Coursera Capstone Project - London Freelance Office Location

Author: Robert Kwiatkowski

Date: 16/01/2020

1. Introduction

1.1 Background

London is a vibrant, never-sleeping city which a large, strong and still growing economy. This is why many big players in finance, e-commerce and digital industries place their headquarter or tech hubs in this city. Most of companies operate now in a digitally-driven, globalised environment which in turn causes migrations of highly-skilled workers between various places, within the same or different companies. Currently London's internet-based industry is one of the fastest growing sectors.

For many people being a contractor/freelancer became their lifestyle and they are nowadays called, after a desert tribe, nomads – digital nomads. London is a place acting as a magnet for many of them as it has a big job market for specialists with digital skills, like data scientists or software developers. This means the newcomers face a question were to stay (open an office) as a contractor/freelancer. This is a very important decision as London is a very expensive city. If you are interested how working as a freelancer in London looks like you may consider reading a blog post "A Day in the Life of Freelancer in London".

1.2 Problem

In this project I will try to find a borough where an exemplary contractor can set up his or her office, assuming that most of the work can be done remotely. Therefore, location relative to the hiring company would play much smaller role.

Therefore, let's make some assumptions about our contractor:

- Moves alone or with a partner (no children, one-bedroom apartment)
- Works remotely or has a parent company very close (distance to company is not relevant)
- Want to rent a flat/house (not to buy)
- Does not want to commute much for shopping
- Prefers eating out to cooking at home
- Does not want to overpay for a place (cost-aware person)

I think these are realistic assumption. Generally, I want to find an optimal area in terms of abovementioned requirements. The question is where in London (borough) the contractor should open the office?

1.3 Interest

All contractors and freelancers would be very interested in choosing an affordable and attractive location of their office. In more general aspect the analysis performed in this report could be of interest for anyone moving to London.

2. Data acquisition and cleaning

The recommendation will be made based on factors depicted in a scheme in Figure 1.

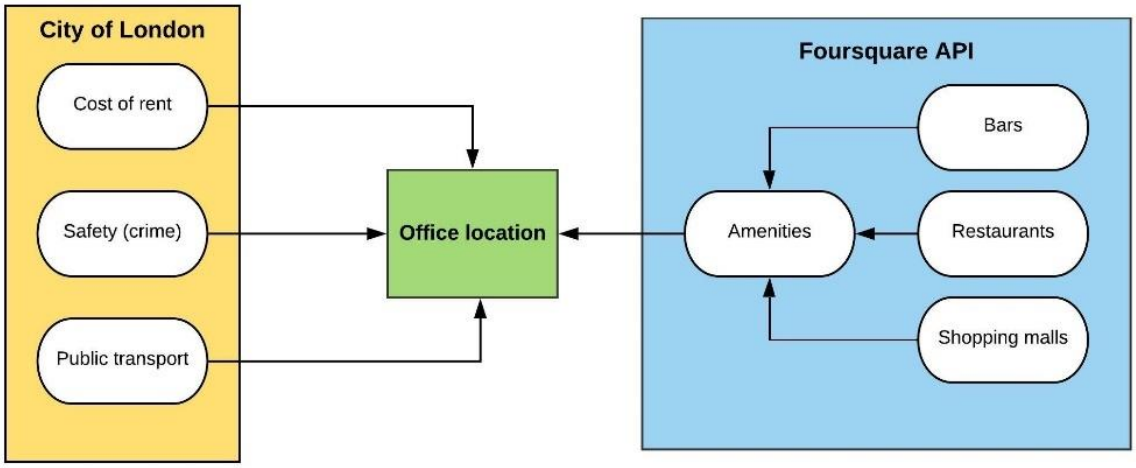

Figure 1 Decision scheme and data sources

The three main aspects to consider are:

- Safety
- Costs of living
- Attractiveness

Data about the first two aspects can be collected from City of London database. Attractiveness will be assessed based on the number of restaurants in the given borough. I will use Foursquare API to obtain relevant data. In order to create good visualisation geojson file with boundaries of London is required. It can be obtained from CART webpage.

Data are provided by City of London are generally well maintained, clean and comes in two main formats: .xls and .csv. Data in Excel format are provided in multiple tabs and have multiple lines of headers thus it is required to adjust import parameters in pandas. All of these data are reported on the level of boroughs but officially one area of London is not a borough – City of London. Therefore, statistics for this area are missing in some datasets.

