

Finding Restaurants in Lagos, Nigeria



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12th July, 2021

Introduction / Business Problem

- A majority of tourists consider where to eat and what to eat when planning a trip.
- In Lagos, tourists have a wide choice of restaurants to explore, and this is even more difficult for first-time visitors.
- This project aims to guide tourists in finding preferable restaurants in the city.

Datasets and Methods

1. Lagos state data from Wikipedia:

https://en.wikipedia.org/wiki/Lagos_State

Raw data was scraped, cleaned and filtered.

	LGA name	Area (km2)	Census 2006 population	Administrative capital	Postalcode
0	Agege	11	459939	Agege	100.0
1	Alimosho	185	1277714	Ikotun	100.0
2	Ifako-Ijaye	27	427878	Ifako	100.0

2. Geographical coordinates using geocoder:

Latitude and Longitudes of the venues.

The coordinates was fetched and added to the table.

	LGA	Area (km2)	Population	Administrative Capital	Postalcode	Latitude	Longitude
0	Agege	11	459939	Agege	100	6.625256	3.311209
1	Alimosho	185	1277714	Ikotun	100	6.584343	3.257631
2	Ifako-Ijaye	27	427878	Ifako	100	6.660436	3.321539

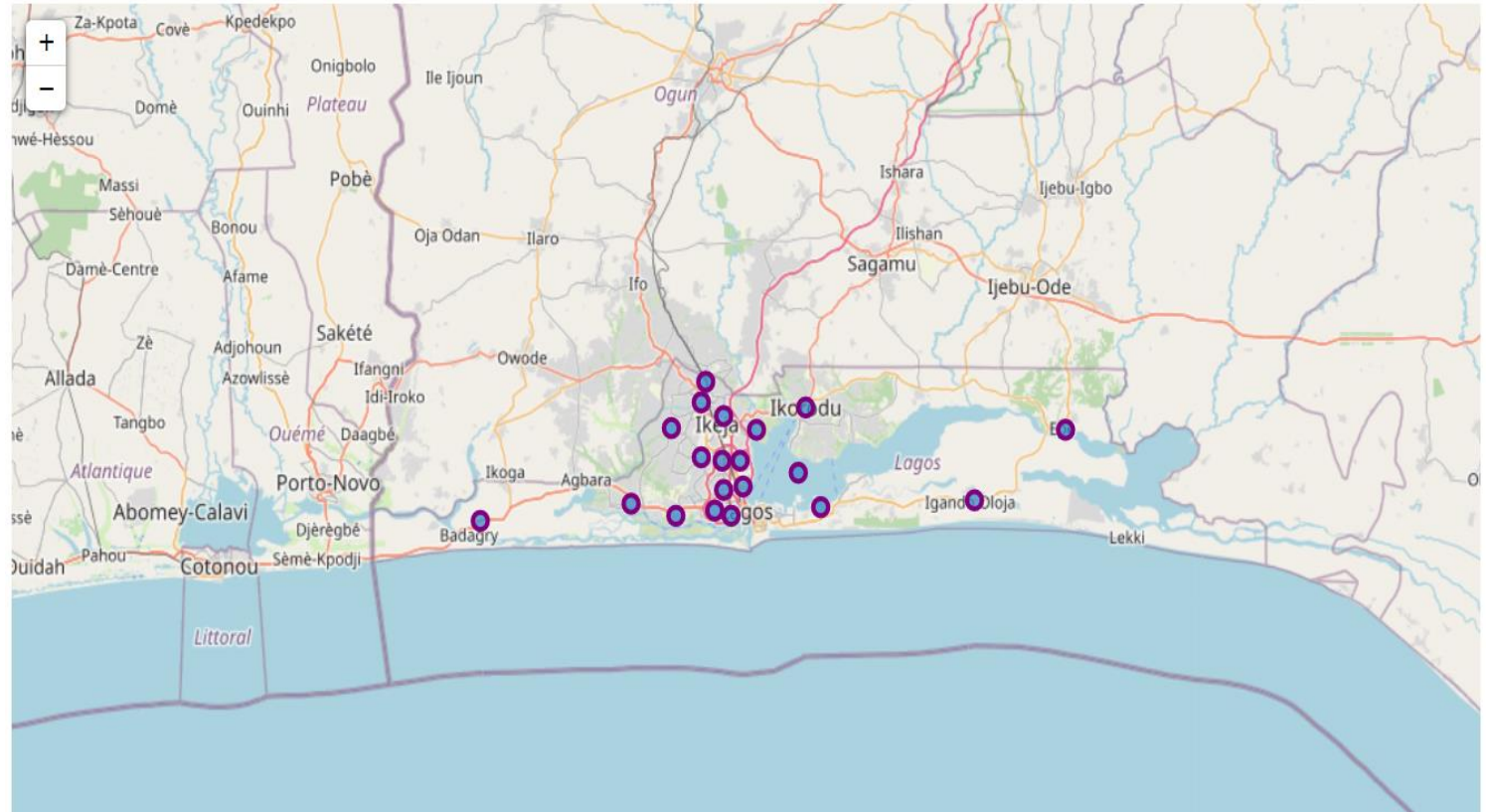
3. Venue data using Foursquare API: venues within 5000 meters radius from each LGA.

