Coursera Capstone

IBM Applied Data Science Capstone

Opening a Asian Restaurant in London, United Kingdom

Asian Food in London

Antonina Pliatsika

January 2021

Introduction

London is now home to more than 8.6 million people, the highest the city's population has been since 1939. What's more, 44% of London now consists of black and ethnic minorities, compared to only 28.9% in 2001. That's according to the Greater London Authority, which serves the London mayor's office. London's proportion of immigrants may seem high, but that's not an uncommon balance for many global business capitals.

This final project explores the best locations for an Asian restaurant throughout the city of London. Potentially the owner of the new Asian restaurant can have great success and consistent profit. However, as with any business, opening a new restaurant requires serious considerations and is more complicated than it seems from the first glance. In particular. The location of the restaurant is one of the most important factors that will affect whether it will have success or a failure. So our project will attempt to answer the questions "Where should the investor open a Asian Restaurant?" and "Where should I go if I want great Asian food?".

Business Problem

The objective of this Capstone project is to analyse and select the best locations in the city of London to open a new Asian restaurant. Using Data Science methodology and instruments such as Data Analysis and Visualization, this project aims to provide solutions to answer the business question: Where in the city of London, should the investor open an Asian Restaurant?

Target Audience of this project and some demographic facts

This project particularly useful to developers and investors looking to open or invest in an Asian restaurant in the city of London. Overall, London is a great place to open a restaurant with an ethnical cuisine. As London is one of the most diverse cities in the world. With its diverse culture, comes diversity in the food items. There are many restaurants in London city, each belonging to different categories like Chinese, Indian, French, etc. Why did we decide to focus on an Asian cuisine in out project? Now when the idea of a healthy lifestyle conquered the minds of people over country, Japanese restaurants became extremely popular, as they offer a healthy alternative to regular London eating habits.

Data

To solve the problem, we will need the following data:

- London data containing the locations and and boroughs.
- Latitude and longitude coordinates of those neighborhoods. This is required to plot the map and get the venue data.
- Venue data, particularly data related to restaurants. We are going to use this data to perform further analysis of this neighborhoods.

This project will require using of many data science skills, from web scrapping (open source dataset), working with API (Foursquare), data cleaning, data wrangling, to map visualization (Folium). In the next Methodology section, we will discuss and describe any exploratory data analysis that we did, any inferential statistical testing that we performed, and what machine learning techniques were used.

Methodology

- Data will be collected from https://en.wikipedia.org/wiki/List_of_areas_of_London and https://en.wikipedia.org/wiki/Demography_of_London, cleaned and processed into a dataframe.
- Foursquare will be used to locate all venues.
- London is big and due to the limitations in the number of calls for the Foursquare API some assumptions are made with corresponding data wrangling and cleansing.
- Finally, the data will be visually assessed using graphing from Python libraries. Also to analyze which neighborhood of London is good to open an Asian restaurant, we will use a K-means clustering: a type of unsupervised learning, which is used when you have unlabeled data (i.e., data without defined categories or groups). The goal of this algorithm is to find groups in the data, with the number of groups represented by the variable K. The algorithm works iteratively to assign each data point to one of K groups based on the features that are provided. Data points are clustered based on feature similarity.

Results

The results of our analysis showed below:

Cluster 1

	London 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
2	Tower Hamlets	Café	Fast Food Restaurant	Turkish Restaurant	Sandwich Place	Falafel Restaurant	Japanese Restaurant	Mediterranean Restaurant	Pakistani Restaurant	Pizza Place	Restaurant
6	Tower Hamlets	Café	Fast Food Restaurant	Turkish Restaurant	Sandwich Place	Falafel Restaurant	Japanese Restaurant	Mediterranean Restaurant	Pakistani Restaurant	Pizza Place	Restaurant
11	Newham	Fast Food Restaurant	Indian Restaurant	Chinese Restaurant	Turkish Restaurant	Thai Restaurant	Bakery	Sandwich Place	Café	Food Truck	Fish & Chips Shop
12	Newham	Fast Food Restaurant	Indian Restaurant	Comfort Food Restaurant	Fish & Chips Shop	Bakery	Café	Chinese Restaurant	French Restaurant	Food Truck	Falafel Restaurant
18	Newham	Fast Food Restaurant	Sandwich Place	Indian Restaurant	Café	Bakery	Doner Restaurant	Mediterranean Restaurant	Mexican Restaurant	Middle Eastern Restaurant	Moroccan Restaurant
31	Newham	Fast Food Restaurant	Sandwich Place	Indian Restaurant	Café	Bakery	Doner Restaurant	Mediterranean Restaurant	Mexican Restaurant	Middle Eastern Restaurant	Moroccan Restaurant
32	Tower Hamlets	Restaurant	Sandwich Place	Salad Place	Italian Restaurant	Café	French Restaurant	Sushi Restaurant	Asian Restaurant	Indian Restaurant	Tapas Restaurant
33	Newham	Café	Fried Chicken Joint	Fast Food Restaurant	Bakery	Middle Eastern Restaurant	Chinese Restaurant	Restaurant	Sandwich Place	Indian Restaurant	Turkish Restaurant
34	Newham	Café	Fried Chicken Joint	Fast Food Restaurant	Bakery	Middle Eastern Restaurant	Chinese Restaurant	Restaurant	Sandwich Place	Indian Restaurant	Turkish Restaurant
37	Newham	Café	Fast Food Restaurant	Sandwich Place	Bakery	Fried Chicken Joint	Middle Eastern Restaurant	Indian Restaurant	Moroccan Restaurant	Mediterranean Restaurant	Asian Restaurant
38	Newham	Café	Fast Food Restaurant	Sandwich Place	Bakery	Fried Chicken Joint	Middle Eastern Restaurant	Indian Restaurant	Moroccan Restaurant	Mediterranean Restaurant	Asian Restaurant

