NLP Course Project: Building Chatbot with RASA

Submitted By:

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Problem Statement:

An Indian startup named 'Foodie' wants to build a conversational bot (chatbot) which can help users discover restaurants across several Indian cities. The main purpose of the bot is to help users discover restaurants quickly and efficiently and provide a good restaurant discovery experience.

The bot should be able to identify common synonyms for cities and entities like cuisine and should be able to handle the errors gracefully. The bot should display results according the user preferred City, Cuisine, Budget and Average cost for two people in descending order of the User Ratings for restaurants. It should be able to check the valid email id and send the details to email if requested by user.

Business Understanding:

The startup Foodie works only in Tier-1 and Tier-2 cities. So it should correctly identify the details of the Tier-1 and Tier-2 cities and for rest of the rest it should throw message "Not operating yet in this city" instead of exception. The bot should also be able to identify common synonyms of city names, such as Bangalore/Bengaluru, Mumbai/Bombay etc. and cuisines like dosa - south India or taco that's Mexican

Also the bot should handle common misspellings for city and cuisine names gracefully.

If the city is not present in valid city names then it should throw error "Saying didn’t recognize the city".

The bot should ask for cuisine preference and show some common cuisines types like Chinese, Mexican, Italian, American, South Indian, North Indian. Apart from these the bot should also handle additional request like Thai or Chaat or dumplings (Chinese) or tacos (Mexican).

Once the location and cuisine is verified the bot should ask for average budget for two people. The bot should display options like: Less than 300 (low budget), In between 300 to 700 (medium budget) and more than 700 (high budget). Apart from this the bot should gracefully handle any other optional budget like if user enters: "in range of 100 to 500".

Once all the details are received the bot should search for the restaurants and display the top 5 results on the display sorted by descending order or user rating. The bot should display: Restaurant Name, Restaurant Address, its User Rating and Price of Average Budget for 2 people. Once this is displayed the Bot should prompt user if it needs the displayed restaurants details emailed. If so the bot should ask for email id, verify

the email entered has valid structure and if email if valid sent the email with Restaurant details. If the email is not valid raise error and ask the user to re-renter.

Once done the bot should bid good bye to user if the user doesn't need any more help.

Implementation:

We used RASA to develop the chatbot. RASA has 2 modules: **RASA NLU** and **RASA Core.**

Rasa NLU is an open-source natural language processing tool for intent classification, response retrieval and entity extraction in chatbots. For example, taking a sentence like "I am looking for a Mexican restaurant in the center of town" and returning structured data like

```
{
  "intent": "search_restaurant",
  "entities": {
    "cuisine" : "Mexican",
    "location" : "center"
  }
}
```

Rasa Core is a dialogue engine for building AI assistants. Rather than a bunch of if/else statements, it uses a machine learning model trained on example conversations to decide what to do next.

Let's dive in detail and see how a specific story/dialogue flow is interpreted in RASA.

Consider a simple story:

Me: Hey there

Bot: Hola Amigo!! Hungry? What's on you mind today?

Me: I am hungry. Can you help me with some good places to eat?

Bot: What location would you prefer?

Me: Ratnagiri

Bot: Sorry did'nt find any such location Ratnagri Can you please tell again?

Me: How about Gangtok?

Bot: We do not operate in Gangtok yet. Please try some other city.

Me: How about Dilli then?

Bot: Ok. What would you like to eat?[Chinese, Mexican, Italian or something Indian?]

Me: Chines

Bot: What is the average budget for two people?

Me: < 300

Bot: Here are our picks!

Restaurant 1: Mom Hand Momos in Opposite Venkateshwara College, Satyaniketan, New Delhi has been rated 4.1

Restaurant 2: Roll Box in Shop 23, GH 13, DDA Market, Paschim Vihar, New Delhi has been rated 3.9

Do you want me to send email about this Restaurants information?

Me: yes please send it to xyz@gmail.com

Bot: Email Sent. Please check your inbox. Have a great time!!

Superb!! Anything else I can do for you? Foodie is always at your service.

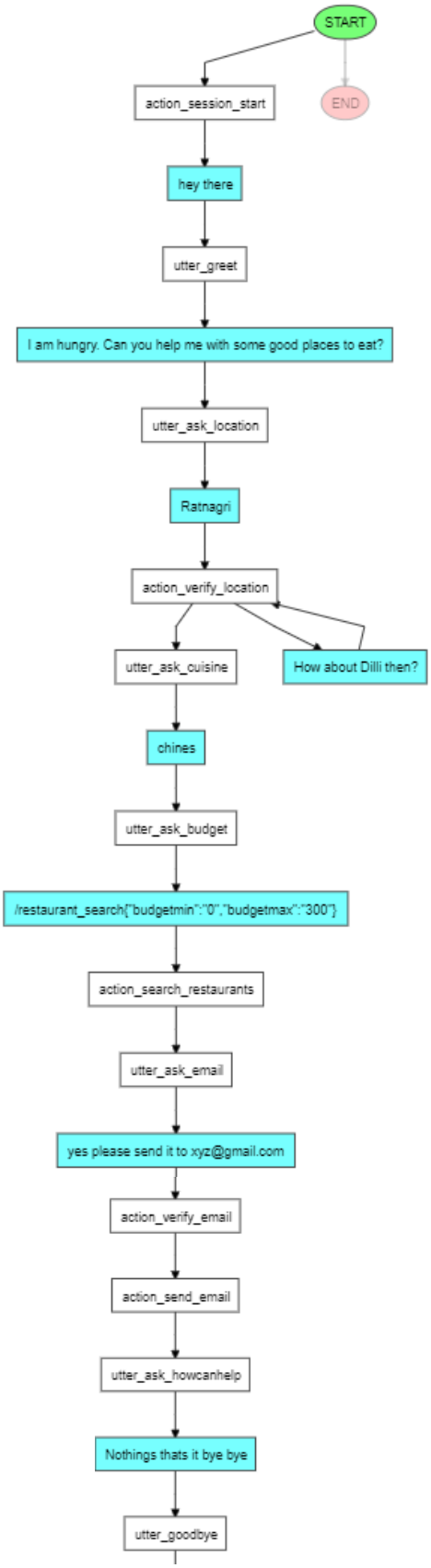
Me: Nothing that's it bye bye

Bot: Happy to help always. See you next time

Above we have mentioned a sample story/ dialogue flow for training the chatbot.

After exchanging greetings the user mentiones it intent for restaurant_search. The bot ask for location. The user mentions it, bot verifies the location and after verification asks for cuisine and budget. The user give appropriate details and bot searches restaurants as per user requirement.

The flow chart for same is as below:


START
END
action_session_start
hey there
utter_greet
I am hungry. Can you help me with some good places to eat?
utter_ask_location
Ratnagri
action_verify_location
utter_ask_cuisine
How about Dilli then?
chines
utter_ask_budget
/restaurant_search{"budgetmin":"0","budgetmax":"300"}
action_search_restaurants
utter_ask_email
yes please send it to xyz@gmail.com
action_verify_email
action_send_email
utter_ask_howcanhelp
Nothings thats it bye bye
utter_goodbye

RASA Core and NLU helps in identifying the intents, entities and maintaining the dialogue flow as shown above.

The demo of slack integration for same with various crucial scenarios is given in you tube video which you can check here:

https://www.youtube.com/watch?v=7SdTPhpB-bI