devices.

In September 2019, Amazon launched many new devices achieving many records while competing with the world's smart home industry. The new Echo Studio became the first smart speaker with 360 sound and Dolby sound. Other new devices included an Echo dot with a clock behind the fabric, a new third-generation Amazon Echo, Echo Show 8, a plug-in Echo device, Echo Flex, Alexa built-in wireless earphones, Echo buds, Alexa built-in spectacles, Echo frames, an Alexa built-in Ring, and Echo Loop.

In November 2014, Amazon announced Alexa alongside the Echo. Alexa was inspired by the computer voice and conversational system on board the Starship *Enterprise* in

science fiction TV series and movies, beginning with *Star Trek: The Original Series* and *Star Trek: The Next Generation*.

Amazon developers chose the name Alexa because it has a hard consonant with the X, which helps it be recognized with higher precision. They have said the name is reminiscent of the Library of Alexandria, which is also used by Amazon Alexa Internet for the same reason. In June 2015, Amazon announced the Alexa Fund, a program that would invest in companies making voice control skills and technologies. The US\$200 million fund has invested in companies including Jargon, Ecobee, Orange Chef, Scout Alarm, Garageio, Toymail, MARA, and Mojio. In 2016, the Alexa Prize was announced to further advance the technology.

In January 2017, the first Alexa Conference took place in Nashville, Tennessee, an independent gathering of the worldwide community of Alexa developers and enthusiasts. The follow-up has been announced with a new name, Project Voice, and will be keynoted on the first day with Amazon's Head of Education for Alexa, Paul Cutsinger.

At the Amazon Web Services Re: Invent conference in Las Vegas, Amazon announced Alexa for Business and the ability for app developers to have paid add-ons to their skills.

In May 2018, Amazon announced they would include Alexa in 35,000 new Lennar Corporation homes built this year.

In November 2018, Amazon opened its first Alexa-themed pop-up shop inside of Toronto's Eaton Centre, showcasing the use of home automation products with Amazon's smart speakers. Amazon also sells Alexa devices at Amazon Books and Whole Foods Market locations, in addition to mall-based pop-ups throughout the United States.

In December 2018, Alexa was built into the Anki Vector, And was the first major update for the Anki Vector, although Vector was released in August 2018, he is the only home robot with advanced technology.

In April 2019, Amazon announced the expansion of Alexa to Brazil, in Portuguese, together with Bose, Intelbras, and LG.

Alexa can perform a number of preset functions out-of-the-box such as set timers, share the current weather, create lists, access Wikipedia articles, and many more

things. Users say a designated "wake word" (the default is simply "Alexa") to alert an Alexa-enabled device of an ensuing function command. Alexa listens for the command and performs the appropriate function, or skill, to answer a question or command. When questions are asked, Alexa converts sound waves into text which allows it to gather information from various sources. Behind the scenes, the data gathered is then sometimes passed to a variety of sources

including WolframAlpha, iMDB, AccuWeather, Yelp, Wikipedia, and others to generate suitable and accurate answers. Alexa-supported devices can stream music from the owner's Amazon Music accounts and have built-in support for Pandora and Spotify accounts. Alexa can play music from streaming services such as Apple Music and Google Play Music from a phone or tablet.

In addition to performing pre-set functions, Alexa can also perform additional functions through third-party skills that users can enable. Some of the most popular Alexa skills in 2018 included "Question of the Day" and "National Geographic Geo Quiz" for trivia; "TuneIn Live" to listen to live sporting events and news stations; "Big Sky" for hyper local weather updates; "Sleep and Relaxation Sounds" for listening to calming sounds; "Sesame Street" for children's entertainment; and "Fitbit" for Fitbit users who want to check in on their health stats. In 2019, Apple, Google, Amazon, and Zigbee Alliance announced a partnership to make smart home products work together.

As of April 2019, Amazon had over 90,000 functions ("skills") available for users to download on their Alexa-enabled devices, a massive increase from only 1,000 functions in June 2016. Microsoft's AI Cortana became available to use on Alexa enabled devices as of August 2018. In 2018, Amazon rolled out a new "Brief Mode," wherein Alexa would begin responding with a beep sound rather than saying, "Okay," to confirm receipt of a command. On December 20, 2018, Amazon announced a new integration with the Wolfram Alpha answer engine, which provides enhanced accuracy for users asking questions of Alexa related to math, science, astronomy, engineering, geography, history, and more.

In the home automation space, Alexa can interact with devices from several manufacturers including SNAS, Fibaro, Belkin, ecobee, Geeni, IFTTT, Insteon, LIFX, LightwaveRF, Nest, Philips Hue, SmartThings, Wink, and

Yonomi. The Home Automation feature was launched on April 8, 2015. Developers are able to create their own smart home skills using the Alexa Skills Kit.

In September 2018, Amazon announced a microwave oven that can be paired and controlled with an Echo device. It is sold under Amazon's AmazonBasics label.^[40]

Alexa can now pair with a Ring doorbell Pro and greet visitors and leave instructions about where to deliver packages.

Take-out food can be ordered using Alexa; as of May 2017 food ordering using Alexa is supported by Domino's Pizza, Grubhub, Pizza Hut, Seamless, and Wingstop. Also, users of Alexa in the UK can order meals via Just Eat. In early 2017, Starbucks announced a private beta for placing pick-up orders using Alexa. In addition, users can order meals using Amazon Prime Now via Alexa in 20 major US cities. With the introduction of Amazon Key in November 2017, Alexa also works together with the smart lock and the Alexa Cloud Cam included in the service to allow Amazon couriers to unlock customers' front doors and deliver packages inside.

According to an August 2018 article by The Information, only 2 percent of Alexa owners have used the device to make a purchase during the first seven months of 2018 and of those who made an initial purchase, 90 percent did not make a second purchase.

Alexa supports a multitude of subscription-based and free streaming services on Amazon devices. These streaming services include: Prime Music, Amazon Music, Amazon Music Unlimited, Apple Music, TuneIn, iHeartRadio, Audible, Pandora, and Spotify Premium. However, some of these music services are not available on other Alexa-enabled products that are manufactured by companies external of its services. This unavailability also includes Amazon's own Fire TV devices or tablets.

4.3 ONLINE APPLICATIONS REQUIREMENT

- **Alexa Skillset**
- **Lambda Functions**

4.3.1 ALEXA SKILLSET

Skills are like apps for Alexa, and provide a new channel for your content and services. Skills let customers use their voices to perform everyday tasks like checking the news, listening to music, playing a game, and more. Organizations and individuals can publish skills in the Alexa Skills Store to reach and delight customers on hundreds of millions of Alexa devices. The Alexa Skills Kit (ASK) provides self-service APIs and tools that you can use to build Alexa skills. You can also hire an agency with Alexa expertise to help your organization build a skill.

Why Build Alexa Skills?

Delight Your Customers

Voice is the most natural user interface. Enable customers to use their voices to easily access your content, devices, and services—wherever they are and whatever they're doing.

Easily Bring Your Vision to Life

Take advantage of Amazon's latest innovations in voice. Use our self-service APIs and tools to deliver experiences in gaming, productivity, news, music, smart home, and more.

Grow Your Business

Expand your reach through hundreds of millions of Alexa devices across the globe, use voice to close the distance between your brand and your customers, and make money by selling premium experiences and physical goods.

What You Can Build

With the Alexa Skills Kit, you can deliver voice experiences in more than 20 different categories, from education to audio to travel. Take advantage of built-in voice interaction models or imagine your own custom voice experience. You can also create multimodal skills that integrate voice, visuals, and touch, and offer premium content in your skills. Here are just a few examples of what you can build.

Alexa is Amazon's cloud-based voice service which powers the Echo family of devices as well as the companion app on the Android and iOS smartphones.

Out of the box, a user can give Alexa a number of voice commands such as creating a to-do-list, set the alarm, play a song, or provide the news. The tasks

Alexa performs upon user request are called “Alexa Skills”. Essentially, an Alexa Skill is a voice-driven Alexa app.

Alexa has a number of built-in skills, but developers can build new custom skills, by using Alexa Skill Kit (ASK). The ASK, a collection of APIs and tools, handles the hard work related to the voice interfaces including speech recognition, text-to-speech encoding and natural language processing. ASK helps developers build a skills quickly and easily.

In this post, we’ll introduce the basics of Alexa skill development by building a simple custom skill called “Examination Portal”.

You can then apply the same process to turn your own idea for a custom voice command into a working Amazon Alexa skill.

The User — Custom Alexa Skill Communication

The communication between the user and the custom skill is achieved via an Alexa powered device such as the Echo.

Activation of a particular skill is done by saying the skill’s invocation name along with the trigger word (“Alexa”) which activates the Echo device. For example, the command “Alexa, open Examination Portal” will start the “Examination Portal” skill.

Upon activating the skill, the user is able to send other voice commands, or speech requests, to the skill.

Communication within the Custom Alexa Skill

The Alexa skill consists of two main components: the skill interface and the skill service.

The skill interface processes the user’s speech requests and then maps them to intents within the interaction model. The intents are actions that fulfill the spoken requests from the user. Every intent has at least one utterance, a predefined word, phrase, or sentence which the user might say to invoke the intent. If a specific intent is detected, the skill interface creates a json encoded event, which is passed to the skill service.