Cluster 2

	London 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
3	Tower Hamlets	Pizza Place	Indian Restaurant	Bakery	English Restaurant	Chinese Restaurant	Fried Chicken Joint	Sandwich Place	Café	Steakhouse	Breakfast Spot
7	Tower Hamlets	Pizza Place	Indian Restaurant	Bakery	English Restaurant	Chinese Restaurant	Fried Chicken Joint	Sandwich Place	Café	Steakhouse	Breakfast Spot
9	Tower Hamlets	Pizza Place	Indian Restaurant	Bakery	English Restaurant	Chinese Restaurant	Fried Chicken Joint	Sandwich Place	Café	Steakhouse	Breakfast Spot
13	Tower Hamlets	Pizza Place	Indian Restaurant	Bakery	English Restaurant	Chinese Restaurant	Fried Chicken Joint	Sandwich Place	Café	Steakhouse	Breakfast Spot
14	Tower Hamlets	Pizza Place	Indian Restaurant	Bakery	English Restaurant	Chinese Restaurant	Fried Chicken Joint	Sandwich Place	Café	Steakhouse	Breakfast Spot
15	Tower Hamlets	Pizza Place	Indian Restaurant	Bakery	English Restaurant	Chinese Restaurant	Fried Chicken Joint	Sandwich Place	Café	Steakhouse	Breakfast Spot
20	Tower Hamlets	Pizza Place	Indian Restaurant	Bakery	English Restaurant	Chinese Restaurant	Fried Chicken Joint	Sandwich Place	Café	Steakhouse	Breakfast Spot
24	Tower Hamlets	Pizza Place	Indian Restaurant	Bakery	English Restaurant	Chinese Restaurant	Fried Chicken Joint	Sandwich Place	Café	Steakhouse	Breakfast Spot

Cluster 3

	London 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
28	Redbridge	Indian Restaurant	BBQ Joint	Bakery	Seafood Restaurant	Café	Chinese Restaurant	Diner	French Restaurant	Food Truck	Fish & Chips Shop
40	Redbridge	Indian Restaurant	BBQ Joint	Bakery	Seafood Restaurant	Café	Chinese Restaurant	Diner	French Restaurant	Food Truck	Fish & Chips Shop

Cluster 4

	London 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
19	Tower Hamlets	Chinese Restaurant	Sandwich Place	Bakery	Portuguese Restaurant	Gastropub	Vegetarian / Vegan Restaurant	Fish & Chips Shop	Fast Food Restaurant	Food Truck	Cafeteria
25	Tower Hamlets	Chinese Restaurant	Sandwich Place	Bakery	Portuguese Restaurant	Gastropub	Vegetarian / Vegan Restaurant	Fish & Chips Shop	Fast Food Restaurant	Food Truck	Cafeteria
26	Tower Hamlets	Chinese Restaurant	Sandwich Place	Bakery	Portuguese Restaurant	Gastropub	Vegetarian / Vegan Restaurant	Fish & Chips Shop	Fast Food Restaurant	Food Truck	Cafeteria
29	Tower Hamlets	Chinese Restaurant	Sandwich Place	Bakery	Portuguese Restaurant	Gastropub	Vegetarian / Vegan Restaurant	Fish & Chips Shop	Fast Food Restaurant	Food Truck	Cafeteria
30	Tower Hamlets	Chinese Restaurant	Sandwich Place	Bakery	Portuguese Restaurant	Gastropub	Vegetarian / Vegan Restaurant	Fish & Chips Shop	Fast Food Restaurant	Food Truck	Cafeteria
36	Tower Hamlets	Chinese Restaurant	Sandwich Place	Bakery	Portuguese Restaurant	Gastropub	Vegetarian / Vegan Restaurant	Fish & Chips Shop	Fast Food Restaurant	Food Truck	Cafeteria
39	Tower Hamlets	Chinese Restaurant	Sandwich Place	Bakery	Portuguese Restaurant	Gastropub	Vegetarian / Vegan Restaurant	Fish & Chips Shop	Fast Food Restaurant	Food Truck	Cafeteria

