

Paris, France

COURSERA
CAPSTONE



ART AND CULTURES



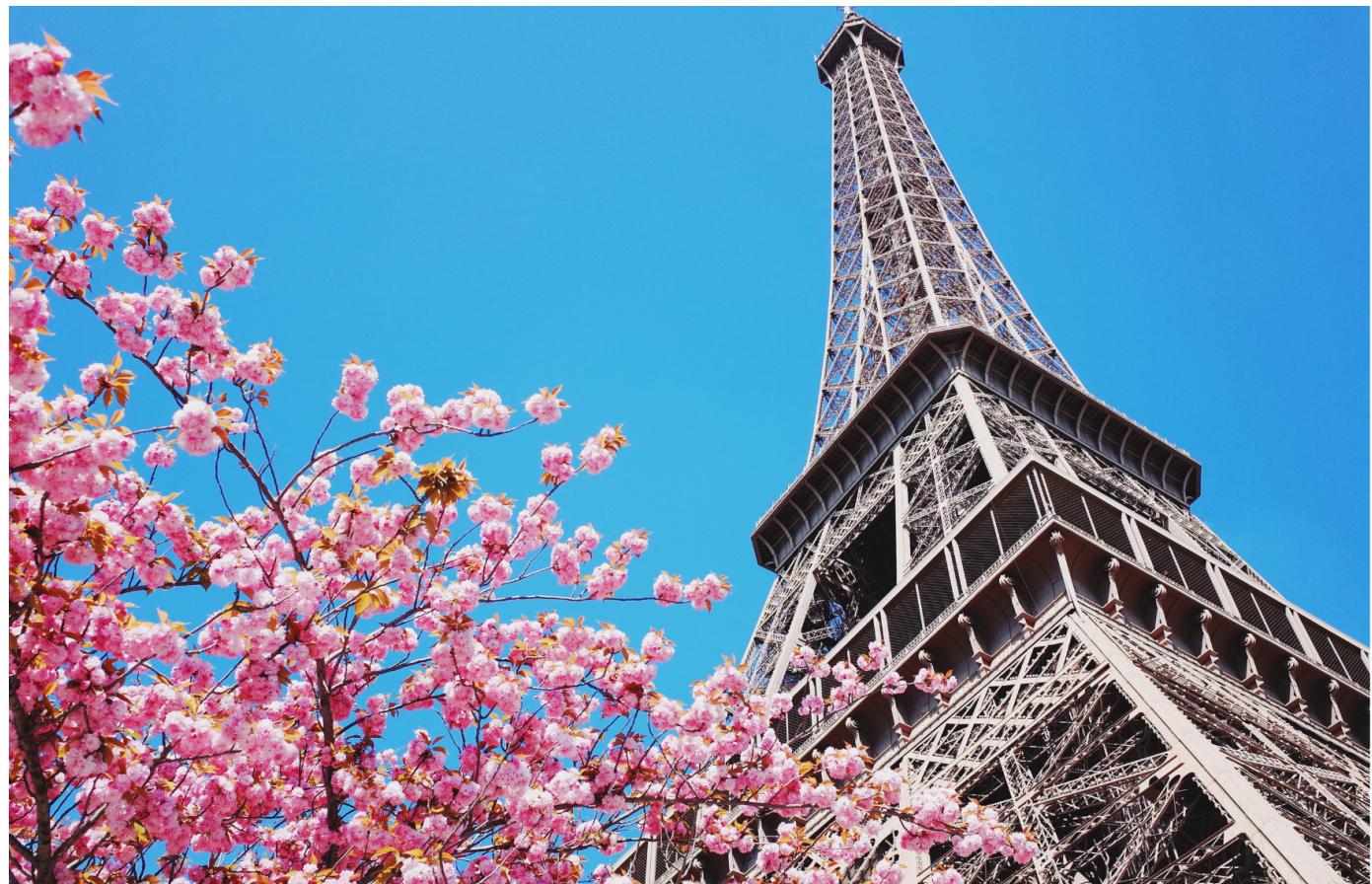
LIFESTYLE AND FOOD



TRAVEL DESTINATION

IBM APPLIED DATA SCIENCE

CAPSTONE PROJECT



The Battle of Neighborhoods
Psychiatric clinic and wellness
center business Clinic in Paris
By Sutinan Thanombun

