DEFINING THE BEST LOCATION TO OPEN HIPSTER RETAIL STORES IN MONTREAL, CANADA

Work developed by

Vinicius Bueno

BUSINESS PROBLEM

- Immigration to Canada has been exponentially growing in the past few decades.

- This huge influx of expats brings people with different cultures, skills, languages and dreams. Most of them try to enter the job market and just a very small portion of immigrants decide to open their own business.

- They, however, face a big challenge: what should they invest in? Often times, business that are successful in their homeland would go bankrupt in the first year due to culture differences.

- A simple search on Google for trending business ideas in Canada show that "hipster stores" have been growing as never before. Thus, opening a business like this one could possibly be a great start to become a successful entrepeneur in Canada.

DATA ACQUISITION AND PROCESSING

• Montreal is divided into "Arrondissements" and "Ville liées", which translates to districts and the "linked cities" that make part of the Great Montreal Area.

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

• The raw data is for Montreal is pubicly available at <http://donnees.ville.montreal.qc.ca/dataset/polygones-arrondissements>, the official website for the city of Montreal. The data, however, is raw and needs to be processed.

• It started with thousands rows of data and features. Processed data contains only 34 rows (neighborhoods) and 4 features (neighborhood name, type, latitude and longitude).

CLEANED DATA 'DATA FRAME'

- Here is the data frame showing the first 11 rows.

	Quartier	Type	Latitude	Longitude
0	Outremont	Arrondissement	45.523651	-73.620776
1	LaSalle	Arrondissement	45.421797	-73.666104
2	Mont-Royal	Ville liée	45.526307	-73.650751
3	Ville-Marie	Arrondissement	45.534758	-73.530129
4	Le Plateau-Mont-Royal	Arrondissement	45.539899	-73.559231
5	Hampstead	Ville liée	45.478934	-73.656011
6	Le Sud-Ouest	Arrondissement	45.448390	-73.629082
7	Rivière-des-Prairies-Pointe-aux-Trembles	Arrondissement	45.633589	-73.624748
8	Lachine	Arrondissement	45.421785	-73.722989
9	Dorval	Ville liée	45.481813	-73.794704
10	Montréal-Nord	Arrondissement	45.583631	-73.654303

