The best place for a new Asian restaurant

Introduction

London is the largest city on the European continent and one of the largest in the world, with a population of more than 8,100,000 inhabitants, according to the 2011 *census*, divided between the city of London and 32 neighborhoods.

It is a true multicultural city with one of the greatest ethnic diversity in the world. A cosmopolitan center. "Ethnic diversity makes Britain's culture great" according to The Guardian. Besides being a cultural center, it is also an important financial center, a very attractive place for a new business.

Problem

An Asian company Nhonho wants to open a new restaurant in London, with a focus on the Asian public. Considering the new business, what would be the most appropriate place to open the business?

When deciding on the concept of the restaurant, the next big question is where to open the restaurant. The choice of where to open is essential for the success of the enterprise, for this, it takes into account several factors for decision making:

- The target audience - Assess the demographics of the city.
- The location of the target audience - Search for a location close to your customers.
- The competitors - Analyze them.
- The types of business close to the location - Check the zone's businesses.

It is hoped that clarifying these points with the appropriate data and analysis will help Nhonho to choose the most appropriate place for the opening of their new venture.

Data acquisition and cleaning

London has a total of 32 boroughs, London City will not be considered as borough. In order to select the right boroughs and neighborhoods we will use the wikipedia pages with the list of the necessary content.

London boroughs

The name of Londons boroughs scrapped from Wikipedia, cleaned to just have the necessary content.

[List of London Boroughs - Wikipedia]

	Borough	Latitude	Longitude
0	Barking and Dagenham	51.5607	0.1557
1	Barnet	51.6252	-0.1517
2	Bexley	51.4549	0.1505
3	Brent	51.5588	-0.2817
4	Bromley	51.4039	0.0198
5	Camden	51.5290	-0.1255
6	Croydon	51.3714	-0.0977
7	Ealing	51.5130	-0.3089
8	Enfield	51.6538	-0.0799
9	Greenwich	51.4892	0.0648
10	Hackney	51.5450	-0.0553
11	Hammersmith and Fulham	51.4927	-0.2339
12	Haringey	51.6000	-0.1119
13	Harrow	51.5898	-0.3346
14	Havering	51.5812	0.1837
15	Hillingdon	51.5441	-0.4760
16	Hounslow	51.4746	-0.3680
17	Islington	51.5416	-0.1022
18	Kensington and Chelsea	51.5020	-0.1947
19	Kingston upon Thames	51.4085	-0.3064
20	Lambeth	51.4607	-0.1163
21	Lewisham	51.4452	-0.0209
22	Merton	51.4014	-0.1958
23	Newham	51.5077	0.0469
24	Redbridge	51.5590	0.0741
25	Richmond upon Thames	51.4479	-0.3260
26	Southwark	51.5035	-0.0804
27	Sutton	51.3618	-0.1945
28	Tower Hamlets	51.5099	-0.0059
29	Waltham Forest	51.5908	-0.0134
30	Wandsworth	51.4567	-0.1910
31	Westminster	51.4973	-0.1372

London demography

To demographically analyze the city of London, a table extracted from Wikipedia will be used, considering the ethnics groups by borough.

[Demography of London]

	Local authority	White	Mixed	Asian	Black	Other
0	Barnet	64.1	4.8	18.5	7.7	4.8
1	Barking and Dagenham	58.3	4.2	15.9	20.0	1.6
2	Bexley	81.9	2.3	6.6	8.5	0.8
3	Brent	36.3	5.1	34.1	18.8	5.8
4	Bromley	84.3	3.5	5.2	6.0	0.9
5	Camden	66.3	5.6	16.1	8.2	3.8
6	City of London	78.6	3.9	12.7	2.6	2.1
7	Croydon	55.1	6.6	16.4	20.2	1.8
8	Ealing	49.0	4.5	29.7	10.9	6.0
9	Enfield	61.0	5.5	11.2	17.2	5.1
10	Greenwich	62.5	4.8	11.7	19.1	1.9
11	Hackney	54.7	6.4	10.5	23.1	5.3
12	Haringey	60.5	6.5	9.5	18.8	4.7
13	Harrow	42.2	4.0	42.6	8.2	2.9
14	Havering	87.7	2.1	4.9	4.8	0.6
15	Hammersmith and Fulham	68.1	5.5	9.1	11.8	5.5
16	Hillingdon	60.6	3.8	25.3	7.3	3.0
17	Hounslow	51.4	4.1	34.4	6.6	3.6
18	Islington	68.2	6.5	9.2	12.8	3.4
19	Kensington and Chelsea	70.6	5.7	10.0	6.5	7.2
20	Kingston upon Thames	74.5	3.9	16.3	2.5	2.7
21	Lambeth	57.1	7.6	6.9	25.9	2.4
22	Lewisham	53.5	7.4	9.3	27.2	2.6
23	Merton	64.9	4.7	18.1	10.4	1.9
24	Newham	29.0	4.5	43.5	19.6	3.5
25	Redbridge	42.5	4.1	41.8	8.9	2.7
26	Richmond upon Thames	86.0	3.6	7.3	1.5	1.6
27	Southwark	54.3	6.2	9.4	26.9	3.3
28	Sutton	78.6	3.8	11.6	4.8	1.3
29	Tower Hamlets	45.2	4.1	41.1	7.3	2.3
30	Waltham Forest	52.2	5.3	21.1	17.3	4.1
31	Wandsworth	71.4	5.0	10.9	10.7	2.1

