

Building Chatbot with Amazon Lex

Summary - This project showcases a series of chatbots built using Amazon Lex, integrated with AWS Lambda, to simulate intelligent, real-time conversational interfaces. The chatbot handles greetings, fallback cases, user-specific data queries (like account balances), and fund transfers.

Objective - To build a chatbot that automates basic banking inquiries and transactions, using Amazon Lex's NLP capabilities combined with serverless computing from AWS Lambda.”

Technologies and services used

- Amazon Lex
- Amazon Lambda
- IAM
- Amazon Console
- NLP concepts like **Utterances, Slots, Fallback, Context Tags**
- Python(lambda code function)
- Cloud Formation

What is **Amazon Lex** and how is it used?

Amazon Lex is a **Natural language Processing** (understands the user input) service used for building interfaces like chatbots by using text and voice . Holds conversations with the help of **Intents** and **Slots**.

Use case of these Chatbots

1) Customer service support - Automatic answers to FAQs, creating appointment for person chat support based on responses of user.

2) Banking - account balance inquiries, fund transfer, Checking Transactions history of account.

3) E-commerce - Product recommendations, Order purchases, Order tracking, Shopping assistance by changing filters, size, colour, price etc.

These chatbots can be trained specifically to generate correct and relevant responses to the user without any person to respond.

Features Implemented

1 . **Intents** - intent is what user is trying to achieve with a conversation to a chatbot.

An Example of intents are : - Checking Bank balance, Ordering a product, Booking a ticket , Q and A response from FAQs etc.

2 . **Welcome Intent**

Welcome Intent is used for Greeting users with friendly message like

“Hello I am Banking Bot how can I help you. today”

3 . **Fallback Intent**

Fallback Intent manages unknown queries which are not related to intent of the chatbot , and generates a response to user like

”could you please ask me about banking details, I can help you with that”

4 . **Check Balance Intent**

Allows to check bank balance of specified **account Type**.

Add slot types Date and Date of Birth to check whether is eligible or not.

5 . **Utterances**

Utterances are example questions or phrases to trigger specific intent in lex chatbot.

utterances helps lex in identifying the correct intent type , even if word are slightly different.

6 . **Custom Slot Types**

- Added blank slot type as **account Type** slot for checking user bank balance.
- Defined Restricted slot values to control input quality in Slot resolution.
- Added **Checking** , **Savings** and **Credit** as Slot values helps lex to accept only specific topics for account type.

7 . **Lambda Integration**

- Created an lambda function and deploy the code
- Used AWS Lambda to simulate account balance responses

- Connected Lex to Lambda using code hooks for real-time logic

8 . Context Tags for Seamless Conversations

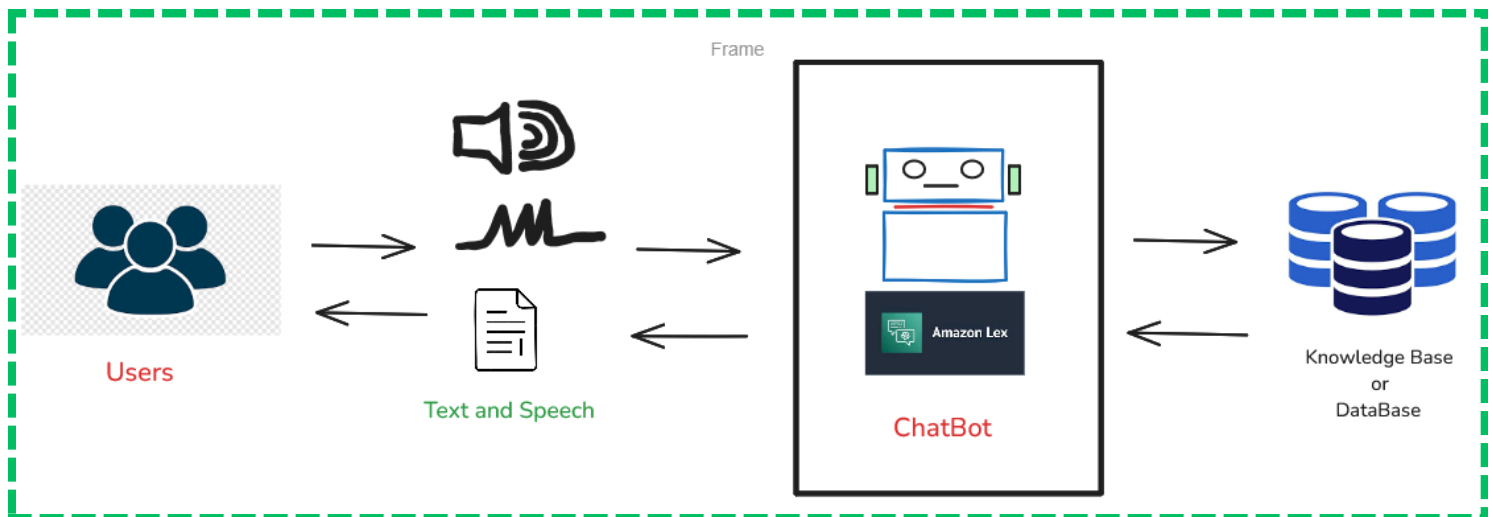
- Used output and input context tags to remember user data (e.g., Date of Birth)
- **Output context tag** will tell chatbot to remember details after conversation to save later example - Account type
- **Input context tag** will check for specific details which are already available like “Date of birth”

