The Battle of Neighborhood — Arabic Coffee Shop in London

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1. Introduction

1.1 Background

As one of the largest English cities, London has one of the most ethnically diverse population in the world. It is considered to the world's cultural capital with a diverse range of cultures and people. Even though English is the official Language in London, there are over 300 languages spoken in the city. According to the 2011 census, over 36.7% of the London residents or 2,998,254 people are foreign-born, which is the second largest population of immigrants in the world right behind New York. Some of the largest ethnic groups in the city include Arabs, Chinese, Bangladeshis, Pakistanis, Indians, and Africans.

Because of the multitude of civilizations, London attracts investors from all over the world and it is one of the best investment cities in the world.

1.2 Problem

My friend asked me to help him exploring London city and choose the best location for his business as he is going to open an Arabic Coffee shop in London. He wants to provide authentic Arabic coffee to Arab and non-Arab people, so that the community knows the ancient original Arab culture, and he believes that there is no much competition in this field.

Arabic coffee is a version of the brewed coffee of Coffea arabica beans. Most Arab countries throughout the Middle East have developed distinct methods for brewing and preparing coffee. Cardamom is an often-added spice, but it can alternatively be served plain.

It was agreed that the location of the business should be close to the main most popular venues and neighborhoods in London, also the presence of Arab and Turkish restaurants would be an advantage.

In this project, we will Scrap London Boroughs, Neighborhoods and Postcode data from Wikipedia, then using geopy library to convert postcodes addresses into their equivalent latitude and longitude values.

After that, we will get the top 10 venues for each Neighborhood using Foursquare API, and using clustering K-Means algorithm to group the neighborhoods into clusters. We will also visualize the neighborhoods in London City and their emerging clusters using Folium library.

Finally, we will choose the best location for the business based on the criteria mentioned above.

2. Data acquisition and cleaning

2.1 Data sources

This project will rely on public data from Wikipedia which has the list of area of London with the postcode. And from Foursquare API to get the most common venues for each neighborhood. This data will help us exploring London neighborhoods and find the best location for the Arabic coffee shop business.

2.1 Data Cleaning

Data downloaded or scraped from multiple sources were combined into one table. There were many unwanted columns and raw's that has been cleared using pandas library

3.0 Methodology

3.1 Analysis methodology

To find the best suitable location for this business we will follow below Methodologies:

1. Scraping list of area (neighborhoods) in London with Postcodes from Wikipedia
2. Get the location latitude and longitude for each neighborhood in London
3. Select the borough that has maximum number of neighborhoods. "Barnet"
4. Highlight top 10 Neighborhoods in Barnet based on number of venues.
5. Get the top ten most venues for each neighborhood in Barnet.
6. Cluster all Neighborhoods in Barnet based on their location.
7. Select the cluster that has Middle Eastern Restaurants.
8. Nominate the neighborhood that is among the top ten Neighborhoods in Barnet

