Battle of Neighborhoods

London, United Kingdom

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Problem Statement

People often explore the neighborhood before they wanted to move to any specific location to understand various aspect of the locations - rentals, near-by shops, clinics / hospitals, schools, safety, distance to the office etc.

In this project, I have chosen to explore London neighborhood, where most of the Asian / Indian community reside and the surrounding restaurants around that area using clustering & segmentation techniques learned in this course.

This project will also help anyone in comparing 2 different neighborhoods of London to choose the best suited location based on the top 10 common venues surrounding it.

Objective

- Extract top trending venues of London using Foursquare API
- Forming neighborhood clusters based on venue categories using unsupervised k-mean clustering algorithm
- Understanding the similarities and differences between two neighborhoods to retrieve more insights and to conclude which neighborhood is best suited for an individual’s need.

Python packages and Dependencies

- NumPy – Library to handle data in a vectorized manner
- Pandas – Library for Data Analysis
- JSON – Library to handle JSON files
- Geopy / Geocoder – To retrieve Location Data
- BeautifulSoap – Library to handle html data crawling
- Matplotlib – Python Plotting Module
- Sklearn – Python machine learning Library
- Folium – Map rendering Library
- Foursquare API – This provides location based information about venues and various other details

Workflow

- Web Scraping, Data Extraction and Data Wrangling
- Retrieving trending venues of neighborhood and kMeans Clustering
- Analyzing and concluding on the clustered neighborhoods based on top common venues of the location.