London neighborhoods (areas)

The list of London neighborhoods is also taken from the wikipedia page in order to get the of the areas and the respective code to further analysis.

[List of London areas]

	Borough	Area	Code
0	Newham	Beckton	TQ435815
1	Tower Hamlets	Bethnal Green	TQ345825
2	Tower Hamlets	Blackwall	TQ385805
3	Tower Hamlets	Bow	TQ365825
4	Tower Hamlets	Bromley (also Bromley-by-Bow)	TQ375825

The latitude and longitude coordinates of each neighborhood will be extracted using **geocode** package.

These datas from Wikipedia are originally from the **London Datastore**.

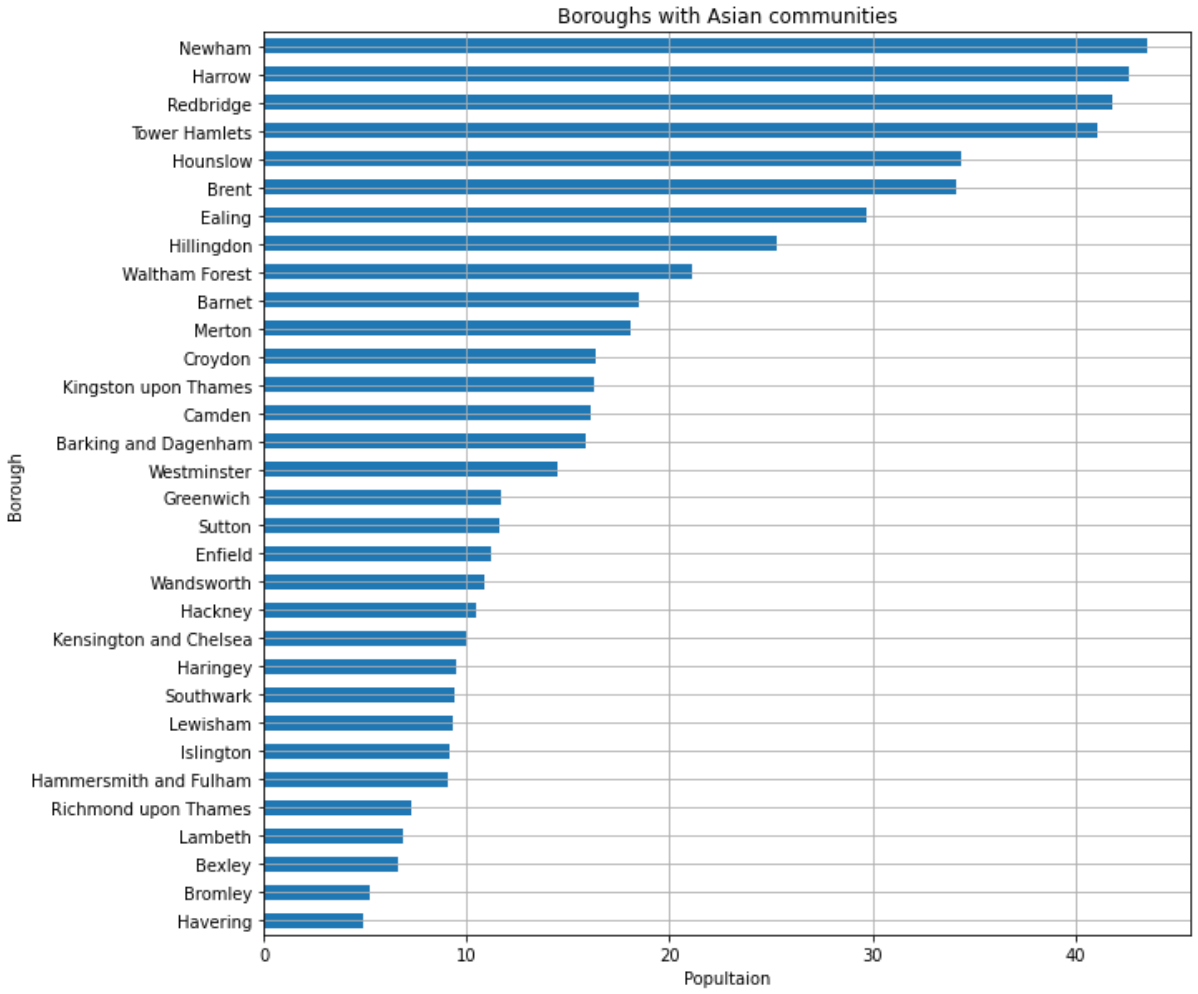
Foursquare API

London geographical coordinates data will be utilized as input for the Foursquare API, that will be leveraged to provision venues information for each neighborhood. We will use the Foursquare API to explore neighborhoods in London boroughs.

Methodology

Explanatory Data Analysis

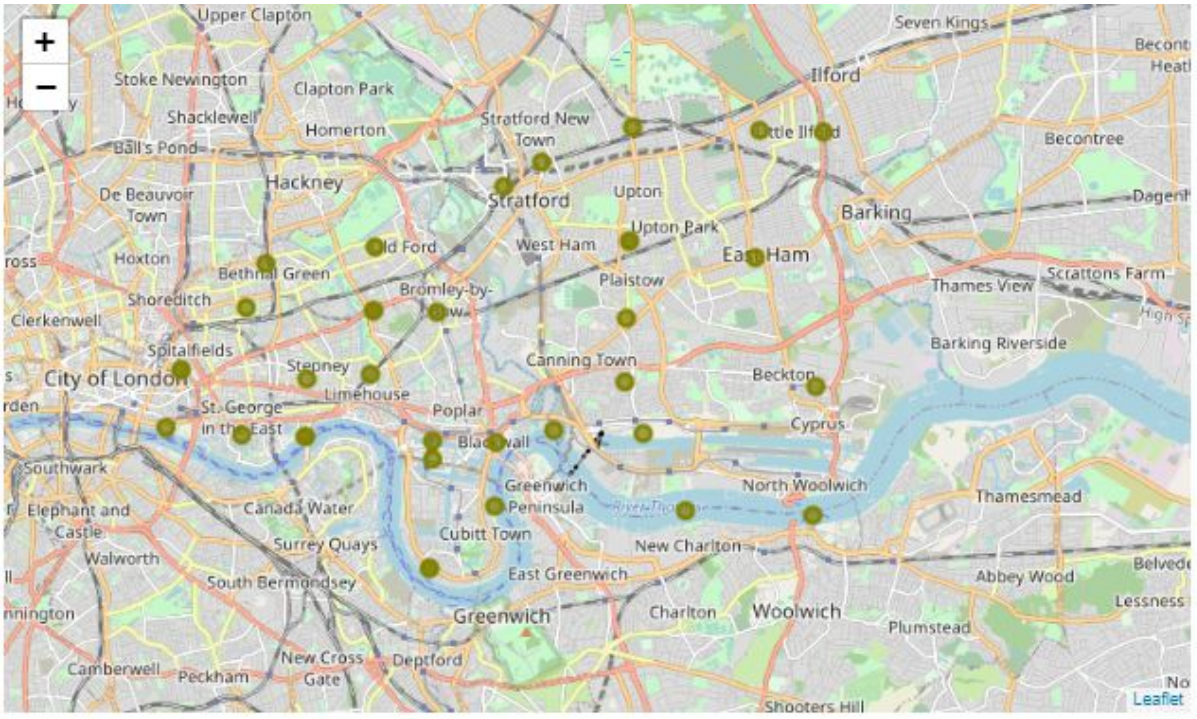
By analyzing the demographic table in London we can visualize which are the boroughs with the largest Asian communities.



