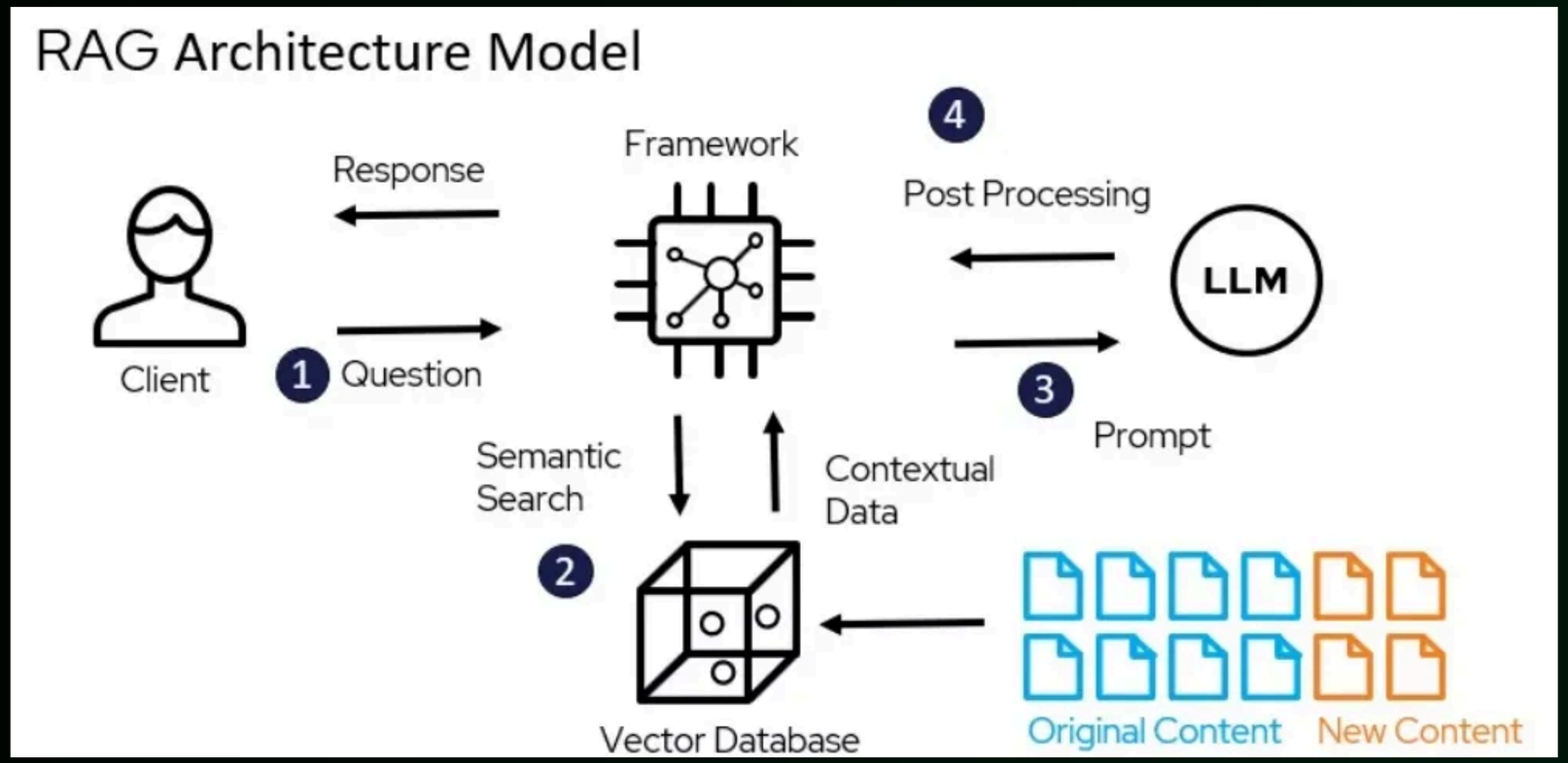
Lang-Chain Travel Agent

GWU CSCI-6365 24FA

Travel Q&A Assistant Using LLM and Vector Databases

Shi Qiu


RAG Architecture Model
Framework
4
Post Processing
Response
LLM
Client
1
Question
3
Prompt
Semantic
Search
Contextual
Data
2
Vector Database
Original Content
New Content