Executive Summary

France is the world's seventh-largest economy by 2022 .nominal figures and the List of countries by GDP (PPP)tenth-largest economy by PPP, constituting 3.3% of world GDP. It is the 3rd largest economy of Europe. France's diversified economy is led bytourism, manufacturing, and pharmaceuticals. This is only the beautiful side.

In contrast, around 1 in 5 French people suffer from mental health problems. (that's is 20%) According to Foundation de France, around 3M people in France suffer from a serious mental illness. With report shown below that **there is not enough** both healthcare facilities and healthcare practitioner to help people who suffer form this.

This could be a proper time for investor, doctor or healthcare practitioner who dream to own business to discover the opportunity to help people suffering with mental illness in the top 3 neibourhoods in Paris by offer more Psychiatric clinic and wellness and retreat center.

Business problems

The final goal of this Capstone project is to analyze and offer the best locations(neighbourhoods) in city of Paris to operate Psychiatric clinic. This will be the key for any business, investor, doctor who interest in helping patients -both locals and travelers with mild to severe mental illness like anxiety, Drug addicted , etc. Using Data science methodology and machine learning techniques. This project aims to provide useful solutions to answer the business questions: In the city of Paris. (Focusing on higher density area **where there should be Plaza, Hotel,Art Gallery and Italian Restaurant . For Starting Psychiatric clinic and wellness center business. Top neibourhood would I recommend it.**

Introduction

According to resource [here](#) that said "The World Health Organization rated it as one of the best in the world, and both locals and foreigners regularly attest to the **high standard of care received in an efficient and affordable manner**" Moreover, WHO records shown people nowadays have higher life expectancy. We want to live longer, live healthier and looking better. The trend "Be the best version of yourself" seems to fit in the modern era now. Thanks to all new advanced healthcare technology and pharmaceutical company.

However, With the higher standard of living it come with the cost. This [research](#) shown "Epidemiological studies show high rates of generalised anxiety and drug and alcohol abuse and dependence, greater use of psychoactive medication" With lesser mental health facility (Paris has considerably less adult psychiatry beds and day care places per head of population than the rest of France)

So, our main goal now is to provide more Psychiatric clinic and wellness center facilities in Paris. We're also focusing on Wellness and Aesthetics here as well, since a lot of wellness program offer treatment to treat earlier anxiety or help individual to rest and find proper care for themselves.

Target Audiences

The goal is to identify the best locations in certain area - to open new clinic as part of the company's plan. Also will add the marketing strategy , most popular products and services among those previous successful business include clinic. The results will be translated to management in a simple form that will convey the data-driven analysis for the best locations to open clinic.

Data Collection

- List of neighborhoods in Paris using API
- Latitude and longitudes coordinates of the neighbourhoods.
- Venue data, Especially Data related to Plaza(mall), Hotel, Art Gallery and Italian Restaurant

Source of Data

- Wikipedia page for Paris neighbourhoods(Paris map shows the 20 different neighborhoods which are called **arrondissements**. In Paris arrondissements are named according to their number, which corresponds to an administrative district. For example, you might live in the 5th arrondissement, which would be written as 5ème (or 5e) in French.)>> <https://en.wikipedia.org/wiki/Paris>

- Geocoder package for latitude and longitude
- Foursquare API for venue information