The skill service determines what actions to take in response to the JSON encoded event received from the skill interface. Upon reaching a decision the skill service

returns a JSON encoded response to the skill interface for further processing. After processing, the speech response is sent back to the user through the Echo.

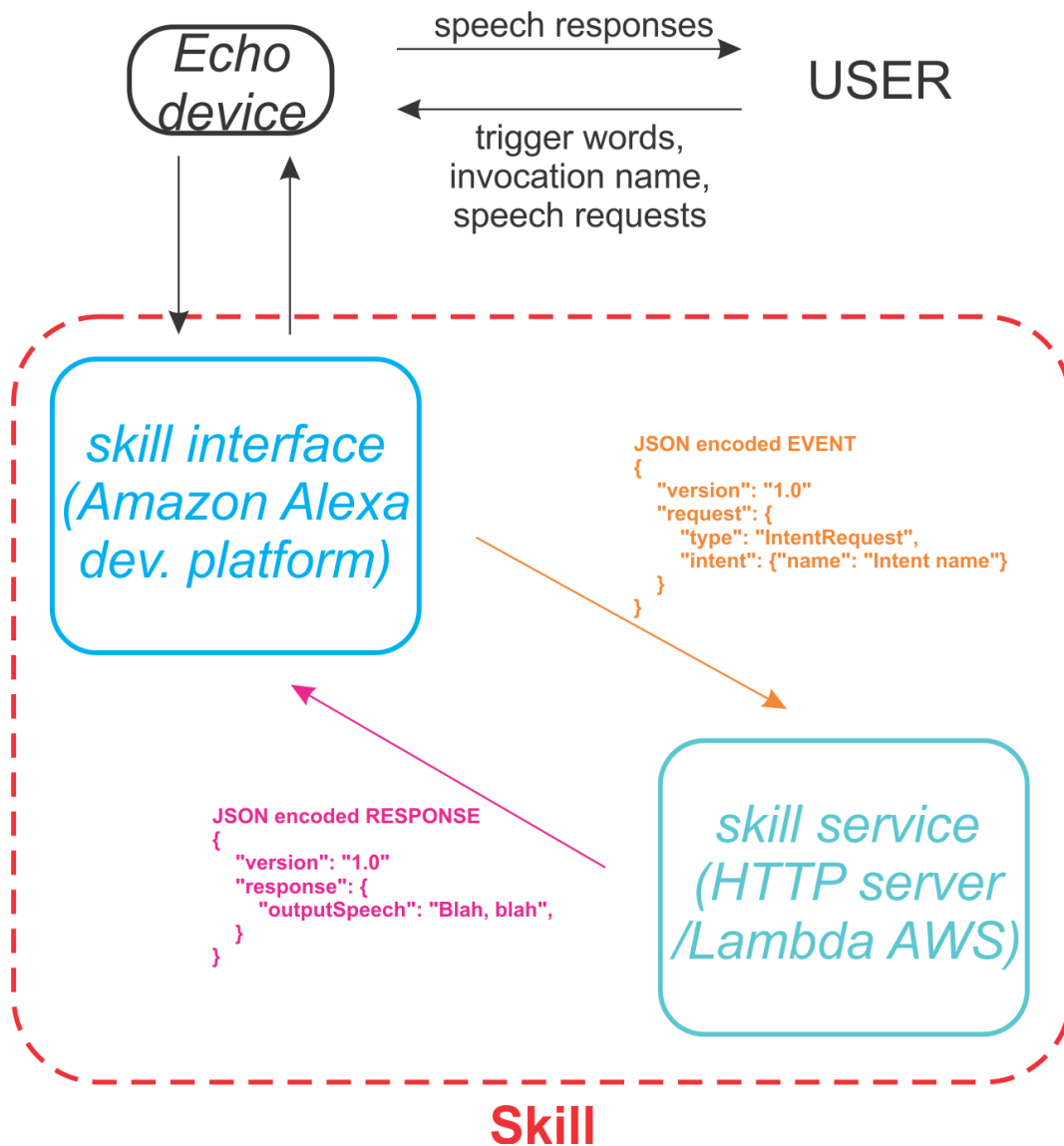


Fig No.4.3 Communication between the Alexa and Amazon server

User-Skill Communication

Key Ingredients for Building a Custom Skill

Now that we know, in principle, how to communicate with a custom skill, it is time to prepare the tools for building one.

The skill interface is implemented within the Amazon Alexa developer's platform. This means that you'll need an Amazon Developers Services (ADS) account in order to build the skill and its interaction model.

Note: If you don't have an ADS account, now is the right time to create one. It is easy and free.

We are going to use the Amazon Web Service (AWS) as the skill service, so you will also need an AWS services account. In AWS, we'll write a function which will make decisions and create responses based on the received event.

Note: Creating an AWS account may take some time, due to the required verification procedures. A debit/credit card info is necessary and the cost for setting up the account is 1\$. However, you'll get a bunch of free tiers which you can use forever.

Building A Custom Skill

With your account set up, we are now going to build our custom Alexa skill. Our custom Amazon Alexa skill is going to do the following: when activated, it will provide a list of inputs in such a way that user say to Alexa to continue with the user's orders. The name of our skill will be "Examination Portal"

To build the Examination Portal skill:

- Sign in to your ADS account and choose Alexa.

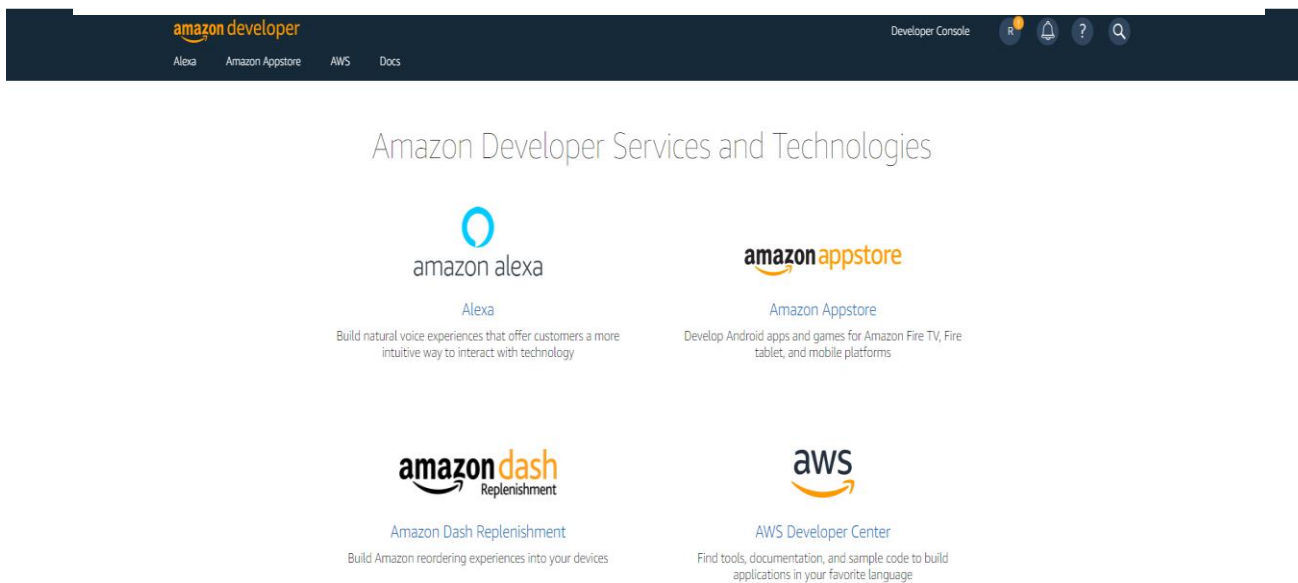


Fig No.4.4 Amazon Developer Page

Amazon Developers Services page

- Click the “Alexa Skills Kit”

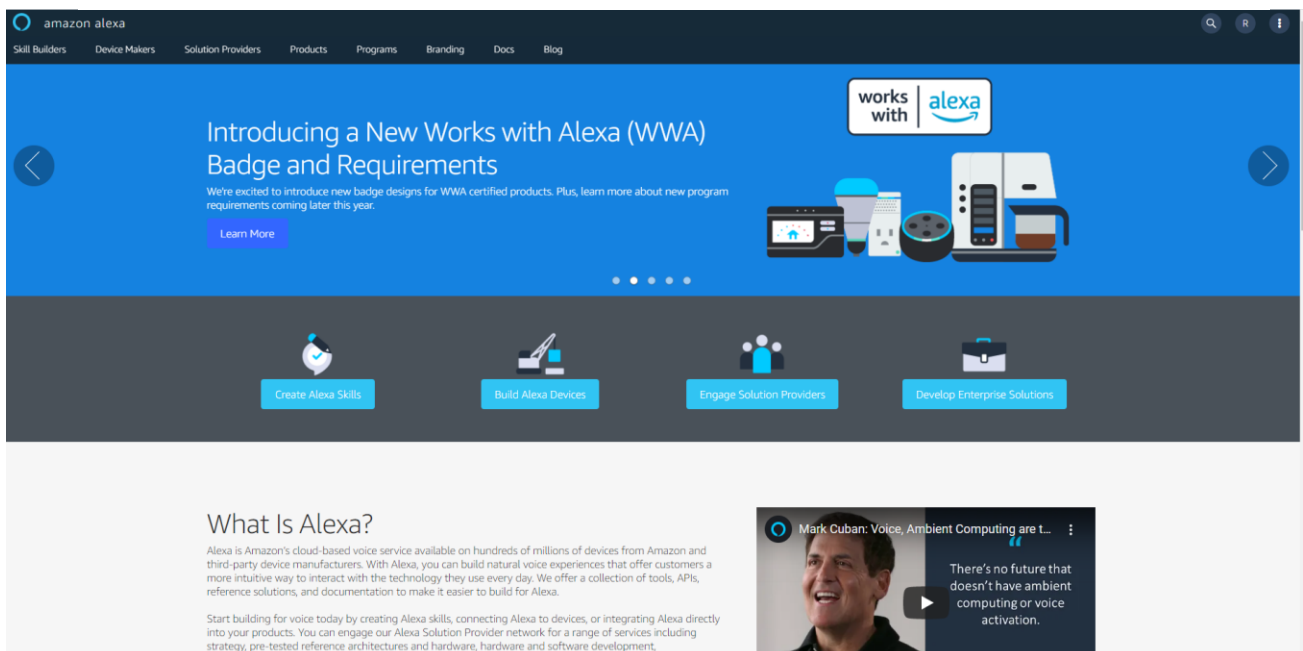


Fig No.4.5 Home page of Alexa Skills set

Alexa Skills Kit page

- Click the “Create Skill” button (this will open the “Create a new skill” form).

