Opening Restaurant in London

Coursera Capstone Project

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1. Business Problem

- **According** to www.food.gov.uk, there are more than 14,000 restaurants in London and about 9 million people. That is why opening a new restaurant there can be an extremely challenging task. According to several surveys, up to 40% of such start-ups fail in the very first year. Let's suppose, an investor has enough time and money, as well as a passion to open the best eating spot in London. What type of restaurant would it be? What would be the best place for it?

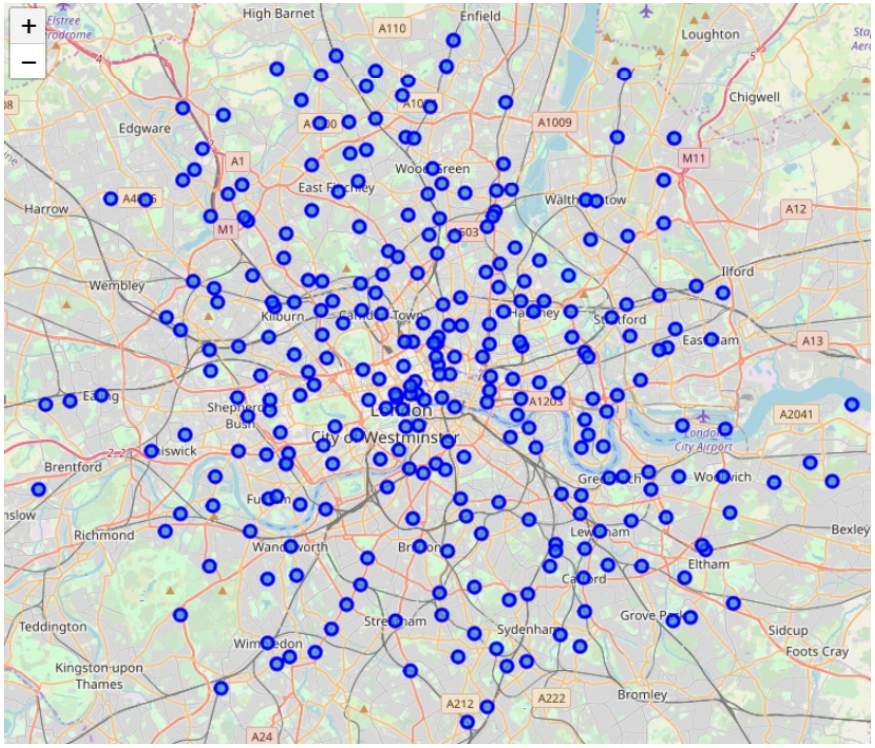
- **Target audience**: investors, entrepreneurs, and chefs interested in opening a restaurant in London, who may need a piece of objective advice of what type of restaurant would be more successful and where exactly it should be opened.

2. Methodology and Data

- **Step 1.** Using a table on https://en.wikipedia.org/wiki/List_of_areas_of_London, collect information about London boroughs and locations, excluding records whose "Post Town" is not London.
- **Step 2.** Use the Geopy and Folium library to get the coordinates of every locations and map geospatial data on a London map.
- **Step 3.** Using Foursquare API, collect the top 100 restaurants and their categories for each location within a radius 500 meters.
- **Step 4.** Group collected restaurants by location and by taking the mean of the frequency of occurrence of each type, preparing them for clustering.
- **Step 5.** Cluster restaurants by k-means algorithm and analyze the top 10 most common restaurants in each cluster.
- **Step 6.** Visualize clusters on the map, thus showing the best locations for opening the chosen restaurant.

3. Exploring London Neighborhoods

- Using Wikipedia we collected all London neighborhoods.
- Using geospatial libraries we add geographical coordinates.
- We had made some cleaning and wrangling, thus we obtained 288 locations in London.



4. Exploring London Restaurants

- We utilized the Foursquare API to get the top 100 restaurants in each neighborhood.
- Thus we obtained 6273 restaurants of 126 unique types.
- We had applied one-hot encoding and grouped them using by taking the mean of the frequency of occurrence of each type.
- Then we clustered restaurants using the k-means algorithm.

