YELLOW PAGES

ON THE GO TRAVEL COMPANION NOW IN YOUR HANDS

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1.EXECUTIVE SUMMARY:

Tourism is one of the major sources of entertainment during all times. Singapore's economy receives a major contribution from the tourism industry. According to the facts stated by the Singapore tourism board, it is the fifth most visited place in the world and second in Asia-pacific. Many of the tourist visits are limited to some popular regions like Singapore Safar, Marina bay sands and Gardens by the bay. As a result, many places remain unexplored. In order to present the tourer with all the localities existing in Singapore, "yellow pages" is created. It aims to act as a travel guide in disguise to suggest attractions, restaurants, shops in vicinity of any area in Singapore and in turn help discover some new places of interest. With "yellow pages" as the constant assistant it will always find new places around and make a memorable trip for the user.

2.INTRODUCTION:

A cognitive system is a one that performs the cognitive work of knowing, understanding, planning, deciding, problem solving, analyzing, synthesizing, assessing and judging as they are fully integrated with perceiving and acting. Cognitive capabilities emerge from activity related to a cognitive system's architecture and are shaped by it. This architecture is a synergy of the functional structure of a physical environment, the social organization of a workplace and that of individual minds. These systems are probabilistic. They do not only generate solutions to numerical problems but also hypotheses, reasoned arguments and reasoned arguments about more complex and meaningful bodies of data. They have been designed to learn at scale, reason with purpose and interact with humans naturally. Though they are explicitly programmed, they can also learn and reason from their interactions with humans and from their experiences with the environment. These systems are being used to assist health care, land lease management, banking etc., Their application ranges from making assistive devices for disabled people to being used in social services, education, transportation, tourism etc.,

Chatbots are one such application of a cognitive system. It is a software application that performs automated task and can converse with humans. However, the idea of conversation is specific to each bot. Primarily, chatbots are of two types: command-based and intelligent/AI-based. Command based chatbots have their scope limited to answering questions or queries. It is semi-automated and therefore it requires the user to determine their next step. Intelligent chatbots leverage machine learning and natural language processing to understand the user's conversation and responds to them in a way which is more humanistic. Few of the most commonly used chatbots in our day-to day life include: Hipmunk, NatGeo Genius, Whole Foods, Duolingo, MangoDB, LeadPages. Chatbots can also be found on Facebook messenger, Slack, Telegram etc.

Tourism is one of the major sources of entertainment during all times. Every year people from all over the world crave to travel to a new place either alone or with their family. Previously they used to get help from travel agents or tourist guide. After the dawn of websites like Triphobo, tripadvisor, applications like kayak, it has become useful for the travelers to see around places they wish, taste the best food and enjoy their stay at the destination. User experience is of critical

importance in the recent times and chatbots are one such tools which helps in achieving it. An example of a chatbot as displayed in expedia.com is shown below.

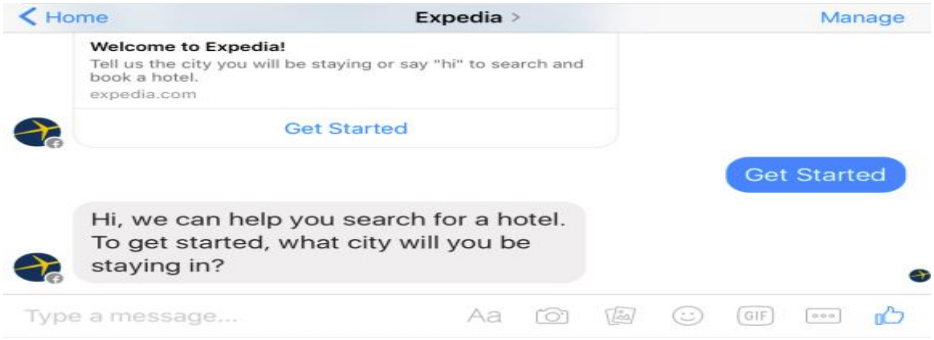


Figure 1: Example of a travel chatbot-Expedia

Singapore's economy receives a major contribution from the tourism industry. According to the facts stated by the Singapore tourism board, it is the fifth most visited place in the world and second in Asia-pacific. Additionally, there were about 18.5 million visitors in 2018 from which it can be inferred that there has been an increase in the count by 6.7 percent since 2017 as emphasised in Wikipedia. This growth is mainly due to the enhancements in entertainment, sightseeing and gaming. The most popular tourist attractions include Singapore safari, Marina bay sands, Gardens by the bay, Resorts world Sentosa, Universal studios theme park, Jurong bird park etc., The transportation modes available here are bus, MRT (Mass Rapid Transit), Taxis, Sightseeing bus fleet and boat fleet. Singapore has exhibited a diversity in the variety of cuisines they offer because of its mixed cultural population. The different kind of food joints available here are hawker centres/food courts, restaurants offering all kinds of Asian, Indian, Chinese, Malay, Korean, Japanese, Western, Continental etc., The city also offers a spread of popular fast food chains like McDonalds, Pizza Hut, KFC, Burger king, Subway and Mos burgers. Some important highlighted events that happens during a year would be the food festival in July, Singapore Arts festival, Singapore garden's festival and the Chingay Parade. The picture of Gardens by the bay as presented in gardensbythebay.com.sg

Figure 2: Super Trees at Gardens by the bay

The proposed project "YELLOW PAGES" chatbot acts as an escort to the tourist arriving in Singapore. It takes them through all the key sight - seeing places in Singapore by knowing the user's location and his desire. It gives a brief description about the places based on the user's interest. The pictures and additional information are also exhibited after the tripper's request. It guides the beginner's through its usage. It also displays attractions based on the reviews and ratings provided by other customers. In order to manifest more user-friendliness, the bot furnishes the opening time and closing time of all locations. Based on the traveller's pick, the bot suggests them with the names of restaurants or other food joints.

3.PROBLEM DESCRIPTION:

With the upsurge in the arrival of tourists to Singapore, there has been a call for chatbots to come into picture by the travel agencies, hotel booking services and other built in businesses around travel and tourism in order to compete with one another and gain more business value. However, most travellers have put forward a complaint stating that most of the existing web applications such as Tripadvisor , Triphobo directs people towards the most visited places and spots with higher reviews and ratings. This has left the user back from exploring the key sightseeing spots

available in Singapore.These drawbacks have laid the foundation of designing an application that incorporates all the essential assistance required by a tripper.

The undertaken project “Yellow pages” rolls down as an alternative to all the cliched travel bots. It has been integrated with different services such as suggesting attractions, restaurants, shopping area, providing a detailed description about the requested locations, recommending them the tourist spots based on the ratings and reviews, guiding the customers around their neighbourhood, planning the tourist’s routine based on the opening and closing times of the tourist attractions and plugging in the eatery options based on the user’s taste. Its user-friendliness can be visualised as it takes us through the description of the application and all the key spots of the city.

4.Technical Description:

4.1:Dialogflow

The heart and soul of Yellow pages is Google Dialogflow. It is a development suite available for creating conversational interfaces between the user and websites, mobile applications. It can interpret and process natural language. It supports more than twenty languages and one click integration with 14 different platforms. It can engage audience by building a multilingual agent with global reach. The conversational interface can also be expanded to recognise voice and generate voice responses too. Another key feature of dialogflow is Automatic spelling correction. It can self-correct spellings and grammar mistakes when the user mistypes sentences in a hurry.

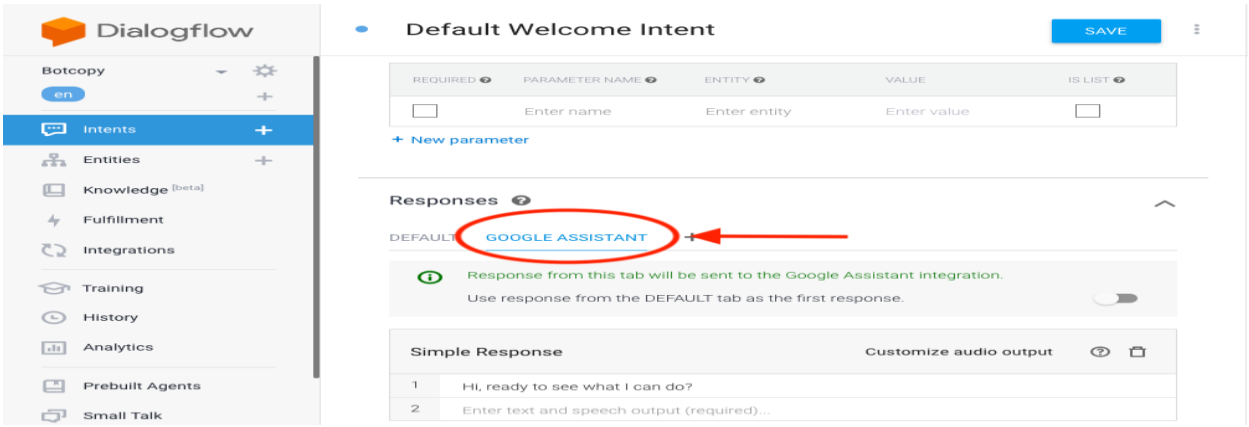


Figure 3: Example of a dialogflow page

A google account is required in order to kick start the work with dialogflow. The major components present in dialogflow are: Agents, intents, entities and fulfilment.