For safety assessment data regarding crime from the London Datastore will be used. The database is called "Recorded Crime: Geographic Breakdown" and is available here. It covers the last available 24 months only for crimes classified according to Home Office crime classifications. Old classification is available back to January 2008 but in this analysis the last 24 month will be used. This dataset is on .csv format.

Costs of living will be assessed based on the cost of renting a one-room apartment (rent is generally a big portion of expenses) based on the statistics also from the London Datastore. The database is called "Average Private Rents, Borough" and is available here. Data are reported on quarterly basis for local authority areas of England which includes boroughs of London as well as

areas around so it requires subsetting to London only. Rent prices are available for various place types like room, flat, one-bedroom house, two-bedroom house, etc. This dataset is in Excel format.

Additionally a dataset regarding population of London will be used and is available from the London Store. The dataset name is "Nationality – Borough" and is available here. It contains statistics about population in each borough broken down to nationality level. These data are more granular than is required for this analysis so it some aggregation is required. Thee data are provided in .csv format.

Data used for creating choropleth maps are taken from CARTO webpage and are available here. They are provided in GeoJSON format.

3. Exploratory Data Analysis

This section explores datasets and contains data visualisations including spatial representation of data. Geopandas library was used to generate choropleth maps.

3.1. Safety – crime rate

In order to create a meaningful statistic to assess boroughs in terms of safety a crime data was combined with population dataset. Original crime dataset contains count of various crimes committed during last 24 months. All of them were grouped and summed by borough giving a good overview of the situation during the last 2 years in each area. In order to better compare boroughs crime statistics were normalised by number of citizens in each borough. The resultant crime rates for each borough are shown in Figure 2.

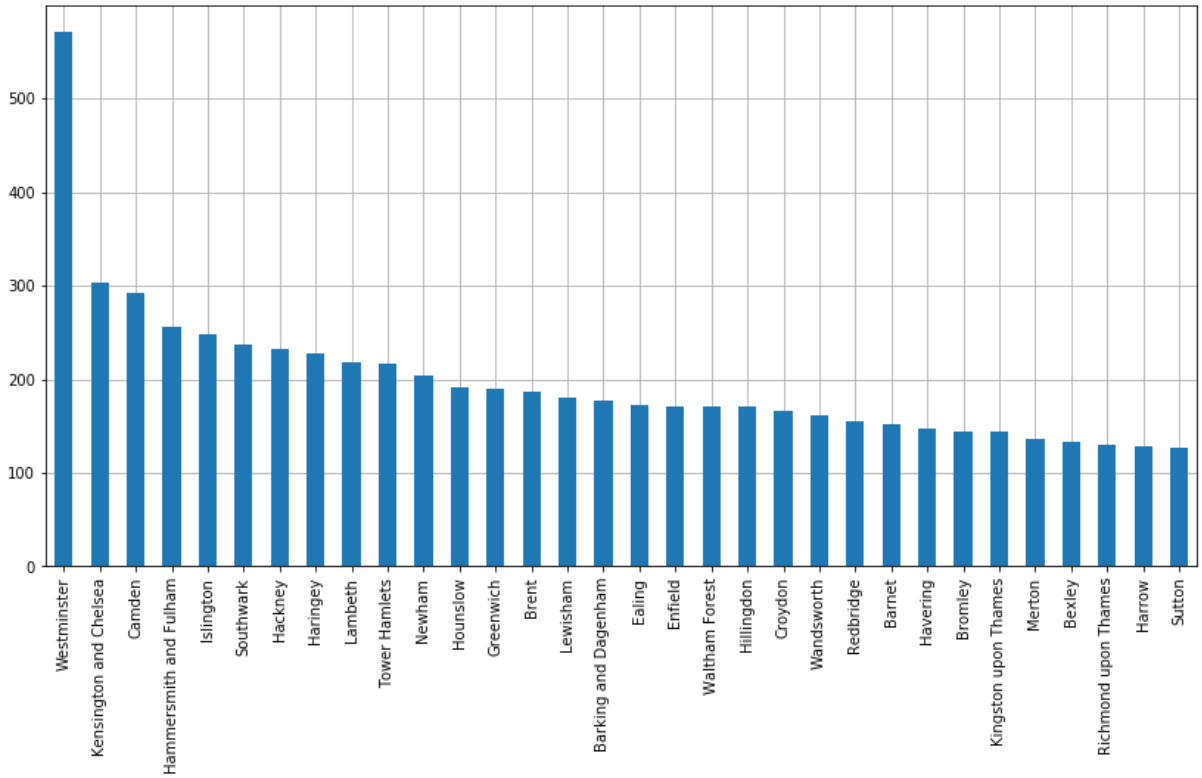

Figure 2 Crime rate from the last 24 months (number of crimes per 1000 citizens)