The venues were retrieved and added to the table for analysis.

	Neighborhood	Neighborhood Latitude	Neighborhood Longitude	Venue	Venue Latitude	Venue Longitude	Venue Category
0	Agege	6.625256	3.311209	KFC	6.620788	3.317968	Fast Food Restaurant
1	Agege	6.625256	3.311209	Shoprite Ikeja	6.614340	3.331319	Shopping Mall
2	Agege	6.625256	3.311209	Tastee Fried Chicken	6.631432	3.339814	Fast Food Restaurant
3	Agege	6.625256	3.311209	NYSC Camp (Lagos)	6.624946	3.302899	Campground
4	Agege	6.625256	3.311209	KFC	6.604590	3.308936	Fast Food Restaurant

Distribution of the 20 LGAs

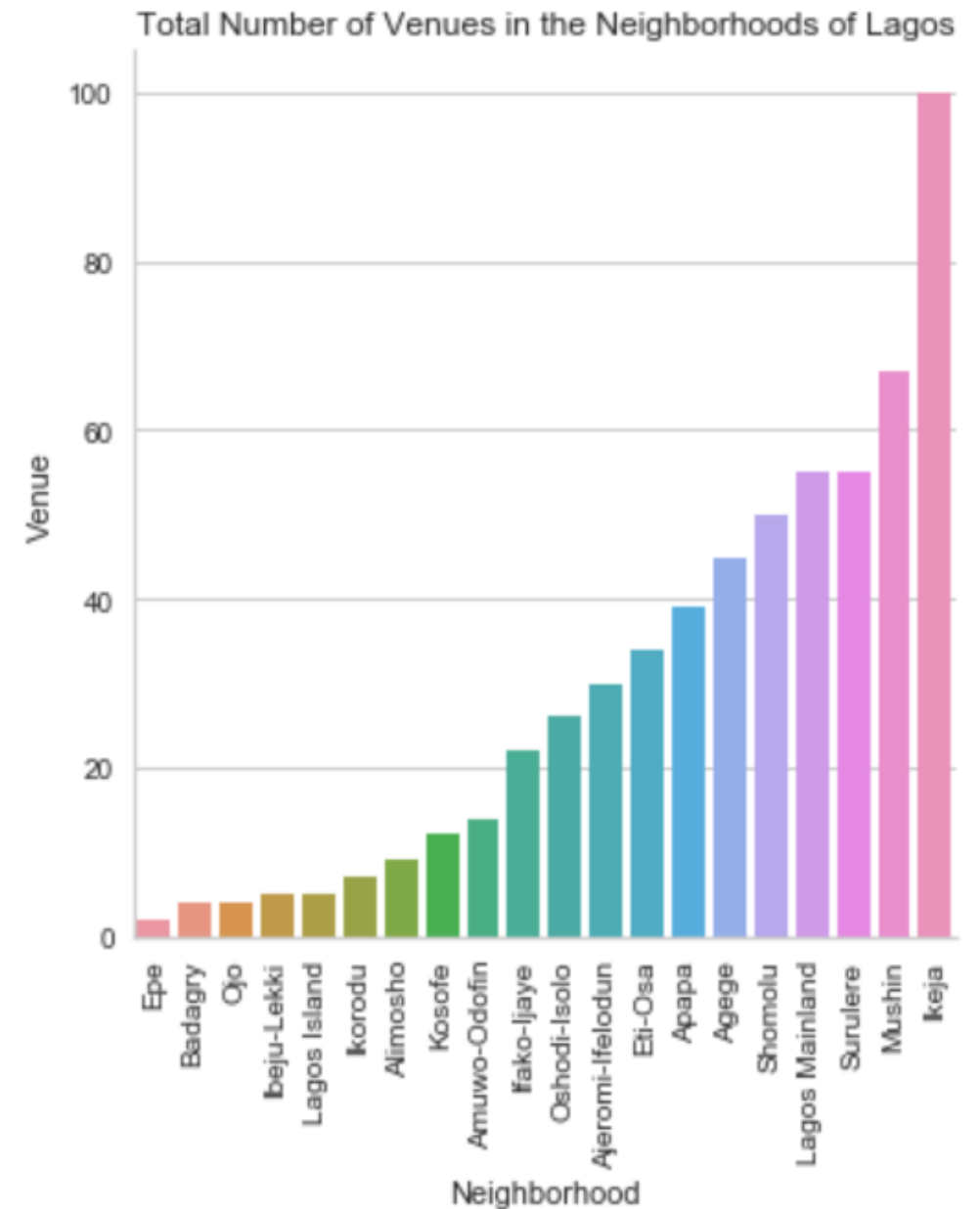
- Folium package was enabled to create a map displaying the distribution of the 20 LGAs.



