London's Optimal District For Families

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July 2020

1.Introduction

1.1 Background

London is a major city with close to 9 million residents. There are 33 districts including, the City of London. Some districts Westminster and Camden are in the centre of the city while others such as Kingston Upon Thames and Harrow are in quieter suburbs.

1.2 Problem

In which area should a family live? Based on geographic factors is one area better than another? In this report, I aim to find the best district in which families should locate.

2. Data acquisition and cleaning

2.1 Data sources

The data source I used for the names of London's districts, their co-ordinates and postcodes can be here. For this project, I will also use Foursquare location data to compare the geographic makeup of London and its various suburbs and identity, whether one is more suitable than another. It is important to note that geographic factors are not the sole factor which determines location, costs, job opportunities and government regulations are also important. I am, however going to solely look at the geographic proximity of shops, parks and educational facilities from the major districts to determine where is the best place to live. I am also assuming that a majority of residents live in these districts and that the proximity to work and local services are a vital factor when choosing a place to live for family.

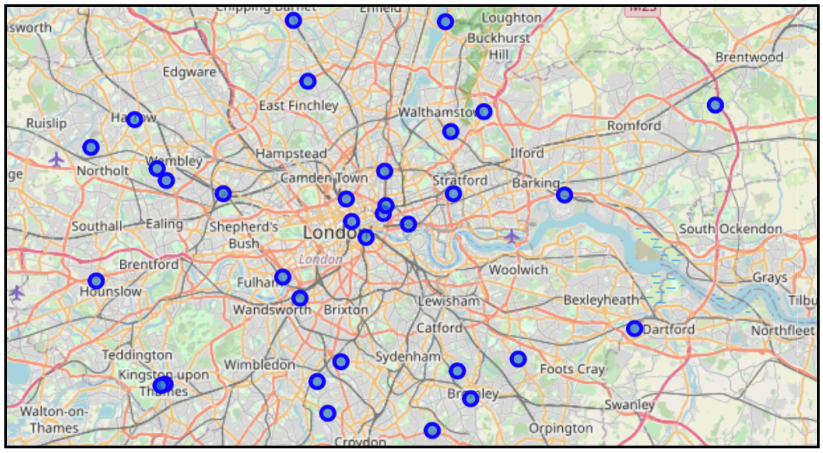
2.2 Data cleaning

Firstly, I removed any unnecessary columns from the data frame leaving only district, county, latitude, longitude and postcode. I then merged any duplicate districts to create a database of only 33 rows, one for each district. The county and postcode columns were also deemed irrelevant to this project, so they were also subsequently dropped.

3. Data analysis

3.1 Dataframe Visualisation

Firstly I created a map of London using folium and superimposed the district centres on top. This gave me a better understanding of the data and what needed to be done from there.



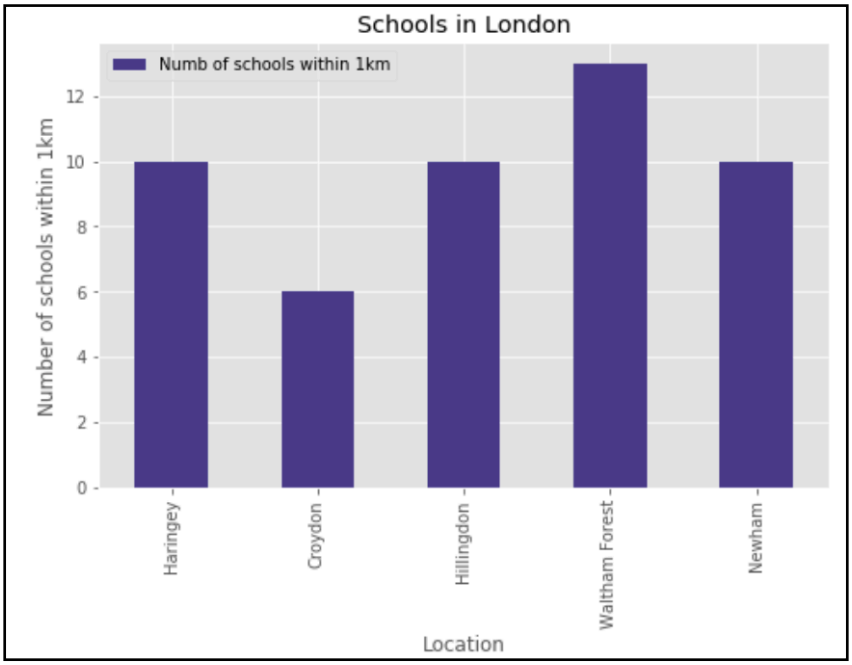
3.2 Most common venues

I then used the Foursquare database and a predefined function to return all the venues within 500 metres of the centre of the district. I subsequently grouped the venues based on their type and created a data frame which consisted of the 10 most common venues in each of those areas.