4.0 Exploratory Data Analysis

4.1   Scrapping data

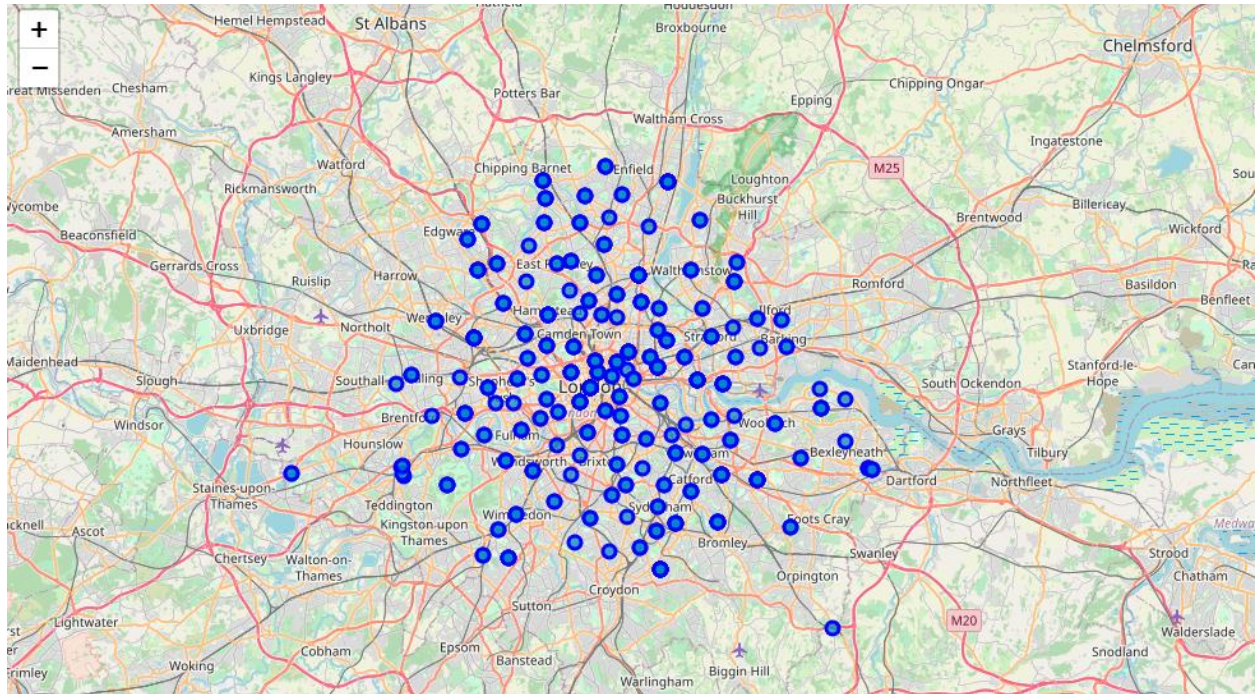To find the best suitable location we will follow below Methodologies:
- Scraping list of area (neighborhoods) in London with Postcodes from below Wikipedia link:
    https://en.wikipedia.org/wiki/List_of_areas_of_London

	neighbourhood	London borough	Post town	Postcode district	Dial code	OS grid ref
0	Abbey Wood	Bexley, Greenwich [7]	LONDON	SE2	020	TQ465785
1	Acton	Ealing, Hammersmith and Fulham[8]	LONDON	W3, W4	020	TQ205805
2	Addington	Croydon[8]	CROYDON	CR0	020	TQ375645
3	Addiscombe	Croydon[8]	CROYDON	CR0	020	TQ345665
4	Albany Park	Bexley	BEXLEY, SIDCUP	DA5, DA14	020	TQ478728
...	...	...	...	...	...	...
527	Woolwich	Greenwich	LONDON	SE18	020	TQ435795
528	Worcester Park	Sutton, Kingston upon Thames	WORCESTER PARK	KT4	020	TQ225655
529	Wormwood Scrubs	Hammersmith and Fulham	LONDON	W12	020	TQ225815
530	Yeading	Hillingdon	HAYES	UB4	020	TQ115825
531	Yiewsley	Hillingdon	WEST DRAYTON	UB7	020	TQ063804

