Suitable New Store Locations in Paris for a Fashion Retailer

1. Introduction and Discussion of the Business Objective and Problem

Locations for New Fashion Stores in High Traffic Areas in Paris France The Task at Hand

A digitally native vertical fashion retailer, with a substantial e-commerce footprint, has begun the rollout of brick and mortar stores as part of their omnichannel retail strategy. After rolling out stores in a few select cities by guessing where the best locations were to open, as part of their store expansion for Paris they've decided to be more informed and selective, and take the time to do some research.

I've been given the exciting task of assisting them to make data-driven decisions on the new locations that are most suitable for their new stores in Paris. This will be a major part of their decision-making process, the other being on the ground qualitative analysis of districts once this data and report are reviewed and studied.

The fashion brand is not what is considered high-end, they are positioned in upper end of the fast fashion market. As such, they do not seek stores in the premium upmarket strips like Avenue Montaigne, but rather, in high traffic areas where consumers go for shopping, restaurants and entertainment. Foursquare data will be very helpful in making data-driven decisions about the best of those areas.

Criteria

Qualitative data from another retailer that they know, suggests that the best locations to open new fashion retail stores may not only be where other clothing is located. This data strongly suggests that the best places are in fact areas that are near French Restaurants, Cafés and Wine Bars. Parisians are very social people that frequent these place often, so opening new stores in these locations is becoming popular.

The analysis and recommendations for new store locations will focus on general districts with these establishments, not on specific store addresses. Narrowing down the best district options derived from analysis allows for either further research to be conducted, advising agents of the chosen district, or on the ground searching for specific sites by the company's personnel.

Why Data?

Without leveraging data to make decisions about new store locations, the company could spend countless hours walking around districts, consulting many real estate agents with their own district biases, and end up opening in yet another location that is not ideal.

Data will provide better answers and better solutions to their task at hand.

Outcomes

The goal is to identify the best districts - Arrondissements - to open new stores as part of the company's plan. The results will be translated to management in a simple form that will convey the data-driven analysis for the best locations to open stores.

2. The Data Science Workflow Data Requirements

The main districts in Paris are divided into 20 Arrondissements Municipaux (administrative districts), shortened to arrondissements.

The data regarding the districts in Paris needs to be researched and a suitable useable source identified. If it is found but is not in a useable form, data wrangling and cleaning will have to be performed.

The cleansed data will then be used alongside Foursquare data, which is readily available. Foursquare location data will be leveraged to explore or compare districts around Paris, identifying the high traffic areas where consumers go for shopping, dining and entertainment - the areas where the fashion brand are most interested in opening new stores.

The Data Science Workflow for Part 1 & 2 includes the following:

Outline the initial data that is required:

District data for Paris including names, location data if available, and any other details required.

Obtain the Data:

Research and find suitable sources for the district data for Paris.

Access and explore the data to determine if it can be manipulated for our purposes.

Initial Data Wrangling and Cleaning:

Clean the data and convert to a useable form as a data frame.

The Data Science Workflow for parts 3 & 4 includes:

Data Analysis and Location Data:

Foursquare location data will be leveraged to explore or compare districts around Paris.

Data manipulation and analysis to derive subsets of the initial data.

Identifying the high traffic areas using data visualization and statistical analysis.

Visualization:

Analysis and plotting visualizations.

Data visualization using various mapping libraries.

Discussion and Conclusions:

Recommendations and results based on the data analysis.

Discussion of any limitations and how the results can be used, and any conclusions that can be drawn.

3. Data Research and Preparation

Import the Paris District Data

Arrondissements Municipaux for Paris CSV (administrative districts) Paris is divided into 20 Arrondissements Municipaux (or administrative districts), shortened to just arrondissements. They and normally referenced by the arrondissement number rather than a name.

Data for the arrondissements is necessary to select the most suitable of these areas for new stores.

Initially looking to get this data by scraping the relevent Wikipedia page (https://en.wikipedia.org/wiki/Arrondissements_of_Paris), fortunately, after much research, this data is available on the web and can be manipulated and cleansed to provide a meaningful dataset to use.

