Locating the best place for Hummus restaurant

Introduction

What is Hummus?

Hummus is a Levantine dip or spread made from cooked, mashed chickpeas or other beans, blended with tahini, olive oil, lemon juice, salt, and garlic. It is popular in the Middle East and Mediterranean, as well as in Middle Eastern cuisine around the globe. Hummus is usually consumed with pita bread and wiped when served in small bowl. It is considered fast Middle Eastern food and very suitable as a vegan or vegetarian choice.

Purpose of this work

The purpose of this work is to simulate a business situation of choosing a location for a restaurant in London. In this case, the potential developer wants to find a place for a Hummus restaurant (Chickpeas).

We will assume for the sake of simplicity that a good location for a restaurant will be around main tourist attractions because of the big tourist traffic.

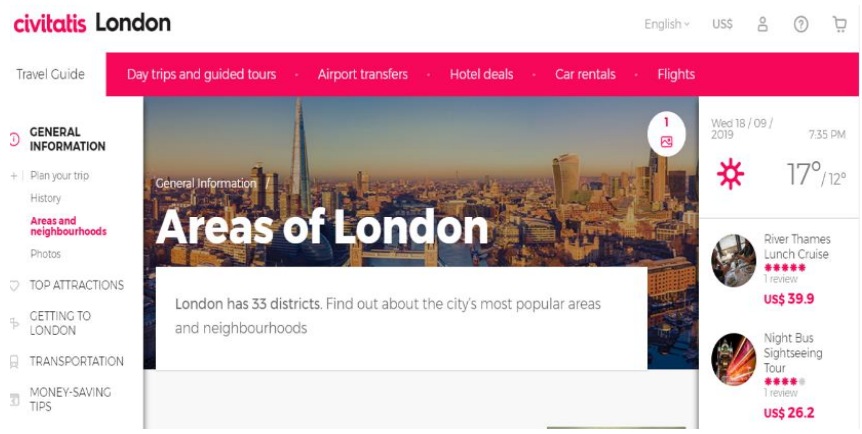
I will extract a list of the most popular sites in LONDON and use the Foursquare site location data, **to find the ideal location for the restaurant according to the competitors' locations.**

Competitors in this case will be a list of specific category of restaurants who usually compete with Hummus places like: middle-eastern, Lebanese, Israeli and such.

Data

Sources:

As mentioned above my potential locations are a list of the most popular tourist places in London. This list is extracted using beautiful soup from this website.



The data after the scrapping process looks like that:

```
Westminster Palace', 'Westminster Abbey', 'Piccadilly Circus', 'Tower of London', 'Tower Bridge', "St Paul's Cathedral", 'Lon']
 don Eye', 'British Museum', 'Hyde Park', 'Camden Town', 'Ver todo', 'Monuments and Tourist attractions', 'Westminster Palace',
'Westminster Abbey', 'Piccadilly Circus', 'Tower of London', 'Tower Bridge', "St Paul's Cathedral", 'London Eye', 'Buckingham P
alace', 'Big Ben', 'Kensington Palace', 'Trafalgar Square', 'Covent Garden', 'The Shard', 'Chinatown', 'The Old Operating Theat
re', 'The Monument', 'Shakespeare's Globe Theatre', 'Changing of the Guard', 'Apsley House', 'City Hall', 'HMS Belfast', 'Ver t
odo', 'Museums and Galleries', 'British Museum', 'National Gallery', 'Imperial War Museum', 'The Wallace Collection', 'Madame T
 ussauds London', 'The Natural History Museum', 'Science Museum', 'Victoria and Albert Museum', 'Tate Modern', 'Tate Britain',
'Museum of London', 'National Portrait Gallery', 'London Transport Museum', 'Sherlock Holmes Museum', 'Sir John Soane's Museu
m', 'Ripley's, Believe it or not!', 'Ver todo', 'Parks and Gardens', 'Hyde Park', 'St James's Park', 'Kensington Gardens', "Reg
['ent's Park", 'Green Park
```

After transforming it to a Pandas Data Frame and using ArcGIS geocoder to retrieve location data:

Longitude	Latitude	Place	
0.135522-	51.497258	Westminster Palace	0
0.128330-	51.499980	Westminster Abbey	1
0.134780-	51.509890	Piccadilly Circus	2
0.075230-	51.509740	Tower of London	3
0.075380-	51.505480	Tower Bridge	4
0.099740-	51.513440	St Paul's Cathedral	5
0.119250-	51.503660	London Eye	6
0.125220-	51.518630	British Museum	7
0.161390-	51.508280	Hyde Park	8
0.145090-	51.537620	Camden Town	9
0.135522-	51.497258	Westminster Palace	12
0.128330-	51.499980	Westminster Abbey	13
0.134780-	51.509890	Piccadilly Circus	14
0.075230-	51.509740	Tower of London	15
0.075380-	51.505480	Tower Bridge	16

Once we have location data for all of the potential spots we can visualize them on the map with folium:

Marking the Competition:

First, Using Foursquare API to extract top 100 businesses at the vicinity of each tourist attraction. The assumption is that most restaurants in tourist areas compete with each other on a local basis, and average customer will not walk more than a few minutes for a meal after he decided "What" to eat. Meaning what type of meal.

So my choice here was to extract the top 100 businesses in a distance of no more than 750M from the potential spot and putting it into the Pandas DF:

```
print(London_venues.shape)
London_venues
```

```
(7 ,4109)
```

	Venue Category	Venue Longitude	Venue Latitude	Venue	Place Longitude	Place Latitude	Place	
	Hotel	0.137404-	51.498598	Taj 51 Buckingham Gate Suites & Residences	0.135522-	51.497258	Westminster Palace	0
	Indie Movie Theater	0.136744-	51.497473	Curzon Victoria	0.135522-	51.497258	Westminster Palace	1
	Coffee Shop	0.136011-	51.496791	Iris & June	0.135522-	51.497258	Westminster Palace	2
	Sporting Goods Shop	0.135426-	51.498128	Run & Become	0.135522-	51.497258	Westminster Palace	3
	Hotel	0.134417-	51.499137	St Ermin's Hotel	0.135522-	51.497258	Westminster Palace	4
	French Restaurant	0.135455-	51.497964	Chez Antoinette	0.135522-	51.497258	Westminster Palace	5
	Coffee Shop	0.133858-	51.497496	Flat Cap Coffee Co	0.135522-	51.497258	Westminster Palace	6
	Indian Restaurant	0.137522-	51.498772	Quilon	0.135522-	51.497258	Westminster Palace	7
	Gym	0.137257-	51.496934	Gymbox	0.135522-	51.497258	Westminster Palace	8

Filtering everything but the potential competition:

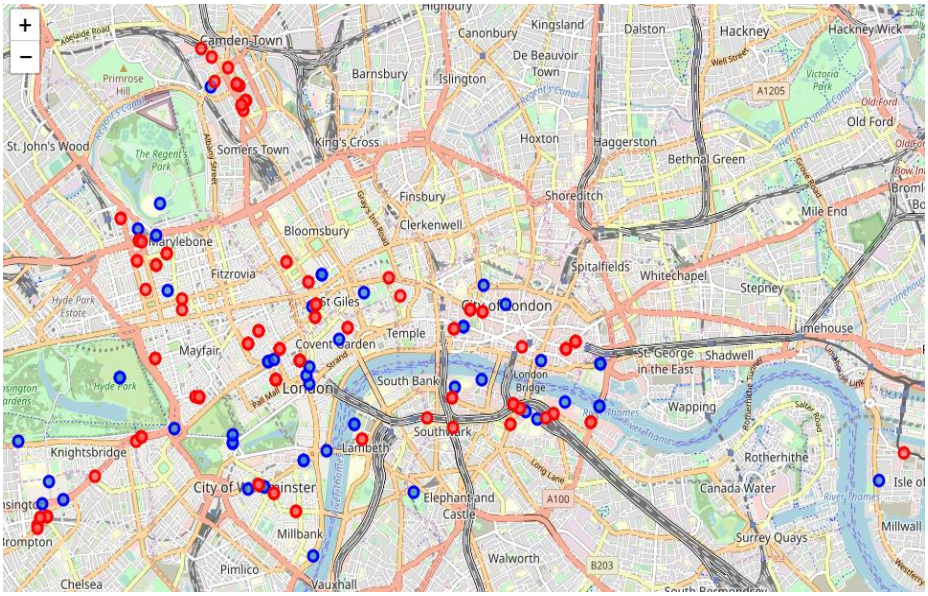
My analysis suggests that restaurants that serve Hummus in their menu can be considered competition. Also vegan, vegetarian because of the vegetarian nature of the Hummus as a dish. Finally I regarded fast food restaurants as competition also because of the fast nature of consumption of Hummus. Usually served very fast and eaten within 15 min.