Closer look at these data reveal that the most dangerous borough is Westminster which is in the centre of the London. It may be slightly biased toward higher number as many of crimes registered are related to tourists who are not included in a population dataset. Size of this effect is difficult to quantify but it's worth to keep this in mind when comparing boroughs. There are also no crimes reported for City of London which officially is not a borough of London. Westminster is followed by Kensington and Chelsea and Camden in terms of the most dangerous places. The safest areas are **Richmond upon Thames, Harrow** and **Sutton**.

A spatial representation of these data is shown in Figure 3.

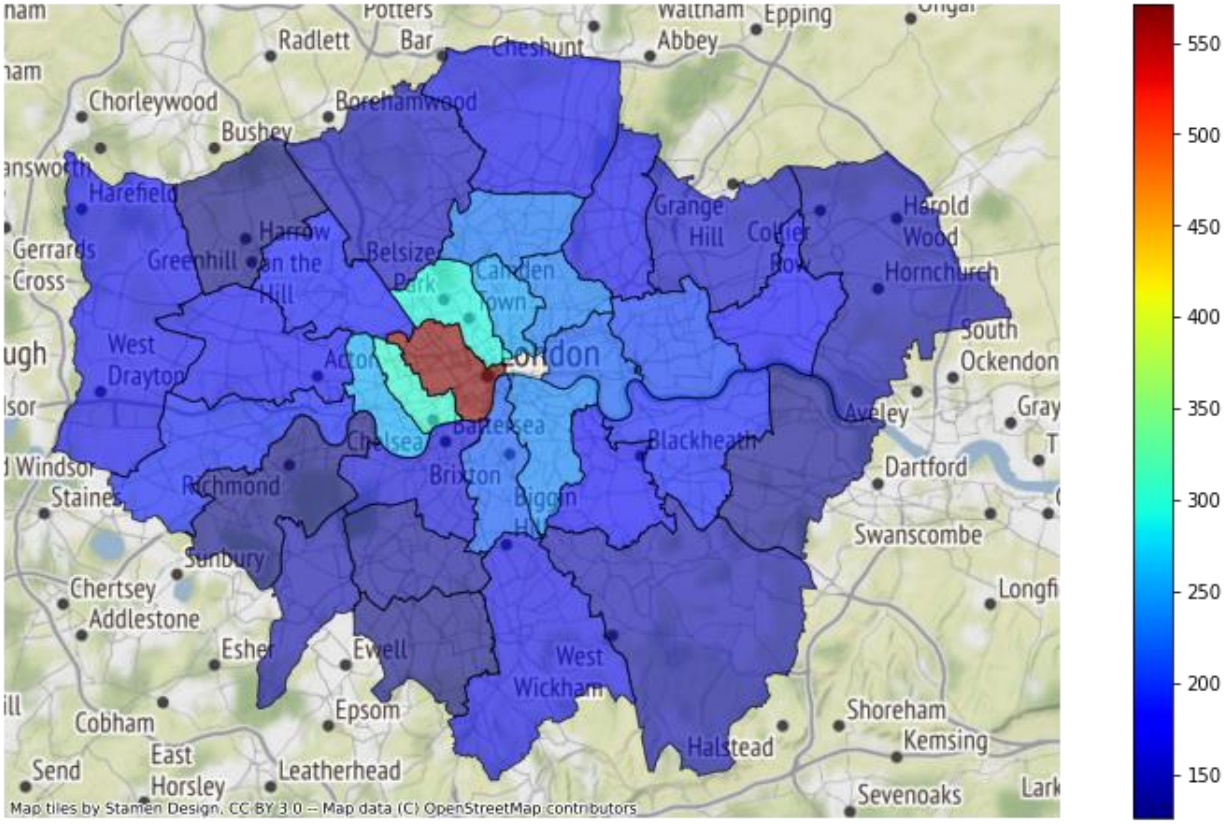

Figure 3 Map of crime rate from the last 24 months (number of crimes per 1000 citizens)

3.2. Rent cost

Rent database contains rent statistics broken down to each borough, year's quarter and type of rented place (room, flat, one-bedroom house, etc.). In this analysis the assumption is the desired place is a one-bedroom house. Average prices for each borough were calculated from the full year of 2018. Results are depicted in Figure 4.