Data from Open|DATA France: https://opendata.paris.fr/explore/dataset/arrondissements/table/?dataChart

Also available from Opendatasoft: https://data.opendatasoft.com/explore/dataset/arrondissements%40parisdata/export/

	CAR	NAME	NSQAR	CAR.1	CARINSEE	LAR	NSQCO	SURFACE	PERIMETRE	Geometry_X	Geometry_Y
0	3	Temple	750000003	3	3	3eme Ardt	750001537	1170882828	4519264	48.862872	2.360001
1	19	Buttes-Chaumont	750000019	19	19	19eme Ardt	750001537	6792651129	11253182	48.887076	2.384821
2	14	Observatoire	750000014	14	14	14eme Ardt	750001537	5614877309	10317483	48.829245	2.326542
3	10	Entrepot	750000010	10	10	10eme Ardt	750001537	2891739442	6739375	48.876130	2.360728
4	12	Reuilly	750000012	12	12	12eme Ardt	750001537	16314782637	24089666	48.834974	2.421325
5	16	Passy	750000016	16	16	16eme Ardt	750001537	16372542129	17416110	48.860392	2.261971
6	11	Popincourt	750000011	11	11	11eme Ardt	750001537	3665441552	8282012	48.859059	2.380058
7	2	Bourse	750000002	2	2	2eme Ardt	750001537	991153745	4554104	48.868279	2.342803
8	4	Hotel-de-Ville	750000004	4	4	4eme Ardt	750001537	1600585632	5420908	48.854341	2.357630
9	17	Batignolles-Monceau	750000017	17	17	17eme Ardt	750001537	5668834504	10775580	48.887327	2.306777
10	18	Buttes-Montmartre	750000018	18	18	18eme Ardt	750001537	5996051308	9916464	48.892569	2.348161
11	1	Louvre	750000001	1	1	1er Ardt	750001537	1824612860	6054937	48.862563	2.336443
12	5	Pantheon	750000005	5	5	5eme Ardt	750001537	2539374623	6239195	48.844443	2.350715
13	7	Palais-Bourbon	750000007	7	7	7eme Ardt	750001537	4090057185	8099425	48.856174	2.312188
14	20	Menilmontant	750000020	20	20	20eme Ardt	750001537	5983446037	10704940	48.863461	2.401188
15	8	elysee	750000008	8	8	8eme Ardt	750001537	3880036397	7880533	48.872721	2.312554
16	9	Opera	750000009	9	9	9eme Ardt	750001537	2178303275	6471588	48.877164	2.337458
17	13	Gobelins	750000013	13	13	13eme Ardt	750001537	7149311091	11546547	48.828388	2.362272
18	15	Vaugirard	750000015	15	15	15eme Ardt	750001537	8494994081	13678798	48.840085	2.292826
19	6	Luxembourg	750000006	6	6	6eme Ardt	750001537	2153095586	6483687	48.849130	2.332898

Exploring, Wrangling and Cleaning the Data

Rename the columns 'Geometry_X' and 'Geometry_Y', "CAR' to 'Arrondissement' etc...

	Arrondissement_Num	Neighborhood	NSQAR	CAR.1	CARINSEE	French_Name	NSQCO	SURFACE	PERIMETRE	Latitude	Longitude
0	3	Temple	750000003	3	3	3eme Ardt	750001537	1170882828	4519264	48.862872	2.360001
1	19	Buttes-Chaumont	750000019	19	19	19eme Ardt	750001537	6792651129	11253182	48.887076	2.384821
2	14	Observatoire	750000014	14	14	14eme Ardt	750001537	5614877309	10317483	48.829245	2.326542
3	10	Entrepot	750000010	10	10	10eme Ardt	750001537	2891739442	6739375	48.876130	2.360728
4	12	Reuilly	750000012	12	12	12eme Ardt	750001537	16314782637	24089666	48.834974	2.421325
5	16	Passy	750000016	16	16	16eme Ardt	750001537	16372542129	17416110	48.860392	2.261971
6	11	Popincourt	750000011	11	11	11eme Ardt	750001537	3665441552	8282012	48.859059	2.380058
7	2	Bourse	750000002	2	2	2eme Ardt	750001537	991153745	4554104	48.868279	2.342803
8	4	Hotel-de-Ville	750000004	4	4	4eme Ardt	750001537	1600585632	5420908	48.854341	2.357630
9	17	Batignolles-Monceau	750000017	17	17	17eme Ardt	750001537	5668834504	10775580	48.887327	2.306777
10	18	Buttes-Montmartre	750000018	18	18	18eme Ardt	750001537	5996051308	9916464	48.892569	2.348161
11	1	Louvre	750000001	1	1	1er Ardt	750001537	1824612860	6054937	48.862563	2.336443
12	5	Pantheon	750000005	5	5	5eme Ardt	750001537	2539374623	6239195	48.844443	2.350715
13	7	Palais-Bourbon	750000007	7	7	7eme Ardt	750001537	4090057185	8099425	48.856174	2.312188
14	20	Menilmontant	750000020	20	20	20eme Ardt	750001537	5983446037	10704940	48.863461	2.401188
15	8	elysee	750000008	8	8	8eme Ardt	750001537	3880036397	7880533	48.872721	2.312554
16	9	Opera	750000009	9	9	9eme Ardt	750001537	2178303275	6471588	48.877164	2.337458
17	13	Gobelins	750000013	13	13	13eme Ardt	750001537	7149311091	11546547	48.828388	2.362272
18	15	Vaugirard	750000015	15	15	15eme Ardt	750001537	8494994081	13678798	48.840085	2.292826
19	6	Luxembourg	750000006	6	6	6eme Ardt	750001537	2153095586	6483687	48.849130	2.332898