4.1.1Agents:

An agent is a virtual representative that communicates with the user. It is a natural language processor that can understand all the implications of the user. It translates the user entered text or voice into an understandable form for the applications. These dialogflow agents can be used to build different types of conversations according to system's requirements.

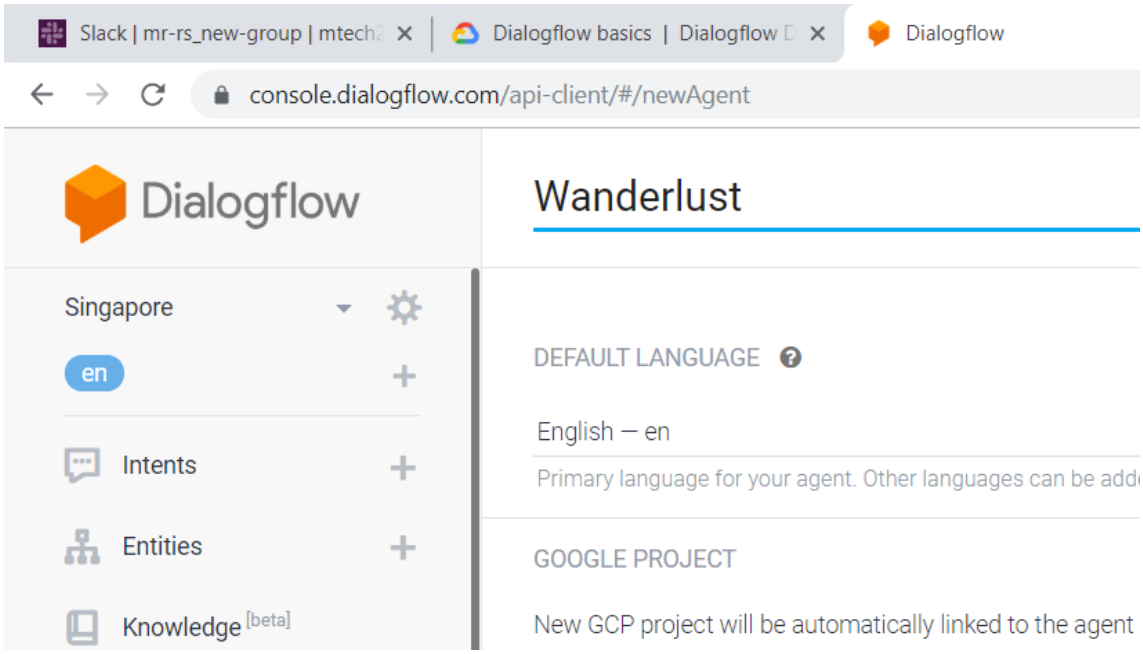


Figure 4: Creation of Yellow pages agent

4.1.2 Intents:

As per the google cloud documentation, "An intent categorises an end user's intention for one conversation. For each agent, many intents can be defined, where the combined intents can handle a complete conversation. When an end-user writes or says something, referred to as an end-user expression ,Dialogflow matches the end user expression to the best intent in the agent". For example: If the user asks for information about the location, then the location intent present in the agent is triggered and the responses corresponding to it is displayed. This process is called intent classification.

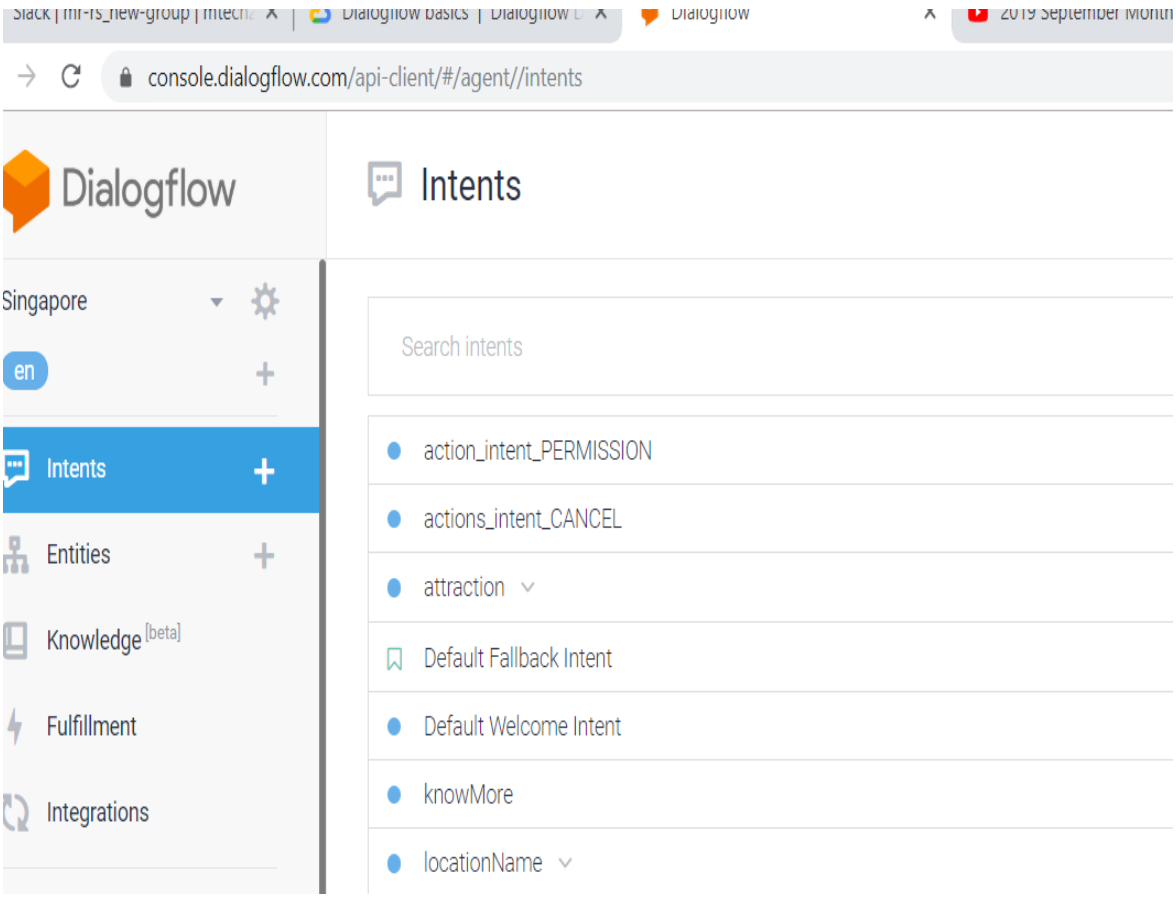


Figure 5: Example of an intent page

The major components of an intent are as follows:

1.Training phrases:

These phrases are few assumptions which are made by the developers in the end-user point of view. If the end users' types or utters any phrase that is similar to the one amongst the listed training phrases, then the corresponding intent is invoked. It is not necessary to have all the possible training phrases in the list as dialogflow has an in-built machine learning system which matches similar phrases.

2.Actions:

Actions can be defined to all the available intents. When an intent is triggered the action is also activated and further this action activates other certain actions defined in the system.

3.Responses:

The text, speech, visual output provided to the end-user is defined here. It can be yes or no answers, descriptions or questions to the user asking for information.

4.Entities:

As stated by the dialogflow document," Each intent parameter has a type, called the entity type, which dictates exactly how data from an end-user expression is extracted". Dialogflow already provides predefined set of entities corresponding to the parameters stated.