So these are the categories that **remain** in the Data Frame after filtering:

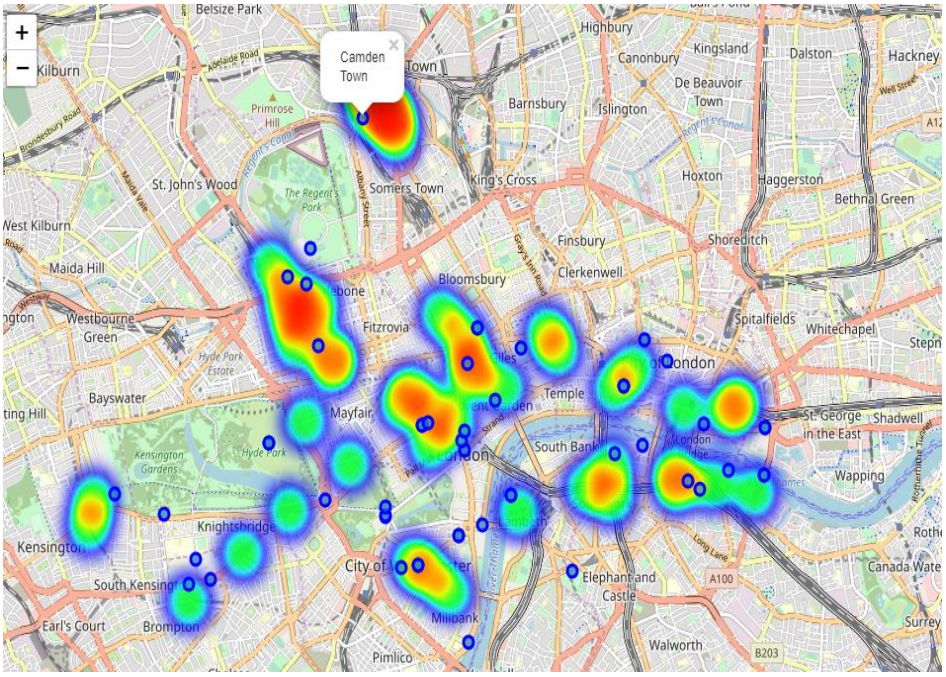
'Turkish Restaurant'
'Mediterranean Restaurant'
'Israeli Restaurant'
'Middle Eastern Restaurant'
'Moroccan Restaurant'
'Fast Food Restaurant'
'Vegetarian / Vegan Restaurant'
'Sandwich Place'
'Fast Food Restaurant
'Kebab Restaurant'
'Falafel Restaurant'
'Halal Restaurant'
'Iraqi Restaurant'
Lebanese Restaurant'
'Persian Restaurant'
'Greek Restaurant'

