

Battle of the Neighborhoods - Clustering the Neighborhoods of Paris

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1. Introduction

TripAdvisor, the travel planning and booking site, unveiled the 2018 Travelers' Choice TM Award-winning destinations. This ranking recognizes the favorite destinations of travelers around the world. In 2018, Paris took 1st place in the “World” ranking, ahead of London, Rome and New York.

Travelers' Choice TM Awards winners are determined based on an algorithm that assesses the quantity and quality of reviews of hotels, restaurants and attractions in destinations around the world, gathered over a 12-month period, as well as the booking interest of travelers when they search the web.

2. Business Problem

The objective of this project is to provide tourists heading to Paris the relevant information about the best places to stay in the city while also taking into consideration the best attractions. We will try to find the most interesting neighborhood to stay in using an Airbnb service.

3. Data

We will be using the following datasets provided by Airbnb:

- <http://data.insideairbnb.com/france/ile-de-france/paris/2020-12-14/visualisations/neighborhoods.csv>
- <http://data.insideairbnb.com/france/ile-de-france/paris/2020-12-14/visualisations/neighborhoods.geojson>

We will also be leveraging the Foursquare API in order to discover information about different venues belonging to a neighborhood and a borough. Foursquare is a location data provider that will provide us with the relevant data involving our venues.

4. Methodology

- Importing relevant libraries and calling Foursquare API credentials.

- Preprocessing dataset into a dataset including longitude and latitude coordinates.
- Visualization of the map using the folium library.
- Defining functions to retrieve venues, then grouping the dataset by the venues and by venue categories.
- One hot encoding of the categories to make the clustering optimal.
- Retrieving venues per neighborhood, K Means clustering model and examining clusters.



Cluster Map

```
In [47]: paris_geo.head()
```

Out[47]:

	longitude	latitude	neighbourhood
0	2.306204	48.887035	Batignolles-Monceau
1	2.312969	48.854714	Palais-Bourbon
2	2.383096	48.887149	Buttes-Chaumont
3	2.337891	48.877028	Opéra
4	2.360472	48.875907	Entrepôt

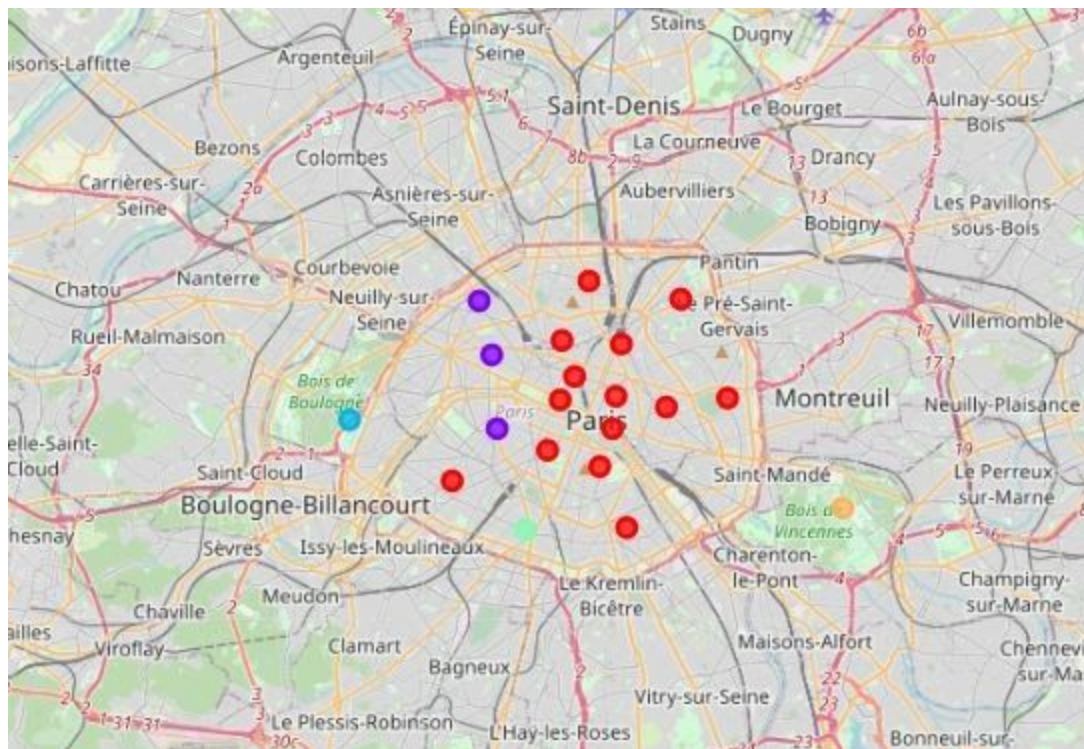
Dataframe with longitude and latitude coordinates as columns