Clean up the dataset to remove unnecessary columns

|	Arrondissement_Num	Neighborhood	French_Name	Latitude	Longitude
0	3	Temple	3eme Ardt	48.862872	2.360001
1	19	Buttes-Chaumont	19eme Ardt	48.887076	2.384821
2	14	Observatoire	14eme Ardt	48.829245	2.326542
3	10	Entrepot	10eme Ardt	48.876130	2.360728
4	12	Reuilly	12eme Ardt	48.834974	2.421325
5	16	Passy	16eme Ardt	48.860392	2.261971
6	11	Popincourt	11eme Ardt	48.859059	2.380058
7	2	Bourse	2eme Ardt	48.868279	2.342803
8	4	Hotel-de-Ville	4eme Ardt	48.854341	2.357630
9	17	Batignolles-Monceau	17eme Ardt	48.887327	2.306777
10	18	Buttes-Montmartre	18eme Ardt	48.892569	2.348161
11	1	Louvre	1er Ardt	48.862563	2.336443
12	5	Pantheon	5eme Ardt	48.844443	2.350715
13	7	Palais-Bourbon	7eme Ardt	48.856174	2.312188
14	20	Menilmontant	20eme Ardt	48.863461	2.401188
15	8	elysee	8eme Ardt	48.872721	2.312554
16	9	Opera	9eme Ardt	48.877164	2.337458
17	13	Gobelins	13eme Ardt	48.828388	2.362272
18	15	Vaugirard	15eme Ardt	48.840085	2.292826
19	6	Luxembourg	6eme Ardt	48.849130	2.332898

4. Discussion of the Business Objective and Problem / The Data Workflow

We now have located and imported the relevant data for the districts of Paris, and have constructed a dataframe.

Our business objective, strategy and methods to achieve our goal have been laid out, and a data workflow established.

Next up, we will leverage Foursquare location data to obtain data on high traffic areas - where consumers go for shopping, restaurants and entertainment - in all of the 20 districts.

Create a map of Paris with districts superimposed
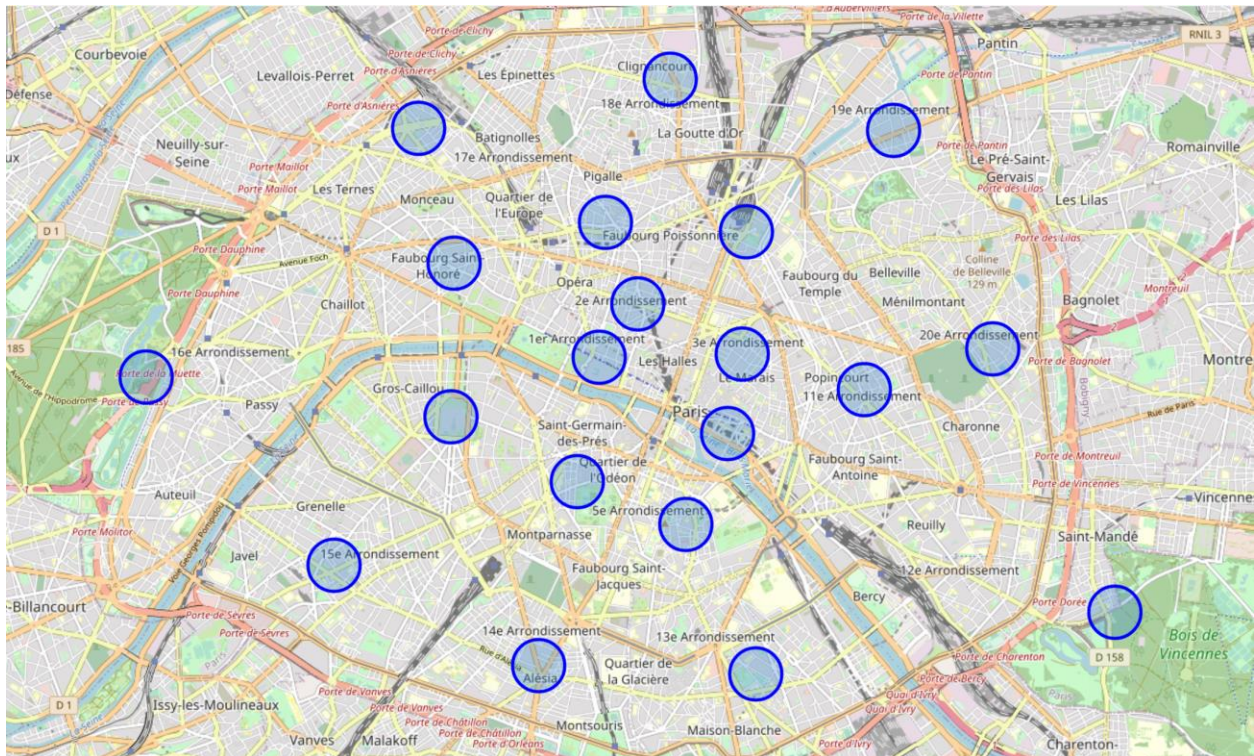
Exploratory data analysis

