

Yelp Explorer

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INTRODUCTION

A project designed to simplify the process of finding great places to eat in Philadelphia. In a city with such a diverse and vibrant food scene, choosing where to dine can often be overwhelming. Yelp Explorer makes restaurant discovery easy, efficient, and tailored to everyone's preferences.

Project Objective and Purpose:

- Simplify Restaurant Discovery
- Smart Utilization of Data



PROJECT OVERVIEW

Three Restaurant Recommendation Systems:

- Location-Based Recommendation System
- Collaborative Filtering Recommendation System
- Content-Based Recommendation System



DATA SOURCE AND PREPARATION

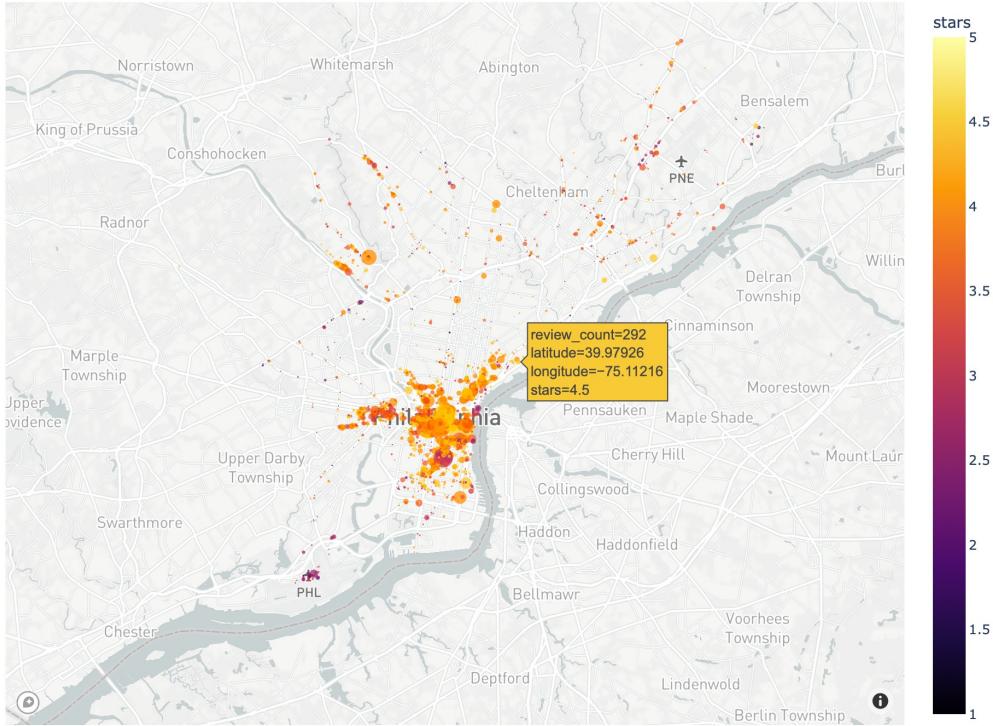
- Data Source : Yelp Open Dataset
- Contents: The dataset comprises `yelp_academic_dataset_business.json` and `yelp_academic_dataset_review.json`, featuring 6,990,280 reviews and 150,346 businesses.
- Focus city: Philadelphia
- Focus business category: Restaurants
- Focus years: 2015 to 2021

After all the sorting and cleaning, we are left with data on 3,525 restaurant businesses in Philadelphia. This included a total of 345,849 Yelp user reviews, giving us a rich source of information to work with.