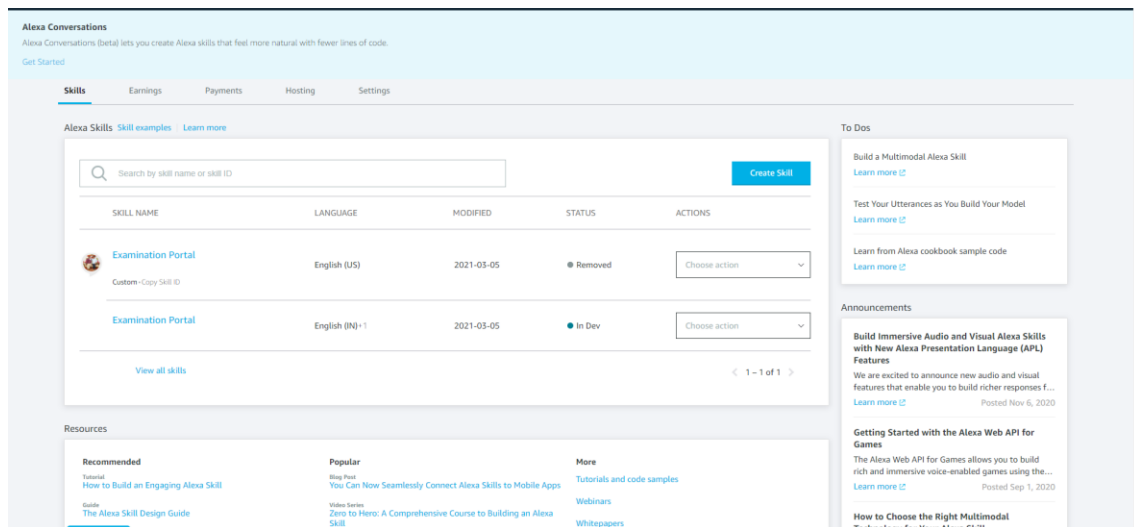


Fig No.4.6 Created Skills list

Part 1: Building the Interaction Model

The Interaction model is a very important part of our skill. It contains the skill's invocation name, intents and utterances, etc., which are crucial for the interaction with the skill services.

First we are going to set up the invocation name for our skill:

- Select the “Invocation” tab.
- Enter “Examination Portal” in the “Skill Invocation Name” field.

The invocation name is what we say to start the interaction with our skill.

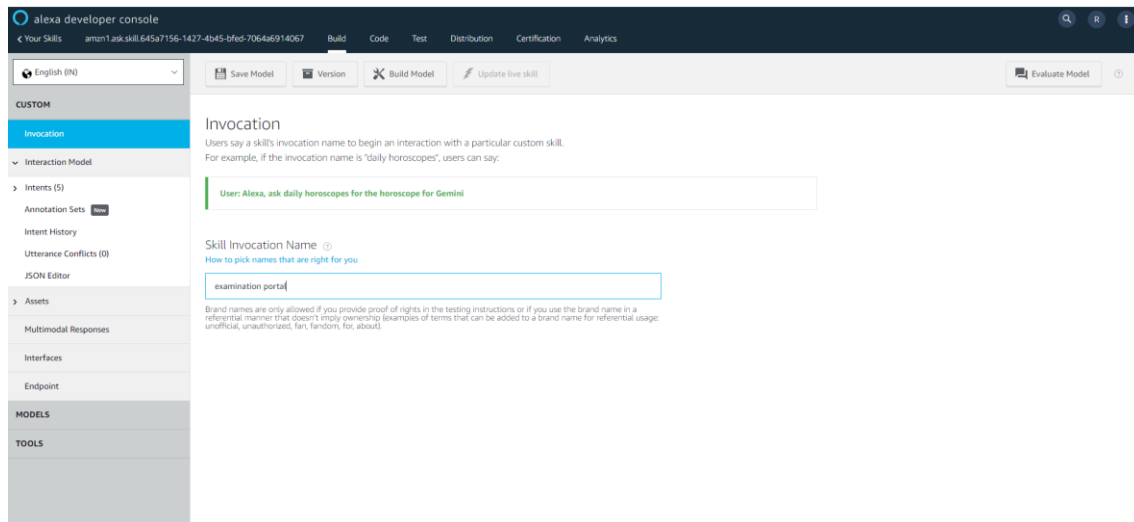


Fig No.4.7 Invocation page

Invocation name setup

Now we are going to set up the intents. For our skill we need:

1. An Invocation name is “Examination Portal”.
2. an intent that handles the user speech request with which the user declines to interact with the skill or wants to stop the interaction,
3. an intent that handles the user speech request which doesn’t match any of the utterances,
4. An intent that handles the user speech request for help.

Luckily, ASK has a large library of built-in intents so we will have to create only one custom intent.

Note: Built-in intents have built-in utterances. It is possible to extend the number of existing utterances by adding new utterances. When a skill is created, four built-in intents are added to the Interaction model by default. These are:

AMAZON.HelpIntent, AMAZON.CancelIntent, AMAZON.FallbackIntent and AMAZON.StopIntent.

To create a custom intent:

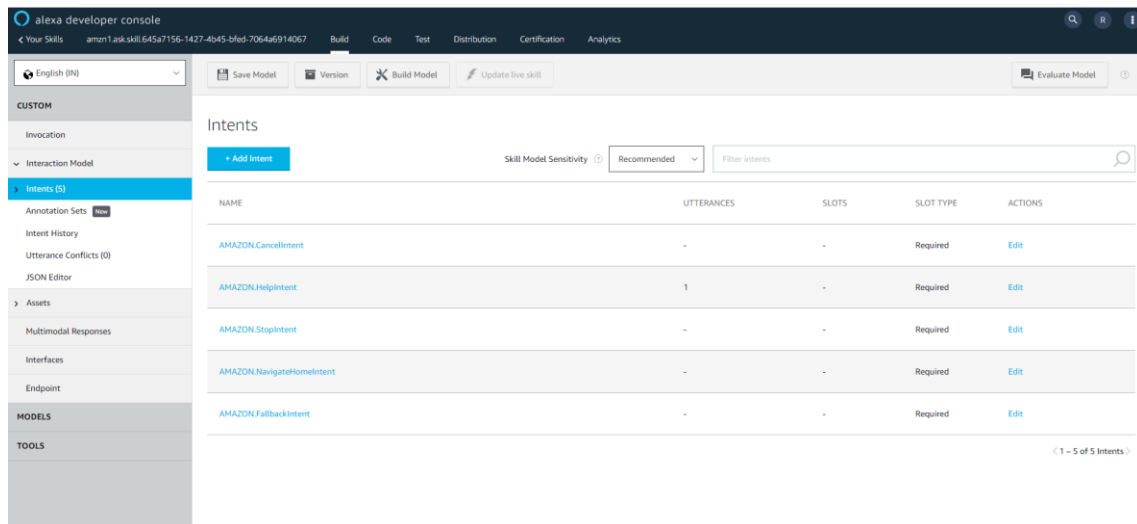


Fig No.4.8 Intents

Custom intent The “Stop” intent handles the user spoken or request to stop or pause the test during the test, can just say Alexa stop the test, we’ll need to employ a custom slot for our utterances.

To create an utterance:

- Create a new slot in the window, which pops up when “{}” is entered, by entering in the “Create a new slot” field and by clicking the “Add” button.
- Click the “plus” sign at the right end of the “Sample Utterances” field.