Explore the first district in our dataframe to become familiar with the data (use the French descriptive arrondissement name)

	name	categories	lat	lng
0	Mmmozza	Sandwich Place	48.863910	2.360591
1	Chez Alain Miam Miam	Sandwich Place	48.862369	2.361950
2	Square du Temple	Park	48.864475	2.360816
3	Marché des Enfants Rouges	Farmers Market	48.862806	2.361996
4	Chez Alain Miam Miam	Sandwich Place	48.862781	2.362064
5	Okomusu	Okonomiyaki Restaurant	48.861453	2.360879
6	Le Burger Fermier des Enfants Rouges	Burger Joint	48.862831	2.362073
7	Hôtel Jules & Jim	Hotel	48.863496	2.357395
8	SoMa	Japanese Restaurant	48.861511	2.362146
9	Les Enfants Rouges	Wine Bar	48.863013	2.361260
10	Bontemps	Dessert Shop	48.863956	2.360725
11	Biglove Caffè	Italian Restaurant	48.862063	2.363557
12	Hank Burger	Burger Joint	48.861340	2.358304
13	Lily of the Valley	Tea Room	48.865221	2.361990
14	L'Îlot	Seafood Restaurant	48.864666	2.363317
15	Taing Song-Heng	Vietnamese Restaurant	48.864701	2.356888
16	0fr.	Bookstore	48.865746	2.361236
17	Le Roi de Pique	Café	48.863375	2.358299
18	Hank Pizza	Pizza Place	48.863737	2.357199
19	Le Barav	Wine Bar	48.865166	2.363155

