

# The Battle of the Neighborhoods

Finding the best place to build a student hall in London

# 1. Problem

- London is one of the most popular destinations for international students. However, they can sometimes have a hard time finding a place to live. It is not easy to secure a safe place with affordable rent.
- Student halls can provide a solution to that, as they provide safe places for students to start their study-abroad life.
- Therefore, this project aims to find the best place to build a student hall in terms of the appropriateness of the atmosphere (from the students' perspective) and the safety of the area.
- The distance from universities will be disregarded in this studies, as this student hall will acommodate students that belong to many different universities.

## 2. Data

Three types of datasets will be used in this study.

**(1) List of London Boroughs** (from Wikipedia, [https://en.wikipedia.org/wiki/List\\_of\\_London\\_boroughs](https://en.wikipedia.org/wiki/List_of_London_boroughs) )

The population and the coordinates of the 32 boroughs of London will be used.

	<b>BoroughName</b>	<b>Population</b>	<b>Latitude</b>	<b>Longitude</b>
<b>0</b>	Barking and Dagenham	194352	51.5607	0.1557
<b>1</b>	Barnet	369088	51.6252	-0.1517
<b>2</b>	Bexley	236687	51.4549	0.1505
<b>3</b>	Brent	317264	51.5588	-0.2817
<b>4</b>	Bromley	317899	51.4039	0.0198

## 2. Data

(2) **London Recorded Crime** (from London Datastore, [https://data.london.gov.uk/dataset/recorded\\_crime\\_summary](https://data.london.gov.uk/dataset/recorded_crime_summary) )

The number of crime records in the last 24 months, classified by boroughs

	MajorText	MinorText	LookUp_BoroughName	201804	201805	201806	201807	201808	201809	201810	...	201906	201907	201908	201909	201910	201911	201912	202001	202002	202003
0	Arson and Criminal Damage	Arson	Barking and Dagenham	3	4	12	6	5	3	8	...	3	5	3	6	9	8	6	4	5	6
1	Arson and Criminal Damage	Criminal Damage	Barking and Dagenham	122	126	123	127	101	107	131	...	113	134	118	109	109	99	121	99	103	106
2	Burglary	Burglary - Business and Community	Barking and Dagenham	36	24	33	30	18	33	32	...	27	31	35	37	30	30	25	31	17	28
3	Burglary	Burglary - Residential	Barking and Dagenham	75	93	77	94	84	99	94	...	96	71	67	80	97	114	130	116	123	97
4	Drug Offences	Drug Trafficking	Barking and Dagenham	3	8	6	9	7	10	7	...	6	9	7	7	10	12	2	11	3	6

## 2. Data

### (3) Foursquare API

Top 50 popular places in each borough.

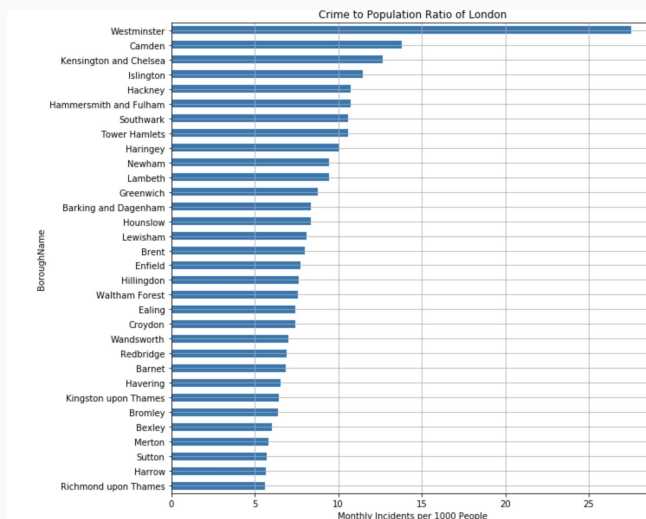
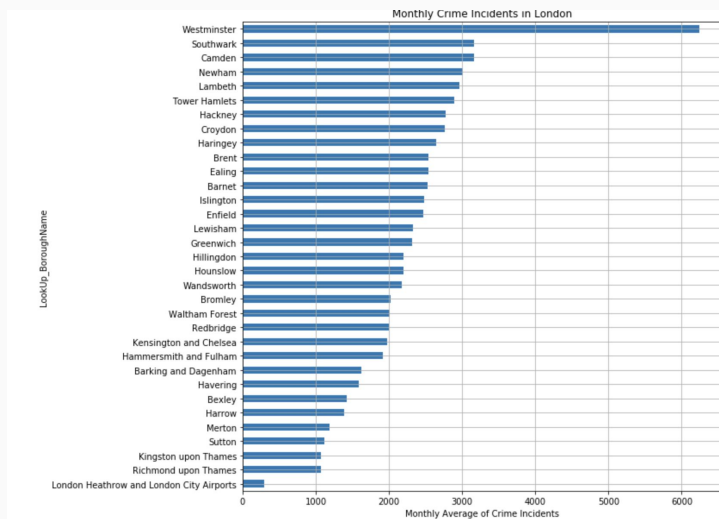
	BoroughName	Borough Latitude	Borough Longitude	Venue	Venue Latitude	Venue Longitude	Venue Category
0	Barking and Dagenham	51.5607	0.1557	Central Park	51.559560	0.161981	Park
1	Barking and Dagenham	51.5607	0.1557	Crowlands Heath Golf Course	51.562457	0.155818	Golf Course
2	Barking and Dagenham	51.5607	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

# 3. Methodology

## (1) Which borough is more dangerous?

The number of crime records per 1000 people were calculated.

