

An Intelligent Chatbot for College Enquiry with Amazon Lex

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Abstract - People are constantly looking for new ways to use technology to make their lives easier as the number of mobile and web-based applications has grown significantly. Chatbots are now an essential component of daily life with a variety of applications & software handling day-to-day tasks. One of the most remarkable and promising developments in human-machine interaction is the chatbot. We are going to implement a virtual assistant based on artificial intelligence that can solve college related queries. This chatbot can deal with the various queries of the stakeholders like admission enquiry, fees structure, scholarship details, etc. This paper focuses on creating a College Enquiry Chatbot using Amazon Lex to help the stakeholders solve various queries.

Key Words: chatbot, Machine Learning, Amazon Web Services, Amazon Lex, Artificial Intelligence

1. INTRODUCTION

The ability of chatbots to solve problems, use less time, and save money is driving up demand for them. Chatbots are changing the way of communication over the past few years. Natural language processing, machine learning, robotics along with e-service agents, also commonly referred to as chatbots, are regarded as the best known applications of artificial intelligence to date [2]. Therefore, a chatbot is the most accessible system for any user and is always available. Internet access and a mobile device or other laptop device can be used by anyone, anywhere, at any time, without any issues, to resolve questions. College Chatbot uses machine learning concepts to have conversations with humans. Typically, chat bots offer a text-based user interface that enables users to enter commands and get text responses in order to solve problems.

For the development of chatbots, many businesses offer both proprietary and open source platforms. One such solution for integrating voice and text-based conversational interfaces into any application is Amazon Lex, a component of Amazon Web Services. Amazon Lex, a flexible chatbot framework uses Natural Language Processing and Machine Learning capabilities. One may create anything using Amazon Lex, from straightforward messaging bots to enterprise systems.

In this paper, we focus on creating a college enquiry chatbot using Amazon Lex. This paper covers the following: Section 2 provides the literature survey, while Section 3 examines the features of Amazon Lex, section 4 discusses the proposed system. Section 5 provides result-interaction with the bot, Section 6 concludes the whole paper.

2. LITERATURE SURVEY

Numerous applications can be made using artificial intelligence. A wide range of businesses, including marketing, education, banking, healthcare, and finance, can use chatbots. Chatbot systems need to incorporate both Natural Language Processing (NLP) and Machine Learning (ML) technology to do this.

A response to various queries was created using AIML by P.Nikhila, G.Jyothi, K.Mounika, Mr. C. Kishor Kumar Reddy, and Dr. B.V. Ramana Murthy [5]. (Artificial Intelligence Mark-up Language). Alicebot is a chatbot application that is supported by ALICE free code and is created or customised using AIML.

A synthetic chatbot based on NLP (Natural Language Processing) was suggested by Nitesh Thakur, Akshay Hiwrale, Sourabh Selote, Abhijeet Shinde, and Prof. Namrata Mahakalkar [6]. NLP can be done in two ways: written text and vocal or voice dialogue. Communication via writing is much simpler than spoken communication. In virtual human discourse systems, this study investigates some fresh possibilities for interpreting and processing information at ever-evolving speeds [6].

Yurio Windiatmoo, Ridho Rahmadi, and Ahmad Fathan Hidayatullah [8] developed a deep learning-based chatbot that could be linked with Facebook Messenger.

3. Amazon Web Services

AWS is an Amazon subsidiary that offers management, cloud computing, and data analytics services, etc. AWS provides an inbuilt infrastructure. Business applications, robotics, content distribution, consumer interaction, end-user computing, storage, machine learning, developer tools, databases, game technology, and media services are among the services it offers.

AWS's Amazon Lex service allows developers to incorporate speech and text-based conversational interfaces into any application. With the help of advanced deep learning capabilities from Amazon Lex, customers can create applications with incredibly engaging user interfaces and realistic conversational interactions. These capabilities include Automatic Speech Recognition and Natural Language Understanding to identify text intent. Anyone with programming skills may instantly construct talking chatbots with Amazon Lex. It controls the dialogue and dynamically modifies the responses. Amazon Lex can be readily linked with many other AWS technology platforms, including Amazon Cognito, AWS Mobile Hub, Amazon CloudWatch, and Amazon DynamoDB, and includes a pre-built interface with AWS Lambda. For linking to data in SaaS platforms like Salesforce, HubSpot, etc., integration with Lambda gives bots access to pre-built serverless enterprise connectors.

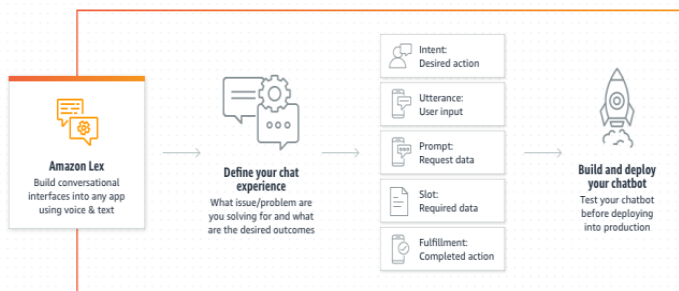


Fig 1: Amazon Lex

Advantages of Amazon Lex includes [7] :

1. **Simpleness:** Amazon Lex creates a complete natural language model from just a few example phrases we provide, enabling the bot to communicate via speech and text to ask questions, receive responses, and carry out complex activities.
2. **Democratized deep learning technologies:** The Speech Language Understanding (SLU) system is built using ASR and NLU technologies from Amazon Lex, which uses the same technology as Alexa. Through SLU, Amazon Lex accepts natural language speech and text input, deciphers the user's purpose, and then satisfies it by calling the relevant business function.
3. **Seamless deployment and scaling –** Amazon Lex enables to easily publish voice or text chatbots for use on mobile devices, web apps, and chat services
4. **Built-in integration with the AWS platform:** Amazon Lex has native interoperability

with other AWS services, including Amazon Cognito, AWS Lambda, Amazon CloudWatch, and AWS Mobile Hub.