Create a nearby venues function for all the neighborhoods in Paris

	French_Name	Latitude	Longitude	Venue	Venue Latitude	Venue Longitude	Venue Category
0	3eme Ardt	48.862872	2.360001	Mmmozza	48.863910	2.360591	Sandwich Place
1	3eme Ardt	48.862872	2.360001	Chez Alain Miam Miam	48.862369	2.361950	Sandwich Place
2	3eme Ardt	48.862872	2.360001	Square du Temple	48.864475	2.360816	Park
3	3eme Ardt	48.862872	2.360001	Marché des Enfants Rouges	48.862806	2.361996	Farmers Market
4	3eme Ardt	48.862872	2.360001	Chez Alain Miam Miam	48.862781	2.362064	Sandwich Place
5	3eme Ardt	48.862872	2.360001	Okomusu	48.861453	2.360879	Okonomiyaki Restaurant
6	3eme Ardt	48.862872	2.360001	Le Burger Fermier des Enfants Rouges	48.862831	2.362073	Burger Joint
7	3eme Ardt	48.862872	2.360001	Hôtel Jules & Jim	48.863496	2.357395	Hotel
8	3eme Ardt	48.862872	2.360001	SoMa	48.861511	2.362146	Japanese Restaurant
9	3eme Ardt	48.862872	2.360001	Les Enfants Rouges	48.863013	2.361260	Wine Bar
10	3eme Ardt	48.862872	2.360001	Bontemps	48.863956	2.360725	Dessert Shop
11	3eme Ardt	48.862872	2.360001	Biglove Caffè	48.862063	2.363557	Italian Restaurant
12	3eme Ardt	48.862872	2.360001	Hank Burger	48.861340	2.358304	Burger Joint
13	3eme Ardt	48.862872	2.360001	Lily of the Valley	48.865221	2.361990	Tea Room
14	3eme Ardt	48.862872	2.360001	L'Îlot	48.864666	2.363317	Seafood Restaurant
15	3eme Ardt	48.862872	2.360001	Taing Song-Heng	48.864701	2.356888	Vietnamese Restaurant
16	3eme Ardt	48.862872	2.360001	Ofr.	48.865746	2.361236	Bookstore
17	3eme Ardt	48.862872	2.360001	Le Roi de Pique	48.863375	2.358299	Café
18	3eme Ardt	48.862872	2.360001	Hank Pizza	48.863737	2.357199	Pizza Place
19	3eme Ardt	48.862872	2.360001	Le Barav	48.865166	2.363155	Wine Bar
20	3eme Ardt	48.862872	2.360001	Jardin des Archives Nationales	48.859929	2.358660	Garden
21	3eme Ardt	48.862872	2.360001	Laïzé 来里 (Laïzé)	48.863077	2.355073	Bubble Tea Shop
22	3eme Ardt	48.862872	2.360001	Fringe	48.862612	2.364752	Coffee Shop
23	3eme Ardt	48.862872	2.360001	L'Aller Retour	48.865247	2.363203	French Restaurant
24	3eme Ardt	48.862872	2.360001	Galerie Thaddaeus Ropac	48.860582	2.363539	Art Gallery
25	3eme Ardt	48.862872	2.360001	Monoprix	48.866150	2.361548	Supermarket
26	3eme Ardt	48.862872	2.360001	La Massara	48.866098	2.359550	Italian Restaurant
27	3eme Ardt	48.862872	2.360001	Love Juice Bar	48.863614	2.355505	Juice Bar
28	3eme Ardt	48.862872	2.360001	Le Mary Céleste	48.861742	2.365012	Cocktail Bar
29	3eme Ardt	48.862872	2.360001	Chocolaterie Jacques Genin	48.864517	2.364591	Chocolate Shop
...	...	...	...	...	...	...	...
220	10eme Ardt	48.876130	2.360728	Maison Nomade	48.874899	2.359258	Coffee Shop
221	10eme Ardt	48.876130	2.360728	La Fabrique à Gâteaux	48.872058	2.360813	Pastry Shop
222	10eme Ardt	48.876130	2.360728	Baci Bisou	48.873210	2.363126	Ice Cream Shop
223	10eme Ardt	48.876130	2.360728	L'École Buissonnière	48.879180	2.364939	French Restaurant
224	10eme Ardt	48.876130	2.360728	Restaurant de Bourgogne Chez Maurice	48.873235	2.362928	French Restaurant
225	10eme Ardt	48.876130	2.360728	Les Caves Saint Martin	48.879651	2.363401	Wine Shop
226	10eme Ardt	48.876130	2.360728	Le Cinquante	48.871937	2.362650	Dive Bar
227	10eme Ardt	48.876130	2.360728	Le Coeur du Liban	48.872366	2.363197	Lebanese Restaurant
228	10eme Ardt	48.876130	2.360728	Bocamexa	48.873862	2.355107	Mexican Restaurant
229	10eme Ardt	48.876130	2.360728	Sheezan	48.873783	2.355220	Indian Restaurant
230	10eme Ardt	48.876130	2.360728	Giacomo	48.879784	2.362198	Italian Restaurant
231	10eme Ardt	48.876130	2.360728	Le Comptoir Iodé	48.874697	2.354645	Seafood Restaurant
232	10eme Ardt	48.876130	2.360728	Hokkaido	48.878187	2.355554	Japanese Restaurant
233	10eme Ardt	48.876130	2.360728	Pomm'	48.877768	2.365382	Diner
234	10eme Ardt	48.876130	2.360728	Le Poutch	48.871917	2.360510	Café
235	10eme Ardt	48.876130	2.360728	Shouk	48.871820	2.362610	Israeli Restaurant
236	10eme Ardt	48.876130	2.360728	Saravanaa Bhavan	48.879935	2.357404	Indian Restaurant
237	10eme Ardt	48.876130	2.360728	Hubert	48.873848	2.355068	French Restaurant
238	10eme Ardt	48.876130	2.360728	Le Perchoir de l'Est	48.876374	2.359724	Beer Garden
239	10eme Ardt	48.876130	2.360728	Au Train de Vie	48.878343	2.358378	Café
240	10eme Ardt	48.876130	2.360728	Sushi Rama	48.873197	2.358073	Japanese Restaurant
241	10eme Ardt	48.876130	2.360728	Yummy Asian Food	48.876416	2.357257	Asian Restaurant
242	10eme Ardt	48.876130	2.360728	East Side Café	48.876008	2.359309	Lounge
243	10eme Ardt	48.876130	2.360728	Le Chansonnier	48.878717	2.364179	French Restaurant
244	10eme Ardt	48.876130	2.360728	Best Western Hôtel Albert 1er	48.879554	2.358110	Hotel
245	10eme Ardt	48.876130	2.360728	SEPHORA	48.876628	2.360042	Cosmetics Shop
246	10eme Ardt	48.876130	2.360728	Belushi's Gare du Nord	48.879355	2.358004	Sports Bar
247	10eme Ardt	48.876130	2.360728	O.B.U (Organisation des Burgers Unis)	48.879216	2.362940	Burger Joint
248	10eme Ardt	48.876130	2.360728	Bombay Palace	48.878327	2.356484	Indian Restaurant
249	10eme Ardt	48.876130	2.360728	Fric Frac	48.872448	2.364304	Sandwich Place

