1. Introduction

There is clearly a big difference between visiting a new country as a tourist for a few days and living and working there for years at a time. As you compile your list of potential destinations, consider each country's defining characteristics and attributes. Even if they don't directly affect your ability to move to and remain in your chosen destination, these factors are certain to influence your experience in a multitude of ways: your personal finances, your career track, your freedom of movement and expression, and your overall mental health, to name but several.

Factors to consider include language, political scene and general government policies, legal framework, public safety, economic health and policy, relationship with your country, climate, and more. The UK remains a top destination for those looking to make a move, and with good reason. Whether you're in search of nightlife, culture, or natural beauty, the UK offers all and more in spades. UK, and especially London are very popular places to live nowadays.

The economy of London is dominated by service industries, particularly financial services and associated professional services, which have strong links with the economy in other parts of the United Kingdom (UK) and internationally. 841,000 private sector businesses were based in London at the start of 2013, more than in any other region or country in the UK. London has five major business districts: the City, Westminster, Canary Wharf, Camden & Islington and Lambeth & Southwark.

London is a nice safe city to live in most areas for most of the time. Astronomically safe compared to many cities in the world. London Metropolitan Police is very efficient and do ensure that Londoner are protected round the clock. Violent crime/Crime against women is very low in London but financial crime (mugging/pick pocketing/theft) is bit high in certain parts of the city. London is very vibrant and very cosmopolitan city.

2. Business problem

A restaurant is a business that prepares and serves food and drinks to customers. Meals are generally served and eaten on the premises, but many restaurants also offer take-out and food delivery services. Restaurants vary greatly in appearance and offerings, including a wide variety of cuisines and service models ranging from inexpensive fast food restaurants and cafeterias, to mid-priced family restaurants, to high-priced luxury establishments.

Restaurants are classified or distinguished in many different ways. The primary factors are usually the food itself (e.g. vegetarian, seafood, steak); the cuisine (e.g. Italian, Chinese, Japanese, Indian, French, Mexican, Thai) or the style of offering (e.g. tapas bar, a sushi train, a tastet restaurant, a buffet restaurant or a yum cha restaurant). Beyond this, restaurants may differentiate themselves on factors including speed (see fast food), formality, location, cost, service, or novelty themes (such as automated restaurants). Some of these include fine dining, casual dining, contemporary casual, family style, fast casual, fast food, cafes, buffet, concession stands, food trucks, pop-up restaurants, and ghost restaurants.

The idea that the food in the UK is the worst in Europe is a thing of the past. Cities like London are on the cutting edge of the culinary scene, and you'll find some of the best restaurants in the world there. If a lower key atmosphere is what you're after, the pub culture in the UK is second to none, with great food, sporting events, and camaraderie, as well as ales and ciders on tap!

Main goal: The main objective of this project is to select the safest area of London, where a new restaurant could be opened, based on official and available police information. To this end, besides security testing, it is also necessary to examine the market, i.e. to check the types and locations of existing restaurants in the town area of interest.

Interest: This type of analysis can be of interest to anyone who wants to move to London, especially if it is a caterer or a person planning to start a business by opening a restaurant. In addition, people already living in London who wish to pursue this type of occupation may be potential clients.

3. Data

For the purpose of examining the security of particular parts of London, the following web site information may be used:

https://www.kaggle.com/jboysen/london-crime#london_crime_by_lsoa.csv

This section provides free information collected by the London Police. This information is in the form of a data set containing the following entries:

- lsoa_code: code for Lower Super Output Area in Greater London.
- borough: Common name for London borough.
- major_category: High level categorization of crime
- minor_category: Low level categorization of crime within major category.
- value: monthly reported count of categorical crime in given borough
- year: Year of reported counts, 2008-2016
- month: Month of reported counts, 1-12

In order to answer the above questions, data on London neighbourhoods, boroughs to include boundaries, latitude, longitude, restaurants, and restaurant ratings and tips are required.

London data containing the boroughs latitudes and longitudes is obtained and added to the previously mentioned dataset.

