IJCSE International Journal of Computer Sciences and Engineering Open Access
Research Paper Vol.-7, Special Issue-14, May 2019 E-ISSN: 2347-2693

goTripper ChatBot for Tourism

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DOI: https://doi.org/10.26438/ijcse/v7si14.3640 | Available online at: www.ijcseonline.org

***Abstract*—** Tourism is one of the major revenue earners for any country. Many countries growth depends mostly on their tourism industry-generated income. While exploring, many tourists sometimes face some situations where they are not able to reach out other locals of the place for help because there is a problem in the communication or sometimes are majorly not aware of the place. The travellers need to plan their trips well in advance keeping their time and destination in mind. Sometimes, in a hurry, they tend to forget some places for their trip and regret later. This happens when there is no proper planning for the trip. Keeping an eye on all these issues, we introduce goTripper Chatbot. This is an application which is build using OpenNLP (natural language processing) which makes it possible for the bot to understand natural language human text/voice input and initiate further work. It includes technologies like machine learning and artificial intelligence which helps the bot learn of its own and become smart enough to respond back to the user with time. This not only resolves the communication problem people face but also have different features which are required by a tourist when he/she is on their trip. It also provides the user with a scheduled plan of the trip that he/she may follow. Being a ChatBot, it will be easy to use with minimum work efforts required, time efficient and is very economical.

***Keywords*—**ChatBot, tourism, tourists, natural language processing, weather, maps, live chat, OpenNLP, intents, entities

I. INTRODUCTION

A ChatBot is a machine which tends to communicate with humans through Voice or Text. A ChatBot is defined with knowledge so that it is able to identify sentences from humans and reciprocate to them with the correct response. There has been an immense increase in the usage of ChatBot in recent time. ChatBot has been already introduced in many domains like Customer Care Services, Technical Consultancy, etc as it has simplicity in its usage. ChatBots are trained machine which can learn from their experience. They will integrate all the experience learning into its skill set and help the user to find its required result with efficiency.

goTripper ChatBot majorly focuses on the Tourism domain. goTripper can help tourists and resolve many tourist-related problems in an effective way. It communicates with its user in text or voice methods. It also includes different components which will be helpful for the user in one or many ways. This ChatBot will be a great plus for those who are travel enthusiasts. And also it will be handy, easy to use and ready to go with.

II. RELATED WORK

There are many works that have been previously achieved related to ChatBots.

ChatBot by Alibaba group
Few employees of Alibaba Group presented a paper on how a ChatBot can be used in the e-commerce domain. They worked in Question & Answer query based on the customer's details in the company's database. This was the input for the ChatBot to learn from. The initial step was to map the queries with the respective response. They had two methods for mapping the responses – Information Retrieval and Sequence to Sequence method. A threshold value was assigned for the query set. If the threshold was not achieved by the responses, then Information Retrieval method was used. Otherwise, Sequence to Sequence methods was preferred. After this, the achieved result confirmed that most of the queries were mapped to correct responses by the ChatBot which could be a great move in the e-commerce domain.

ChatBot by Microsoft
There is a publication by Microsoft Research thought of an idea of forming a ChatBot for Indian Youth. The team informed that the ChatBot will be more of a friend to its user rather than just a machine code. The team confirmed the development of three personalities for the ChatBot – two of them were friendly where they were helping the user with suggestions whereas the third one was being empathetic. To

provide the information to the ChatBot, the team hired a person who was a great expert in communications and English language. The results achieved by the ChatBot working with 14 participants were satisfactory as it gave recommendations and suggestions that were in line with the users' query. The only problem with the ChatBot was that it couldn't differentiate between "privacy" and "personal". The team started working on this limitation.