Web Scraping, Data Extraction and Data Wrangling

Beautiful Soup

Collecting Location data with postal code & Demographic data

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

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

Geocoder Package

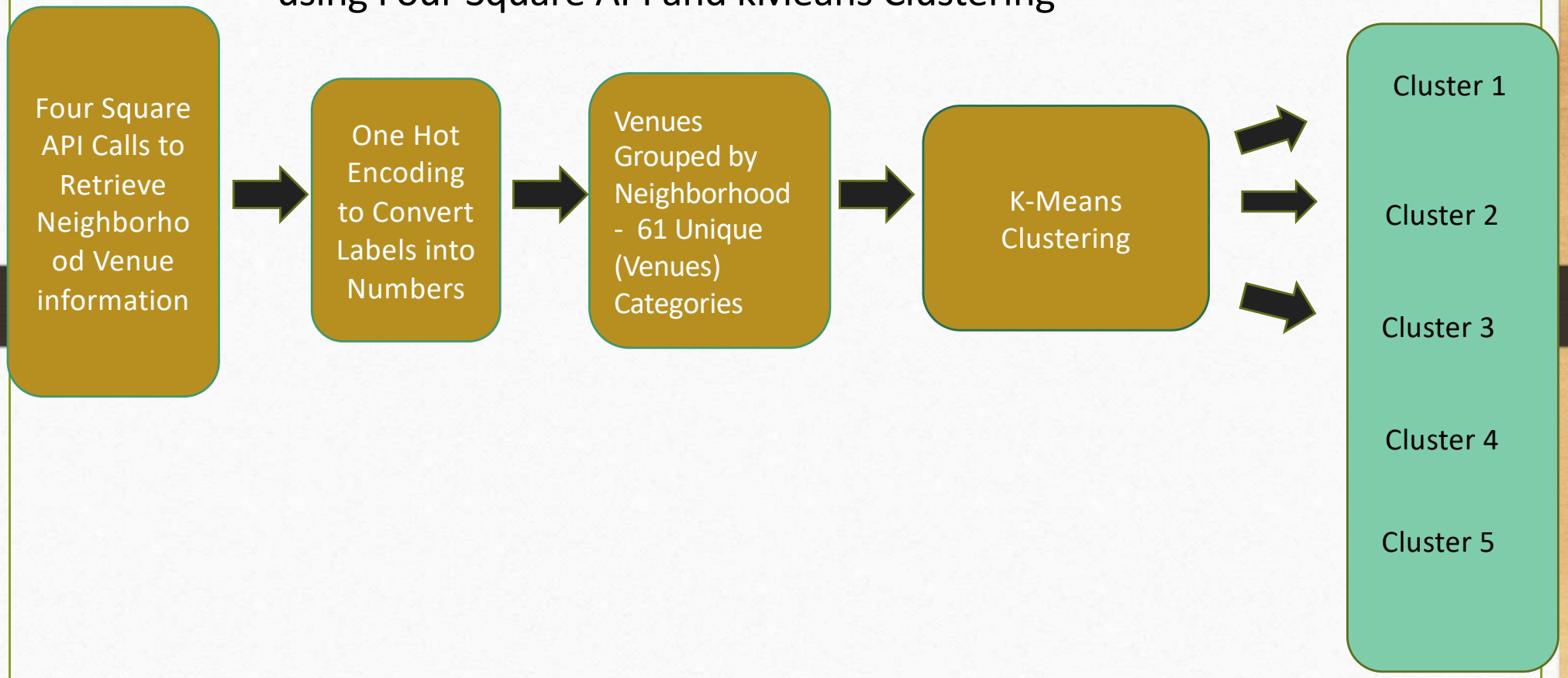
To Collect Latitude & Longitude Data

	Location	Borough	Post_town	PostalCode	Latitude	Longitude
0	Beckton	Newham	LONDON, BARKING	E6	51.532920	0.054610
1	Beckton	Newham	LONDON, BARKING	E16	51.509130	0.015280
