



The Battle of the Neighborhoods

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Introduction

- Background: When choosing a neighborhood to settle in, safety is often an important factor to consider. Knowing the venues within each neighborhood is also useful when deciding compatibility.
- Approach: This project will use crime data for each borough in London to determine the safest borough. The neighborhoods within the identified borough will then be clustered using k-means clustering.
- Target: Those who might be interested in the findings of this project include those who are looking to relocate to London and who value safety.

Data

- Data Acquisition:
 - London crime data will be retrieved from the official government database
 - The list of London boroughs and the list of neighborhoods within Richmond upon Thames (RuT) will be scraped from their respective Wikipedia pages
- Data Cleaning:
 - Only data for crimes in the most recent period (2019-04 to 2020-04) will be kept
 - The Beautiful Soup package will be used to scrape data from the Wikipedia pages
 - We will produce a merged dataframe with coordinates of each neighborhood in RuT and their venue data using the Foursquare API

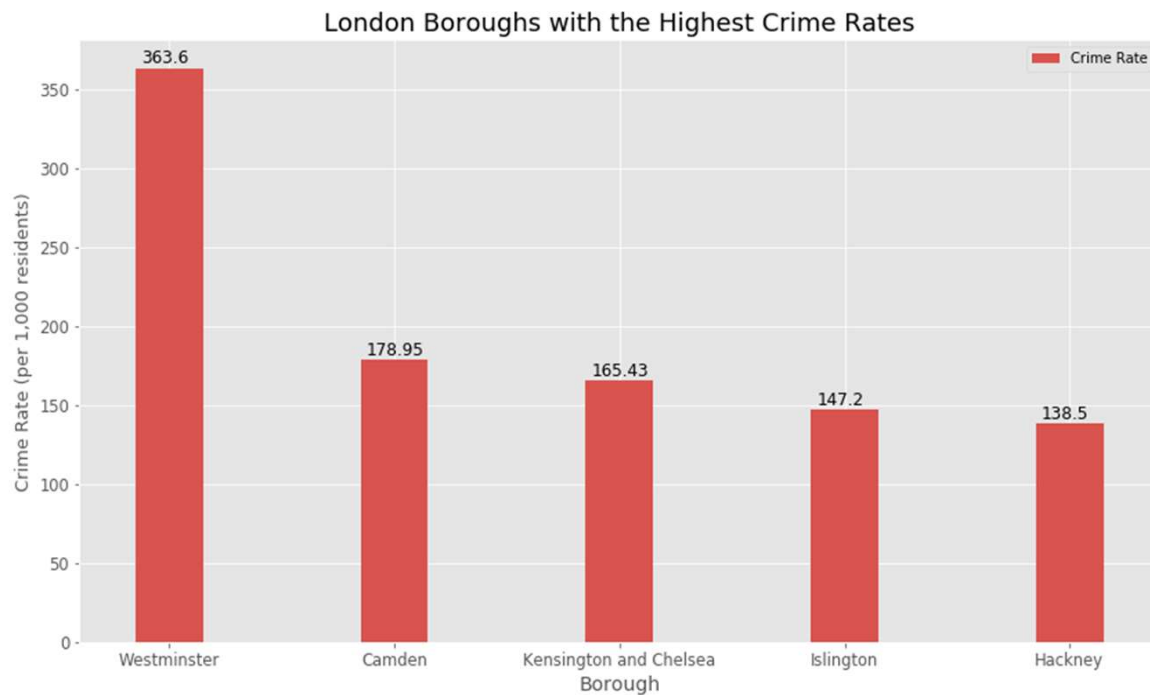
Methodology: Exploratory Data Analysis

Descriptive Statistics:

- There are 32 boroughs (count)
- Mean population: 262,777
- Mean total crimes: 29,913
- Mean crime rate: 115 crimes per 1,000 residents
- Min. crime rate vs. Max crime rate: 71 vs. 363 crimes per 1,000 residents