First ever ChatBot- ELIZA

ELIZA- It's the very first ChatBot ever developed. Joseph Weizenbaum from MIT University has developed the ChatBot. He developed this ChatBot for the psychologically challenged people. IT has two major reasons to make it a good experiment:

i) The ChatBot was able to identify pre-recorded patterns. ii) The behavior presented after realizing the pre-recorded patterns. After ELIZA it was thought that machines can be made more intelligent by analyzing "Human Emotion". This also helped in evolving thought that, in the near future, Robots can act like humans- unpredictable.

IRCTC ChatBot- AskDisha

Indian Railways have recently introduced an AI-powered ChatBot which is known as AskDisha. The ChatBot is developed to interact with railway travelers. Travelers can ask queries related to information about trains, time table of trains, booking e-Tickets, cancellation of tickets, etc.

ChatBot by an IIT Allahabad student

Saurav Mishra and his team from IIT, Allahabad created a "Virtual Doctor" ChatBot which was for patients when there are no doctors or in case of any emergencies. They used Python as their primary coding language for developing their algorithms. They also used Natural Language Toolkit with PyQt for the graphical user interface. The algorithm involved two important criteria: disease or ailments and patients problems. The method was to find important words from the user's queries and find a correct response for it. Around 80% output was correct by the ChatBot.

ChatBot by Facebook

ChatBots are one of the greatest inventions in the field of technology. But every good also possesses bad in it. It is a similar case with the ChatBot. Example: Facebook's ChatBots were seen developing their own languages so that they can communicate within themselves. This left all the developers confused.

III. METHODOLOGY

When the user provides the ChatBot with an input query, the first job is done by the ChatBot is to analyze the intents and entities with respect to the context. Based on all those parameters a set of output responses are created out of which only the desirable one with respect to the context is chosen and given as a reply to the user.

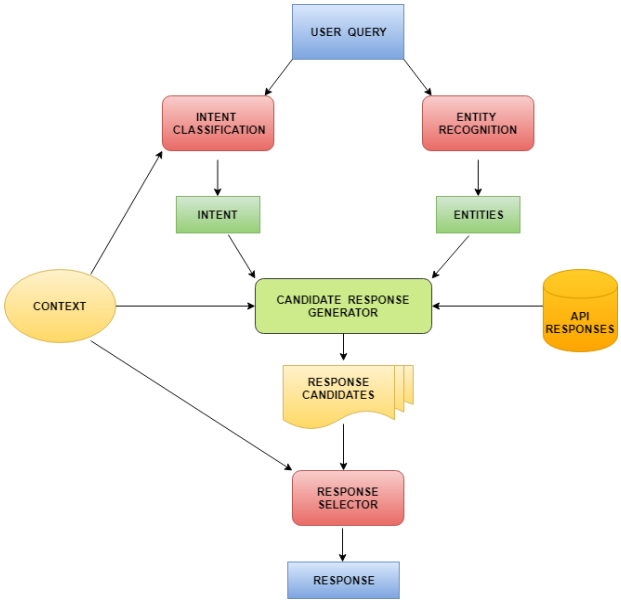


Fig. 1

The ChatBot is made using Apache OpenNLP (Natural Language Processing) which helps the bot to understand the natural language text or voice input by the user and is able to recognize set of intents and entities with respect to a context and generates the appropriate output response for the user.

The system basically consists of 3 basic modules:

1) NLU module
2) State machine module
3) NLG module

- **NLU module-:** The NLU module is used to obtain and interpret the input text query of the user (converting unstructured data to structured). Identifies the entities in query text (so as to understand the intents) i.e., for example,

  Query- Weather today in Chennai?
  Entities in the query: Location- Chennai, Measure-weather.

  Intent of the query: Determining weather.

HOW THIS MODULE WORKS?

1) NLU module processes every incoming query and performs intent and entity Classification, Language Identification with respect to the context of the query.
2) The result of this module is added to query's metadata instantly (under event.nlu) and becomes readily available for consumption by other modules as well as components.

- **State Machine module:** This module takes care and maintains conversation statei.e., the context of the query, for example, at what stage are we in the conversation? We are at the starting or at the ending of the conversation? Have we got all the set of intents and entities to execute a further API query?
  This module does a very complex work as modeling a Natural Language query is very tough.