5. Results

- Cluster #1.

	Borough	Cluster Labels	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
count	16	16.0	16	16	16	16	16	16	16	16	16	16
unique	14	NaN	7	8	10	11	9	11	12	12	11	12
top	Tower Hamlets	NaN	Café	Breakfast Spot	Café	Chinese Restaurant	Yoshoku Restaurant	Diner	Doner Restaurant	Donut Shop	Dumpling Restaurant	Eastern European Restaurant
freq	2	NaN	5	4	5	3	3	4	5	4	4	5

- The most common restaurant: Café.
- The 10th most common restaurant: Eastern European Restaurant.

5. Results

- Cluster #2.

	Borough	Cluster Labels	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
count	103	103.0	103	103	103	103	103	103	103	103	103	103
unique	28	NaN	26	33	32	33	44	47	40	42	41	42
top	Tower Hamlets	NaN	Café	Restaurant	Italian Restaurant	Café	Sandwich Place	Doner Restaurant	Pizza Place	Falafel Restaurant	Ethiopian Restaurant	Empanada Restaurant
freq	10	NaN	29	12	13	9	7	7	8	8	8	11

- The most common restaurant: Café.
- The 10th most common restaurant: Empanada Restaurant.

5. Results

- Cluster #3.

	Borough	Cluster Labels	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
count	17	17.0	17	17	17	17	17	17	17	17	17	17
unique	13	NaN	6	12	8	11	11	13	12	11	12	11
top	Barnet	NaN	Café	Italian Restaurant	Yoshoku Restaurant	Bakery	Dim Sum Restaurant	Diner	Doner Restaurant	Donut Shop	Ethiopian Restaurant	Eastern European Restaurant
freq	3	NaN	9	3	5	5	3	3	3	3	3	4

- The most common restaurant: Café.
- The 10th most common restaurant: Eastern European Restaurant.

5. Results

- Cluster #4.

	Borough	Cluster Labels	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
count	26	26.0	26	26	26	26	26	26	26	26	26	26
unique	14	NaN	6	15	16	14	17	15	14	17	15	14
top	Barnet	NaN	Indian Restaurant	Café	Café	Fish & Chips Shop	Dim Sum Restaurant	Diner	Doner Restaurant	Donut Shop	Dumpling Restaurant	Eastern European Restaurant
freq	4	NaN	17	6	5	4	5	6	7	7	7	8

- The most common restaurant: Indian Restaurant.
- The 10th most common restaurant: Eastern European Restaurant.