help me find a hotel in newyork

Multiple matches found (37). Please refine your search criteria

"Enter additional requirements (e.g., 'parking', 'free wifi', etc.):"

```
Number of results found: 37
-------------------------------------------------
Sample of the matched results:
                                HotelName HotelRating
The Penthouse Organic & Modern in Times Square   ThreeStar Distances are ca
                               Visions Inn   ThreeStar
                  Riviera Motor Inn Brooklyn     OneStar
                             Villa Florencia         All
                               Argos Inn    FourStar
-------------------------------------------------
```

maybe a 4 star hotel

Multiple matches found (5). Please refine your search criteria

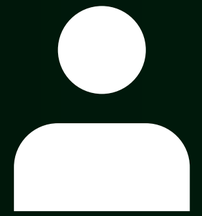
"Enter additional requirements (e.g., 'parking', 'free wifi', etc.):"

```
Number of results found: 5
-------------------------------------------------
Sample of the matched results:
                 HotelName HotelRating
                 Argos Inn    FourStar
New York Marriott East Side    FourStar
      LaGuardia Plaza Hotel    FourStar
                Boro Hotel    FourStar
        YO1 Wellness Center    FourStar
-------------------------------------------------
```

maybe fivestar instead

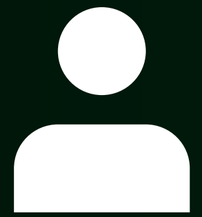
Congrats, we found you a hotel: Collective Governors Island, what else do you want to know?

how can i contact them



To contact Collective Governors Island, you can reach out to them via email at hello@collectiveretreats.com or by phone at (970) 445-2033. You can also visit their website at https://www.booking.com/hotel/us/collective-governors-island.html for more information and to make reservations.

how to get there



To get to Collective Governors Island, you can take the Governors Island Ferry departing daily from Lower Manhattan and Brooklyn. The island is car-free, so it is best explored by foot or bicycle. You can also reach the island from local airports such as Newark International, LaGuardia, and JFK by taking public transportation or a taxi to the 10 South Street Ferry Terminal and then taking the Governors Island Ferry. Enjoy your stay at this peaceful oasis with endless opportunities for discovery and relaxation.

what can i do there

At Collective Governors Island, you can enjoy a variety of activities such as morning yoga, spa offerings, live music, cocktail hour on the sunset terrace, chef-driven farm-to-table dining, and exploring historic Governor's Island by bike. The gourmet dining experience offers a contemporary American menu with a focus on wood flame grilling. Additionally, guests can relax in the peaceful oasis and take advantage of the expansive outdoor setting. To get to Collective Governors Island, you can take the Governors Island Ferry departing daily from Lower Manhattan and Brooklyn. Enjoy your stay!