Utterances with a slot

We can create a few more utterances with the same slot. In the “Sample Utterances” field we’ll enter the following utterances:

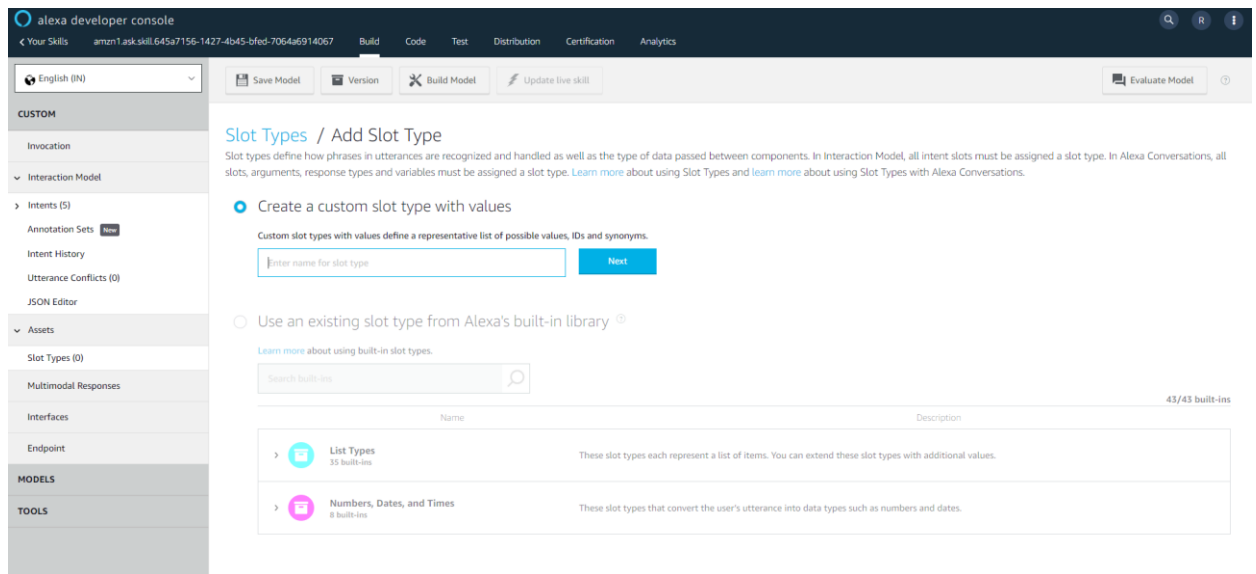


Fig No.4.9 Slot

Note: Slots are a very powerful accessory for building a custom Alexa skill. Furthermore, multiple slots provide the possibility of using dialogs in which the Alexa skill prompts the user to fill all slot values in order to fulfill the intent.

The slot is empty and we can't populate it directly with the names of the conversation. However, we can associate the slot to a slot type which contains the intents. ASK includes a large library of slot types, but for our purposes we need to create a custom slot type. To create a custom slot type:

- Click the "Add" sign within the "Slot Types" tab.
- Select "Create custom slot type".
- Click the "Create custom slot type" button.

Custom slot type

Let's create slot type.

- Select “Slot Types” tab.
- Enter the names in the “Slot Values” field.
- Add names to the slot type by clicking the “plus” sign at the right end of the “Slot Values” field.

The remaining intents are built-in intents.

The “AMAZON.NoIntent”, “AMAZON.CancelIntent” and “AMAZON.StopIntent” will handle the user speech request when the user declines to interact with the skill, or wants to stop the interaction.

The “AMAZON.FallbackIntent” will handle the user speech request which doesn’t match any of the utterances.

The “AMAZON.HelpIntent” will handle the user speech request for help.

The “AMAZON.NoIntent” is not included by default, like the other built-in intents, so we’ll have to add it.

To add the “AMAZON.NoIntent”:

- Click the “Add” sign near the “Intents” tab.
- Select “Use an existing intent from Alexa’s built-in library”.
- Enter “NoIntent” in the search field.
- Click the “+ Add intent” button.

The built-in AMAZON.NoIntent

We should now save our interaction model by clicking the “Save Model” button, and build it by clicking the “Build Model” button.

That is it. But before we proceed further with building our skill, we should talk about the interaction model schema.

Every interaction model has its interaction model schema, which can be accessed by selecting the “JSON Editor” tab. The interaction model schema, written in a json file, contains intents, utterances, and slots, i.e. everything that is implemented within the interaction model.

Consequently, if the interaction model changes the interaction model schema will change accordingly, and vice versa. This means that the entire interaction model can be built directly by writing a bit of json code in the “JSON Editor” or by uploading a json file.

Part 2: Choosing the Endpoints

The skill service can be either a user implemented web service or the AWS service. This is configured in the “Endpoints”. For our skill, we are going to use the AWS service, which communicates with the skill interface via the AWS Lambda function.

To choose the AWS service:

- Click the “Endpoints” tab.
- Select the “AWS Lambda function”.

In order to connect our skill interface with the AWS Lambda function we need to pass the skill the skill ID to the Lambda function. The skill ID is located in the “Endpoints”, and we will copy it by clicking “Copy to Clipboard”.

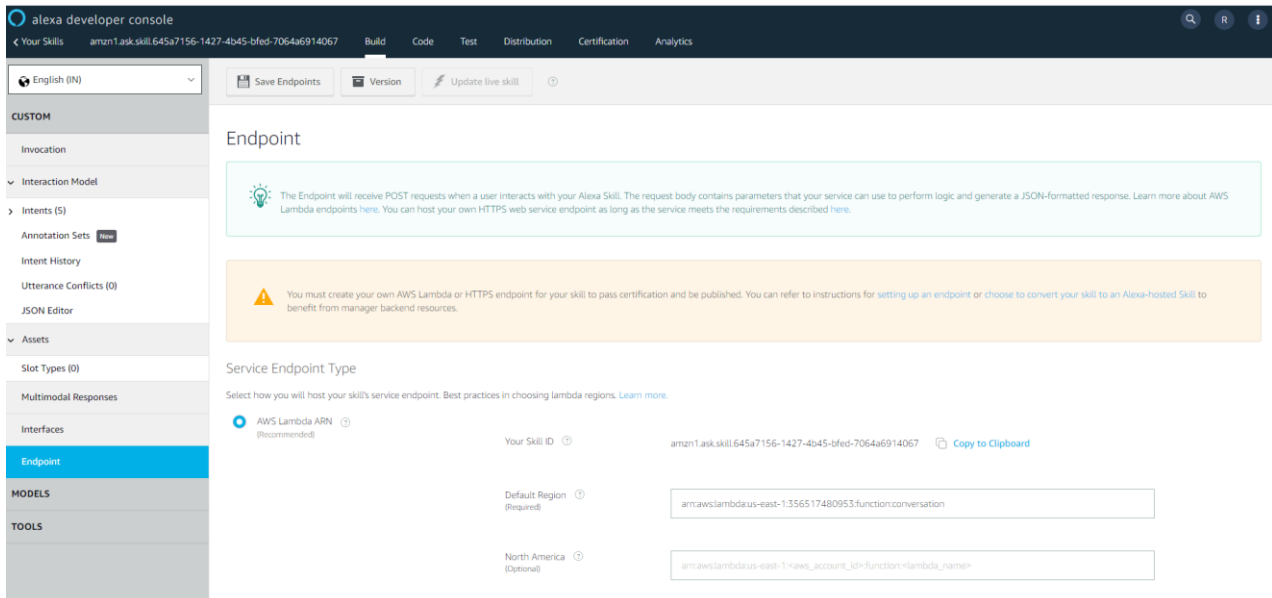


Fig No.4.10 The Endpoints

Part 3: Creating the AWS Lambda Function

To complete our skill we need to create and configure the AWS lambda function. This function receives events from and returns responses to the skill interface. Events contain the information about the way in which the user is interacting with the skill including the type of request user has triggered.

There are three main request types:

- **LaunchRequest** is sent within the event to the Lambda function when the user invokes the skill by saying its invocation name.
- **IntentRequest** is sent within the event to the Lambda function when the user interacts with the skill, i.e. when his speech request is mapped to intent. The intent is also inscribed in the event.
- **SessionEndedRequest** is sent within the event to the Lambda function when the session ends, due to an error, when the user says “exit”, when the user doesn’t respond while the device is listening, or when the user says something that doesn’t match an intent defined in your skill interface while the device is listening.

The events are encoded in json format by the skill interface in accordance with the interaction model. The responses sent by the AWS service to the skill interface are also encoded in json format.

For our simple custom skill we'll configure the Lambda function using Python, which is supported on the AWS services.

For this type of the response format, the output provided to the user will be:

- A speech response, triggered by the “outputSpeech” object. The message written in the “text” field of this object is conveyed to the user via the Echo.
- A text on the device having the Alexa app such as a smartphone. This response is triggered by the “card” object and the message that will be displayed is located in the “title” and “content” fields of this object.
- A re-prompt speech response from the skill, sent to the user through the Echo. This response is triggered by the “reprompt” object which contains the “outputSpeech” object.

We are ready to create the AWS Lambda function using the AWS services.