5. **Cost-effectiveness :** There are no minimum fees or up-front expenditures with Amazon Lex. Only the text or speech requests that are made result in a charge . The service is a cost-effective solution to create conversational interfaces because of the pay-as-you-go pricing and minimal cost per request.

4. Proposed System

The user's basic information is collected by the bot, which then processes it and shows the user the search results.

Intents: A user's intended action is represented by an intent. When an end-user interacts with the bot, the user's query is matched to the best intent available in the bot. EveryA user's requested action is represented by an intent. The user's query is matched to the best intent the bot has when the user interacts with it. There is a set of sample utterances for each intent. The user's query is matched with sample utterances. A bot can be set up to handle multiple intents as well. Combining intents makes it possible to handle difficult conversations.

Sample utterance : This is a collection of possible end expressions. These are basically phrases that have the same meaning as our stated intent. When configuring the intent, several expressions are offered. The user's requests are categorized using a model created using these expressions. This model determines the user's intent when they use any of these sentences. The best match is activated when many intents match.

Fulfillment: When an intent is activated, the bot responds by sending a fulfillment. Two definitions of fulfillment exist: Create a Lambda function that will be called when the intent is triggered. Amazon recommends creating a Lambda function to fulfill the functions. The Lambda function will carry out the action and choose which response to give to the user after receiving all the information from Lex (intent detail and slots). b) Lex returns to the data (intent detail and slots) back so that it can complete the necessary fulfillment.

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Slots: The parameters included in the intent configuration are referred to as slots. The value of a slot is dynamically taken from the user's query at runtime.

Slots hold structured data that can be utilized to quickly execute logic or produce results. Each slot has a type that determines what kind of value it will hold. Lex has a few built-in intents and slot kinds to extract the essential data. e.g., city names, dates, and some units of measurement

The intents are particular to the kind of query the user provides. Some of the intentions include information about their academics, announcements, timetables, course specifics, attendance, academic prompts, and details about various clubs of the college. The AWS S3 (Simple Storage Service), a service that offers object storage through a web service interface that is linked to the chatbot, supplies all of this data.

5. Result

The goal of the system is to address the various needs of the stakeholders.

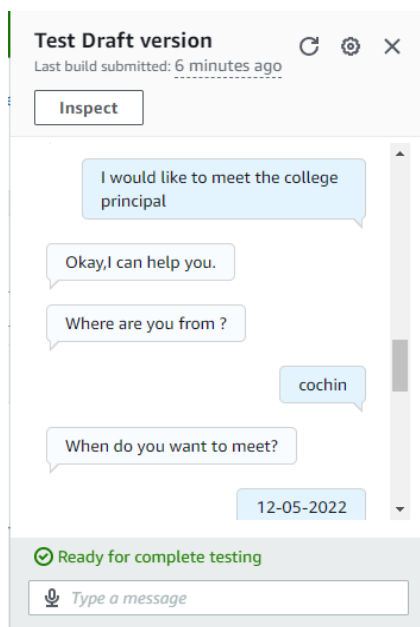


Fig 2: Interacting with chatbot 1

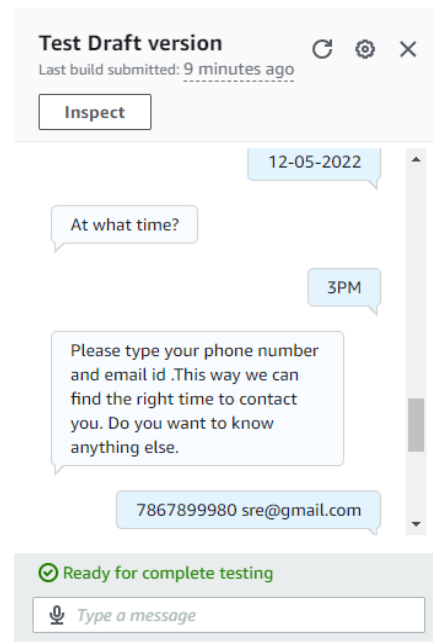


Fig 3: Interacting with chatbot 2

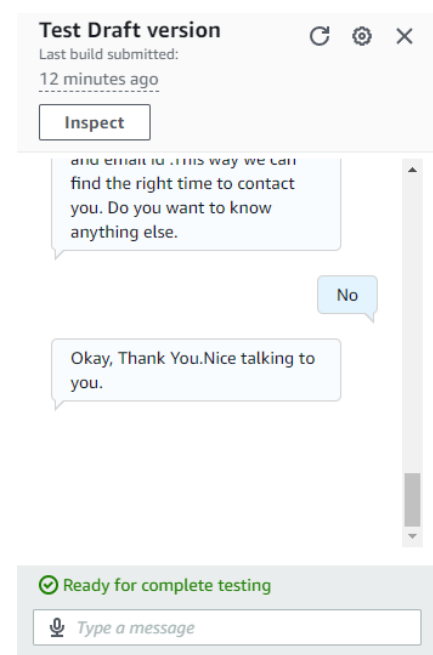


Fig 3: Interacting with chatbot 3

6. CONCLUSION

The proposed system reduces the paperwork, labour, and time required by each person.. In this paper we had developed a chatbot which can interact with various users by means of reducing the time for visiting the college to enquire about the details/information regarding admissions, college activities etc. For queries unrelated to the intents described in the chatbot, a generalized

response is generated, and such questions have to be checked later and included to the datasets

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