CAPSTONE PROJECT REPORT

Capstone Project - The Battle of Neighborhoods

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Battle of neighbourhoods in London

1. Introduction

1.1 Background

Many people move from one place to another for various reasons like career, family etc. One of the attractive destinations is London. People who want to relocate from one location to another location need to go through many challenging steps. This will be even more challenging for people moving from different country. In addition, one need to select right location within in the city live in a new city people would consider many aspects which include, safety, schools, good transportation, distance to work location, medical facilities in the neighbourhood, and many more.

1.2 Problem definition

London as a city has many neighbourhoods with each one having different benefits to offer to the residents. One of the most important parameters for a person moving to London or any city is to select right neighbourhood which is safe for oneself and family.

The problem definition for this project is to identify the best boroughs (top three) on safety and perform analysis of its neighbourhoods for key venues. This is performed using crime data available from public sources across different boroughs of London using statistical data analysis methods.

1.3 Interested/Target audience

The people planning to relocate to London are the target audience for this project. These people will be interested to know the safe boroughs and associated neighbourhoods in London for relocation and also explore different venues in each neighbourhood that are of interest so that one can select most suitable neighbourhoods based on the venues of interest within safe boroughs identified.

2. Data used for the project

For the purpose of this project the following different sources of data are used.

2.1 List of London boroughs

https://en.wikipedia.org/wiki/List_of_London_boroughs
This is a Wikipedia page with list of local authority districts / boroughs in London. We will read the tables in the page and extract the details of boroughs available in the tables.
The two tables are:

- List of boroughs and local authorities
- City of London

The table(s) has/have following columns.

- Borough
- Inner
- Status
- Local authority
- Political control
- Headquarters
- Area (sq mi)
- Population (2013 est) / (2011 est)
- Co-ordinates
- Nr. In map

We will use these tables to extract the list of boroughs in London.

2.2 Recorded Crime: Geographic Breakdown

This data is obtained from London Data store (https://data.london.gov.uk/). This data counts the number of crimes at different geographic levels of London (borough, ward, LSOA) per month, according to crime type. Data is available in two files for each level of geography - the most up to date data covering the last available 24 months only and one covering all historic full calendar years. We have considered **MPS Borough Level Crime (most recent 24 months)** for the purpose of this project. This currently only covers the most recent 24 months of data.

Below is a list of the crime types covered under the new HO categories:

Major Category: Minor Category
Arson and Criminal Damage - Arson / Criminal Damage

Burglary: Burglary - Business and Community / Burglary - Residential**

Drug Offences: Drug Trafficking / Possession of Drugs

Miscellaneous Crimes Against Society: Absconding from Lawful Custody / Bail Offences / Bigamy / Concealing an Infant Death Close to Birth / Dangerous Driving / Disclosure, Obstruction, False or Misleading State / Exploitation of Prostitution / Forgery or Use of Drug Prescription / Fraud or Forgery Associated with Driver Records / Going Equipped for Stealing / Handling Stolen Goods / Making,

Supplying or Possessing Articles for use i / Obscene Publications / Offender Management Act / Other Forgery / Other Notifiable Offences / Perjury / Perverting Course of Justice / Possession of False Documents / Profitting From or Concealing Proceeds of Crime / Soliciting for Prostitution / Threat or Possession With Intent to Commit Crimina / Wildlife Crime

Possession of Weapons: Other Firearm Offences / Possession of Firearm with Intent / Possession of Firearms Offences / Possession of Other Weapon / Possession of Article with Blade or Point

Public Order Offences: Other Offences Against the State, or Public Order / Public Fear Alarm or Distress / Racially or Religiously Aggravated Public Fear / Violent Disorder

Robbery: Robbery of Business Property / Robbery of Personal Property

Sexual Offences: Other Sexual Offences / Rape

Theft: Bicycle Theft / Other Theft / Shoplifting / Theft from Person

Vehicle Offences: Aggravated Vehicle Taking / Interfering with a Motor Vehicle / Theft from a Motor Vehicle / Theft or Taking of a Motor Vehicle

Violence Against the Person: Homicide / Violence with Injury / Violence without Injury

The web page for this data is
https://data.london.gov.uk/dataset/recorded_crime_summary

The actual file of the data considered for this project is at:
https://data.london.gov.uk/download/recorded_crime_summary/d2e9ccfc-a054-41e3-89fb-53c2bc3ed87a/MPS%20Borough%20Level%20Crime%20%28most%20recent%2024%20months%29.csv'

2.3 List of London neighbourhoods in the top three safe boroughs

Based on the analysis of crime data it is found that the top three safe boroughs in London are: Kingston upon Thames, Sutton and Richmond upon Thames.