All data related to locations and quality of various restaurants will be obtained via the FourSquare API utilized via the Request library in Python.
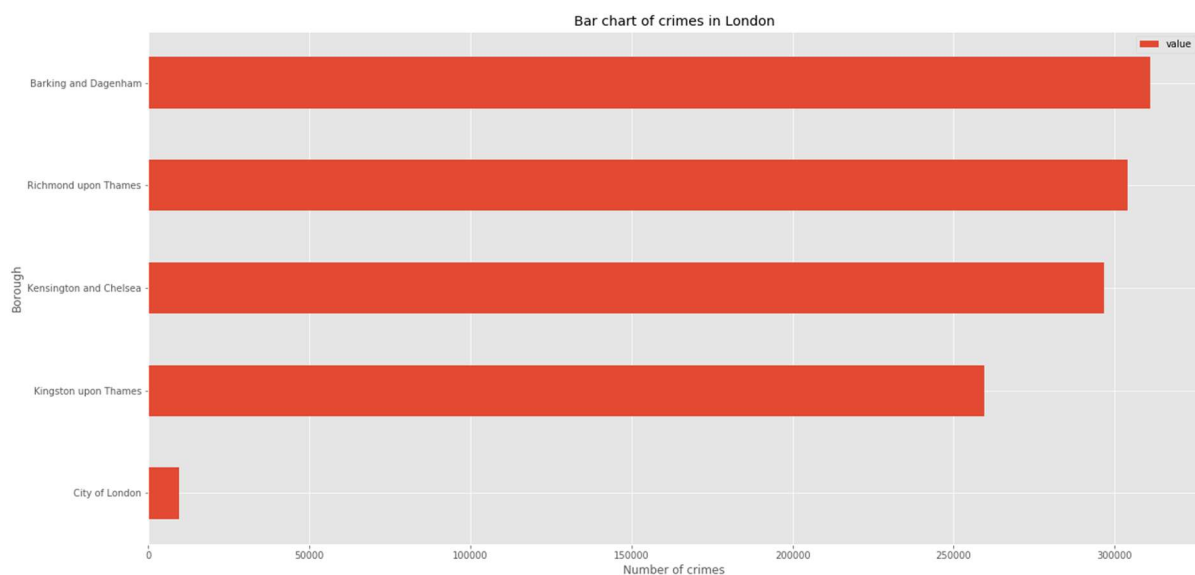
4. Methodology

Police data is imported to dataframe:

	lsoa_code	borough	major_category	minor_category	value	year	month
0	E01001116	Croydon	Burglary	Burglary in Other Buildings	0	2016	11
1	E01001646	Greenwich	Violence Against the Person	Other violence	0	2016	11
2	E01000677	Bromley	Violence Against the Person	Other violence	0	2015	5
3	E01003774	Redbridge	Burglary	Burglary in Other Buildings	0	2016	3
4	E01004563	Wandsworth	Robbery	Personal Property	0	2008	6

After reading the police dataset, it was needful to clean data accordingly, to obtain dataset with accurate data, and it is sorted to observe most safe areas of London:

borough	value
City of London	9720
Kingston upon Thames	259524
Kensington and Chelsea	296784
Richmond upon Thames	304128
Barking and Dagenham	311040

From above, it is obvious that the City of London is the borough with smallest crime rate. The safest boroughs are also visualised:
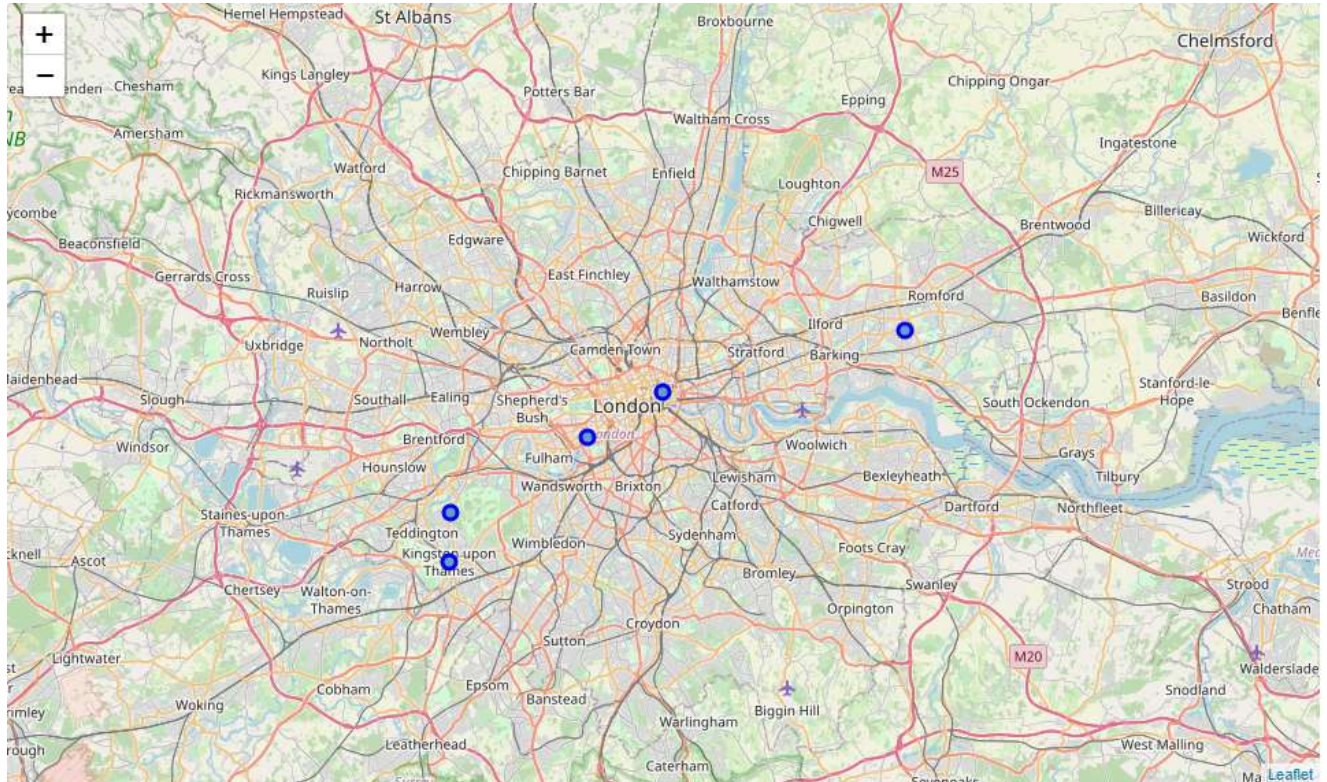
The previous picture shows that, given the crime rate, the City of London is the safest part of London, with a significantly lower crime rate than the other four parts of the city.