- Using geopy library to add Location Latitude and Longitude columns corresponding to each Neighborhood/postcode
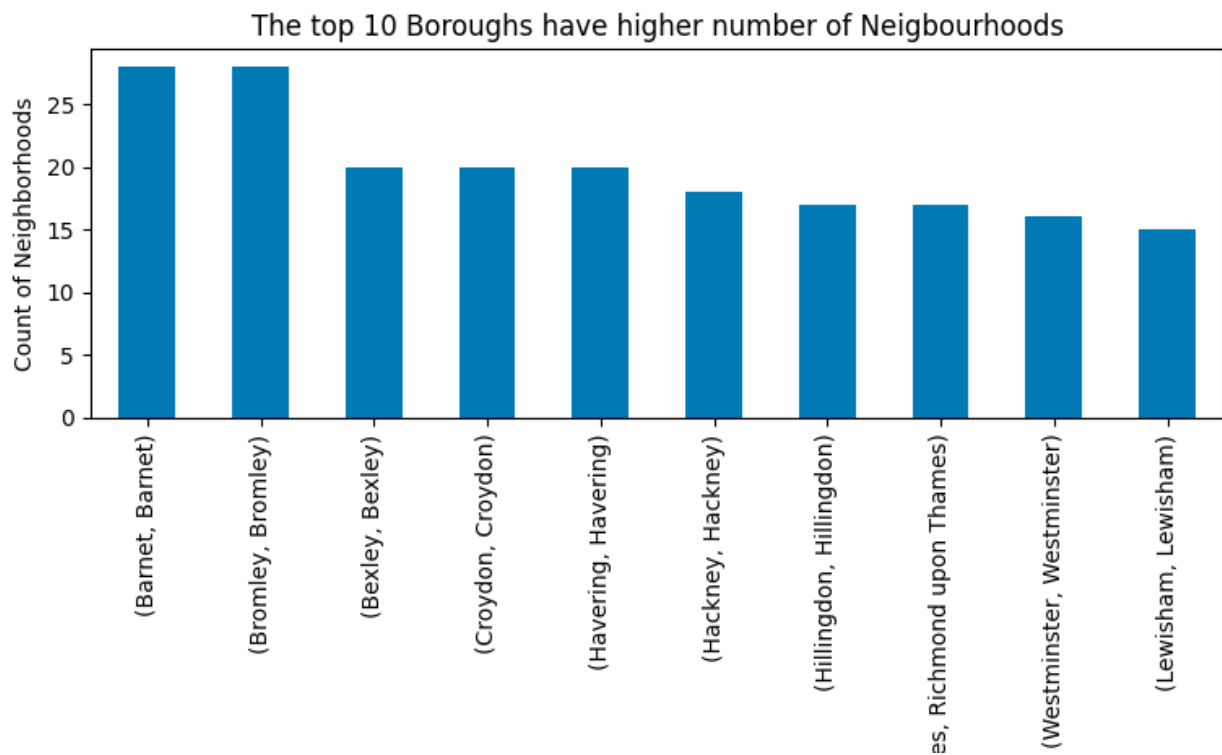
	Unnamed: 0	neighbourhood	London_borough	Post_town	Postcode_district	Dial_code	Latitude	Longitude
0	0	Abbey Wood	Bexley, Greenwich [7]	LONDON	SE2	20	51.492450	0.121270
1	1	Acton	Ealing, Hammersmith and Fulham[8]	LONDON	W3, W4	20	51.513240	-0.267460
2	2	Addington	Croydon[8]	CROYDON	CR0	20	51.384755	-0.051498
3	3	Addiscombe	Croydon[8]	CROYDON	CR0	20	51.384755	-0.051498
4	4	Albany Park	Bexley	BEXLEY, SIDCUP	DA5, DA14	20	51.452068	0.172207
...	...	...	...	...	...	...	...	...
527	527	Woolwich	Greenwich	LONDON	SE18	20	51.482070	0.071430
528	528	Worcester Park	Sutton, Kingston upon Thames	WORCESTER PARK	KT4	20	51.506420	-0.127210
529	529	Wormwood Scrubs	Hammersmith and Fulham	LONDON	W12	20	51.506450	-0.236910
530	530	Yeading	Hillingdon	HAYES	UB4	20	51.506420	-0.127210
531	531	Yiewsley	Hillingdon	WEST DRAYTON	UB7	20	51.506420	-0.127210