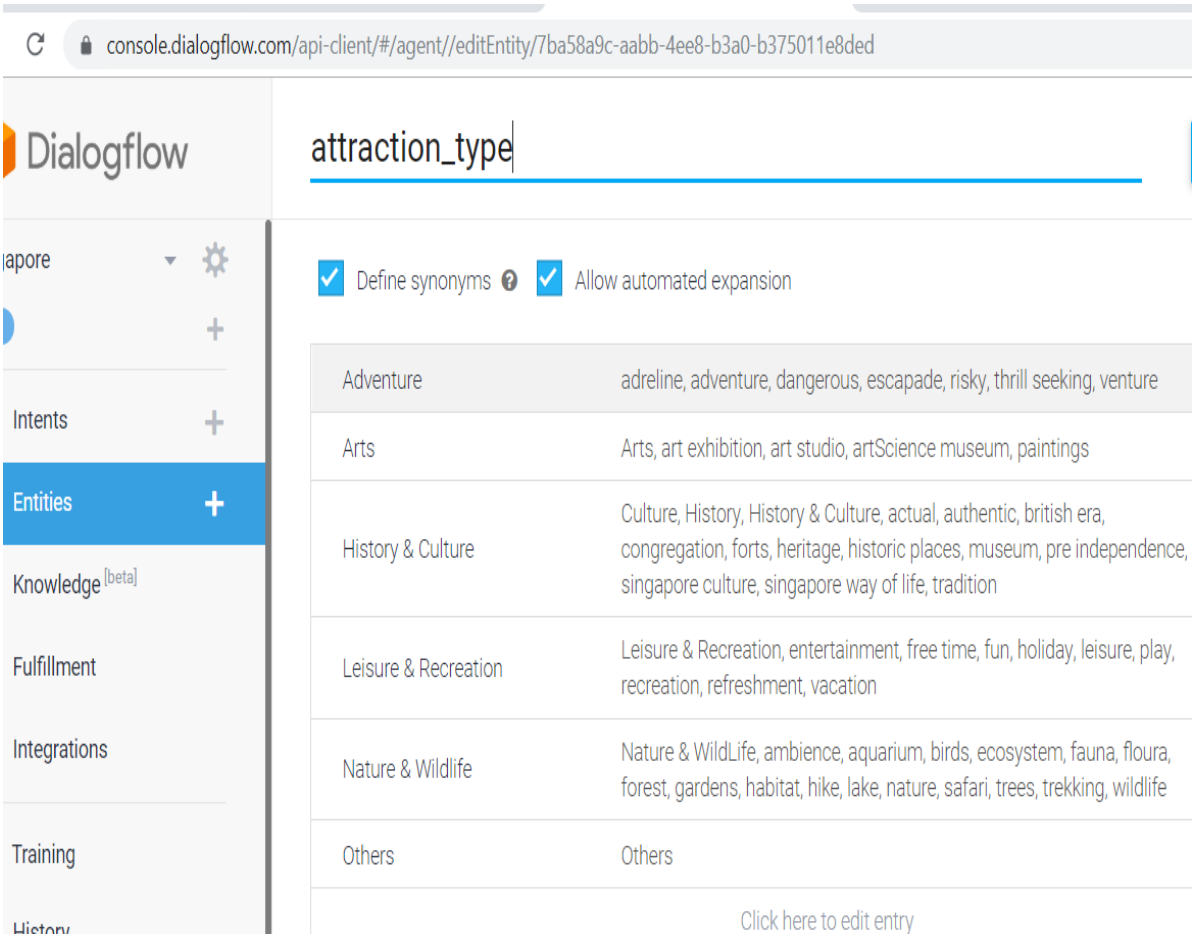


Figure 6: Example of entities

4.1.3.Fulfilment:

Dialogflow agents can be integrated to services such as Facebook messenger, Telegram, Twitter, Skype, Viber, LINE, Slack, Google Assistant. In order to achieve this integration Fulfilment needs to be enabled in an agent. These connections help the chatbot to take actions based on the user's input and send them dynamic responses. Each intent has an option to enable fulfilment in order to receive dynamic responses from the backend and display it to the user. This backend dynamic responses can be provided using python script. When an intent with fulfilment is petitioned, it uses a feature called webhook to send response request for the matched intent. Webhook enabling is under the fulfilment tab of all agents. Figure 7 shows the working of fulfilment as given analyticvidhya.com.The workflow of Fulfilment can be best explained as follows:

- Users type or say a piece of text
- Dialogflow matches the entered text with the existing intents and looks for the corresponding entities or parameters
- It sends a webhook request to the backend in order to look for the responses matching intent.
- It extracts the responses and sends an API call to the user interface to display responses to the user.
- It is accomplished with the help of python.

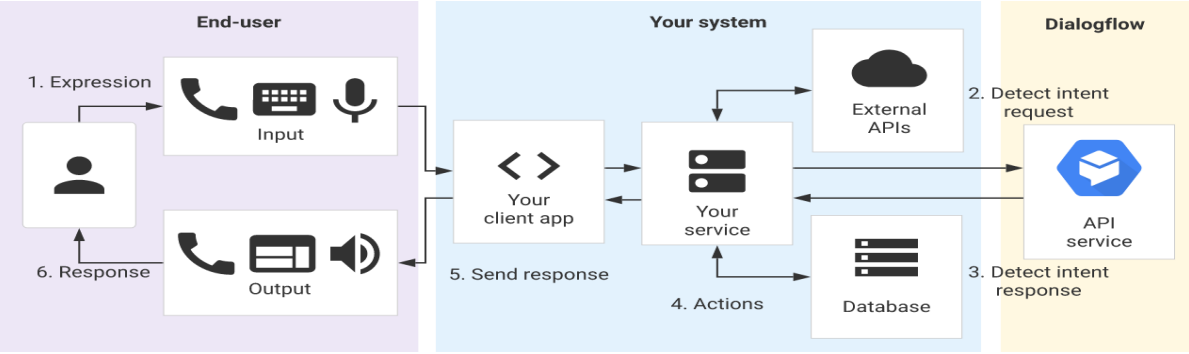


Figure 7: Workflow of fulfilment

4.1.4.Python :

Python script provides backend support to the Yellow pages bot by providing dynamic response to the user when an intent matching occurs. The scripts consist of code deployed as a webhook and responds to HTTP requests from dialogflow. The fulfilment processes the information from the matched intent and constructs a response to return to the user. Flask framework is used for hosting the webservice. For the requests obtained, python provides required fulfilment

4.1.5. NGROK:

NGROK is a web tunnelling tool that can be used for testing webhooks and local server. It is available for free and be downloaded from NGROK.io

4.2.Google Assistant:

It is a virtual assistant developed by Google and it is available on mobile platforms and smart home devices. It interacts with the user in the form of natural voice, textual input and visual images. The main functionalities included in itself are “searching the internet, scheduling events and alarms, adjust hardware settings on the user’s device and show information from the user’s google account”(as per the facts provided by Wikipedia).Yellow pages bot is linked to google assistant and can be activated by uttering its name or typing in text format. An image of Google assistant page from Wikipedia can be seen below.

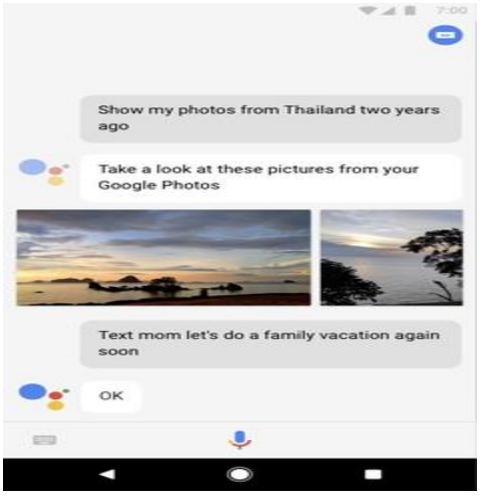


Figure 8: Example of a travel bot using google assistant

5.TECHNICAL SOLUTION:

5.1.Data collection:

The data required for this project were taken from the official website of tourism board of Singapore. The tourism and information hub are a digital repository of Singapore's tourism offerings and other travel offerings. Signing up as a developer in this webpage grants access to all the libraries that contains details about attractions, bars and clubs, food and beverages, shops and mall. The Application Program Interface (API) provided can be used to develop applications that can improvise a trotter's experience in Singapore.

The API key provided by this service has been used in the python script and has been web-hooked to dialogflow which extracts data from it and responds accordingly. The data also has been processed and it is stored in the form of a csv file using the dictionary library available in Python. This is done in order to overcome the delay in intent matching and to avoid the three seconds timeout feature in Dialogflow.

5.2. KNOWLEDGE BASE:

The knowledge base acts as the main driving factor used for the making a cognitive decision. Different formats of knowledge base are used in form of Dialogflow entities and csv files. Below diagram gives the overview of the knowledge base behind the Yellow Pages bot.

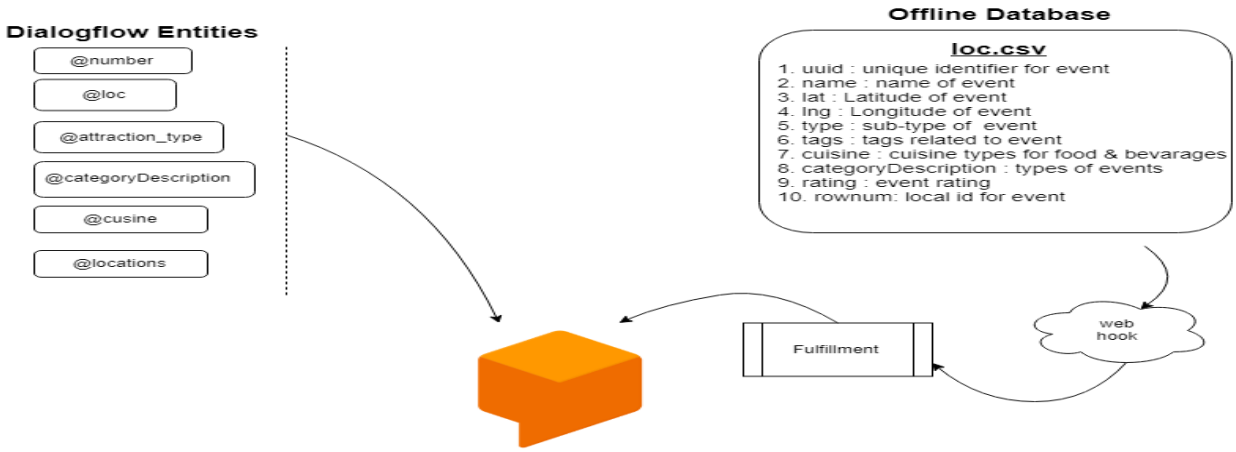


Figure 9: Knowledge base

5.3. Python Webhook:

The backbone of this project are the python scripts which are used to extract data from the API and provide lively answers to the user. Each aspect of the tour has been analysed by separate scripts and has been stored in the form of a csv file. The following are the files used to accomplish this project: app.py, getloc.py, findlocations.py, util.py, response.py, weather.py and loc.py.