Methodology

To solve the problems, I use these techniques gathering this data

- Web scraping Wikipedia page for neighbourhoods list (retrieval data from wikipedia <https://en.wikipedia.org/wiki/Paris>)
- Get latitude and longitude coordinates using Geocoder
- Use Foursquare API to get venue data
- Group data by neighbourhood and taking the mean of the frequency of occurrence of each venue category
- From Paris map shows overall 20 neighbourhoods which are called arrondissements. Filter only venue that have high density on this category (Plaza, Hotel, and Art Gallery and Italian Restaurant)

Result

nalysis. To answer to top neibourhoods that pass all criteria we set (Plaza, Hotel, and Art Gallery and Italian Restaurant) Among all 20 venues we treived. With 197 unique venue category. We get 2 venues

Which is 4 and 8

**4eme Ardt: Hotel-de-ville and
8eme Ardt: Elysee**

Discussion

- 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.

Recommendation

For further analysis,I also add another criteria which is Cafe or Bar to give more dimension to this project.

Conclusion

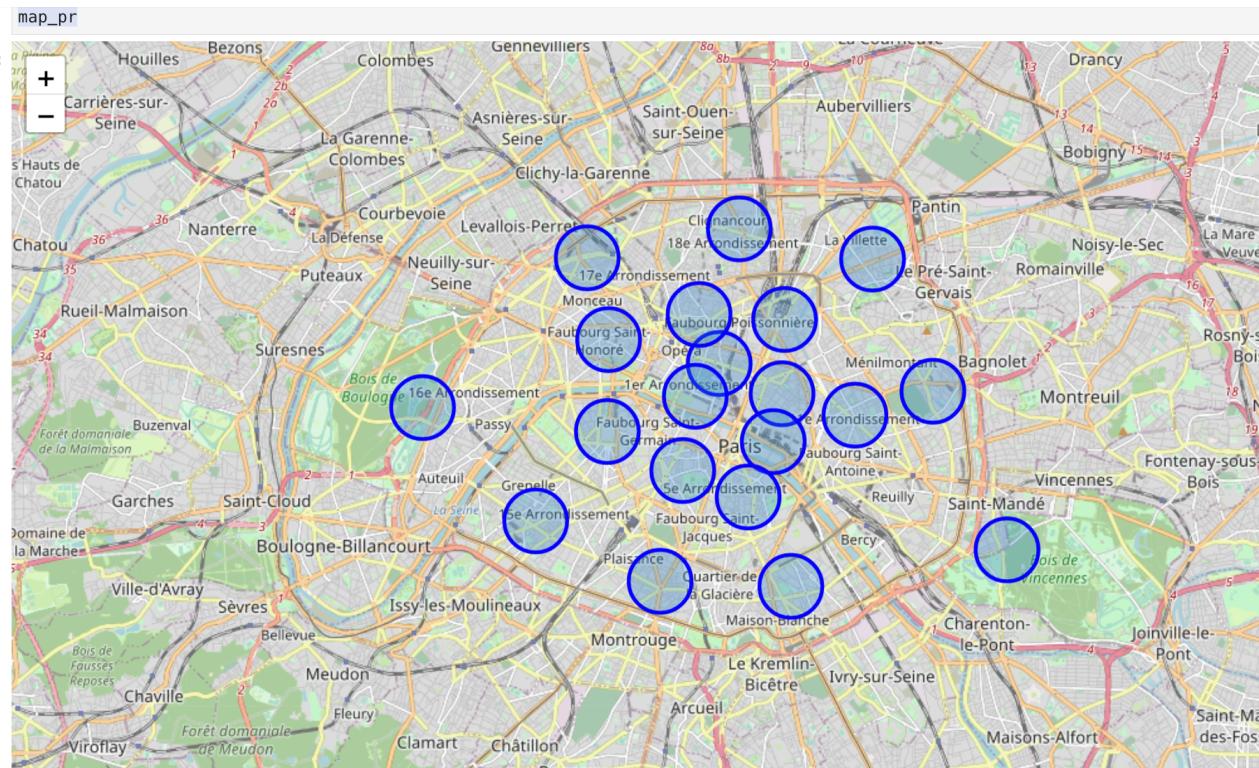
Finding in these project will help Stakeholder/CEO or business owner better understanding of Paris neibourhoods. It's significantly narrow it down to 2 venues that pass all criteria we've set