- Using folium library, we plotted the neighborhoods location on the map as shown below ...
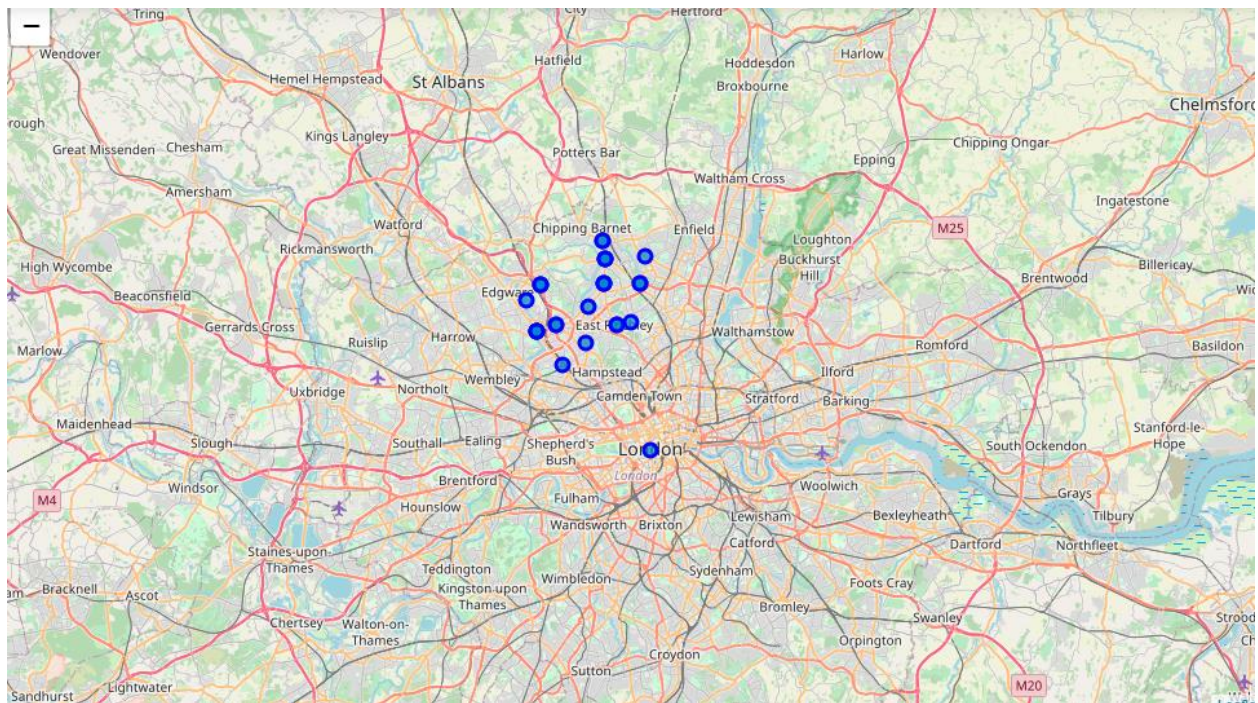
4.2 Number of neighborhoods for each borough

- From below We found that London Borough of Barnet has 28 of neighborhoods, so, we will select London Borough of Barnet as a target location for the business.

The top 10 Boroughs have higher number of Neigbourhoods

- Exploring London Borough of Barnet

	neighbourhood	London_borough	Post_town	Postcode_district	Dial_code	Latitude	Longitude
24	Barnet Gate	Barnet	LONDON, BARNET	NW7, EN5	20	51.615680	-0.245110
60	Brent Cross	Barnet	LONDON	NW2, NW4	20	51.589180	-0.228050
94	Childs Hill	Barnet	LONDON	NW2	20	51.562370	-0.221310
101	Church End	Barnet	LONDON	N3	20	51.601040	-0.194010
105	Colindale	Barnet	LONDON	NW9	20	51.584860	-0.248810
108	Colney Hatch	Barnet	LONDON	N11, N10	20	51.591070	-0.148520
144	East Barnet	Barnet	BARNET	EN4	20	51.506420	-0.127210
147	East Finchley	Barnet	LONDON	N2	20	51.589270	-0.163950
153	Edgware	Barnet	EDGWARE	HA8	20	51.604980	-0.260219
170	Finchley	Barnet	LONDON	N2, N3, N12	20	51.615920	-0.176740
180	Friern Barnet	Barnet	LONDON	N11	20	51.616310	-0.138390
189	Golders Green	Barnet	LONDON	NW11	20	51.576730	-0.196950
192	Grahame Park	Barnet	LONDON	NW9	20	51.584860	0.248810

