Buddakan Restaurant - London

Segmenting and Clustering of Neighborhoods

1. *Introduction:*

1.1 About Restaurant:

Buddakan is a restaurant chain serving New American Asian cuisine owned by STARR Restaurants with locations in Philadelphia, Pennsylvania, New York City, New York and Atlantic City, New Jersey. Buddakan presents the vivid flavors of the Far East in a surreal atmosphere that marries the serenity of Asia with the flamboyance of 16th-century Paris.

1.2 Objective of the Restaurant:

Buddakan is planning to open a restaurant in the heart of United Kingdom, London, to broaden their Asian fusion food venture into the United Kingdom.

1.3 Requirement:

A Geo spatial data analysis of the city of London is to be performed to determine the best location to open the restaurant. Since Buddakan is an Asian Fusion style restaurant, The target audience is mostly Asian and White. Each Borough is segmented, clustered and analyzed for determining the best neighborhood(s) with most target audience to open the restaurant. Foursquare API is used to determine the coordinates of the location of these boroughs in London.

2. *Data:*

2.1 Population Data:

The data for determining the best Neighborhood(s) with most target audience is provided by London Data store. The London Data store is an open source platform to access London's data for free. The London Data store is created by the Greater London Authority (GLA).The Data set containing the population of each borough classified based on ethnicity is used to perform the analysis. The data set consists of all 33 boroughs in London along with the respective population for each Borough.

2.2 Location Data:

The data consisting of the location of each borough in London along with the co-ordinates is scraped from the web through a Wikipedia page: https://en.wikipedia.org/wiki/List_of_London_boroughs. This data is merged with the population data to determine the latitude and longitude of each borough.

2.3 Neighborhood Data:

The data consisting of the neighborhoods of each borough in London is scraped from the web through the Wikipedia page: https://en.wikipedia.org/wiki/List_of_areas_of_London. This data is merged with the merged population data and location data to determine the best neighborhood(s) to open the restaurant.

3. *Methodology:*

3.1 Data Preparation:

The population data is taken into a data frame and is merged with the location data. Data is cleaned, processed and sorted in such a way that the final data frame consists of both the population and location of each borough in London. The Final data frame consists of 33 rows X 13 columns.

3.2 Data Visualization:

A map showing all the boroughs in London is created using the folium library. The geographical co-ordinates of London is retrieved using geocoders from the geopy library and the map showing all the boroughs in London is created. The Boroughs are marked by markers.

	Borough	Population	White	Asian	Black	Mixed/ Other	British	Europeans	Asians	Americans	Rest of World	Latitude	Longitude
0	Barking and Dagenham	224332.972143	109000	54000	36000	15000	167000	27000	10000	2000	6000	51.5607	0.1557
1	Barnet	415066.094851	250000	57000	30000	54000	321000	45000	17000	3000	6000	51.6252	-0.1517
2	Bexley	243193.377090	195000	17000	21000	15000	219000	18000	4000	1000	6000	51.4549	0.1505
3	Brent	348633.247526	102000	107000	62000	56000	226000	66000	27000	2000	7000	51.5588	-0.2817
4	Bromley	328780.563072	267000	15000	21000	28000	291000	21000	8000	2000	8000	51.4039	0.0198