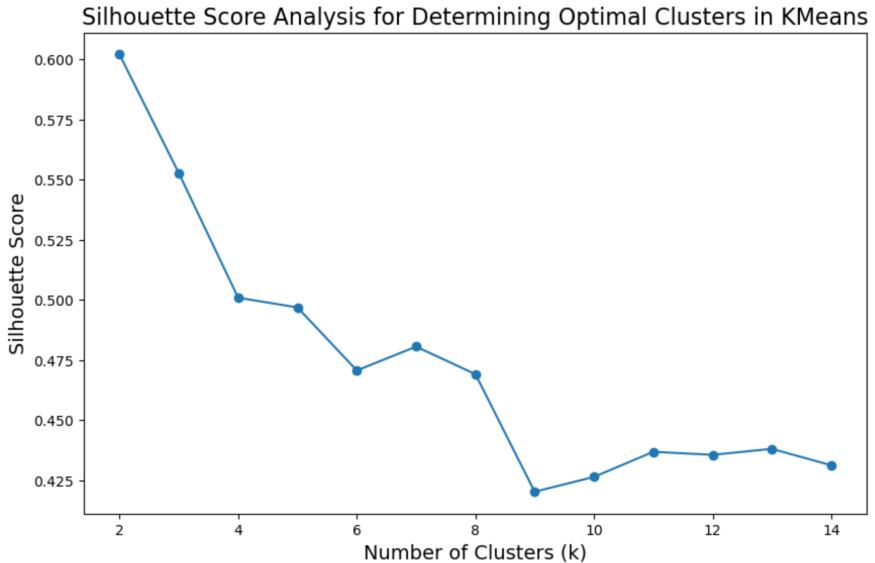
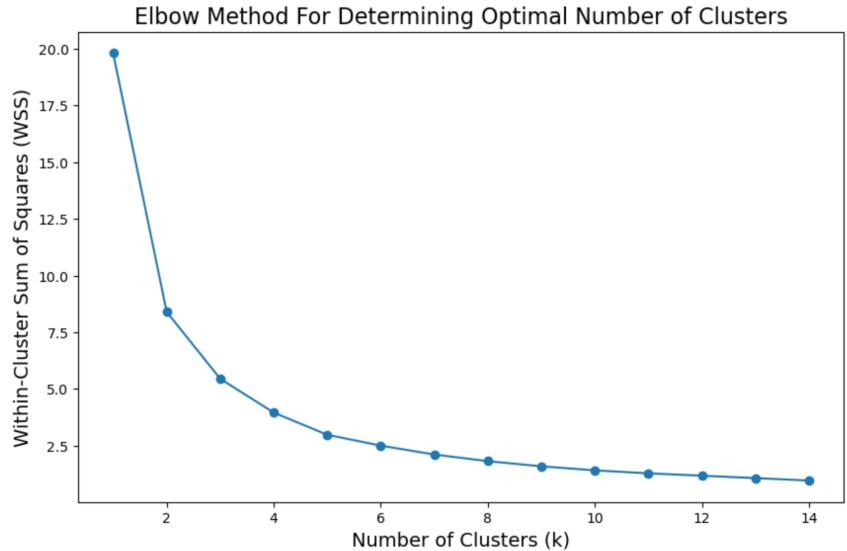