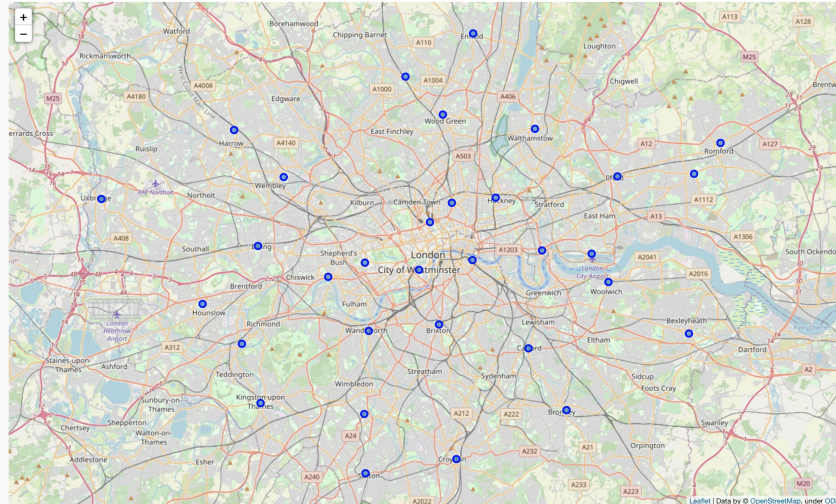
Westminster, Camden, and Kensington and Chelsea seemed to be the top three dangerous places.



# 3. Methodology

## (2) Map of London

Using the coordinates of the London's boroughs, we visualized each borough on the map.



# 3. Methodology

## (3) Cluster Analysis of the popular venues

Using one hot encoding method, we found out what venue categories are most popular. Venues from the same boroughs were categorized, and the frequency of the type of venues were calculated.

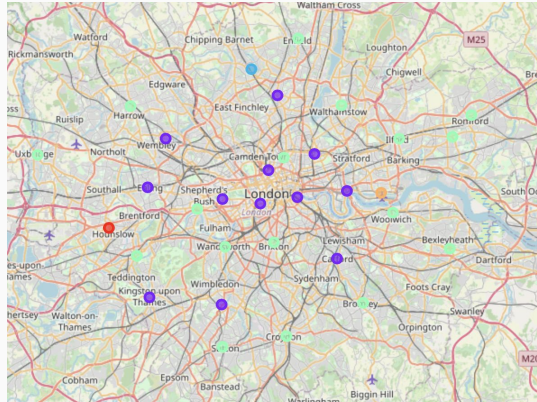
	BoroughName	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue	6th Most Common Venue	7th Most Common Venue	8th Most Common Venue	9th Most Common Venue	10th Most Common Venue
0	Barking and Dagenham	Pool	Park	Bus Station	Supermarket	Golf Course	Martial Arts Dojo	Gym / Fitness Center	Discount Store	Donut Shop	Food Court
1	Barnet	Café	Bus Stop	Yoga Studio	Fast Food Restaurant	Gaming Cafe	Furniture / Home Store	French Restaurant	Food Court	Flea Market	Fish Market
2	Bexley	Coffee Shop	Pub	Clothing Store	Italian Restaurant	Supermarket	Fast Food Restaurant	Pharmacy	Hotel	Furniture / Home Store	Optical Shop
3	Brent	Coffee Shop	Hotel	Clothing Store	Grocery Store	Bar	Sporting Goods Shop	American Restaurant	Sandwich Place	Sports Bar	Outlet Store
4	Bromley	Clothing Store	Coffee Shop	Pizza Place	Burger Joint	Gym / Fitness Center	Portuguese Restaurant	Burrito Place	Café	Sandwich Place	Chocolate Shop



# 3. Methodology

## (4) K-Means Clustering

Boroughs were categorized into five clusters depending on the common venue categories.



## 4. Results

Based on the categories of the venues and safety, these five locations were suggested to be the best places to build a student hall.

Safety refers to the crime to population ratio, and the score was normalized so that 1 represents the neighborhood with least crime per person. Atmosphere refers to the score given to each cluster, and the higher it is, the more appropriate for the students to live.

	<b>BoroughName</b>	<b>Safety</b>	<b>Atmosphere</b>	<b>Score</b>
<b>1</b>	Barnet	0.944005	1.0	1.944005
<b>22</b>	Merton	0.989088	0.9	1.889088
<b>19</b>	Kingston upon Thames	0.962294	0.9	1.862294
<b>7</b>	Ealing	0.917974	0.9	1.817974
<b>3</b>	Brent	0.890738	0.9	1.790738

# 5. Conclusion

The map shows the locations where it would be best to build a student hall.

However, they are all located in the suburbs, which would be one of the shortcomings of the result of the study.

In the future, studies that consider more factors, such as housing prices and the population of students will be necessary.