For the detailed analysis of these boroughs and its neighbourhoods, the following Wikipedia pages are used as source for collecting the list of neighbourhoods/districts within these three boroughs.
https://en.wikipedia.org/wiki/London_Borough_of_Sutton
https://en.wikipedia.org/wiki/Royal_Borough_of_Kingston_upon_Thames
https://en.wikipedia.org/wiki/London_Borough_of_Richmond_upon_Thames
Note: For this section, the list of neighbourhoods are collected manually

2.4 Other sources:

a. Geocoder package: It is used to obtain the Latitude and Longitudes of a given location.
b. Foursquare APIs are used to obtain the venue details for a given location.

3. Project Methodology

The project is executed as per the following major steps.

a. Collect and process the list of boroughs in London

To start with we collect the list of boroughs from wiki page https://en.wikipedia.org/wiki/List_of_London_boroughs

This page has two tables from which the names of the boroughs in London need to be collected. BeautifulSoup package is used to obtain the tables from the web page. The tables are processed to have common column names.

The details of data frame after merging and processing is given below and it has 33 boroughs identified.

```
df_London_boroughs.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 33 entries, 0 to 32
Data columns (total 10 columns):
Borough              33 non-null object
Inner                4 non-null object
Status               5 non-null object
Local authority      33 non-null object
Political control    33 non-null object
Headquarters         33 non-null object
Area (sq mi)         33 non-null float64
Population           33 non-null int64
Co-ordinates         33 non-null object
Nr. in map           33 non-null int64
dtypes: float64(1), int64(2), object(7)
memory usage: 2.7+ KB
```

```
df_London_boroughs.shape
```

```
(33, 10)
```

b. Collect and process the borough wise recent crime data in London

As a next step, the recent borough wise crime data in London is obtained from London Data store (https://data.london.gov.uk/). This data counts the number of crimes at different geographic levels of London (borough, ward, LSOA) per month, according to crime type. We have considered **MPS Borough Level Crime (most recent 24 months)** for this project.

The original table has,

```
df_london_crime_data.shape
```

```
(1584, 27)
```

Following picture shows number of crimes recorded in 24 months across the different Major Crime types.

```
df_london_crime_data['MajorCrimeCategory'].value_counts()
```

```
Miscellaneous Crimes Against Society    613
Possession of Weapons                   152
Theft                                   132
Vehicle Offences                        132
Public Order Offences                   129
Violence Against the Person              97
Sexual Offences                          66
Arson and Criminal Damage                66
Drug Offences                            66
Burglary                                 66
Robbery                                  65
Name: MajorCrimeCategory, dtype: int64
```

The following image shows the re-structured table with number of crimes across Major Crime category for each borough.

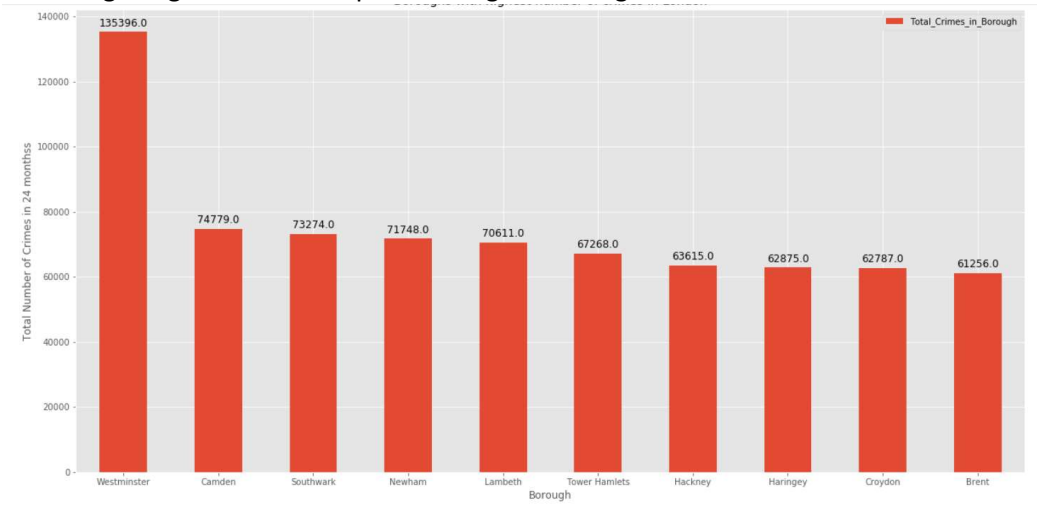
```
df_pivot_london_crime_data['Total_Crimes_in_Borough'] = df_pivot_london_crime_data.sum(axis=1)
df_pivot_london_crime_data.head()
```