- **NLG module:** This module is responsible for replying back to the user. Also takes care of the conversation between the user and the bot. it takes input from the state machine module and generates natural language responses for the user.

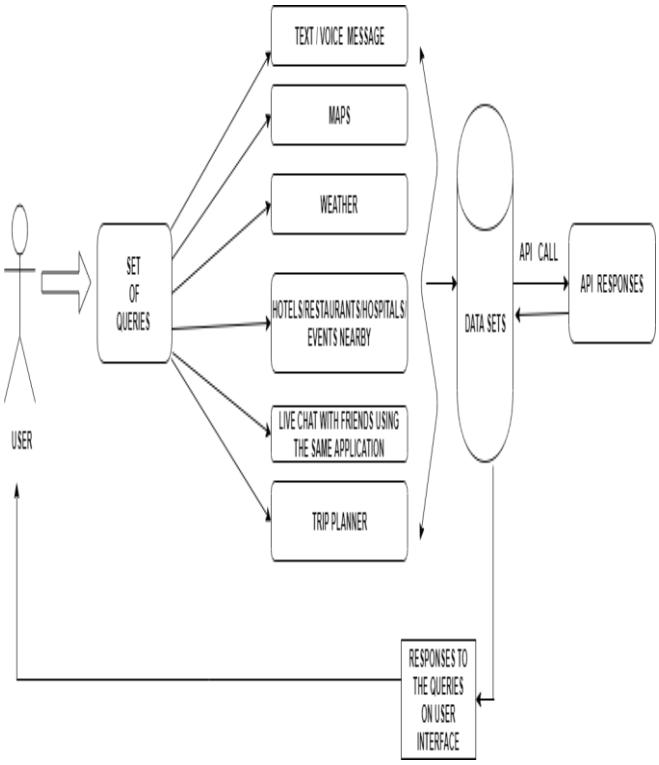
USER MODULE

DESCRIPTION

1) User has some wide range of a set of queries.
2) User may ask queries in the form of text or voices messages.
   - **TEXT MESSAGE**: The user can communicate with the chatbot by text messages. The user can type in their queries and the chatbot will respond to it in textual format.
   - **VOICE MESSAGE**: The user also has an alternate way to communicate with the chatbot. The user can ask questions to the chatbot and it will respond in a voice note. The language of the voice can be set by the user depending on the region.
3) With respect to our provided features (Maps, Hotels / Restaurants / Hospitals/ events happening nearby, Friends using this app nearby), the user may ask any related queries.

   - MAP: User can use the map module for routes and navigation. The map API is an integrated module in the application so that the user doesn't have to switch between multiple applications.

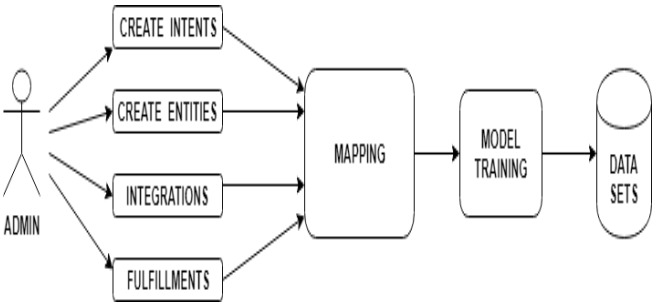
   - HOSPITALS/RESTAURANTS/HOTELS/TOURIST PLACES /BANKS etc.: The chatbot has a unique module which can help the user locate nearby places which are mostly searched during travel period. goTripper makes sure nothing is missed during travel also will make sure that the user is always informed about nearby hospitals/restaurants/hotel. In any time of emergency, the user can rely on the chatbot for further help.
4) All the user queries have some set of intents and entities which are mapped by the admin to the responses and are stored in the database.
5) Once all the intents and entities sets of any query of the user are identified, API calls are made and then API responses are sent to the user interface as a reply to the user query.