1.loc.py: This file is used to create a dictionary of all the available attractions, bars, clubs, restaurants, shops and their related features as location, opening/closing time, rating, reviews. The data is further sorted based on the rating and the result is stored as a csv for faster access of the data.

2.getloc.py: User can query for the places in and around Singapore by mentioning the location name and the type of activity he/she wishes to do(e.x find restaurants in *Boon lay*). The dialogflow agent will read the location provided as an input and return the location's latitude and longitude in radians used by app.py and findlocations.py.

3. findlocations.py: After knowing the user's location, this file scans through the list of all places and provides him the location in his/her vicinity. It also responds based on the specific tags uttered by the user. For example, if the user says they want to know about the restaurants nearby, it goes through the list of restaurants alone and puts forth the one next to them.

3. util.py: This file gives the contains the methods for reading data from API and responding specific information. It lists down all the tourist attractions, restaurants, the images of all places, weblinks to the sites, the MRT close to the spot, the description of each location, the exact address, the ticket pricing, additional information , the opening time ,the closing time, the reviews and ratings of all localities.

4.response.py: It contains the JSON framework understood by the dialogflow as different functions. It is used further by app.py for creating specific requests based on fulfilment requests.

5. app.py: It is the flask framework which is used to accept all the fulfilment request and prepare appropriate responses for the same.

5.4 Dialog flow intents and entities:

The following intents were used in the agent:

1. Action_intent_permission: It is used for requesting user with NAME and DEVICE_PRECISE_LOCATION permissions

2. Action_intent_cancel: It handles the user's request to exit the chat bot.

3. Attraction :Intent handles the user's request to visit a specific place (attractions,restaurants,bars, malls etc).

4. Attraction-yes: It is a sub-intent defined inside attraction which handles user intent to search restaurant by a specific cuisine

5. Attraction-no: It is a sub-intent defined inside attraction which handles user intent not to search restaurant by a specific cuisine

6. Attraction-types: This is for the user to know the sub-categories present in all the attractions.

7. Know-more: This is exclusively for beginners or first-time users of chatbots.

8. LocationCat: Intent handles the user request to search a specific location in a locality. e.g finding restaurant in Clementi.

9. LocationName: This is to provide the travellers with information about the location names they selected based on their interest.

10. Location-getMoreinfo: Sub intent in LocationName,this provides some interesting facts about the location selected

11. Location-namenearestMRT:Sub intent in LocationName, this is used to gather information about the MRT near the location which user mentioned.

12. Locationnameaddress: Sub intent in LocationName,the address of the selected tourist spots can be obtained here

13. Locationname-cuisine: Sub intent in LocationName, in case the location selected is a restaurant this intent handles the request to list cuisine available in a restaurant.

14. LocationNameGetReview: Sub intent in LocationName,this is to access the reviews about the location from other users.

15. LocationName-getOpenTime: Sub intent in LocationName,this is to know about the opening time of the attraction

16. LocationName-getclosingtime: Sub intent in LocationName, this is to know about the closing time of the attraction

17. Locationname-is Open: Sub intent in LocationName,this is used by the user to know about the current status of the spot.

18.LocationName-getprice; Sub intent in LocationName,this is to get notified the ticket price levied on that spot

19. LocationName-getprice-select.numberAdults: Sub intent in LocationName-getprice,this is to obtain the number of adults visiting a location

20. LocationName-getprice-select.numberchild: Sub intent in LocationName-getprice,this is to obtain the number of children visiting a location and return the total ticket

21. LocationName-getprice-yes Sub intent in LocationName-getprice, it requests whether user likes to share details about the number of visitors accompanying him.

22. LocationnameLike: Gives similar location which user selected.

23. LocationnameDifferent: Gives an option to select different location from the location present.

24.LocationOther: It is use to mention whether the user is wishes to visit other location in the vicinity

25.LocationOther-no: In case user does not wishes to visit any other location. Application will close its execution

26. Locationother-yes:In case the user wishes the visit other places near the new selected location intent would be fired.

26. metBefore:This is for the regular customers in order to skip them with the introduction part

and take them into the trip directly.

27.RestaurantCuisine: This is to describe all the vivid cuisines available in town for the tripper to eat.

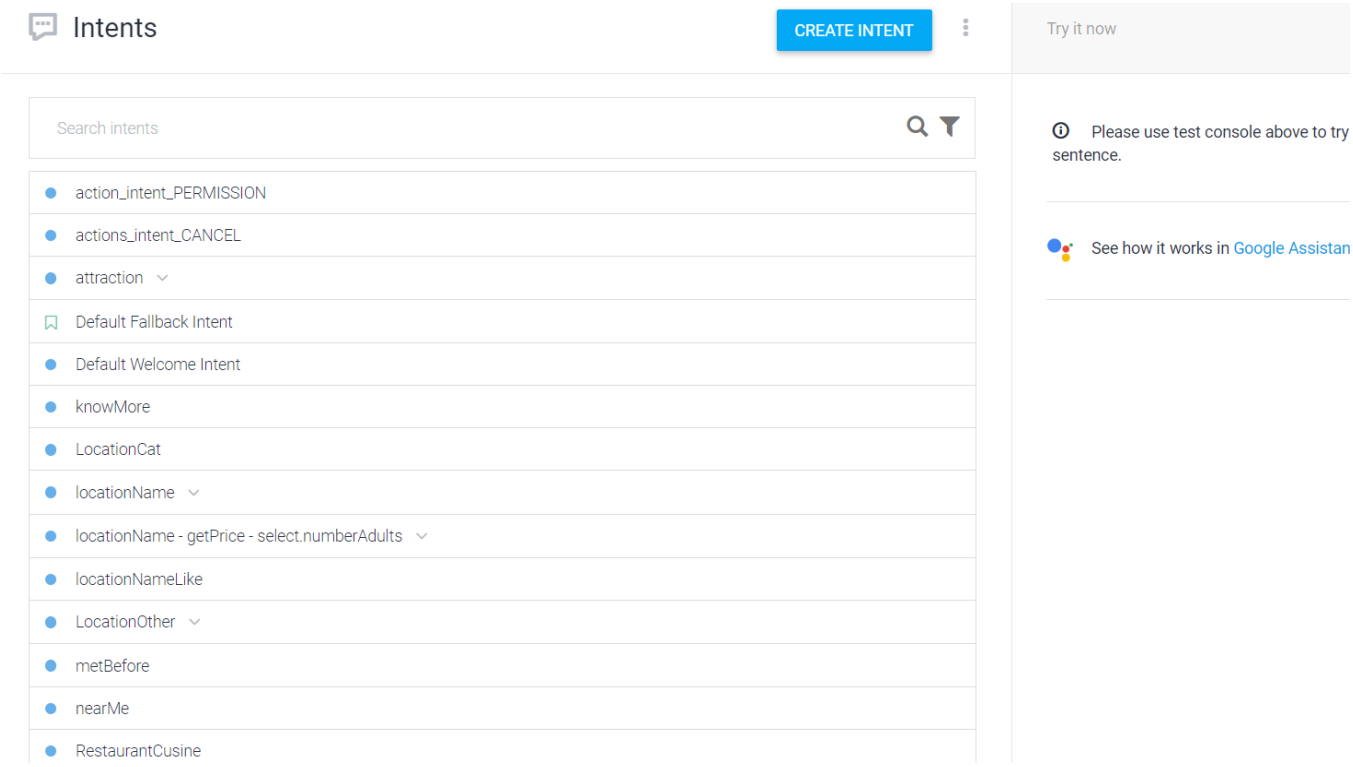


Figure 10: all the Specified intents

5.5.Entities:

Here the synonyms for all the parameters derived from the intents are being defined. The following are the prescribed entities:

Attraction types: This incorporates the different kinds of attraction available in town and the activities undertaken there. Example: Adventure, malls and shops, hawker centres etc.,

Category Description: It reports about the different itineraries available as a part of this tour, for instance, attractions, bars and clubs, food and beverages.

Cuisine: It provides knowledge about the distinct types of meals availing in the city. Example: American, Indian, Chinese, Malay etc.,

Loc: This is to put forward vivid terms used to identify locations around the user.

Location: This matches the location's Id number with the name of the location.