<u>The top 10 venue categories for each neighborhood</u>

This is a very useful results table that can provide at a glance information for all of the districts.

Even once any conclusions are drawn further into the data workflow, we can refer back to this table for meaningful insights about the top categories of businesses in all the neighbourhoods.

Even without actual counts and numbers, it makes a great reference table for the client.

	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
0	10eme Ardt	French Restaurant	Hotel	Coffee Shop	Café	Indian Restaurant	Bistro	Pizza Place	Japanese Restaurant	Bar	Seafood Restaurant
1	11eme Ardt	French Restaurant	Café	Supermarket	Bar	Pastry Shop	Wine Bar	Restaurant	Bakery	Theater	Cocktail Bar
2	12eme Ardt	Zoo Exhibit	Supermarket	Monument / Landmark	Zoo	Antique Shop	Argentinian Restaurant	Food & Drink Shop	Flower Shop	Fish & Chips Shop	Fast Food Restaurant
3	13eme Ardt	Vietnamese Restaurant	Asian Restaurant	Thai Restaurant	Chinese Restaurant	French Restaurant	Juice Bar	Bus Stop	Coffee Shop	Cambodian Restaurant	Sandwich Place
4	14eme Ardt	French Restaurant	Hotel	Bistro	Plaza	Laundromat	Food & Drink Shop	Bus Stop	Brasserie	Tea Room	Bakery
5	15eme Ardt	Hotel	French Restaurant	Italian Restaurant	Coffee Shop	Lebanese Restaurant	Indian Restaurant	Brasserie	Bistro	Japanese Restaurant	Thai Restaurant
6	16eme Ardt	Plaza	Lake	Pool	Bus Station	French Restaurant	Bus Stop	Boat or Ferry	Park	Art Museum	Recording Studio
7	17eme Ardt	French Restaurant	Hotel	Italian Restaurant	Japanese Restaurant	Café	Bakery	Plaza	Bistro	Bar	Portuguese Restaurant
8	18eme Ardt	Bar	French Restaurant	Hotel	Convenience Store	Restaurant	Coffee Shop	Café	Sandwich Place	Cheese Shop	Plaza
9	19eme Ardt	French Restaurant	Bar	Bistro	Hotel	Seafood Restaurant	Beer Bar	Supermarket	Brewery	Restaurant	Steakhouse
10	1er Ardt	French Restaurant	Hotel	Japanese Restaurant	Plaza	Italian Restaurant	Art Museum	Theater	Garden	Cheese Shop	Candy Store
11	20eme Ardt	Bakery	Plaza	Japanese Restaurant	French Restaurant	Italian Restaurant	Café	Pizza Place	Bar	Bistro	Lounge
12	2eme Ardt	French Restaurant	Wine Bar	Cocktail Bar	Hotel	Bakery	Bistro	Creperie	Concert Hall	Thai Restaurant	Italian Restaurant
13	3eme Ardt	French Restaurant	Japanese Restaurant	Coffee Shop	Wine Bar	Gourmet Shop	Italian Restaurant	Art Gallery	Bakery	Burger Joint	Sandwich Place
14	4eme Ardt	French Restaurant	Clothing Store	Ice Cream Shop	Pedestrian Plaza	Plaza	Wine Bar	Hotel	Italian Restaurant	Coffee Shop	Tea Room
15	5eme Ardt	French Restaurant	Italian Restaurant	Science Museum	Bakery	Bar	Café	Plaza	Hotel	Coffee Shop	Pub
16	6eme Ardt	French Restaurant	Fountain	Bistro	Pastry Shop	Cocktail Bar	Plaza	Café	Clothing Store	Supermarket	Pub
17	7eme Ardt	Hotel	French Restaurant	Italian Restaurant	Café	Plaza	Cocktail Bar	History Museum	Historic Site	Garden	Bistro
18	8eme Ardt	French Restaurant	Hotel	Spa	Theater	Art Gallery	Plaza	Cocktail Bar	Park	Resort	Modern European Restaurant
19	9eme Ardt	French Restaurant	Hotel	Cocktail Bar	Bakery	Bistro	Lounge	Wine Bar	Japanese Restaurant	Café	Plaza