Fig 1: Final data set merged with all required data

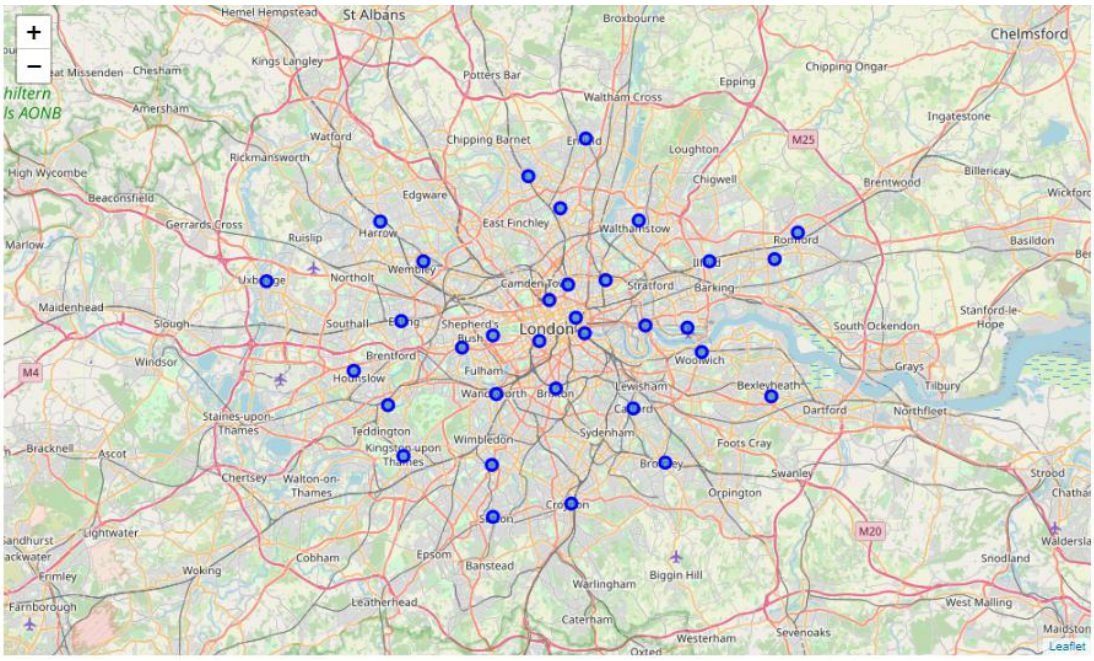

Fig 1a:London map showing all Boroughs

3.3 Exploratory Data Analysis:

Exploratory Data Analysis(EDA) is performed on population of each borough based on ethnicity and nationality. The parameters taken into consideration for the EDA based on ethnicity are: Population, White population, Asian population, Mixed / Other population. The Parameters taken into consideration for the EDA based on Nationality are: British, Europeans, Americans, Rest of the world.