References:

[expatarrival.com](#)

<https://www.chooseparisregion.org/industries/health-healthtech>

<https://pubmed.ncbi.nlm.nih.gov/16446209/>



Map Paris 1

LIMIT = 100 # limit of number of venues returned by Foursquare API

radius = 1000 # define radius

```
lize is deprecated, use pandas.json_normalize instead
    """
```

		name	categories	lat	lng
0		Mmmozza	Sandwich Place	48.863910	2.360591
1		Square du Temple	Park	48.864475	2.360816
2		Les Enfants Rouges	Wine Bar	48.863013	2.361260
3		Chez Alain Miam Miam	Sandwich Place	48.862369	2.361950
4		Okomusu	Okonomiyaki Restaurant	48.861453	2.360879
5		Marché des Enfants Rouges	Farmers Market	48.862806	2.361996
6		Chez Alain Miam Miam	Sandwich Place	48.862781	2.362064
7		Le Burger Fermier des Enfants Rouges	Burger Joint	48.862831	2.362073
8		Bontemps	Dessert Shop	48.863956	2.360725
9		Strada Café	Café	48.862224	2.357379
10		Paris New York	Burger Joint	48.863843	2.362661
11		Musée de la Chasse et de la Nature	Museum	48.861507	2.358624
12		Les Enfants Du Marché	French Restaurant	48.862746	2.361950
13		Little Red Door	Speakeasy	48.863703	2.363514

```
print(pr_venues.shape)
pr_venues.head(250)
```

(1340, 7)

	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	Square du Temple	48.864475	2.360816	Park
2	3eme Ardt	48.862872	2.360001	Les Enfants Rouges	48.863013	2.361260	Wine Bar
3	3eme Ardt	48.862872	2.360001	Chez Alain Miam Miam	48.862369	2.361950	Sandwich Place
4	3eme Ardt	48.862872	2.360001	Okomusu	48.861453	2.360879	Okonomiyaki Restaurant
...
245	10eme Ardt	48.876130	2.360728	Shouk	48.871820	2.362610	Israeli Restaurant
246	10eme Ardt	48.876130	2.360728	La Patache	48.872770	2.363497	Bar
247	10eme Ardt	48.876130	2.360728	Baci Bisou	48.873210	2.363126	Ice Cream Shop
248	10eme Ardt	48.876130	2.360728	Les Caves Saint Martin	48.879651	2.363401	Wine Shop

There are 197 unique venue categories.

Turn all this into Dummy variables

pr_onehot

30]:

	Neighborhood	Afghan Restaurant	African Restaurant	American Restaurant	Antique Shop	Argentinian Restaurant	Art Gallery	Art Museum	Arts & Crafts Store	Asian Restaurant	...	Udon Restaurant	Vegetarian / Vegan Restaurant
0	3eme Ardt	0	0	0	0	0	0	0	0	0	0	0	0
1	3eme Ardt	0	0	0	0	0	0	0	0	0	0	0	0
2	3eme Ardt	0	0	0	0	0	0	0	0	0	0	0	0
3	3eme Ardt	0	0	0	0	0	0	0	0	0	0	0	0
4	3eme Ardt	0	0	0	0	0	0	0	0	0	0	0	0
...
1335	6eme Ardt	0	0	0	0	0	0	0	0	0	0	0	0
1336	6eme Ardt	0	0	0	0	0	0	0	0	0	0	0	0
1337	6eme Ardt	0	0	0	0	0	0	0	0	0	0	0	0
1338	6eme Ardt	0	0	0	0	0	0	0	0	0	0	0	0
1339	6eme Ardt	0	0	0	0	0	0	0	0	0	0	0	0

Group rows by neighborhood and take the mean of the frequency of occurrence of each category