	District	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	Pub	Optical Shop	Pharmacy	Auto Garage	Convenience Store	Grocery Store	Yoga Studio	Fast Food Restaurant	Fried Chicken Joint	French Restaurant
1	Barnet	Grocery Store	French Restaurant	Greek Restaurant	Yoga Studio	Garden Center	Furniture / Home Store	Fruit & Vegetable Store	Fried Chicken Joint	Food Truck	Food Stand
2	Bexley	Gay Bar	Train Station	Yoga Studio	Fast Food Restaurant	Furniture / Home Store	Fruit & Vegetable Store	Fried Chicken Joint	French Restaurant	Food Truck	Food Stand
3	Brent	Supermarket	Fast Food Restaurant	Indian Restaurant	Asian Restaurant	Metro Station	Fish & Chips Shop	Sandwich Place	Gym / Fitness Center	Yoga Studio	Fruit & Vegetable Store
4	Bromley	Platform	Coffee Shop	Sandwich Place	Clothing Store	Grocery Store	Park	Bakery	Supermarket	Fast Food Restaurant	Stationery Store
5	Camden	Hotel	Pub	Café	Italian Restaurant	Thai Restaurant	Fast Food Restaurant	Coffee Shop	Burger Joint	Turkish Restaurant	Garden
6	City of London	Coffee Shop	Sandwich Place	Food Truck	Plaza	Pub	Chinese Restaurant	Burger Joint	Cocktail Bar	Gym / Fitness Center	Street Food Gathering
7	Croydon	Italian Restaurant	Café	Indian Restaurant	Supermarket	Pet Store	Fast Food Restaurant	Fish & Chips Shop	Furniture / Home Store	Fruit & Vegetable Store	Fried Chicken Joint
8	Ealing	Pub	Bus Stop	Metro Station	Golf Course	Fish & Chips Shop	Garden	Furniture / Home Store	Fruit & Vegetable Store	Fried Chicken Joint	French Restaurant
9	Enfield	Café	Reservoir	Construction & Landscaping	Yoga Studio	Fast Food Restaurant	Furniture / Home Store	Fruit & Vegetable Store	Fried Chicken Joint	French Restaurant	Food Truck
10	Greenwich	Pub	Bookstore	Grocery Store	Yoga Studio	Fast Food Restaurant	Furniture / Home Store	Fruit & Vegetable Store	Fried Chicken Joint	French Restaurant	Food Truck
11	Hackney	Coffee Shop	Café	Italian Restaurant	Restaurant	Hotel	Furniture / Home Store	Flea Market	Cocktail Bar	Pizza Place	Bar
12	Hammersmith and Fulham	Platform	Coffee Shop	Bus Stop	Brazilian Restaurant	Grocery Store	Fast Food Restaurant	Convenience Store	Sandwich Place	Pharmacy	Pub
13	Haringey	College Football Field	Playground	Indoor Play Area	Supermarket	Athletics & Sports	Coffee Shop	Fast Food Restaurant	Furniture / Home Store	Fruit & Vegetable Store	Fried Chicken Joint
14	Harrow	Clothing Store	Coffee Shop	Sandwich Place	Pizza Place	Donut Shop	Gym	Fast Food Restaurant	Pharmacy	Department Store	Chocolate Shop
15	Hillingdon	Gas Station	Park	Supermarket	Clothing Store	Fast Food Restaurant	Bakery	Pizza Place	Empanada Restaurant	Fish & Chips Shop	Fruit & Vegetable Store
16	Hounslow	Dessert Shop	Playground	Food Truck	Park	Yoga Studio	Fast Food Restaurant	Furniture / Home Store	Fruit & Vegetable Store	Fried Chicken Joint	French Restaurant
17	Islington	Pub	Café	Grocery Store	Cocktail Bar	Coffee Shop	Pizza Place	Bar	Restaurant	Convenience Store	Turkish Restaurant
18	Kensington and Chelsea	Pub	Italian Restaurant	Café	Gastropub	Nightclub	Restaurant	Hotel	Arts & Crafts Store	Building	Performing Arts Venue
19	Kingston upon Thames	Coffee Shop	Café	Clothing Store	Pub	Burger Joint	Italian Restaurant	Thai Restaurant	Department Store	Bakery	Gym / Fitness Center
20	Lambeth	Pub	Park	Fast Food Restaurant	Café	Video Game Store	Garden	Bar	Yoga Studio	Fruit & Vegetable Store	Fried Chicken Joint
21	Lewisham	Fast Food Restaurant	North Indian Restaurant	Hotel	Laser Tag	Construction & Landscaping	Yoga Studio	Furniture / Home Store	Fruit & Vegetable Store	Fried Chicken Joint	French Restaurant
22	Merton	Café	Breakfast Spot	Fast Food Restaurant	Health & Beauty Service	Yoga Studio	Flea Market	Garden	Furniture / Home Store	Fruit & Vegetable Store	Fried Chicken Joint
23	Newham	Bus Stop	Thai Restaurant	Café	Hotel	Historic Site	Trail	Grocery Store	Park	Fruit & Vegetable Store	Fried Chicken Joint
24	Redbridge	Pub	Seafood Restaurant	Bus Stop	Indian Restaurant	Trail	Hotel	Tea Room	Chinese Restaurant	English Restaurant	Yoga Studio
25	Richmond upon Thames	Pub	Italian Restaurant	Café	Coffee Shop	Burger Joint	Department Store	Clothing Store	Bakery	Thai Restaurant	Kitchen Supply Store
26	Southwark	Pub	Coffee Shop	Wine Bar	Italian Restaurant	Hotel	Portuguese Restaurant	Seafood Restaurant	Bakery	Art Museum	Burger Joint
27	Sutton	Warehouse Store	Asian Restaurant	Tram Station	Construction & Landscaping	Gas Station	Yoga Studio	Fish & Chips Shop	Garden	Furniture / Home Store	Fruit & Vegetable Store
28	Tower Hamlets	Grocery Store	Park	Light Rail Station	Pub	Street Art	Sandwich Place	Coffee Shop	Fried Chicken Joint	Dive Bar	Indian Restaurant
29	Waltham Forest	Supermarket	Coffee Shop	Pub	Park	Pizza Place	Cosmetics Shop	Burger Joint	Chinese Restaurant	Fish & Chips Shop	Sandwich Place
30	Wandsworth	Coffee Shop	Pub	Cocktail Bar	Platform	Café	Bar	Pizza Place	Pharmacy	Supermarket	Grocery Store
31	Westminster	Pub	Coffee Shop	Sandwich Place	Restaurant	Italian Restaurant	Japanese Restaurant	Hotel	Burrito Place	Beer Bar	Caf