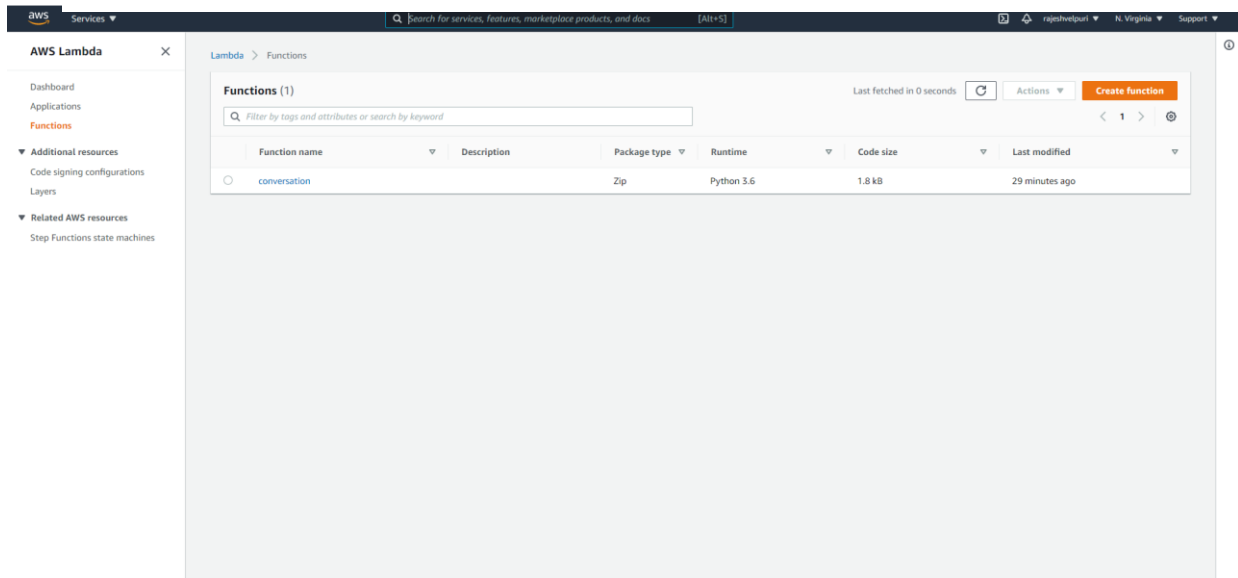


Fig No.4.11 AWS Lambda

AWS home page

- In the upper right corner select “N. Virginia”, to make the Alexa Skill Kit trigger available to the AWS Lambda function.

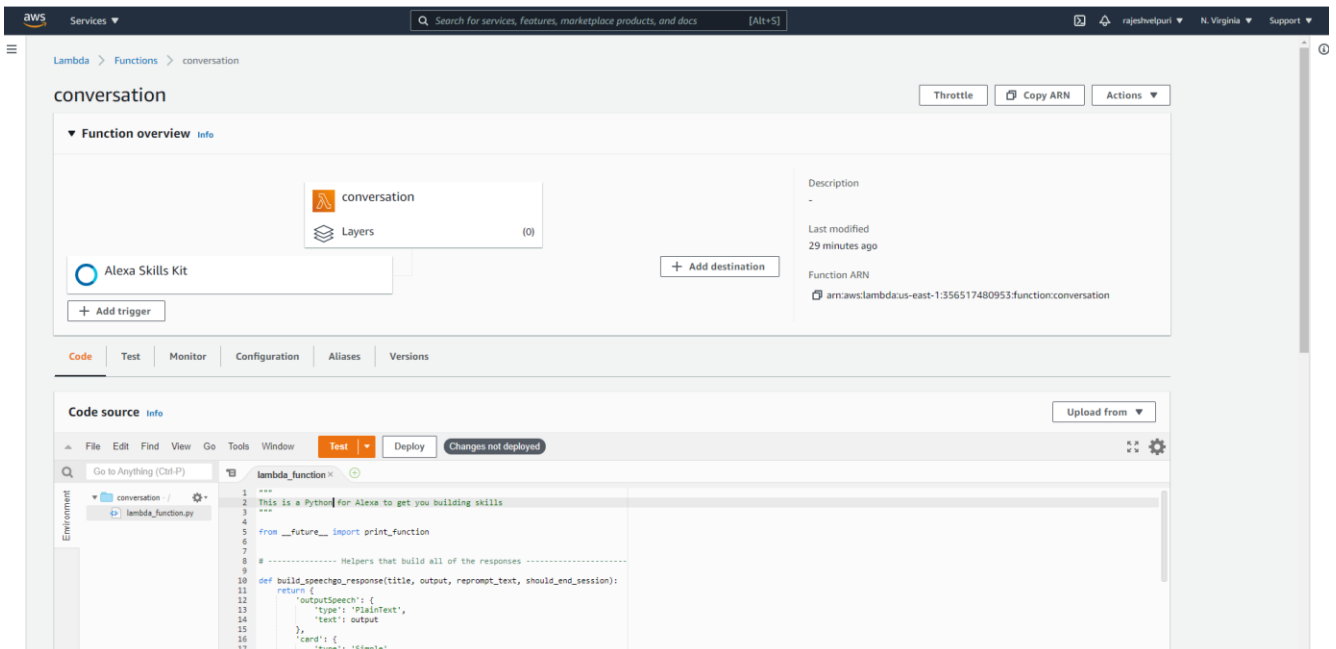


Fig No.4.12 Location of the Alexa

- Click the “Create a function” button.

AWS Lambda service

- In the “Create function” form select “Author from scratch”
- In the “Name” field enter the the function name “conversation”.
- From the “Runtime” list select Python 3.6.
- From the “Role” list select a “Custom Role”, and wait for the IAM manager to open.
- In the IAM manager click on the “Allow” button and you will be redirected back to the “Create function” form.

- Click the “Create function” button, located in the lower-right corner of the “Create function” form.

Now that the AWS Lambda function has been created, we need to set the function triggers and write the code. If everything was done correctly, we should have the “conversation” form in our browser.

To set the function trigger:

- Select the “Alexa Skills Kit” in the “Add triggers” list.

AWS Lambda service – Conversation form showing the active “Alexa Skills Kit” panel with notification “Configuration required”

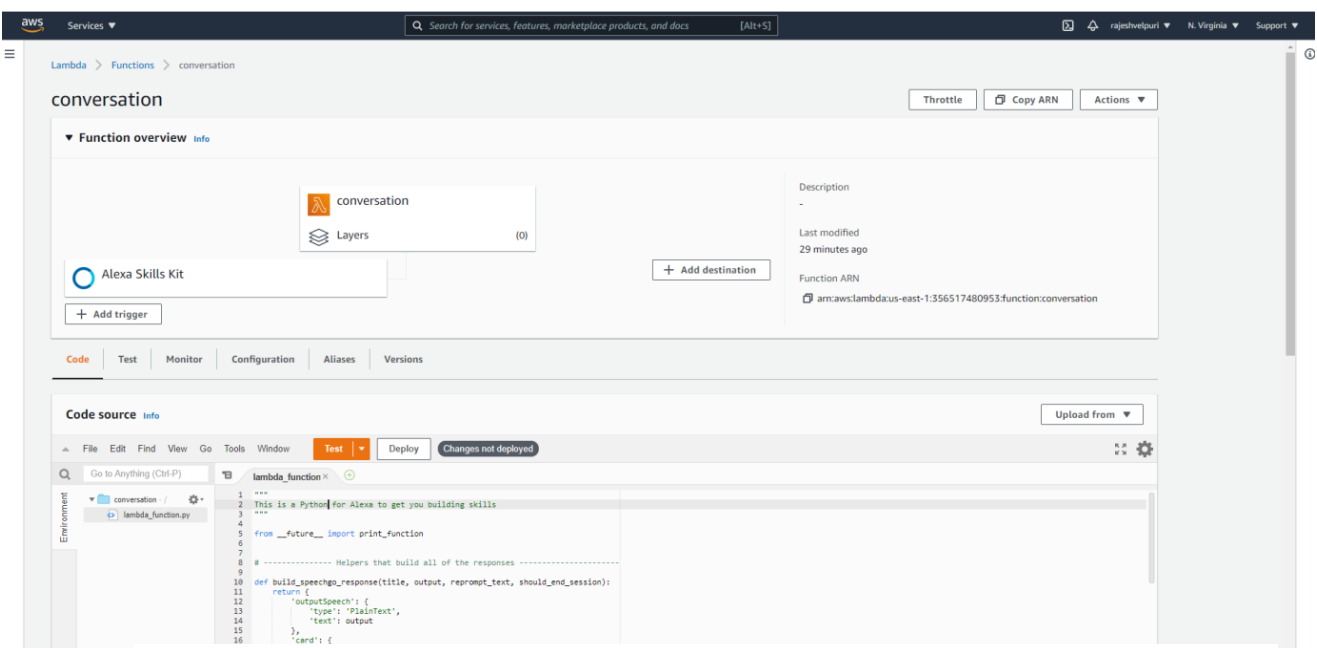


Fig No.4.13 Program with Lambda Function

- Scroll down the page and in the “Skill ID” field paste the skill ID that you have copied earlier, from the “Endpoints”.
- Click the “Add” button located at the bottom of the page.