9 . Multi-Slot Interaction (Transfer Funds)

- Built **TransferFunds intent** with multiple slots
- Add slots **Source Account type, target Account type** with slot type as accountType
- Add slot **transferAmount** with slot type as Number
- Enabled confirmation prompts to validate transactions

10 . CloudFormation

- Used Infrastructure-as-Code (IaC) to deploy the full chatbot configuration with a file template and can create , update and delete stack as needed.



Workflow of Chatbot

User input - User starts a conversation through text or speech.

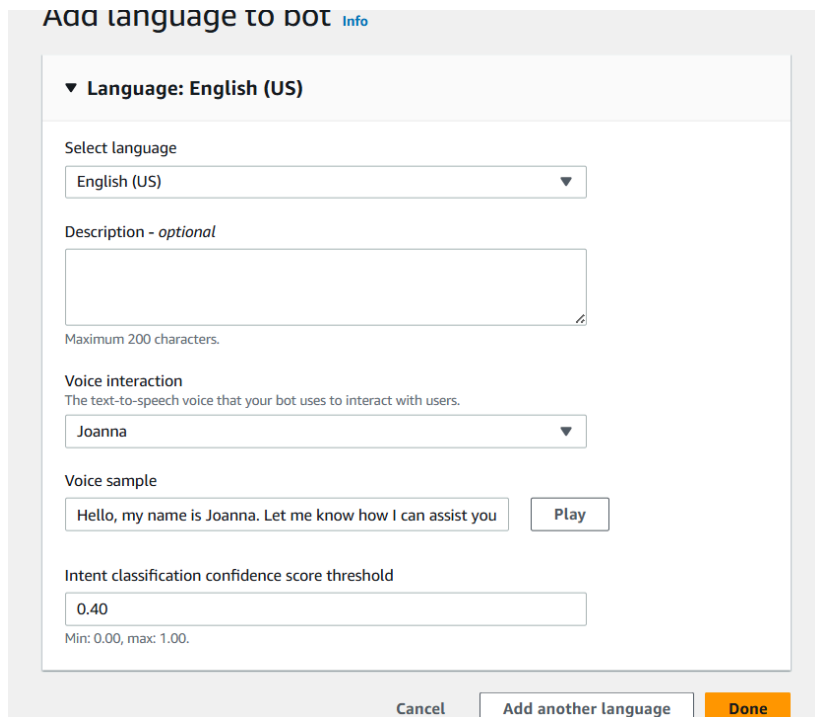
Processing - Chatbot process the input to understand user intents and extract relevant information .

Information retrieval - Here chatbot will access knowledge base or database .

Response Generation - Chatbot will formulate a response based on the processed input and retrieved information from KB or DB .

User Output - Chatbot will generates response to user in form of text or speech.

Setting up Chatbot



The screenshot shows a configuration window titled "Add language to bot" with an "Info" link. The window is set to configure the language "English (US)". It includes a dropdown for "Select language" (currently showing "English (US)"), a text area for "Description - optional" (with a "Maximum 200 characters" note), a "Voice interaction" section with a dropdown for the voice (currently "Joanna") and a "Voice sample" section with a text input "Hello, my name is Joanna. Let me know how I can assist you" and a "Play" button. At the bottom, there is an "Intent classification confidence score threshold" input field set to "0.40" (with a "Min: 0.00, max: 1.00" note). The window has three buttons at the bottom: "Cancel", "Add another language", and "Done".

Add language to bot [Info](#)

▼ Language: English (US)

Select language

English (US)

Description - optional

Maximum 200 characters.

Voice interaction

The text-to-speech voice that your bot uses to interact with users.

Joanna

Voice sample

Hello, my name is Joanna. Let me know how I can assist you

Play

Intent classification confidence score threshold

0.40

Min: 0.00, max: 1.00.

Cancel Add another language Done

Slots

Slot type values

Modify the list of values used to train the machine learning model to recognize values for a slot.

Q Search slot type values

Checking

Tab or ; or enter return for new value



Savings

Tab or ; or enter return for new value



Credit

Tab or ; or enter return for new value

Add value

credit card



visa



mastercard



amex



american express



Maximum 140 characters. Valid characters: A-Z, a-z, 0-9, @, #, \$

☐ Use slot values as custom vocabulary [Info](#)

▼ Slots (2) - optional [Info](#)

Information that a bot needs to fulfill the intent. The bot prompts for slots required for intent fulfillment, in priority order below.

Add slot

Q Filter

▶ Prompt for slot: accountType

Message: For which account would you like your balan...