LOCATION-BASED RECOMMENDATION SYSTEM

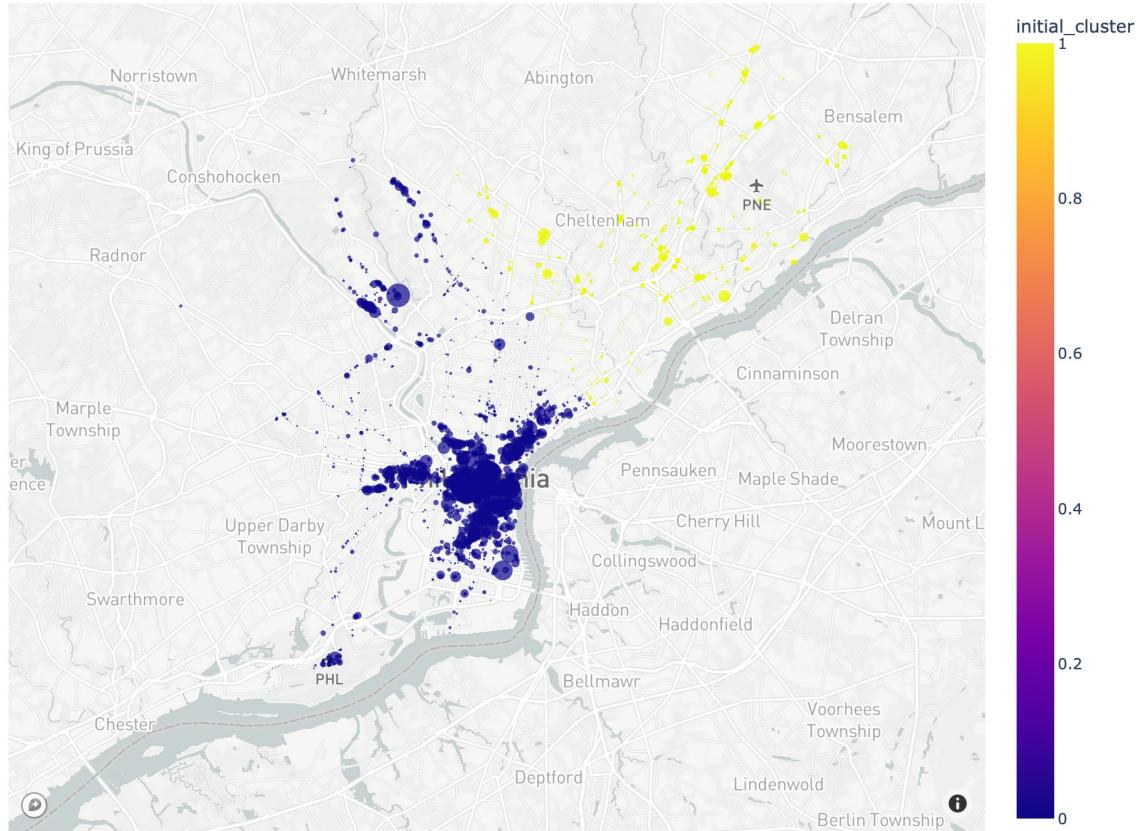
- Recommendation Systems have cold-start problem.