MajorCrimeCategory	Borough	Arson and Criminal Damage	Burglary	Drug Offences	Miscellaneous Crimes Against Society	Possession of Weapons	Public Order Offences	Robbery	Sexual Offences	Theft	Vehicle Offences	24months_Total Violence Against the Person	Total_Crimes_in_Borough
0	Barking and Dagenham	3039	3195	1960	532	355	2031	1913	1148	6911	5342	11365	37791
1	Barnet	4032	7432	1512	716	358	3360	1724	1189	13336	10633	13477	57769
2	Bexley	3210	3387	1255	439	234	2005	692	764	5834	5164	9093	32077
3	Brent	4307	6084	3509	742	561	3686	2986	1379	12268	8523	17211	61256
4	Bromley	4171	5233	1588	587	397	3035	976	1161	10494	7070	11953	46665

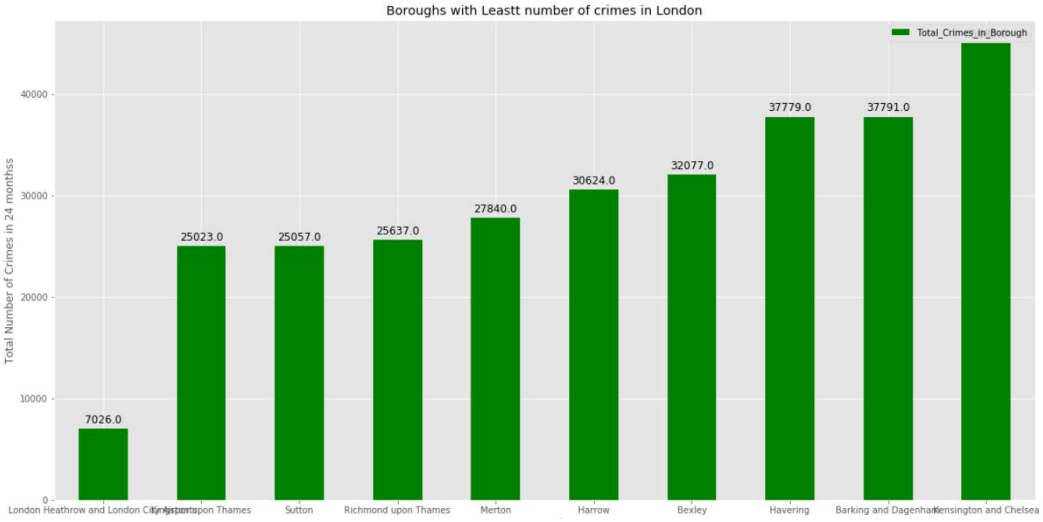
c. Perform analysis to identify top three safe boroughs in London based on the crime data

From the above analysis we have data ready to sort the table based on total number of crimes across each borough.

Following image shows the top 10 boroughs with highest number of total crimes.



Another view is to identify the top 10 boroughs with least number of crimes.



For our project we need to identify the top three safe boroughs.

From the above picture we can understand that the borough “London Heathrow and London city airports” has the least number of crimes reported. But we would prefer not to consider airport for our living, hence we select the next top three boroughs.

The top three boroughs considered for our further analysis are:

i. Kingston upon Thames,
ii. Sutton and
iii. Richmond upon Thames.

d. Collect list of neighbourhoods and associated geographical coordinates to prepare a table of top three safe boroughs

Now collect list of neighborhoods in and around the top three safe boroughs. This is done manually using the Wikipedia pages.

Collect list of neighbourhoods for the three best boroughs with least number of crimes

