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The Optimal Location for Indian Restaurant

Introduction

As an Indian and food lover, I was always curious to, what if someone like me want to open Indian restaurant. Great!!!

I choose London for my analysis. London is diverse city. London is home of 500k people roughly 10% of total population, originated from Indian, Pakistan and Bangladesh. India Pakistan and Bangladesh were a single country in colonial era. And it had been ruled by Britain, so lot of people for Indian subcontinent are moved to Britain and especially London, Additional to that, lot of travellers visit to London. Thant's why I am so excited about London

Business problem

Since we have decided to open an Indian restaurant in London, we need to get optimal location. For that we are considering some criteria.

- We will consider the area which has more Indian population
- Restaurant should be not crowed with another Indian restaurants
- It should be as near to city centre as possible

There are 33 boroughs in London, and we will study each of them

Data

The Borough list, Area, Population I get from Wikipedia page [2]. And Indian population I get manually by visiting every borough's Wikipedia page.

I used geocoder python package [3] to get latitude and Longitude of borough, also to get the distance of borough from city centre

Table 1

	Borough	Lat	Lng	Area	Population	Indian_population	Dist_from_center	Indian_rest_count
0	Barking and Dagenham	51.574780	0.174410	13.93	194352.0	23144	22.265301	9
1	Barnet	51.527095	-0.066826	33.49	369088.0	35479	4.781269	100
2	Bexley	51.452078	0.069931	23.38	236687.0	8554	14.970919	5
3	Brent	51.609783	-0.194672	16.70	317264.0	74147	12.415363	6
4	Bromley	51.601511	-0.066365	57.97	317899.0	8494	11.390290	6

Foursquare API is used to get explore the places and get venue and nearby restaurants [4].

I used foursquare category to filter out Indian restaurants [5]

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Table 2

	Borough	Lat	Lng	name	lat	lng	category
0	Barking and Dagenham	51.57478	0.17441	Costa Coffee	51.576890	0.179497	Coffee Shop
1	Barking and Dagenham	51.57478	0.17441	The Range	51.575550	0.180254	Furniture / Home Store
2	Barking and Dagenham	51.57478	0.17441	Debenhams	51.579097	0.182720	Department Store
3	Barking and Dagenham	51.57478	0.17441	Ciao Bella	51.576103	0.182819	Italian Restaurant
4	Barking and Dagenham	51.57478	0.17441	Costa Coffee	51.576481	0.182448	Coffee Shop

Methodology

I used the foursquare API to get top 100 venues at given location. Then I rearrange to get top 10 most common places in borough. Coffee place, Pub, Bar are the most common places in Borough.

Table 3

	Borough	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	Barking and Dagenham	Coffee Shop	Clothing Store	Fast Food Restaurant	Grocery Store	Shopping Mall	Park	Supermarket	Furniture / Home Store	Café	Pub
1	Barnet	Coffee Shop	Pub	Café	Italian Restaurant	Restaurant	Pizza Place	Bookstore	Wine Bar	Beer Bar	Market
2	Bexley	Grocery Store	Park	Pub	Mediterranean Restaurant	Castle	Garden	Supermarket	Forest	Department Store	Café
3	Brent	Coffee Shop	Supermarket	Turkish Restaurant	Café	Gym / Fitness Center	Park	Grocery Store	Japanese Restaurant	Italian Restaurant	Bakery
4	Bromley	Pub	Coffee Shop	Supermarket	Bar	Grocery Store	Brewery	Park	Café	Fast Food Restaurant	Furniture / Home Store

For further analysis. I used following columns

Table 4

	Borough	Area	Population	Dist_from_center	Indian_population	Indian_rest_count	R
0	Barking and Dagenham	13.93	194352.0	22.265301	23144	9	
1	Barnet	33.49	369088.0	4.781269	35479	100	
2	Bexley	23.38	236687.0	14.970919	8554	5	
3	Brent	16.70	317264.0	12.415363	74147	6	
4	Bromley	57.97	317899.0	11.390290	8494	6	

As, this is unlabelled data, we need to use unsupervised algorithms to get cluster of the areas with similar properties like have similar venues and neighbourhood. Then I will compare between the clusters, I used k-means clustering to cluster the data.