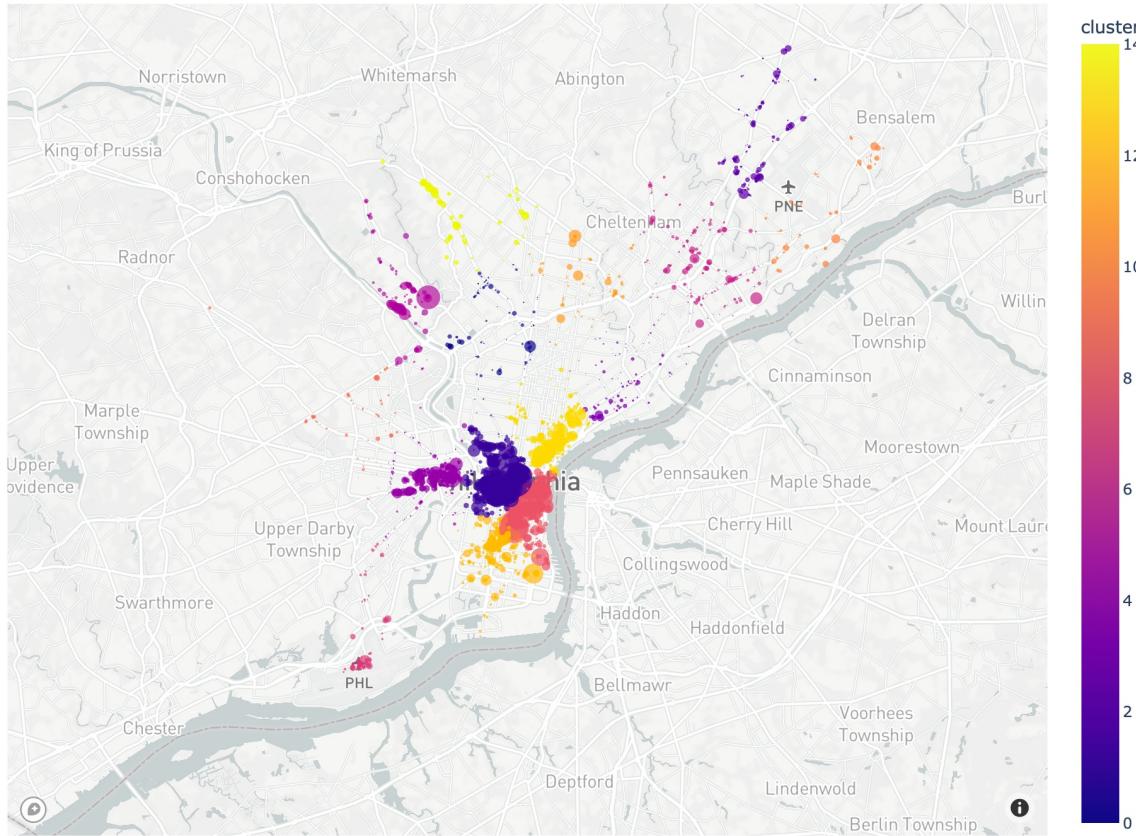
Elbow Method to determine K



Restaurant Clusters with K = 2



Restaurant Clusters with K = 15



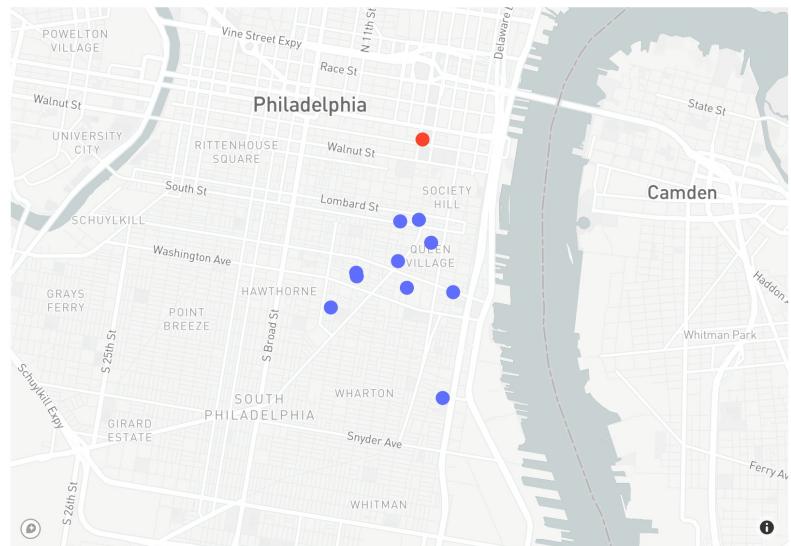
id	name	latitude	longitude
1	Liberty Bell Center	39.9496	-75.1503
2	Philadelphia Museum of Art	39.9656	-75.1810
3	University of Pennsylvania	39.9532	-75.1939

0 Liberty Bell Center

Name: name, dtype: object

Assigned cluster for this location: 8

	name	latitude	longitude	categories	stars	review_count	cluster
1645	Tortilleria San Roman	39.937636	-75.158082	Convenience Stores, Italian, Specialty Food, M...	5.0	219	8
1878	El Rancho Viejo	39.936282	-75.152142	Restaurants, Mexican	5.0	110	8
782	Alma Del Mar	39.937310	-75.158010	Coffee & Tea, Seafood, Restaurants, Fish & Chi...	5.0	80	8
3505	Restaurant Ambra	39.940324	-75.149300	Italian, Restaurants	5.0	61	8
635	Antonio's Deli	39.934514	-75.161045	Delis, Restaurants, Event Planning & Services,...	5.0	58	8
2938	Palm Tree Gourmet	39.935885	-75.146716	Restaurants, Vegetarian, Grocery, Specialty Fo...	5.0	44	8
3215	la bamba	39.938675	-75.153181	Tacos, Restaurants, Mexican	5.0	44	8
1141	Taco & Ramen	39.942243	-75.152919	Mexican, Vegan, Restaurants, Juice Bars & Smoo...	5.0	26	8
3385	2 Street Sammies	39.926384	-75.147946	Event Planning & Services, Street Vendors, Sal...	5.0	19	8
345	Midori Sushi	39.942384	-75.150736	Salad, Sushi Bars, Japanese, Restaurants	5.0	18	8

