

Indian Coffee Shop

London – Business location feasibility

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Business Idea

To setup an Indian Coffee shop in a suitable location in East London.

Target Audience

ABC Inc. – a consumer beverages company in India – planning to expand into Europe - initially with coffee shops at various location in London to capture the brand in young minds before promoting their other products in Europe.

Through Data science tools, the activity is to explore the venues at various neighbourhoods in East London and find the right venue for their First Coffee shop there.

Success Criteria

To find low coffee shop density venues(neighborhoods) and explore feasibility of setting up one for on-time break-even.

Data Collection:

- **Wikipedia:** *Wikipedia Python API*
 - Data 1:
 - *Indian Community percentage of Total Population*
 - *Postcodes details for East London (Location of interest)*
 - <https://pypi.org/project/wikipedia/>
- **Foursquare:** *Foursquare developer kit API that can handle requests with ClientID & ClientSecret*
 - Data 2:
 - *Explored venue details from each Lat long location*
 - <https://developer.foursquare.com/docs/>
- **PGEOCODE:** *Python library having postcode and address details for each location.*
 - Data 3:
 - *Lat-Long, address details for each Post code*
 - <https://pypi.org/project/pgeocode/>

London - Indian Coffee Shop - Business viability

1. Introduction - London City

London is the capital and largest city of England and the United Kingdom. The city stands on the River Thames in the south-east of England, at the head of its 50-mile (80 km) estuary leading to the North Sea.

London has been a major settlement for two millennia, and was originally called Londinium, which was founded by the Romans. The City of London, London's ancient core and financial centre—an area of just 1.12 square miles (2.9 km²) and colloquially known as the Square Mile—retains boundaries that closely follow its medieval limits

London's gross regional product in 2018 was almost £500 billion, around a quarter of UK GDP. London has five major business districts: the city, Westminster, Canary Wharf, Camden & Islington and Lambeth & Southwark

London has a diverse range of people and cultures, and more than 300 languages are spoken in the region.

British Indians form the largest ethno-national group in London with a population of around 542,857 or 6.6% of the population. The majority are concentrated in West London, though populations can be found throughout London.

Major Coffee Houses in London:

As per CNN Traveller below are some of the best coffee houses in London:

<https://www.cntraveller.com/gallery/best-coffee-in-london>

The locations of those coffee shops include:

- *MONMOUTH COFFEE COMPANY - COVENT GARDEN*
- *ORIGIN - SHOREDITCH*
- *FLYING HORSE COFFEE - MARE STREET MARKET*[1](#)

For an Indian Coffee shop business – one of the important criterions to survive and grow is to find a suitable location where there is high density of Indian ethnicity population but less density of Indian restaurants/ coffee shops.

We will further explore the neighbourhood of East London (which is the Location of interest)

2. Data Science Tools:

Python, Jupyter Notebook and required libraries:

- Data visualisation – Matplotlib, Seaborn, Folium maps
- Data importing, Data Wrangling – Pandas module, NumPy module
- Web Scraping – Foursquare dev tools API, Wikipedia python API, PGEOCODE API
- Clustering – K-Means clustering Scikit learn implementation

2.1 Data Collection:

Data 1:

Wikipedia API: This API has 'wpi.page("Wikipedia_page_name").html()' method to get the webpage content into a variable and then we need to select the required table with index method on the table num from that particular page.

For our first requirement to get the demographic distribution of the Indian community in London – below code to be executed:

```
In [4]: import pandas as pd
import wikipedia as wp
html = wp.page("Indian_community_of_London").html().encode("UTF-8")
try:
    df = pd.read_html(html)[5]
except IndexError:
    df = pd.read_html(html)[0]
print(df)
```

	Community	Percentage of total population
0	Greater London	6.6%
1	Harrow	26.4%
2	Hounslow	19.0%
3	Brent	18.6%
4	Redbridge	16.4%
5	Ealing	14.3%
6	Newham	13.8%
7	Hillingdon	13.4%

Similarly, we can get the data for Post codes East London.

