International Journal of Scientific Research in Engineering and Management (IJSREM)
Volume: 07 Issue: 04 | April - 2023 Impact Factor: 8.176 ISSN: 2582-3930

CONVERSATIONAL AI FOR TOURISM [TravelBuddy]

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Abstract – ***Due to the rapid increase in the demand for information that supports tourists after, before, and during the trip, many tour systems are available. However, these types of systems are not able to successfully replace a human tourist guide which is expensive to hire. The primary key qualities of a human tourist guide are his/her knowledge about that place, communication skills, and interpretation of destination attractions. Traditional tourist facilitator systems are lacking in these qualities. The main idea of the research is to design an agent to guide tourists, provide them accurate information about tourist places, without having any bound for a specific region and it will have human-like communication skills along with the point of interest knowledge, which depends on its internal knowledge base as well as its online searching techniques.***

Key words: Application Programming Interface, Natural Language Processing, AI Chatbot

I. INTRODUCTION

Tourism industry is one of the major contributors of Gross Domestic Product (GDP) in India. Tourism industry does not only include travel sector but also allied sectors like hospitality, transport, entertainment and escorts. Smaller businesses like shops, emporiums, hawkers, etc. Also depend on tourism industry at tourist destinations. The world changed dramatically a few years ago because of the the immense development of technology. Due to the evolution of technology, tourism is currently increasing at an extensive range. In the modern world, people like to travel frequently and most of them use navigator devices and some other options like the internet for information retrieval about a particular point of interest, which requires a lot of time and effort. Whenever people visit a city/country, their primary concern is to find its tourist information. They can access maps and obtain information about points of interest such as museums, parks, historical places and hotels, etc. Tourist can find relevant information about their point of interest through the internet by scrolling a lot of web pages. Mostly, people focus on particular websites, which are designed for this purpose. These systems are helpful but none of them can replace a human guide due to lack of communication facility

Previously many tourist guide systems have been proposed, but they lack different features that are significant for any tourist guide system. A human tourist guide has some qualities, which include interpretation, knowledge about destination attractions, communication skills, but the currently available systems do not have such qualities so we cannot fully depend on these systems as compared to human guides. Almost all available systems only focus on some ordinary modules like the point of interest, route map, and some tourist services but there is no such a system that can communicate with users and answer their questions like a human guide. System based on Conversational AI can be used here

TravelBuddy is a conversational AI application developed for Indian tourism. The main aim of this project is to provide travelers with a personalized travel guide that can assist them throughout their journey. The problem we are

trying to solve is to give travelers a way to plan their trip and get personalized recommendations according to their preferences. Conversational AI is a type of artificial intelligence that enables computer programs to engage in natural dialogue with humans. This technology allows users to communicate with machines in a way that feels more like a conversation than traditional forms of interaction.

II. LITERATURE REVIEW

Technology and large amount of data has made difficult for tourist to receive the exact information online in required time. There are various chatbot or question answering system developed but very few provide correct and efficient answers. A well-developed system has to fetch the user query in form of natural language, and give correct and precise answer to users questions. The agent should generate more appropriate responses while communicating with users.

Following are the existing applications available:

1. **Design of information system architecture for the recommendation of tourist sites in the city of Manta, Ecuador through a Chatbot**
   Nowadays, the development of computer systems for service recommendations is becoming increasingly common. On Internet, users can find from recommended web sites that appear as advertising, to virtual assistants that interact with the people through -per example- a chat. The current paper will present a solution for the recommendation of tourist places of the city of Manta, Ecuador. These recommendations will be performed through the decision trees algorithm and will have a chatbot as user interface in Facebook Messenger. The presented solution integrates different components, and this paper will describe the proposal by means of diagrams of software architecture. Within these components, the integration of Web services such as IBM Watson Assistant and Google Dialog flow will be presented. In this paper, the authors present the technological solution developed between the Informatics Engineering section of Pontifical Catholic University of Peru (PUCP), and the Faculty of Tourism, hospitality and gastronomy of University "Eloy Alfaro" of Manabí (ULEAM), Ecuador. The solution is the development of a mobile application that allows access to tourist information about the city of Manta, Ecuador, using a chatbot. As a tourist destination, this city still lacks reliable and centralized information that could be checked in by tourists who visit it, the reason for which, a computer solution is developed to address this problem.