I decided to select two boroughs with a large community and close to each other. They are Newham and Tower Hamlets.

Using the BeautifulSoup package and urllib.request I scrapped the List of areas in London to take only the neighborhoods(areas) from the two boroughs selected, then I use geocode to take the geo coordinates for each neighborhood.

	Borough	Neighborhood	Latitude	Longitude
0	Newham	Beckton	51.514206	0.066634
1	Tower Hamlets	Bethnal Green	51.525404	-0.062604
2	Tower Hamlets	Blackwall	51.506466	-0.005767
3	Tower Hamlets	Bow	51.524925	-0.033793
4	Tower Hamlets	Bromley (also Bromley-by-Bow)	51.524683	-0.019387
5	Tower Hamlets	Cambridge Heath	51.531623	-0.058015
6	Tower Hamlets	Canary Wharf	51.504015	-0.020284
7	Newham	Canning Town	51.514959	0.023429
8	Tower Hamlets	Cubitt Town	51.497480	-0.006160
9	Newham	Custom House	51.507696	0.027431



Venues exploration

The last table provides the continuation of our study for the next stage. Using the final dataset. The final dataset allows us to find all venues with a radius of 1000 meters over each neighborhood through the Foursquare API.
The json files returned from Foursquare is converted in a pandas dataframe as we see in table above.