Fig -1 shows the different K-values and mean squared distance.

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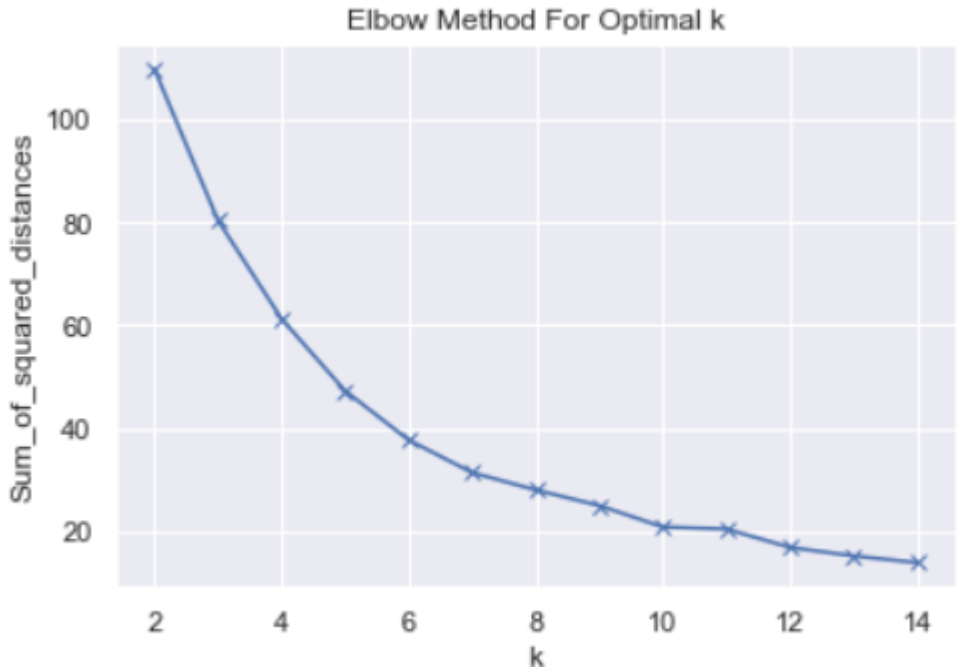
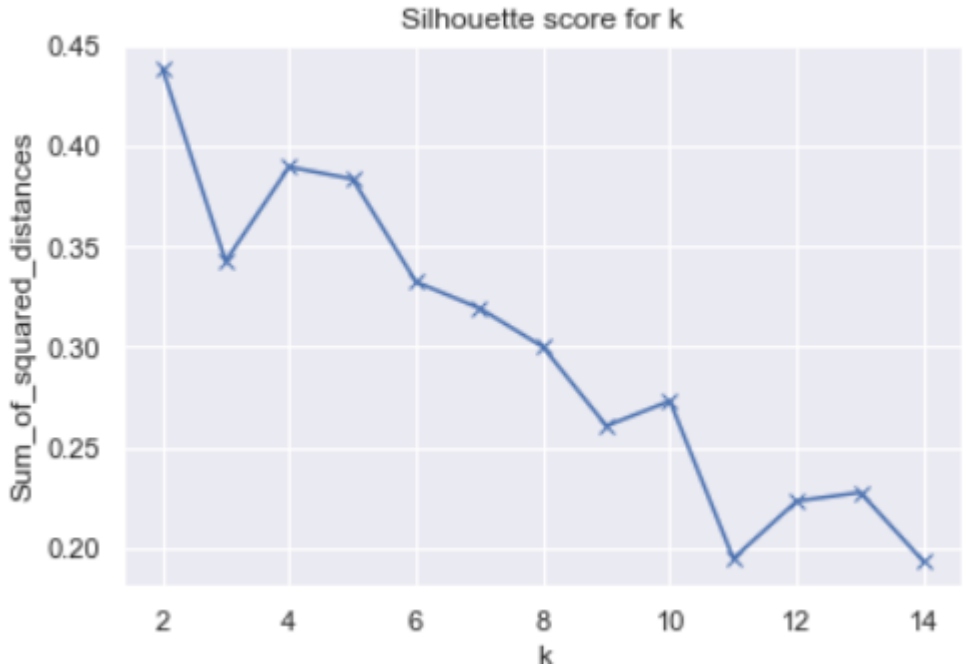
Fig 1



I calculate the Silliouette score for different K, Silliouette score varies from -1 to 1, If it is -1 than clusters are not assigned properly, where data points are assigned to wrong cluster. If its 1 then clusters are perfect.