After the five safest parts of London have been spotted, a more detailed study is possible. First, existing data need to be reduced (columns that are no longer of interest, such as crime type, crime category, etc. are removed). Second, columns containing the total number of incidents in each borough as well as the geographical coordinates of the borough have been added.

	borough	value	latitude	longitude
0	City of London	9720	51.515618	-0.091998
1	Kingston upon Thames	259524	51.409627	-0.306262
2	Kensington and Chelsea	296784	51.487542	-0.168220
3	Richmond upon Thames	304128	51.440461	-0.305519
4	Barking and Dagenham	311040	51.554117	0.150504

To get a better understanding of the area being tested, five of the safest parts of the city are shown on the map:

Using the latest dataset containing the safest parts of the city and their geographical coordinates, and using the Foursquare API, all locations can be found within 2000 meters, as shown by the following data frames:

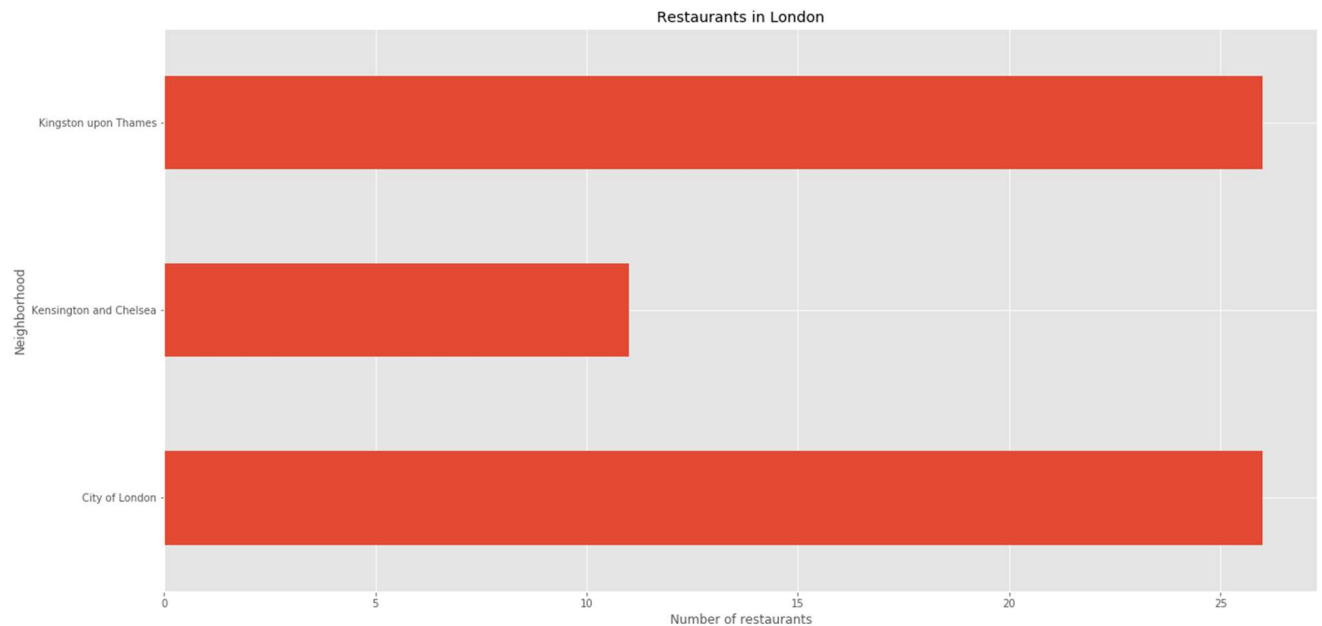|	Neighborhood	Neighborhood Latitude	Neighborhood Longitude	Venue	Venue Latitude	Venue Longitude	Venue Category
0	City of London	51.515618	-0.091998	Goodman Steak House Restaurant	51.514398	-0.090745	Steakhouse
1	City of London	51.515618	-0.091998	The Ned Hotel	51.513755	-0.090067	Hotel
2	City of London	51.515618	-0.091998	The Merchant House	51.513264	-0.093039	Cocktail Bar
3	City of London	51.515618	-0.091998	Hawksmoor Guildhall	51.515498	-0.090849	Steakhouse
4	City of London	51.515618	-0.091998	City Càphê	51.514750	-0.091545	Vietnamese Restaurant