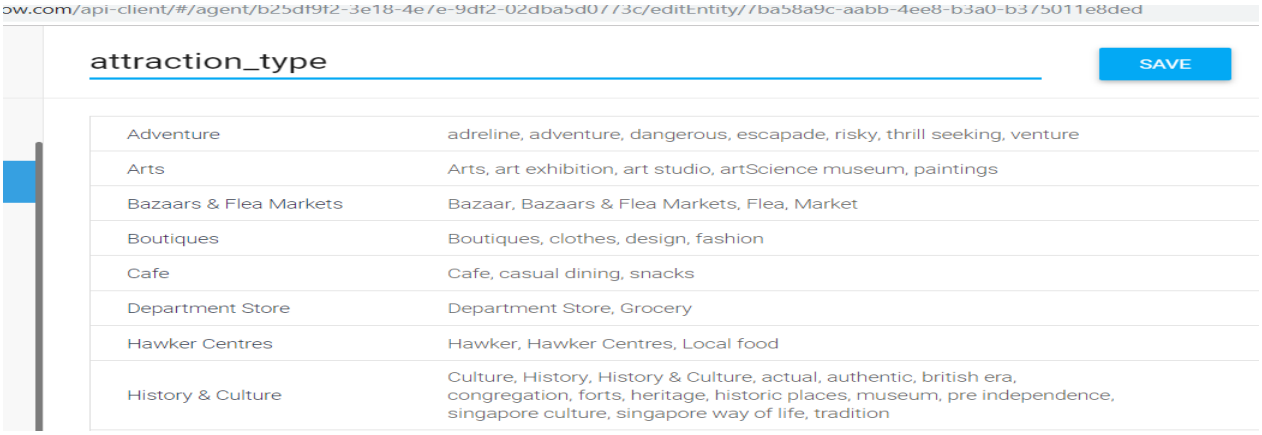


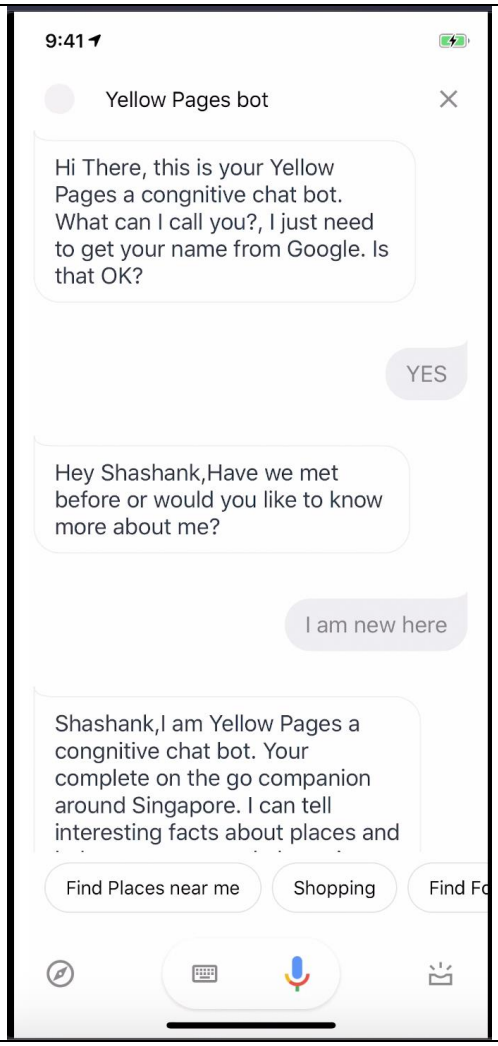
Figure 11: entities specified under attraction types

Number: This defines the total number of members participating in the tour.

5.6 Fulfilment:

To make Yellow pages capable of producing proactive replies, web hooking must be enabled under all intents. The python scripts are made to interact with the local server using Flask. The link to the local server and the agent in dialogflow is achieved through NGrok which provides the URL to be attached to the fulfilment tab. In this way "Yellow pages" can provide lively responses to the customers. Here is a sample spectacle of how the entire chatbot works.

User Agent Conversation	**Dialog Flow**

User: Hi *Invokes **Default welcome** intent* Bot: Hi There, this is your Yellow Pages a cognitive chat bot. What can I call you? I just need your name from Google. Is that Ok? ***Invokes Intent permission** for Names* User: Ok *User **Permissio**n for using Name is obtained model can address user by its name* Bot: Hey username, have we met before or would you like to know more about me? *Bot ask whether the user is a returning user or a first-time user* User: I am new here *Invokes **know more** intent* Bot: Username, I am Yellow Pages a cognitive chat bot. Your complete on to go companion around Singapore I can tell interesting facts about places and help you get around in your locality *Bot gives suggestions of activities which the user can do with the bot*	

1. Asking about the activities that could be done near me

User Agent Conversation	**Dialog Flow**

User: Find Places near me

*Invokes **near me** intent*

Bot: Can we know your current location?, I just need to know your current location from Google. Is that Ok?

*Bot request for user's current location through **DEVICE_PRECISE_LOCATION** and invokes **intent_permission intent***

User: Ok

*User Gave Permission to access location invokes **attraction intent***

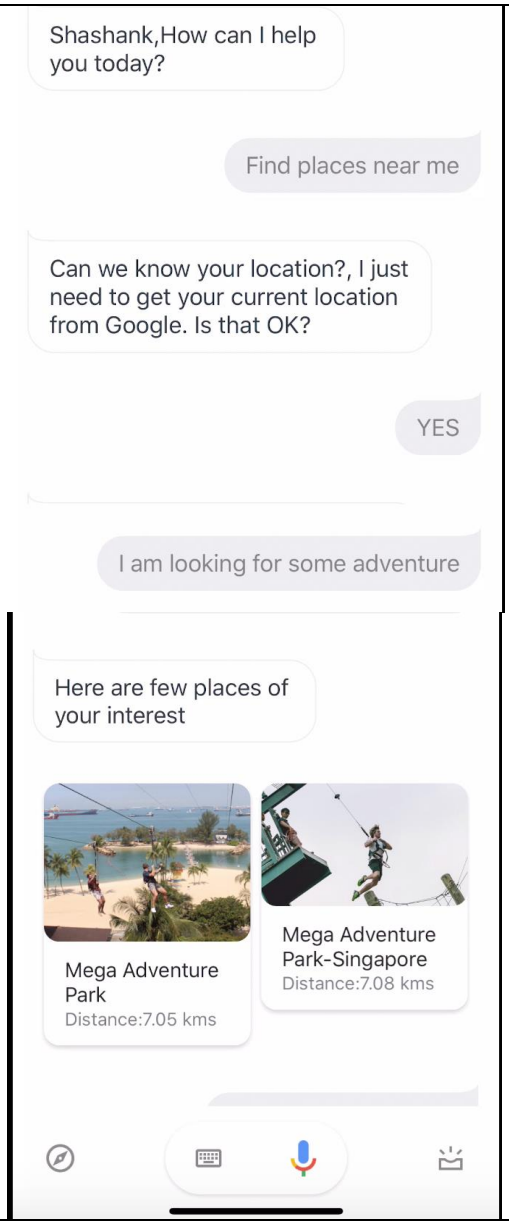
Bot: What kind of activity are you interested in?

User: I am looking for some adventure

*Invokes **attractiontype** intent*

Bot: Here are the few places of your interest

Bot displays nearest adventure attraction near user With the distance information



Finding similar places of interest Based on selection:

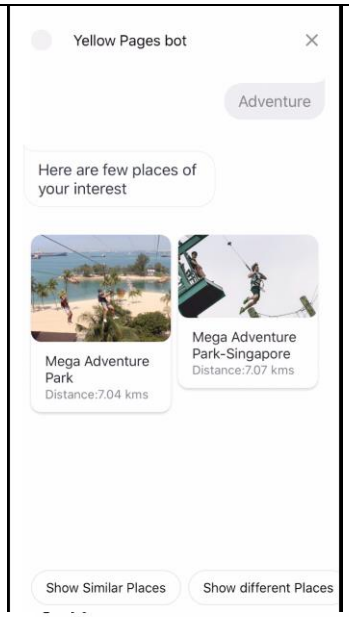
User : Show other similar places

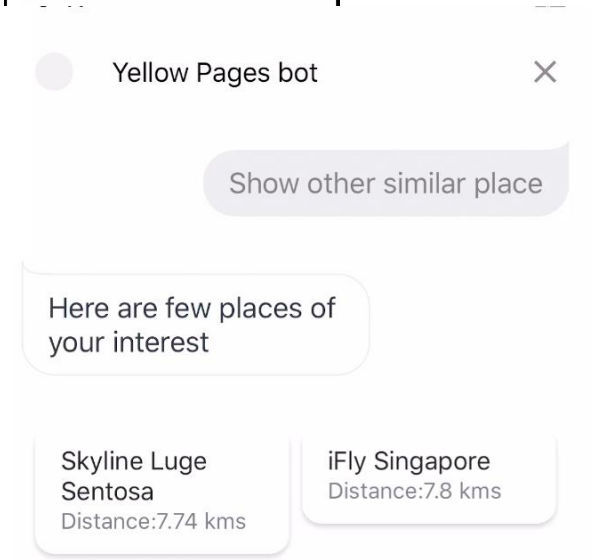
Invokes LocationNameLike intent

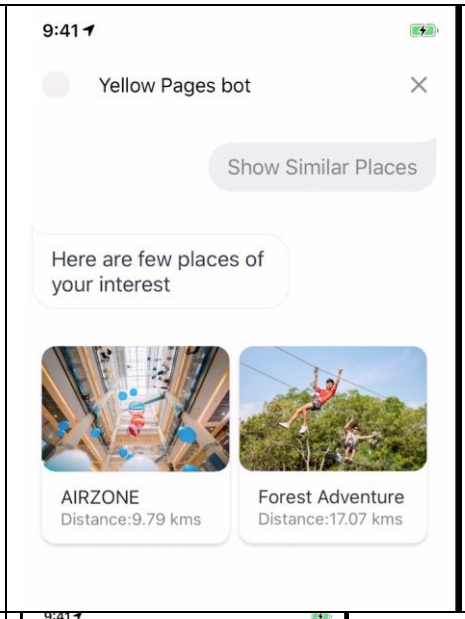
Bot: Displays other adventure places

Places listed are with increase distance from original

A similar workflow would follow for rest of attraction types


Yellow Pages bot
Adventure
Here are few places of your interest
Mega Adventure Park
Distance:7.04 kms
Mega Adventure Park-Singapore
Distance:7.07 kms
Show Similar Places
Show different Places


Yellow Pages bot
Show other similar place
Here are few places of your interest
Skyline Luge Sentosa
Distance:7.74 kms
iFly Singapore
Distance:7.8 kms



2. Listing Restaurants Near User

User: Where can I find food near me?