Venues in the Neighborhoods

Foursquare API returned the following venues:

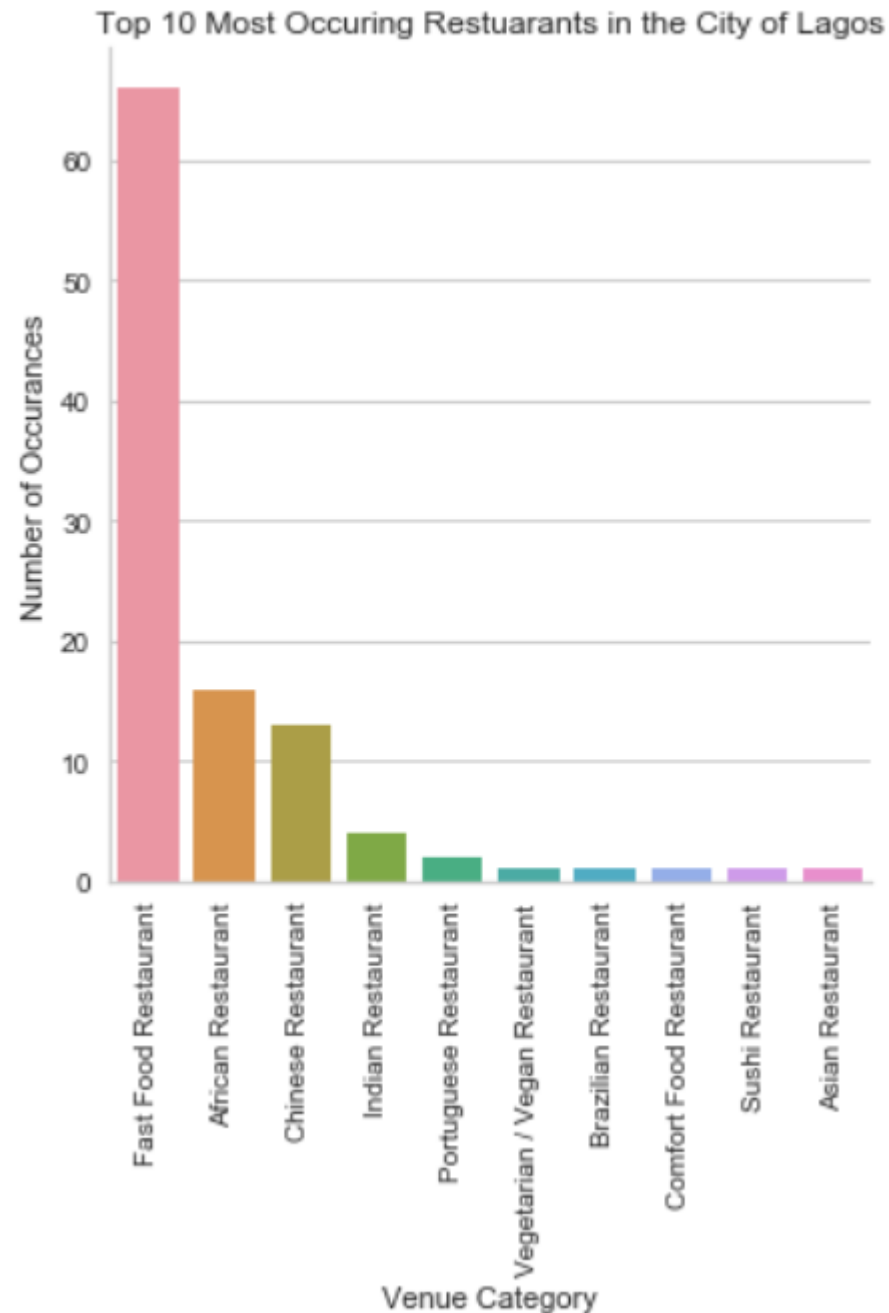
- Ikeja has **100** venues.
- Mushin has over **60** venues.
- Surulere, Lagos Mainland, Shomolu and Agege have between **40-60** venues returned.
- Apapa, Eti-Osa, Ajeromi-Ifelodun, Oshodi-Isolo, and Ifako-Ijaye have between **20 - 40** venues.
- Meanwhile, from Amowo-Odofin to Epe have **less than 20** venues.