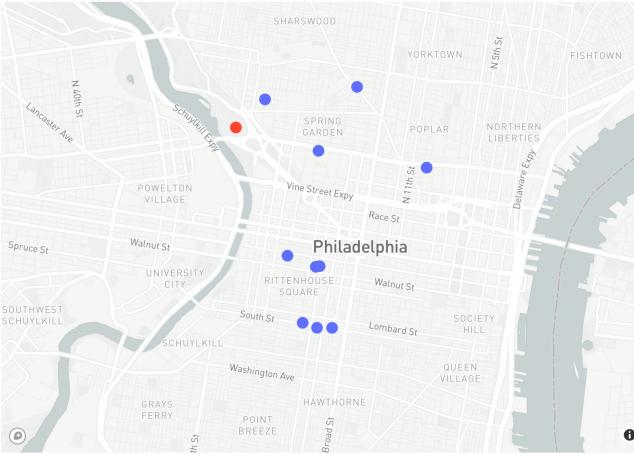


1 Philadelphia Museum of Art

Name: name, dtype: object

Assigned cluster for this location: 1

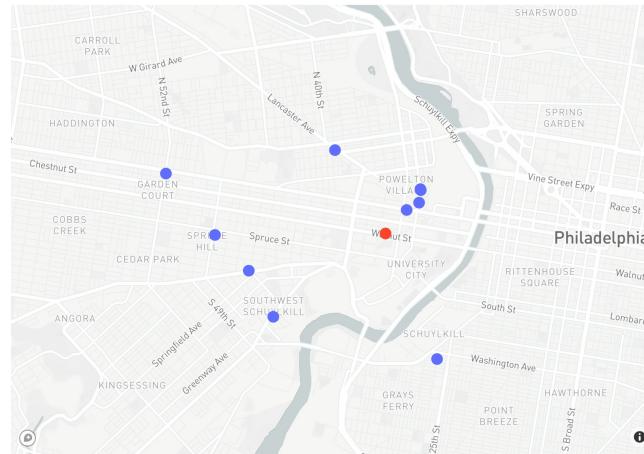
		name	latitude	longitude	categories	stars	review_count	cluster
3312		Christie's Deli	39.963081	-75.169360	Restaurants, Breakfast & Brunch, Delis, Sandwi...	5.0	152	1
2959		Bad Brother	39.968629	-75.176888	Beer Bar, Nightlife, Restaurants, American (Tr...	5.0	92	1
139	Mom Mom's Kitchen and Polish Food Cart	39.943986	-75.167449	Food, Polish, Food Trucks, Street Vendors, Res...	5.0	91	1	
1901	A La Mousse	39.943993	-75.169575	Coffee & Tea, Desserts, Food, Restaurants, Cafes	5.0	59	1	
1787	South Deli and Grocery	39.944531	-75.171588	Delis, Spanish, Restaurants, Food	5.0	29	1	
265	Bold Coffee Bar	39.969977	-75.163925	Coffee & Tea, Food, Cafes, Restaurants	5.0	28	1	
448	The Lucky Well - Spring Arts	39.961265	-75.154128	Chicken Shop, Barbeque, Restaurants	5.0	27	1	
3281	Villekebabs and Platters	39.950574	-75.169746	Restaurants, Mediterranean, Afghan, Halal	5.0	21	1	
334	Pho Mi Rittenhouse	39.951771	-75.173725	Restaurants, Vietnamese	5.0	20	1	
996	Greens and Grains	39.950639	-75.169199	Restaurants, Vegan	5.0	14	1	