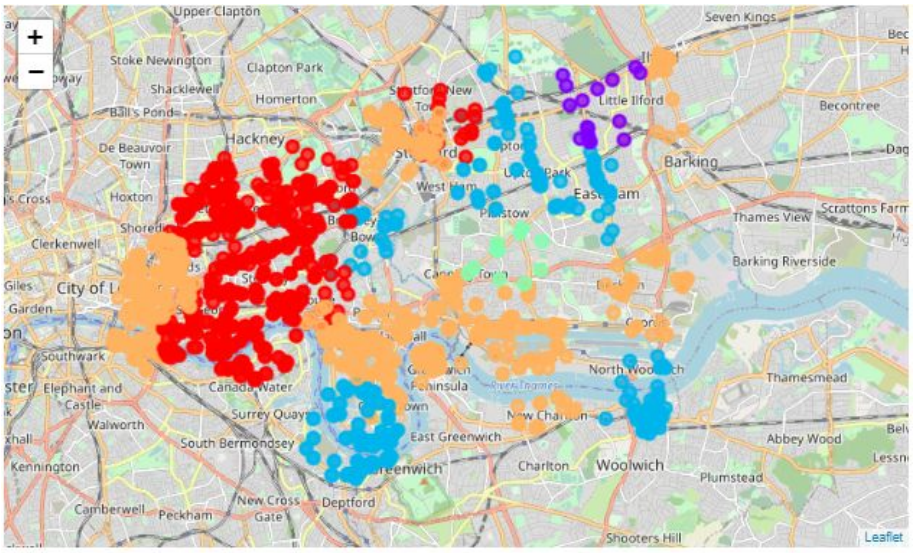
	Neighborhood	Neighborhood Latitude	Neighborhood Longitude	Venue	Venue Latitude	Venue Longitude	Venue Category
0	Beckton	51.514206	0.066634	East london Gymnastics Club	51.514107	0.060155	Gym / Fitness Center
1	Beckton	51.514206	0.066634	Home Bargains	51.516805	0.062804	Discount Store
2	Beckton	51.514206	0.066634	Lituanica	51.516442	0.062927	Grocery Store
3	Beckton	51.514206	0.066634	The Reach Bar + Kitchen	51.506730	0.073015	Gastropub
4	Beckton	51.514206	0.066634	Pets at Home	51.520473	0.070494	Pet Store

The data is grouped by neighborhood and calculated by the ten most common venues based on occurrence for each neighborhood.

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
Beckton	Supermarket	Coffee Shop	Clothing Store	Furniture / Home Store	Gym / Fitness Center	Shopping Plaza	Light Rail Station	Portuguese Restaurant	Park	Discount Store
Bethnal Green	Coffee Shop	Café	Pub	Cocktail Bar	Wine Bar	Beer Bar	Indian Restaurant	Bagel Shop	Market	Farm
Blackwall	Coffee Shop	Burger Joint	Hotel	Italian Restaurant	Park	Café	Lounge	Plaza	English Restaurant	Movie Theater
Bow	Pub	Café	Pizza Place	Canal Lock	Park	Burger Joint	Coffee Shop	Sandwich Place	Restaurant	Climbing Gym
Bromley (also Bromley-by-Bow)	Pub	Bus Stop	Historic Site	Gym	Grocery Store	Park	Bar	Burger Joint	Café	Canal Lock

Clustering

Finally, in order to group the neighborhoods according to their venues I used K-means clustering. K-means clustering is a way of unsupervised machine learning algorithm that cluster the data on cluster sizes ordained.
I use 5 clusters to managed the group of neighborhoods according to their similarities.



Analysis of each cluster

Cluster 1

Most common venue is Pub.