3.3.1 EDA based on Ethnicity :

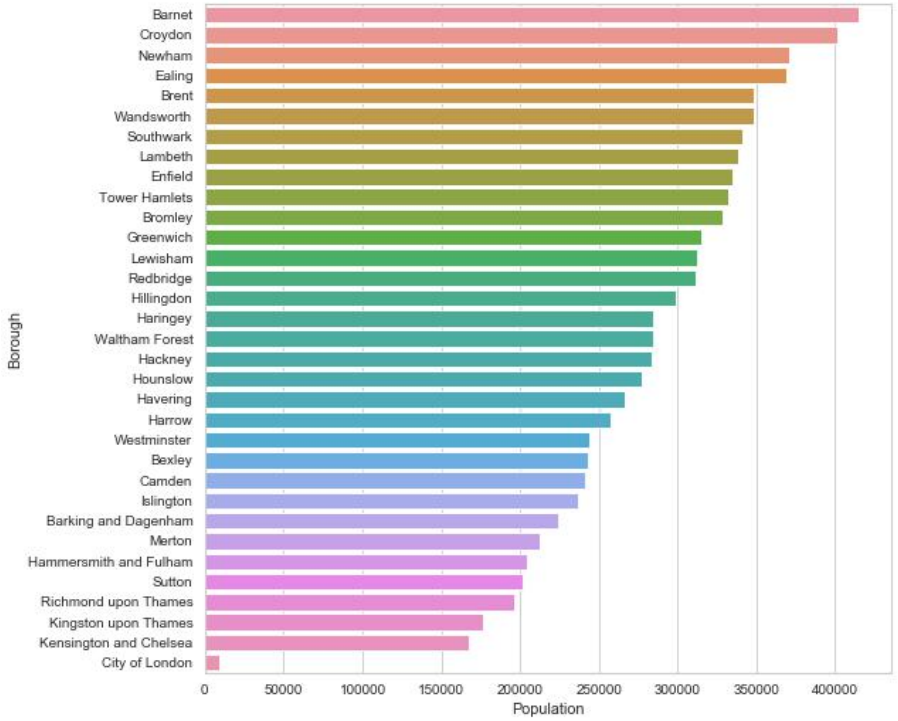

Fig 2: Borough vs Population

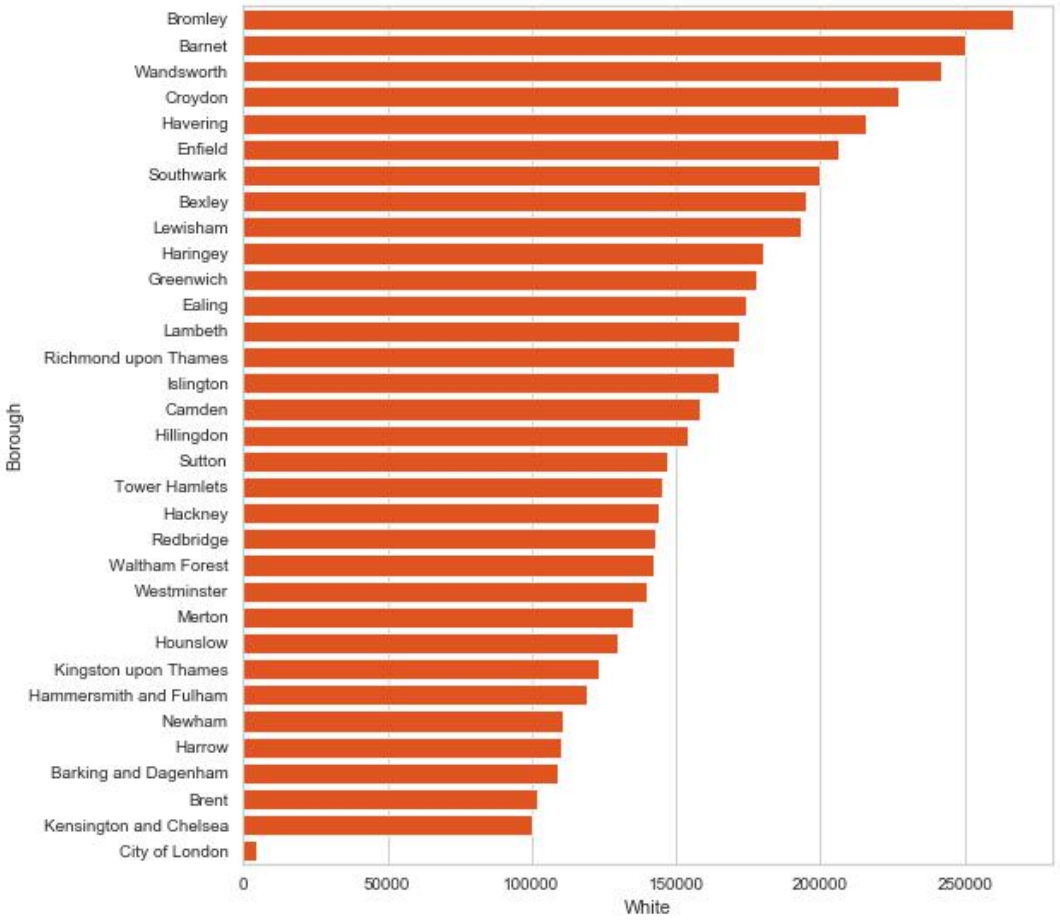

Fig 3: Borough vs White

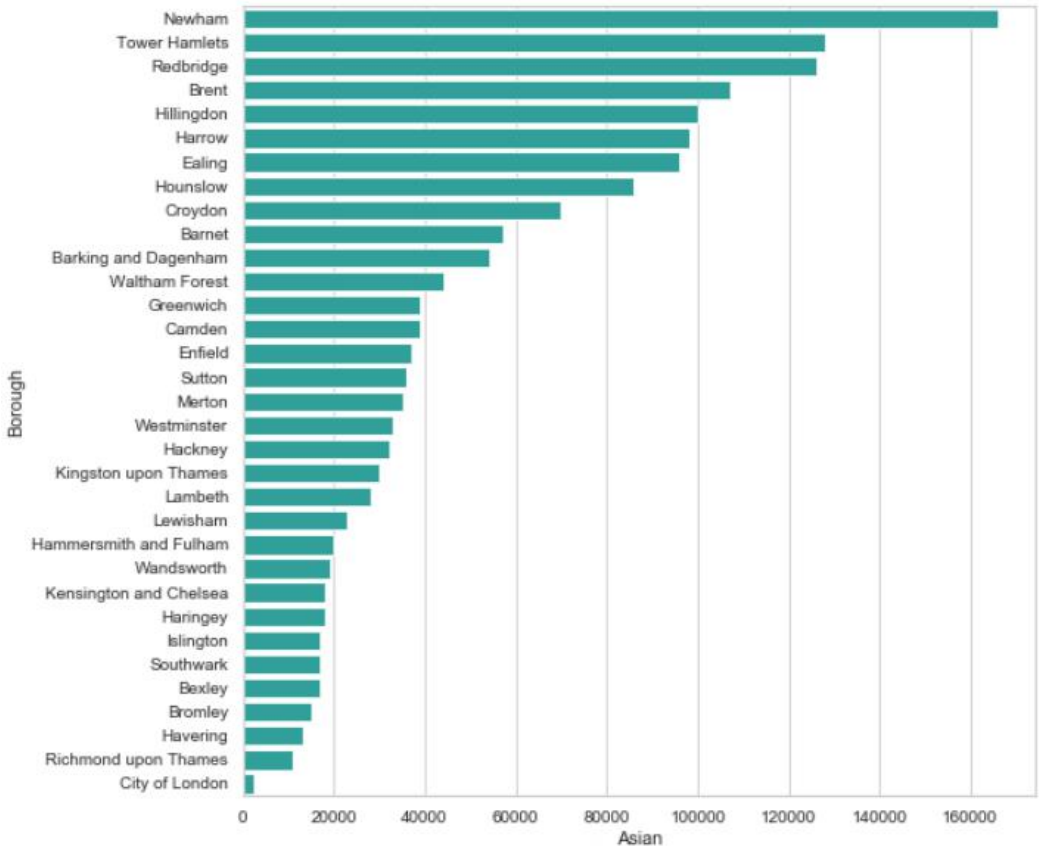

Fig 4: Borough vs Asians

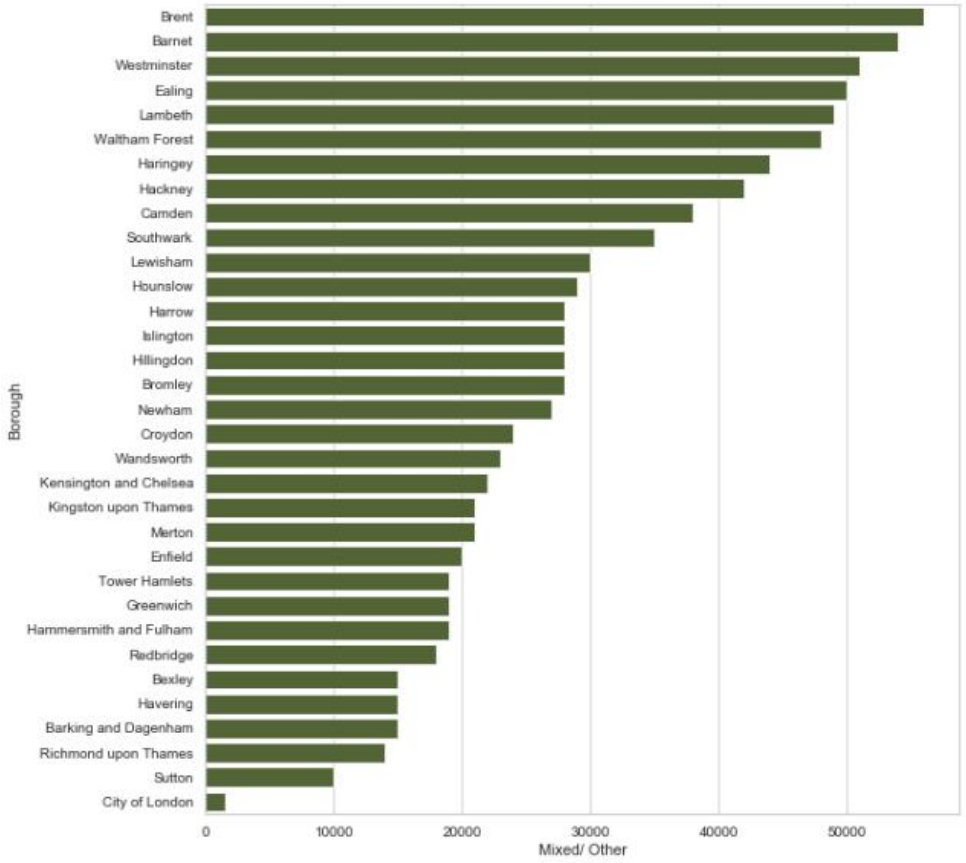

Fig 5: Borough vs Mixed / Other