[]: pr_grouped = pr_onehot.groupby('Neighborhood').mean().reset_index()

[]:

	Neighborhood	Afghan Restaurant	African Restaurant	American Restaurant	Antique Shop	Argentinian Restaurant	Art Gallery	Art Museum	Arts & Crafts Store	Asian Restaurant	...	Udon Restaurant	Vegetarian / Vegan Restaurant
0	10eme Ardt	0.000000	0.02	0.000000	0.00	0.00	0.000000	0.000000	0.000000	0.020000	...	0.00	0.0
1	11eme Ardt	0.014706	0.00	0.000000	0.00	0.00	0.000000	0.014706	0.000000	0.014706	...	0.00	0.0
2	12eme Ardt	0.000000	0.00	0.000000	0.00	0.00	0.000000	0.000000	0.000000	0.000000	...	0.00	0.0
3	13eme Ardt	0.000000	0.00	0.000000	0.00	0.00	0.000000	0.000000	0.000000	0.210526	...	0.00	0.0
4	14eme Ardt	0.000000	0.00	0.000000	0.00	0.00	0.000000	0.000000	0.000000	0.000000	...	0.00	0.0
5	15eme Ardt	0.000000	0.00	0.000000	0.00	0.00	0.000000	0.000000	0.016129	0.000000	...	0.00	0.0
6	16eme Ardt	0.000000	0.00	0.000000	0.00	0.00	0.000000	0.090909	0.000000	0.000000	...	0.00	0.0
7	17eme Ardt	0.000000	0.00	0.000000	0.00	0.00	0.000000	0.016949	0.000000	0.016949	...	0.00	0.0
8	18eme Ardt	0.000000	0.00	0.000000	0.00	0.00	0.000000	0.000000	0.000000	0.000000	...	0.00	0.0
9	19eme Ardt	0.000000	0.00	0.020833	0.00	0.00	0.000000	0.000000	0.000000	0.000000	...	0.00	0.0
10	1er Ardt	0.000000	0.00	0.000000	0.00	0.00	0.000000	0.040000	0.000000	0.000000	...	0.02	0.0
11	20eme Ardt	0.000000	0.00	0.000000	0.00	0.00	0.000000	0.000000	0.000000	0.018182	...	0.00	0.0
12	2eme Ardt	0.000000	0.00	0.010000	0.00	0.00	0.000000	0.000000	0.000000	0.010000	...	0.00	0.0
13	3eme Ardt	0.000000	0.00	0.000000	0.00	0.01	0.060000	0.010000	0.000000	0.000000	...	0.00	0.0
14	4eme Ardt	0.000000	0.00	0.000000	0.00	0.00	0.020000	0.010000	0.010000	0.000000	...	0.00	0.0
15	5eme Ardt	0.000000	0.00	0.000000	0.00	0.00	0.000000	0.000000	0.000000	0.000000	...	0.00	0.0

Find out each neighborhood with it's top 15 most common venues

```
36]: # Each neighborhood with top 15 most common venues
```

1 / 1

```
num_top_venues = 15

for hood in pr_grouped['Neighborhood']:
    print("----"+hood+"----")
    temp = pr_grouped[pr_grouped['Neighborhood'] == hood].T.reset_index()
    temp.columns = ['venue','freq']
    temp = temp.iloc[1:]
    temp['freq'] = temp['freq'].astype(float)
    temp = temp.round({'freq': 2})
    print(temp.sort_values('freq', ascending=False).reset_index(drop=True).head(num_top_venues))
    print('\n')
```

---10eme Ardt---		venue	freq
0	French Restaurant	0.11	
1	Bistro	0.07	
2	Coffee Shop	0.05	
3	Hotel	0.04	
4	Café	0.03	
5	Wine Bar	0.03	
6	Japanese Restaurant	0.03	
7	Italian Restaurant	0.03	
8	Indian Restaurant	0.03	
9	Seafood Restaurant	0.02	
10	Restaurant	0.02	
11	Burger Joint	0.02	
12	Breakfast Spot	0.02	
13	Pizza Place	0.02	
14	Cocktail Bar	0.02	