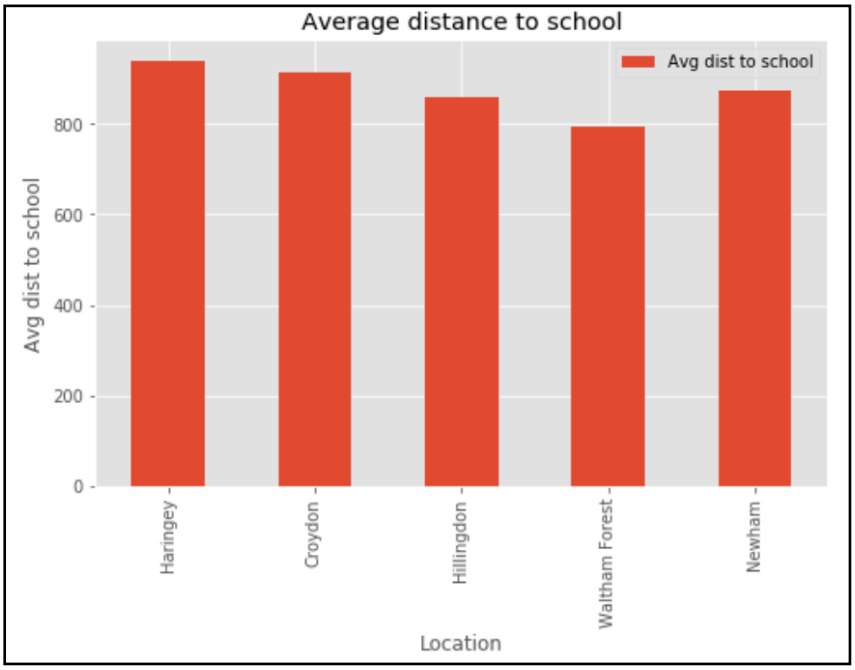
3.3 Number of schools

Next, I took the 5 most family-friendly areas based on the above data frame and the most common venues, Croydon, Hillingdon, Newham, Waltham Forest and Haringey and with the Foursquare API and a predefined function, returned the number of schools within 1km of the districts' centres.



3.4 Average distance to school

I then calculated the distance from the schools to the centre of each district and created an average. This value represents how far on average a person in the district must travel to any school.



4. Results and discussion

Firstly we broke down London into 33 distinct districts and created a database of their co-ordinates. We were then able to use the Foursquare API to identify the top 10 most common venues in each of these districts. Many of these areas would be unsuitable for families due to the number of bars, shops and restaurants nearby. This indicates that the district is in a busy area which is loud and dangerous.

I then chose 5 districts from this database, based on the number of parks, grocery stores and pharmacies nearby.

The chosen districts were;

- Croydon - has many supermarkets and pet shops
- Hillingdon - has many parks, supermarkets, clothing stores and bakeries
- Newham - has many bus stops, parks and grocery stores
- Waltham Forest - has many parks and grocery stores
- Haringey - has many college football fields, playgrounds, indoor play areas, supermarkets and athletics & sports shops

From this database I believe that Haringey is the most suitable place for a family based on the venues nearby

Another important factor when choosing a location is the schools nearby. Based on this, I took the 5 most suitable districts and calculated the number of schools within a 1km radius and the average distance to a given school. Waltham forest not only had the most schools within 1km at 13 but it also had the lowest average distance at 794m.

5. Conclusion

Based on my research, both Haringey and Waltham Forest are ideal places for a family to locate in London. Which one they choose is dependant on what is more important: the number of nearby facilities or the distance and number of schools. Looking beyond this project, there are other factors that influence whether or not a family moves into an area, notably property values. This is a topic which could be explored greater in the future.