



The Battle of Neighbourhoods

Applied Data Science Capstone by IBM/Coursera



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Introduction

- London is one of the most popular and multicultural cities in the World. It is diverse and is the financial capital of the UK and Europe. It provides lot of business opportunities and business friendly environment. It is a global hub of business and commerce. The city is a major centre for banking and finance, retailing, world trade, transportation, tourism, real estate, new media, traditional media, advertising, legal services, accountancy, insurance, theatre, fashion, and the arts in Europe. Therefore, London attracts many people, especially young professionals.
- There are many criterions for people who would like to move to London. One of the top concerns is safety when finding a new place. Safety is naturally a really big factor in buying or renting a home. Moreover, it is also important that the area should be lively i.e. close to local amenities. This project aims to find out the top 10 boroughs and explore its neighbourhoods in London.

Data

London Recorded Crime: Geographic Breakdown

Source: London Datastore

https://data.london.gov.uk/dataset/recorded_crime_summary

The main focus is analysing MPS Borough Level Crime (most recent 24 months). Data is taken between 2018-06-01 and 2020-05-31

Size: 1566 * 27

MajorText	MinorText	LookUp_B	201911	201912	202001	202002	202003	202004
Arson and Criminal Damage	Arson	Barking and Dagenham	8	6	4	5	6	2
Arson and Criminal Damage	Criminal Damage	Barking and Dagenham	97	121	97	103	108	82
Burglary	Burglary - Business and Commercial	Barking and Dagenham	30	25	31	17	27	29
Burglary	Burglary - Residential	Barking and Dagenham	114	130	116	123	97	56
Drug Offences	Drug Trafficking	Barking and Dagenham	12	3	11	3	6	9
Drug Offences	Possession of Drugs	Barking and Dagenham	94	79	98	107	102	139
Miscellaneous Crime	Bail Offences	Barking and Dagenham	0	0	0	0	0	0
Miscellaneous Crime	Bigamy	Barking and Dagenham	0	0	0	0	0	0
Miscellaneous Crime	Dangerous Driving	Barking and Dagenham	1	2	2	0	1	0

Data

► List of London Boroughs

Source: Wikipedia

https://en.wikipedia.org/wiki/List_of_London_boroughs

Size: 33 * 10

Borough	Inner	Status	Local authority	Political control	Headquarters	Area (sq mi)	Population (2013 est) ^[1]	Co-ordinates	Nr. in map
Barking and Dagenham ^[note 1]			Barking and Dagenham London Borough Council	Labour	Town Hall, 1 Town Square	13.93	194,352	 51.5607°N 0.1557°E	25
Barnet			Barnet London Borough Council	Conservative	North London Business Park, Oakleigh Road South	33.49	369,088	 51.6252°N 0.1517°W	31
Bexley			Bexley London Borough Council	Conservative	Civic Offices, 2 Watling Street	23.38	236,687	 51.4549°N 0.1505°E	23
Brent			Brent London Borough Council	Labour	Brent Civic Centre, Engineers Way	16.70	317,264	 51.5588°N 0.2817°W	12
Bromley			Bromley London Borough Council	Conservative	Civic Centre, Stockwell Close	57.97	317,899	 51.4039°N 0.0198°E	20
Camden	✓		Camden London Borough Council	Labour	Camden Town Hall, Judd Street	8.40	229,719	 51.5290°N 0.1255°W	11
Croydon			Croydon London Borough Council	Labour	Bernard Weatherill House, Mint Walk	33.41	372,752	 51.3714°N 0.0977°W	19