Data 2:

Foursquare API: Foursquare developer kit API that can handle requests with ClientID & ClientSecret for given Lat Long locations – to explore nearby venues and to get the venue details and categories.

Below is the sample code to get the required details of venues with this API:

```
In [40]: LIMIT = 100
radius = 750
url = 'https://api.foursquare.com/v2/venues/explore?&client_id={}&client_secret={}&v={}&ll={},{}&radius={}&limit={}'.format(
    CLIENT_ID,
    CLIENT_SECRET,
    VERSION,
    neighborhood_latitude,
    neighborhood_longitude,
    radius,
    LIMIT)
```

```
strat_results = requests.get(url).json()
strat_results
```

Data 3:

PGEocode: Python library having postcode and address details for each location.

In pgeocode nominatim method we need to specify the country code and postal code as shown:

```
nomi = pgeocode.Nominatim('GB')
e2 = nomi.query_postal_code("E2")
print(list(e2))
```

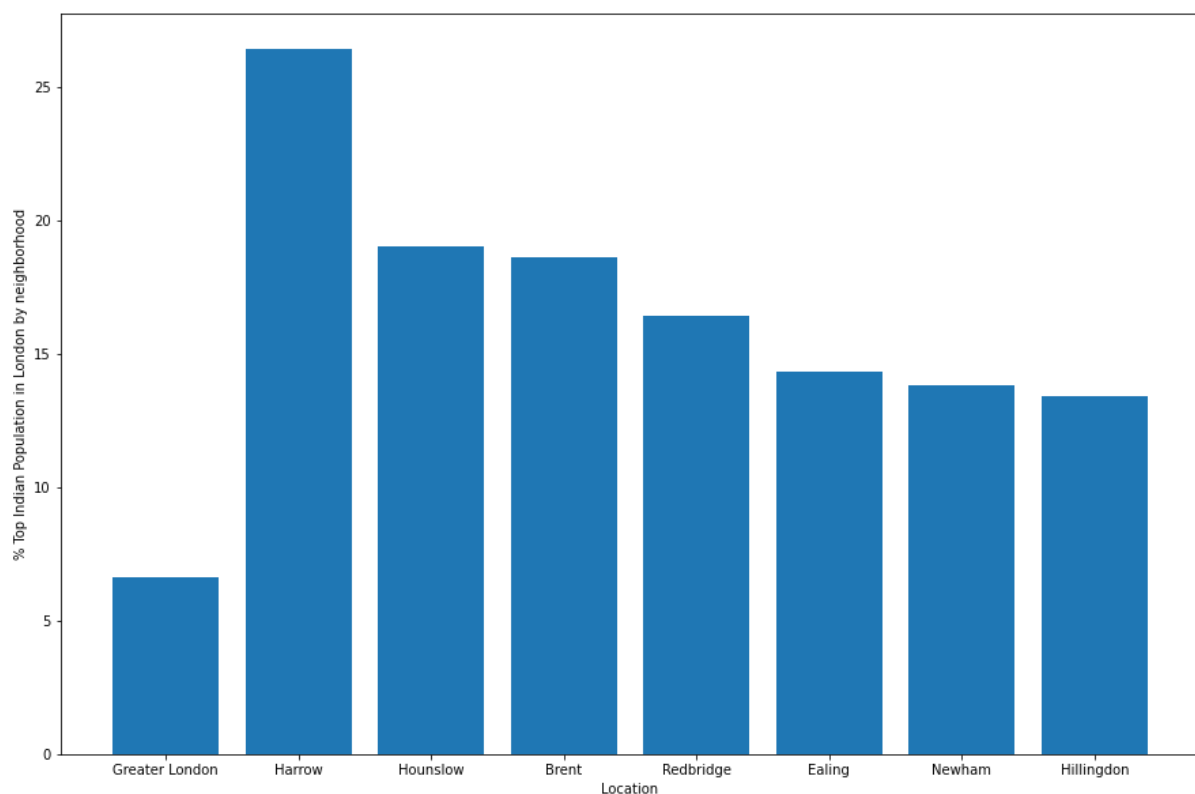
```
['E2', 'GB', 'Hackney, Bethnal Green, Tower Hamlets, Haggerston', 'England', 'ENG', 'Greater London', '11609024', nan, nan, 51.55, -0.055525, 4.0]
```