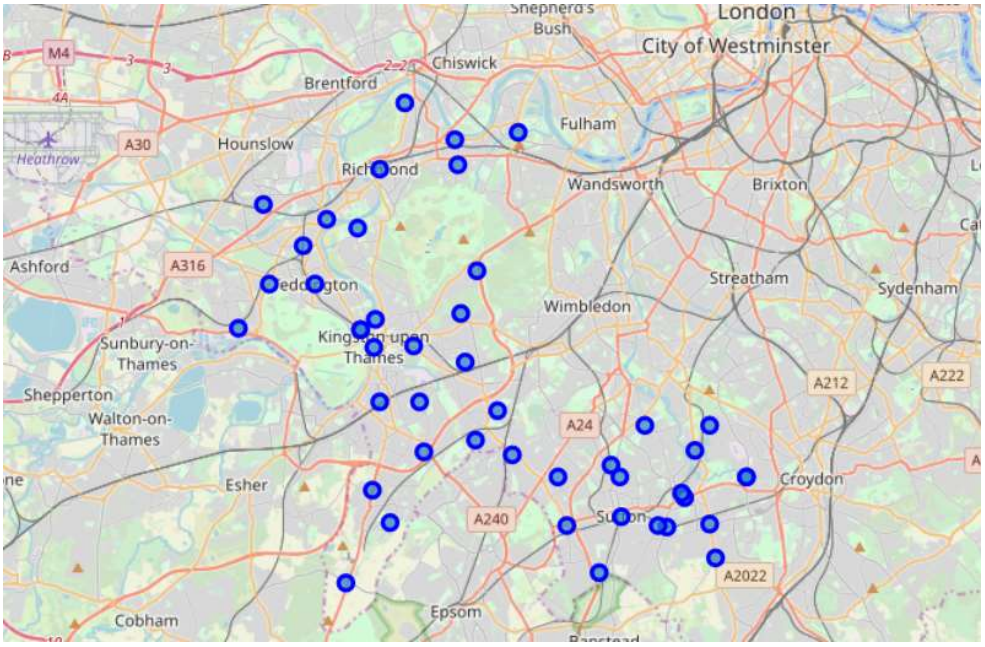
```
Sutton_neighbourhood = ['Bandon Hill', 'Beddington', 'Beddington Corner', 'Belmont', 'Benhilton', 'Carshalton',
                        'Carshalton Beeches', 'Carshalton on the Hill', 'Cheam', 'Hackbridge',
                        'Little Woodcote', 'North Cheam', 'Rosehill', 'St. Helier', 'South Beddington',
                        'Sutton principal town',  'Sutton Common', 'Sutton High Street','The Wrythe',
                        'Wallington', 'Woodcote Green', 'Worcester Park']
```

```
Richmond_upon_Thames_neighbourhood = ['Barnes', 'East Sheen', 'Ham and Petersham', 'Hampton', 'Hampton Hill',
                                      'Hampton Wick', 'Kew', 'Mortlake', 'Richmond and Richmond Hill',
                                      'Strawberry Hill', 'St Margarets and East Twickenham', 'Teddington',
                                      'Twickenham', 'Whitton and Heathfield']
```

```
Kingston_upon_Thames_neighbourhood = ['Berrylands', 'Canbury', 'Chessington', 'Coombe', 'Hook',
                                      'Kingston upon Thames', 'Kingston Vale', 'Malden Rushett',
                                      'Motspur Park', 'New Malden', 'Norbiton', 'Old Malden', 'Hampton Wick',
                                      'Surbiton', 'Tolworth']
```

Using geolocator.geocode, obtain the longitude and latitude for each neighbourhood and prepare a table with neighbourhoods for top three safe boroughs.

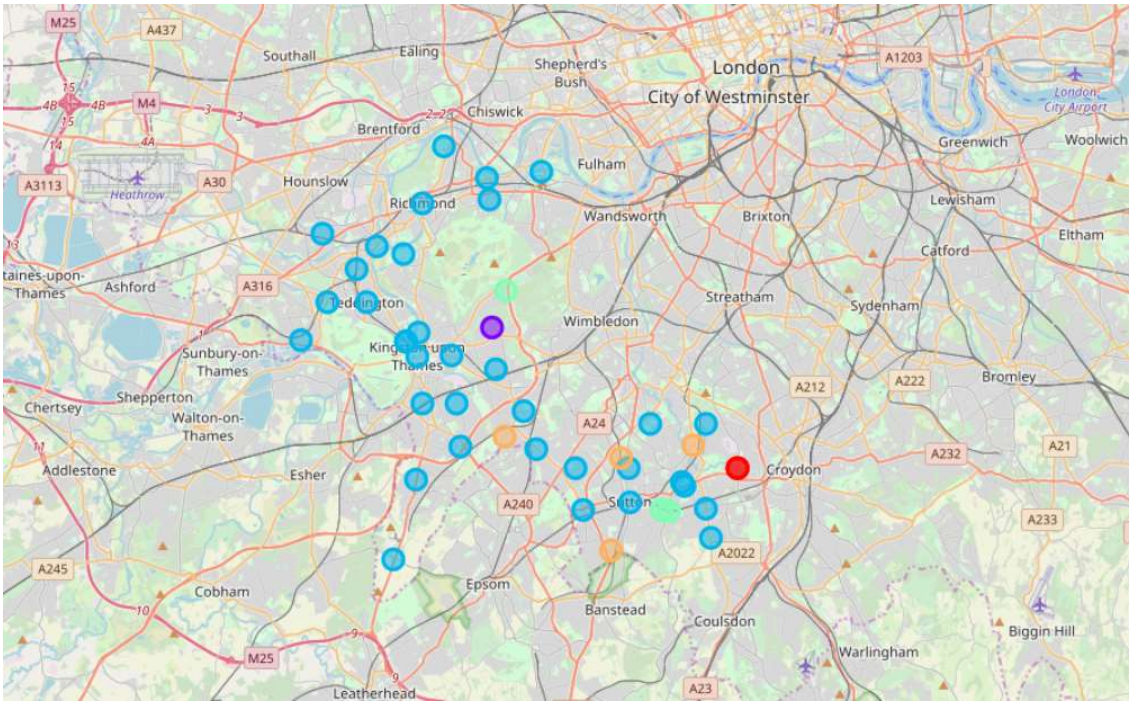
Following map shows the neighbourhoods in the top three safe boroughs of London.