Data

► Foursquare API

Foursquare API is used to extract venues from selected neighbourhood

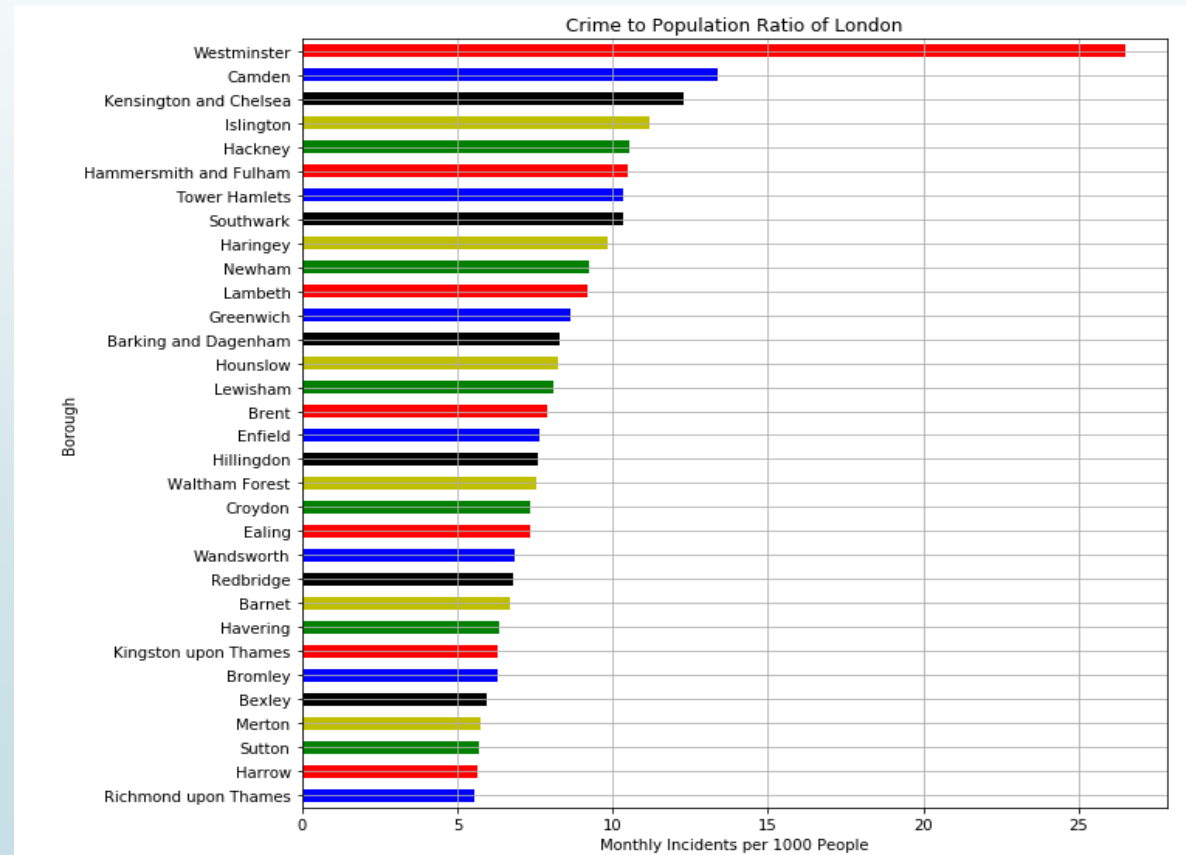
<https://developer.foursquare.com>

Size: 1140 * 7

	Borough	Borough Latitude	Borough Longitude	Venue	Venue Latitude	Venue Longitude	Venue Category
0	Barking and Dagenham	51.5607	0.1557	Central Park	51.559560	0.161981	Park
1	Barking and Dagenham	51.5607	0.1557	Crowlands Heath Golf Course	51.562457	0.155818	Golf Course
2	Barking and Dagenham	51.5607	0.1557	Robert Clack Leisure Centre	51.560808	0.152704	Martial Arts Dojo
3	Barking and Dagenham	51.5607	0.1557	Morrisons	51.559774	0.148752	Supermarket
4	Barking and Dagenham	51.5607	0.1557	Beacontree Heath Leisure Centre	51.560997	0.148932	Gym / Fitness Center