	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
38	Bethnal Green	Coffee Shop	Café	Pub	Cocktail Bar	Wine Bar	Beer Bar	Indian Restaurant	Bagel Shop	Market	Farm
238	Bow	Pub	Café	Pizza Place	Canal Lock	Park	Burger Joint	Coffee Shop	Sandwich Place	Restaurant	Climbing Gym
308	Cambridge Heath	Coffee Shop	Pub	Café	Wine Bar	Cocktail Bar	Bakery	Restaurant	Hotel	Bookstore	Flower Shop
951	Limehouse	Park	Coffee Shop	Pub	Canal Lock	Café	Hotel	Indian Restaurant	Pizza Place	Italian Restaurant	Grocery Store
1053	Maryland	Pub	Grocery Store	Pizza Place	Café	Hotel	Clothing Store	Park	Italian Restaurant	Coffee Shop	Bar
1149	Mile End	Pub	Café	Pizza Place	Canal Lock	Park	Burger Joint	Coffee Shop	Sandwich Place	Restaurant	Climbing Gym
1320	Old Ford	Pub	Café	Park	Pizza Place	Coffee Shop	Grocery Store	Wine Shop	Gastropub	Canal Lock	Art Gallery
1520	Ratcliff	Pub	Park	Grocery Store	Coffee Shop	Italian Restaurant	Café	Hotel	Chinese Restaurant	Athletics & Sports	Indian Restaurant
1597	Shadwell	Pub	Park	Grocery Store	Coffee Shop	Italian Restaurant	Café	Hotel	Chinese Restaurant	Athletics & Sports	Indian Restaurant
1797	Stepney	Pub	Grocery Store	Park	Hotel	Sandwich Place	Coffee Shop	Gym / Fitness Center	Chinese Restaurant	Indian Restaurant	Italian Restaurant
2106	Wapping	Pub	Coffee Shop	Hotel	Italian Restaurant	Park	Indian Restaurant	History Museum	Sandwich Place	Bar	Café

Cluster 2

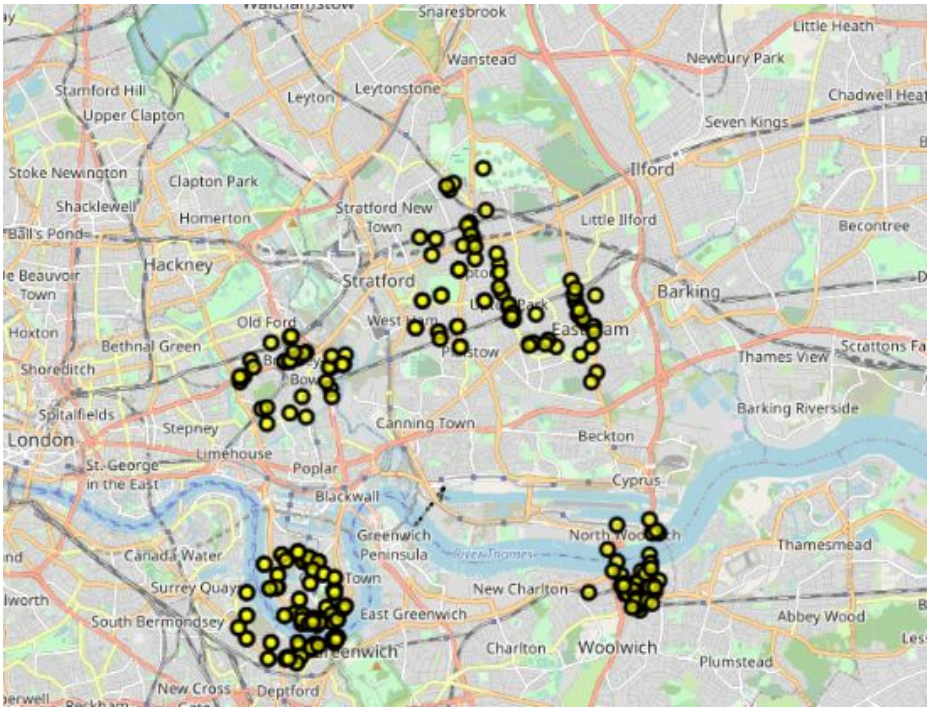
Most common venue is Indian restaurant.

	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
1035	Manor Park	Indian Restaurant	Restaurant	Park	Gym / Fitness Center	Train Station	Hotel	Pub	Grocery Store	Gas Station	Auto Garage

Cluster 3

Most common venu is Pub.