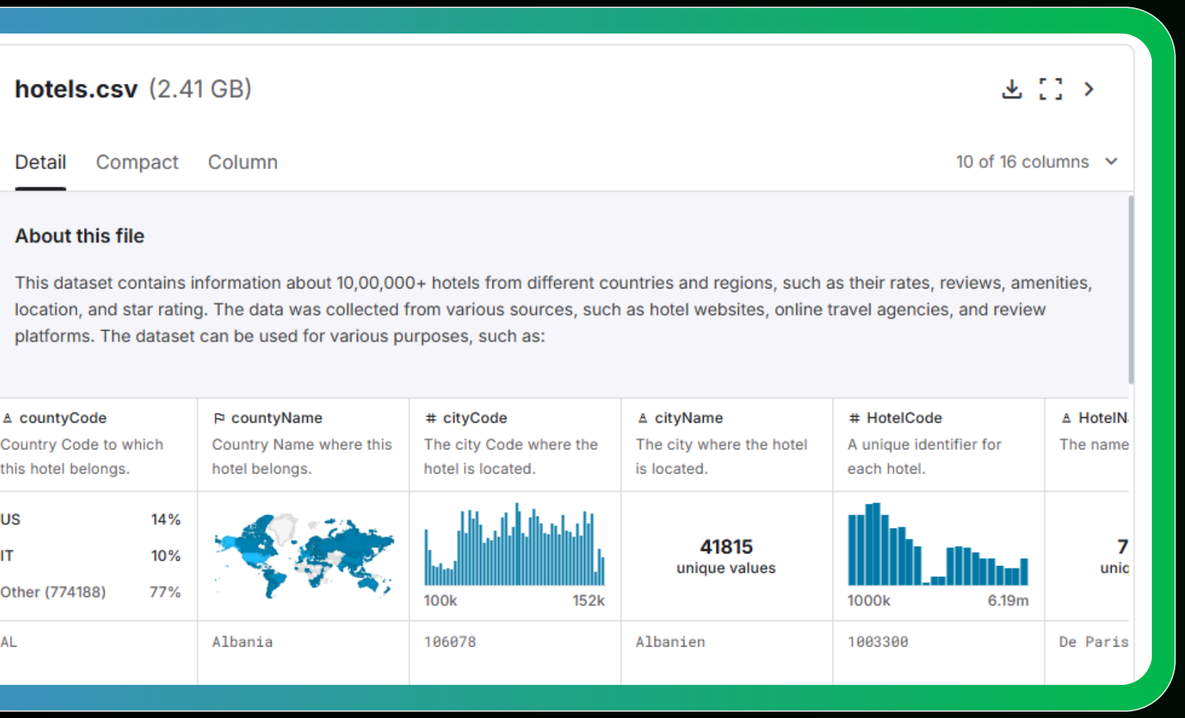
thankyou, exit

Thank you for your interest in Collective Governors Island. If you have any further questions or need assistance with booking, feel free to reach out to us at hello@collectiveretreats.com or call (970) 445-2033. Have a great day!

Thank you for using the Travel Assistant. Goodbye!

Process

1. The user asks a question.
2. The system uses an LLM to classify the query's intent (hotel-related or not).
3. If hotel-related, it searches a hotel CSV based on extracted filters. If non-hotel-related, it uses vector-based semantic search on a local text file of attractions.
4. The system collects relevant information, then prompts the LLM to generate a cohesive, helpful answer.
5. The user receives a final, context-informed response. The conversation continues as the user asks follow-up questions.

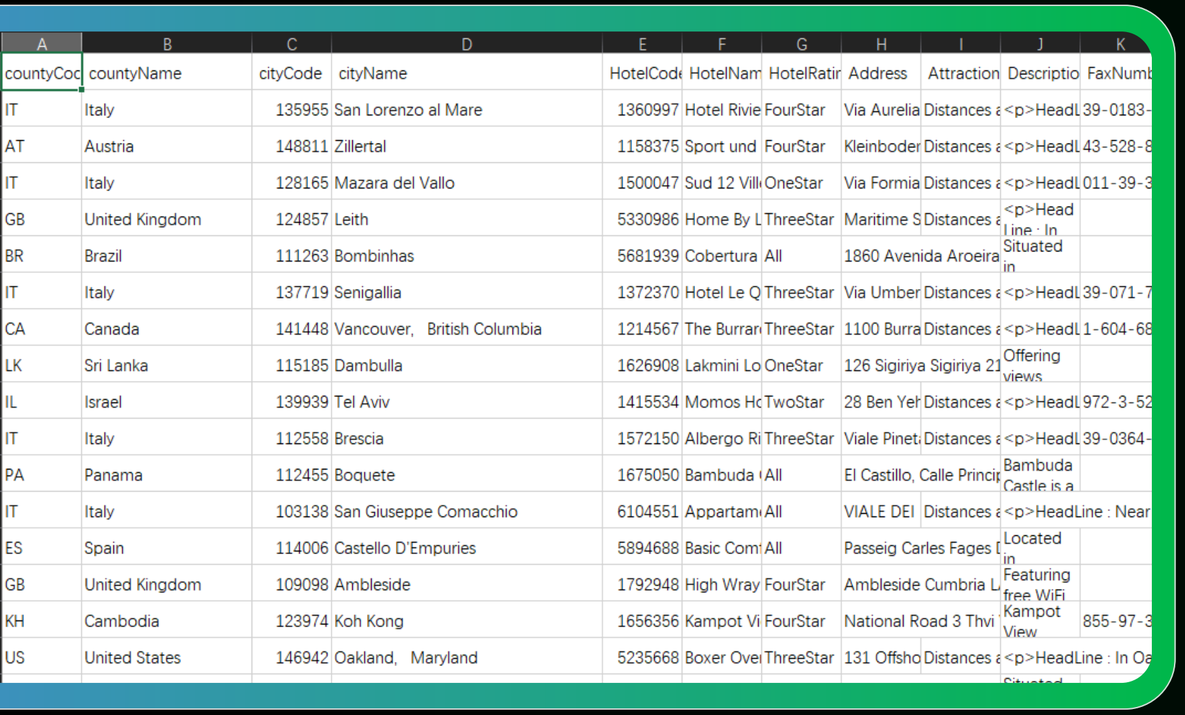


Hotel Data

- Source: A structured CSV file containing information about various hotels.
- Purpose: Enables fast filtering and retrieval of hotel-related information based on user queries.