The shape of the grouped data is (20, 198)

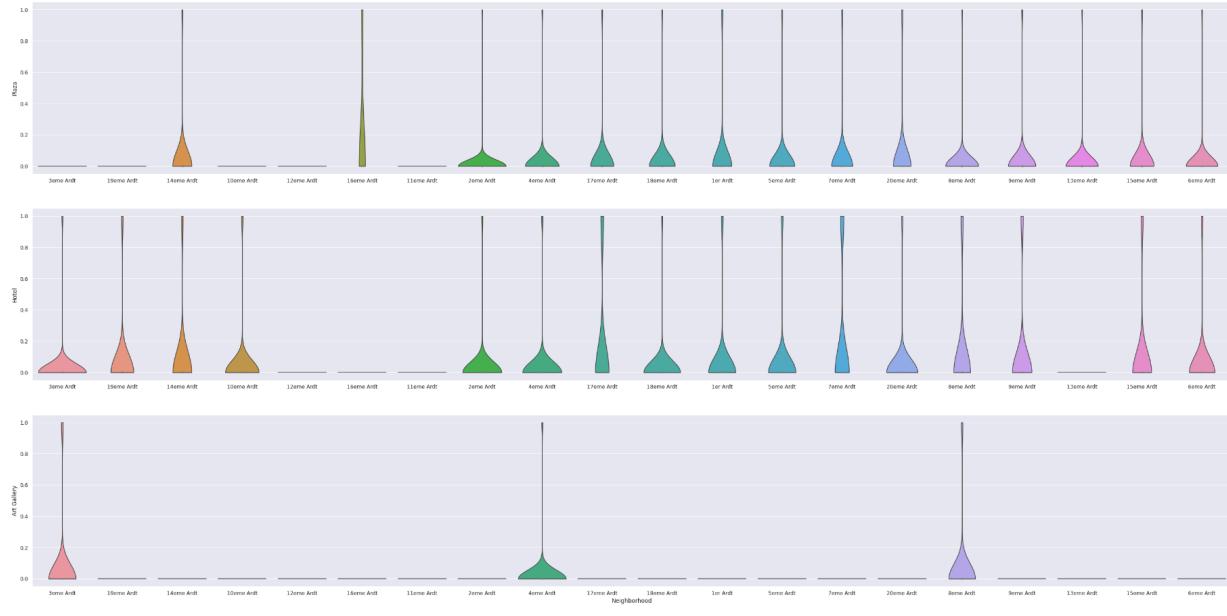
And find 15 most popular category by means of each venues, and then sorted most common inside each venues, From the beginning The business types that will pass the criteria from Business owner/doctor! _'Plaza', 'Hotel' and 'Art Gallery'_

```
pr_venues sorted,head(20)
```