2. **An Interactive Voice Assistant System for Guiding the Tourists in Historical places**
   This paper examines the imminent of a voice empowered route aide for an individual client in an obscure landscape. This paper opens up the chance of the route framework for the individual clients to give the exact area data in the new landscape. It is probably going to grip a substantially more critical blow in broad daylight places, for example, clinics, transport stations, railroad stations, air terminals and shopping-shopping centres. This paper utilizes Google Map API to give data. This framework is a selfoverseeing program which is cost ideal and permits the local clients to get to this program. Local clients who don't know about the exact area in the tremendous territory will discover this administration as the most useful one. The essential target in the plan of this paper depends on the Human-Machine communication. This framework is attractive for the people to go in the obscure landscape with the assistance of voice empowered property through the Android App. We execute Speech affirmation procedure, which is the path toward changing over a talk sign to a movement of words by strategies for a figuring realized as a PC program. Discourse is the simplest type of correspondence and henceforth we are utilizing this quality in our paper and actualized in the App. Indeed, even the unskilled people can talk and can speak with the Android application which we created.

3. **E-Commerce Assistance with a Smart Chatbot using Artificial Intelligence**

   In this present research we use design science analysis to express chatbot design awareness in higher

education. For previous research into the design process, we carried out a literature review. Furthermore, we studied the content of student emails and forum articles from four instances of a fundamental Java programming course. We introduce a conceptual architecture for chatbots in higher education from literature and evidence and show how this is applied. We conclude with a debate with tentative design recommendations and a plan for further research. Chatbot rules-based program performs prefixed acts based on "playbooks" that you have setup at the back of the user interface. Just like a virtual assistant, chat-based rules-based technologies can function on the basis of click acts, such as "Yes" against "No. "Website and social networking outlets have become more and more popular places for people to voice their opinions on different issues, in particular their frustrations with brands and corporations.

This paper have developed an e-commerce engine that has a list of items that can be searched by Chatbot for demonstrating the idea of the project. The site is automatic and can simply be built into the Chatbot. The height of "pick and order" is incredibly versatile. The data base of the agent is the cornerstone of data availability and storage, but it is not accessible to the customer. Forging a bot takes the load from the computers on our servers, protecting users from needless storage problems. The customer will be happy to be tell when the orders.

III. METHODOLOGY

In recent years, the growth of conversational AI has been fueled by the rise of messaging apps and the development of artificial intelligence technologies such as machine learning and natural language processing (NLP). Today, conversational AI is being used in a wide range of applications, including customer service, sales, marketing, and website navigation.

Following are all the different components and algorithms/ Technologies are used in the project:

1. Natural Language Processing (NLP)

Natural Language Processing is the automatic manipulation of natural language, like speech and text, by software.
There are a number of human errors, differences, and special intonations that humans use every day in their speech. NLP technology allows the machine to understand, process, and respond to large volumes of text rapidly in real-time. Several methods are used to understand the words and intentions of the user who is communicating within a context: from a simple search of text patterns in the user's messages to more advanced artificial intelligence techniques applied to human language. These methods are those that make it possible to simulate a real conversation with a human and understand what the user is, in fact, looking for. The advances in this area will be present in the construction of the chatbot that will be used in the proposed solution.

NLP Module further has two components:

- Intent Classifier: Intent classifier takes user's input identifies its meaning and relates back to one of the intents that the chatbot supports.
- Entity Extractor: Entity extractor is what extracts key information from the user's query.

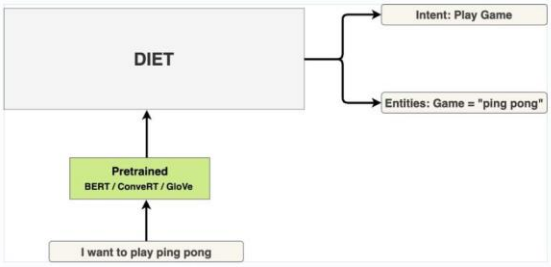
We have used DIET Classifier for entity extraction and intent classification, which is a crucial component of chatbot development..