Learn More

https://www.kaggle.com/datasets/raj713335/tbo-hotels-dataset



A	B	C	D	E	F	G	H	I	J	K
countyCoc	countyName	cityCode	cityName	HotelCod	HotelNam	HotelRatir	Address	Attraction	Descriptio	FaxNumb
IT	Italy	135955	San Lorenzo al Mare	1360997	Hotel Rivie	FourStar	Via Aurelia	Distances a	<p>HeadL	39-0183-
AT	Austria	148811	Zillertal	1158375	Sport und	FourStar	Kleinboder	Distances a	<p>HeadL	43-528-8
IT	Italy	128165	Mazara del Vallo	1500047	Sud 12 Vill	OneStar	Via Formia	Distances a	<p>HeadL	011-39-3
GB	United Kingdom	124857	Leith	5330986	Home By L	ThreeStar	Maritime S	Distances a	<p>Head Line : In	
BR	Brazil	111263	Bombinhas	5681939	Cobertura	All	1860 Avenida Aroeira		Situated in	
IT	Italy	137719	Senigallia	1372370	Hotel Le Q	ThreeStar	Via Umber	Distances a	<p>HeadL	39-071-7
CA	Canada	141448	Vancouver, British Columbia	1214567	The Burrar	ThreeStar	1100 Burra	Distances a	<p>HeadL	1-604-68
LK	Sri Lanka	115185	Dambulla	1626908	Lakmini Lo	OneStar	126 Sigiriya Sigiriya 21		Offering views	
IL	Israel	139939	Tel Aviv	1415534	Momos Hc	TwoStar	28 Ben Yeh	Distances a	<p>HeadL	972-3-52
IT	Italy	112558	Brescia	1572150	Albergo Ri	ThreeStar	Viale Pineta	Distances a	<p>HeadL	39-0364-
PA	Panama	112455	Boquete	1675050	Bambuda (	All	El Castillo, Calle Princip		Bambuda Castle is a	
IT	Italy	103138	San Giuseppe Comacchio	6104551	Appartam	All	VIALE DEI	Distances a	<p>HeadLine : Near	
ES	Spain	114006	Castello D'Empuries	5894688	Basic Com	All	Passeig Carles Fages [		Located in	
GB	United Kingdom	109098	Ambleside	1792948	High Wray	FourStar	Ambleside Cumbria L		Featuring free WiFi	
KH	Cambodia	123974	Koh Kong	1656356	Kampot Vi	FourStar	National Road 3 Thvi		Kampot View	855-97-3
US	United States	146942	Oakland, Maryland	5235668	Boxer Ovei	ThreeStar	131 Offsho	Distances a	<p>HeadLine : In Oa	

Key Columns in the Dataset

- HotelName: Name of the hotel.
- HotelRating: Rating of the hotel (e.g., stars).
- CityName: Location of the hotel.
- HotelFacilities: Facilities offered (e.g., parking, free WiFi).
- Attractions: Nearby attractions.
- Description: Brief description of the hotel.
- PhoneNumber: Contact information.
- HotelWebsiteUrl: Official website of the hotel

https://www.kaggle.com/datasets/raj713335/tbo-hotels-dataset

Some Key Stats:

Key Statistics

- Records: 1,009,103 entries
- Unique Cities: 41,796 unique city names
- Hotel Ratings Distribution:
  - ThreeStar: 352,451 hotels
  - TwoStar: 159,708 hotels
  - FiveStar: 22,369 hotels