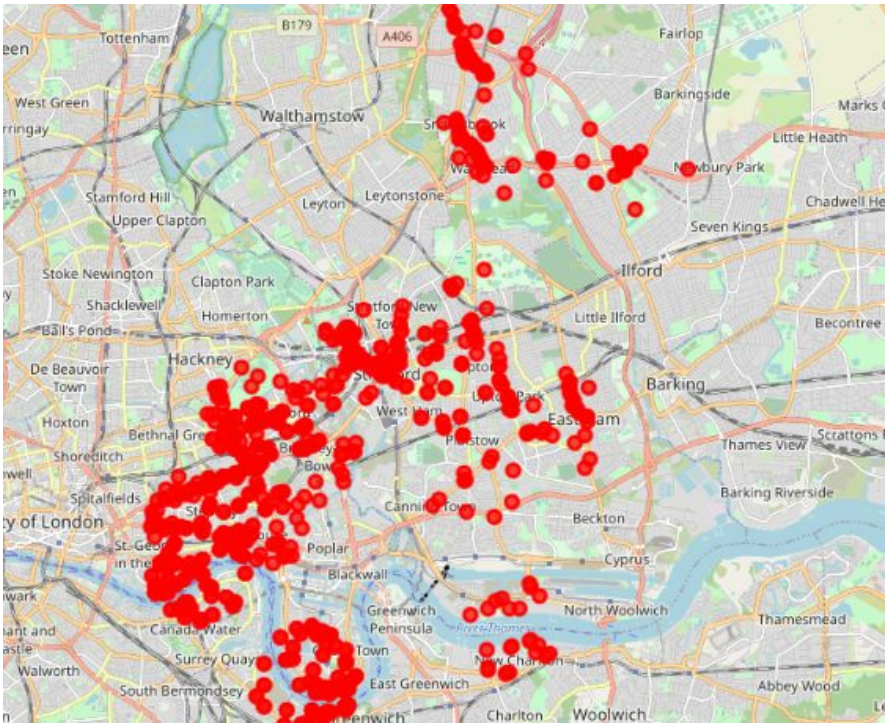
	Neighborhood	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue	6th Most Common Venue	7th Most Common Venue	8th Most Common Venue	9th Most Common Venue	10th Most Common Venue
273	Bromley (also Bromley-by-Bow)	Pub	Bus Stop	Historic Site	Gym	Grocery Store	Park	Bar	Burger Joint	Café	Canal Lock
727	East Ham	Pub	Grocery Store	Fast Food Restaurant	Indian Restaurant	Park	Sandwich Place	Supermarket	Coffee Shop	Toy / Game Store	Clothing Store
756	Forest Gate	Pub	Grocery Store	Café	Bus Stop	Wine Bar	Restaurant	Comfort Food Restaurant	Fast Food Restaurant	Indian Restaurant	Fish & Chips Shop
779	Isle of Dogs	Pub	Boat or Ferry	Grocery Store	Café	Supermarket	Indian Restaurant	Trail	Harbor / Marina	Park	Vietnamese Restaurant
1184	Millwall	Pub	Boat or Ferry	Grocery Store	Café	Supermarket	Indian Restaurant	Trail	Harbor / Marina	Park	Vietnamese Restaurant
1257	North Woolwich	Pub	Grocery Store	Supermarket	Coffee Shop	Clothing Store	Pier	Plaza	Platform	Bakery	Hotel
2086	Upton Park	Pub	Grocery Store	Bakery	Soccer Stadium	Boutique	Bus Stop	Shopping Mall	Market	Café	Metro Station
2206	West Ham	Pub	Grocery Store	Bakery	Soccer Stadium	Boutique	Bus Stop	Shopping Mall	Market	Café	Metro Station



Cluster 4

Cafe is the most common venue in this cluster.