In this way, data on all places, their coordinates, and the categories to which they belong are collected.

5. Results

As indicated in the business plan, only different types of restaurants are of interest. As a result, the entire dataset was reduced to all types of restaurants:
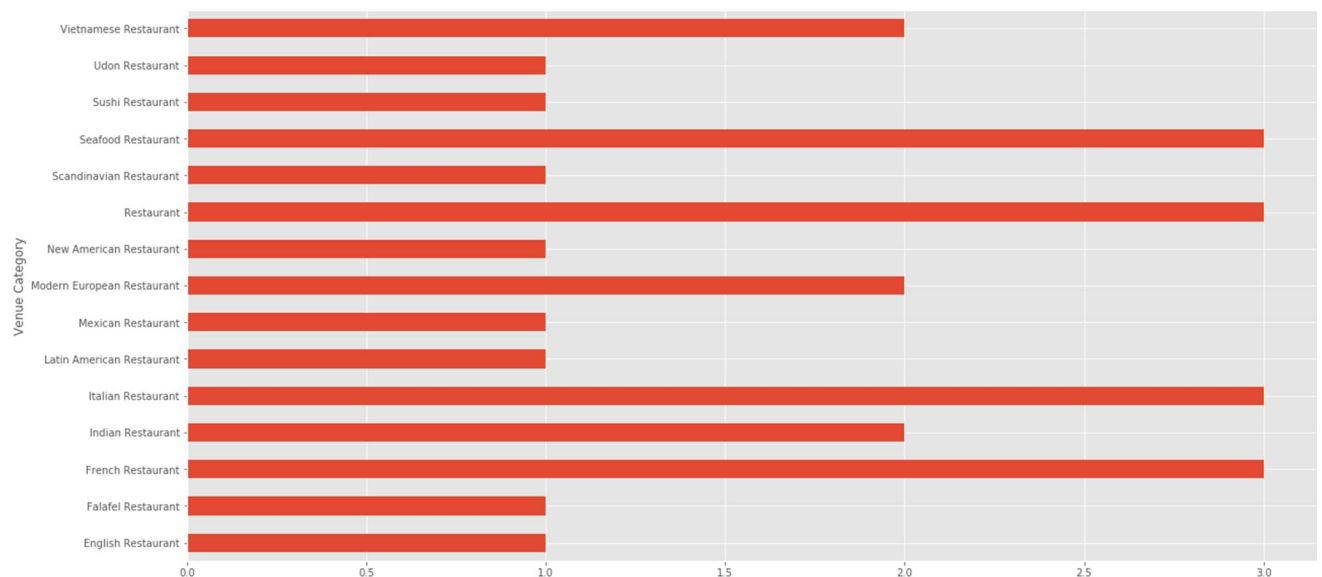
Neighborhood	Neighborhood Latitude	Neighborhood Longitude	Venue	Venue Latitude	Venue Longitude	Venue Category
City of London	51.515618	-0.091998	City Càphê	51.514750	-0.091545	Vietnamese Restaurant
City of London	51.515618	-0.091998	The Trading House	51.515063	-0.091427	Modern European Restaurant
City of London	51.515618	-0.091998	Manicomio	51.515369	-0.095414	Italian Restaurant
City of London	51.515618	-0.091998	Malibu Kitchen	51.513511	-0.090074	New American Restaurant
City of London	51.515618	-0.091998	Burger & Lobster	51.513687	-0.094643	Seafood Restaurant

The data are grouped by borough affiliation and presented in the following graph:

It can be noted that the City of London and Kingston upon Thames have slightly larger restaurants than Kensington and Chelsea. However, this number is still quite small, so it remains a realistic possibility to open a new restaurant in this area. In order to narrow down the number of data considered and given that the City of London was found to be the safest part of London, the focus can now be shifted only to the City of London.
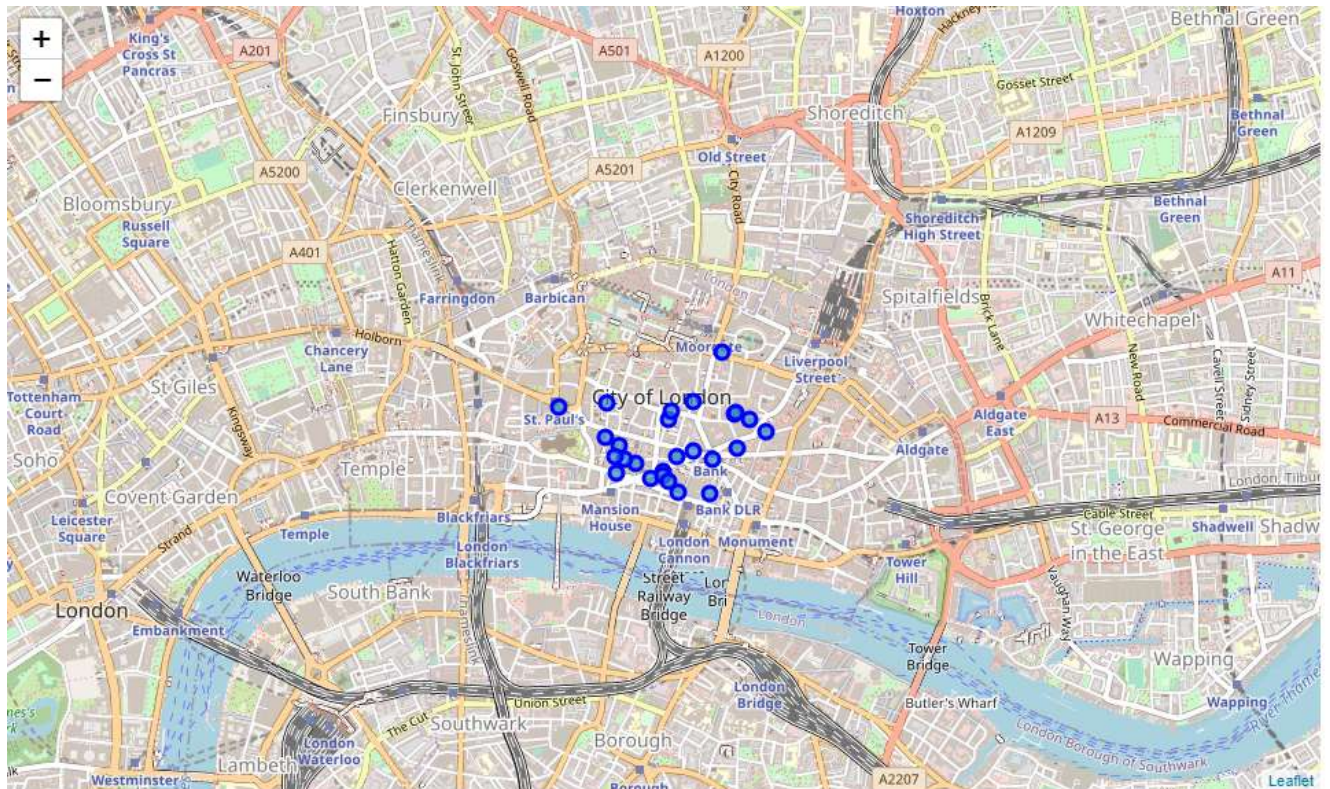
All restaurants are sorted in categories (types), and the total number of restaurants in each category in City of London is shown in the following graph:
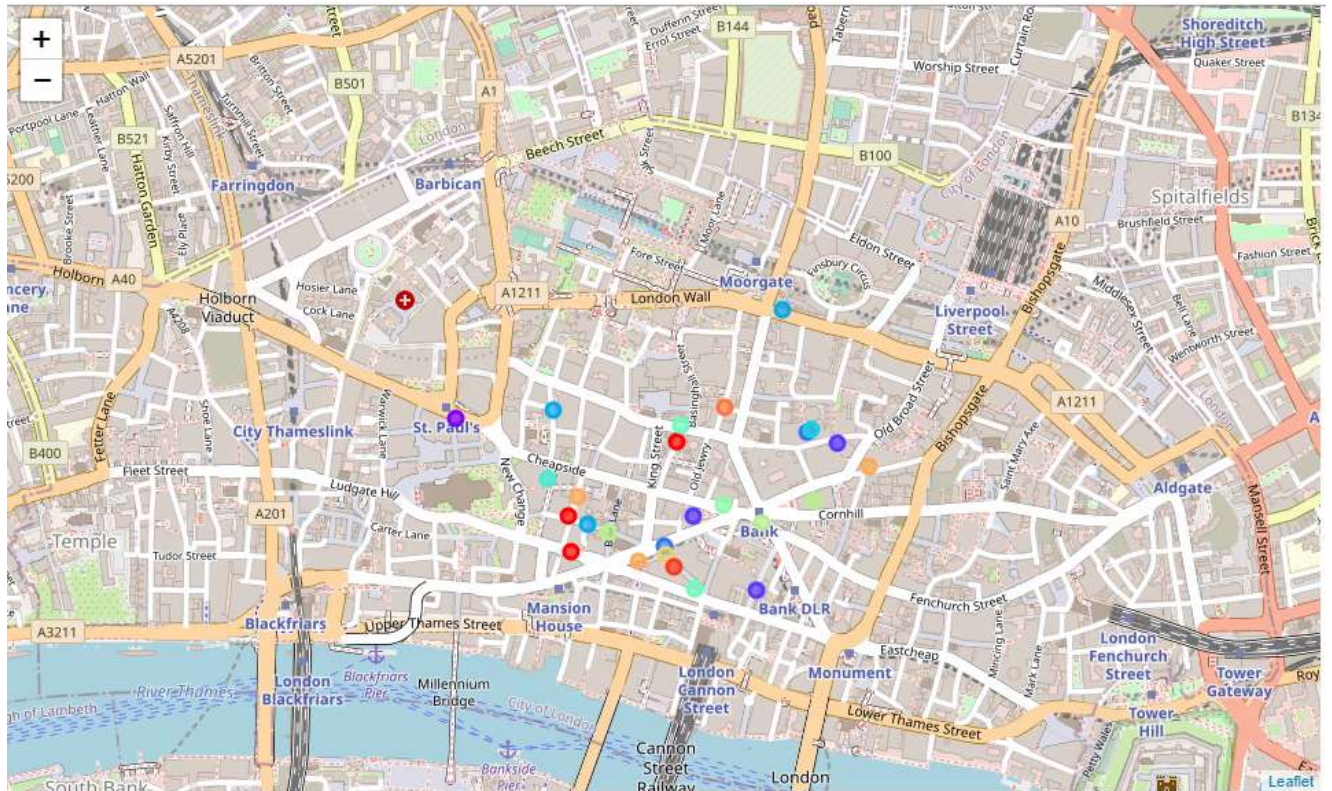