	Neighbourhood	Neighbourhood Latitude	Neighbourhood Longitude	Venue	Venue Latitude	Venue Longitude	Venue Category
0	Batignolles-Monceau	48.887035	2.306204	LeavinRoom Escape Game	48.887913	2.307708	Escape Room
1	Batignolles-Monceau	48.887035	2.306204	Le Bistrot Tocqueville	48.886365	2.309140	Diner
2	Batignolles-Monceau	48.887035	2.306204	Fratelli	48.884824	2.307728	Italian Restaurant
3	Batignolles-Monceau	48.887035	2.306204	Hôtel Gaston	48.887659	2.307825	Hotel
4	Batignolles-Monceau	48.887035	2.306204	Pizzeria d'Ampère	48.885210	2.306645	Italian Restaurant
...
1082	Hôtel-de-Ville	48.854664	2.357004	Aux Merveilleux de Fred	48.855686	2.356369	Dessert Shop
1083	Hôtel-de-Ville	48.854664	2.357004	Maison Européenne de la Photographie	48.855128	2.358948	Art Museum
1084	Hôtel-de-Ville	48.854664	2.357004	Pamela Popo	48.855749	2.356919	French Restaurant
1085	Hôtel-de-Ville	48.854664	2.357004	Jardin de l'Hôtel de Sens	48.853842	2.358404	Garden
1086	Hôtel-de-Ville	48.854664	2.357004	Vingt Vins d'Art	48.855214	2.357940	Wine Bar

Grouping venues by neighborhoods

	longitude	latitude	neighbourhood	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	2.306204	48.887035	Batignolles-Monceau	1	French Restaurant	Hotel	Italian Restaurant	Bakery	Japanese Restaurant	Café	Bistro	Plaza	Restaurant	Metro Station
1	2.312969	48.854714	Palais-Bourbon	1	Hotel	French Restaurant	Café	Plaza	History Museum	Italian Restaurant	Bakery	Historic Site	Garden	Park
2	2.383096	48.887149	Buttes-Chaumont	0	French Restaurant	Bar	Supermarket	Sushi Restaurant	Hotel	Italian Restaurant	Bistro	Beer Bar	Seafood Restaurant	Farmers Market
3	2.337891	48.877028	Opéra	0	French Restaurant	Hotel	Japanese Restaurant	Bistro	Cocktail Bar	Lounge	Bar	Bakery	Restaurant	Wine Bar
4	2.360472	48.875907	Entrepôt	0	French Restaurant	Bistro	Hotel	Coffee Shop	Café	Bar	Indian Restaurant	Asian Restaurant	Pizza Place	Fast Food Restaurant
5	2.362916	48.830100	Gobelins	0	Vietnamese Restaurant	French Restaurant	Chinese Restaurant	Asian Restaurant	Hotel	Creperie	Park	Plaza	Sushi Restaurant	Cambodian Restaurant
6	2.296235	48.841495	Vaugirard	0	French Restaurant	Hotel	Italian Restaurant	Bakery	Plaza	Lebanese Restaurant	Bistro	Coffee Shop	Indian Restaurant	Supermarket
7	2.445016	48.835072	Reuilly	4	Theater	Playground	Performing Arts Venue	Botanical Garden	Comedy Club	Stadium	Bike Trail	Bike Rental / Bike Share	Tennis Stadium	Fast Food Restaurant
8	2.337345	48.861938	Louvre	0	French Restaurant	Plaza	Café	Italian Restaurant	Coffee Shop	Art Museum	Historic Site	Hotel	Udon Restaurant	Cheese Shop
9	2.332321	48.849443	Luxembourg	0	French Restaurant	Pastry Shop	Plaza	Italian Restaurant	Wine Bar	Fountain	Tea Room	Bakery	Chocolate Shop	Deli / Bodega

Merging of datasets in order to include longitude and latitude coordinates



5 Cluster Map

5. Results and Discussion

The results of the modeling has proven that Paris is truly a multicultural city. It boasts restaurants that cater to all kinds of tastes, including but not limited to Italian, Middle-Eastern, Asian and French cuisines. There are gourmet shops and wine bars for a sophisticated outing as well as bistros and cafes if you want to take it easy and relax. Aside from restaurants, Paris is home to a number of stores, museums, stadiums and hotels that can tickle anyone's fancy. Whether you're looking to relax in a park or go clubbing, Paris has just the place for your needs.

6. Conclusion

The objective of this capstone project was to analyze data about the city of Paris and give a report on the most interesting places that would seduce a tourist into visiting. Paris seems to offer all kinds of places for all kinds of people. As has been indicated by the modelling, we are able to visualize the extent to which each neighborhood provides a variety of interesting venues for tourists. In the interests of exploration this city has anything you would be interested in seeing, whether it be art and culture, sports or even nature.