e. **Perform detailed analysis of venues within/around these neighbourhoods using K-Means clustering and identify ten common venues**.
Now use Foursquare APIs to obtain the venues using neighbourhoods and corresponding coordinates (latitude & longitudes). Using the data returned from Foursquare API, we will do further analysis of neighbourhoods and associated venues.
Initially categorize each venue based on its "Venue Category" and group them according to their neighbourhoods. Identify the top five and ten most common venues for each neighbourhood. For this purpose one hot encoding of venues is done.
Now perform K-Means clustering of neighbourhoods into 5 different clusters. This is to identify the similar neighbourhoods in the top three safe boroughs. It does grouping of neighbourhoods with similar venues. This helps people look for neighbourhoods with venues of their interests.

4. Results

There are 46 neighbourhoods identified across top three safe boroughs and using K-Means clustering algorithm we have grouped them into five different clusters. Each colour below show different clusters.



Further analysis of each cluster.

Cluster-1:

Cluster-1 has only two neighbourhoods with Hardware store, Indian restaurant, Pub, Park etc as most common venues in this cluster. People interested in these venues would like live in Cluster-1 neighbourhoods.

```
# Cluster -1
london_merged[london_merged['Cluster Labels'] == 0]
```

	Neighbourhood	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
14	Beddington	Sutton	51.371988	-0.132393	0	Hardware Store	Indian Restaurant	Pub	Park	Women's Store	Donut Shop	Fast Food Restaurant	Farmers Market	Falafel Restaurant	English Restaurant
25	South Beddington	Sutton	51.371988	-0.132393	0	Hardware Store	Indian Restaurant	Pub	Park	Women's Store	Donut Shop	Fast Food Restaurant	Farmers Market	Falafel Restaurant	English Restaurant

Cluster-2:

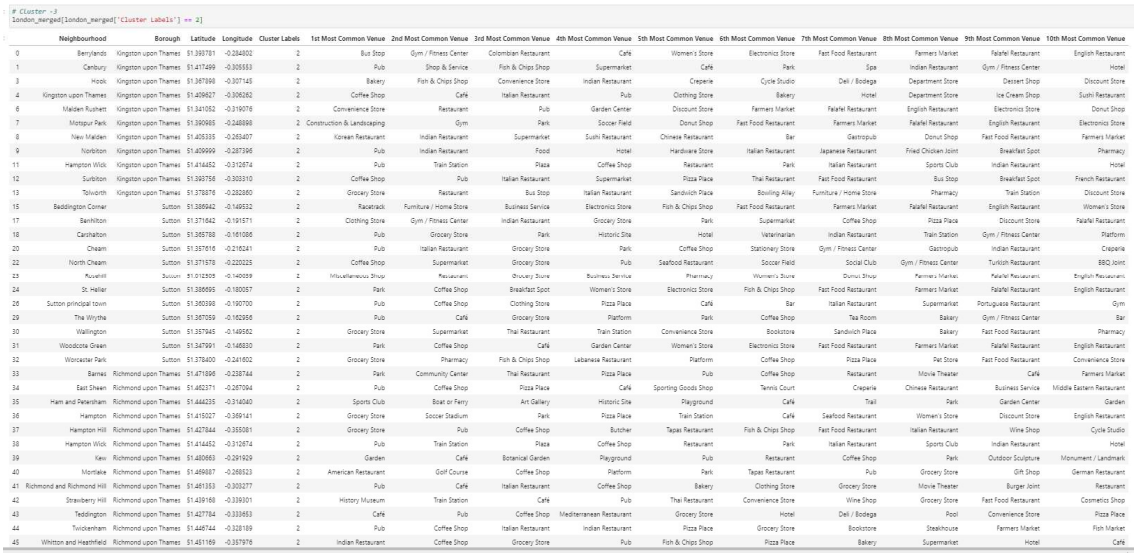
Cluster-2 has only one neighbourhood with Tea Room, Women's store, Food, Fish & chips shop and Fast food restaurant as key most common venues of this neighbourhood.

```
# Cluster -2
london_merged[london_merged['Cluster Labels'] == 1]
```