Depending on the preferences of the business owner, the future owner of a new restaurant can now decide what type of restaurant he wants to open. For example, if he wants to have

less competition, for example, it might opt for some type of scarce restaurant, such as a Sushi restaurant. However, if you look at the existing number of restaurants, and considering that it is likely that the largest number of restaurants is in the category of the most popular restaurants, it is possible to opt for more competition in the market and open, for example, an Italian restaurant, believing that it is one of the most popular types.

Let us show all restaurants in the City of London on the map:

Now the future owner of the restaurant could have a good insight into the positions of the existing restaurants, which would ease the dilemma in which fourth is best to open his own restaurant. To better understand the prevalence of restaurant types by districts, all restaurants are divided into clusters by type, and clusters are pinned on the following map:
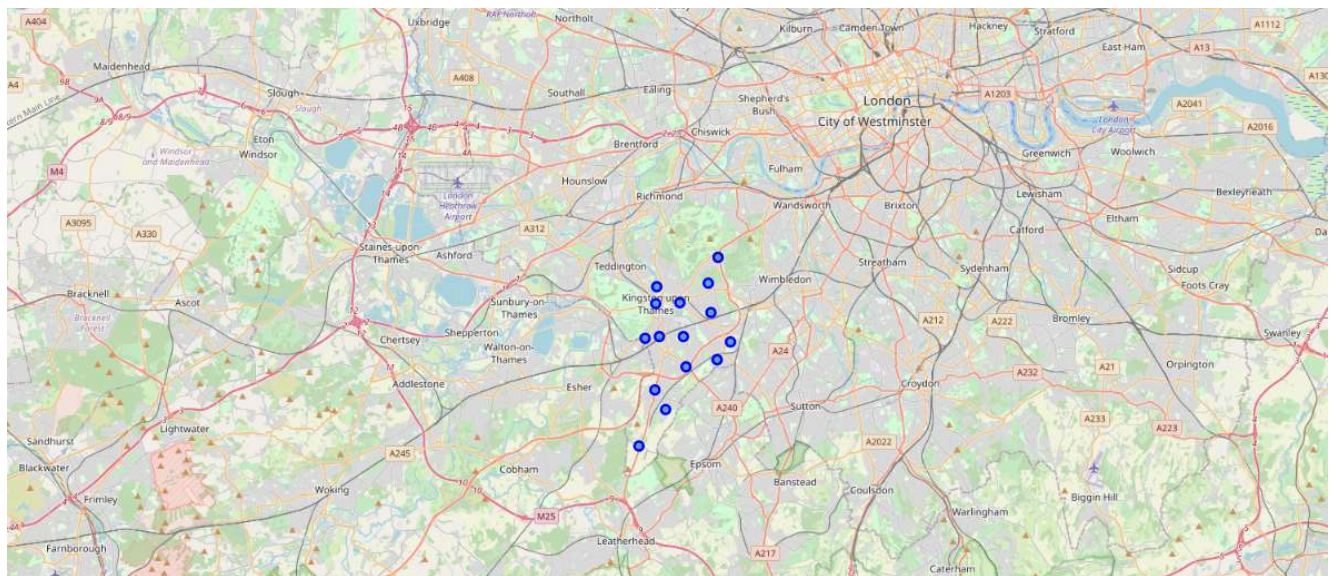
City of London is a borough but there are no neighbourhoods in it, so detailed cluster analysis will be performed on the next safest part of London, which is Kingston upon Thames.