*Invokes **attractions** intent*

Bot: Are you looking for some specific cusine?

*Invokes **attractiontype-yes** and **attractiontype-no***

User: Yes

*Invokes **RestuarantCusine** intent*

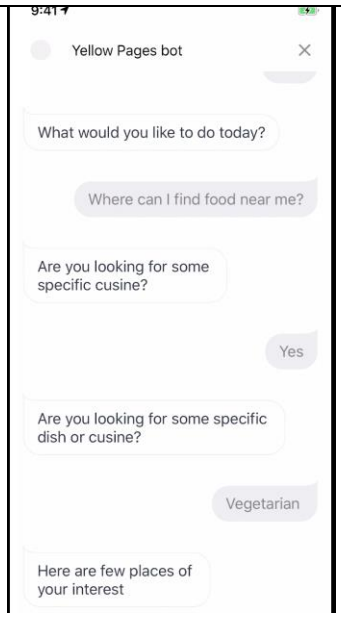
User Vegetarian

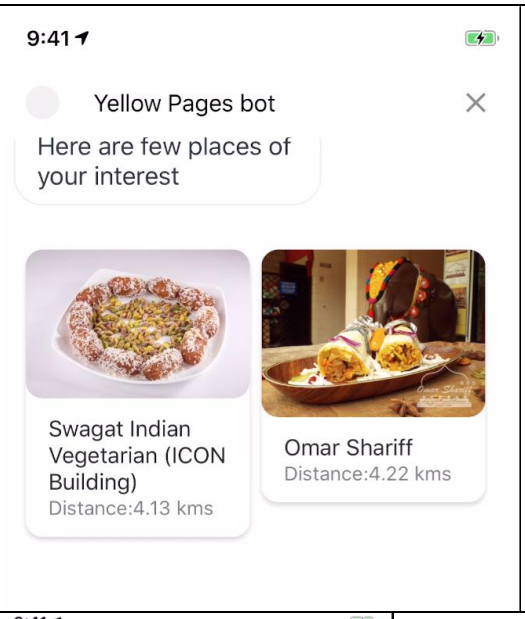
*Invokes the **attractiontype** intent*

Bot: Here are few places of your interest

*Displays the carousels and invokes **locationName** intent*

A similar intent workflow would follow for other cuisine types





6. Finding Hawker Centres near by

User: Where can I find food near me?

*Invokes **attractions** intent*

Bot: Are you looking for some specific cusine?

*Invokes **attractiontype-yes** and **attractiontype-no***

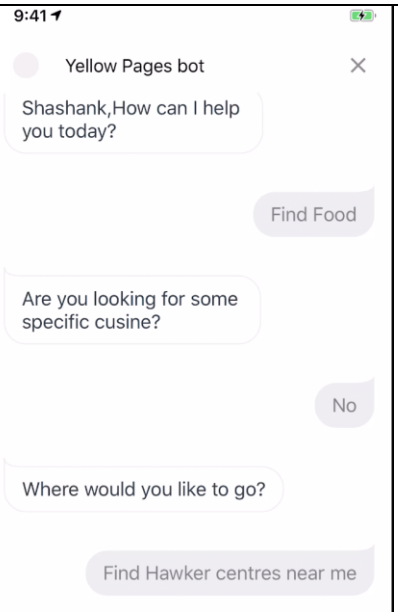
User: No

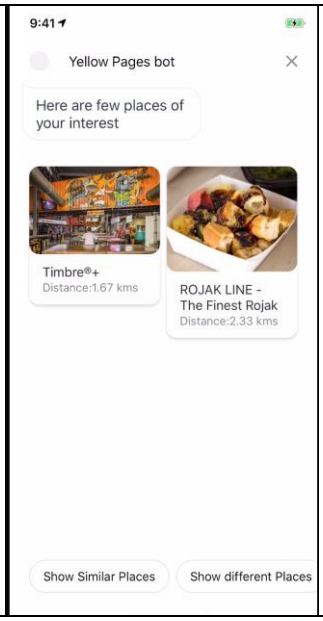
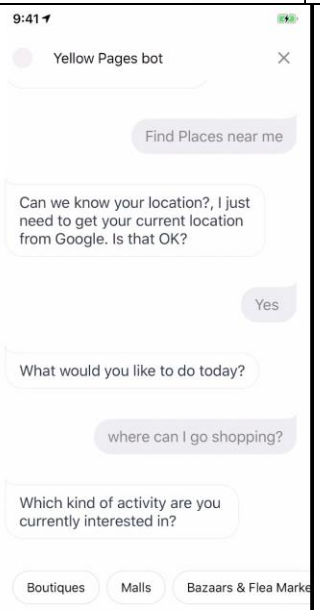
*Invokes **AttractionType** intent*

Bot: Here are few places of your interest

*Displays the carousels and invokes **locationName** intent*

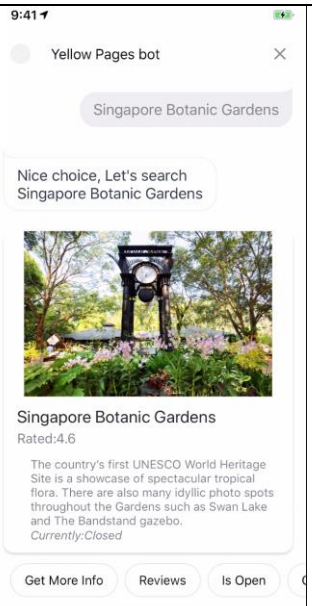
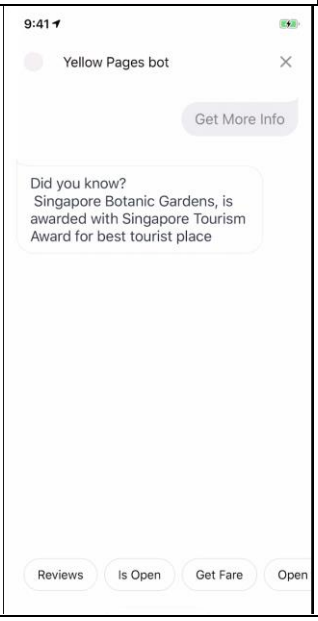
A similar intent workflow will follow for restaurants, cusine, café, hawker centres,

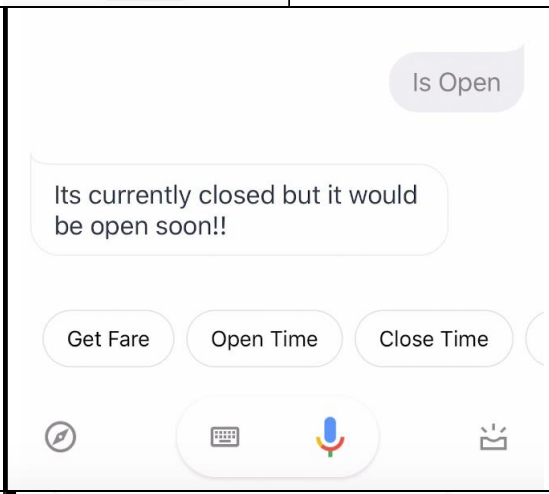
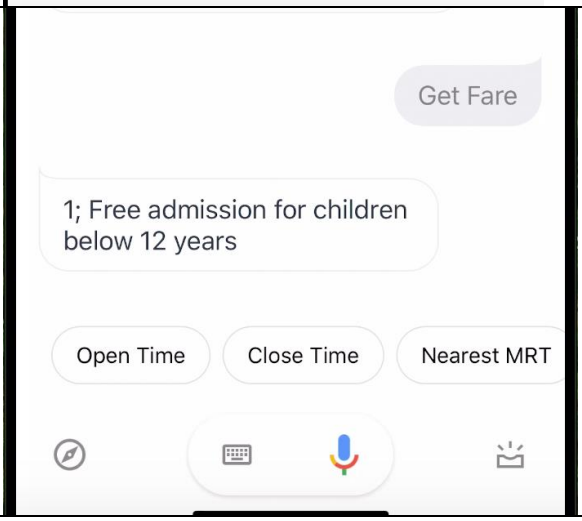