	Neighbourhood	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
2	Coombe	Kingston upon Thames	51.41945	-0.265398	1	Tea Room	Women's Store	Food	Fish & Chips Shop	Fast Food Restaurant	Farmers Market	Falafel Restaurant	English Restaurant	Electronics Store	Donut Shop

Cluster-3:

Cluster-3 is the largest cluster with 36 neighbourhoods. This cluster has Pub, Restaurant, Coffee shop, Café, Gym, Park, Italian restaurant, Indian restaurant etc are most common venues of this cluster. This cluster has much wider types of venues.



```
# Cluster -3
london_merged[london_merged['Cluster Labels'] == 2]
```

	Neighbourhood	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	Bus Stop	Gym / Fitness Center	Colombian Restaurant	Café	Women's Store	Electronics Store	Fast Food Restaurant	Farmers Market	Falafel Restaurant	English Restaurant
1	Canbury	Kingston upon Thames	51.417499	-0.305553	2	Pub	Shop & Service	Fish & Chips Shop	Supermarket	Café	Park	Spa	Indian Restaurant	Gym / Fitness Center	Hotel
3	Hook	Kingston upon Thames	51.367898	-0.307145	2	Bakery	Fish & Chips Shop	Convenience Store	Indian Restaurant	Creperie	Cycle Studio	Deli / Bodega	Department Store	Dessert Shop	Discount Store
4	Kingston upon Thames	Kingston upon Thames	51.409627	-0.306262	2	Coffee Shop	Café	Italian Restaurant	Pub	Clothing Store	Bakery	Hotel	Department Store	Ice Cream Shop	Sushi Restaurant
6	Malden Rushett	Kingston upon Thames	51.341052	-0.319076	2	Convenience Store	Restaurant	Pub	Garden Center	Discount Store	Farmers Market	Falafel Restaurant	English Restaurant	Electronics Store	Donut Shop
7	Motspur Park	Kingston upon Thames	51.390985	-0.248898	2	Construction & Landscaping	Gym	Park	Soccer Field	Donut Shop	Fast Food Restaurant	Farmers Market	Falafel Restaurant	English Restaurant	Electronics Store
8	New Malden	Kingston upon Thames	51.405335	-0.263407	2	Korean Restaurant	Indian Restaurant	Supermarket	Sushi Restaurant	Chinese Restaurant	Bar	Gastropub	Donut Shop	Fast Food Restaurant	Farmers Market
9	Norbiton	Kingston upon Thames	51.409999	-0.287396	2	Pub	Indian Restaurant	Food	Hotel	Hardware Store	Italian Restaurant	Japanese Restaurant	Fried Chicken Joint	Breakfast Spot	Pharmacy
11	Hampton Wick	Kingston upon Thames	51.414452	-0.312674	2	Pub	Train Station	Plaza	Coffee Shop	Restaurant	Park	Italian Restaurant	Sports Club	Indian Restaurant	Hotel
12	Surbiton	Kingston upon Thames	51.393758	-0.303310	2	Coffee Shop	Pub	Italian Restaurant	Supermarket	Pizza Place	Thai Restaurant	Fast Food Restaurant	Bus Stop	Breakfast Spot	French Restaurant
13	Tolworth	Kingston upon Thames	51.378676	-0.282680	2	Grocery Store	Restaurant	Bus Stop	Italian Restaurant	Sandwich Place	Bowling Alley	Furniture / Home Store	Pharmacy	Train Station	Discount Store
15	Beddington Corner	Sutton	51.386942	-0.149322	2	Racetrack	Furniture / Home Store	Business Service	Electronics Store	Fish & Chips Shop	Fast Food Restaurant	Farmers Market	Falafel Restaurant	English Restaurant	Women's Store
17	Benhilton	Sutton	51.371642	-0.191571	2	Clothing Store	Gym / Fitness Center	Indian Restaurant	Grocery Store	Park	Supermarket	Coffee Shop	Pizza Place	Discount Store	Falafel Restaurant
18	Carshalton	Sutton	51.365788	-0.161086	2	Pub	Grocery Store	Park	Historic Site	Hotel	Veterinarian	Indian Restaurant	Train Station	Gym / Fitness Center	Platform
20	Cheam	Sutton	51.357616	-0.216241	2	Pub	Italian Restaurant	Grocery Store	Park	Coffee Shop	Stationery Store	Gym / Fitness Center	Gastropub	Indian Restaurant	Creperie
22	North Cheam	Sutton	51.371578	-0.220225	2	Coffee Shop	Supermarket	Grocery Store	Pub	Seafood Restaurant	Soccer Field	Social Club	Gym / Fitness Center	Turkish Restaurant	BBQ Joint