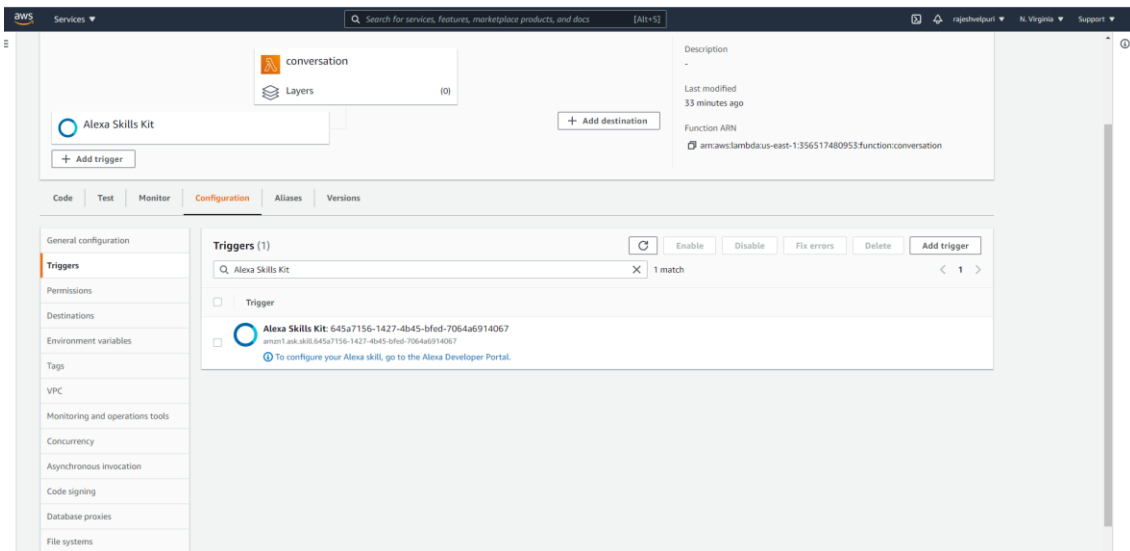


Fig No.4.14 Connecting Alexa with AWS console

The ARN is used to complete the connection between the skill interface and the Lambda function, which is why our next step would be to pass it to the skills “Endpoints”.

Amazon Resource Name (ARN)

- Go back to the Alexa developer’s portal and select “Endpoints”. Paste the ARN in the “Default Region” field and click the “Save Endpoints” button.

Connecting the AWS Lambda and the skill

The Examination Portal custom Alexa skill is completed and ready for testing!

Testing the Skill

Finally, we can test our custom Alexa skill using:

1. any type of Alexa device such as the Echo or Echo Dot,

2. the Echo Simulator Community Edition at [Echoism.io](https://echoism.io),
3. The service simulator under the Test tab.

To test the skill in the service simulator:

- Click the “Test” tab.
- Toggle the Test button on.
- Write what you want to say in the empty field or hold the microphone and speak.

- Service simulator test of the My Examination Portal skill

Besides the speech which you will hear and the text which will be displayed on your screen, the service simulator also displays the JSON input (json event sent by the skill interface to the Lambda function) and the JSON output (json response sent by the Lambda function to the skill interface).

If you are satisfied with your skill and sure that it works properly, you can publish it to the AWS Alexa.

That is it! You now have a working custom Amazon Alexa Skill.

Let's do a quick recap.

First, we have learned that an Alexa skill is voice-driven app for Alexa which preforms a specific task for the user at his request.

We then learned that the user request (to the skill) is handled first by the skill interface, using the interaction model, and then by the skill service that forms the response for the user, using the Lambda function.

Finally, by building our own custom skill we have learned the very basics of practical skill building and scratched the surface of the Amazon Alexa developers console and AWS Lambda services.

Have fun while making your own custom skills!

4.3.2 LAMDBA FUNCTIONS

AWS Lambda is a serverless compute service that runs your code in response to events and automatically manages the underlying compute resources for you. You can use AWS Lambda to extend other AWS services with custom logic, or create your own back-end services that operate at AWS scale, performance, and security. AWS Lambda can automatically run code in response to multiple events, such as HTTP requests via Amazon API Gateway, modifications to objects in Amazon S3 buckets, table updates in Amazon DynamoDB, and state transitions in AWS Step Functions.

Lambda runs your code on high-availability compute infrastructure and performs all the administration of the compute resources, including server and operating system maintenance, capacity provisioning and automatic scaling, code and security patch deployment, and code monitoring and logging. All you need to do is supply the code.

The code you run on AWS Lambda is called a “Lambda function.” After you create your Lambda function it is always ready to run as soon as it is triggered, similar to a formula in a spreadsheet. Each function includes your code as well as some associated configuration information, including the function name and resource requirements. Lambda functions are “stateless,” with no affinity to the underlying infrastructure, so that Lambda can rapidly launch as many copies of the function as needed to scale to the rate of incoming events.

After you upload your code to AWS Lambda, you can associate your function with specific AWS resources (e.g. a particular Amazon S3 bucket, Amazon DynamoDB table, Amazon Kinesis stream, or Amazon SNS notification). Then, when the resource changes, Lambda will execute your function and manage the compute resources as needed in order to keep up with incoming requests.

AWS Lambda allows you to add custom logic to AWS resources such as Amazon S3 buckets and Amazon DynamoDB tables, making it easy to apply compute to data as it enters or moves through the cloud.

It is easy to get started with AWS Lambda. First you create your function by uploading your code (or building it right in the Lambda console) and choosing the memory, timeout period, and AWS Identity and Access Management (IAM) role. Then, you specify the AWS resource to trigger the function, either a particular Amazon S3 bucket, Amazon DynamoDB table, or Amazon Kinesis stream. When the resource changes, Lambda will run your function and launch and manage the compute resources as needed in order to keep up with incoming requests. You can use AWS Lambda to create new back-end services for your applications that are triggered on-demand using the Lambda API or custom API endpoints built using Amazon API Gateway. By using Lambda to process custom events instead of servicing these on the client, you can avoid client platform variations, reduce battery drain, and enable easier updates.

With AWS Lambda, there are no new languages, tools, or frameworks to learn. You can use any third party library, even native ones. You can also package any code (frameworks, SDKs, libraries, and more) as a Lambda Layer and manage and share them easily across multiple functions. Lambda natively supports Java, Go, Power Shell, Node.js, C#, Python, and Ruby code, and provides a Runtime API which allows you to use any additional programming languages to author your functions. AWS Lambda manages the entire infrastructure to run your code on highly available, fault-tolerant infrastructure, freeing you to focus on building differentiated back-end services. With Lambda, you never have to update the underlying OS when a patch is released, or worry about resizing or adding new servers as your usage grows. AWS Lambda seamlessly deploys your code, does all the administration, maintenance, and security patches, and provides built-in logging and monitoring through Amazon Cloud Watch.

Lambda has built-in fault tolerance. AWS Lambda maintains compute capacity across multiple Availability Zones in each region to help protect your code against individual machine or data center facility failures. Both AWS Lambda and the functions running on the service provide predictable and reliable operational performance. AWS Lambda is designed to provide high availability for both the service itself and for the functions it operates. There are no maintenance windows or scheduled downtimes. AWS Lambda supports packaging and deploying functions as container images, making it easy for customers to build Lambda based applications by using familiar container image tooling, workflows, and dependencies. Customers also benefit from the operational simplicity, automatic scaling with sub-second startup times, high availability, native integrations with 140 AWS services, and pay for use billing model offered by AWS Lambda. Enterprise customers can use a consistent set of tools with both their Lambda and containerized applications for central governance requirements such as security scanning and image signing.

CHAPTER 5

RESULT & DISCUSSION

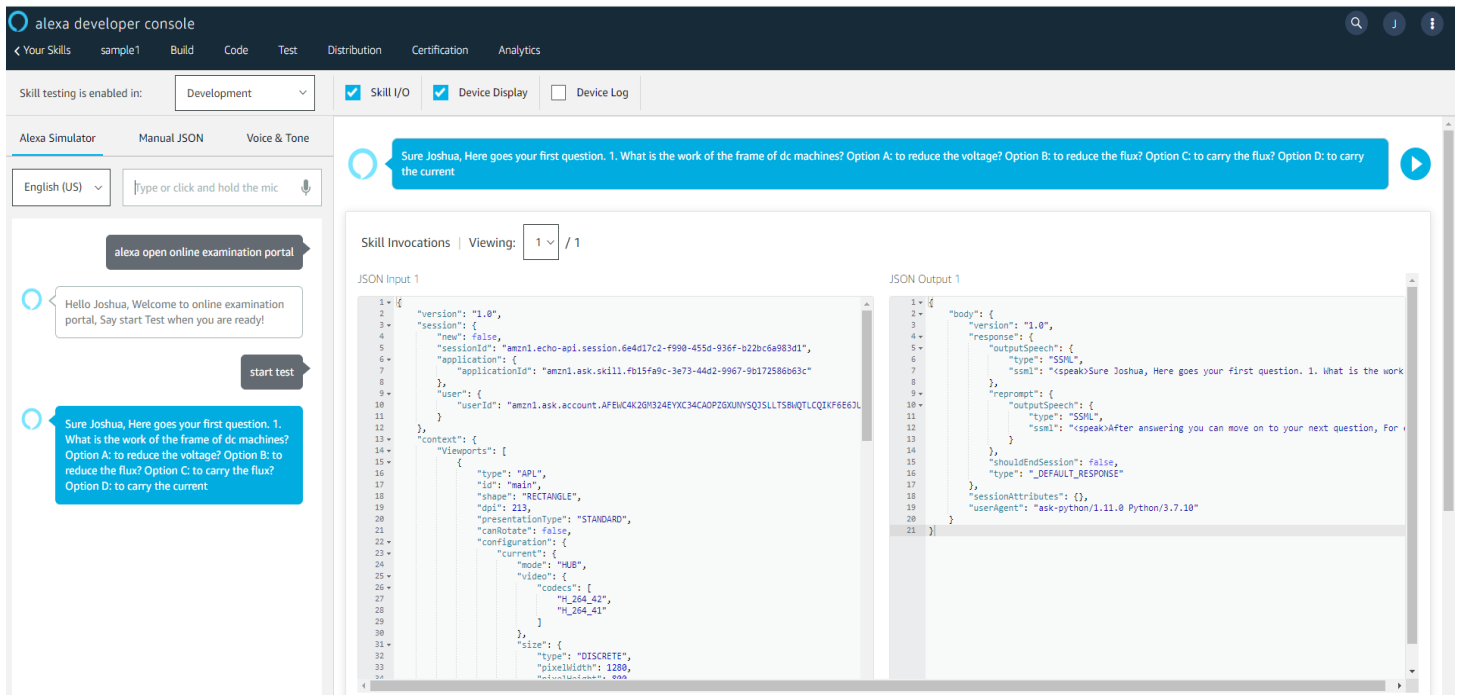


Fig No. 5.1 Developer Mode

We skilled up this Amazon Alexa Echo to perform and conduct Online Examinations for visually challenged people. By using various lambda functions and skilllets for performing the test. In this fig no. it is an Amazon AWS console as a developer using test the conditions of the skills. So that we can check the skill is working as per the creator or not. After that uploading, the skills set to the Amazon cloud server for using it in our Alexa echo dot. The skill can be used in our Alexa which was uploaded through the account.