3.3.2 EDA based on Nationality :

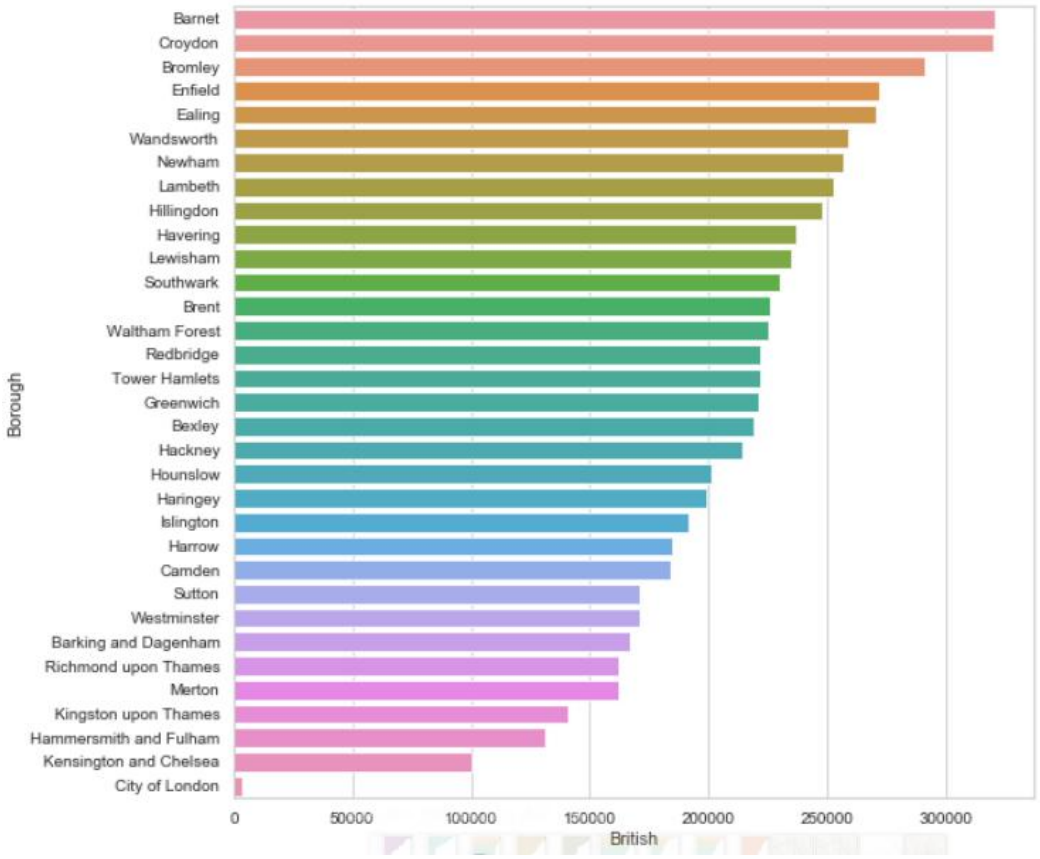

Fig 6: Borough vs British

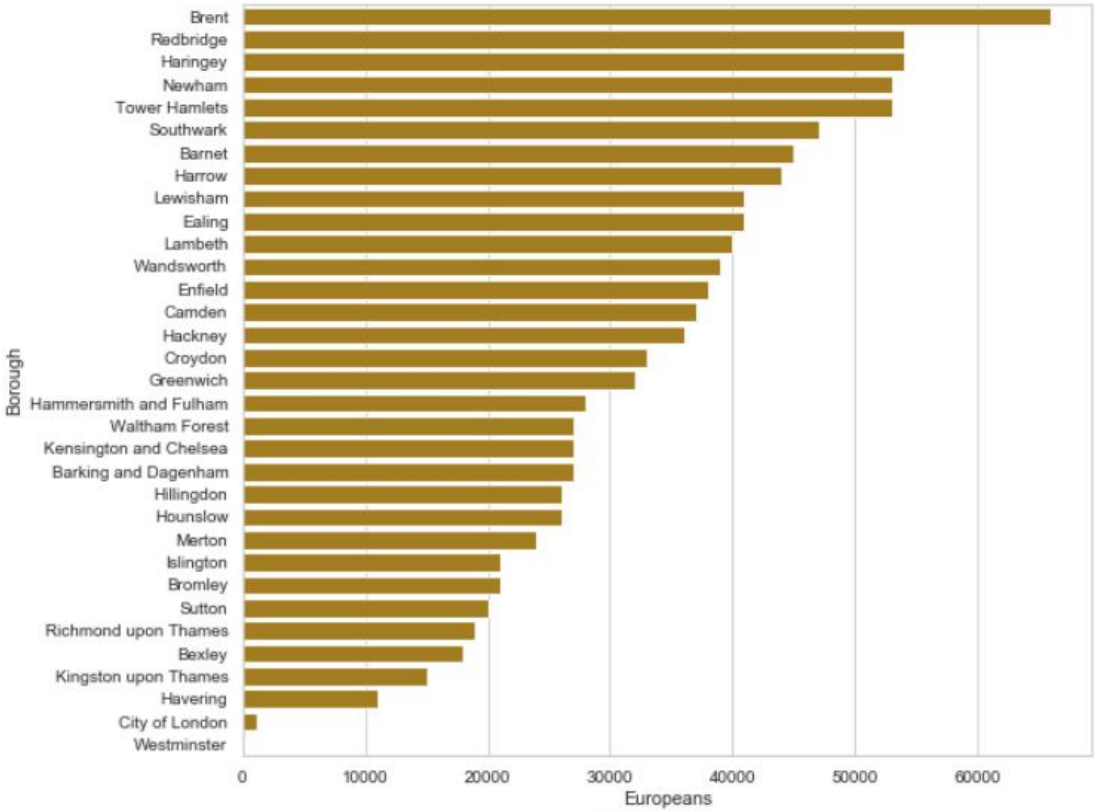

Fig 7: Borough vs Europeans

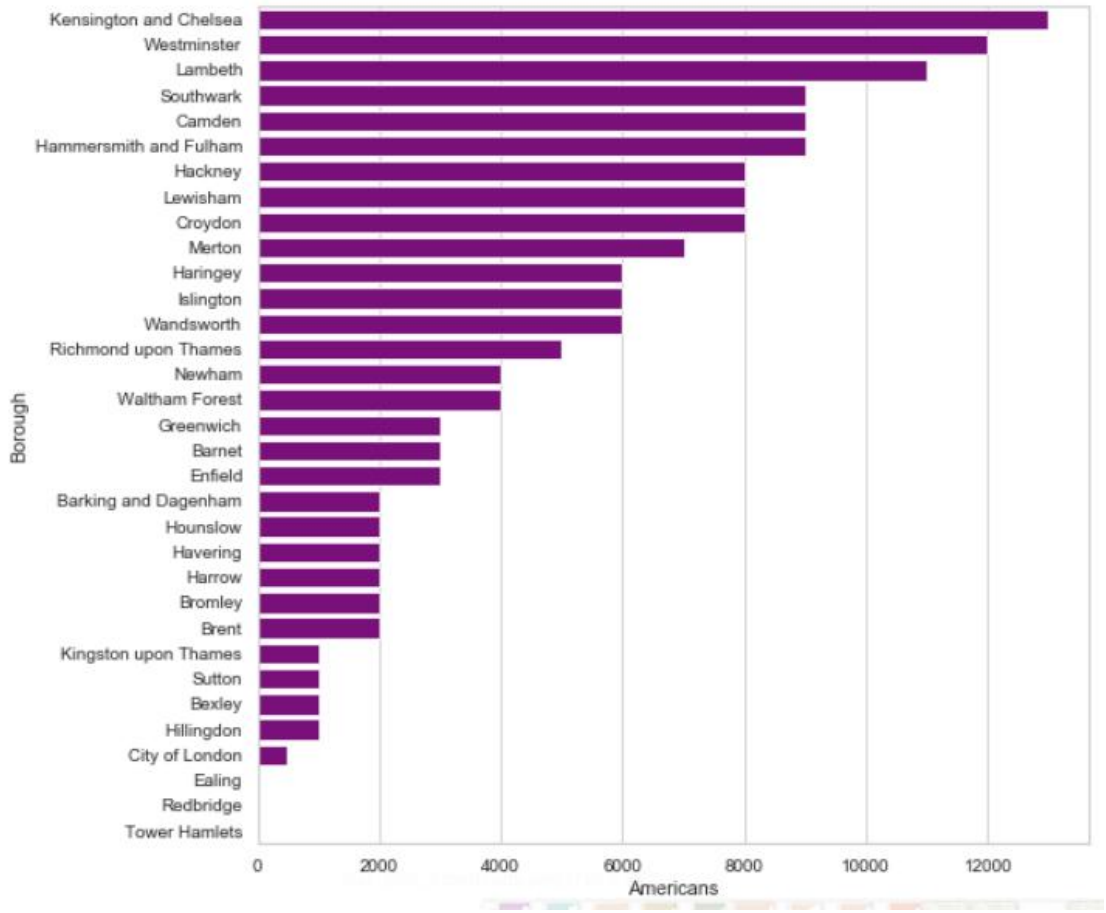

Fig 8: Borough vs Americans

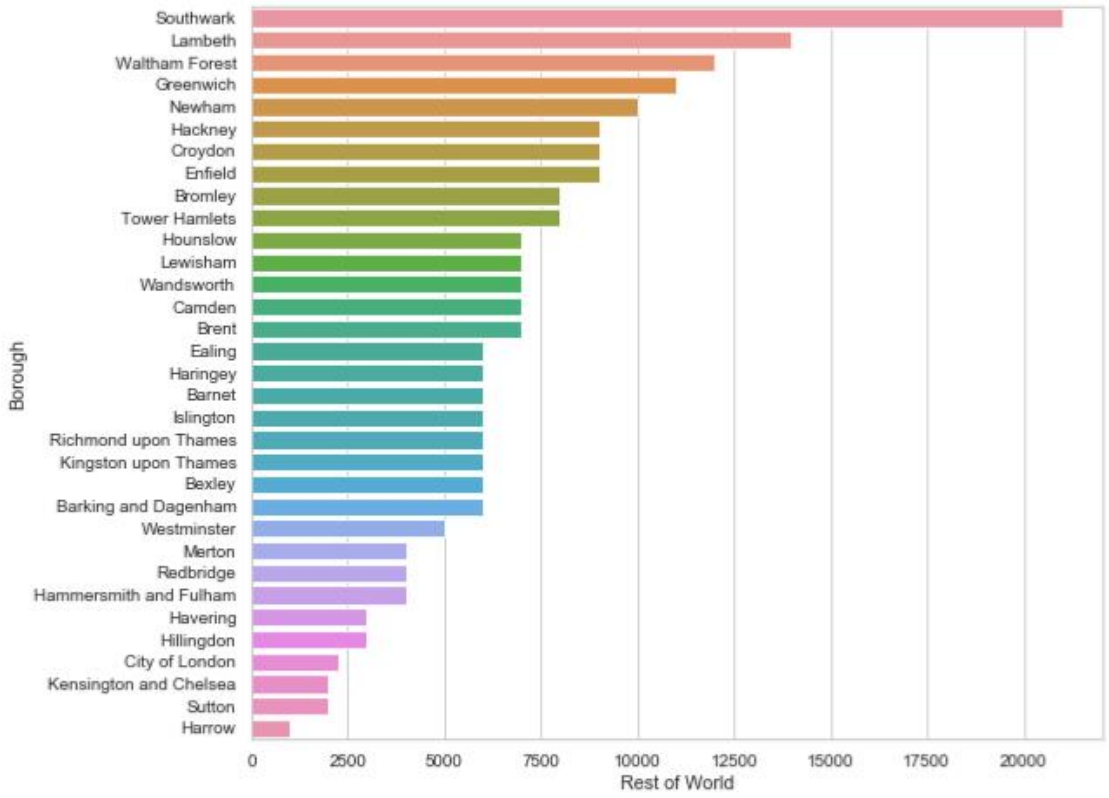

Fig 9: Borough vs Rest of World