2	Beckton	Newham	LONDON, BARKING	IG11	51.532674	0.085256
3	Bethnal Green	Tower Hamlets	LONDON	E2	51.526690	-0.062570
4	Blackwall	Tower Hamlets	LONDON	E14	51.511220	-0.012640

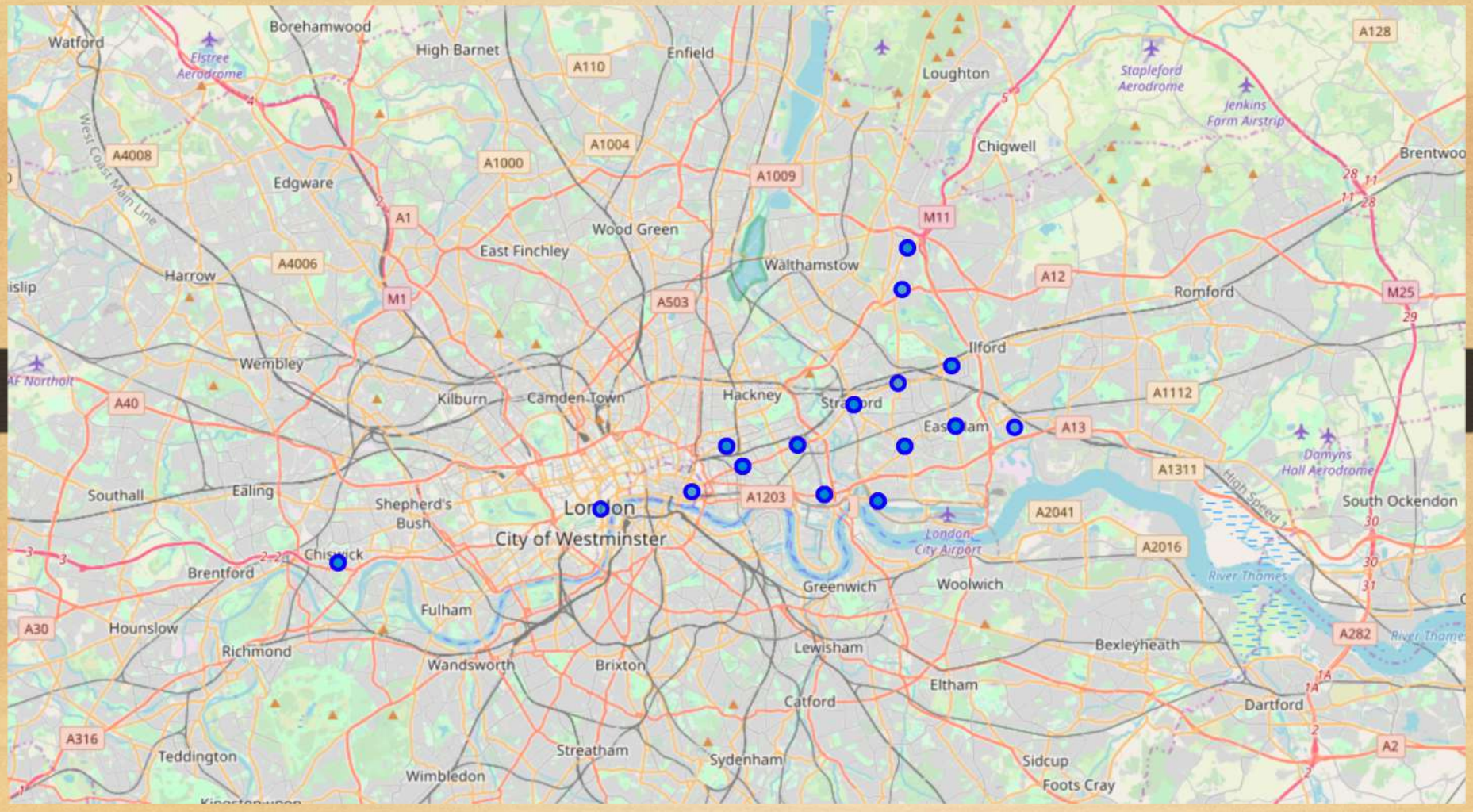
	Location	Borough	Post_town	PostalCode
0	Abbey Wood	Bexley, Greenwich	LONDON	SE2
1	Acton	Ealing, Hammersmith and Fulham	LONDON	W3
1	Acton	Ealing, Hammersmith and Fulham	LONDON	W4
2	Addington	Croydon	CROYDON	CR0
3	Addiscombe	Croydon	CROYDON	CR0