2 University of Pennsylvania

Name: name, dtype: object

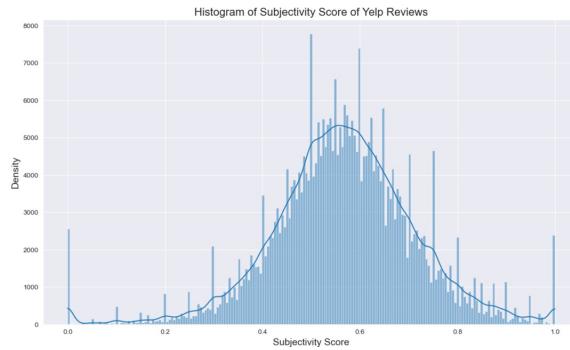
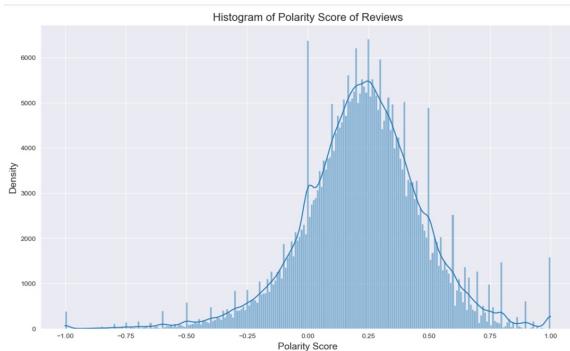
Assigned cluster for this location: 4

		name	latitude	longitude	categories	stars	review_count	cluster
2886		Fresh Donuts	39.962212	-75.201024	Donuts, Breakfast & Brunch, Restaurants, Coffe...	5.0	22	4
3379	Alif Brew & Mini Mart	39.949178	-75.213168	Restaurants, Food, Convenience Stores, Cafes, ...	5.0	19	4	
1147	Linda's Cart	39.953042	-75.217928	Food, Restaurants, Food Stands	5.0	16	4	
570	52nd Station Diner	39.959681	-75.224842	Comfort Food, Diners, Restaurants, Breakfast &...	5.0	15	4	
2420	Fudena	39.939628	-75.186640	African, Food, Food Delivery Services, Restaur...	5.0	15	4	
246	Mommy Telly's Famous BBQ	39.956532	-75.189178	Food, Food Trucks, Barbeque, Restaurants, Fili...	5.0	14	4	
1388	The Gables Cafe	39.944194	-75.209709	Food, Coffee & Tea, Restaurants, Italian, Dess...	5.0	14	4	
2823	Rio Brazilian Steak Truck	39.955744	-75.190922	Food, Event Planning & Services, Barbeque, Cat...	5.0	9	4	
2272	Academic Bistro	39.957889	-75.188931	Event Planning & Services, Restaurants, Educat...	5.0	6	4	
3497	Greek From Greece	39.957993	-75.188979	Greek, Cafes, Food, Mediterranean, Bakeries, C...	5.0	6	4	

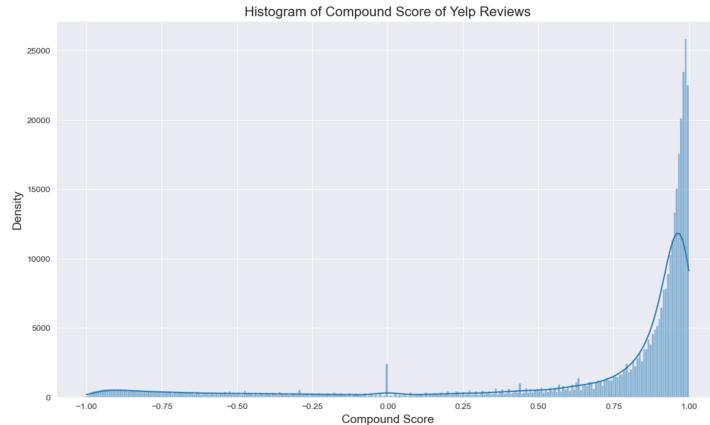


SENTIMENT ANALYSIS

Polarity and Subjectivity from TextBlob



Compound Score from VADER



COLLABORATIVE-FILTERING RECOMMENDATION SYSTEM

- Prime Score = star rating + (polarity score x compound score).
- User-Item Matrix
- Cosine Similarity
- Truncated SVD
- Collaborative-Filtering Recommendation System

Example 1: Reading Terminal Market

```
# Obtaining recommendations for those who enjoyed visiting Reading Terminal Market
suggested_restaurants = recommend_similar_restaurants('Reading Terminal Market')
suggested_restaurants = pd.DataFrame(data=suggested_restaurants)

suggested_restaurants
```