FOLIUM MAP OF MONTREAL

Using Geopy to find Montreal coordinates and the Folium library, I generated this map:
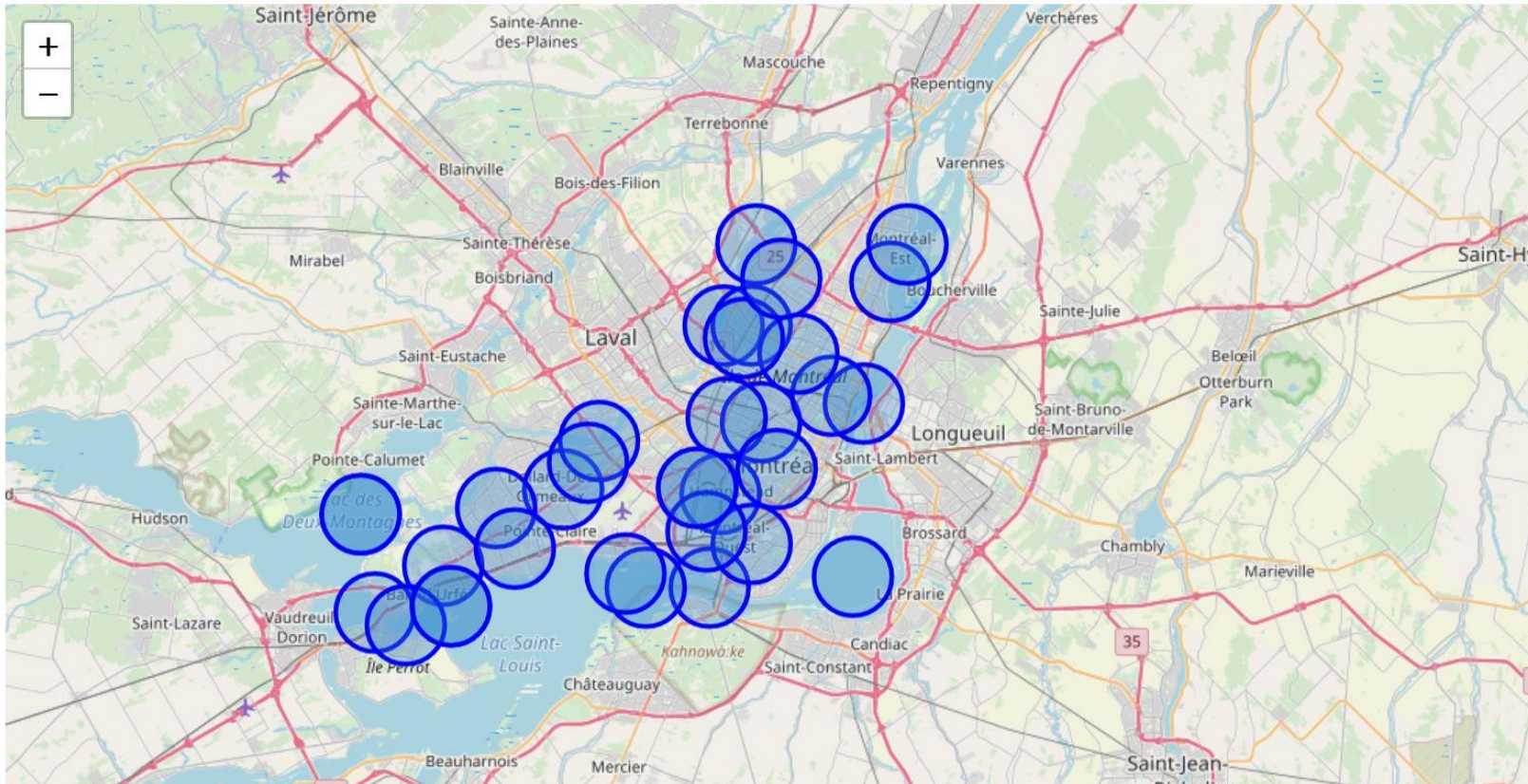
OBJECTIVES

- The objective of this study is to find the most suitable locations in Montreal, Canada to open a new hipster retail store.

- We will narrow down the options of neighborhoods (from 34 to 3) based on some pre-determined criterias.

- Criteria:
  - Customers will be more attracted to this new store if there are PARKS, COFFEE SHOPS & GYMS in the same regions;
  - Since data science is an iterative process, we decided to add RESTAURANTS as a category that customers would appreciate to have near the new hipster retail store.

EXPLORATORY ANALYSIS

- First, I explored one of the neighborhoods of Montreal (namely Outremont) using the Foursquare API to find up to 100 venues in a radius of 1500 meters from the coordinates of the neighborhood.

- The resulting table for Outremont comprised 100 different venues as we can see in the next slide.

VENUES IN OUTREMONT, MONTREAL

	name	categories	lat	lng
0	Bombay Mahal	Indian Restaurant	45.524623	-73.625736
1	Damas	Mediterranean Restaurant	45.522596	-73.613112
2	Mamie Clafoutis	Bakery	45.521466	-73.613998
3	Punjab Palace	Indian Restaurant	45.525239	-73.625190
4	Provisions	Restaurant	45.521631	-73.613866
5	Dispatch Coffee	Café	45.528903	-73.616104
6	Café Prague	Café	45.521059	-73.614384
7	Sushi Plus	Sushi Restaurant	45.521308	-73.624082
8	Maison Indian Curry	North Indian Restaurant	45.524723	-73.625520
9	Restaurant le Mile-Ex	Diner	45.528540	-73.614308
10	Afroditi Bakery	Bakery	45.528445	-73.630014

FURTHER EXPLORATORY ANALYSIS

- The next step was to perform the same analysis for ALL THE 34 neighborhoods in the Great Montreal Area.