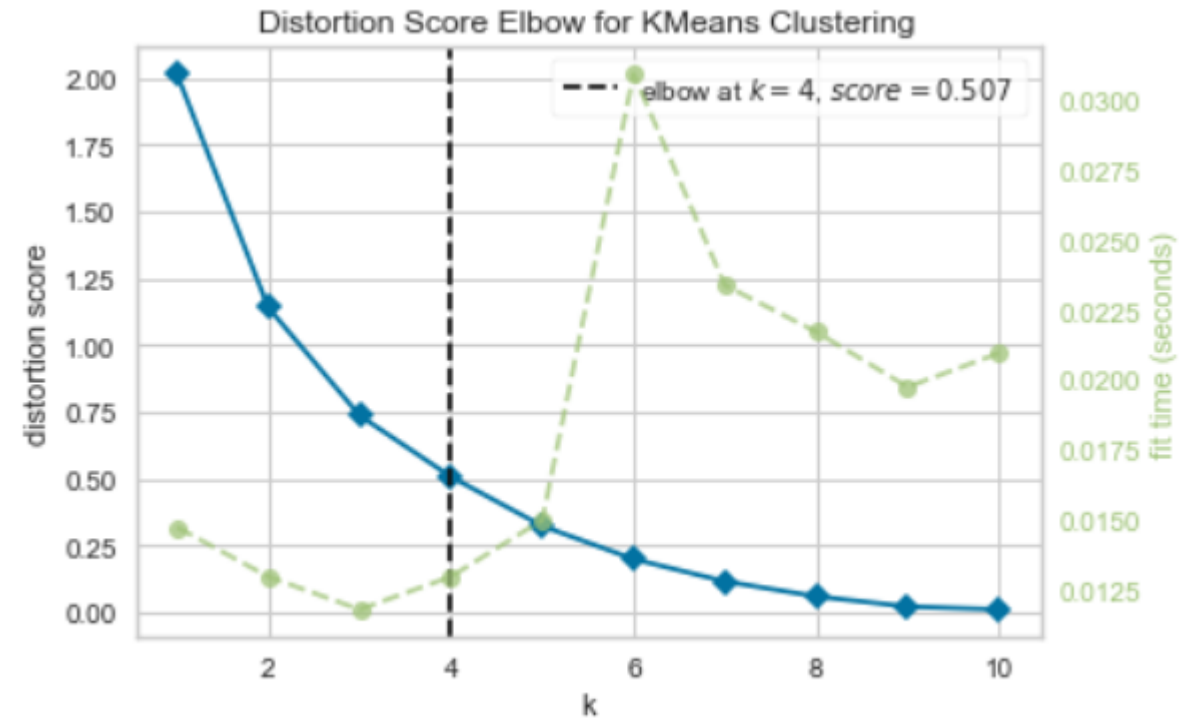
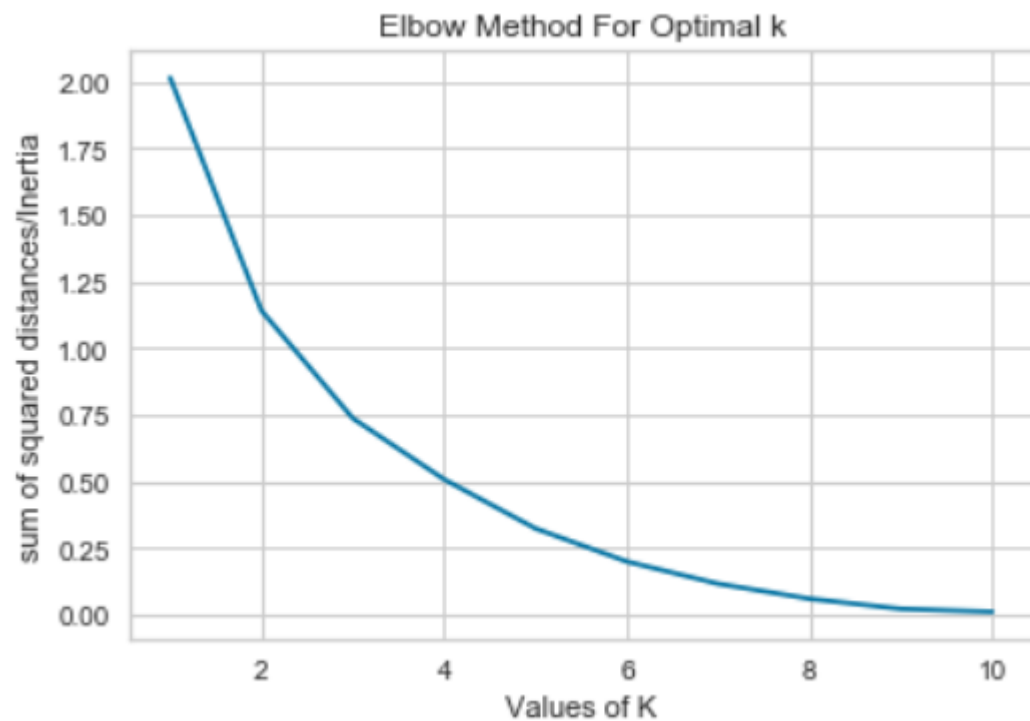
Top 10 Restaurant