[32]:	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	Bistro	Coffee Shop	Hotel	Indian Restaurant	Italian Restaurant	Japanese Restaurant	Café	Wine Bar	Asian Restaurant
1	11eme Ardt	French Restaurant	Supermarket	Café	Restaurant	Theater	Pastry Shop	Bakery	Pizza Place	Wine Bar	Vietnamese Restaurant
2	12eme Ardt	Zoo Exhibit	Cafeteria	Zoo	Monument / Landmark	Bike Rental / Bike Share	Park	Grocery Store	Nightclub	Noodle House	Okonomiyaki Restaurant
3	13eme Ardt	Vietnamese Restaurant	Asian Restaurant	Chinese Restaurant	Thai Restaurant	French Restaurant	Juice Bar	Japanese Restaurant	Convenience Store	Park	Furniture Home Store
4	14eme Ardt	French Restaurant	Hotel	Food & Drink Shop	Brasserie	Sushi Restaurant	Fast Food Restaurant	Bistro	Tea Room	Bakery	Supermarket
5	15eme Ardt	Hotel	Italian Restaurant	French Restaurant	Supermarket	Coffee Shop	Plaza	Thai Restaurant	Bistro	Indian Restaurant	Pa
6	16eme Ardt	Lake	Plaza	Bus Station	Park	Pool	Art Museum	Boat or Ferry	Bike Rental / Bike Share	French Restaurant	Afghan Restaurant
7	17eme Ardt	Hotel	French Restaurant	Italian Restaurant	Restaurant	Bakery	Bistro	Plaza	Japanese Restaurant	Mediterranean Restaurant	Ca
8	18eme Ardt	French Restaurant	Bar	Café	Restaurant	Supermarket	Hotel	Vietnamese Restaurant	Bistro	Cheese Shop	Gastropub
9	19eme Ardt	French Restaurant	Bar	Café	Bistro	Hotel	Supermarket	Beer Bar	Seafood Restaurant	Sandwich Place	Brewery
10	1er Ardt	French Restaurant	Café	Coffee Shop	Japanese Restaurant	Plaza	Hotel	Art Museum	Brasserie	Historic Site	Italian Restaurant

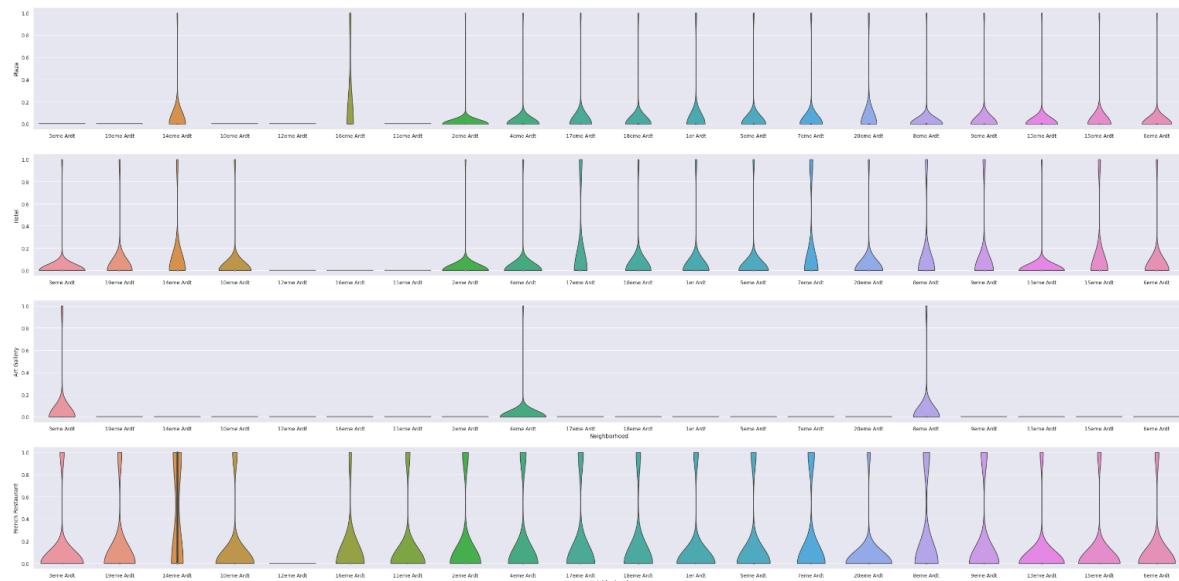
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Frequency distribution for the top venue categories for each neighborhood (includes French Restaurant)

Add Italian Restaurant to criteria



The winner - Results

Inferential analysis using the data, as well as domain knowledge of retail and marketing, allow the list to be focussed to just only 2 neighbourhoods from the list.

The reasoning being that if the 3 criteria have been met - identifying neighbourhoods that are plenty with Hotel, Plaza and Art Gallery - adding French Restaurant 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 Healthcare division - is very desirable as a investor.