London Borough Similarities vs their Average House Prices

1.1 Background

London is one of the biggest cities in the world with such a diverse set of boroughs, 32 in total.

The size of London means that it is very difficult for people to be able to discover all of these areas in detail.

Houses in certain areas of London have become mostly unaffordable to new buyers

and it is hard to find good alternatives to these areas.

They may have seen a specific area that they like but it could be out of their price range,

therefore they may want to find another London borough which is similar to that borough but with lower house prices.

This report aims to compare house prices in different London boroughs while grouping neighbourhoods

so that house buyers can find similar areas to ones they liked but with cheaper house prices.

This report will look at amenities in each borough,

the types that mostly occur and the frequency so that similar boroughs can be found.

1.2 Data

This report uses the co-ordinates for each London borough in order to locate them [1].

The Foursquare API is then used to bring back the variety of venues in each borough and the frequency of them.

A London government website provided the average house prices per borough which have been utilised for this project [2].

[1] - https://en.wikipedia.org/wiki/List_of_London_boroughs

[2] - https://data.london.gov.uk/average-house-prices/

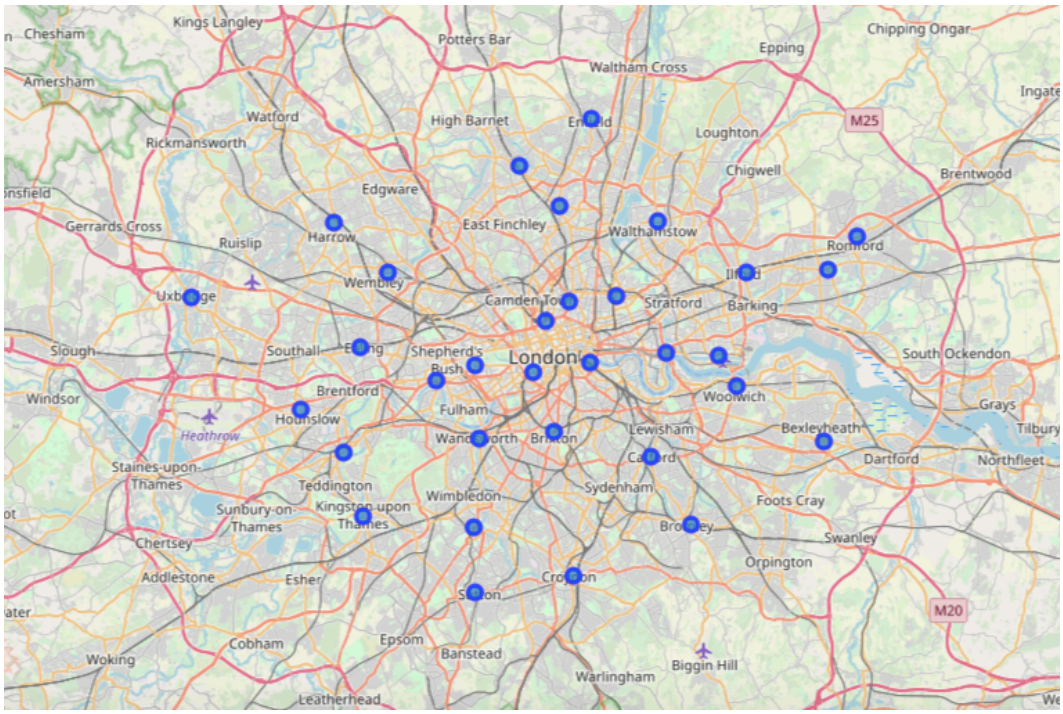
1.3 Methodology

I have used GitHub as my data repository.

I began by importing my data into a Pandas data frame from Wikipedia.

	Borough	Political control	Area (sq mi)	Population (2013 est)[1]	Latitude	Longitude
0	Barking and Dagenham [note 1]	Labour	13.93	194352	51.5607	0.1557
1	Barnet	Conservative	33.49	369088	51.6252	-0.1517
2	Bexley	Conservative	23.38	236687	51.4549	0.1505
3	Brent	Labour	16.70	317264	51.5588	-0.2817
4	Bromley	Conservative	57.97	317899	51.4039	0.0198
5	Camden	Labour	8.40	229719	51.5290	-0.1255

I then added the average house price data into a separate data frame. I used the python folium library and the latitude and longitude coordinates to get a map of London with the boroughs pinned on to it.