23	Rowhill	Sutton	51.012505	-0.140059	2	Miscellaneous Shop	Restaurant	Grocery Store	Business Service	Pharmacy	Women's Store	Donut Shop	Farmers Market	Falafel Restaurant	English Restaurant
24	St. Helier	Sutton	51.386695	-0.160057	2	Park	Coffee Shop	Breakfast Spot	Women's Store	Electronics Store	Fish & Chips Shop	Fast Food Restaurant	Farmers Market	Falafel Restaurant	English Restaurant
26	Sutton principal town	Sutton	51.360398	-0.190700	2	Pub	Coffee Shop	Clothing Store	Pizza Place	Café	Bar	Italian Restaurant	Supermarket	Portuguese Restaurant	Gym
29	The Wrythe	Sutton	51.367059	-0.162956	2	Pub	Café	Grocery Store	Platform	Park	Coffee Shop	Tea Room	Bakery	Gym / Fitness Center	Bar
30	Wallington	Sutton	51.357945	-0.149582	2	Grocery Store	Supermarket	Thai Restaurant	Train Station	Convenience Store	Bookstore	Sandwich Place	Bakery	Fast Food Restaurant	Pharmacy
31	Woodcote Green	Sutton	51.347991	-0.146030	2	Park	Coffee Shop	Café	Garden Center	Women's Store	Electronics Store	Fast Food Restaurant	Farmers Market	Falafel Restaurant	English Restaurant
32	Worcester Park	Sutton	51.378400	-0.241602	2	Grocery Store	Pharmacy	Fish & Chips Shop	Lebanese Restaurant	Platform	Coffee Shop	Pizza Place	Pet Store	Fast Food Restaurant	Convenience Store
33	Barnes	Richmond upon Thames	51.471896	-0.238744	2	Park	Community Center	Thai Restaurant	Pizza Place	Pub	Coffee Shop	Restaurant	Movie Theater	Café	Farmers Market
34	East Sheen	Richmond upon Thames	51.462371	-0.267094	2	Pub	Coffee Shop	Pizza Place	Café	Sporting Goods Shop	Tennis Court	Creperie	Chinese Restaurant	Business Service	Middle Eastern Restaurant
35	Ham and Petersham	Richmond upon Thames	51.444235	-0.314040	2	Sports Club	Boat or Ferry	Art Gallery	Historic Site	Playground	Café	Trail	Park	Garden Center	Garden
36	Hampton	Richmond upon Thames	51.415027	-0.369141	2	Grocery Store	Soccer Stadium	Park	Pizza Place	Train Station	Café	Seafood Restaurant	Women's Store	Discount Store	English Restaurant
37	Hampton Hill	Richmond upon Thames	51.427844	-0.355081	2	Grocery Store	Pub	Coffee Shop	Butcher	Tapas Restaurant	Fish & Chips Shop	Fast Food Restaurant	Italian Restaurant	Wine Shop	Cycle Studio
38	Hampton Wick	Richmond upon Thames	51.414452	-0.312674	2	Pub	Train Station	Plaza	Coffee Shop	Restaurant	Park	Italian Restaurant	Sports Club	Indian Restaurant	Hotel
39	Kew	Richmond upon Thames	51.480663	-0.291929	2	Garden	Café	Botanical Garden	Playground	Pub	Restaurant	Coffee Shop	Park	Outdoor Sculpture	Monument / Landmark
40	Mortlake	Richmond upon Thames	51.469887	-0.266523	2	American Restaurant	Golf Course	Coffee Shop	Platform	Park	Tapas Restaurant	Pub	Grocery Store	Gift Shop	German Restaurant
41	Richmond and Richmond Hill	Richmond upon Thames	51.461353	-0.303277	2	Pub	Café	Italian Restaurant	Coffee Shop	Bakery	Clothing Store	Grocery Store	Movie Theater	Burger Joint	Restaurant
42	Strawberry Hill	Richmond upon Thames	51.439168	-0.339301	2	History Museum	Train Station	Café	Pub	Thai Restaurant	Convenience Store	Wine Shop	Grocery Store	Fast Food Restaurant	Cosmetics Shop
43	Teddington	Richmond upon Thames	51.427784	-0.333653	2	Café	Pub	Coffee Shop	Mediterranean Restaurant	Grocery Store	Hotel	Deli / Bodega	Pool	Convenience Store	Pizza Place
44	Twickenham	Richmond upon Thames	51.448744	-0.328199	2	Pub	Coffee Shop	Italian Restaurant	Indian Restaurant	Pizza Place	Grocery Store	Bookstore	Steakhouse	Farmers Market	Fish Market
45	Whitton and Heathfield	Richmond upon Thames	51.451169	-0.357976	2	Indian Restaurant	Coffee Shop	Grocery Store	Pub	Fish & Chips Shop	Pizza Place	Bakery	Supermarket	Hotel	Café