5. Results

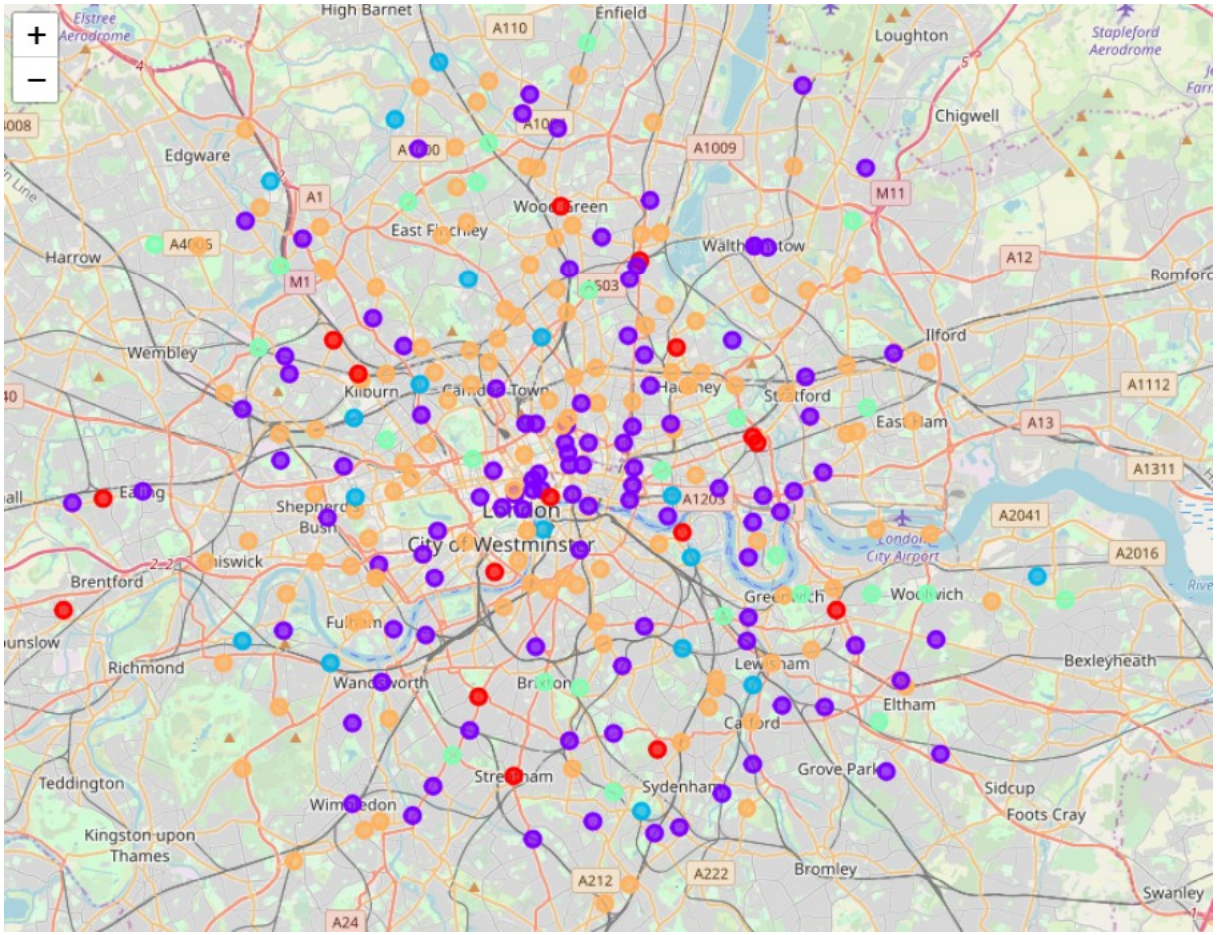
- Cluster #5

	Borough	Cluster Labels	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
count	121	121.0	121	121	121	121	121	121	121	121	121	121
unique	29	NaN	21	27	34	36	44	51	46	45	48	49
top	Barnet	NaN	Café	Café	Italian Restaurant	Italian Restaurant	Pizza Place	Fast Food Restaurant	Fast Food Restaurant	Donut Shop	Dumpling Restaurant	Eastern European Restaurant
freq	10	NaN	75	15	13	12	9	9	10	10	12	15

- The most common restaurant: Café.
- The 10th most common restaurant: Eastern European Restaurant.

5. Results

- Visualizing Clusters



Cluster 1 - red
Cluster 2 - purple
Cluster 3 - blue
Cluster 4 - green
Cluster 5 - orange

6. Discussion

- Analyzing the most popular restaurants in each cluster, the stakeholder should prefer the least popular types as a safe choice. That is why in our recommendations we offer to select 10th or 9th positions.

- Recommendations, based on description of each cluster:

  Cluster 1 Locations: Eastern European or Dumpling Restaurant

  Cluster 2 Locations: Empanada or Ethiopian Restaurant

  Cluster 3 Locations: Eastern European or Ethiopian Restaurant

  Cluster 4 Locations: Eastern European or Dumpling Restaurant

  Cluster 5 Locations: Eastern European or Dumpling Restaurant

- After the type of restaurant is chosen, it is time to select a right place. Using the final map its legend the solution is quite obvious.

7. Conclusion

- In this report we worked out a methodology to determine what the most promising type of restaurant is and where it should be opened.
- This type of analysis can be applied to any city of your choice that has available geospatial information.
- This type of analysis can be applied to any type of venue (shopping, clubs, etc.) that is available in Foursquare database.