

SMART TRAVEL SYSTEM

¹Sarang Choudhary, ²Hrishikesh Damania, ³Shraddha Gangurde, ⁴Anushree Deshmukh

^{1,2,3}UG Student, ⁴Mentor, Rajiv Gandhi Institute of Technology, Mumbai, India.

¹sarang27.choudhary@gmail.com, ²damania00@gmail.com, ³shraddhagangurde9@gmail.com,

⁴anushree.deshmukh@mctrigit.ac.in

Abstract— The proposed model represents a smart travel system that will guide the customers to travel in luxury for less cost. In this system we display the best optimized output for the user, based on the loyalty program of the airlines. The chatbot created will make the system interactive and easy to use.

Keywords— Agents, Chatbot, Dialogflow platform, Entities, Intents, Machine Learning (ML), Natural Language Processing (NLP), Neural Net (NN).

I. INTRODUCTION

To design an Smart Travel System that will enable people to have a luxurious travel in low cost using the frequent flier programs of various airlines. Also it is software that has a chatbot that will enable a user friendly experience and an interactive system. The website will enable a simple and user friendly approach to the booking process.

The Chatbot is used to simulate a real world travel agent. It uses NLP takes input from user and processes it.. It works just like the other voice-driven digital assistants such as Google's new assistant, Amazon's Alexa, Microsoft's Cortana and Apple's Siri. The MIT Review list states it as one of the ten breakthrough technologies of 2016.

Commercial web and entertainment systems currently use text based chatbots. We proposed a voice based chatbot which interacts with user. It uses natural language processing and uses speech to solve travel based queries. Successful implementation of the system will understand what you are saying, analyze it, and give you a suitable response if the query is related to the travel domain.

User interaction with the device is the one that triggers the Dialogflow which processes the request and generates a suitable response from the data retrieved from the knowledge base. The backend server processes the request which is hosted by Dialogflow. The back-end database is incorporated into a knowledge base which uses user rating for training. The user response is generated after the query is analyzed.

Smart agents are needed a lot nowadays as the need is growing with more use of personal machines and the desire of their makers to provide natural language interfaces. The proposed system will change how to recommend travel itinerary by incorporating the airline frequent flier miles and user preferences, remembering its users' intentions and travel history, and generating responses using collaborative filtering.

II. BACKGROUND

Today, there is currently no travel system with chatbots which has an integration of the frequent flier program. There is no system which organizes the results of the airlines by filtering according the users enrolled frequent flier program various airlines. Also there is a lack of awareness among the people regarding the frequent flier programs.

The traditional travel agents have many issues that can be conquered by the smart one. The traditional ones are not available every time; the Smart Agent is available throughout. However; no agent in this world can "know it all". The travel agent can have limited or outdated data, this makes it not so efficient. In addition to that, most of the travel agents do not remember the history of the customer when they call them after few months which is a time consuming process. The smart agent recollects and stores all data of the customer.

The popularity of chatbot is increasing daily; the demand for chatbots development platforms is also increasing. Dialogflow is Google-owned AI powered Chabot development framework which is used to build a voice or text based bot it was previously known as API.AI. It is a Machine Learning based natural language processor. Dialogflow is used to provide a delightful and natural experience to a customer just as a normal travel agent. To update the memory and predict user intention, many hand labeled data points are used from which a learning system usually learns. This is a big issue as, a lot of efforts are needed to either writing many rules takes a lot of time or collect hundreds of thousands of hand-labeled training data for machine learning algorithm to learn. The system should be able to adapt to the various new and real life changing scenarios.

III. CHATBOT ARCHITECTURE

The system uses Natural language processing; it uses input

from the user in form of speech and analysis it. It gives the most suitable output for the input travel query. Our system consists of three main modules: the heart of the chatbot which is the knowledge base, a speech recognition engine which acts as an interface between users and machine, and an interpreter program. Dialogflow is our interpreter program and knowledge base has been created by data mining, AI algorithms and Machine learning to provide a smart travel system. It uses various technologies like Elasticsearch, Neural Networks, MySQL, MongoDB, and Restricted Boltzmann machine for Collaborative filtering and for successful completion.



Fig. 1. High-Level Architecture



Fig. 2 Dialogflow

API.ai (now Dialogflow) is victimisation of their language process Engine, which could analyse each user requests to extract the relevant information. it's designed to manage the colloquial flow. It uses the help of the Machine Learning to know the user's questions, convert them to the structured information and extract the relevant parameters from it.