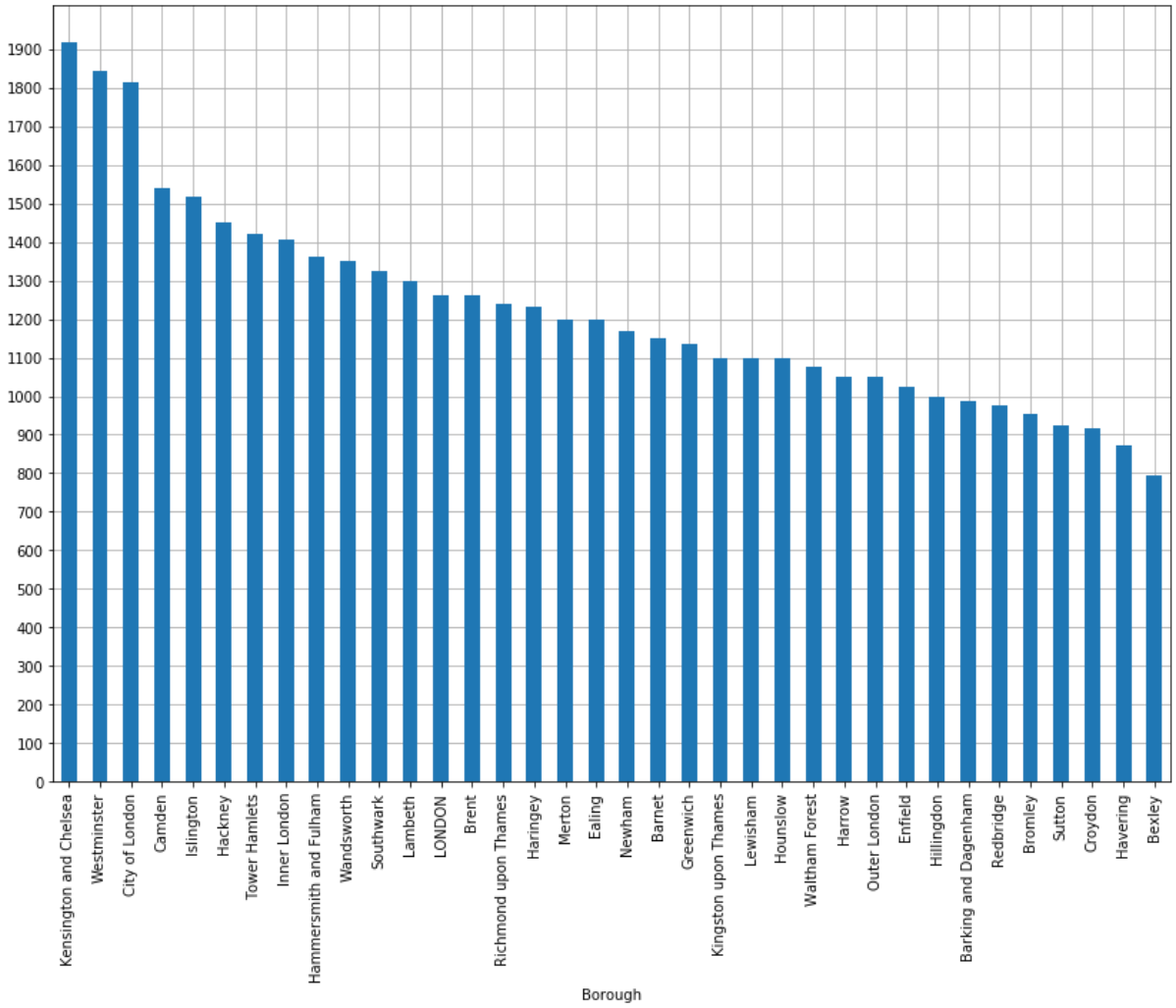

Figure 4 Average price of renting one-bedroom house (pound per month)

The highest rents are in Kensington and Chelsea, Westminster, City of London (officially not a borough of London) and Camden. The rents there are in range of 1500-1900 pounds per month. The cheapest boroughs are **Bexley, Havering** and **Sutton** where rents are in a range of 800-1000 pounds per month.