Cluster-4:

Cluster-4 has three neighbourhoods with Bakery, Italian restaurant, Grocery store, Discount store, and Fast food restaurant are most most common venues of neighbourhoods of this cluster.

```
# Cluster -4
london_merged[london_merged['Cluster Labels'] == 3]
```

	Neighbourhood	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
5	Kingston Vale	Kingston upon Thames	51.431850	-0.258138	3	Bar	Italian Restaurant	Grocery Store	Soccer Field	Discount Store	Fast Food Restaurant	Farmers Market	Falafel Restaurant	English Restaurant	Electronics Store
19	Carshalton Beeches	Sutton	51.357211	-0.169349	3	Bakery	Italian Restaurant	Grocery Store	Train Station	Discount Store	Fast Food Restaurant	Farmers Market	Falafel Restaurant	English Restaurant	Electronics Store
28	Sutton High Street	Sutton	51.357511	-0.173640	3	Bakery	Park	Grocery Store	Italian Restaurant	Train Station	Donut Shop	Fast Food Restaurant	Farmers Market	Falafel Restaurant	English Restaurant

Cluster-5:

Cluster-5 has four neighbourhoods with Pub, Food, Park, Convenience store, Train Station and donut shop are most most common venues of neighbourhoods of this cluster.

```
# Cluster -5
london_merged[london_merged['Cluster Labels'] == 4]
```

	Neighbourhood	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
10	Old Malden	Kingston upon Thames	51.382484	-0.259090	4	Food	Pub	Train Station	Discount Store	Fast Food Restaurant	Farmers Market	Falafel Restaurant	English Restaurant	Electronics Store	Donut Shop
16	Belmont	Sutton	51.343785	-0.201152	4	Pub	Asian Restaurant	Park	Train Station	Donut Shop	Fast Food Restaurant	Farmers Market	Falafel Restaurant	English Restaurant	Electronics Store
21	Hackbridge	Sutton	51.379613	-0.156754	4	Convenience Store	River	Park	Train Station	Donut Shop	Fast Food Restaurant	Farmers Market	Falafel Restaurant	English Restaurant	Electronics Store
27	Sutton Common	Sutton	51.375373	-0.196032	4	Tennis Court	Gym / Fitness Center	Grocery Store	Athletics & Sports	Park	Train Station	Women's Store	Farmers Market	Falafel Restaurant	English Restaurant

5. Discussion Section

In this project, we identify the top three safe boroughs in London and associated neighbourhoods of interest for the people who want to relocate/move to London. We have seen 33 boroughs in London and the three best boroughs identified are Kingston upon Thames, Sutton and Richmond upon Thames.

One key observation is that Cluster-3 has maximum number of neighbourhoods and highly skewed. This has many types of most common venues. It may be necessary to perform next level of grouping within Cluster-3 to get next level of analysis. Each neighbourhood has good variety of most common venues and it is mostly personal preference to pick the neighbourhood of specific interest.

6. Conclusion

People who want to relocate to London will get benefitted from this project as they get know about the safest boroughs in the city. The analysis also provides details of neighbourhoods and associated most common venues for identifying the specific neighbourhood of interest.
The scope of current project is mainly around safety considering the recent crime data. This can be further expanded with analysis of schools, ethnicity, social economics data, transportation facilities, distance to work location, medical facilities and more and many more. For all such further study, this project can be a good starting point.

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