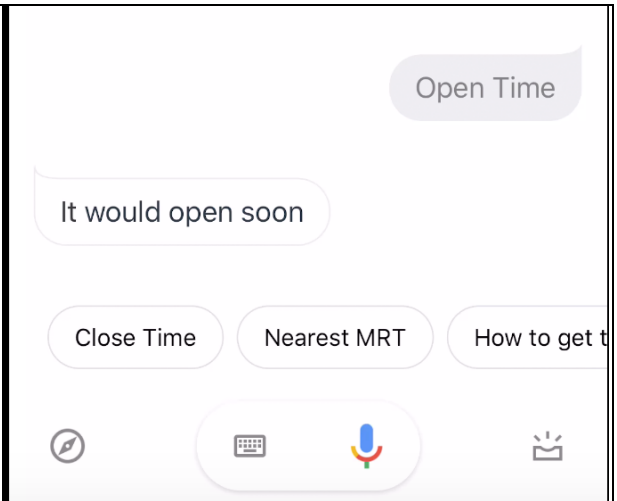
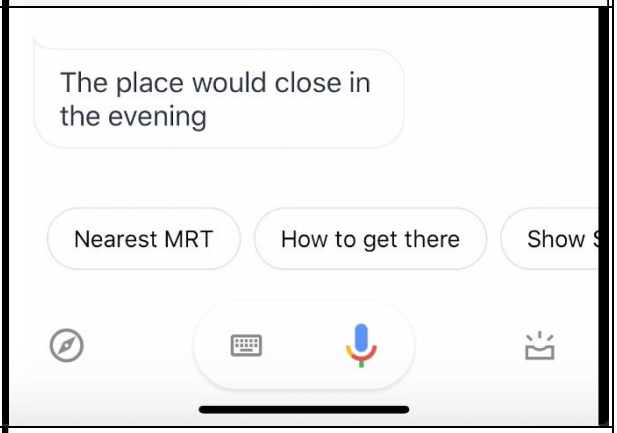
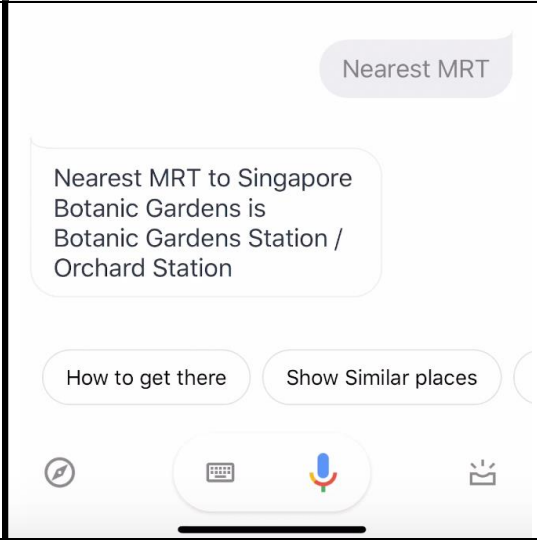
		
5. Listing Shopping centers(Malls) User: Where can I go Shopping? *Invokes **Attraction** Intent* Bot: What Kind of activity are you currently interested in and suggests Boutiques Malls Bazars etc User: Which Malls are near me? *Invokes the **attractiontype** intent* Bot :List the Malls near the user with distances. Similar workflow can be followed for Bars and other shop types		

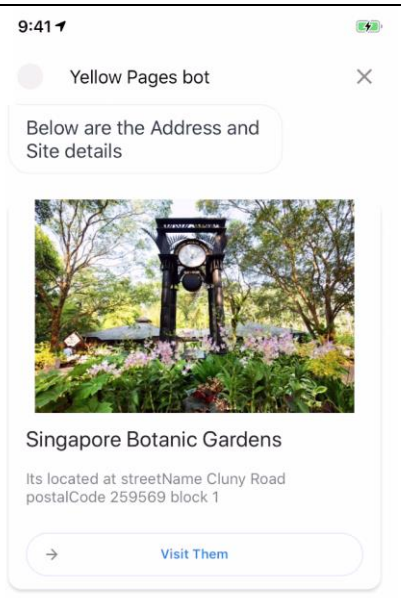
3.Exploring a location (exploring Singapore Botonic Gardens):

User Agent Conversation	Dialog Flow

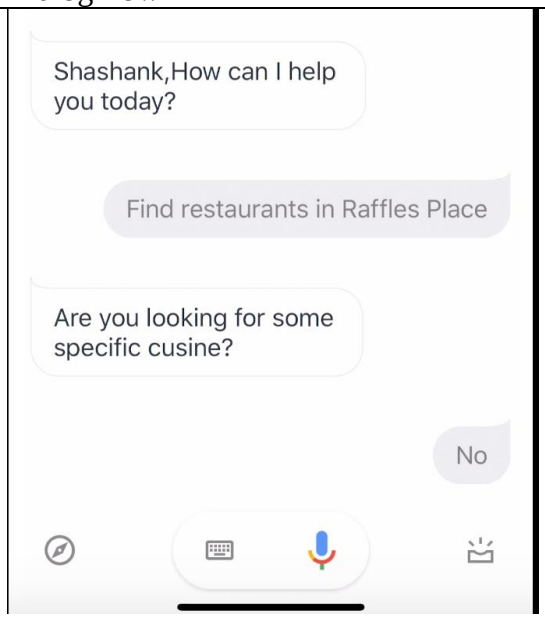
User: Singapore Botonic Gardens *Invokes **LocationName** intent* Bot: Nice Choice, Let's search Singapore Botonic Garden *Bot displays the picture of the location* *Rating* *Description* *Current status whether its open or not* *And gives user the different options to select from to further view the location*		
User: Get More Info *Invokes the **LocationName-Getdetails** for the location.* Bot: List a random interesting fact about the location.		

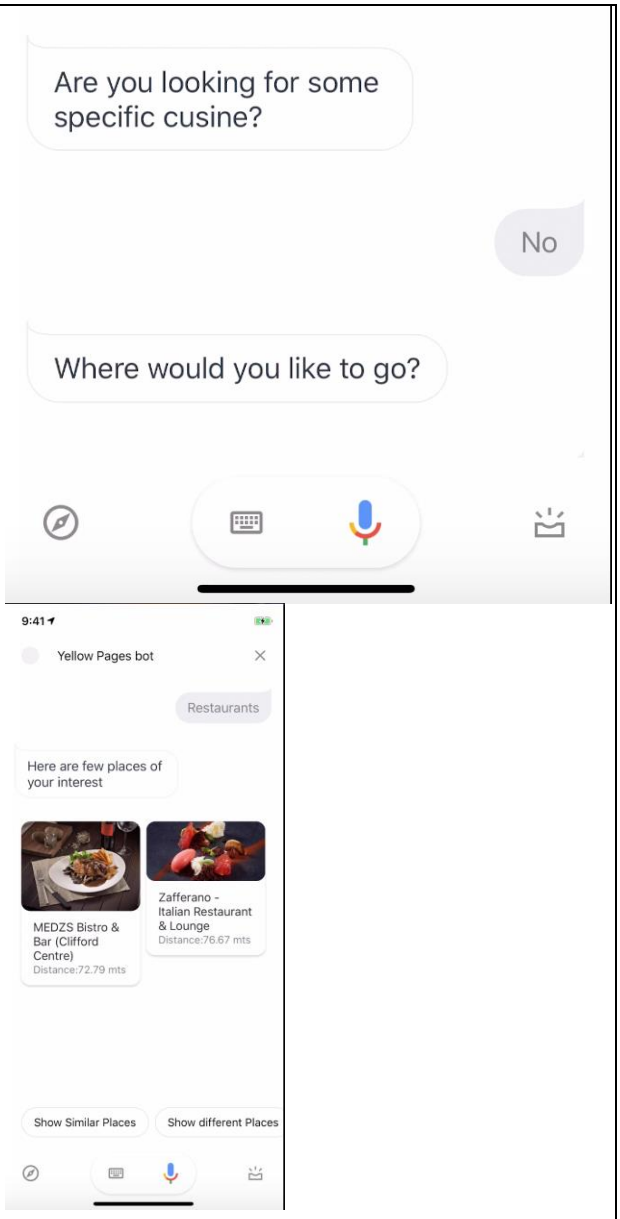
User: Reviews *Invokes **LocationNameReview*** Bot: Returns a user review for the location.	
User: IsOpen *Invokes **LocationNameisOpen** Intent* Bot: Returns if the location is open in case not by when it will open	
User: Get Fare *Invokes **LocationName-GetFare Intent*** Bot: Returns the Fare for the location if it has any	

User: Open Time *Invokes LocationName-OpenTime* Bot: Returns the opening time of the location	
User: Close Time *Invokes **LocationName ClosingTime*** Bot: The place will close in the evening.	
User: Nearest Mrt *Invokes **LocationNameNearestMrT*** Bot: Returns the list of MRT closer to the location	

User: How to Get there? *Invokes* ***LocationNameAddress*** Bot: Returns the details of the location including the address, postal code and a web URL to the official site. The Bot also ask user whether he needs to see places around. This recommend places around the location in this case places around Botonical gardens.	