2. DIET (Dual Intent and Entity Transformer)

DIET is a multi-task transformer architecture that handles both intent classification and entity recognition together. It provides the ability to plug and play various pre-trained embeddings like BERT, Glove, ConveRT, and so on. Large-scale pre-trained language models aren't ideal for developers building conversational AI applications.

DIET is different because it:

A. Is a modular architecture that fits into a typical software development workflow
B. Parallels large-scale pre-trained language models in accuracy and performance
C. Improves upon current state of the art and is 6X faster to train



high level illustration of DIET

3. RASA

Rasa is an open source machine learning conversational AI platform that allows you to understand and hold conversations, and connect to messaging channels and third party systems through a set of APIs

It Consists of 2 components –

A. NLU: Ear of assistant. Help assistant to understand what is being said. It Takes user input in an unstructured human language and extract structured data in form of intents and entities.

B. Dialogue Management (Core): - Brain of Assistant. Makes decision of how an assistant should respond based on specific state of conversation as well as context. - Core learns by observing patterns from conversational data between user and Assistant.

Rasa Open Source uses YAML as a unified and extendable way to manage all training data, including NLU data, stories and rules. You can split the training data over any number of YAML files, and each file can contain any combination of NLU data, stories, and rules. The training data parser determines the training data type using top level keys. The domain uses the same YAML format as the training data and can also be split across multiple files or combined in one file.

4. Retrofit Library

The Retrofit library is a type-safe REST client for Android, Java, and Kotlin, developed by Square. With the help of the Retrofit library, we can have access to a powerful framework that helps us in authenticating and interacting with APIs and sending network requests with Ok Http. With the help of this library, downloading JSON or XML data from a web API becomes easy. In a Retrofit library, once the data is downloaded, it is parsed into a Plain Old Java Object (POJO) which must be defined for each "resource" in the response. Retrofit is an easy and fast library to retrieve and upload data via a REST-based web service.

Retrofit manages the process of receiving, sending, and creating HTTP requests and responses. It resolves issues before sending an error and crashing the application. It pools connections to reduce latency. It is used to cache responses to avoid sending duplicate requests.

5. GPT

GPT is based on a neural network architecture known as a transformer. The transformer architecture was first introduced in a paper by Vaswani et al. in 2017 and has since become a popular choice for natural language processing tasks. The transformer architecture is characterized by its ability to process input sequences in parallel and to attend to different parts of the input at different depths. The development of GPT involved training a transformer-based language model on a massive corpus of text data. The training data consisted of a diverse range of texts, including books, articles, and websites. The training process involved using a variant of the unsupervised learning technique known as masked language modeling. In this technique, the model is trained to predict missing words in a given text sequence.

6. OpenTripMap API

OpenTripMap is open data sources to generate a comprehensive database of geographic data related to tourism. The platform is based on a data model that includes information about points of interest, transportation routes, and other tourist-related features.

The data is stored in a PostgreSQL database and is exposed through a RESTful API.

To generate the data, OpenTripMap uses a variety of open data sources, including OpenStreetMap, Wiki data, and Open Data Switzerland. The platform also includes a feature extraction pipeline that uses machine learning algorithms to identify and extract information from unstructured data sources such as social media and travel blogs. One of the key features of OpenTripMap is its focus on open data and open standards. The platform is built on open-source software and is designed to be easily extensible and customizable.

7. OpenWeatherMap API

OpenWeatherMap is an online service, owned by OpenWeather Ltd, that provides global weather data via API, including current weather data, forecasts, nowcasts and historical weather data for any geographical location. API provides a minute-by-minute hyperlocal precipitation forecast for any location. The convolutional machine learning model is used to utilise meteorological broadcast services and data from airport weather stations, on-ground radar stations, weather satellites, remote sensing satellites, METAR and automated weather stations.

8. Geocoder

Geocoder plugins are software components that enable geocoding functionality in various programming languages and frameworks. Geocoding is the process of converting a location description, such as an address or place name, into geographic coordinates. Geocoder plugins work by communicating with geocoding services, such as Google Maps Geocoding API, OpenStreetMap Nominatim, or Mapbox Geocoding API. These services maintain databases of location information and provide geocoding functionality through web APIs. When a geocoder plugin receives a location description, it sends a request to the geocoding service, which returns a response containing the geographic coordinates of the location.