A spatial representation of these data is shown in Figure 5.

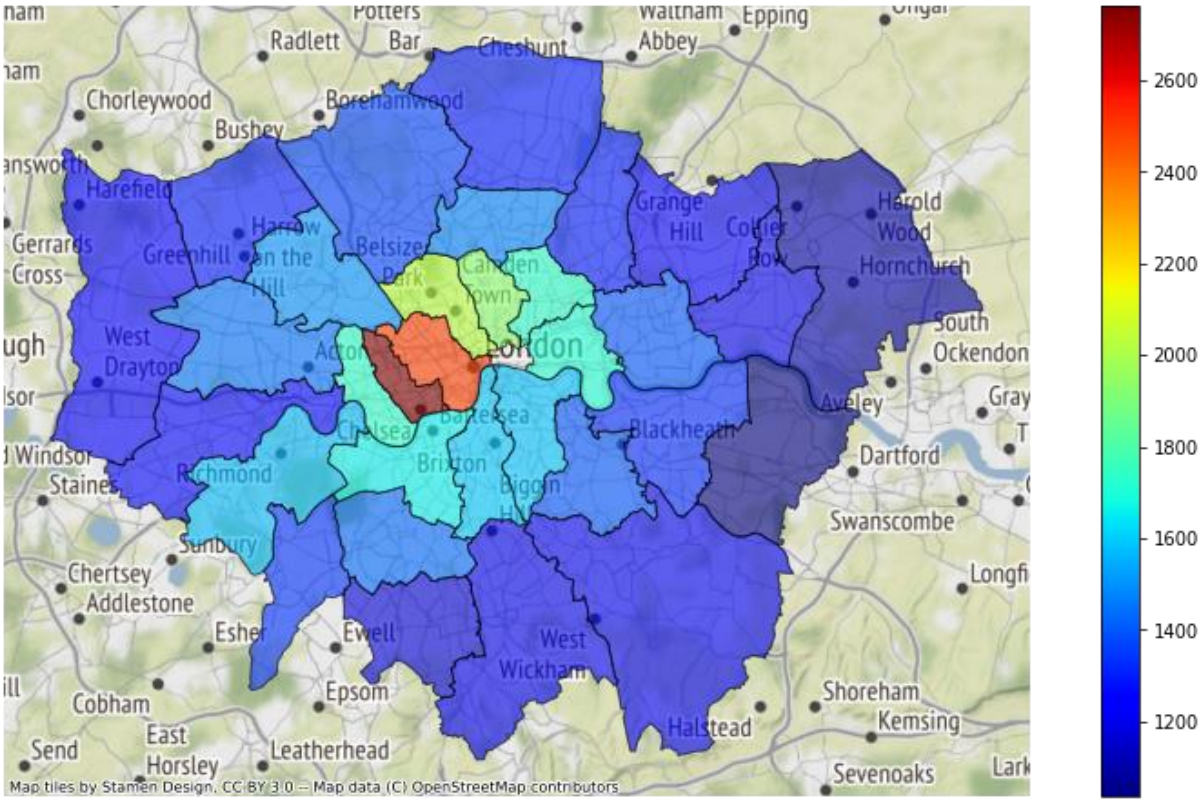

Figure 5 Map of average price of renting one-bedroom house (pound per month)

3.3. Amenities

Foursquare API was used to retrieve positions of restaurants to assess the attractiveness of various areas. As the single call can retrieve maximum 50 venues, I had to generate some scanning points dispersed over London providing good area coverage. There are in total 63 points which can theoretically provide 3150 venues. These points are shown in Figure 6.