Machine Learning is one of the good resources of Dialogflow, it allows the agent to understand user, the input language is converted and put into structured form, removing the relevant parameters. Within the Dialogflow nomenclature, machine learning algorithms are used by the agent to match user requests to specific intents and entities are used to extract relevant information from them. The agent learns from the knowledge you offer in it (annotated examples in intents and entries in entities) moreover as from the language models developed by Dialogflow. Supported this information, model is built and the intent generated calls the information. The intents are the basic modules of the chatbot The agent is exclusive to model. There is dynamic arrangement by the model in step with the changes created in agent and within the Dialogflow platform to make positive that the model is up, the agent has to be trained on regular bases so as to be up to date with the new environment.

Glossary of Dialogflow:

1. Agent [Anushrang]

Agent is basically the name of your chatbot. It is used as a mode of communication between the user and the system. These are going to be enclosed in your product, services, or app and remodel user requests into unjust information.

The name of the app is also known as Agent. It is very important to keep the name of the agent. Here is few pointers whereas choosing the name:

You need to invoke your agent by saying:

"Hello Anusharang please book me a flight ticket"

2. Intent [conversation starter]

They are conversation starter whenever a query is raised it matches it and generates output. In Dialogflow, research of data is done by the intent and it gives relevant answer to the query.

To understand the question better the intent must be trained much more. There are various other ways of generating an answer to a query by using different types of intents.

3. Entity [variables]

The agent used in Dialogeflow needs to understand what intent is useful and what is not useful. To serve that purpose entity are created they act just like variables to store the variable values

4. Fulfilment [Custom code]

Dialogflow is backed by Google and hence it works on cloud functions. Fulfilment is used to bind the custom code with the core functions. After you have made the intents you need to fill the fulfilments in order to use the core functions.

5. Context

Context is very important in the success of the assistant. Content helps the chatbot to behave like a real human. It helps the Dialogflow to have human like conversation. This feature allows the system to become more user friendly and hence it enhances the experience for the user. The user feels that he or she is talking to a real travel agent. The content also helps the system to solve the various queries that are generated and can also help in real human like conversations.

6. Platform Integration

Dialogflow helps in integration with various platforms. The chatbot can be integrated with the mobile app with the embedded feature. Dialogflow also can be integrates with various other platforms such as amazon alexa, facebook messenger and many other platforms.

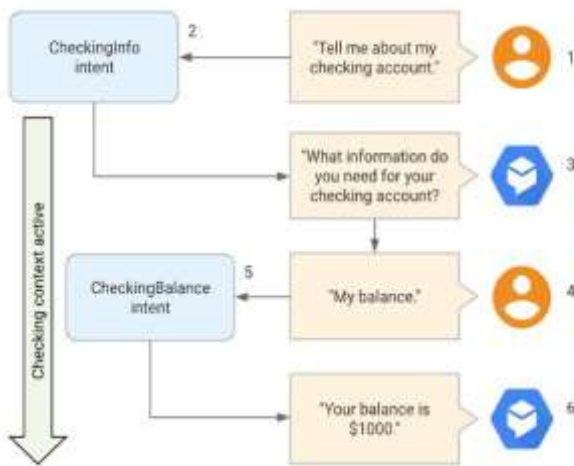


Fig. 3. Working of Dialogflow

IV. USER REQUIREMENTS

An important characteristic that the system must execute is interpreting the natural language correctly. The Dialogflow must be trained enough to answer the complex queries of the user. For the same intents must be defined correctly such that it is able to fetch all the travel related data and use the same to have conversation with the user. Also to make the services unambiguous and more reliable we need to take help of Some AI and ML algorithms. This helps to train the bot well so that all the requests from the user can be managed and correct reply can be predicted. A database which contains all the essential data regarding the flights and the airlines plays a vital role in the system. It also stores the user information and travel history. Thus, the requirements can be listed as follows:

- Dialogflow
- content
- ML Algorithms
- Database of the airlines

V. PROPOSED SYSTEM

With the advances in technology, searching and booking air tickets has become quite easier. Various websites and web applications are available which provides these services to the user. In spite of these, there are users who do not have the adequate knowledge to use these applications. Therefore, they contact or personally visit a travel agent for all the travel related queries. The main purpose of this system is to make a virtual travel agent available to them in the form of a travel chatbot. This chatbot takes the required inputs from the user and gives them a relevant response.

At first, the system identifies the missing information and then asks the user to fill the missing information so that the

initial query which is to be responded is created. The bot answers the initial query by considering the travel history of the user. The user has a conversation with the bot which is analogous to having a conversation with a travel agent. If any information is missing or any other information is required the bot asks the user for the same. Depending upon the query the bot will make use of the correct algorithm to answer that query.

A. System Architecture:

Agile methodologies are used for the development and maintenance of the system. The modules made are independent from each other which are further integrated to provide the required services.