Popular Cities

- London: 5,941 hotels
- Orlando, Florida: 5,522 hotels
- Bali: 3,153 hotels

columns		null_values	data types
0	countyCode	912	object
1	countyName	0	object
2	cityCode	0	int64
3	cityName	0	object
4	HotelCode	0	int64
5	HotelName	0	object
6	HotelRating	0	object
7	Address	102	object
8	Attractions	525092	object
9	Description	47005	object
10	FaxNumber	560347	object
11	HotelFacilities	50378	object
12	Map	930	object
13	PhoneNumber	327137	object
14	PinCode	30979	object
15	HotelWebsiteUrl	250118	object

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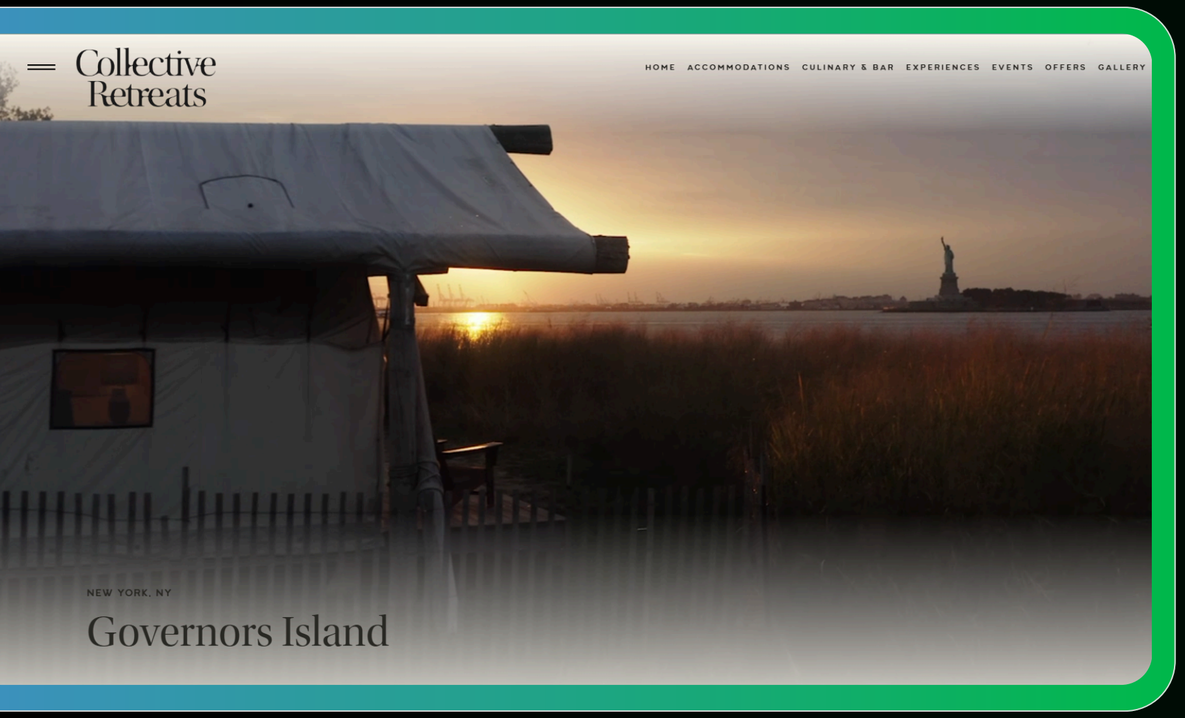
```python
def parse_user_input(user_input, column_names):
    """
    Uses LLM to extract filtering criteria and return fields.
    """
    one_shot_example = """
    Example User Input: "I want to find a hotel in London, with 3 star and wifi"
    Example Output: {
      "filters": {"cityName": "London", "HotelRating": "ThreeStar", "HotelFacilities": "Wifi"}
    }
    """

    prompt_text = f"""
    The dataset has the following columns: {column_names}
    Based on this, analyze the user's input and determine:
    1. The filtering criteria (e.g., "cityName": "New York").

    Provide your answer in JSON format like this:
    {{
      "filters": {{"column_name": "value", "another_column": "value"}}
    }}

    {one_shot_example}

    User Input: "{user_input}"
    """
    response = llm.invoke(prompt_text)
    response_content = response.content.strip()

    if "Output:" in response_content:
        response_content = response_content.split("Output:", 1)[1].strip()

    try:
        parsed_request = json.loads(response_content)
        return parsed_request
    except json.JSONDecodeError:
        print("-------------------------------------------------")
        print("Error parsing LLM response as JSON.")
        print("Please try rephrasing your query.")
        print("-------------------------------------------------")
        raise ValueError("LLM returned an invalid JSON response.")
```