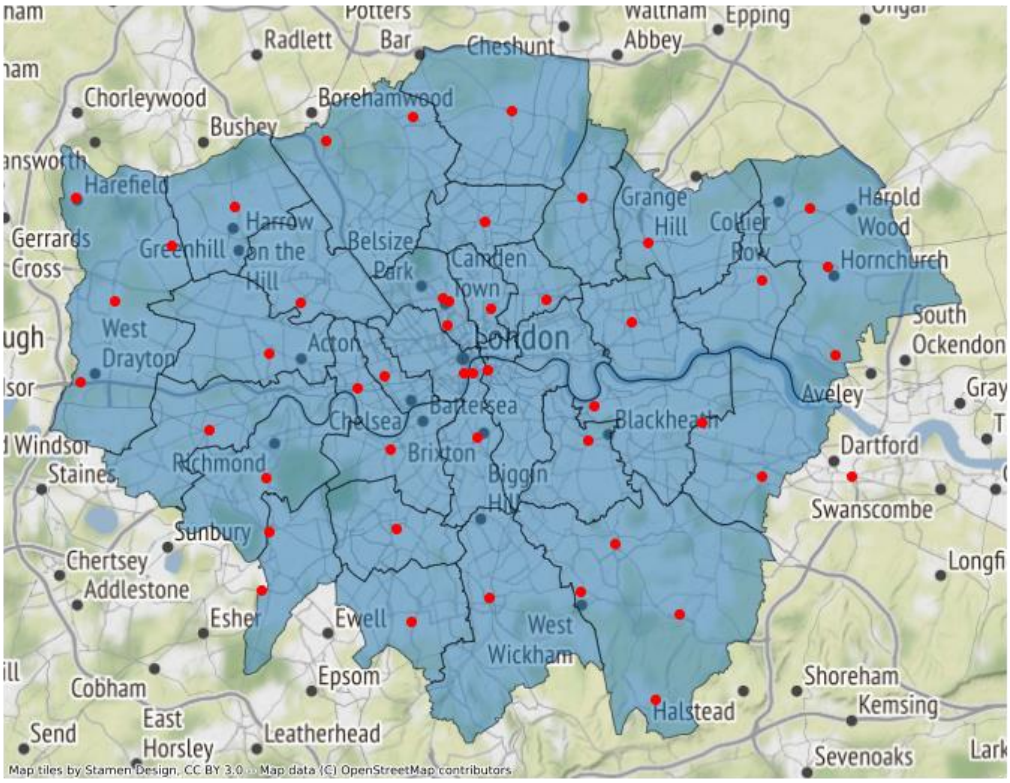

Figure 6 Scanning points used to retrieve venues locations from Foursquare API.

Obtained venues are depicted on the Figure 7.

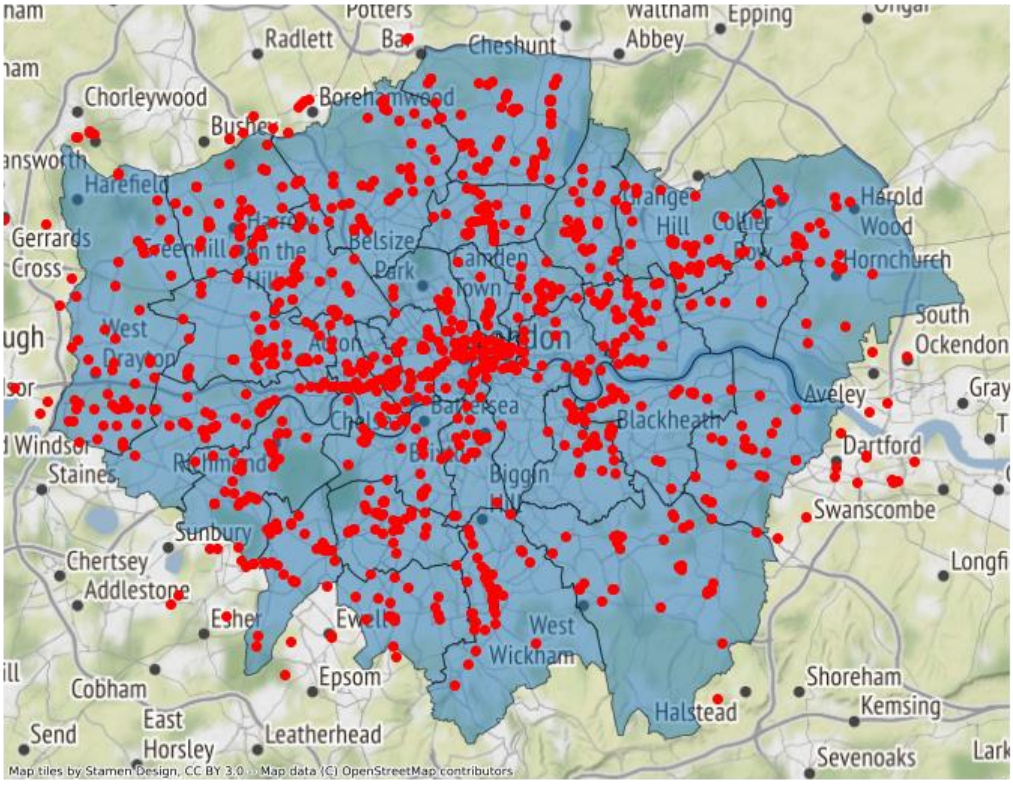

Figure 7 Restaurants locations obtained from Foursquare API

As a result of querying Foursquare API 1237 locations were provided. Assuming this is a representative sample and by counting number of points in each borough we obtain a total number of restaurants for each area. This is shown in Figure 8.