Output: Lat-Long address details for each Post code

2.2. Exploratory Data Analysis:

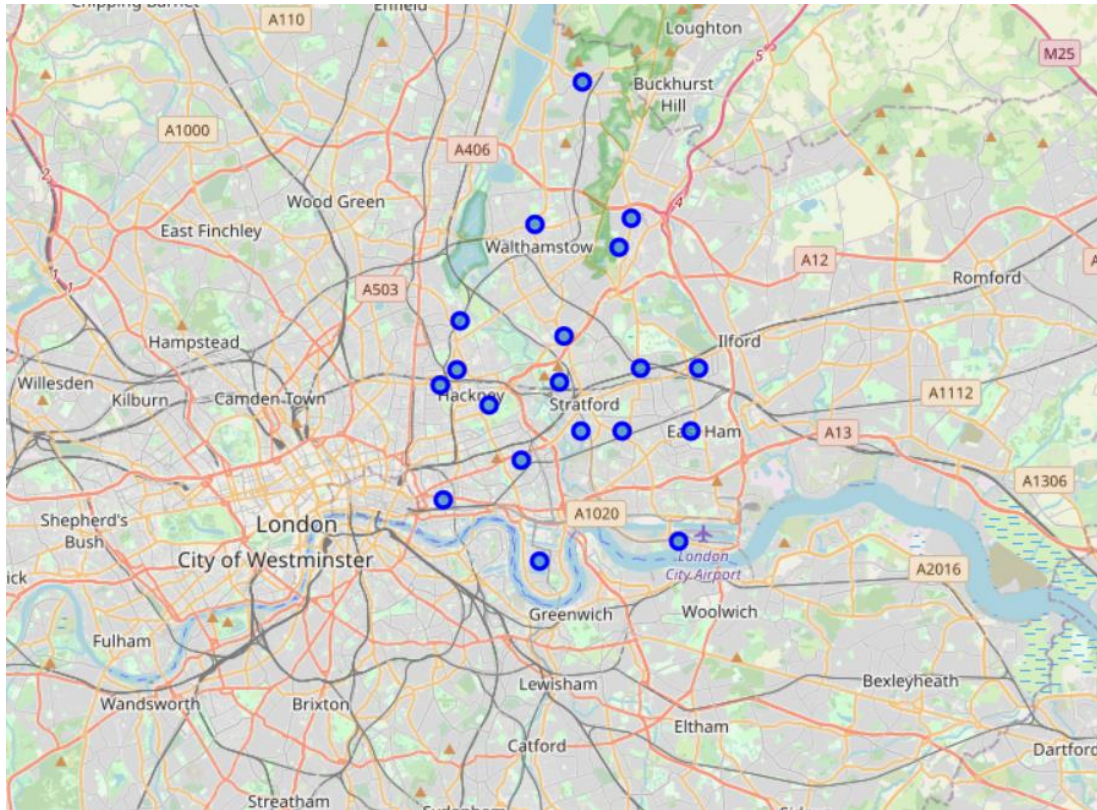
a. Indian Ethnicity in London by Demographics:

- British Indians form the largest ethno-national group in London with a population of around 542,857 or 6.6% of the population. The majority are concentrated in West London, though populations can be found throughout London.



- Harrow has top Indian population followed by Hounslow, Brent, RedBridge
- Location of interest for the company is East London*** – with less dense Indian population where we can have competitive advantage from denser areas having a greater number of Indian restaurants.
- Below we will explore the East London Venue details with all venue categories.

- Exploring venue categories available in each of the neighborhoods in East London (Location of Interest) with Folium Maps.



- Different venue locations in East London – list from Foursquare API with Lat Long details.