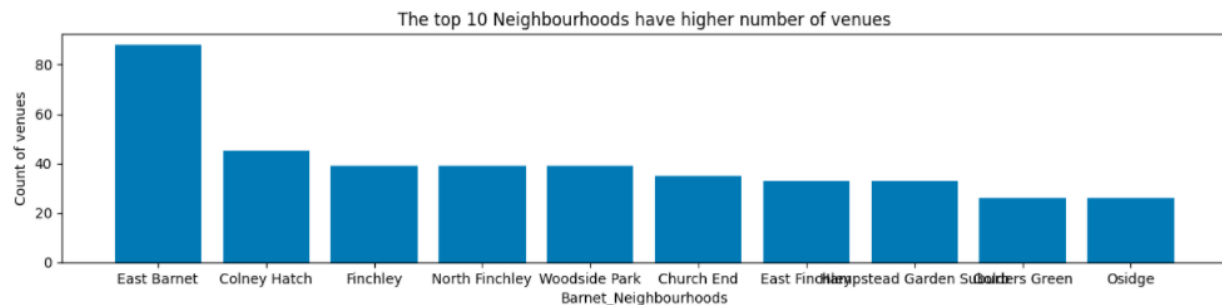- Plotting all Barnet Neighborhoods using folium library

4.3   Getting venues information from Foursquare API

- Getting all venues in Barnet and their location from Foursquare API

	Neighborhood	Neighborhood Latitude	Neighborhood Longitude	Venue	Venue Latitude	Venue Longitude	Venue Category
0	Barnet Gate	51.61568	-0.24511	The Good Earth	51.616961	-0.245282	Chinese Restaurant
1	Barnet Gate	51.61568	-0.24511	Bluebelles of Portabello	51.614848	-0.246753	Café
2	Barnet Gate	51.61568	-0.24511	Day of the Raj	51.616012	-0.244872	Indian Restaurant
3	Barnet Gate	51.61568	-0.24511	PizzaExpress	51.615861	-0.244703	Pizza Place
4	Barnet Gate	51.61568	-0.24511	M&S Foodhall	51.614187	-0.249267	Grocery Store

- Below are the Top 10 Neighborhoods in Barnet with high Number of Venues.
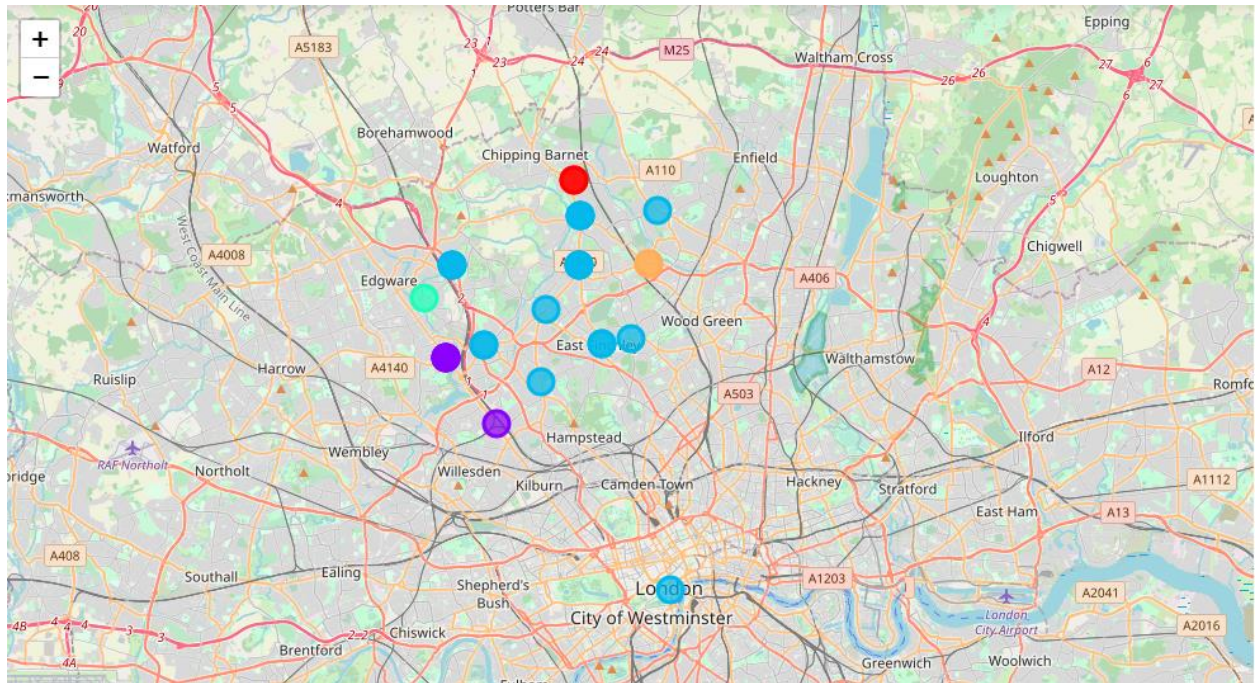 Note: the business location should be near to one of these 10 neighborhoods.