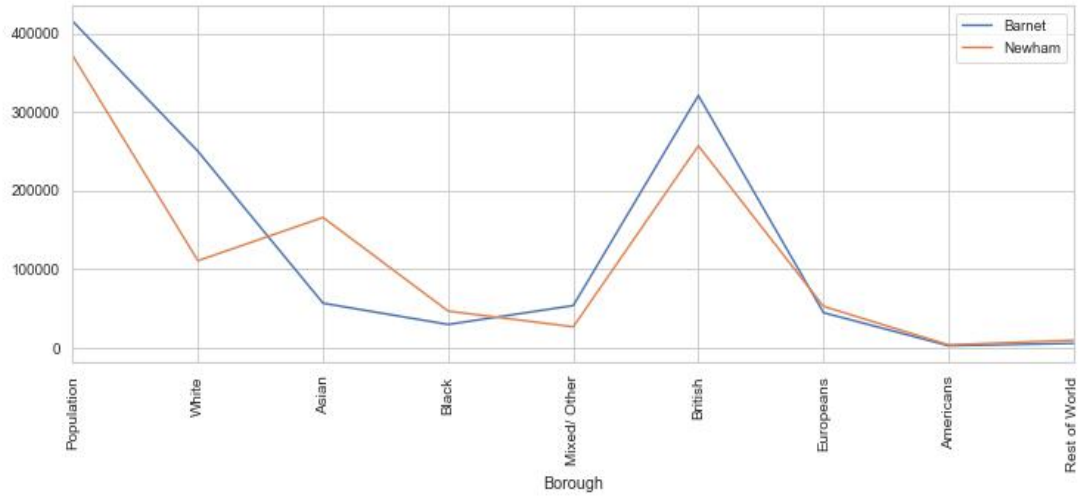

Fig 9: Barnet vs Newham

4. Results:

Based on the EDA performed on ethnicity and nationality, We can narrow down the list of boroughs from 33 to 2 boroughs: Barnet and Newham. These two boroughs are chosen for final EDA. Performing further EDA using line graph on Barnet vs Newham, We can conclude that Barnet is the best suited borough to open the restaurant based on Total population, White population, Asian population, Mixed / Other population, British population, European population, American population and Rest of the world population.

5. Discussion:

5.1 Barnet Borough Analysis:

The data consisting of the neighborhoods of each borough in London is scraped from the web through the Wikipedia page: https://en.wikipedia.org/wiki/List_of_areas_of_London. This data is merged with the merged population data and location data to determine the best neighborhood(s) to open the restaurant.