	Local authority	White	Mixed	Asian	Black	Other
24	Newham	29	4.5	43.5	19.6	3.5
13	Harrow	42.2	4	42.6	8.2	2.9
25	Redbridge	42.5	4.1	41.8	8.9	2.7
29	Tower Hamlets	45.2	4.1	41.1	7.3	2.3
17	Hounslow	51.4	4.1	34.4	6.6	3.6

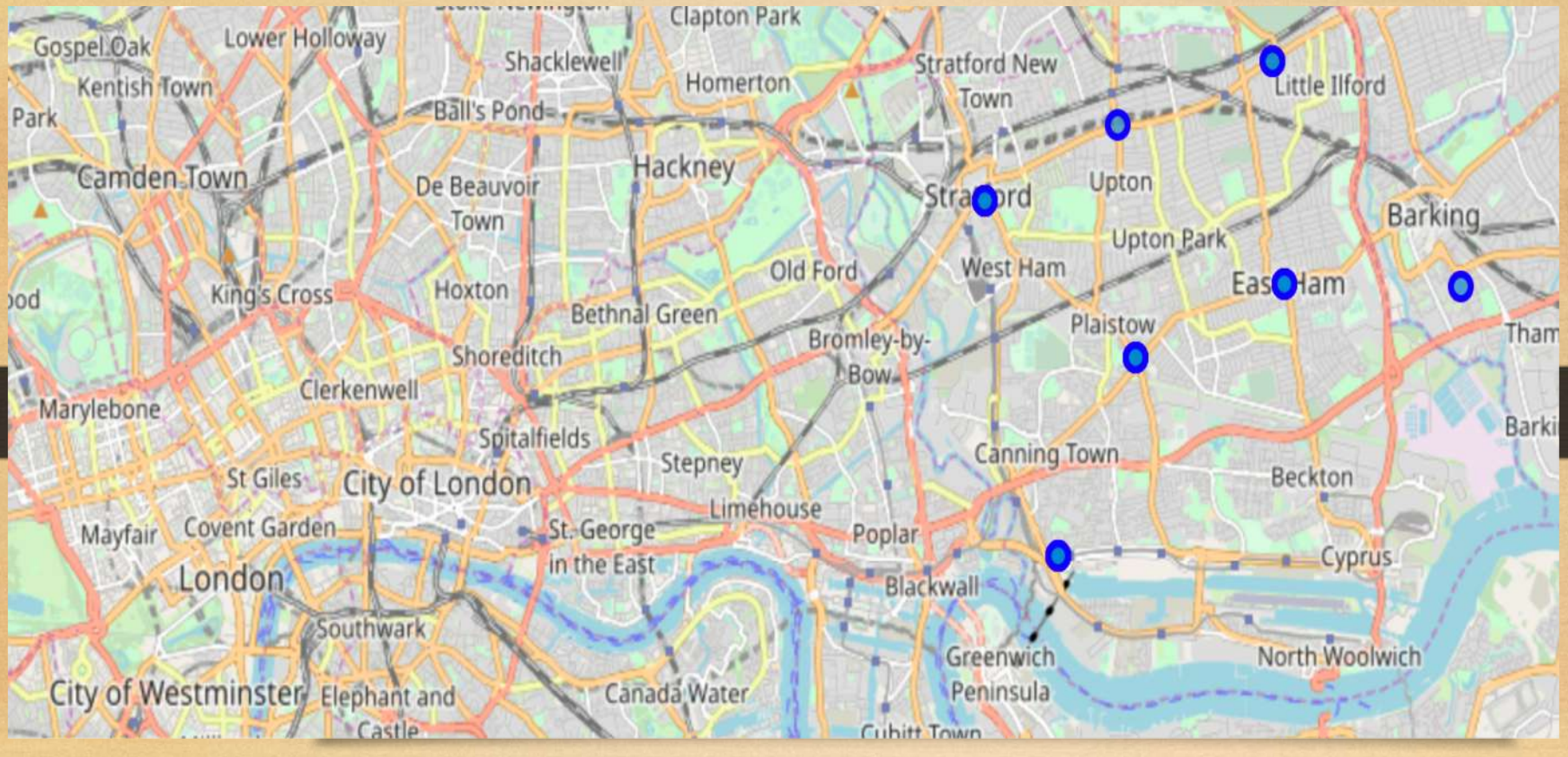
Retrieving Trending venues of Neighborhood using Four Square API and kMeans Clustering



Clustering Neighborhood - London



Clustering Neighborhood - Newham



Analyzing Neighborhood - Newham

Onehot encoding – converting labels to numbers

	Neighborhood	Athletics & Sports	Bakery	Bar	Beach	Bookstore	Bus Station	Bus Stop	Cable Car
0	Beckton	0	0	0	0	0	0	0	0
1	Beckton	0	0	0	0	0	0	0	0
2	Beckton	0	0	0	0	0	0	0	0
3	Beckton	0	0	0	0	0	0	0	0
4	Beckton	0	0	0	0	0	0	0	0

Finding Neighborhood with Indian Restaurant

```
#Check Indian restaurant in Newham
newham_onehot.loc[newham_onehot['Indian Restaurant'] != 0]
```

2]:

	Neighborhood	Athletics & Sports	Bakery	Bar	Beach	Bookstore	Bus Station	Bus Stop
117	Forest Gate	0	0	0	0	0	0	0
171	Maryland	0	0	0	0	0	0	0
269	Stratford	0	0	0	0	0	0	0
349	West Ham	0	0	0	0	0	0	0