In Developer mode, we can check whether the skill which is made is working or not.

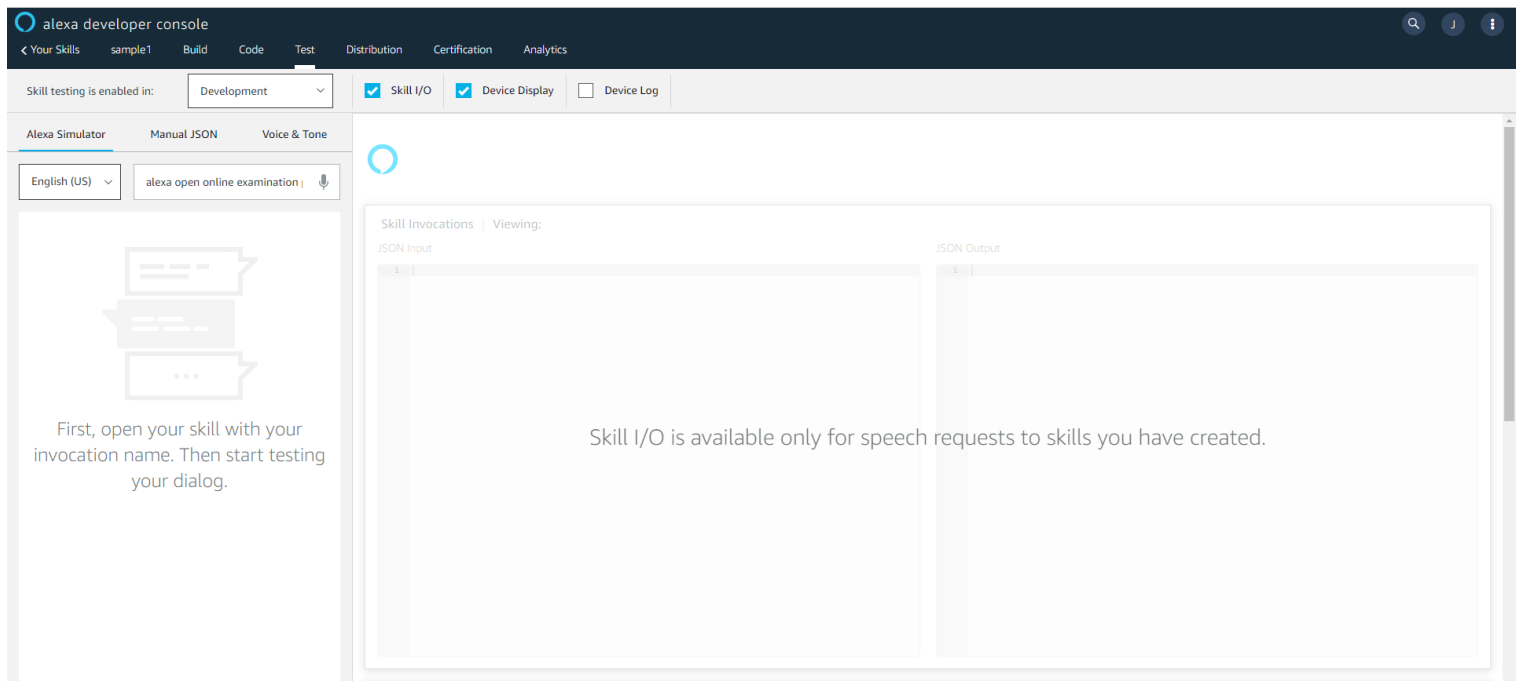


Fig No.5.2 Checking in Developer mode

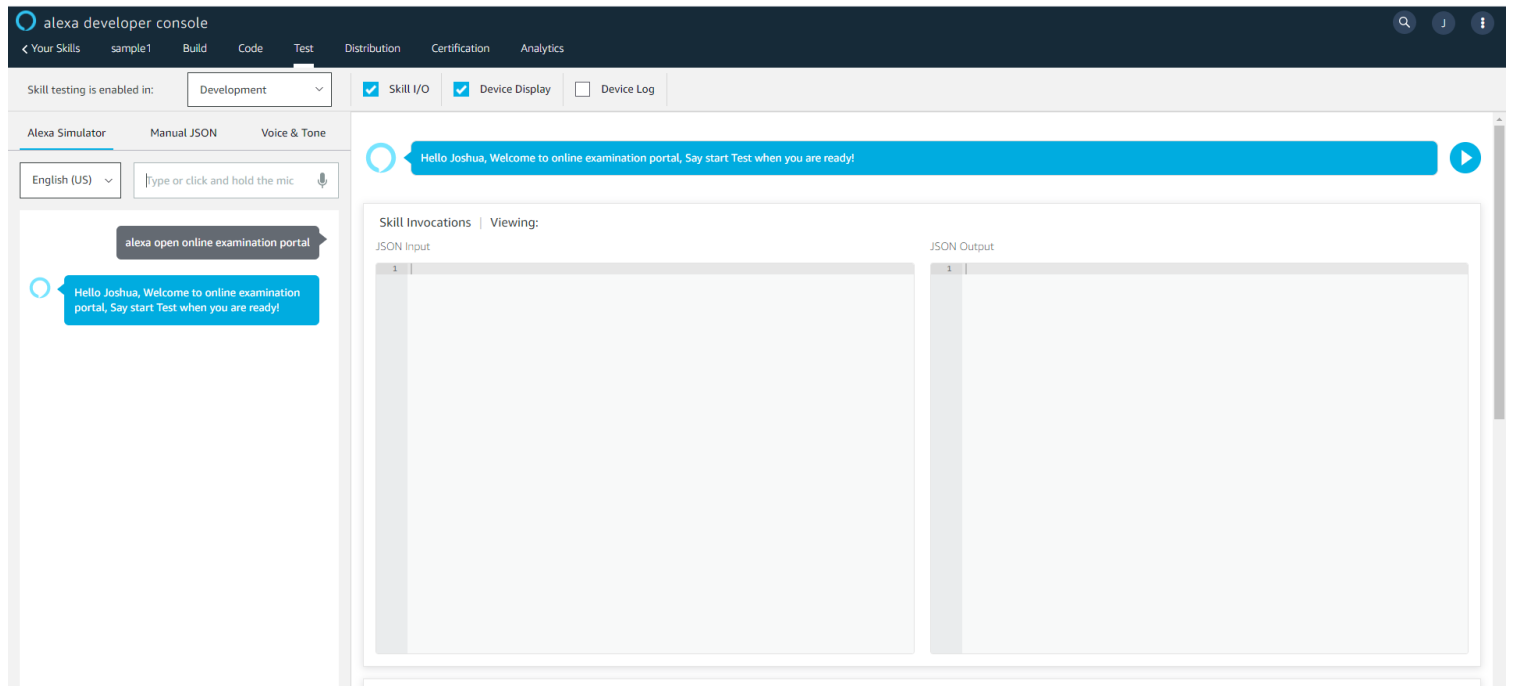


Fig No.5.3 Asking Alexa to Open Examination Portal

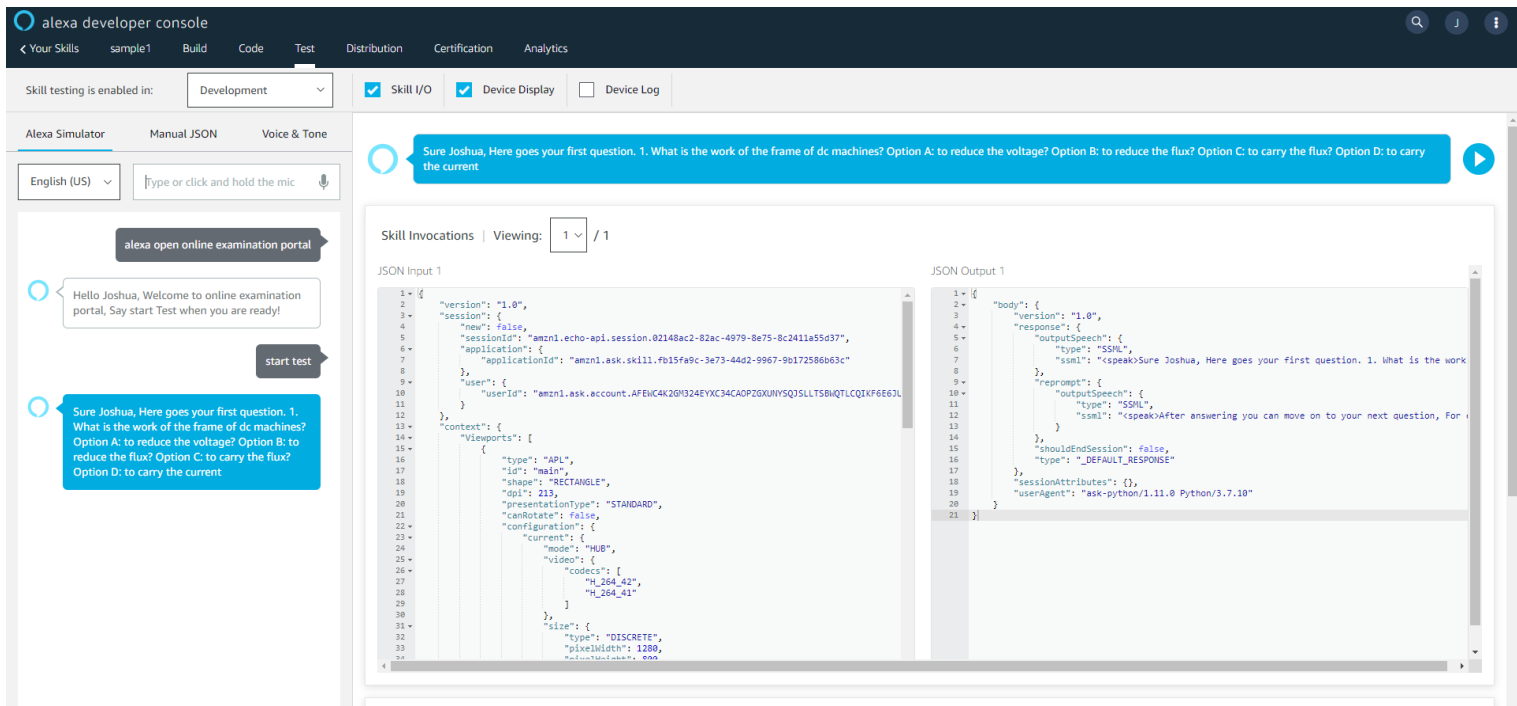


Fig 5.4 Conducting Examination through Alexa

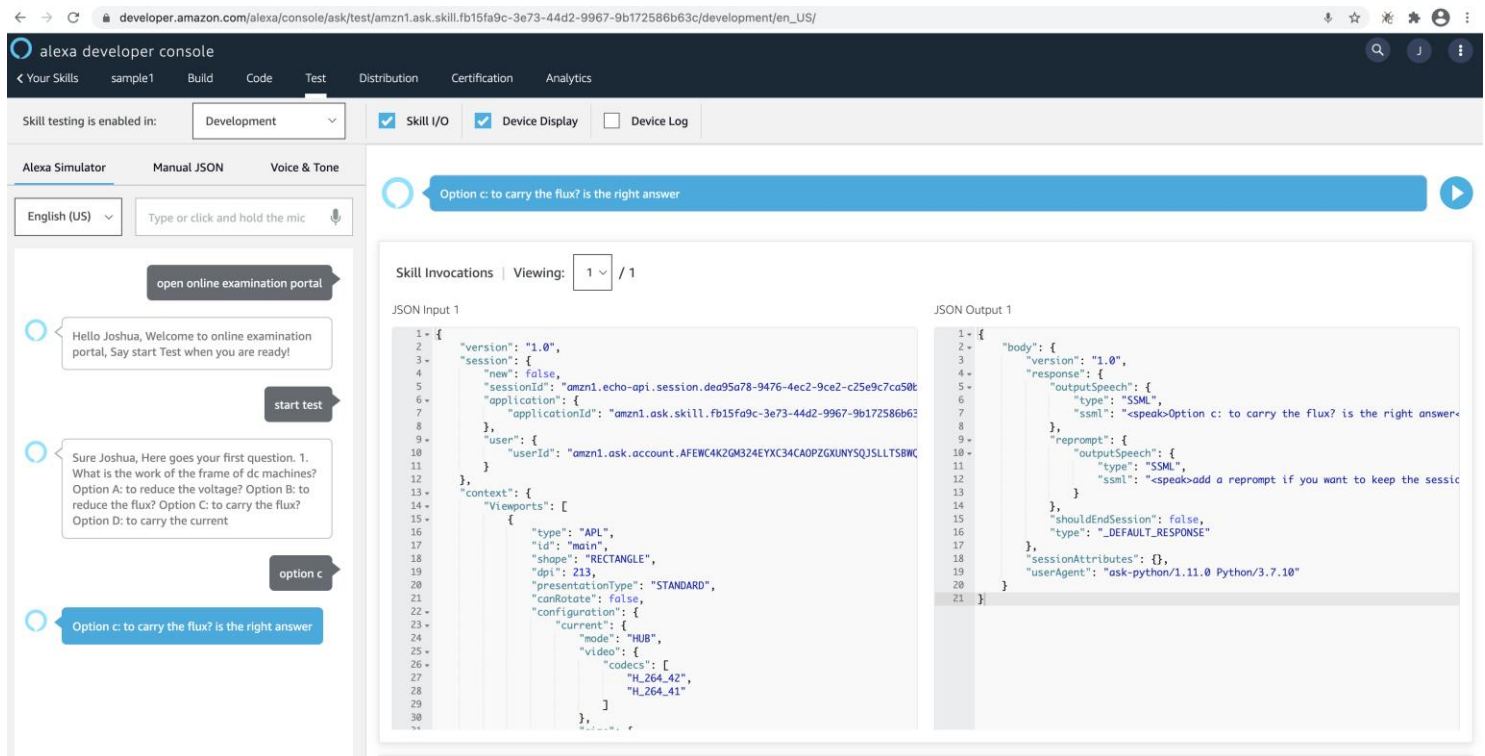


Fig No.5.5 Selecting the option for the question

developer.amazon.com/alexa/console/ask/test/amzn1.ask.skill.fb15fa9c-3e73-44d2-9967-9b172586b63c/development/en_US/

alexa developer console

< Your Skills sample1 Build Code Test Distribution Certification Analytics

Skill testing is enabled in: Development

☒ Skill I/O ☒ Device Display ☐ Device Log

Alexa Simulator Manual JSON Voice & Tone

English (US) Type or click and hold the mic

Sure Joshua, Here goes your first question. 1. What is the work of the frame of dc machines? Option A: to reduce the voltage? Option B: to reduce the flux? Option C: to carry the flux? Option D: to carry the current

option c

Option c: to carry the flux? is the right answer

second question

Here goes your Second question. Why is the length of the yoke made larger? Option A: to protect the armature windings? Option B: to cover the armature windings? Option C: to cover the field windings? Option D: to cover and protect the field windings?

option a

Option A: to protect the armature windings? is wrong answer

Option A: to protect the armature windings? is wrong answer

Skill Invocations | Viewing: 1 / 1

JSON Input 1

```

1 {
2   "version": "1.0",
3   "session": {
4     "new": false,
5     "sessionId": "amzn1.echo-api.session.dea95a78-9476-4ec2-9ce2-c25e9c7ca50b",
6     "application": {
7       "applicationId": "amzn1.ask.skill.fb15fa9c-3e73-44d2-9967-9b172586b63c"