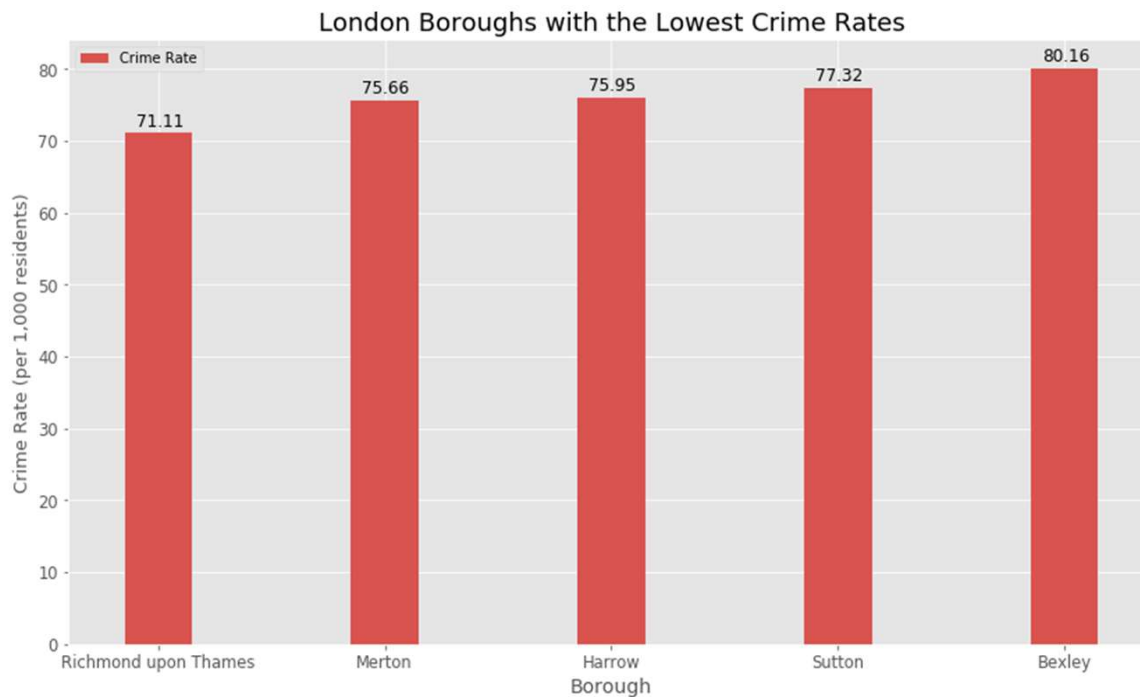
	Population (2013 est)	Total Crimes	Crime Rate
count	32.000000	32.000000	32.000000
mean	262777.718750	29913.906250	115.808750
std	57346.611409	12411.117231	52.630362
min	155594.000000	13608.000000	71.110000
25%	224047.500000	23947.250000	87.535000
50%	263697.000000	29668.500000	100.955000
75%	311447.500000	34280.500000	129.797500
max	372752.000000	82479.000000	363.600000