ADMIN MODULE

DESCRIPTION

1) Admin will identify and create intents and entities from some common problem statements or queries to use them for the model training. These can be used as a part of our supervised learning of ChatBot.
2) Admin is also responsible for the integrations of different modules or APIs into the application so as to ease the work of the user. For example, instead of using maps as a different application, the admin will integrate this into the ChatBot so everything happens under one platform.
3) Mapping is the phase where the intents and entities are mapped to their respective responses. There might be cases when a user can form the same query in different forms but the response should be always the same with respect to the intent and entity.
4) Model training is done to train our ChatBot. It enables the ChatBot to learn how to respond to the queries based on the intents and entities.
5) Datasets are then stored in the database for future use.



IV. RESULTS AND DISCUSSION

This is an android/web application which is a ChatBot that will help the tourists as a tourist guide.

Issues related to languages will vanish as this ChatBot uses natural language processing which helps the bot to easily understand the user's text or voice input and comes up with a suitable reply for the user. User doesn't need to memorize any format or command of text to ask to the bot.

This ChatBot includes several features which help the user in several aspects related to weather information, maps and navigations, live chat with friends and planning their trip as they are getting a trip planner within.

It intimates the user about all the tourist places available in that place.

User can easily live chat with an individual or group of friends and plan a trip together. All they need to do is to provide the ChatBot with some basic details like the number of days they are going to stay, tick the places they are interested to visit from a dropdown option and some information related to time and they get a detailed plan as a response by the ChatBot which they can follow.

Traveler can book hotel rooms, restaurant seats, and flight/train/bus tickets through the same platform i.e., the ChatBot and they don't need to switch between different applications to do the same.

They can also book cabs or order food online through this application.

This application provides a whole new experience to the tourists as all they need to do is interact with the bot and tell it their requirements and the bot does the work for them within seconds.

A ChatBot like this serves the requirements of tripper and guide them as a tourist guide and can be used by a huge variety of users with different conceptual and perceptual skills as it uses Natural Language Processing. It doesn't make one feel that his or her needs are not being understood. It works for you just as you want it to.

ADVANTAGES

- Easy to access and communicate with at anytime from anywhere.
- Uses Natural Language Processing which makes it easy to be used by a huge variety of people
- No manual work required.
- Easy access to maps and navigation.
- Easy access to weather information which helps the tourist to plan the trip accordingly.
- Live chat with an individual or group of friends.
- Weather notifications to notify the tourist about any bad weather conditions detected well in advance.
- Very much time saving as no manual work is required and every service is just a click or conversation away. For example, booking a flight, hotel room, restaurant seat, bus/train tickets, ordering food, booking a cab, registering for nearby events, etc.
- Helps the tourist to get a detailed trip plan generated by the application provided some basic information.

V. CONCLUSION AND FUTURE SCOPE

This ChatBot assists tourists to explore a city in a similar way to how a tourist guide does. It is very handy and easy to use as it uses Natural Language Processing, which makes it very easy for a wide range of users to use it. It also saves a lot of time and efforts of a user as everything is just one click away. It also saves money that the trippers spend on hiring tourist guides.
In future, such ChatBots can be easily used by trippers throughout their trips at any corner of the globe in a smart way.

ACKNOWLEDGMENT

In playing out our specialized paper, we needed to take the assistance and rule of some regarded people, who merit our most prominent appreciation. The consummation of this task gives us much Pleasure. We might want to demonstrate our appreciation Mrs. Jyoti K Mirji, Assistant Professor, School of C&IT, REVA University for giving us a decent rule for the task all through various counsels. We might likewise want to extend our most profound appreciation to every one of the individuals who have straightforwardly and by implication guided us recorded as a hard copy of this specialized paper.

We thank every one of the general population for their assistance straightforwardly and in a roundabout way to finish our task.

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