Fig- 2



From fig-1 and fig-2 we can see that k = 4, is well for our data set. So, I cluster the data in four. I used folium library to visualize the data

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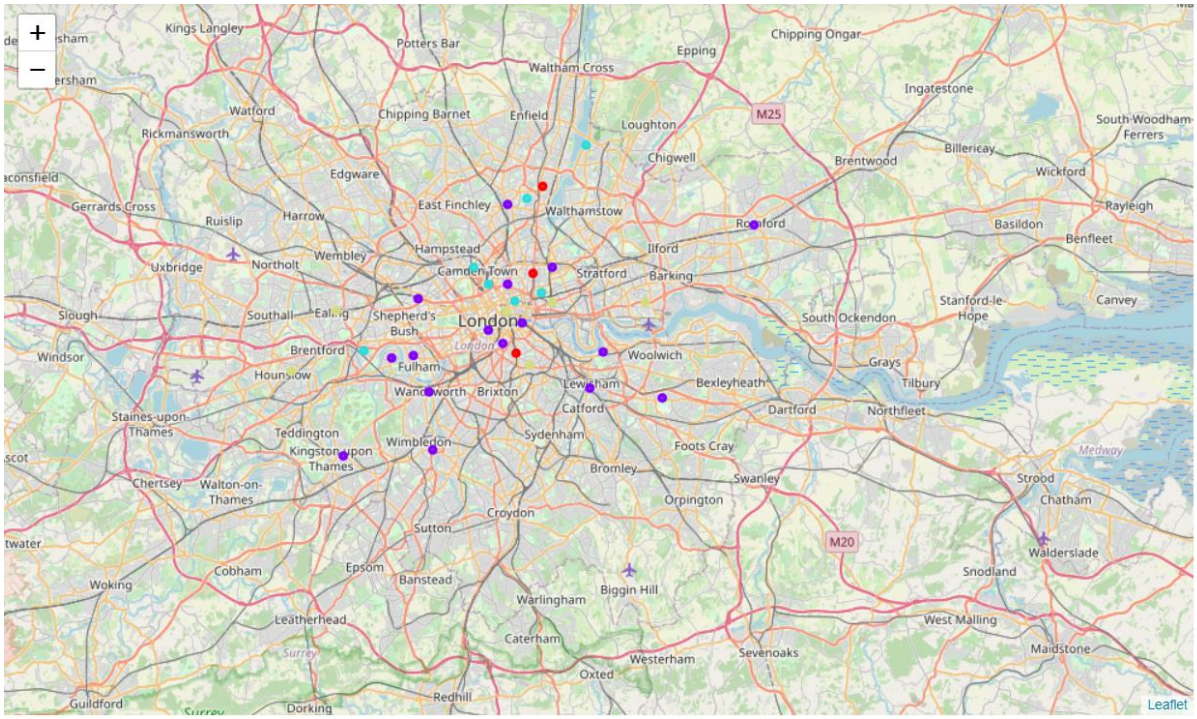
Fig- 3



Results

Fig-4 show the different borough. Cluster number 3 seems to be more interesting. It has more Indian population and has low number of Indian restaurants Unlike the other cluster, if we narrow down our analysis, we can see that Redbridge has Indian population around 32% of the total population. Redbridge has 27 restaurants in that only one is Indian. Additional to that it is very close to city centre around 4.6 Km. That is why Redbridge is very promising area to open the new Indian restaurant.