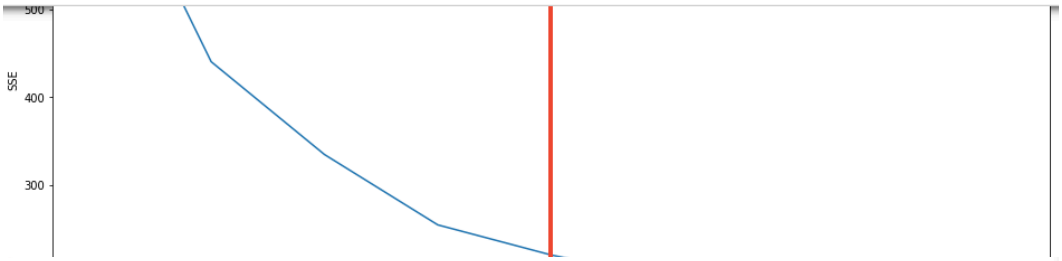


I used the FourSquare API to pull back venue results for each of the borough, limiting the results to 5000 venues and a radius of 1000.

	Borough	Political control	Area (sq mi)	Population (2013 est) [1]	Latitude	Longitude	Parks	Museum	Library	Public Bathroom	...	ATM	Casino	Lake	Cultural Center	Movie Theater	Music Venue	Pu
0	Barking and Dagenham [note 1]	Labour	13.93	194352	51.5607	0.1557	2	0	0	0	...	1	0	1	0	0	0	
1	Barnet	Conservative	33.49	369088	51.6252	-0.1517	3	0	1	0	...	1	0	0	0	0	0	
2	Bexley	Conservative	23.38	236687	51.4549	0.1505	1	1	2	0	...	0	0	0	0	1	0	
3	Brent	Labour	16.70	317264	51.5588	-0.2817	2	0	3	0	...	0	0	0	0	1	4	
4	Bromley	Conservative	57.97	317899	51.4039	0.0198	8	0	1	0	...	1	2	0	0	2	1	

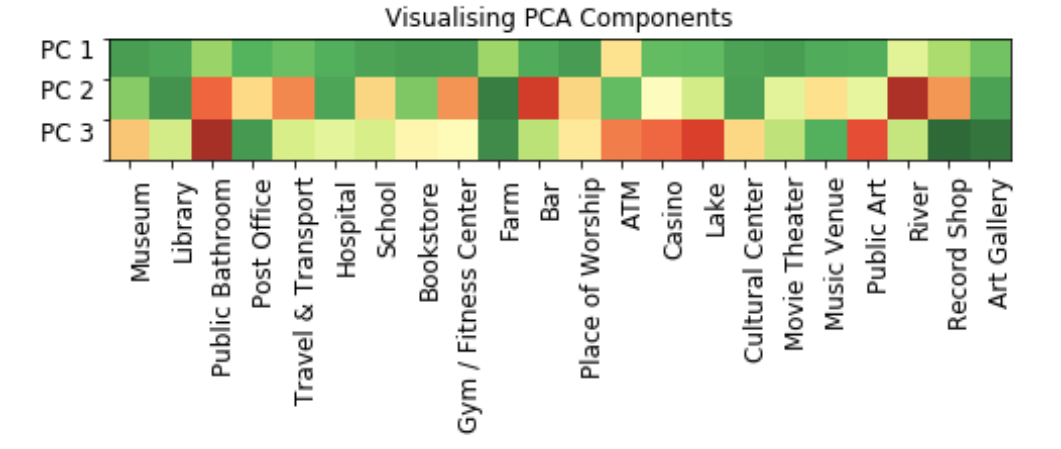
5 rows × 29 columns

I then used the k-means clustering method to find the optimal number of clusters which was 5 and produced the clustered data.