London Boroughs with the Highest Crime Rates



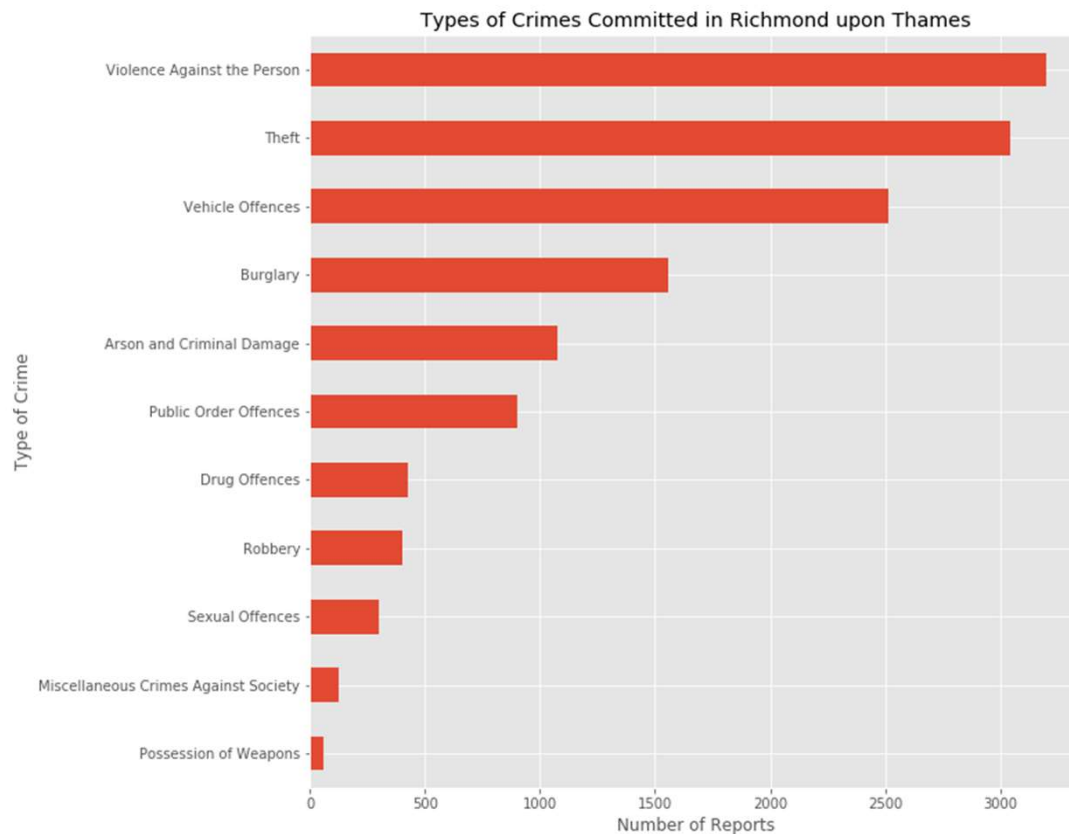
- It is evident that the borough of Westminster has the highest crime rate
- The crime rate is significantly higher than in other boroughs (at double that of Camden's crime rate!)

London Boroughs with the Lowest Crime Rates



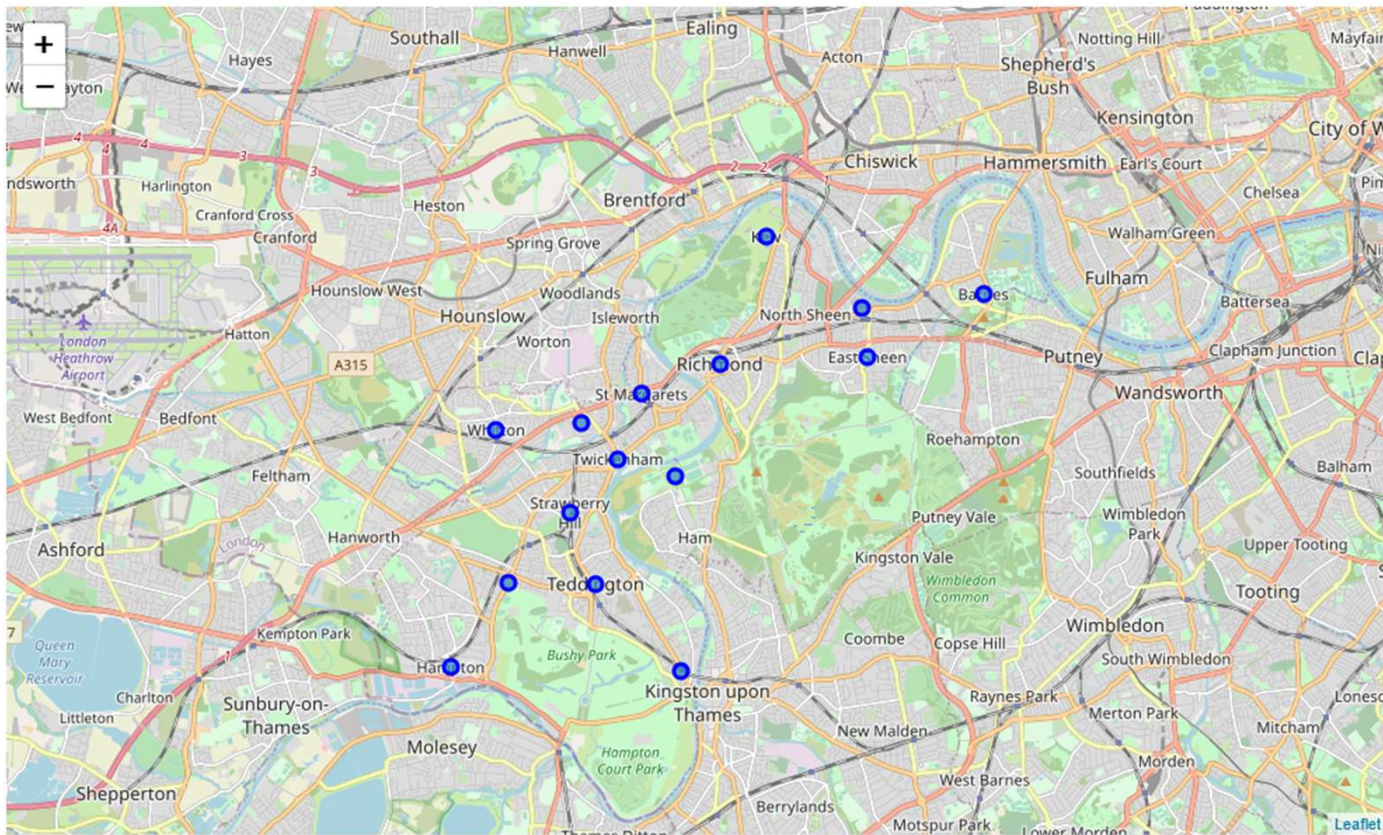
- The safest borough (based on having the lowest crime rate) is Richmond upon Thames
- It is worth noting that there is little difference between the numbers (they all lie between 70 and 80 crimes per 1,000 residents)