4 Searching in a specific location (Restaurants in Raffles Place)

User Agent Conversation	Dialog flow
Bot: Username, How can I Help you today? Username: Find restaurants in Raffles Place Invokes LocationCat intent Bot: Are you looking for some specific cusine? User : No Invokes attractionType Intent Bot:Where would you like to go? User: Restuarants Invokes LocationName intent Bot: Returns the list of restaurant in Raffles Place	


Are you looking for some specific cusine?
No
Where would you like to go?
9:41
Yellow Pages bot
Restaurants
Here are few places of your interest
MEDZS Bistro & Bar (Clifford Centre)
Distance:72.79 mts
Zafferano - Italian Restaurant & Lounge
Distance:76.67 mts
Show Similar Places
Show different Places

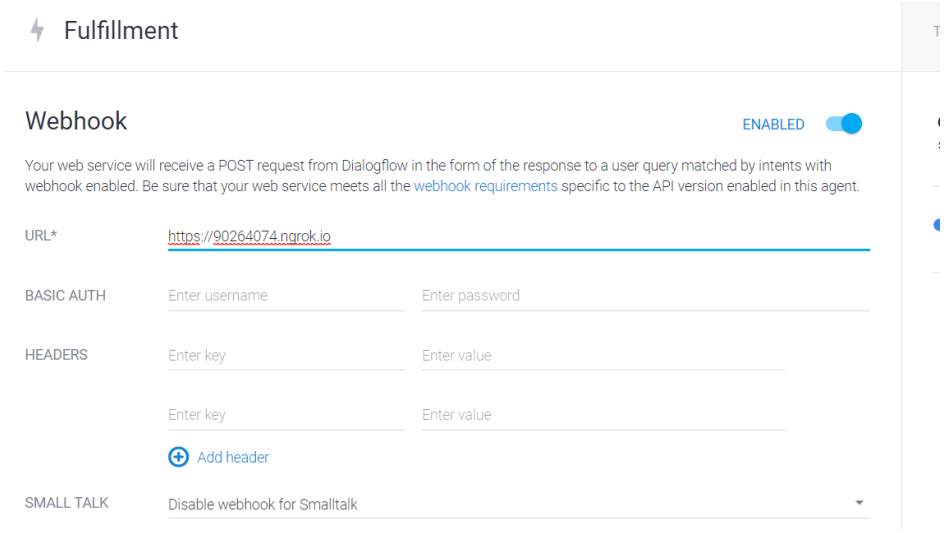


Figure 12: Example of the fulfilment page

6.Workflow:

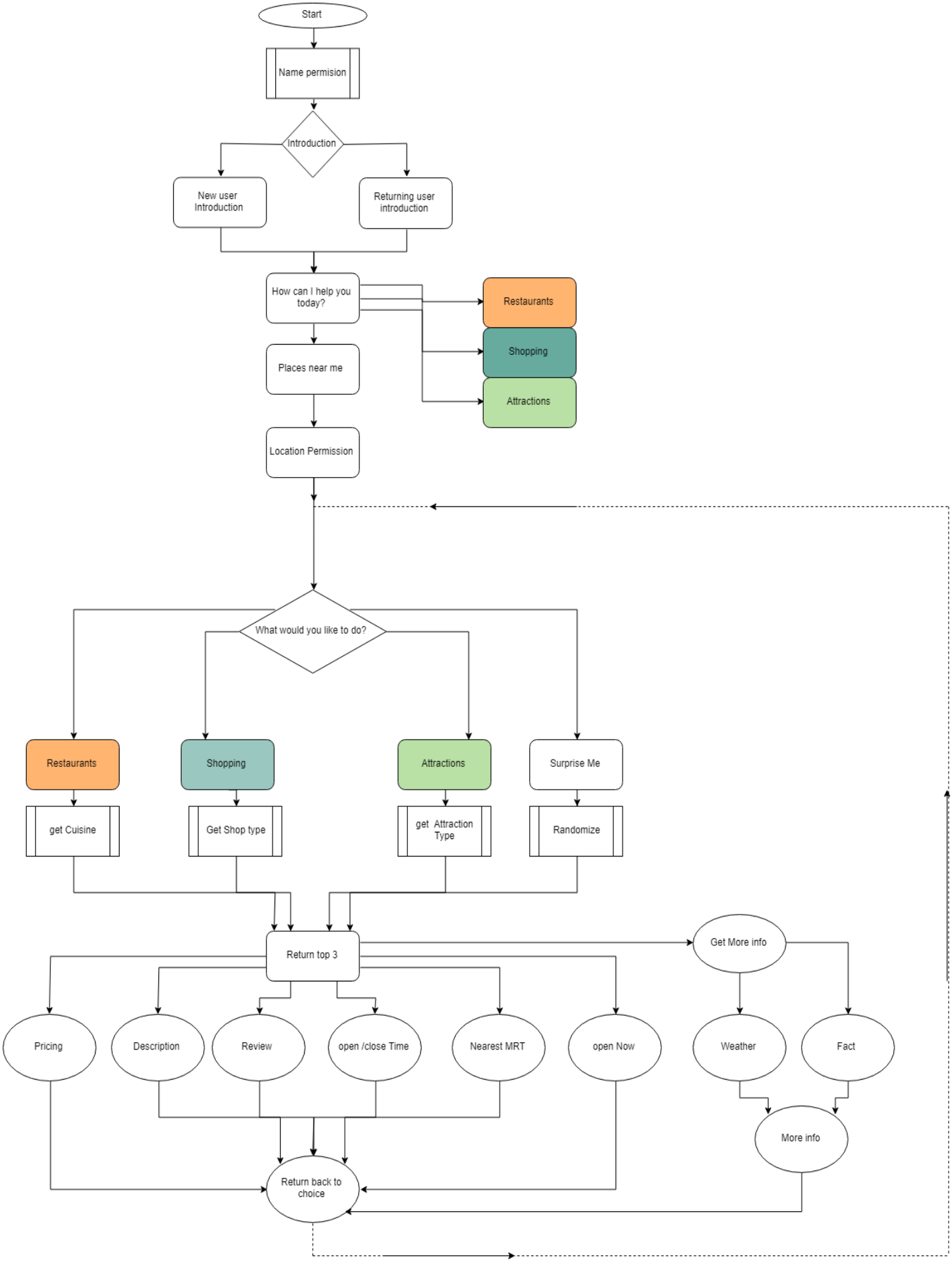
The operation strategy of yellow pages can be explained as follows:

- The first step is to open Google Assistant in any mobile phone or web browser.
- Next the user can utter or type “Open yellow pages”.
- This will take the user to the introductory part of the chatbot which wants the customer to say whether they are first time user or a regular user.
- For beginners, it will take them through a brief description and suggest locations or restaurants in the vicinity.
- The regular users are directed to the list of attractions, restaurants or shopping avenues to choose from.
- The bot then waits for the end user’s selection.
- If the enjoyer selects restaurants, then yellow pages puts forward the different types of cuisines available. If the choice is shopping, then it throws the vivid purchasing options that can be availed.

- Additionally, there is a surprise element that can be used by the tourer in order to provide them with the best rated places.
- Based on their pick, the traveller can ask questions about Pricing, nearest MRT, description, open and close time and reviews and return to the selection page.
- The trotter can also get additional facts and the climatic condition of the spot at that time.

The flow chart of this process can be visualised as follows:

MTech-IS Cognitive systems Project



7.Limitations:

"Yellow pages" is a chatbot built specifically for tourists coming into Singapore and trotting around. The main knowledge source for the application is https://tih.stb.gov.sg/content/tih/en/about_tih/about-us.html and the locations included in them. The locations and the information specific to it are limited to the ones provided by the API. The application currently focuses on attractions, shopping and restaurants. The other aspects have been added to the future scope of the project. A cognitive system requires a large number of training phrases in order to be interactive. Due to the limited amount of training phrases and entities available, not everything could be matched to the real-life scenario. Fare calculations per person assumes that the data is obtained in a specific format. Entities defined are being classified and limited to the pre-defined ones which are available through suggestions while navigating through the bot. The application is curbed to take locations defined in https://en.wikipedia.org/wiki/List_of_places_in_Singapore.

8.Further Enhancements:

Current application is limited to the API data. It can be improved by adding more relevant data and have a strong knowledge base to provide strong cognitive responses for the same. The live weather data can be included in the system to give better recommendations to the users. The locations can be divided into more cognitive classes to achieve better fulfillments.

9.Conclusion:

This report contains all the details regarding the reason building a travel chatbot "yellowbot", the idea behind it, its design features and the technical aspects. It can handle conversations related to travel and stimulate human-like interactive experience. Due to time and resource constraints, there are few limitations present in this bot. It has been analyzed and put forward under the limitation's sections. It has also paved the way for future improvements as suggested above. To conclude, a chatbot development process still faces issues such as intent mismatch, less user-friendly etc.,. In order to avoid this more intuitive sentences and suitable contexts can be used for training it.

10.References:

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