Table - 5

	Borough	Lat	Lng	Area	Population	Indian_population	Dist_from_center	Indian_rest_count	cluster_labels
24	Redbridge	51.475773	-0.080698	21.78	288272.0	92722	4.696983	1	3

That is why we will choose Redbridge to open a new restaurant. Fig-4 shows all restaurants present in Redbridge borough.

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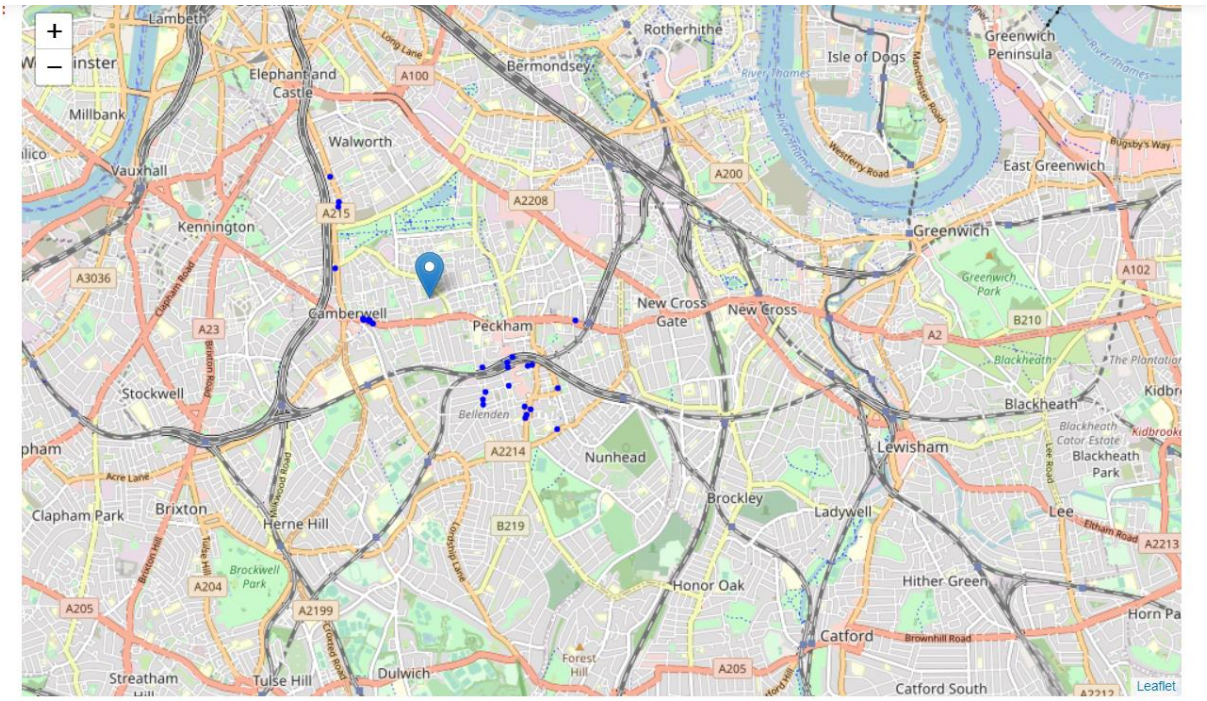
Fig- 4



Discussion

Limitation and suggestion

Although we have gone through analysis of boroughs and find out promising borough. But still stakeholder needs to do street level study, like nearby parking area, transportation and connectivity, and area hygiene conditions.

This all thing we cannot find by virtually, stakeholder need to visit places and find location.

Conclusion

London has good number Indian, Pakistani and Bangladeshi people. It is good to open an Indian restaurant in anywhere in London however, the location of the restaurant is key point in business. So, we consider some criteria to open the Indian restaurant.

And according to our analysis, Redbridge borough is very good place to open the new Indian restaurant

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References

- [1] https://en.wikipedia.org/wiki/London
- [2] https://en.wikipedia.org/wiki/List_of_London_boroughs
- [3] https://pypi.org/project/geocoder/
- [4] https://foursquare.com/
- [5] https://developer.foursquare.com/docs/build-with-foursquare/categories/