Types of crimes committed in Richmond upon Thames



- The two most frequent types of crime committed in RuT are violence against the person and theft
- The least frequent types of crimes are possession of weapons, sexual offences, and miscellaneous crimes

The 15 neighborhoods in Richmond upon Thames



Methodology: Modelling

	Neighborhood	Neighborhood Latitude	Neighborhood Longitude	Venue	Venue Latitude	Venue Longitude	Venue Category
0	Barnes	51.471896	-0.238744	Olympic Studios Cafe + Dining Room	51.475158	-0.240333	Indie Movie Theater
1	Barnes	51.471896	-0.238744	Barnes Common	51.469260	-0.238903	Park
2	Barnes	51.471896	-0.238744	ArteChef	51.474705	-0.241282	Pizza Place
3	Barnes	51.471896	-0.238744	Alma Café	51.474880	-0.239207	Breakfast Spot
4	Barnes	51.471896	-0.238744	Awesome Thai Cuisine	51.474905	-0.240909	Thai Restaurant

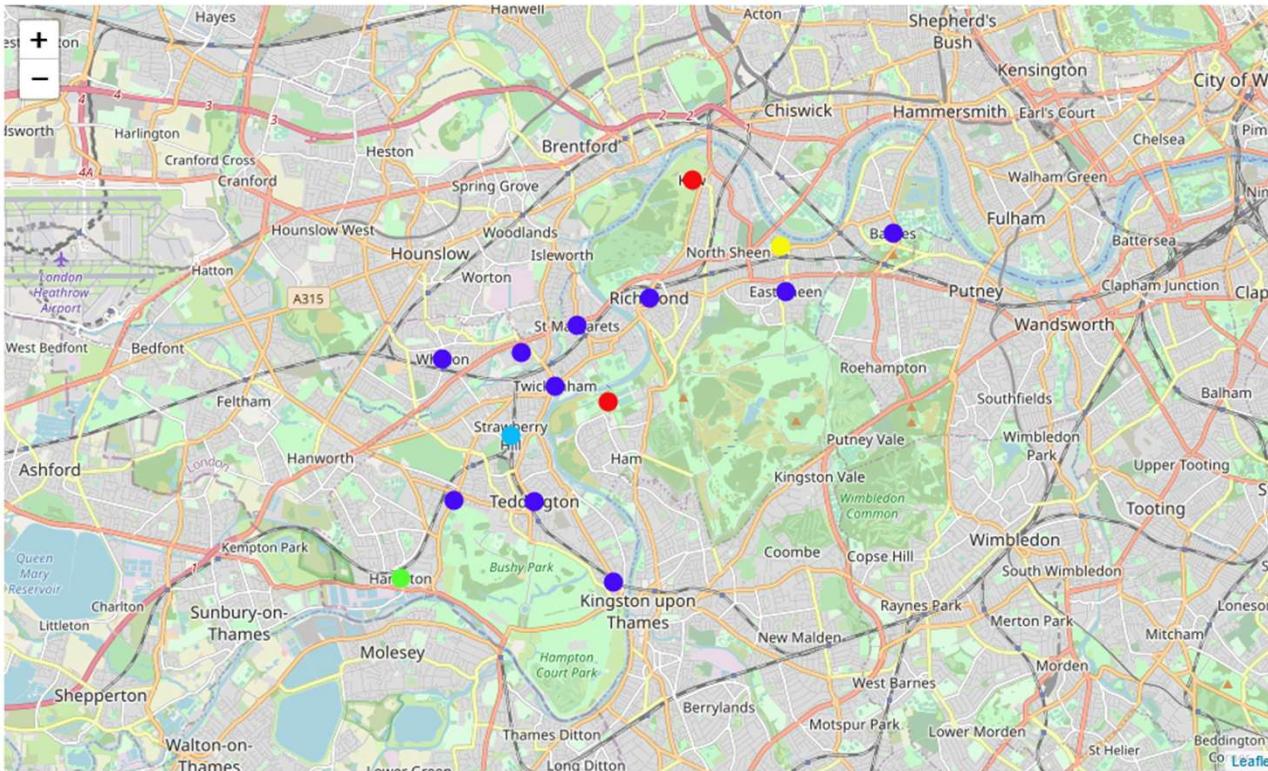
- A merged dataframe will be created containing location data and venue data for each neighborhood in Richmond upon Thames
- This involves the use of Foursquare location data and the python geopy package