4.4   Most common venues for each Neighborhood

- Mapping top ten most common venues for each neighborhood in Barnet

	Neighborhood	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue	6th Most Common Venue	7th Most Common Venue	8th Most Common Venue	9th Most Common Venue	10th Most Common Venue
0	Barnet Gate	Grocery Store	Platform	Juice Bar	Pizza Place	Italian Restaurant	Restaurant	Bus Stop	Pub	Stationery Store	Chinese Restaurant
1	Brent Cross	Coffee Shop	Pizza Place	Japanese Restaurant	Noodle House	Pub	Chinese Restaurant	Fried Chicken Joint	Student Center	Sushi Restaurant	Park
2	Childs Hill	Music Venue	Historic Site	Gym / Fitness Center	Clothing Store	Supermarket	Bus Station	Wine Bar	Diner	Discount Store	English Restaurant
3	Church End	Supermarket	Turkish Restaurant	Cosmetics Shop	Pizza Place	Pub	Japanese Restaurant	Café	Coffee Shop	Playground	Chinese Restaurant
4	Colindale	Asian Restaurant	Bus Stop	Ice Cream Shop	Bar	Hotel	Coffee Shop	Pub	Café	Supermarket	Sushi Restaurant

4.5   Clustering Neighborhoods

- Clustering Barnet neighborhoods using k-means algorithm to find out the neighborhood that has Middle Eastern and Turkish Restaurant as well as in the top 10 Neighborhoods in Barnet.
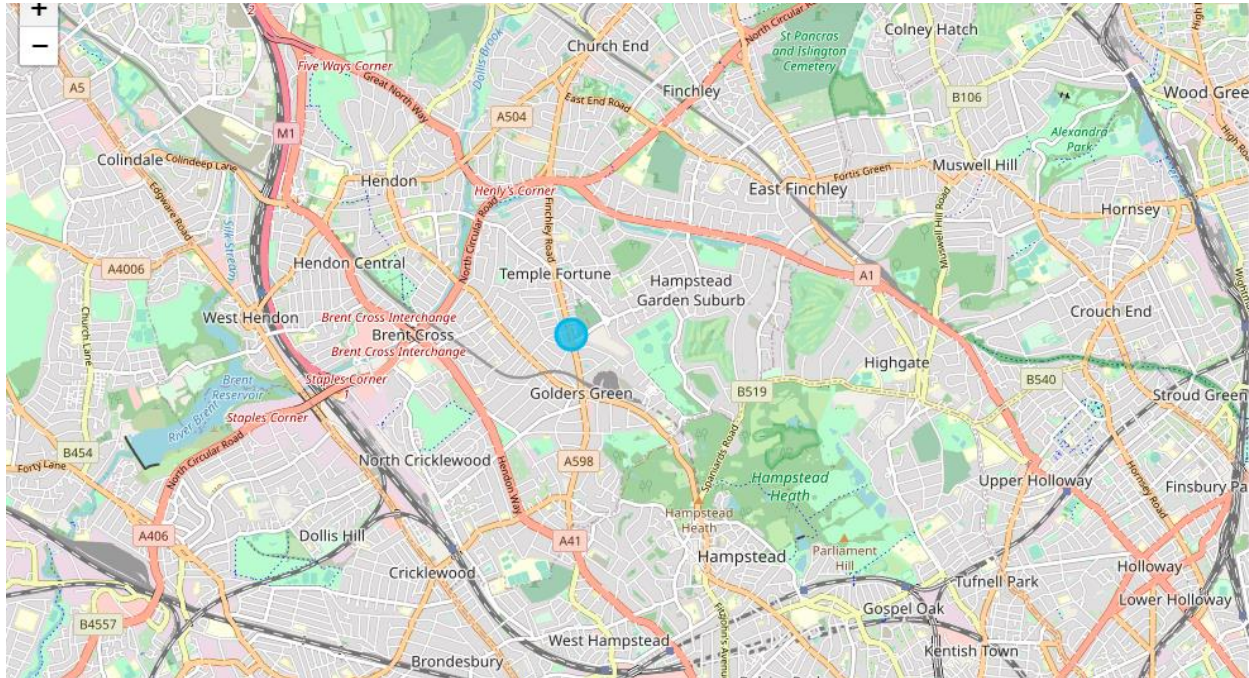
	neighbourhood	London_borough	Post_town	Postcode_district	Dial_code	Latitude	Longitude	Cluster Labels	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue
24	Barnet Gate	Barnet	LONDON, BARNET	NW7, EN5	20	51.61568	-0.24511	2	Grocery Store	Platform	Juice Bar	Pizza Place
60	Brent Cross	Barnet	LONDON	NW2, NW4	20	51.58918	-0.22805	2	Coffee Shop	Pizza Place	Japanese Restaurant	Noodle House
94	Childs Hill	Barnet	LONDON	NW2	20	51.56237	-0.22131	1	Music Venue	Historic Site	Gym / Fitness Center	Clothing Store
101	Church End	Barnet	LONDON	N3	20	51.60104	-0.19401	2	Supermarket	Turkish Restaurant	Cosmetics Shop	Pizza Place
105	Colindale	Barnet	LONDON	NW9	20	51.58486	-0.24881	1	Asian Restaurant	Bus Stop	Ice Cream Shop	Bar