<u>Let's look at their frequency of occurance for all the Paris neighborhoods</u>

Frequency distribution for the top 3 venue categories for each neighborhood (click to enlage)
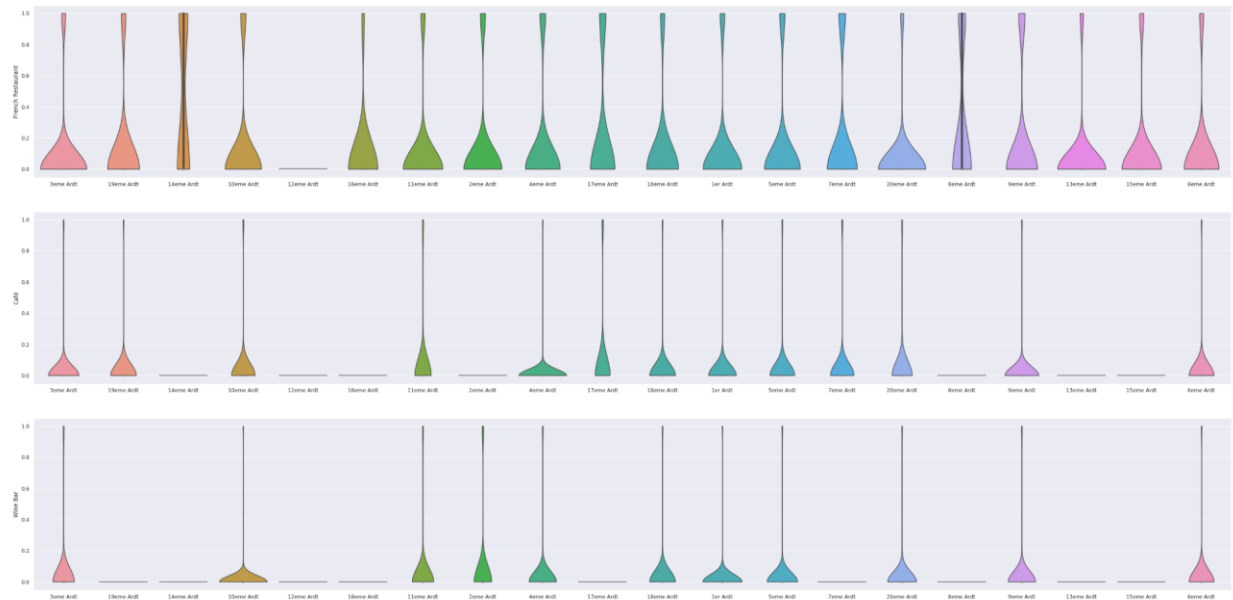
5. Inferences and Discussion

<u>Chosen Neighborhoods - Results</u>

Inferential analysis using the data, as well as domain knowledge of retail and marketing, allow the list to be focused to just 3 neighborhoods from the previous ones.

The reasoning being that if the 3 criteria have been met - identifying neighbourhoods that are lively with Restaurants, Cafés and Wine Bars - adding Clothing Stores into the mix of stores in the area is a significant bonus. Having some of the same category of stores in the same area - especially in fashion retail - is very desirable as a retailer.

So we can increase the criteria to include Restaurants, Cafés, Wine Bars and Clothing Stores - which narrows down and focuses the suggested districts for new stores to be located, and at the same time provides better locations for the brand.