8     },
9     "user": {
10      "userId": "amzn1.ask.account.AFENC4K2QM324EYXC34CA0PZGXUNYSQJSLT5BW"
11    }
12  },
13  "context": {
14    "Viewports": [
15      {
16        "type": "APL",
17        "id": "main",
18        "shape": "RECTANGLE",
19        "dpi": 213,
20        "presentationType": "STANDARD",
21        "canRotate": false,
22        "configuration": {
23          "current": {
24            "mode": "HUB",
25            "video": {
26              "codecs": [
27                "H_264_42",
28                "H_264_41"
29              ]
30            }
31          }
32        }
33      }
34    ]
35  }
36 }

```

JSON Output 1

```

1 {
2   "body": {
3     "version": "1.0",
4     "response": {
5       "outputSpeech": {
6         "type": "SSML",
7         "ssml": "<speak>Option A: to protect the armature windings? is wrong answer"
8       },
9       "reprompt": {
10        "outputSpeech": {
11          "type": "SSML",
12          "ssml": "<speak>add a reprompt if you want to keep the session open"
13        }
14      },
15      "shouldEndSession": false,
16      "type": "_DEFAULT_RESPONSE"
17    },
18    "sessionAttributes": {},
19    "userAgent": "ask-python/1.11.0 Python/3.7.10"
20  }
21 }

```

Hub Landscape Medium

Fig No.5.6 Selecting the answer for the next question

CHAPTER 6

CONCLUSION AND FUTURE SCOPE

By using Machine Learning, we can build skills to perform various activities and tasks. We can use ML and make Alexa read out the question from the pdf or scanned copies to conduct the exam. And it can be used to conduct an exam without entering the data into the Amazon server every time we use it. Just need to upload the pdf or word or scanned copy to the Alexa so that it can be converted with the help of ML to conducting an exam.