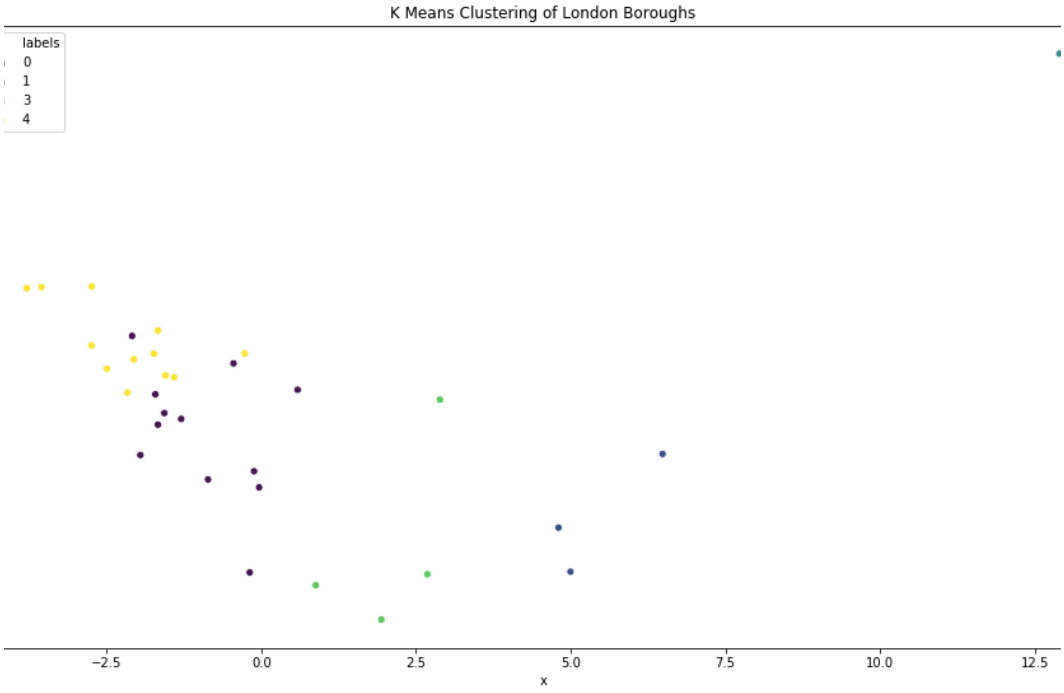


Borough	Latitude	Longitude	Parks	Museum	Library	Public Bathroom	Post Office	Travel & Transport	Hospital	School	...	Casino	Lake	Cultural Center	Movie Theater	Music Venue	Public Art	R
Barking and Dagenham [note 1]	51.5607	0.1557	2	0	0	0	1	6	0	5	...	0	1	0	0	0	0	
Barnet	51.6252	-0.1517	3	0	1	0	0	8	0	2	...	0	0	0	0	0	0	
Bexley	51.4549	0.1505	1	1	2	0	1	16	0	7	...	0	0	0	1	0	0	
Brent	51.5588	-0.2817	2	0	3	0	3	35	3	13	...	0	0	0	1	4	2	
Bromley	51.4039	0.0198	8	0	1	0	2	33	0	12	...	2	0	0	2	1	1	
Camden	51.5290	-0.1255	31	32	30	0	16	50	44	35	...	3	2	5	11	25	25	
Croydon	51.3714	-0.0977	4	2	1	0	4	47	1	15	...	1	0	0	3	6	1	
Ealing	51.5130	-0.3089	9	0	1	0	10	41	0	14	...	0	0	0	5	0	0	

I then used different visualisation tools to explore the data with PCA components.



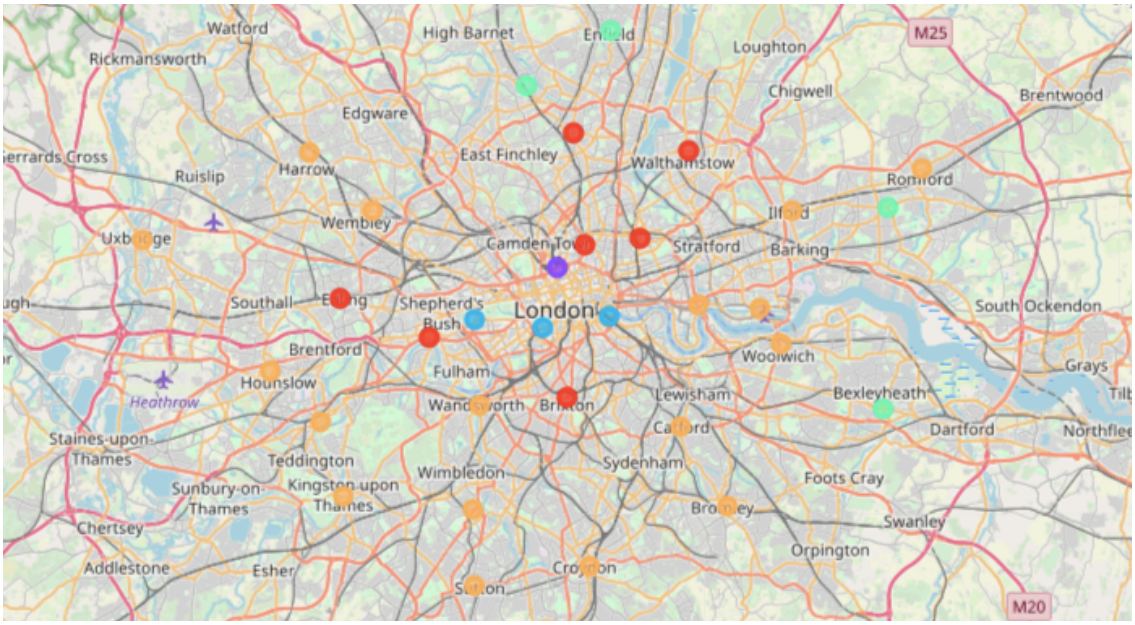
I then clustered the data and we can see the spread of the clusters below. The purple and yellow clusters have some overlap and then green cluster points are quite far apart but the clusters work.