Reading Terminal Market	
	name
	Gaetano's
	0.987967
Imperial Palace Chinese Restaurant	
	0.975909
Suzani Palace	
	0.969099
House of Kosher	
	0.931326
P & S Ravioli	
	0.925535
Top Taste 2	
	0.918305
Star Pizza	
	0.891949
Scramble Club	
	0.857237
AL-JANA Halal Food Market	
	0.837938
La Mamiringa Restaurant	
	0.829485

Example 2: Otolith Sustainable Seafood

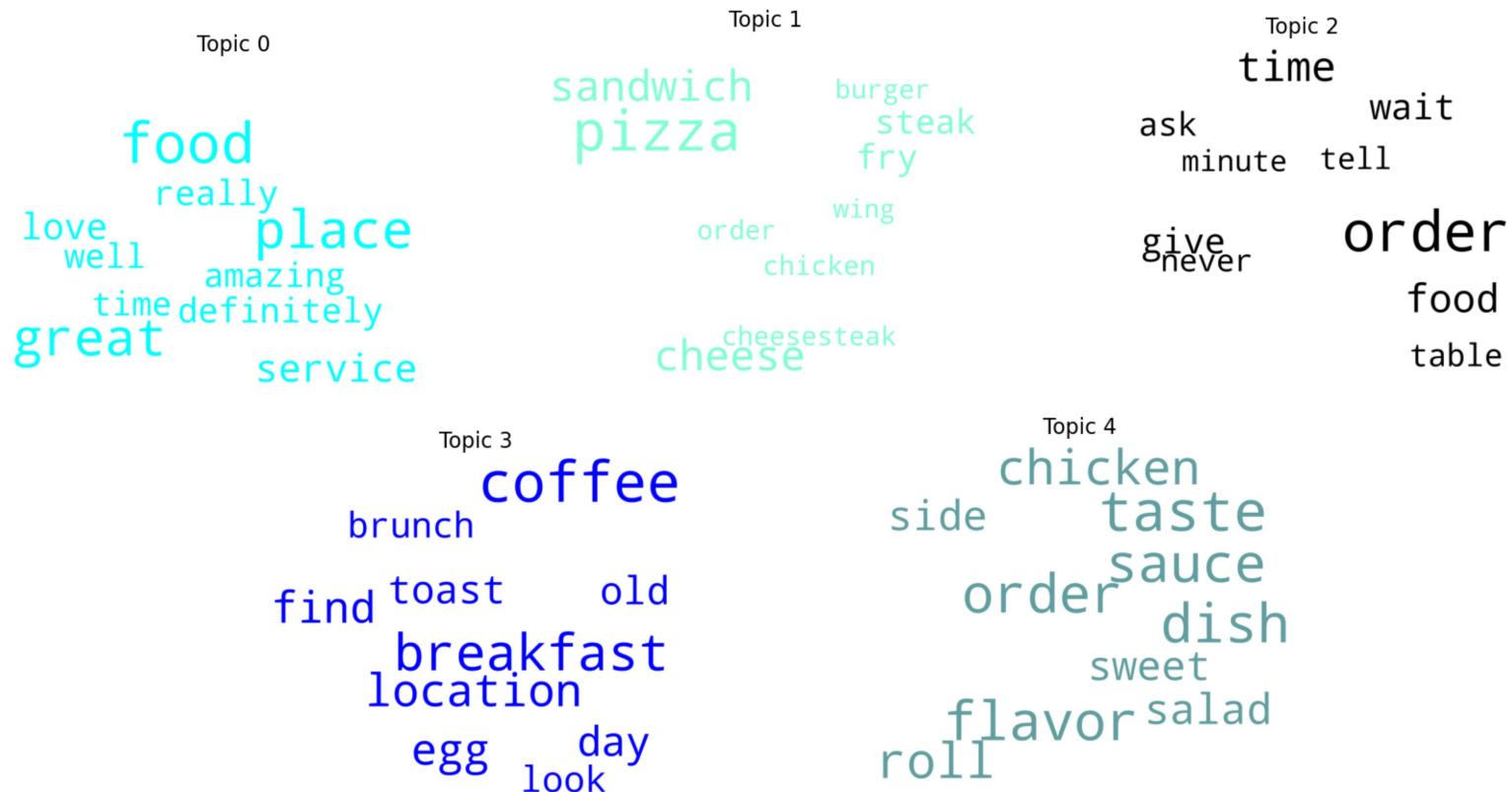
```
# Obtaining recommendations for those who enjoyed visiting Otolith Sustainable Seafood
suggested_restaurants = recommend_similar_restaurants('Otolith Sustainable Seafood')
suggested_restaurants = pd.DataFrame(data=suggested_restaurants)

suggested_restaurants
```