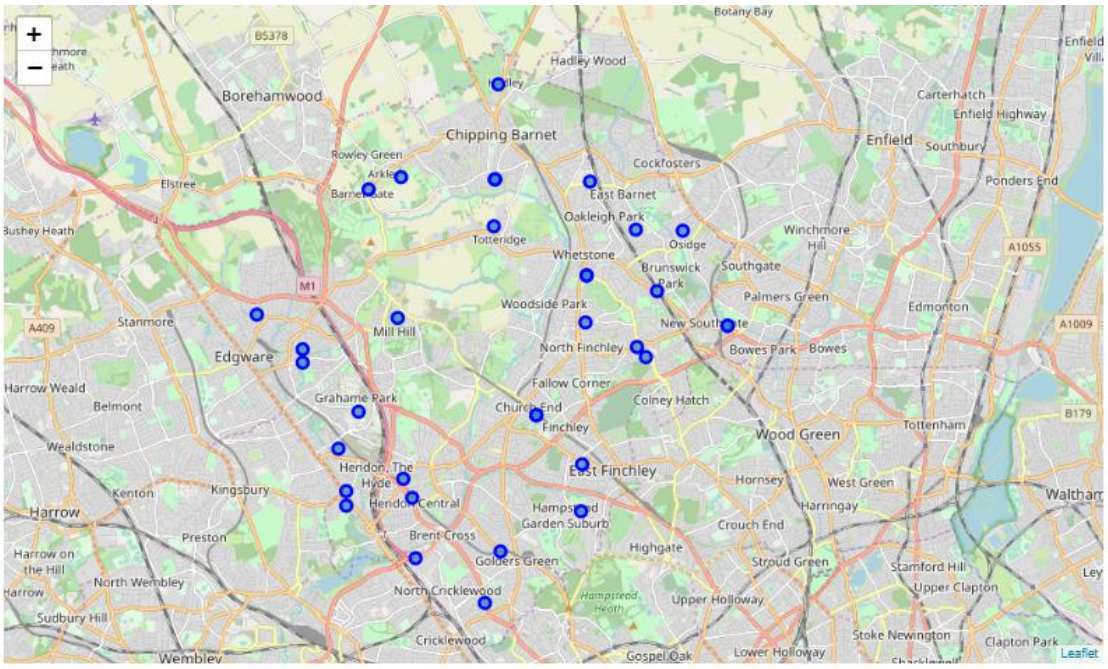

Fig 10: Barnet map showing all Neighborhoods

5.1.1 Clustering Neighborhoods of Barnet Borough:

All Neighborhoods under Barnet borough is segmented and clustered to analyze the 10 most visited places. One hot encoding method is applied to the data set and 10 most visited places for each neighborhood is determined through K-means clustering algorithm. The neighborhoods are clustered into 5 clusters based on location and each cluster is marked in the borough map.

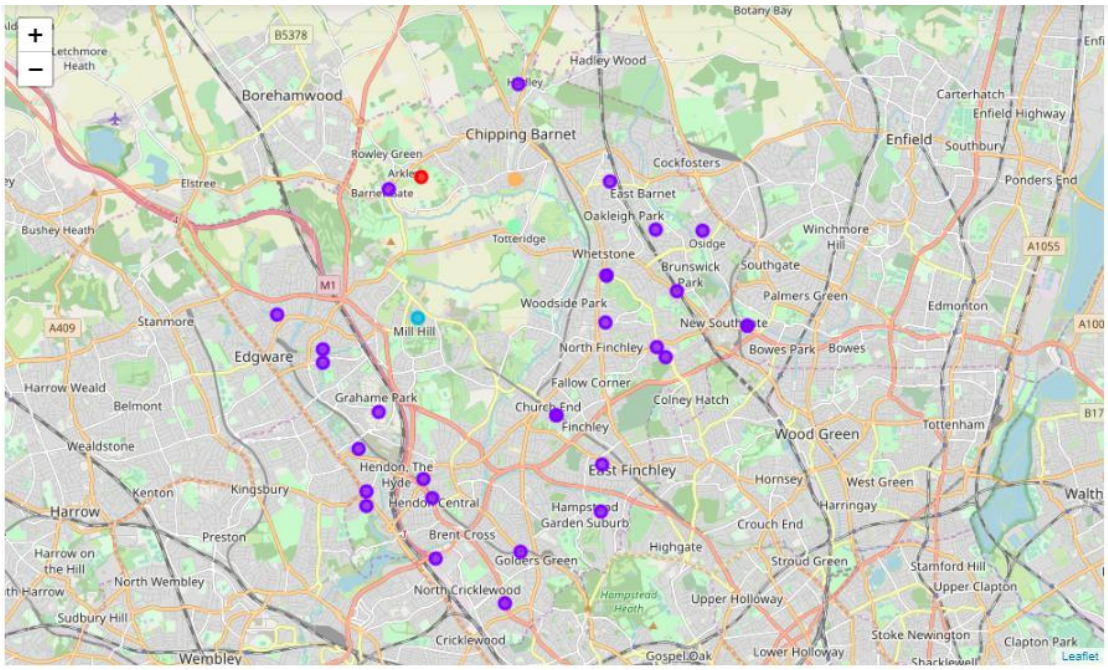

Fig 11: Barnet map showing all clusters of Neighborhoods

6. Conclusion:

Based on the analysis performed on various Boroughs and their Neighborhoods in London, We can recommend that *Mill Hill*, *Hampstead Garden Suburb*, *Friern Barnet*, *Finchley*, *Colindale* and *The Burroughs* are the best Neighborhoods in Barnet Borough to open the restaurant.