	Neighborhood	Neighborhood Latitude	Neighborhood Longitude	FS Venue ID	Venue	Venue Latitude	Venue Longitude	Venue Category
0	Whitechapel, Rotherhithe, Stepney Green, Stepn...	51.5138	-0.061773	4ac518d7f964a5206aa820e3	Lahore Kebab House	51.514483	-0.062912	Kebab Restaurant
1	Whitechapel, Rotherhithe, Stepney Green, Stepn...	51.5138	-0.061773	4d8cab66174a09350509ee3	Lahore One	51.514725	-0.059399	Indian Restaurant
2	Whitechapel, Rotherhithe, Stepney Green, Stepn...	51.5138	-0.061773	5a70e9a7d41b754fe93b13f	Amber	51.513820	-0.068825	Middle Eastern Restaurant
3	Whitechapel, Rotherhithe, Stepney Green, Stepn...	51.5138	-0.061773	4ad0972ff964a520a0d820e3	Tayyabs	51.517240	-0.063476	North Indian Restaurant
4	Whitechapel, Rotherhithe, Stepney Green, Stepn...	51.5138	-0.061773	5262c65b11d2099bed712005	Qbic Hotel	51.516183	-0.067454	Hotel

List of locations having Coffee shops

	Neighborhood	Neighborhood Latitude	Neighborhood Longitude	Venue ID	Venue	Venue Latitude	Venue Longitude	Venue Category
22	Whitechapel, Rotherhithe, Stepney Green, Stepn...	51.5138	-0.061773	4c0a225dff8c9b6c9108b61	Costa Coffee	51.516190	-0.062046	Coffee Shop
32	Whitechapel, Rotherhithe, Stepney Green, Stepn...	51.5138	-0.061773	4c55c3a11b46c9b6a5cdcad0	Café Marrone	51.511685	-0.056377	Coffee Shop
59	Hackney, Bethnal Green, Tower Hamlets, Haggerston	51.5500	-0.055525	4c39c8f93849c928e7c7c1b1	Coffee8	51.547573	-0.054663	Coffee Shop
66	Hackney, Bethnal Green, Tower Hamlets, Haggerston	51.5500	-0.055525	4fda0cff6b7475e93c4b9c1a	Brew for Two	51.546993	-0.051329	Coffee Shop
71	Hackney, Bethnal Green, Tower Hamlets, Haggerston	51.5500	-0.055525	513b37f5e4b0f9297ab8a4d4	119 Lower Clapton	51.552351	-0.052790	Coffee Shop
117	Chingford, Highams Park, Gilwell Park, Hale En...	51.6303	0.000500	4c77e8981e71a1cd47f40dea	Caffè Nero	51.631661	0.004759	Coffee Shop

From above list we can see that neighborhoods WhiteChapel, Rotherhite, Stepney Green, Hackney, Bethnal Green, Chingford, Highams Park, Gilwell Park with Coffee Shop brands including **Costa Coffee, Brew for Two, Caffè Nero**.

2.3 K-Means Clustering:

- K-means clustering unsupervised method is applied for clustering the neighborhoods.
- Further we will analyze the clusters for what are the various feature collections
- Scikit-learn implementation of K-Means clustering is applied for the collected Dataset.