So the final 3 prospective neighborhoods for new store locations are where 4 criteria are met:

- *3eme Ardt : Arrondissement 3, Temple*
- *4eme Ardt : Arrondissement 4, Hotel-de-Ville*
- *6eme Ardt : Arrondissement 6, Luxembourg*

Let's look at the 3 districts on a Paris map
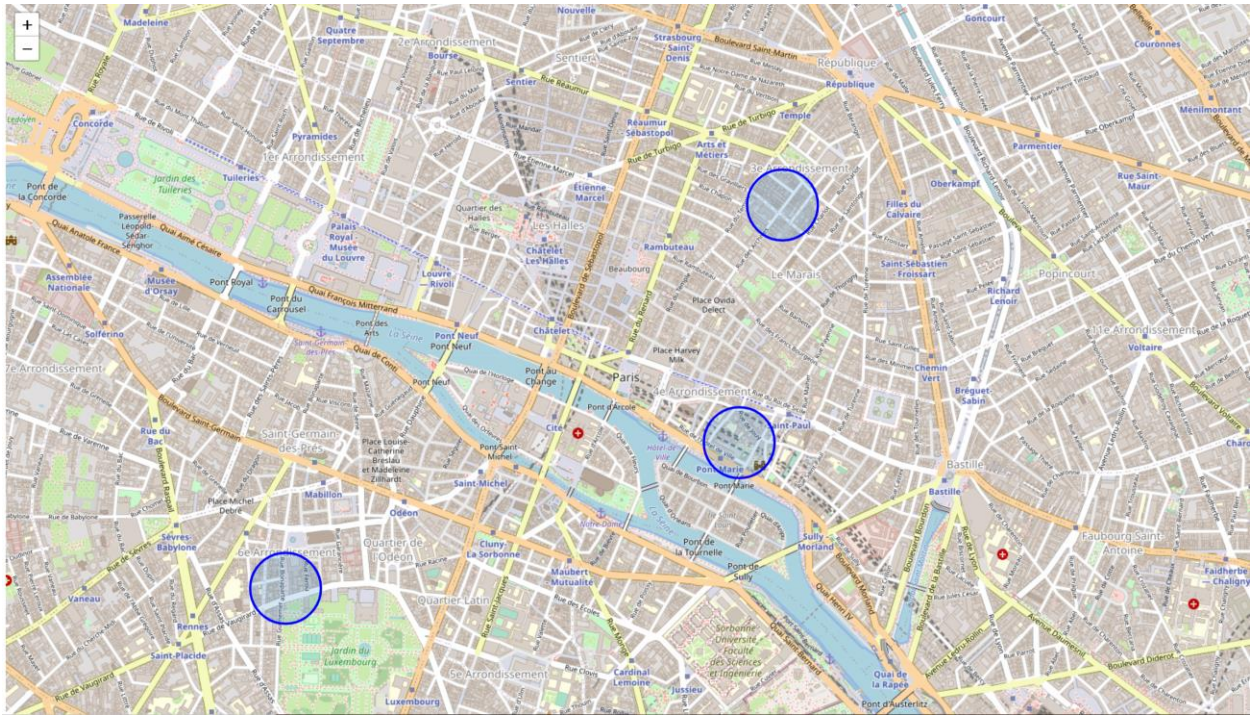
6. Observations and Inferences

I guess it's not a surprise that these districts are all very centrally located in the circular arrangement of Paris's arrondissements. Locations fitting the criteria for popular venues would normally be in central locations in many cities of the world.

From this visualisation it is clear that on a practical level, with no data to base decisions on, the circle of the 20 districs is very large, and researching and then visiting them all would be a daunting and time consuming task. We have narrowed the search area down significantly from 20 potential districts to 3 that should suit the client's retail business.

We have made inferences from the data in making the location recommendations, but that is exactly the point. There is no right or wrong answer or conclusion for the task at hand. The job of data analysis here is to steer a course for the location selection of new stores (i) to meet the criteria of being in neighbourhoods that are lively with abundant leisure venues, and (ii) to narrow the search down to just a few of the main areas that are best suited to match the criteria.

7. Conclusions

There are many ways this analysis could have been performed based on different methodolgy and perhaps different data sources. I chose the method I selected as it was a straight forward way to narrow down the options, not complicating what is actually simple in many ways – meeting the the critera for the surrounding venues, and in my case, domain knowledge I have on the subject. I originally intended to use the clustering algorythms to cluster the data, but as it progressed it became obvious that this only complicated the task at hand. The analysis and results are not an end point, but rather a starting point that will guide the next part of the process to find specific store locations. The next part will involve domain knowledge of the industry, and perhaps, of the city itself. But the data analysis and resulting recommendations have greatly narrowed down the best district options based on data and what we can infer from it.

Without leveraging data to make focussed decisions, the process could have been drawn out and resulted in new stores opening in sub-standard areas for this retailer. Data has helped to provide a better strategy and way forward, these data-driven decisions will lead to a better solution in the end.