- Top 10 restaurants and the number of occurrences shows **Fast Food Restaurant** as top 1 with over 60 venues.

	VenueCategory	Number of Occurances
0	Fast Food Restaurant	66
1	African Restaurant	16
2	Chinese Restaurant	13
3	Indian Restaurant	4
4	Portuguese Restaurant	2
5	Vegetarian / Vegan Restaurant	1
6	Brazilian Restaurant	1
7	Comfort Food Restaurant	1
8	Sushi Restaurant	1
9	Asian Restaurant	1



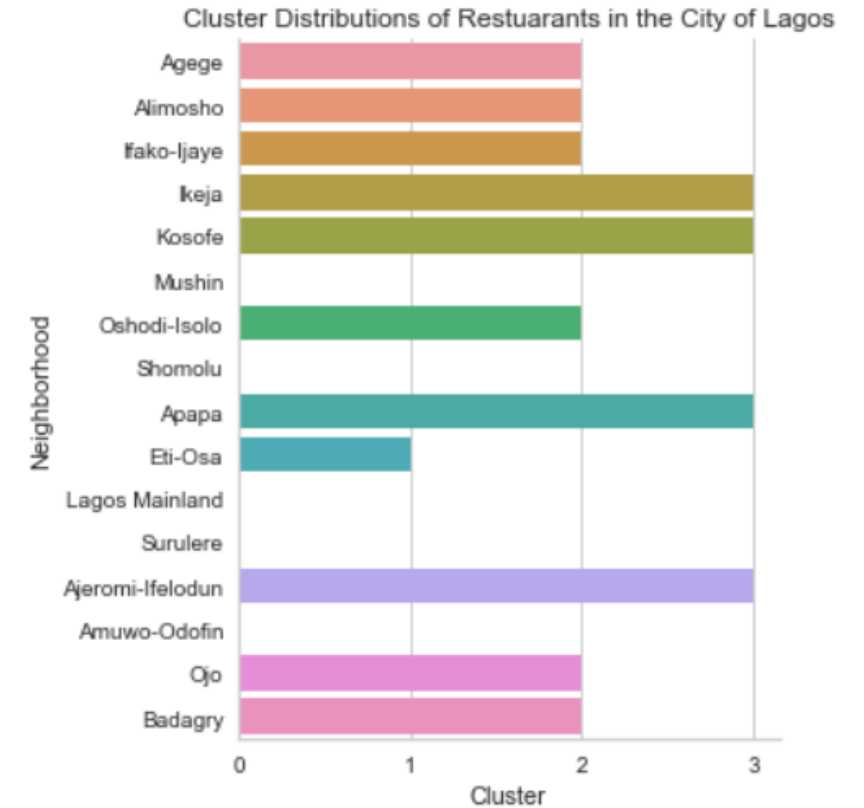
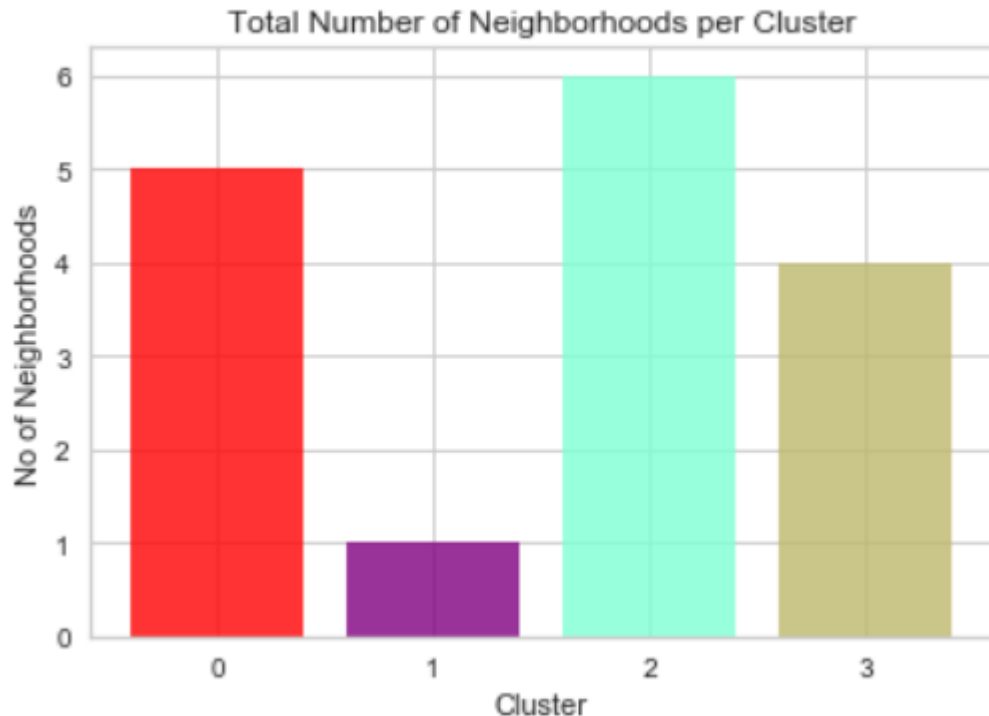
Elbow Point Method for Choosing K



The elbow is at $K = 4$. Hence, 4 was selected as the number of clusters.

Number of Clusters and distributions

Cluster 0: **five** neighborhoods
Cluster 1: **one** neighborhood
Cluster 2: **six** neighborhoods
Cluster 4: **four** neighborhoods



Cluster 0: Mushin, Shomolu, Lagos Mainland, Surulere and Amuwo-Odofin.