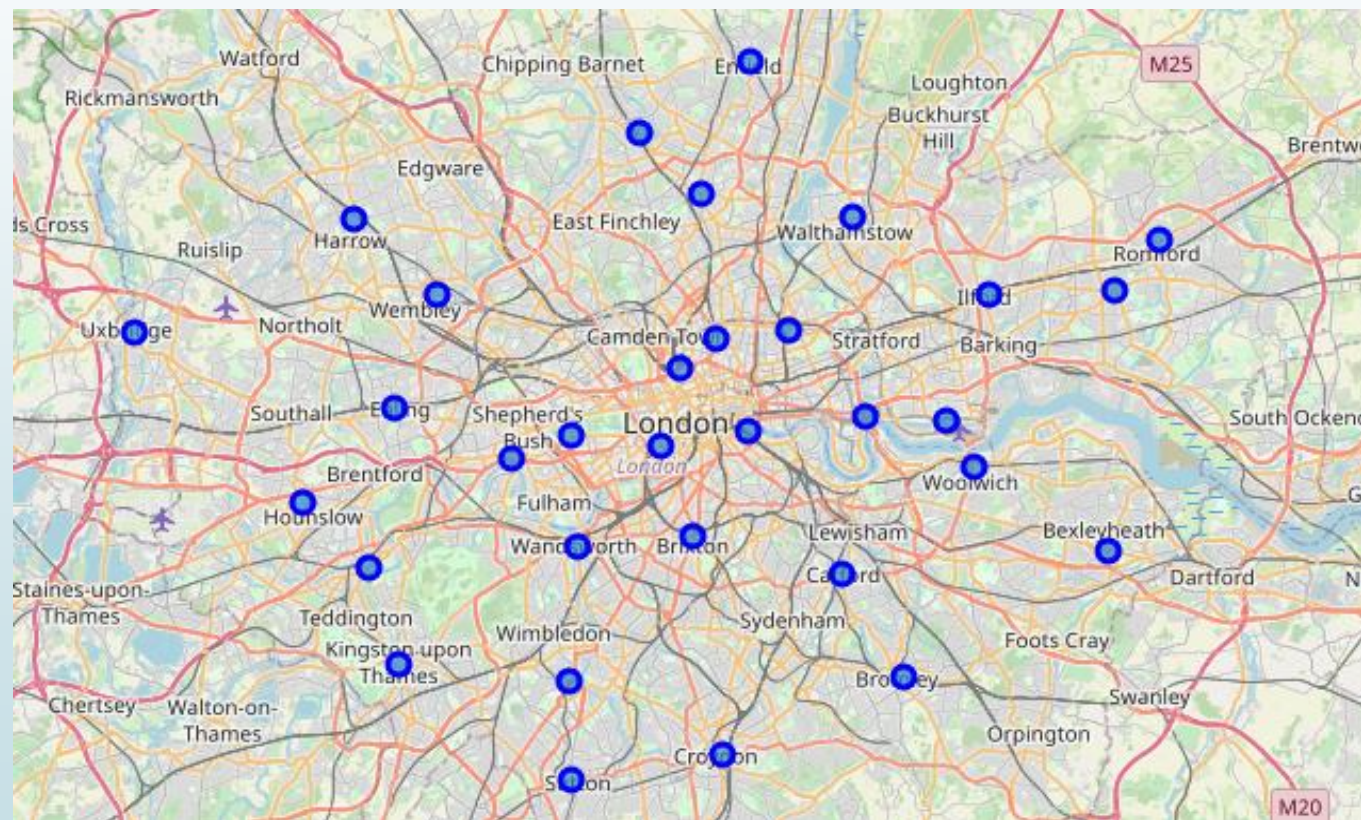
Methodology

- Merged London Recorded Crime and List of Boroughs data and cleaned
- Since population is different for the boroughs, number of recorded crimes for 1000 people has been calculated.



Methodology

- Create a map by using the coordinates from List of Boroughs data to get familiar with London Boroughs



Methodology

- Extract top 50 venues for each neighbourhood by using Foursquare API
- Most popular venues have been grouped as per frequency as below