K-Means Clustering

```
In [56]: # set number of clusters
kclusters = 5

east1_grouped_clustering = east1_grouped.drop('Neighborhood', 1)

# run k-means clustering
kmeans_strat = KMeans(n_clusters = kclusters, random_state=0).fit(east1_grouped_clustering)

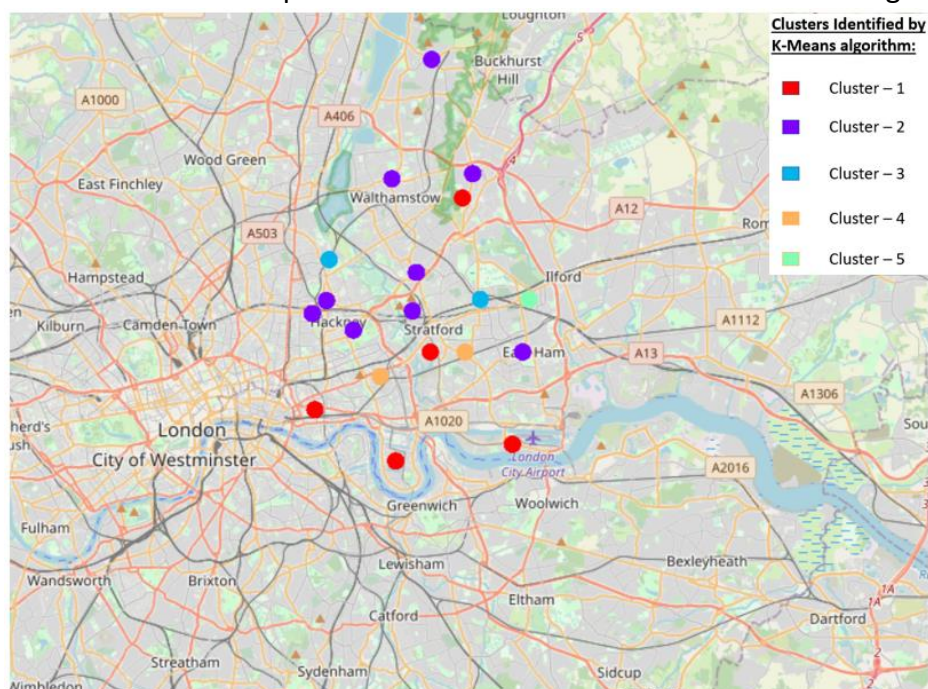
# check cluster labels generated for each row in the dataframe
kmeans_strat.labels_[0:10]

Out[56]: array([1, 3, 1, 3, 3, 1, 3, 3, 4, 1])
```

Resulting DataFrame with cluster Labels:

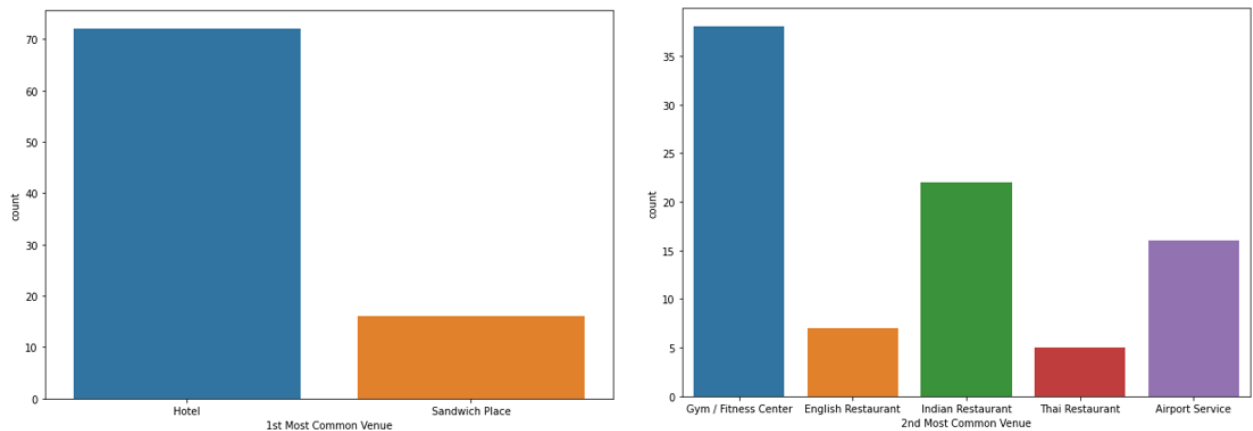
	Neighborhood	Neighborhood Latitude	Neighborhood Longitude	FS Venue ID	Venue	Venue Latitude	Venue Longitude	Venue Category	Cluster Labels	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue
0	Whitechapel, Rotherhithe, Stepney Green, Stepn...	51.5138	-0.061773	4ac518d7f964a5206aa820e3	Lahore Kebab House	51.514483	-0.062912	Kebab Restaurant	3	Hotel	Grocery Store	Coffee Shop
1	Whitechapel, Rotherhithe, Stepney Green, Stepn...	51.5138	-0.061773	4d8cabcf66174a09350509ee3	Lahore One	51.514725	-0.059399	Indian Restaurant	3	Hotel	Grocery Store	Coffee Shop
2	Whitechapel, Rotherhithe, Stepney Green, Stepn...	51.5138	-0.061773	5a70e9a7d41bb754fe93b13f	Amber	51.513820	-0.068825	Middle Eastern Restaurant	3	Hotel	Grocery Store	Coffee Shop
3	Whitechapel, Rotherhithe, Stepney Green, Stepn...	51.5138	-0.061773	4ad0972ff964a520a0d820e3	Tayyabs	51.517240	-0.063476	North Indian Restaurant	3	Hotel	Grocery Store	Coffee Shop
4	Whitechapel, Rotherhithe, Stepney Green, Stepn...	51.5138	-0.061773	5262c65b11d2099bed712005	Obic Hotel	51.516183	-0.067454	Hotel	3	Hotel	Grocery Store	Coffee Shop