The 10 most common venues in each neighborhood

	Neighborhood	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	Barnes	Park	Food & Drink Shop	Café	Indie Movie Theater	Pizza Place	Community Center	Movie Theater	Pub	Restaurant	Breakfast Spot
1	East Sheen	Coffee Shop	Pub	Pizza Place	Café	Creperie	Indian Restaurant	Sporting Goods Shop	Stationery Store	Beer Store	Supermarket
2	Ham and Petersham	Sports Club	Boat or Ferry	Historic Site	Park	Café	Garden	Playground	Trail	Garden Center	Art Gallery
3	Hampton	Grocery Store	Café	Pizza Place	Train Station	Park	Seafood Restaurant	Soccer Stadium	Department Store	Coffee Shop	Comedy Club
4	Hampton Hill	Grocery Store	Wine Shop	Pub	Butcher	Italian Restaurant	Fast Food Restaurant	Coffee Shop	Discount Store	Comic Shop	Community Center

- The ten most frequent venues in each neighborhood will be identified based on their respective *venue categories*

Results and Discussion



- Using k-means, the neighborhoods are clustered into five clusters
- Based on the types of venues that are frequently found in each cluster, individuals can shortlist neighborhoods which interest them

An example: Cluster 1

	Neighborhood	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
2	Ham and Petersham	Richmond upon Thames	51.444235	-0.314040	1	Sports Club	Boat or Ferry	Historic Site	Park	Café	Garden	Playground	Trail	Garden Center
6	Kew	Richmond upon Thames	51.480663	-0.291929	1	Garden	Botanical Garden	Café	Playground	Coffee Shop	Wine Shop	Restaurant	Pub	Ice Cream Shop

- For example, the red cluster (cluster 1) contains venues such as gardens, parks, sports clubs, historic sites and cafes
- This kind of serene, relaxed environment is suggested for older individuals or those looking to lead a quieter lifestyle

Conclusion

- All in all, this project has been successful in:
 - identifying the safest borough in London based on crime rate
 - clustering the neighborhoods in that borough
 - offering advice/comments about the findings
- However, the project is restrictive in the sense that it only considers safety as the primary factor for analysis *and* it doesn't explicitly distinguish between the different types of crime (e.g. petty theft vs. homicide)
- In the future, the project can be extended to look into factoring in cost of living and employability

References

- https://data.london.gov.uk/dataset/recorded_crime_summary
- https://en.wikipedia.org/wiki/London_Borough_of_Richmond_upon_Thames#List_of_neighbourhoods
- https://en.wikipedia.org/wiki/List_of_London_boroughs