

## **CS510- Final Project**

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### Step 1: Application: Trip planner

This application is designed in dialog flow, it plans user trip based on destination name given by the user. It provides different types of travel options to the user and ends with providing some basic accommodation details. This application uses intents, follow-up intents, contexts, webhook and fulfillment to drive a meaningful conversation with user.

An intent in this application is derived based on previous assignments, in previous assignments user is provided with options for travel from Portland to New York JFK. But in this application source and destination can be any global city, it provides user car rental as a travel mode along with flights. It also asks user the type of car he prefers, it also provides the user possible hotel accommodations near destination airport.

### Step 2: Interaction Model

This application asks user destination name, it can be any global city. Source parameter for application is not mandate, its value is defaulted to “Portland”. After receiving destination, application calls google distance API and responds back to user with distance between the cities and asks user to provide his preferred mode of transport. If user picked by road, application calls google Places API and gets car rentals within radius of 200 miles. If user preferred air travel, application returns nearby airport details. If user confirms from the results obtained, application will call an intent to get price details and confirms booking. It ends by prompting user for hotel accommodations which is defaulted with follow-up intents. User can end conversation at any stage by just saying “no” when he does not like the suggestion provided by application.

Intents: Getdestinationdetails, Gettransportdetails, travelbooking, Getrentalcardetails, userconfirmation

Contexts: awaiting\_destination, awaiting\_transportmode, user\_response, awaiting\_confirmation

API:

[https://maps.googleapis.com/maps/api/directions/json?origin="+source+"&destination="+destination+"&key=AIzaSyDsUZbwZQf7DVeRyxiUxveG5uWXLJ3HS\\_c](https://maps.googleapis.com/maps/api/directions/json?origin=)

[https://maps.googleapis.com/maps/api/place/findplacefromtext/json?input="+transport+", "+location+"&inputtype=textquery&fields=formatted\\_address,name,opening\\_hours,rating&locationbias=circle:2000&key=AIzaSyD7lnEvqoaQdFXqFBiZEscDWopMQLKaAOI](https://maps.googleapis.com/maps/api/place/findplacefromtext/json?input=)

Parameters: destination – global-city; car rental – custom entity; car type – custom entity;

Custom entities:

Carrental:

"rent a car", "rent a car", "rentals", "by road", "on road", "drive"

"rentals", "rentals"

"need a car", "need a car"  
"prefer a car", "prefer a car"  
"by flight", "by flight"  
"near by airport", "by air"  
Cartye:  
"SUV", "SUV", "6 seater", "family car"  
"Sedan", "Sedan", "luxury", "permium"  
"EV", "EV", "electric", "tesla"

Training Phases:  
need a break thinking about visiting destination  
Looks like destination is a great place to visit lets plan a trip  
Planning to family occasion to destination coming Thursday  
Family trip to destination on date  
Thinking of going to destination

### Step 3: Fulfilment

Intent 1: Getdestinationdetails

Pseudocode :

- If(source is not defined):
  - Mark source as Portland;
- Call Distance API:
  - Returns distance between cities;
  - Receives distance value and prompts user for mode of transport;

Intent 2: Gettransportdetails

Pseudocode:

- Get transport\_mode from parameters;
- Get destination from input context;
- Call Places API :
  - Return values of car rentals / Airport;

Intent 3: travelbooking

Pseudocode:

- Get mode of travel from input context;
- Get destination from input context;
- Get user response from parameters;
- If user response is defined :
  - If response is no:
    - End the conversation;
  - Else:
    - If (mode of travel includes “car”):
      - Return agent with car rental values ;
    - Else :
      - Return with flight ticket details;

Prompt user to hotel accommodations;

#### Intent 4: Getrentalcardetails

It calls custom entity car type and receives user preferred car type;