Slot type

accountType



▼ Prompt for slot: dateOfBirth

Message: For verification purposes, what is your date ...

Slot type

AMAZON.Date



☒ Required for this intent

The bot will prompt for this slot during the conversation if a value is not provided by the user.

Name

dateOfBirth

Slot type

AMAZON.Date



Prompts

For verification purposes, what is your date of birth?

Intents

Sort by last updated ▼

FollowupCheckBalance **Unsaved**

CheckBalance

FallbackIntent

WelcomeIntent

Representative phrases that you expect a user to speak or type to invoke this intent. Amazon Lex extrapolates based on the sample utterances to interpret any user input that may vary from the samples. The priority order of the sample utterances is not used to determine intent classification output.

To generate utterances, you must have permissions to Amazon Bedrock. Amazon Lex will make calls to Amazon Bedrock. Additional charges may be incurred based on the usage of Amazon Bedrock. [Learn more](#)

Filter

Sort by added (ascending) ▼

Preview

Plain text

How about my {accountType} account?

What about {accountType} ?

And in {accountType} ?

Editor

Visual builder

New

Save intent

Banking Bot

Test Draft version
Last build submitted: 4 minutes ago

Inspect

hello

Hi! I'm BB, the Banking Bot. How can I help you today?

i like to transferr funds

Which account would you like to transfer from?

visa

Ready for complete testing

Type a message

Test Draft version
Last build submitted: 4 minutes ago

Inspect

visa

Which account are you transferring to?

savings

How much money would you like to transfer?

50000

Ready for complete testing

Type a message

Test Draft version
Last build submitted: 5 minutes ago

Inspect

50000

Got it. So we are transferring 50000 from Credit to Savings. Can I go ahead with the transfer?

yes

The transfer is complete. 50000 should now be available in your Savings account.

Ready for complete testing

Type a message

Test Draft version
Last build submitted: 14 minutes ago

Inspect

Which account are you transferring to?

savings

How much money would you like to transfer?

259

Got it. So we are transferring 259 from Savings to Savings. Can I go ahead with the transfer?

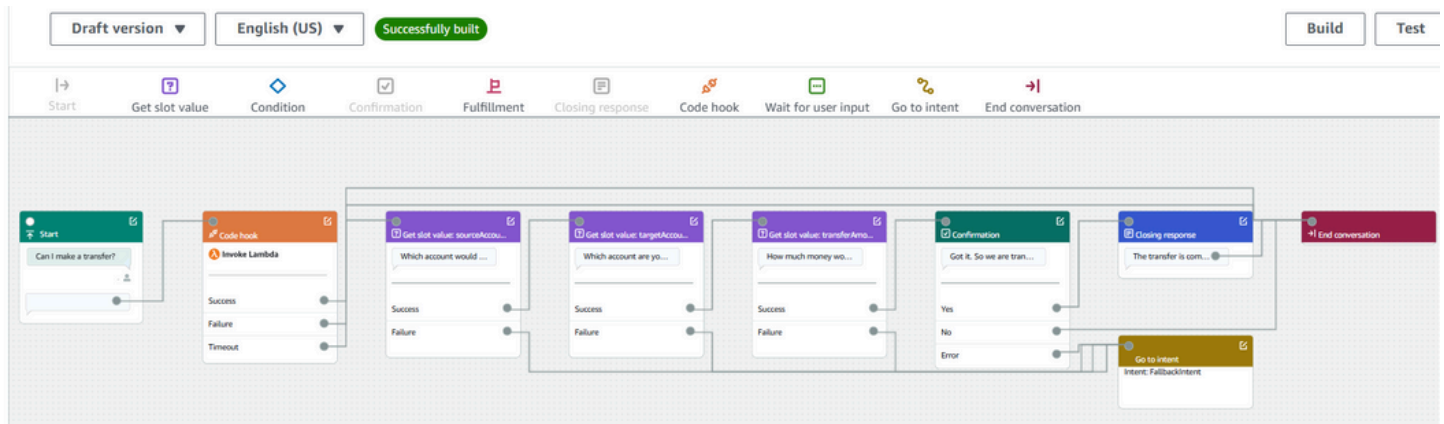
no

The transfer has been cancelled.

Ready for complete testing

Type a message

Visual Representation flow of chatbot



Key Takeaways

- Building a chatbot was easy with Amazon Lex with help of built-in tools.
- Slot type and context tags are important for gathering inputs and helps in managing conversation flow of user with correct information.
- Managing the chatbot to handle the fallback intent and generating responses human - friendly.
- These chatbots can be used in industries like banking, customer support which automates common tasks and improves the user experience.

Conclusion

This project provides hands-on experience of creating a Banking Bot that can greet, check bank balance, Transfer funds and handle fallback which it doesn't understand. With Amazon Lex and Lambda creating serverless chatbots for interaction with users.

These tasks of creating intents, Slots, Utterances, tags can be automated with the help of Cloud Formation, where it is a Infrastructure as a Code(Iaas) where single file can be uploaded and can update, modify or delete the chatbot configurations as needed.