Explore Paris Arrondissements

In the objective of opening a 3 to 4 star hotel

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Introduction:
Business Problem

- Geographic location context: Paris

Brussels, capital of France, is home to more than 2,14 million people and the famous Eiffel tower

- Business Problem: Opening a hotel in Paris

This report aims to solve the problem regarding opening a new hotel in Paris. In which arrondissement ('district') should we open one according to the surrounding and the competition? Representing a huge investment for an entrepreneur or a company, we will base our decision on the results provided by this data science assignment.

- Interested Audience: Investors/Entrepreneurs

This report will be of interest of the individual/organisation which needs the data insights to help taking their decisions to open a hotel in Paris

Data preparation

- The report was based on the following source :
  - Wikipedia (Arrondissement of Paris) : consulted on the 28th of July 2020 https://en.wikipedia.org/wiki/Arrondissements_of_Paris
  - Foursquare
  - IBM data science professional certificate material
- We gathered the data importing geoJSON files, by scraping, making Foursquare API calls..

- In order to scrap the data, we used"BeautifulSoup4" library and "Requests" to create a dataframe with the information "Arrondissement", "Size", "Population"

- We deleted the irrelevant columns and added a column to associate name of the arrondissement to the postcode.

IMPORTANT:

The data retrieved on Wikipedia combined the 1st an 4th district and weren't split in the original document, thus they have been combined under the same postcode "75002" situated in the middle of these tiny district acting as one together.

Methodology

- **Calculating Latitude and Longitude per Arrondissement**
  - Function get_latlng
  - Merge dataframe with coordinates obtained from function
- **Create clusters of Paris' arrondissements**
  - Foursquare API call
    - Find venues nearby
    - Sort them with Paris' arrondissement
    - Analysing the arrondissements and group rows by frequency mean
    - Define top 5 most common venue per arrondissement
  - Clustering arrondissement

Results

- 7 clusters
- Cluster 0:

	Arrondissement	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	10th Most Common Venue
8	12th (XIIe) R	2.444957	0	Theater	Restaurant	Comedy Club	Bike Rental / Bike Share	Bike Trail	Tennis Stadium	Performing Arts Venue	Fast Food Restaurant	Recreation Center	Stadium
9	13th (XIIIe) L	2.362283	0	Vietnamese Restaurant	Chinese Restaurant	Asian Restaurant	French Restaurant	Hotel	Thai Restaurant	Farmers Market	Park	Cambodian Restaurant	Creperie
10	14th (XIVe) L	2.323828	0	French Restaurant	Hotel	Pizza Place	Tea Room	Thai Restaurant	Modern European Restaurant	Brasserie	Food & Drink Shop	Plaza	Café
11	15th (XVe) L	2.296975	0	French Restaurant	Italian Restaurant	Hotel	Bistro	Supermarket	Indian Restaurant	Coffee Shop	Bakery	Lebanese Restaurant	Park
15	19th (XIXe) R	2.385625	0	French Restaurant	Supermarket	Japanese Restaurant	Beer Garden	Hotel	Italian Restaurant	Historic Site	Metro Station	Moroccan Restaurant	Pharmacy

Results

- Cluster 1:

	Arrondissement	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	10th Most Common Venue
6	10th (Xe) R	2.36233	1	French Restaurant	Coffee Shop	Café	Bistro	Asian Restaurant	Bar	Wine Bar	Pizza Place	Thai Restaurant	Japanese Restaurant

- Cluster 2:

	Arrondissement	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	10th Most Common Venue
7	11th (XIe) R	2.378126	2	French Restaurant	Wine Bar	Café	Restaurant	Asian Restaurant	Vegetarian / Vegan Restaurant	Coffee Shop	Pastry Shop	Italian Restaurant	Bar
13	17th (XVIIe) R	2.306293	2	French Restaurant	Hotel	Italian Restaurant	Japanese Restaurant	Bakery	Plaza	Café	Restaurant	Bistro	Korean Restaurant
14	18th (XVIIIe) R	2.348094	2	Bar	French Restaurant	Café	Italian Restaurant	Gastropub	Restaurant	Coffee Shop	Convenience Store	Plaza	Seafood Restaurant

Results

- Cluster 3:

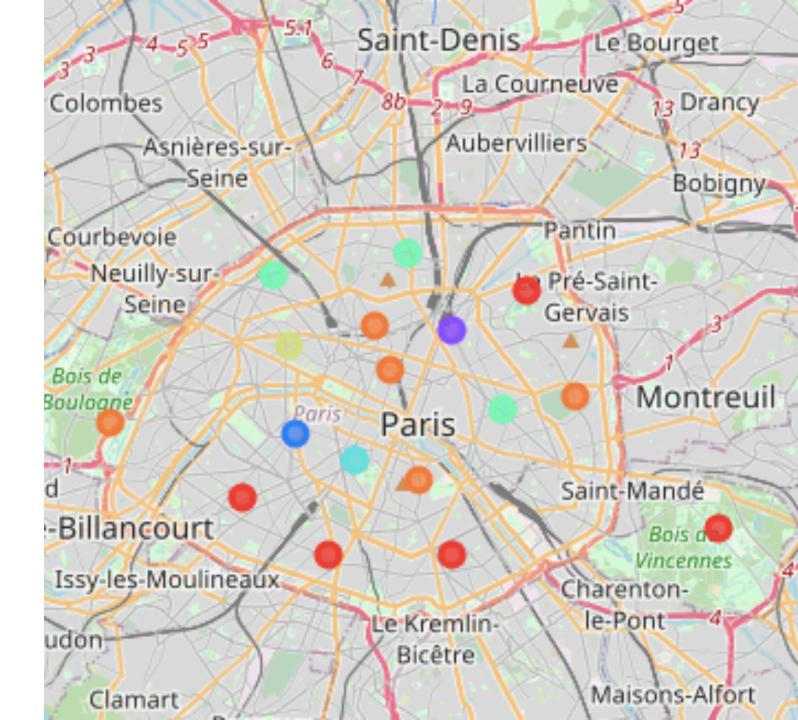|	Arrondissement	Longitude	Cluster Labels	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue	6th Most Common Venue	7th Most Common Venue	8th Most Common Venue	9th Most Common Venue	10th Most Common Venue
4	8th (VIIIe) R	2.311249	3	French Restaurant	Hotel	Art Gallery	Department Store	Spa	Cocktail Bar	Bakery	Cosmetics Shop	Corsican Restaurant	Café

- Cluster 4:

	Arrondissement	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	10th Most Common Venue
3	7th (VIIe) L	2.313061	4	Hotel	French Restaurant	Café	Italian Restaurant	History Museum	Plaza	Coffee Shop	Garden	Historic Site	Japanese Restaurant

- Cluster 5:

	Arrondissement	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	10th Most Common Venue
2	6th (VIe) L	2.332099	5	French Restaurant	Hotel	Italian Restaurant	Chocolate Shop	Restaurant	Fountain	Plaza	Seafood Restaurant	Tea Room	Bakery

Results

- Cluster 6:

	Arrondissement	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	10th Most Common Venue
0	Paris Centre 1st (Ier) / 2nd (IIe) / 3rd (IIIe...	2.343093	6	French Restaurant	Cocktail Bar	Wine Bar	Italian Restaurant	Bakery	Bistro	Japanese Restaurant	Coffee Shop	Thai Restaurant	Salad Place
1	5th (Ve) L	2.351892	6	French Restaurant	Bar	Hotel	Wine Bar	Italian Restaurant	Creperie	Café	Coffee Shop	Pub	Tea Room
5	9th (IXe) R	2.337893	6	French Restaurant	Hotel	Japanese Restaurant	Bistro	Cocktail Bar	Bakery	Lounge	Bar	Wine Bar	Gourmet Shop
12	16th (XVIe) R	2.255971	6	Lake	Bike Rental / Bike Share	Park	Circus	Yoga Studio	Farmers Market	French Restaurant	Fountain	Food & Drink Shop	Flower Shop
16	20th (XXe) R	2.400828	6	French Restaurant	Bakery	Japanese Restaurant	Café	Bistro	Food & Drink Shop	Bar	Park	Roof Deck	Restaurant

Results

Discussion

- The results shows the different district (arrondissement) in Paris and the most common venues per arrondissement and clusters.

- We see for example that the 1- 4th, 5th, 9th, 16th and 20th are very popular for restaurants.

- As seen earlier the 8th district is quite interesting if the audience targeted is a wealthy and aging population between Gen X and Gen Y, we could aim at the 8th district as the common nearby venues are diversify (French Restaurant for the the typical experience, Art Gallery, Department store (such as Gallery Lafayette), Spa and cocktail bars) - a very convenient location for a hotel!

Conclusion

- The results are a bit too big and the original data combining the 1st to 4th arrondissement together as they're a small, isn't helping. In order to proceed with a decision (confirming the implementation in the 8th district) more accurate data should be gathered. Unfortunately the current data haven't been updated yet.

- It would be interesting to add the suburbs surrounding Paris such as Levallois, Genviliers, Saint-Denis, and Montreuil, getting famous right now with real estate (professional and touristic).