#### Places API/Distance API :

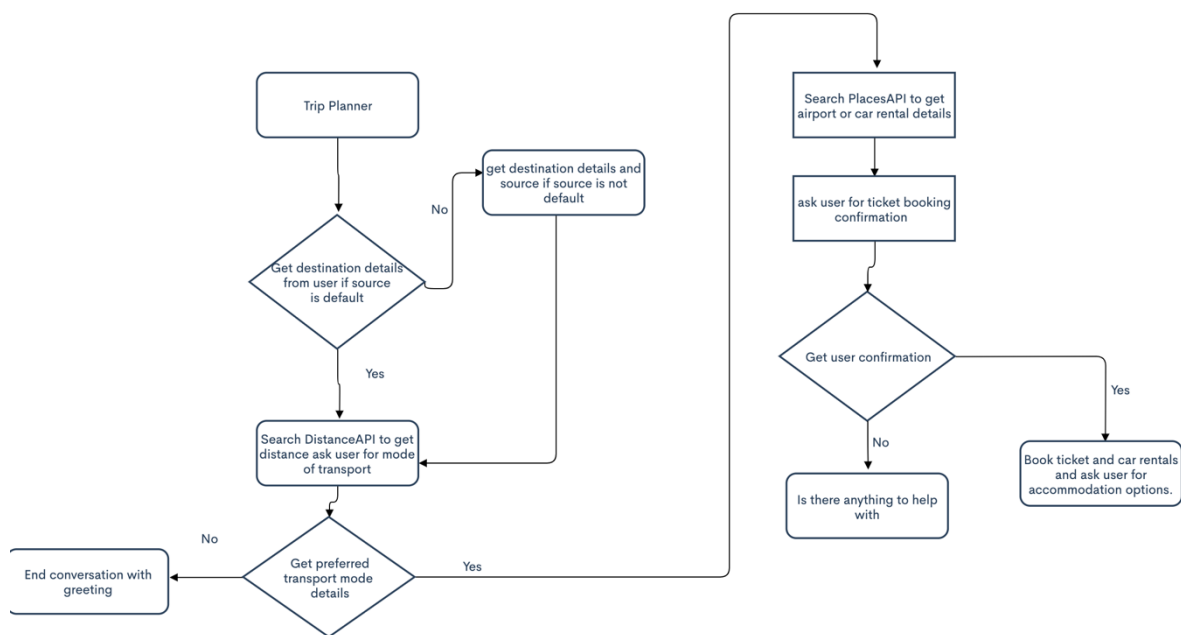
Receives destination or search details from function parameters;

Searches API through URL;

Gets https request through json format;

Resolve json and return response with name, formatted address and user rating values;

#### Conversational Flow:



#### Conversation:

Hi

Welcome to trip planner, which place are you planning to travel?

Vegas on this monday

The distance is 971 mi by road it takes 15 hours 27 mins to Las Vegas, NV, USA. Are you planning to travel by road or by air ?

i prefer a travelling by road

available car rentals are National Car Rental with user rating as 4.4 located at 7105

NE Airport Way, Portland, OR 97218, United States Which type of car do you want ?

i want a sedan

a Sedan to Las Vegas costs about 125\$ per day. do you want to confirm booking?

Yes book it

your rental car of type Sedan booking is confirmed from Las Vegas. Do you want to search hotels in Las Vegas.

Yes I do

Nearby hotel to airport in Las Vegas is Hotel Radisson. Is there anything else i can help you with ?

Hi

Welcome to trip planner, which place are you planning to travel?

Seattle tuesday

The distance is 174 mi by road it takes 2 hours 44 mins to Seattle, WA, USA. are you planning to travel by road or by air ?

i will travel by flight

Nearby airport is Portland International Airport with user rating as 4.5 located at 7000 NE Airport Way, Portland, OR 97218, United States Do you want to book a ticket ?

yes book the ticket

Your ticket from Portland to Seattle is confirmed. Carrier id - 756 run by Jetairlines seat number 13A. Do you want to search hotels in Seattle

yes i do

Nearby hotel to airport in Seattle is Hotel Radisson. Is there anything else i can help you with ?

Hi

Welcome to trip planner, which place are you planning to travel?

Dallas sunday

The distance is 2,033 mi by road it takes 1 day 6 hours to Dallas, TX, USA. Are you planning to travel by road or by air ?