Otolith Sustainable Seafood	
	name
	Franzone's Pizzeria & Restaurant
	0.923567
	nunu
	0.890500
	Victory Beer Hall
	0.889699
	Hook & Master
	0.879442
	U-Bahn
	0.878601
	Corner Bakery
	0.871747
	Jose Pistola's
	0.870960
	Baby Blues BBQ Philly
	0.870337
	Ocean Harbor
	0.868549
	Au Bon Pain
	0.866726



TOPIC MODELING



CONTENT-BASED RECOMMENDATION SYSTEM

- Keywords + Categories
- Bag of Words
- CountVectorizer
- Cosine Similarity
- Content-based Recommendation System

Example 1: Dim Sum Garden

```
recommend_similar_restaurants('Dim Sum Garden')
```

```
['Ocean City',
 'Panda Garden Chinese Restaurant',
 'Solo Skewer Bar',
 'Asian Fusion & Steak',
 'Dragon Phoenix House',
 'China Wok',
 'First Wok',
 'Shee Yuan Chinese',
 'Yu Hsiang Garden',
 'China Bowl Restaurant']
```

Example 2: Zahav

```
recommend_similar_restaurants('Zahav')
```

```
['Clock Bar',
 'Las Vegas Lounge',
 'Dawson Street Pub',
 'Victory Brewing Company Philadelphia',
 'The Bishop's Collar',
 'Brasil's Nightclub',
 'Jose Pistola's',
 'Queen Sheba',
 'Cantina Dos Segundos',
 'Henry James Saloon']
```

```
philly_data[philly_data['name'] == 'Dim Sum Garden'][['name', 'category']]
```

	name	categories	prime_score
117129	Dim Sum Garden	Chinese, Restaurants, Dim Sum, Asian Fusion, S...	4.287049

```
philly_data[philly_data['name'] == 'Ocean City'][['name', 'category']]
```

	name	categories	prime_score
100989	Ocean City	Chinese, Restaurants, Seafood, Dim Sum	4.079939

```
philly_data[philly_data['name'] == 'Panda Garden Chinese Restaurant'][['name', 'category']]
```

	name	categories	prime_score
106679	Panda Garden Chinese Restaurant	Chinese, Restaurants	3.055273

```
philly_data[philly_data['name'] == 'Solo Skewer Bar'][['name', 'category']]
```

	name	categories	prime_score
238706	Solo Skewer Bar	Chinese, Restaurants	2.998038

```
philly_data[philly_data['name'] == 'Zahav'][['name', 'category', 'prime_score']]
```

	name	categories	prime_score
74933	Zahav	Nightlife, Bars, Food, Ethnic Food, Middle Eas...	5.250744

```
philly_data[philly_data['name'] == 'Clock Bar'][['name', 'category', 'prime_score']]
```

	name	categories	prime_score
340398	Clock Bar	Nightlife, Restaurants, Seafood, Bars	0.865495

```
philly_data[philly_data['name'] == 'Dawson Street Pub'][['name', 'category', 'prime_score']]
```

	name	categories	prime_score
160526	Dawson Street Pub	Nightlife, Pubs, Bars, Gastropubs, Restaurants	5.573443

```
philly_data[philly_data['name'] == 'Victory Brewing Company Philadelphia'][['name', 'category', 'prime_score']]
```

	name	categories	prime_score
111402	Victory Brewing Company Philadelphia	Nightlife, Breweries, Bars, Food, Pubs, Restau...	5.259196



Thank you