One Shot

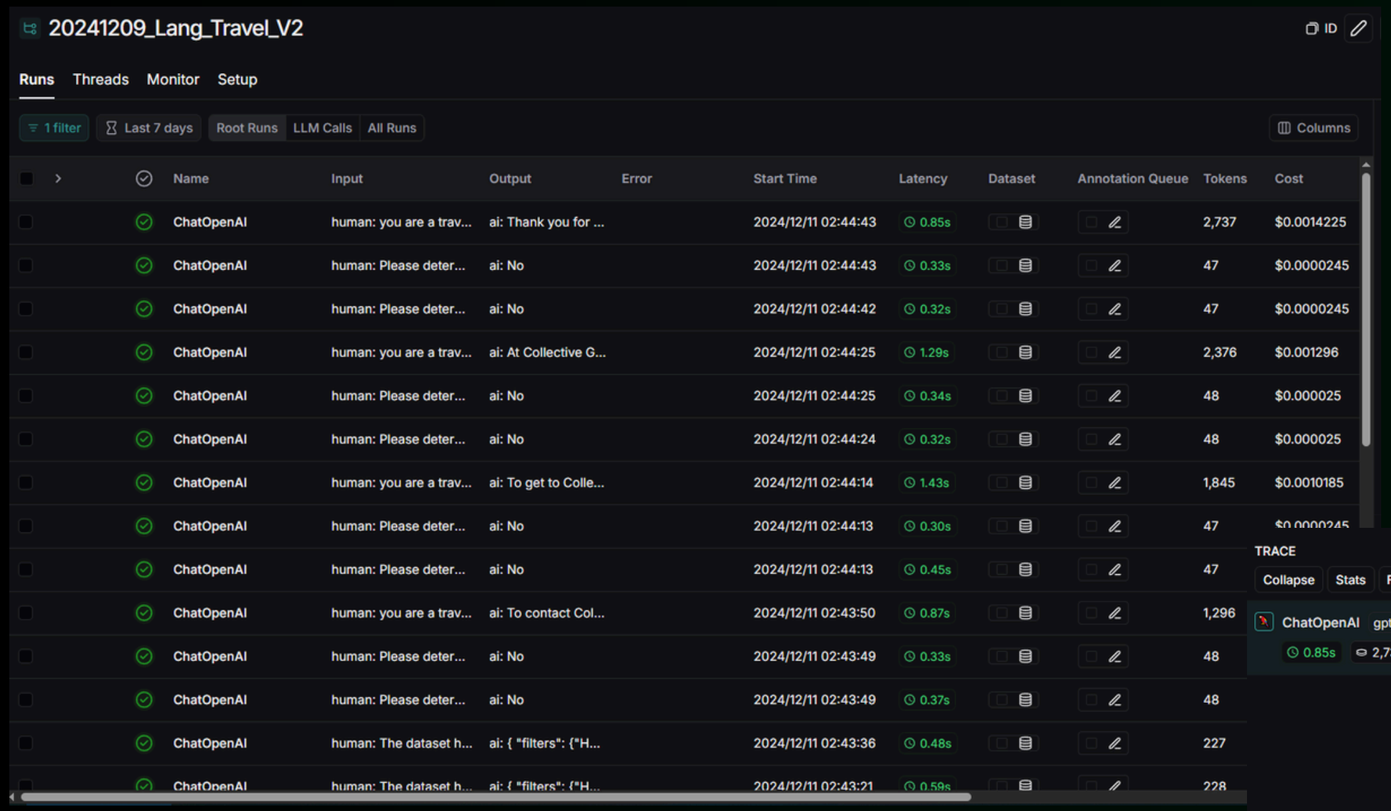
```
one_shot_example = """
  Example User Input: "I want to find a hotel in London, with 3 star and wifi"
  Example Output: {
   "filters": {"cityName": "London", "HotelRating": "ThreeStar", "HotelFacilities": "Wifi"}
  }
  """
```