Below is the Folium Map with locations of each of the clusters with Legend:



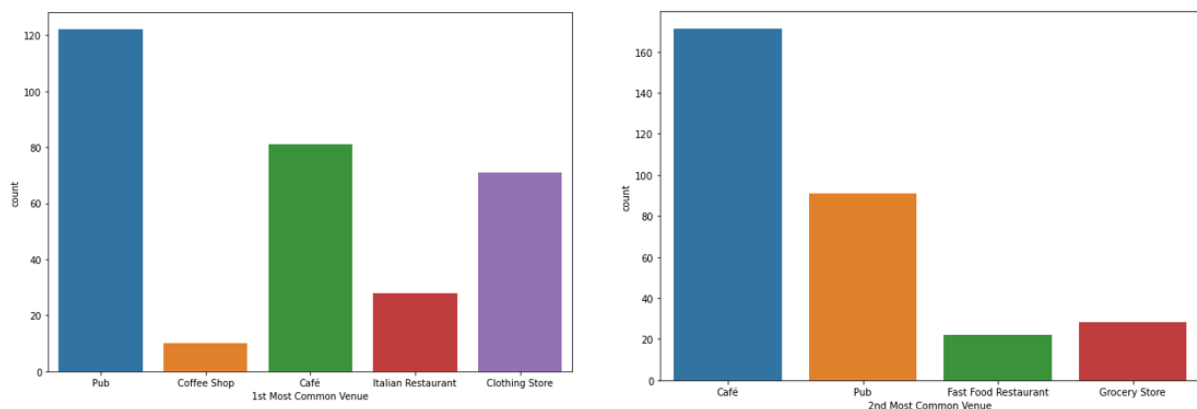
Let us look at each cluster statistics before we conclude on the Location of the Indian Coffee shop in East London.

Cluster 1 Analysis:



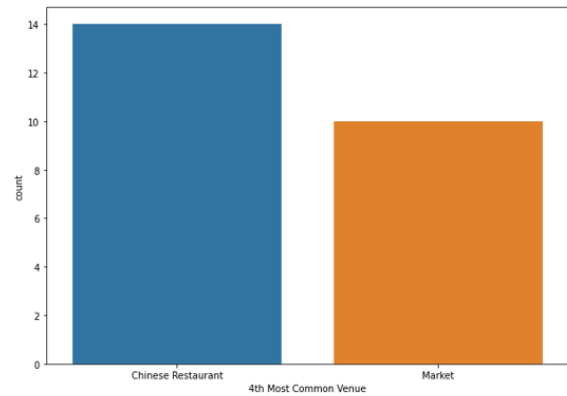
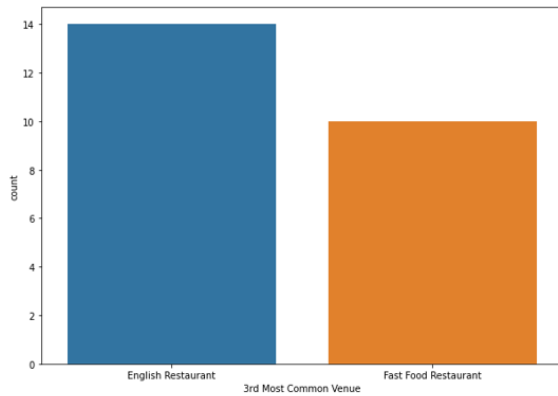
- The East London neighbourhood include **Whitechapel, Rotherhithe, Snaresbrook, Wanstead, Cubitt Town, Canary Wharf, Stratford, Pudding Mill Lane**
- Further clustering is based on Ranking of num of Similar Common venues at each of the Neighbourhood: **Hotel, Gym, Fitness centre, Grocery store, Indian Restaurant, Pub**