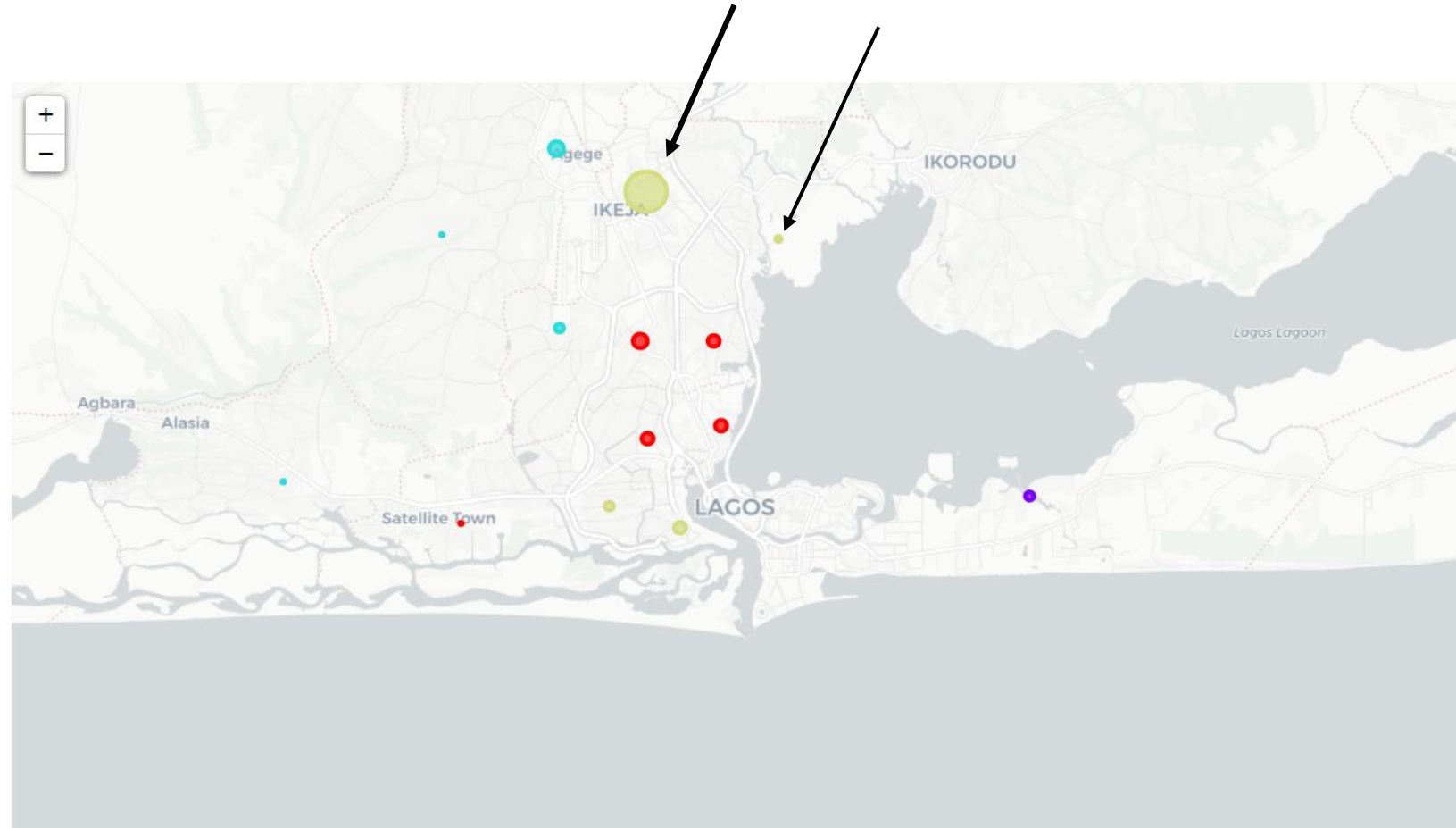
Cluster 1: Eti-Osa.

Cluster 2: Agege, Alimosho, Ifako-Ijaye, Oshodi-Isolo, Ojo and Badagry.

Clusters 4: Ikeja, Kosofe, Apapa and Ajeromi-Ifelodun.

Clusters and distributions using Folium map

- The map shows the distributions of the clusters.
- For example, we can see the third clusters in yellow indicating a dominating number of venues at Ikeja and the least venues at Ajeromi-Ifelodun.



Cluster Analysis: First Cluster (Cluster 0)

	Neighborhood	Area (km2)	Population	Administrative Capital	Postalcode	Latitude	Longitude	Cluster Labels	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue	6th Cor \
5	Mushin	17	633009	Mushin	100	6.533331	3.349999	0.0	Fast Food Restaurant	African Restaurant	Vegetarian / Vegan Restaurant	Sushi Restaurant	Portuguese Restaurant	Rest
7	Shomolu	12	402673	Shomolu	101	6.533565	3.384161	0.0	Fast Food Restaurant	African Restaurant	Vegetarian / Vegan Restaurant	Sushi Restaurant	Portuguese Restaurant	Rest
12	Lagos Mainland	19	317720	Lagos Mainland	101	6.493061	3.388250	0.0	Fast Food Restaurant	African Restaurant	Vegetarian / Vegan Restaurant	Sushi Restaurant	Portuguese Restaurant	Rest
13	Surulere	23	503975	Surulere	101	6.487201	3.353259	0.0	Fast Food Restaurant	African Restaurant	Chinese Restaurant	Vegetarian / Vegan Restaurant	Sushi Restaurant	Portu, Rest
16	Amuwo-Odofin	135	318166	Festac Town	102	6.447023	3.266280	0.0	Fast Food Restaurant	African Restaurant	Vegetarian / Vegan Restaurant	Sushi Restaurant	Portuguese Restaurant	Rest