Cluster 5

	London 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	Newham	Café	Thai Restaurant	Fast Food Restaurant	Middle Eastern Restaurant	Indian Restaurant	Sandwich Place	Caribbean Restaurant	Diner	Food Truck	Restaurant
1	Newham	Café	Thai Restaurant	Fast Food Restaurant	Middle Eastern Restaurant	Indian Restaurant	Sandwich Place	Caribbean Restaurant	Diner	Food Truck	Restaurant
8	Newham	Café	Middle Eastern Restaurant	Restaurant	Italian Restaurant	Diner	Caribbean Restaurant	Food Truck	Steakhouse	Thai Restaurant	BBQ Joint
10	Newham	Café	Middle Eastern Restaurant	Restaurant	Italian Restaurant	Diner	Caribbean Restaurant	Food Truck	Steakhouse	Thai Restaurant	BBQ Joint
21	Newham	Café	Middle Eastern Restaurant	Restaurant	Italian Restaurant	Diner	Caribbean Restaurant	Food Truck	Steakhouse	Thai Restaurant	BBQ Joint
23	Newham	Café	Fried Chicken Joint	Restaurant	Middle Eastern Restaurant	Chinese Restaurant	Food Truck	Fish & Chips Shop	Fast Food Restaurant	Falafel Restaurant	English Restaurant
27	Newham	Café	Middle Eastern Restaurant	Restaurant	Italian Restaurant	Diner	Caribbean Restaurant	Food Truck	Steakhouse	Thai Restaurant	BBQ Joint
35	Redbridge	Café	Restaurant	Italian Restaurant	Pizza Place	Bakery	Vietnamese Restaurant	English Restaurant	Mediterranean Restaurant	Diner	French Restaurant

Cluster 6

	London 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
4	Tower Hamlets	French Restaurant	Bakery	Breakfast Spot	Burger Joint	Sandwich Place	Chinese Restaurant	Vietnamese Restaurant	Diner	Food Truck	Fish & Chips Shop
5	Tower Hamlets	French Restaurant	Bakery	Breakfast Spot	Burger Joint	Sandwich Place	Chinese Restaurant	Vietnamese Restaurant	Diner	Food Truck	Fish & Chips Shop
22	Tower Hamlets	French Restaurant	Bakery	Breakfast Spot	Burger Joint	Sandwich Place	Chinese Restaurant	Vietnamese Restaurant	Diner	Food Truck	Fish & Chips Shop

Cluster 7

	London 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
16	Newham	Indian Restaurant	Asian Restaurant	Fried Chicken Joint	Restaurant	Turkish Restaurant	Argentinian Restaurant	Comfort Food Restaurant	Food Truck	Fish & Chips Shop	Fast Food Restaurant
17	Newham	Indian Restaurant	Asian Restaurant	Fried Chicken Joint	Restaurant	Turkish Restaurant	Argentinian Restaurant	Comfort Food Restaurant	Food Truck	Fish & Chips Shop	Fast Food Restaurant

Discussion Section

1. Pizza Places, Cafes and Chinese Restaurants are popular in these areas of London.
2. As for restaurants Chinese, French are very popular in Tower Hamlets.
3. Asian restaurants is the 2nd most common venue in Newham.
4. It is surprising to see that there are many restaurants serving for example Chinese or Indian food, cuisines that are Asian, but there are few restaurants that serving all these cuisines at the same place.
5. Based on the results of our analysis, I would state that Newham is the best location to open an Asian restaurant in London.

Limitations and suggestions for future researchers

All the above analysis is depended on the accuracy of the Foursquare data. Besides, during this project the numbers of API calls and results were limited. To get better results, future research work

and more comprehensive analysis could consider using a paid account to bypass these limitations as well as incorporating data from other external databases.

Conclusion

In the project we have gone through the process of identifying the business problem, specifying the data required, extracting and preparing the data, performing analysis, and lastly providing recommendations to the investors/developers. During the project, we applied different data science methods and instruments to get the answer to our main question: "Where in the city of London, should the investor open an Asian Restaurant?" The findings of this project will help the relevant investor better understand the advantages of different London neighborhoods/boroughs in terms of opening an Asian restaurant.