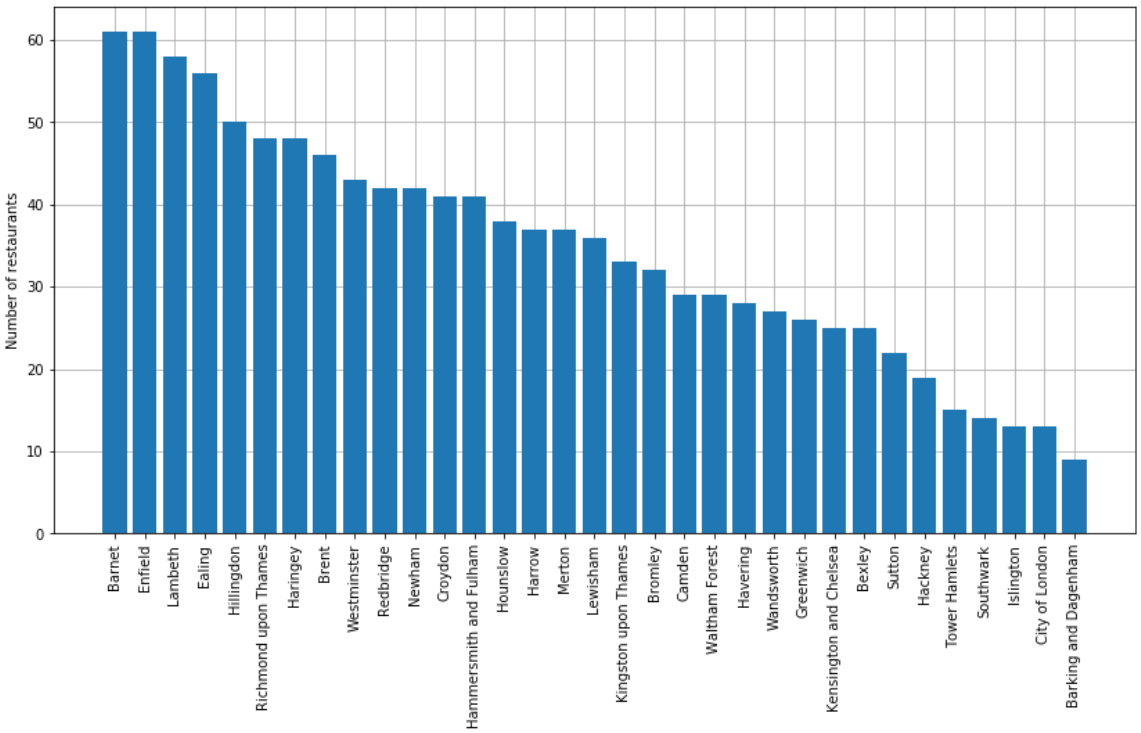

Figure 8 Number of restaurants in each borough

The biggest number of restaurants is in **Barret, Enfield, Lambeth** and **Ealing**. The smallest number is in Barking and Dagenham.

4. Results

From the conducted analysis the most recommended boroughs for setting up a freelance office are **Ealing**, **Enfield** and **Lambeth**. They offer a good balance of the three main aspects being considered in this analysis

5. Discussion

This analysis is based on a fixed set of assumptions described in section 1.2 and the result will change based on their definition. Also, number of factors and associated datasets will influence the decision. Moreover, this analysis is based on the assumption that all three aspects are equally important which may not be true in all circumstances.

6. Conclusion

This report shows how to combine and use public data in combination with RESTful API of Foursquare in order to select a recommended location for a freelance office in London. The final result depends strongly on the personal preferences defined in analysis assumptions. For the current set of requirements three boroughs were selected: **Ealing**, **Enfield** and **Lambeth**.