9. Wikipedia API

The Wikipedia API is a powerful tool for accessing and manipulating content on the popular online encyclopedia, Wikipedia. The API provides a range of functionality, allowing developers to retrieve data, search for articles, and even make edits to pages. The Wikipedia API is a RESTful web service, which means that it uses HTTP requests to retrieve data from the Wikipedia servers. Developers can interact with the API by sending requests to specific endpoints, such as the article endpoint, which retrieves information about a specific Wikipedia article.

IV. RESULT

Following are the snap shots of the TravelBuddy Chat bot .

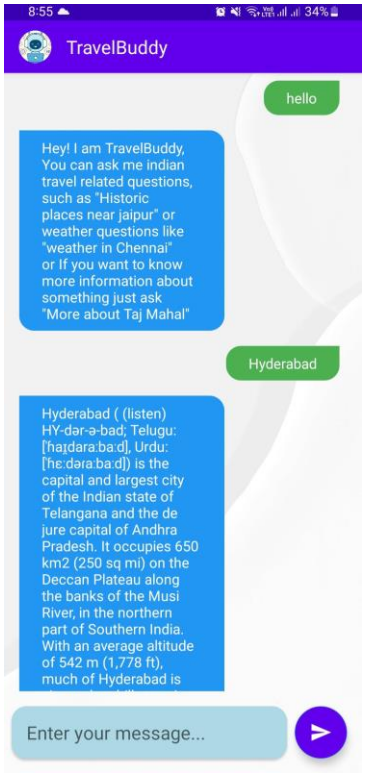


FIG.IV . I Working of chatbot

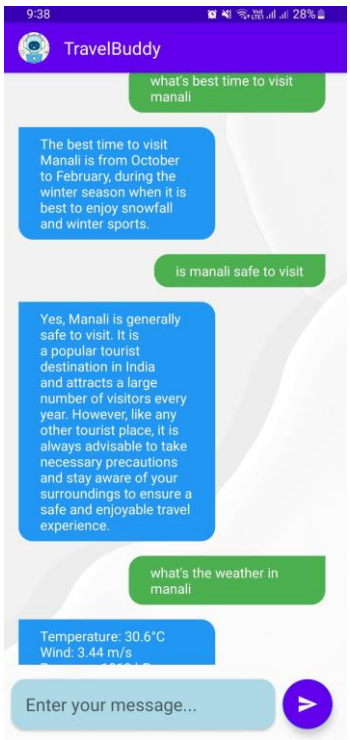


FIG.IV . II Working of chatbot

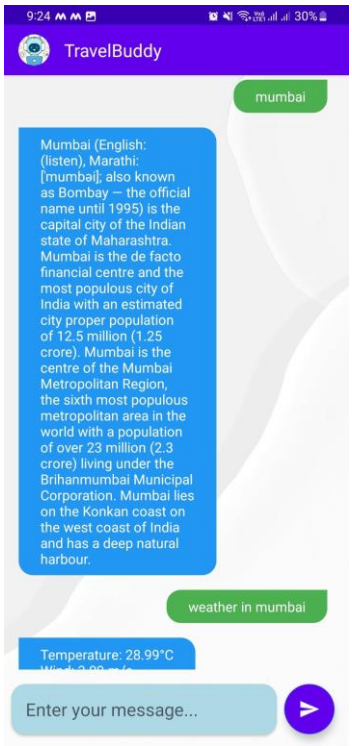


FIG.IV . III Working of chatbot

FIG.I . IV Working of chatbot

V. CONCLUSION

Modern technology and large amount of data has made difficult for tourist to receive the exact information online in required time. There are various chatbot or question answering system developed but very few provide correct and efficient answers. A well-developed system has to fetch the user query in form of natural language, using various techniques such as removal of stop words, POS tagging, stemming and using efficient classifier it has to classify user questions to give correct and precise answer. The agent should generate more appropriate responses while communicating with users.

VI. FUTURE WORK

For Future Work we would try to,

- Add support for more languages.
- Expand the technology from android to iOS Devices.

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