Results

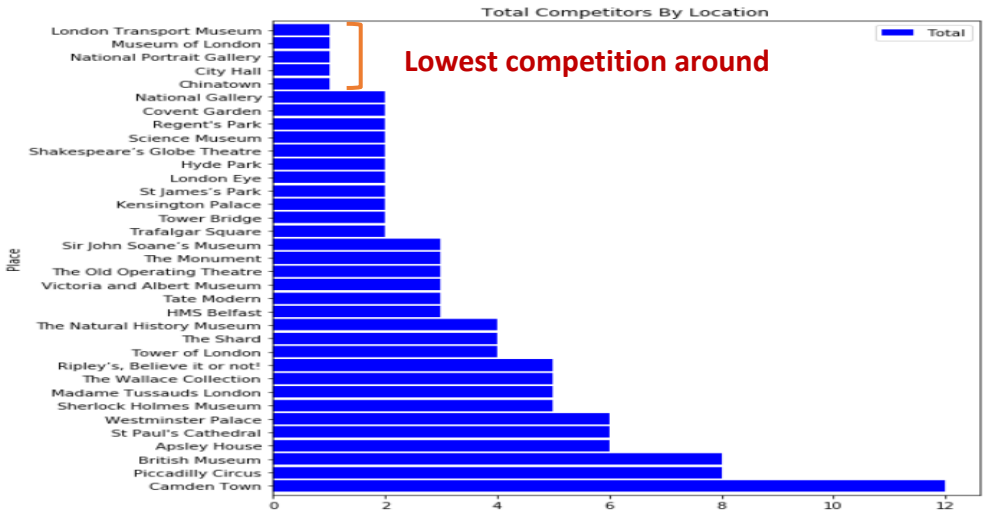
Now let's visualize the completion alongside with the potential spots:



And let's visualize the competition with Heat Map:



Let's continue with the visualization process in order to start evaluating the potential areas where competition is light:



Competition analysis using clustering:

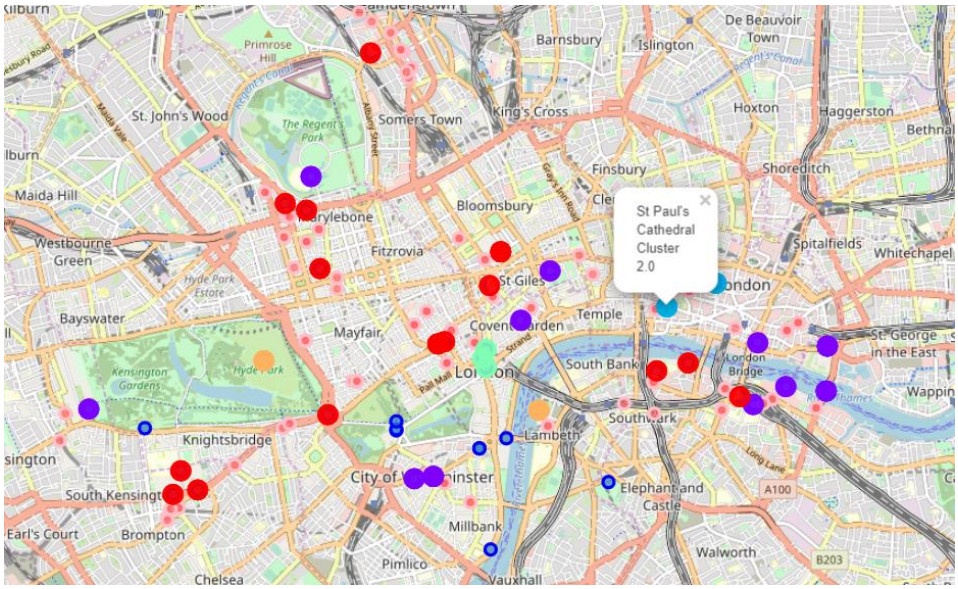
Preforming analysis with K-means algorithm will help us to further understand the characteristics of potential spots. First we conduct Analysis of the frequency of occurrence of competitiors:

7th Most Common Venue	6th Most Common Venue	5th Most Common Venue	4th Most Common Venue	3rd Most Common Venue	2nd Most Common Venue	1st Most Common Venue	Place	
Moroccan Restaurant	Vegetarian / Vegan Restaurant	Iraqi Restaurant	Lebanese Restaurant	Persian Restaurant	Turkish Restaurant	Middle Eastern Restaurant	Apsley House	0
Middle Eastern Restaurant	Moroccan Restaurant	Persian Restaurant	Vegetarian / Vegan Restaurant	Greek Restaurant	Turkish Restaurant	Mediterranean Restaurant	British Museum	1
Turkish Restaurant	Fast Food Restaurant	Halal Restaurant	Kebab Restaurant	Middle Eastern Restaurant	Vegetarian / Vegan Restaurant	Greek Restaurant	Camden Town	2
Lebanese Restaurant	Mediterranean Restaurant	Middle Eastern Restaurant	Moroccan Restaurant	Persian Restaurant	Vegetarian / Vegan Restaurant	Turkish Restaurant	Chinatown	3
Mediterranean Restaurant	Middle Eastern Restaurant	Moroccan Restaurant	Persian Restaurant	Turkish Restaurant	Vegetarian / Vegan Restaurant	Falafel Restaurant	City Hall	4

After clustering each spot receives a label, 5 labels were used with the algorithm.

5th Most Common Venue	4th Most Common Venue	3rd Most Common Venue	2nd Most Common Venue	1st Most Common Venue	Cluster Labels	Longitude	Latitude	Place	
Persian Restaurant	Turkish Restaurant	Vegetarian / Vegan Restaurant	Falafel Restaurant	Fast Food Restaurant	1.0	0.135522-	51.497258	Westminster Palace	0
Turkish Restaurant	Greek Restaurant	Israeli Restaurant	Mediterranean Restaurant	Vegetarian / Vegan Restaurant	0.0	0.134780-	51.509890	Piccadilly Circus	2
Moroccan Restaurant	Persian Restaurant	Vegetarian / Vegan Restaurant	Fast Food Restaurant	Turkish Restaurant	1.0	0.075230-	51.509740	Tower of London	3
Middle Eastern Restaurant	Moroccan Restaurant	Persian Restaurant	Turkish Restaurant	Vegetarian / Vegan Restaurant	1.0	0.075380-	51.505480	Tower Bridge	4
Moroccan Restaurant	Persian Restaurant	Vegetarian / Vegan Restaurant	Turkish Restaurant	Falafel Restaurant	2.0	0.099740-	51.513440	St Paul's Cathedral	5
Middle Eastern Restaurant	Moroccan Restaurant	Persian Restaurant	Vegetarian / Vegan Restaurant	Turkish Restaurant	4.0	0.119250-	51.503660	London Eye	6
Persian Restaurant	Vegetarian / Vegan Restaurant	Greek Restaurant	Turkish Restaurant	Mediterranean Restaurant	0.0	0.125220-	51.518630	British Museum	7
Middle Eastern Restaurant	Moroccan Restaurant	Persian Restaurant	Vegetarian / Vegan Restaurant	Turkish Restaurant	4.0	0.161390-	51.508280	Hyde Park	8
Halal Restaurant	Kebab Restaurant	Middle Eastern Restaurant	Vegetarian / Vegan Restaurant	Greek Restaurant	0.0	0.145090-	51.537620	Camden Town	9
Persian Restaurant	Turkish Restaurant	Vegetarian / Vegan Restaurant	Falafel Restaurant	Fast Food Restaurant	1.0	0.135522-	51.497258	Westminster Palace	12

Visualizing clustering analysis alongside with our previous map:



Discussion

After analyzing the clustering process combining we can come to few conclusions:

- Places labeled “2” (**blue**) are in vicinity to Falafel restaurants. These are considered very competitive to Hummus restaurants due to their fast food nature and the fact the falafel is also made of Hummus.
- Places labeled “3” (**green**) are in vicinity to Kebab restaurants. These are probably less competitive because the serve meat in their menu.
- Places labeled “4” are in vicinity to Turkish restaurants. These are probably also less competitive because Turkish restaurants offer their guests a more stylistic atmosphere.
- Places labeled “1” and “0” (**red**, **purple**) do not lead to any particular conclusion. They are just a mixed group of restaurants.

Conclusion

After analyzing the most popular sites in London. It can be concluded that it is best to open a hummus restaurant in areas that do not contain any competitors or near sites that are labeled "2".

[Green areas in the map]