Those modules are as follows:

- 1) Flight Module: This module is reserved for all the queries that are related to flights schedules, flight bookings etc. It handles every conversations related to flights.
- 2) Rental Car Module: This module is designed so that the travellers find too easy to find transportation in the city they are travelling to. The modules determine the pick and drop locations, the time and the passenger count.
- 3) Hotel Module: To make the stay easy at the location, the system provides suggestions for the hotels at that location. The user can further book the hotel as per his requirements.
- 4) Web Application Module: A web module is made so that it stores all the passenger information, their travel history which can be helpful to manage the travel related decisions.

VI. METHODOLOGY

1) The first three modules flight, hotel and car module are hosted by Dialogflow. The database service used is responsible for giving inputs to the Dialogflow for prompting the correct answers to the queries. There are custom servers at the backend which works parallel with the database systems. It also makes API calls to the third party services.

2) Web app: Using the web module the user can login into the application and store the information like the personal details within the database. The databases used are MongoDB and MySQL. While MongoDB stores personal information, the later is responsible for storing of transaction related history. This module also encrypts information like the passwords and the credit card details. The profile page here displays the user details which can be changed as an when required.

3) Chatbot system:- Chatbot helps the user to interact with the system and determine the answers associated with his queries. this method used BM-25, tf-idf, bag of words algorithms to go looking and type the information in step with the command or query given by the user. The system gives recommendations supported the frequent flier

program and accordingly lists the flight details and their specifications.

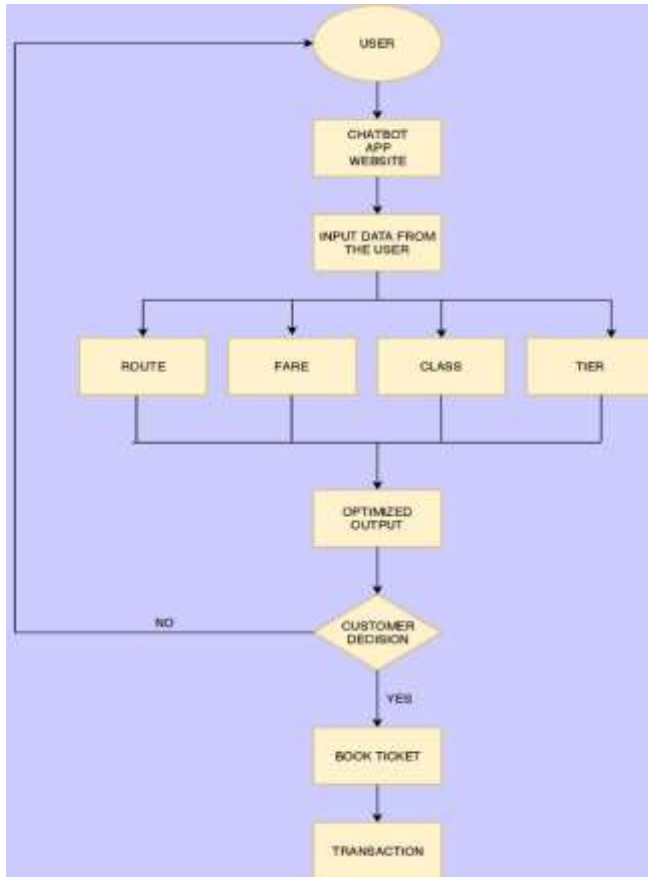


Fig. 4. Methodology

The following methodology will be used for working of the system

- The user will first login or sign-up into the app or website:
The system can be accessed using android application or a html website. The user has to create his/her account on the website by signing up to the system. Then for the future use the user can login to his/her account.
- Then the user will search for their requirements either manually or by using the chatbot feature:
Since the system has a voice chatbot the user can ask his query (place to travel and when) to the system the same way one ask the travel agent else he/she put the inputs manually.
- Then the user will be asked to choose the options from route, fare, class of travel, tier and hotels:
The user further chooses how he wants to earn the miles and chooses amongst route, fare, class of travel, tier and hotels.
- After the user is done with this then the optimized results will be shown to the user:
Using the data mining algorithms best results are given to users so that they can choose amongst the one.

- The user then chooses deal from the results and then further makes the payment of the tickets or hotels booked.
Further the deal chosen by the user is booked.

VII. CONCLUSION

During the coming years, the demand for the voice chatbots is going to increase as it more beneficial than the currently available text chatbots. Once it is deployed on larger a market it's impact and the amount of users using it will increase.too.

Implementing this system is similar to implementation of a basic travel website but the only diifference is that this system will have a voice enabled chatbot which will be responsible for the conversation between the user and the virtual agent. This system can also be a place where most of the travel related queries can be answered.

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