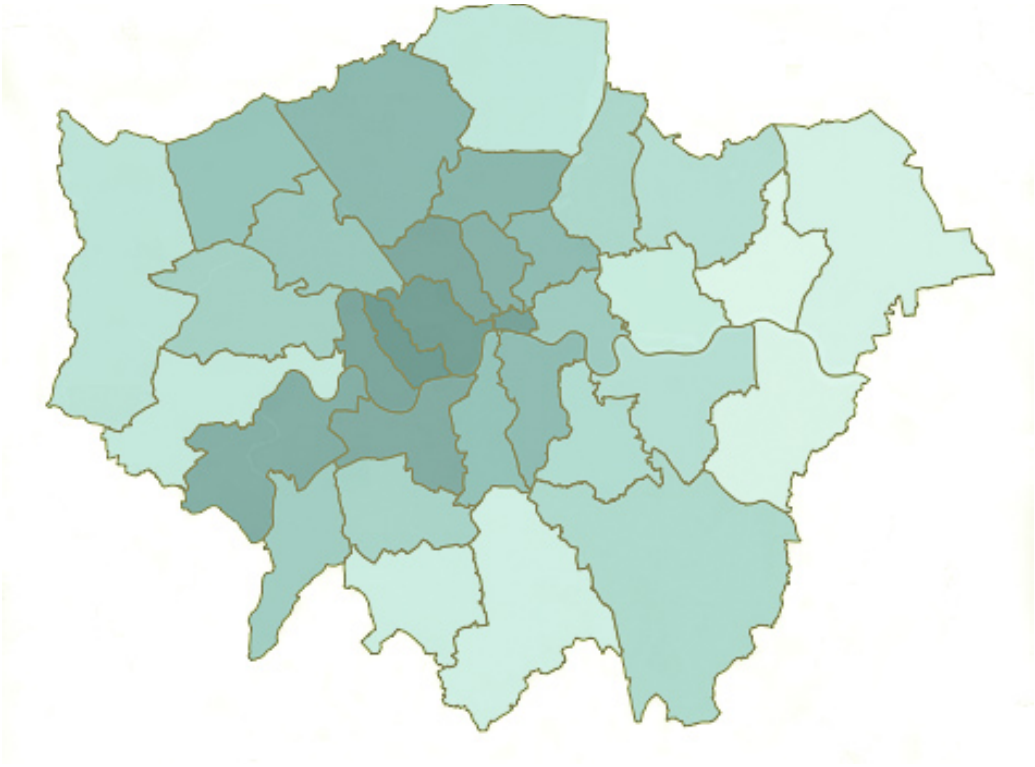
The clusters formed from the data were:

Label 0
Brent, Croydon, Ealing, Greenwich, Haringey, Hillingdon, Hounslow, Kingston upon Thames, Newham, Sutton, Tower Hamlets, Wandsworth
Label 1
Kensington and Chelsea, Southwark, Westminster
Label 2
Camden
Label 3
Hackney, Hammersmith and Fulham, Islington, Lambeth
Label 4
Barking and Dagenham, Barnet, Bexley, Bromley, Enfield, Harrow, Havering, Lewisham, Merton, Redbridge, Richmond upon Thames, Waltham Forest

I then created the map to show how the boroughs are clustered.



When compared to the choropleth map of London with house prices on it, we can see the similarities between the areas with similar venues and the average house price in the area.



1.4 Results

We can see that similar boroughs definitely have more similar average house prices when compared with other boroughs.

The boroughs in central London are more expensive and have more expensive houses, especially in the South West where we have the 3 most expensive boroughs.

Those in North West London are a bit more similar to those surrounding central London and the others on the outskirts are more similar in price and venue selection.

1.5 Discussion

This analysis was used to look at the similarities between different boroughs and to see whether they correlate in any way with house prices. We can see that boroughs with similar venues do seem to have similar house prices but this is a very complex topic and we cannot in any way assume that these similarities are as a result of each other.

It was merely a look in to whether this may be the case as it is more likely that areas with better schools and more high end entertainment are likely to be in those areas with higher house prices and vice versa for the other areas.

Analysis could be done into areas within specific boroughs to look at the different neighbourhoods and how these vary from borough to borough along with price. Are prices steeper by stations and amenities and lower near the less accessible areas?

1.6 Conclusion

We can conclude that though not perfectly similar, there are definitely similarities between the areas with similar amenities and their average house prices. Boroughs are very large in London and therefore different parts of these boroughs will vary greatly but we can see that overall, similar venues tend to occur in similarly priced areas.

This visualisation aims to help people who are trying to get on the property ladder and may not be able to afford to buy in their perfect area. They are able to look at this map and look for areas which seem similar to their ideal area but are slightly more affordable.

1.7 References

[1] - https://en.wikipedia.org/wiki/List_of_London_boroughs

[2] - https://data.london.gov.uk/average-house-prices/