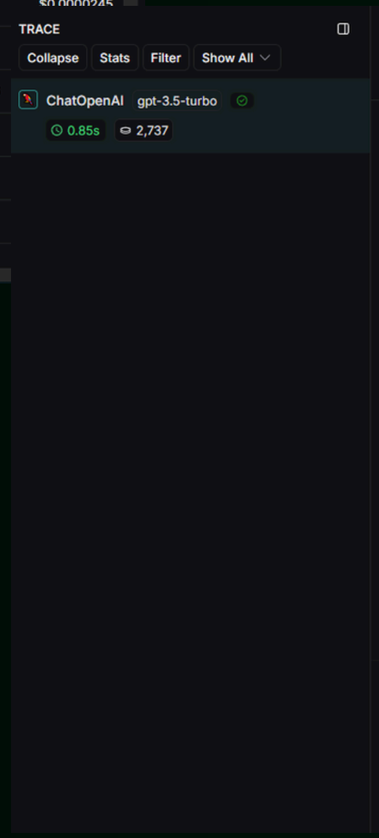


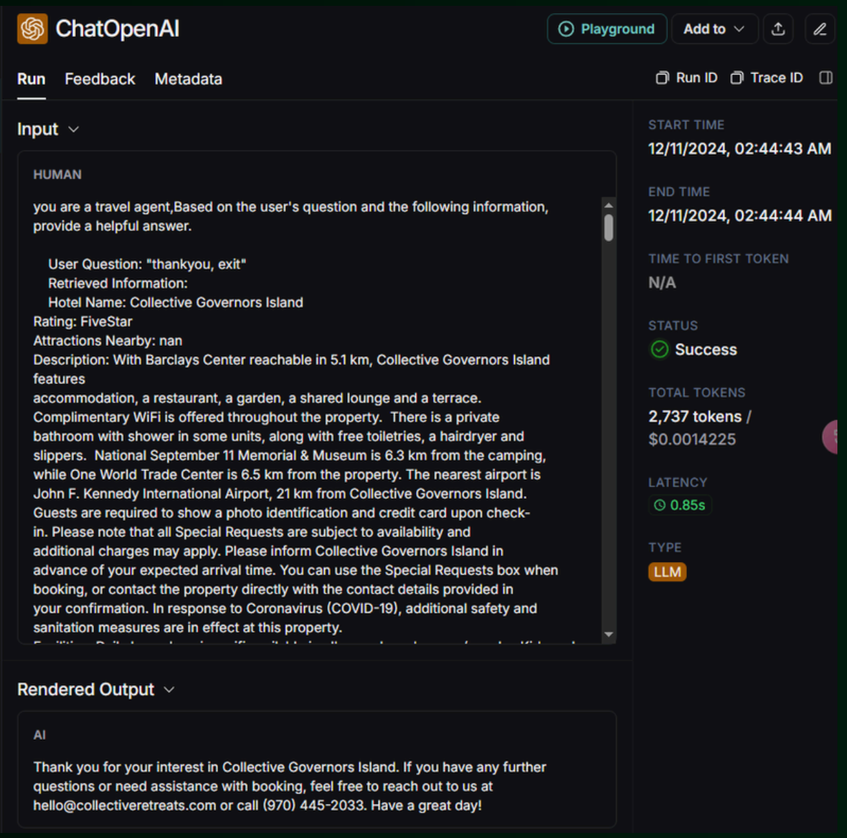
Hotel detail

- New York Looks Different From Here
- Immediately accessible yet a world away. Take an 8-minute ferry ride and set foot onto the island's 173 acres of peaceful, sprawling green space. Unspoiled skyline and landmark views are enjoyed from our unique indoor/outdoor accommodations, sprinkled from the shoreline to the retreat's great lawn.
- Reset and get totally removed from city life while exploring all our island retreat has to offer. Morning yoga, slow bike rides, culinary explorations, sunset cocktails, and once-in-a-lifetime views await.

https://collectiveretreats.com/governors-island/







- System Performance Report
- Key Metrics
- Last 7 Days Statistics:
- Run Count: 231
- Total Tokens Used: 72,634 ($1.01)
- Median Tokens per Run: 219
- Error Rate: 3%
- Streaming Usage: 0%
- Latency Analysis
- P50 Latency: 0.80 seconds
- P99 Latency: 10.14 seconds

Ref:

https://medium.com/@bijit211987/advanced-rag-for-llms-slms-5bcc6fbba411
https://lilianweng.github.io/posts/2023-06-23-agent/
https://python.langchain.com/docs/tutorials/rag/
https://smith.langchain.com/

Thank You

FOR YOUR ATTENTION