Grouping Neighborhood – mean frequency of occurrence

	Neighborhood	Athletics & Sports	Bakery	Bar	Beach	Bookstore	Bus Station	Bus Stop	Cable Car	Café	Caril Resta
0	Beckton	0.02381	0.023810	0.023810	0.02381	0.000000	0.047619	0.023810	0.02381	0.047619	0.
1	Canning Town	0.05000	0.000000	0.050000	0.05000	0.000000	0.050000	0.000000	0.05000	0.050000	0.
2	Custom House	0.05000	0.000000	0.050000	0.05000	0.000000	0.050000	0.000000	0.05000	0.050000	0.
3	East Ham	0.00000	0.058824	0.000000	0.00000	0.000000	0.000000	0.000000	0.00000	0.058824	0.
4	Forest Gate	0.00000	0.052632	0.000000	0.00000	0.000000	0.000000	0.105263	0.00000	0.052632	0.
5	Little Ilford	0.00000	0.000000	0.000000	0.00000	0.000000	0.000000	0.000000	0.00000	0.000000	0.
6	Manor Park	0.00000	0.000000	0.000000	0.00000	0.000000	0.000000	0.000000	0.00000	0.000000	0.
7	Maryland	0.00000	0.018868	0.018868	0.00000	0.037736	0.018868	0.018868	0.00000	0.037736	0.

Top Ten Venues of Neighborhood - Newham

Beckton

```
----Beckton----
                  venue  freq
0                 Hotel  0.07
1           Coffee Shop  0.05
2                 Café  0.05
3  Fast Food Restaurant  0.05
4       Clothing Store  0.05
5         Grocery Store  0.05
6           Bus Station  0.05
7            Steakhouse  0.02
8                 Pier  0.02
9             Gym Pool  0.02
```

Forest Gate

```
----Forest Gate----
                  venue  freq
0         Grocery Store  0.16
1  Fast Food Restaurant  0.11
2              Bus Stop  0.11
3                   Pub  0.11
4                 Hotel  0.05
5      Indian Restaurant  0.05
6      Fish & Chips Shop  0.05
7                Market  0.05
8  Comfort Food Restaurant  0.05
9      Chinese Restaurant  0.05
```

Neighborhood and its most common venues in Newham

	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
0	Beckton	Hotel	Coffee Shop	Bus Station	Grocery Store	Café	Fast Food Restaurant	Clothing Store
1	Canning Town	Hotel	Athletics & Sports	Scenic Lookout	Grocery Store	Italian Restaurant	Middle Eastern Restaurant	Diner
2	Custom House	Hotel	Athletics & Sports	Scenic Lookout	Grocery Store	Italian Restaurant	Middle Eastern Restaurant	Diner
3	East Ham	Clothing Store	Warehouse Store	Sandwich Place	Grocery Store	Turkish Restaurant	Fast Food Restaurant	Electronics Store
4	Forest Gate	Grocery Store	Fast Food Restaurant	Bus Stop	Pub	Comfort Food Restaurant	Chinese Restaurant	Indian Restaurant

Compare between Neighborhoods of Newham

Forest Gate and Maryland

Here I'm comparing 2 neighborhoods to choose one that best matches my requirements as given below

1. Asian population
2. Nearby Grocery / Market
3. Bus stop / Metro
4. Indian / Chinese Restaurant

Neighborhood Venues

Location	Forest Gate	Maryland
Borough	Newham	Newham
Post_town	LONDON	LONDON
PostalCode	E7	E15
Latitude	51.5467	51.54
Longitude	0.02558	0.00289
Cluster Labels	0	3
1st Most Common Venue	Grocery Store	Pub
2nd Most Common Venue	Fast Food Restaurant	Platform
3rd Most Common Venue	Bus Stop	Hotel
4th Most Common Venue	Pub	Sandwich Place
5th Most Common Venue	Comfort Food Restaurant	Supermarket
6th Most Common Venue	Chinese Restaurant	Coffee Shop
7th Most Common Venue	Indian Restaurant	Bookstore
8th Most Common Venue	Market	Café
9th Most Common Venue	Fish & Chips Shop	General Entertainment
10th Most Common Venue	Moving Target	Indoor Play Area

Conclusion

This Analysis concludes that compared to Maryland , Forest Gate satisfies all the requirements:

- Both satisfies the Asian community since its part of Newham borough
- Top 10 common venues shows Forest Gate has got a good neighborhood with all the requirement mentioned in the previous slide .

Thank You!