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----Barking and Dagenham----
      venue  freq
0      Park  0.14
1 Gym / Fitness Center  0.14
2      Pool  0.14
3   Bus Station  0.14
4   Supermarket  0.14
  
```

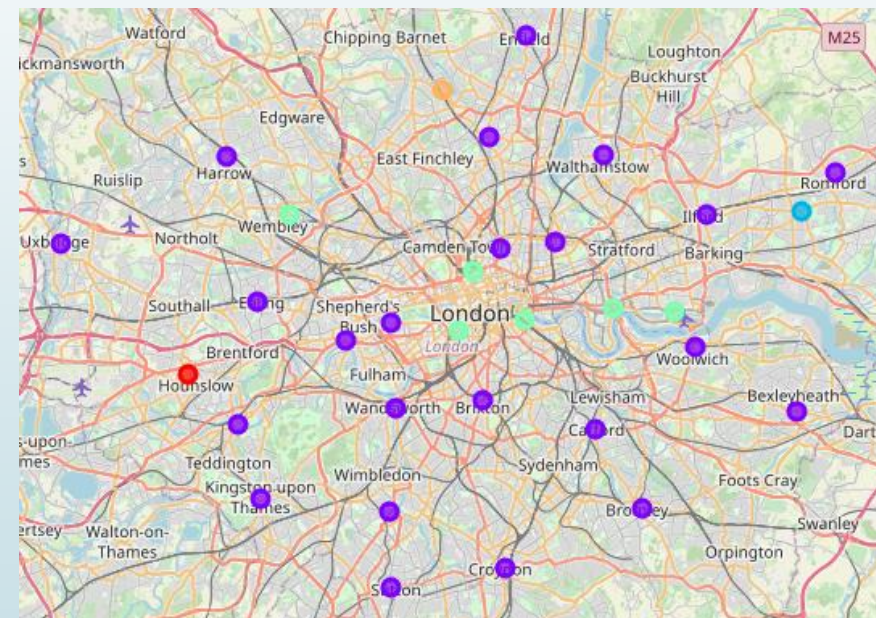
	Borough	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue	6th Most Common Venue	7th Most Common Venue	8th Most Common Venue	9th Most Common Venue	10th Most Common Venue
0	Barking and Dagenham	Golf Course	Pool	Bus Station	Supermarket	Gym / Fitness Center	Park	Martial Arts Dojo	Dumpling Restaurant	Fast Food Restaurant	Farmers Market
1	Barnet	Café	Salon / Barbershop	Bus Stop	Eastern European Restaurant	Fish Market	Film Studio	Fast Food Restaurant	Farmers Market	Event Space	English Restaurant
2	Bexley	Coffee Shop	Pub	Clothing Store	Pharmacy	Fast Food Restaurant	Furniture / Home Store	Supermarket	Italian Restaurant	Hotel	Bakery
3	Brent	Coffee Shop	Hotel	Clothing Store	Grocery Store	Sporting Goods Shop	American Restaurant	Sandwich Place	Bar	Plaza	Roof Deck
4	Bromley	Clothing Store	Coffee Shop	Pizza Place	Gym / Fitness Center	Burger Joint	Irish Pub	Sandwich Place	Café	Chocolate Shop	Pub
5	Camden	Coffee Shop	Café	Hotel	Burger Joint	Breakfast Spot	Deli / Bodega	Pizza Place	Garden	Train Station	Modern European Restaurant

Methodology

► K-Means Clustering

K-Means clustering analysis has been conducted based on the common venue categories

	Borough	MonthlyAverage	Population	Latitude	Longitude	CrimeToPop	Cluster Labels
0	Barking and Dagenham	1613.041667	194352	51.5607	0.1557	8.299589	2
1	Barnet	2478.500000	369088	51.6252	-0.1517	6.715201	4
2	Bexley	1409.666667	236687	51.4549	0.1505	5.955826	1
3	Brent	2508.041667	317264	51.5588	-0.2817	7.905220	3
4	Bromley	1997.083333	317899	51.4039	0.0198	6.282132	1



Results

- In order to find out best neighbours, safety and atmosphere indexes have been calculated based on crime data and clustering analysis
- Total score has been calculated as below

Score = Safety Index + Atmosphere Index

	Borough	CrimeToPop	Cluster Labels	Safety	Atmosphere
0	Barking and Dagenham	8.299589	2	0.867976	0.7
1	Barnet	6.715201	4	0.943574	0.9
2	Bexley	5.955826	1	0.979807	1.0
3	Brent	7.905220	3	0.886793	0.8
4	Bromley	6.282132	1	0.964238	1.0
5	Camden	13.366330	3	0.626219	0.8

Conclusion

- According to the analysis, it has been found that the ten boroughs below are the best places to live based on safety and atmosphere of the neighbourhood.
- The following table is sorted based on Score which is safety index + atmosphere index

	Borough	MonthlyAverage	Population	Latitude	Longitude	CrimeToPop	Safety	Atmosphere	Score
25	Richmond upon Thames	1058.750000	191365	51.4479	-0.3260	5.532621	1.000000	1.0	2.000000
13	Harrow	1375.666667	243372	51.5898	-0.3346	5.652526	0.994279	1.0	1.994279
27	Sutton	1117.750000	195914	51.3618	-0.1945	5.705309	0.991760	1.0	1.991760
22	Merton	1171.458333	203223	51.4014	-0.1958	5.764398	0.988941	1.0	1.988941
2	Bexley	1409.666667	236687	51.4549	0.1505	5.955826	0.979807	1.0	1.979807
4	Bromley	1997.083333	317899	51.4039	0.0198	6.282132	0.964238	1.0	1.964238
19	Kingston upon Thames	1054.625000	166793	51.4085	-0.3064	6.322957	0.962290	1.0	1.962290
14	Havering	1537.791667	242080	51.5812	0.1837	6.352411	0.960884	1.0	1.960884
24	Redbridge	1966.250000	288272	51.5590	0.0741	6.820815	0.938535	1.0	1.938535
30	Wandsworth	2123.583333	310516	51.4567	-0.1910	6.838885	0.937672	1.0	1.937672

Conclusion

- The following map has been created based on top 10 areas



References

- “London Recorded Crime: Geographic Breakdown”, London Datastore
- “List of London Boroughs”, Wikipedia
- Foursquare API
- IBM Professional Data Science Specialization Lecture Notes, Coursera