Fast Food-African cluster

Cluster Analysis: Second Cluster (Cluster 1)

	Neighborhood	Area (km2)	Population	Administrative Capital	Postalcode	Latitude	Longitude	Cluster Labels	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue	6th Common Venue
10	Eti-Osa	192	287785	Ikoyi	101	6.460231	3.532181	1.0	Vegetarian / Vegan Restaurant	Sushi Restaurant	Comfort Food Restaurant	Chinese Restaurant	Asian Restaurant	Portuguese Restaurant

Vegetarian/ Vegan-Sushi cluster

Cluster Analysis: Third Cluster (Cluster 2)

	Neighborhood	Area (km2)	Population	Administrative Capital	Postalcode	Latitude	Longitude	Cluster Labels	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue	6th Common Venue
0	Agege	11	459939	Agege	100	6.625256	3.311209	2.0	Fast Food Restaurant	Chinese Restaurant	Vegetarian / Vegan Restaurant	Sushi Restaurant	Portuguese Restaurant	Restaurant
1	Alimosho	185	1277714	Ikotun	100	6.584343	3.257631	2.0	Fast Food Restaurant	Vegetarian / Vegan Restaurant	Sushi Restaurant	Portuguese Restaurant	Indian Restaurant	European Restaurant
2	Ifako-Ijaye	27	427878	Ifako	100	6.660436	3.321539	2.0	Fast Food Restaurant	Chinese Restaurant	Vegetarian / Vegan Restaurant	Sushi Restaurant	Portuguese Restaurant	Restaurant
6	Oshodi-Isolo	45	621509	Oshodi/Isolo	100	6.540010	3.312415	2.0	Fast Food Restaurant	Chinese Restaurant	Vegetarian / Vegan Restaurant	Sushi Restaurant	Portuguese Restaurant	Restaurant
17	Ojo	158	598071	Ojo	102	6.466665	3.183333	2.0	Fast Food Restaurant	Vegetarian / Vegan Restaurant	Sushi Restaurant	Portuguese Restaurant	Indian Restaurant	European Restaurant
18	Badagry	441	241093	Badagry	103	6.439322	2.905844	2.0	Fast Food Restaurant	Vegetarian / Vegan Restaurant	Sushi Restaurant	Portuguese Restaurant	Indian Restaurant	European Restaurant

Fast Food-Chinese-Vegetarian/ Vegan cluster

Cluster Analysis: Fourth Cluster (Cluster 3)

	Neighborhood	Area (km2)	Population	Administrative Capital	Postalcode	Latitude	Longitude	Cluster Labels	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue	6th Most Common Venue
3	Ikeja	46	313196	Ikeja	100	6.604859	3.353204	3.0	Fast Food Restaurant	African Restaurant	Chinese Restaurant	Portuguese Restaurant	Indian Restaurant	European Restaurant
4	Kosofe	81	665393	Kosofe	100	6.581974	3.414836	3.0	Portuguese Restaurant	Fast Food Restaurant	African Restaurant	Vegetarian / Vegan Restaurant	Sushi Restaurant	Res
9	Apapa	27	217362	Apapa	101	6.445187	3.368373	3.0	Fast Food Restaurant	Indian Restaurant	Chinese Restaurant	African Restaurant	Vegetarian / Vegan Restaurant	Res
15	Ajeromi-Ifelodun	12	684105	Ajeromi/Ifelodun	102	6.455122	3.335946	3.0	Fast Food Restaurant	Chinese Restaurant	Indian Restaurant	Vegetarian / Vegan Restaurant	Sushi Restaurant	Portuguese Restaurant

Fast Food-Portuguese/Afro-Asian cluster

Conclusions

- Managed a business problem using data science approaches.
- Achieved a goal by providing a guide for tourists in finding preferable restaurants in the neighborhood of Lagos.
- Also useful for entrepreneurs and investors who plan to engage in restaurants business in the city of Lagos.
- Analysis methods can be employed to explore other cities or countries to solve related real-world problems.

Thank You!