List of all neighbourhoods of Kingston upon Thames can be found at the following address: https://en.wikipedia.org/wiki/List_of_districts_in_the_Royal_Borough_of_Kingston_upon_Thames

	Neighborhood	Borough	Latitude	Longitude
0	Berrylands	Kingston upon Thames	51.393781	-0.284802
1	Canbury	Kingston upon Thames	51.417499	-0.305553
2	Chessington	Kingston upon Thames	51.358336	-0.298622
3	Coombe	Kingston upon Thames	51.419450	-0.265398
4	Hook	Kingston upon Thames	51.367898	-0.307145
5	Kingston upon Thames	Kingston upon Thames	51.409627	-0.306262
6	Kingston Vale	Kingston upon Thames	51.431850	-0.258138
7	Malden Rushett	Kingston upon Thames	51.341052	-0.319076
8	Motspur Park	Kingston upon Thames	51.390985	-0.248898
9	New Malden	Kingston upon Thames	51.405335	-0.263407

	Neighborhood	Borough	Latitude	Longitude
10	Norbiton	Kingston upon Thames	51.409999	-0.287396
11	Old Malden	Kingston upon Thames	51.382484	-0.259090
12	Seething Wells	Kingston upon Thames	51.392642	-0.314366
13	Surbiton	Kingston upon Thames	51.393756	-0.303310
14	Tolworth	Kingston upon Thames	51.378876	-0.282860

To have a clear picture about this data and Kingston upon Thames as a borough, lets visualize all its 15 neighbourhoods on a following map:

Using a dataset related to the Kingston upon Thames and calling the Foursqare API, a list of all venues within 500 meters is obtained for each neighbourhood:
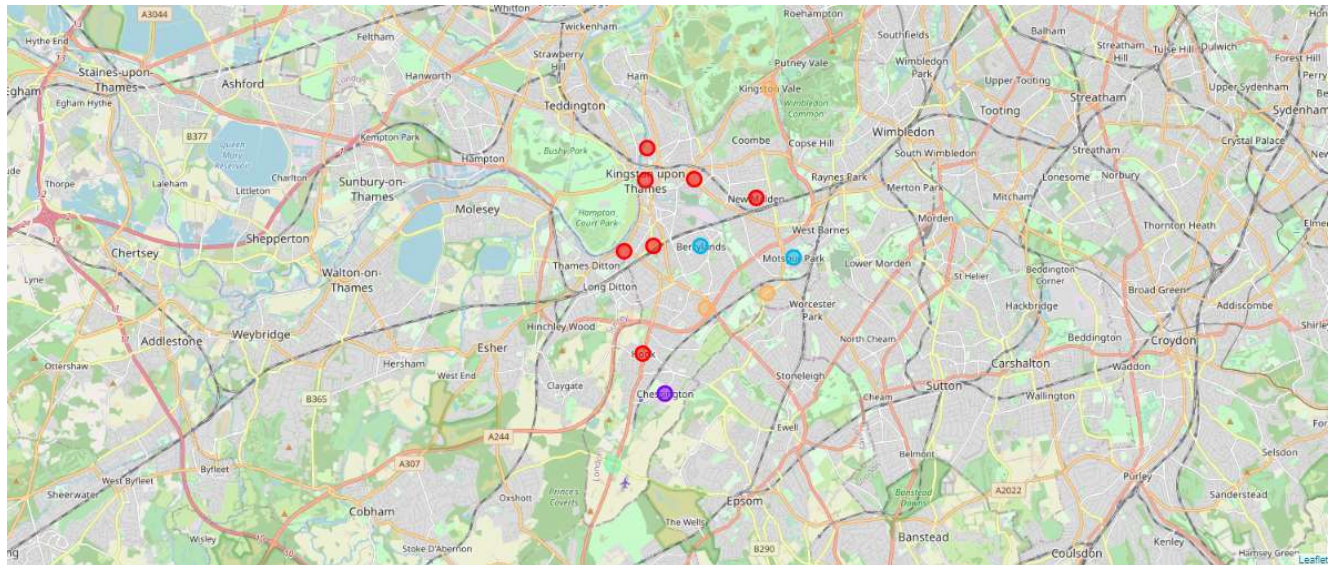
	Neighborhood	Neighborhood Latitude	Neighborhood Longitude	Venue	Venue Latitude	Venue Longitude	Venue Category
0	Berrylands	51.393781	-0.284802	Surbiton Racket & Fitness Club	51.392676	-0.290224	Gym / Fitness Center
1	Berrylands	51.393781	-0.284802	Alexandra Park	51.394230	-0.281206	Park
2	Berrylands	51.393781	-0.284802	K2 Bus Stop	51.392302	-0.281534	Bus Stop
3	Canbury	51.417499	-0.305553	Canbury Gardens	51.417409	-0.305300	Park
4	Canbury	51.417499	-0.305553	The Boater's Inn	51.418546	-0.305915	Pub