By road

available car rentals are National Car Rental with user rating as 4.4 located at 7105 NE Airport Way, Portland, OR 97218, United States Which type of car do you want ?

I want a SUV

a SUV to Dallas costs about 125\$ per hour. Are you ok with the price, do you want to confirm booking?

No

Is there anything else i can help with ?

Step 4: User testing:

Task	Completed	Time to complete in sec	User 1	User 2
1.Booking a flight	Yes	35	34	43
2. planning entire trip	Yes	37	No, 40	36
3. planning a trip by road	Yes	32	37	45
4. planning a trip by flight	Yes	31	31	No , 28
5. get distance between cities	Yes	17	19	14

Question	Strongly disagree	Disagree	Neutral	Agree	Strongly Agree
The system is easy to use				Yes	
System understands what I say				Yes	
Sometimes the advice seems irrelevant			Yes		
The system is confusing		Yes			
I like the flow of the video			Yes		
I find the system entertaining		Yes			
I am happy with advice offered			Yes		
I would be happy to use this system again			Yes		
I like idea of being able to interact with this				Yes	
It is fun to play around with the system		Yes			

What works:

It has provided multiple choices to the user, conversation by bot has given expected responses for each user choice.

Application required less inputs from user, it has driven conversation with just city name input.

Open ended Questions:

For no responses by user, application has stopped the conversation, it could have improved.

Further improvement can include accommodations and other dining options.

API call is taking time to return responses, it can be improved.

More training phases can be added.

## Step 5: Review and Reflection

### Impressions:

Developing an application with given use cases has provided a chance to understand, different ways a user can respond to a bot. Most enjoyable part is driving conversation and designing fulfillment code as per user responses. Most difficult part of designing a voice assistant is collecting training phrases for intents. Using follow-up intents, to capture user responses has improved application in many ways. A conversation can have multiple branches emerging with each user response, analyzing all possible ways that a user can respond and designing application for each expected response has given a real time application development experience. Testing stages has improved task completion rate after training application with different sample utterances.

When user is trying to end conversation, by saying no to the bot, follow-up intents are getting not executed, it can be improved. Application is using just two basic calls provided by google, it can be improved. For instance, flight rates are defaulted in application instead it can call public API like sky scanner, to get flight rates. More number of training phrases can be added, to reduce failures and dead ends in the conversation. Output contexts are created but only few context values are used in fulfillment code, it can be improved.

### Platform:

Working with dialog flow and testing applications in breakout rooms is the most enjoyable part of the class. When others testing our application, many possible training phrases are obtained. Designing an agent in dialog flow, after creating similar agent in Alexa has clearly shown advantages of dialog flow compared to Alexa. Dialog flow works well for analyzing user response, even user responded with dialogue which has matching entity, but not with matching training phase. If the same training phase existed in multiple intents, then Alexa skill picked a random intent in skill, but dialog flow regulated conversation with contexts. Actions in dialog flow has reduced effort of creating additional intents, by providing default follow-up intents options like 'yes', 'no', 'later'.

Understanding working of each platform and creating intent as per platform is difficult. platforms are supporting different programming languages. For instance, dialog flow webhook fulfillment code supported only java script language whereas Alexa supported python language. While migrating from Alexa to dialog flow it is challenging to understand google cloud functions and dialog flow fulfillment in webhook code. Execution of Training phases differs among platforms, dialog flow has picked up intent with ease when compared to Alexa which expected user response in exact format as that of intent. This has made testing in dialog flow simpler when compared to Alexa.

### Testing:

I have performed user testing with 5 different users and received responses from them. After user testing, it is understood that application is not able to understand few utterances from user. After testing I have added many training phrases to capture all kinds of user responses but still there might be some new phrases by the user which are not captured. To develop the application further rigorous testing is required with all possible training phrases. Application

must be tested under scenarios like removing values for non-mandatory parameters, and providing multiple values to custom entity parameters, thereby observing differences between expected and obtained responses.