Cluster 2 Analysis:



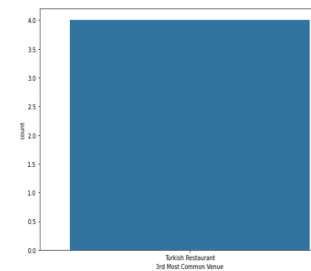
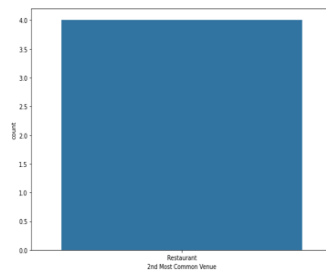
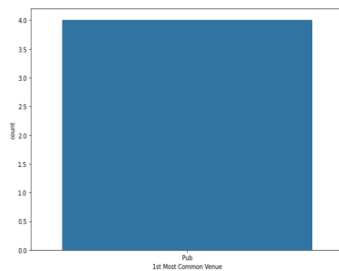
- The Neighborhoods in this cluster include **Hackney, Bethnal Green, Tower Hamlets, Haggerston, East Ham, Beckton, Cyprus**
- As per above graph and value_counts table Top 5 venues at each of the Neighborhoods include: **Pub, Brewery, Cafe, Italian Restaurant, Coffee shop**

Cluster 3 Analysis:



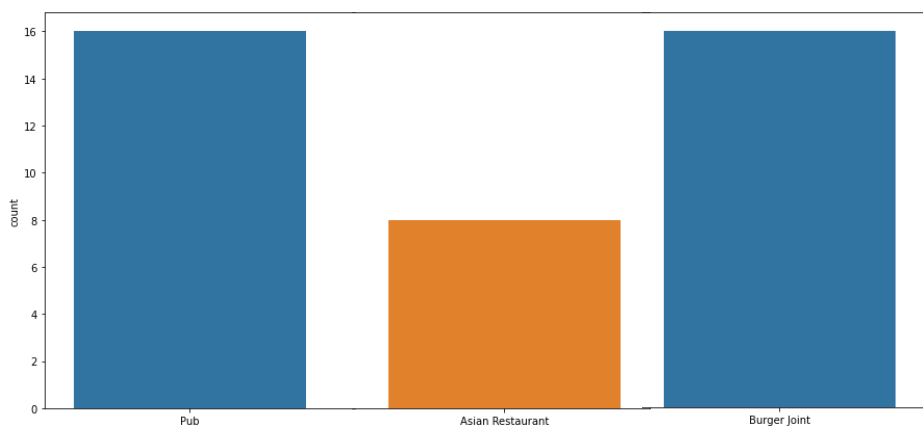
- The Boroughs include **Upperclapton, Clapton park, Hackney Marshes**
- Further clustering is based on Ranking of Similar Common venues this Borough
 - **Pub, English, Chinese Restaurant, Breakfast Spot, Fast Food Restaurant**

Cluster 4 Analysis:



- The cluster 4 neighborhood includes **Manorpark, Little Ilford, Alders Brook**
- This neighborhood has these venues: **Pub, Restaurant, Turkish, Asian restaurant, Dive bar**

Cluster 5 Analysis:

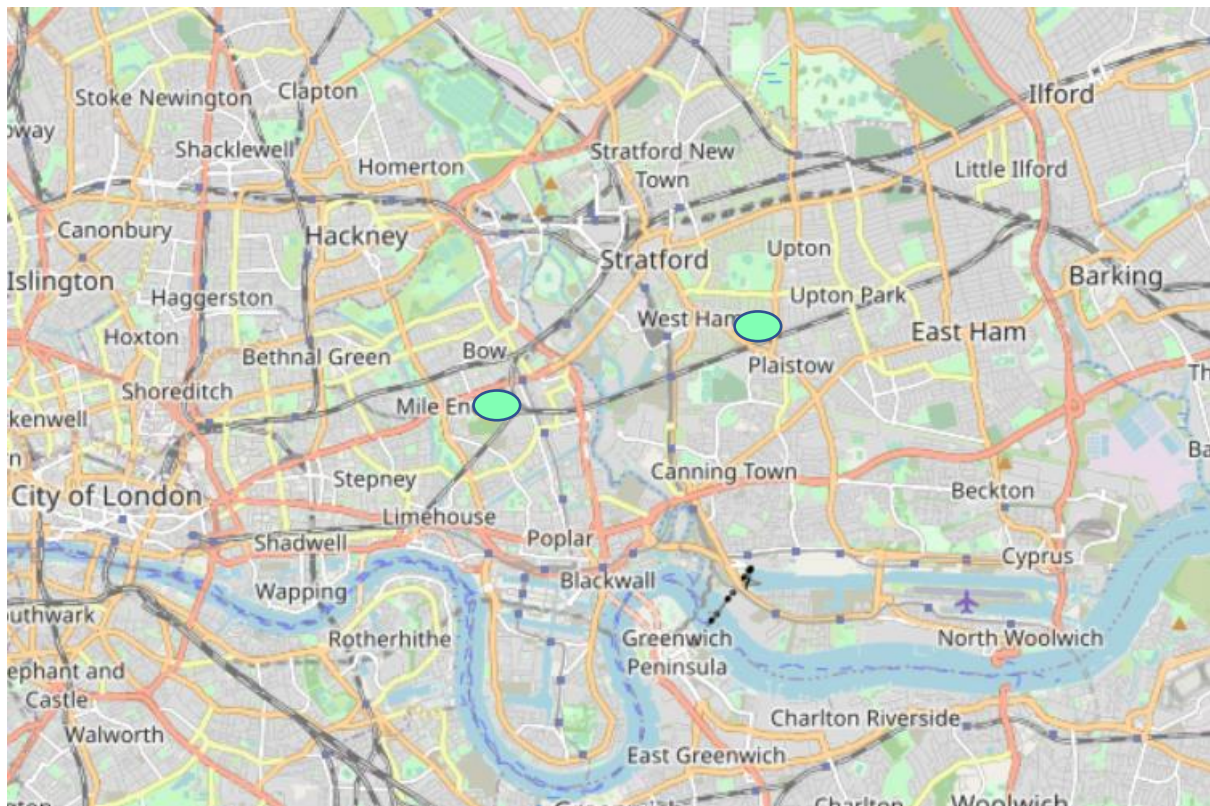


- The cluster 5 neighborhood includes **Mile End, Old Ford, Devons Road, Bow Road**
- This neighborhood has these venues: **Pub, Burger Joint, Breakfast Spot, Bar, Chinese**

3. Conclusion:

Location of Indian Coffee Shop Business details:

- *From previous analysis on each cluster data*
- *We infer that **except for cluster 5, all other cluster have at-least few num of Coffee shops & Indian/Asian restaurants***
- *From the list of Top coffee shops in the neighborhood –*
- *we find that **none of those shops have Indian food items, Chai (Indian tea) in menu.***
- *The Indian coffee shop could include other chat items in the menu based on continuous customer feedback.*



From previous analysis, we can conclude on the Location of New Indian Coffee shop as Cluster 5 in one of the neighbourhoods below:

- ***Mile End***
- ***Bow Road***
- ***WestHam***
- ***Plastow***