

# Locating Hotel in London

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## 1. Introduction

Tourism is a very important source of capital for many economies, and a very lucrative business for hotel chains. Many companies will build hotels in places that attract lots of tourists throughout the year and Europe has some of the countries that are most visited by people from every corner of the planet. The United Kingdom attracts lots of tourists because it has some of the most beautiful spots for tourism in the world, and several of the greatest cultural and art museums.

A situation arose where a hotel company wants to build a hotel in the city of London. The problem is that they do not know the best location for the hotel in the city. There are 33 neighborhoods to choose from and the magnitude of the investment makes this choice crucial for the development of the business.

What is the best neighborhood in London to build a hotel?

## 2. Data

### 2.1 Data Sources

Two important pieces of data were used throughout this project in order to obtain an answer to the question posed before: What is the best neighborhood in London to build a hotel?

The first one is a geoJson map of the city neighborhoods with the geographical coordinates in order to identify them individually in a map and be able to see which venues are in these neighborhoods.

The second one, and maybe most important, is the data imported from the FourSquare API of all the venues in the city of London with their respective coordinates and neighborhood.

### 2.2 Data Cleaning & Feature Selection

This FourSquare data was analyzed to reach a conclusive answer to the question.

Data cleaning was a fairly simple process due to the fact that the venues and their coordinates were fully and perfectly imported from the FourSquare API.

Feature selection consisted mostly on filtering the data. Neighborhoods with existing hotels were filtered and also those where there were little to no venues. The point was to identify the best fit for the hotel's location based on how attractive or fit for tourism the venues in the

neighborhoods are. For example, importance was given to the abundance of museums and places of sort, and not so much to coffee shops, given that museums attract a lot of tourism and coffee shops are regular stops anywhere.

### 3. Methodology

The first step was collecting the data in an organized manner suitable to be processed by the machine learning model. Several tables were constructed in order to help visualize specific aspects of the venues. Examples of these would be a table to show the amount of venues per neighborhood (figure 1) and the amount of each specific venue per neighborhood (figure 2).

	Neighborhood	Venue
0	Barking and Dagenham	2
1	Barnet	2
2	Bexley	24
3	Brent	4
4	Camden	32
5	City of London	100
6	Croydon	2
7	Ealing	4
8	Enfield	68
9	Greenwich	4
10	Hackney	21

Figure 1

Neighborhood	African Restaurant	American Restaurant	Argentinian Restaurant	Art Gallery
0 Barking and Dagenham	0	0	0	0

Figure 2

Later on, a final table was constructed where the mean amount of each venue for each neighborhood was displayed. This table was the one analyzed by the machine learning model. The chosen model was K-Means Clustering to group similar neighborhoods together and evaluate the best possible location for the hotel and allow several options, should they belong to the same cluster.

Before the analysis however, as explained previously in the Data section, several neighborhoods were filtered from the possibilities because they either already had a hotel or they had a very small number of venues.

### 4. Results & Discussion

Initially, the 33 neighborhoods in London could be a possibility:

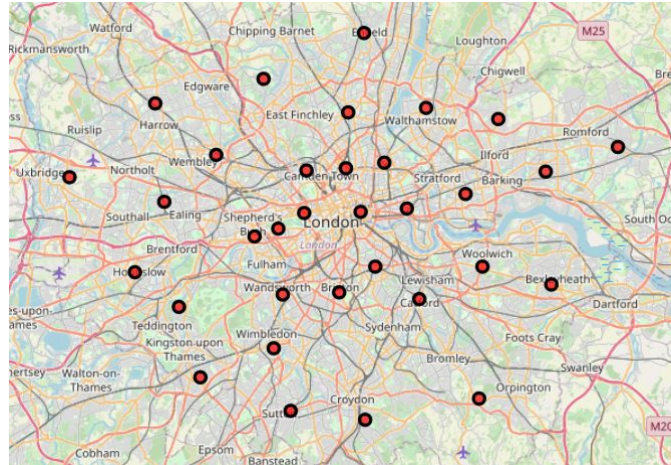


Figure 3

After the filtering, only nine remained:

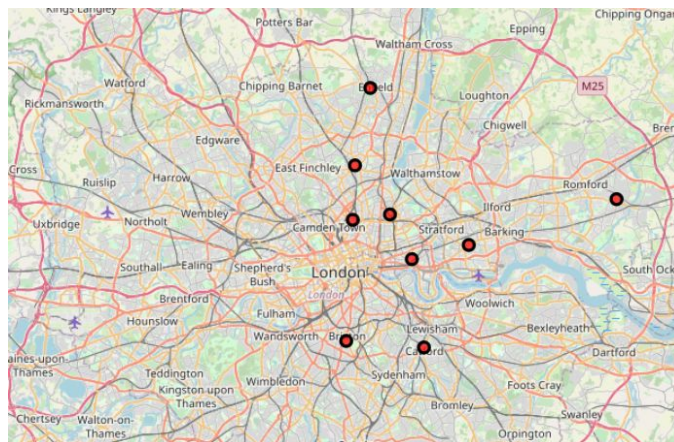


Figure 4

Finally, after applying the K-Clustering model, we could visualize the groups on the map:

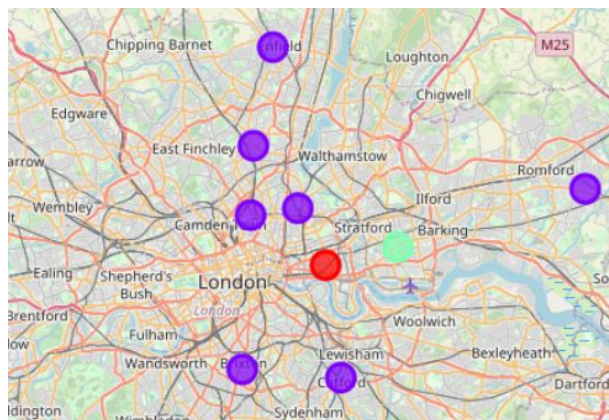


Figure 5

This reduced number of neighborhoods allowed the visualization of a reduced table consisting of the 15 most common venues in each of these neighborhoods. This was extremely useful for the analysis since it allowed me to see what I was looking for in the form of a readable table:

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	11th Most Common Venue	12th Most Common Venue	13th Most Common Venue	14th Most Common Venue	15th Most Common Venue
<b>Enfield</b>	Coffee Shop	Clothing Store	Café	Pub	Restaurant	Optical Shop	Shopping Mall	Sandwich Place	Supermarket	Bookstore	Department Store	Pharmacy	Gift Shop	Gym / Fitness Center	Grocery Store
<b>Hackney</b>	Grocery Store	Pub	Yoga Studio	Breakfast Spot	Café	Restaurant	Gourmet Shop	Park	Furniture / Home Store	Coworking Space	Brewery	Coffee Shop	Italian Restaurant	French Restaurant	Food Truck
<b>Haringey</b>	Clothing Store	Bus Stop	Coffee Shop	Sandwich Place	Pharmacy	Discount Store	Café	Chinese Restaurant	Smoke Shop	Shopping Mall	Pub	Dessert Shop	African Restaurant	Burger Joint	Park
<b>Havering</b>	Italian Restaurant	Grocery Store	Supermarket	Coffee Shop	Pub	Café	Pharmacy	Sandwich Place	Thai Restaurant	Theater	Train Station	Garden	Portuguese Restaurant	Bank	Bakery
<b>Islington</b>	Café	Coffee Shop	Pub	Italian Restaurant	Ethiopian Restaurant	Wine Shop	Vietnamese Restaurant	French Restaurant	Park	Gym / Fitness Center	Farm	Malay Restaurant	Pizza Place	Sesfood Restaurant	Yoga Studio
<b>Lambeth</b>	Coffee Shop	Bus Stop	Indian Restaurant	Pub	Music Venue	Grocery Store	Pizza Place	Park	Caribbean Restaurant	Social Club	Spa	Modern European Restaurant	Café	Fried Chicken Joint	Yoga Studio
<b>Lewisham</b>	Grocery Store	Supermarket	Platform	Pub	Coffee Shop	Italian Restaurant	Bus Stop	Greek Restaurant	Dessert Shop	Pharmacy	Portuguese Restaurant	Sandwich Place	Cocktail Bar	Shopping Mall	Shopping Plaza
<b>Newham</b>	Grocery Store	Café	Fish & Chips Shop	Gym / Fitness Center	Pub	Home Service	Convenience Store	Toy / Game Store	French Restaurant	Food Truck	Food Court	Fish Market	Field	Fast Food Restaurant	Yoga Studio
<b>Tower Hamlets</b>	Canal Lock	Pub	Bakery	Chinese Restaurant	Museum	Skate Park	Go Kart Track	Persian Restaurant	Playground	Diner	Recreation Center	Athletics & Sports	Art Gallery	Eastern European Restaurant	Food Truck

Figure 6

It is important to mention an important finding throughout the analysis. It was very curious to see that Bromely had no venues in its vicinity. This finding was quite surprising as i didn't think it was possible, and was what made me realize that neighborhoods with little to no venues needed to be filtered to obtain the best result possible.

## 5. Conclusion

Considering the neighborhoods in London City that have enough venues to be considered as touristic attractions, it is my belief that Tower Hamlets is the best option as the location of the hotel.

It has museums as the 5th most common venue and art galleries as the 13th, something no other neighborhood has in its top 15. Moreover, pubs are the 2nd most common venues in Tower Hamlets. England being known for their pubs, it is likely that tourists would like to visit them on a couple of occasions. In addition, several foreign restaurants are present in Tower Hamlets, an attractive idea for dinner to most tourists. Finally, it is the second closest neighborhood to the airport in those that we consider viable options for the hotel placement.

All in all, I believe that Tower Hamlets is a perfectly good option for the location of a hotel.