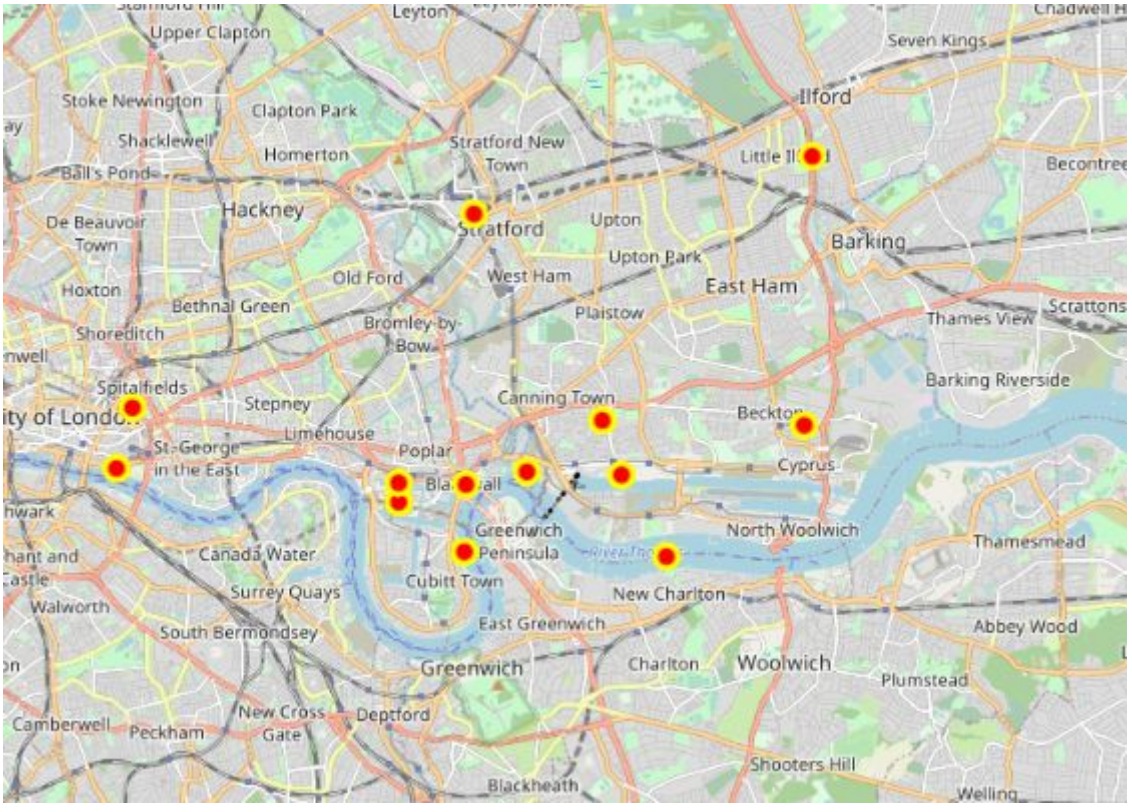
	Neighborhood	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue	6th Most Common Venue	7th Most Common Venue	8th Most Common Venue	9th Most Common Venue	10th Most Common Venue
1406	Plaistow	Café	Gym / Fitness Center	Pub	Gas Station	Vietnamese Restaurant	Tennis Court	Fast Food Restaurant	Grocery Store	Metro Station	Hotel



Cluster 5

The most commons venues in this cluster are hotel and coffee shops.