- Cluster 3 the only cluster that has Middle eastern Restaurants, in the top 10 most common venues.

	neighbourhood	London_borough	Post_town	Postc	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue	6th Most Common Venue	7th Most Common Venue	8th Most Common Venue	9th Most Common Venue	10th Most Common Venue
189	Golders Green	Barnet	LONDON		Bakery	Café	Grocery Store	Turkish Restaurant	Korean Restaurant	Italian Restaurant	Restaurant	Sandwich Place	Middle Eastern Restaurant	Fast Food Restaurant
352	Osidge	Barnet	LONDON		Fast Food Restaurant	Coffee Shop	Pizza Place	Café	Gym / Fitness Center	Turkish Restaurant	Italian Restaurant	Pharmacy	Middle Eastern Restaurant	Portuguese Restaurant

4.6   Business Location (Problem Solved)

-    Golders Green Neighborhood are nominated to be the location for the business as the site has all the necessary specifications for the success of the project.

5. Result and Findings

1. Barnet and Bromley Boroughs both have 28 Neighborhoods in the top compared to other Boroughs in London, for simplicity we selected London Borough of Barnet to Explore.
2. East Barnet Neighborhood has the Max. Number of Venues (88 venues) based on Foursquare data
3. Top 10 Neighborhoods in Barnet based on Number of venues are: East Barnet, Colney Hatch, Finchley, North Finchley, Woodside Park, Church End, East Finchley, Hampstead Garden Suburb, Golders Green, Osidge
4. It is important to Open Arabic Coffee Shop business near to Middle Eastern Restaurants.
5. Cluster 3 the only cluster that has Middle eastern Restaurants, in the top 10 most common venues
6. Only Golders Green and Osidge neighborhoods have Middle Eastern Restaurants in their Most Common Venues.
7. The Best Location for the business recommended to be nearby **Golders Green** neighbourhood because it is in the top 10 neighborhoods in Barnet in terms of number of venues