There are 99 unique venue categories in this dataset. Thereafter, venue data were subjected to a process of one hot encoding aimed at transforming categorical variables into a more suitable form for further analysis and grouping. To enable the client to find the best neighbourhood for their needs the K-means clustering algorithm will be used, which will divide all 15 neighbourhoods into 5 clusters. Thus, neighbourhoods with similar venues will be found in the same group, making it easier to identify the highest quality neighbourhoods from the client's point of view.

	Neighborhood	Borough	Latitude	Longitude	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
0	Berrylands	Kingston upon Thames	51.393781	-0.284802	2	Gym / Fitness Center	Park	Bus Stop	Deli / Bodega	Department Store	Dessert Shop	Discount Store	Donut Shop	Dry Cleaner	Electronics Store
1	Canbury	Kingston upon Thames	51.417499	-0.305553	0	Pub	Tennis Court	Shop & Service	Spa	Fish & Chips Shop	Supermarket	Indian Restaurant	Plaza	Hotel	Gym / Fitness Center
2	Chessington	Kingston upon Thames	51.358336	-0.298622	1	Construction & Landscaping	Women's Store	Fast Food Restaurant	Department Store	Dessert Shop	Discount Store	Donut Shop	Dry Cleaner	Electronics Store	English Restaurant
4	Hook	Kingston upon Thames	51.367898	-0.307145	0	Indian Restaurant	Bakery	Supermarket	Fish & Chips Shop	Women's Store	Fast Food Restaurant	Department Store	Dessert Shop	Discount Store	Donut Shop
5	Kingston upon Thames	Kingston upon Thames	51.409627	-0.306262	0	Coffee Shop	Italian Restaurant	Clothing Store	Café	Pub	Bakery	Department Store	Sandwich Place	Sushi Restaurant	Hotel

The first cluster is the largest with a total of 7 members, the second and fourth have one element each, while the third has two elements, and the fifth a total of three elements. In the first cluster, which is the largest, the most represented are supermarkets, shops, restaurants, sports centers, and cafes. The third cluster, which consists of two neighbourhoods, is Berrylands and Motspur Park, with parks, sports grounds, bus stops, and shops.

We can now show these clusters on the Kingston upon Thames map. The largest cluster is shown in red, while cluster number three is shown in light blue.

6. Discussion

Based on the analysis, it becomes clear that:

1. The safest parts of London in relation to the total number of criminal incidents are City of London, Kingston upon Thames, Kensington and Chelsea, Richmond upon Thames, and Barking and Dagenham,
2. There are currently 28 different types of restaurants registered in City of London,
3. There is a reasonable expectation that there is still room to open a new restaurant in this part of the city.
4. If you have a family probably you should choose cluster 3 in Kingston upon Thames, if you prefer to have some places to go out and have some fun, then opt for first cluster.

7. Conclusion

This project was intended to help the future restaurant owner to decide on the location of a new restaurant in London. The main criterion used in data analysis is the safety of the area but also the economic prospects for the business to succeed. In the future, this project could be expanded to further consider real estate prices, the popularity of certain types of restaurants, the number of tourists visiting certain areas, etc.