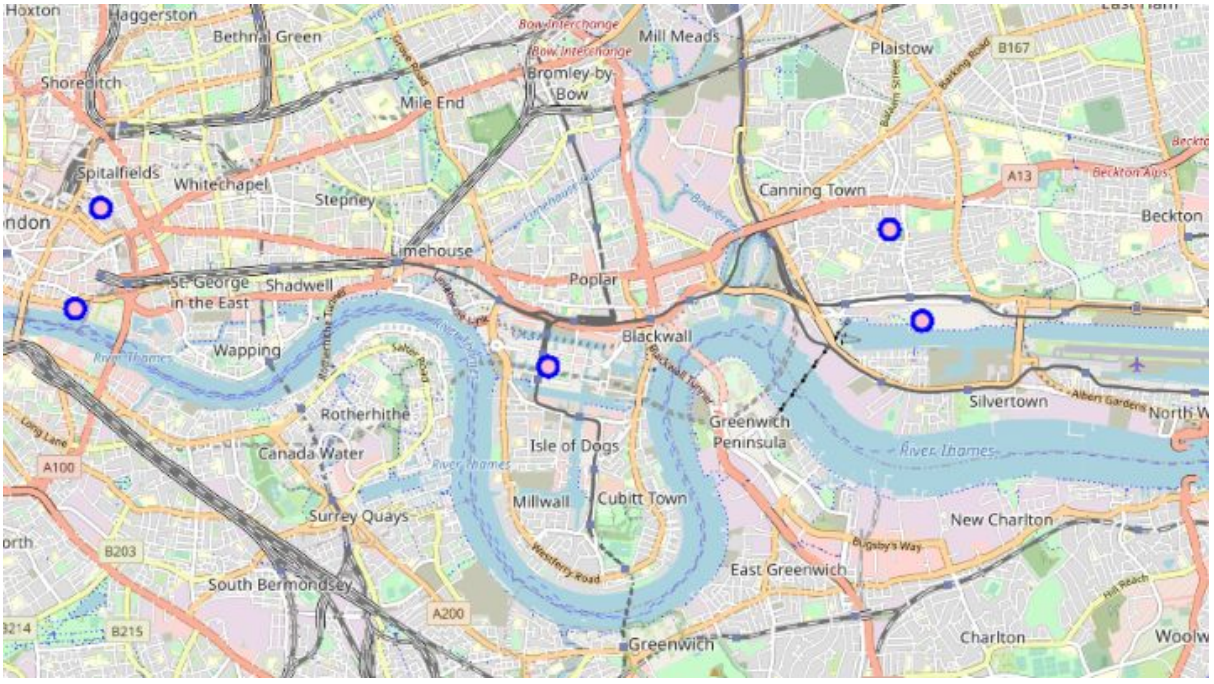
	Neighborhood	Neighborhood Latitude	Neighborhood Longitude	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue	6th Most Common Venue	7th Most Common Venue	8th Most Common Venue	9th Mos Commo Venu
0	Beckton	51.514206	0.066634	Supermarket	Coffee Shop	Clothing Store	Furniture / Home Store	Gym / Fitness Center	Shopping Plaza	Light Rail Station	Portuguese Restaurant	Parl
138	Blackwall	51.506466	-0.005767	Coffee Shop	Burger Joint	Hotel	Italian Restaurant	Park	Café	Lounge	Plaza	Englis Restauran
408	Canary Wharf	51.504015	-0.020284	Hotel	Coffee Shop	Park	Gym / Fitness Center	Sandwich Place	Steakhouse	Italian Restaurant	Indian Restaurant	Plaz
508	Canning Town	51.514959	0.023429	Hotel	Grocery Store	Café	Pub	Gym / Fitness Center	Bakery	Sandwich Place	Italian Restaurant	Chines Restauran
568	Cubitt Town	51.497480	-0.006160	Coffee Shop	Bar	Hotel	Indian Restaurant	Harbor / Marina	Park	Lounge	Music Venue	Hotel Ba
657	Custom House	51.507696	0.027431	Hotel	Light Rail Station	Chinese Restaurant	Pub	Café	Coffee Shop	Park	Convenience Store	Grocer Stor
852	Leamouth	51.508043	0.007271	Coffee Shop	Hotel	Italian Restaurant	Bar	Gym / Fitness Center	Lounge	Burger Joint	Café	Grocer Stor
1014	Little Ilford	51.550148	0.068263	Grocery Store	Gas Station	Movie Theater	Dessert Shop	Supermarket	Newsstand	Park	Bakery	Trai Statio
1420	Poplar	51.506710	-0.020167	Park	Coffee Shop	Hotel	Italian Restaurant	Gym / Fitness Center	Burger Joint	Sandwich Place	Plaza	Steakhous
1674	Silvertown	51.496738	0.037029	Park	Café	Grocery Store	Tunnel	Fast Food Restaurant	Museum	Carpet Store	Light Rail Station	Furniture Home Stor
1697	Spitalfields	51.516655	-0.077389	Hotel	Coffee Shop	Gym / Fitness Center	Pizza Place	Food Truck	French Restaurant	Pub	Italian Restaurant	Japanes Restauran
1886	Stratford	51.542410	-0.004196	Café	Pub	Italian Restaurant	Ice Cream Shop	Hotel	Park	Clothing Store	Grocery Store	Departmen Stor
1988	Tower Hill	51.508615	-0.080609	Hotel	Coffee Shop	Gym / Fitness Center	Seafood Restaurant	Scenic Lookout	Restaurant	Italian Restaurant	French Restaurant	Food Truc
2226	Whitechapel	51.516655	-0.077389	Hotel	Coffee Shop	Gym / Fitness Center	Pizza Place	Food Truck	French Restaurant	Pub	Italian Restaurant	Japanes Restauran



Discussion and results

When analyzing cluster 5, we noticed that the neighborhoods have hotels, pubs and cafes in common. What would be an interesting place for the opening of a new restaurant.

	Neighborhood	Neighborhood Latitude	Neighborhood Longitude	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	10t Cc
408	Canary Wharf	51.504015	-0.020284	Hotel	Coffee Shop	Park	Gym / Fitness Center	Sandwich Place	Steakhouse	Italian Restaurant	Indian Restaurant	Plaza	
508	Canning Town	51.514959	0.023429	Hotel	Grocery Store	Café	Pub	Gym / Fitness Center	Bakery	Sandwich Place	Italian Restaurant	Chinese Restaurant	Fa Res
657	Custom House	51.507696	0.027431	Hotel	Light Rail Station	Chinese Restaurant	Pub	Café	Coffee Shop	Park	Convenience Store	Grocery Store	Hc
1697	Spitalfields	51.516655	-0.077389	Hotel	Coffee Shop	Gym / Fitness Center	Pizza Place	Food Truck	French Restaurant	Pub	Italian Restaurant	Japanese Restaurant	Res
1986	Tower Hill	51.508615	-0.080609	Hotel	Coffee Shop	Gym / Fitness Center	Seafood Restaurant	Scenic Lookout	Restaurant	Italian Restaurant	French Restaurant	Food Truck	M



In order to reduce risks, the most appropriate places to open a new restaurant would be in the neighborhoods above, considering that the hotels are the first most common venue in theses areas, followed by a great variety of other business. These place is also known by their asian community and culture.