- The resulting dataset comprised of 936 venues distributed in 34 neighborhoods of Montreal.

- From these 936 venues, there were 175 unique venue categories, including Indian restaurants, yoga studios, etc.

- Remember that we want to focus in 4 type of categories: gyms, parks, coffee shops and restaurants.

VENUES BY NEIGHBORHOOD

The following table shows how many venues per neighborhood (only 14 out of 34 displayed) the Foursquare API retrieved in the search (remember I limited to max 100 venues in the radius of 1500 meters of the center of the neighborhood).

Quartier	Latitude	Longitude	Venue	Venue Latitude	Venue Longitude	Venue Category
Ahuntsic-Cartierville	7	7	7	7	7	7
Anjou	36	36	36	36	36	36
Baie-d'Urfé	4	4	4	4	4	4
Beaconsfield	4	4	4	4	4	4
Côte-Saint-Luc	20	20	20	20	20	20
Côte-des-Neiges-Notre-Dame-de-Grâce	20	20	20	20	20	20
Dollard-des-Ormeaux	24	24	24	24	24	24
Dorval	62	62	62	62	62	62
Hampstead	28	28	28	28	28	28
Kirkland	13	13	13	13	13	13
L'Île-Bizard-Sainte-Geneviève	1	1	1	1	1	1
L'Île-Dorval	8	8	8	8	8	8
LaSalle	9	9	9	9	9	9
Le Plateau-Mont-Royal	100	100	100	100	100	100

ONE HOT ENCODING

- Then, using one hot encoding we figured out the occurrence frequency of each venue in each neighborhood.

- Below is one example for the neighborhood Côte-Saint-Luc:

```
----Côte-Saint-Luc----
                        venue  freq
0                Skating Rink  0.10
1                         Gym  0.10
2        Furniture / Home Store  0.10
3                    Pharmacy  0.05
4                        Bank  0.05
5               Grocery Store  0.05
6                        Park  0.05
7                Shopping Mall  0.05
8       Scandinavian Restaurant  0.05
9                  Restaurant  0.05
```

TOP 10 VENUES CATEGORIES PER NEIGHBORHOOD

• For each neighborhood, I created a data frame for the top 10 venues categories.

• Here the table with 6 neighborhoods displayed:

|	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	Ahuntsic-Cartierville	Park	Pharmacy	Fast Food Restaurant	Gymnastics Gym	Gas Station	Yoga Studio	Flower Shop	Flea Market	Fish Market	Farmers Market
1	Anjou	Pharmacy	Restaurant	Hardware Store	Supermarket	Italian Restaurant	Furniture / Home Store	Liquor Store	Breakfast Spot	Paper / Office Supplies Store	Recreation Center
2	Baie-d'Urfé	Pub	Pharmacy	Business Service	Sporting Goods Shop	Dessert Shop	Factory	Food	Flower Shop	Deli / Bodega	Flea Market
3	Beaconsfield	Pub	Pharmacy	Business Service	Sporting Goods Shop	Dessert Shop	Factory	Food	Flower Shop	Deli / Bodega	Flea Market
4	Côte-Saint-Luc	Skating Rink	Furniture / Home Store	Gym	Bank	Shopping Mall	Movie Theater	Restaurant	Rental Service	Rental Car Location	Café
5	Côte-des-Neiges-Notre-Dame-de-Grâce	Skating Rink	Furniture / Home Store	Gym	Bank	Shopping Mall	Movie Theater	Restaurant	Rental Service	Rental Car Location	Café

VIOLIN PLOT

Violin plots display density estimation of the underlying distribution. It will make it easier to visualize the best neighborhoods. The first plot considers Gyms, Parks and Coffee Shops.

Frequency distribution for the selected 3 venue categories for each neighborhood (click to enlage)

ADDING RESTAURANTS
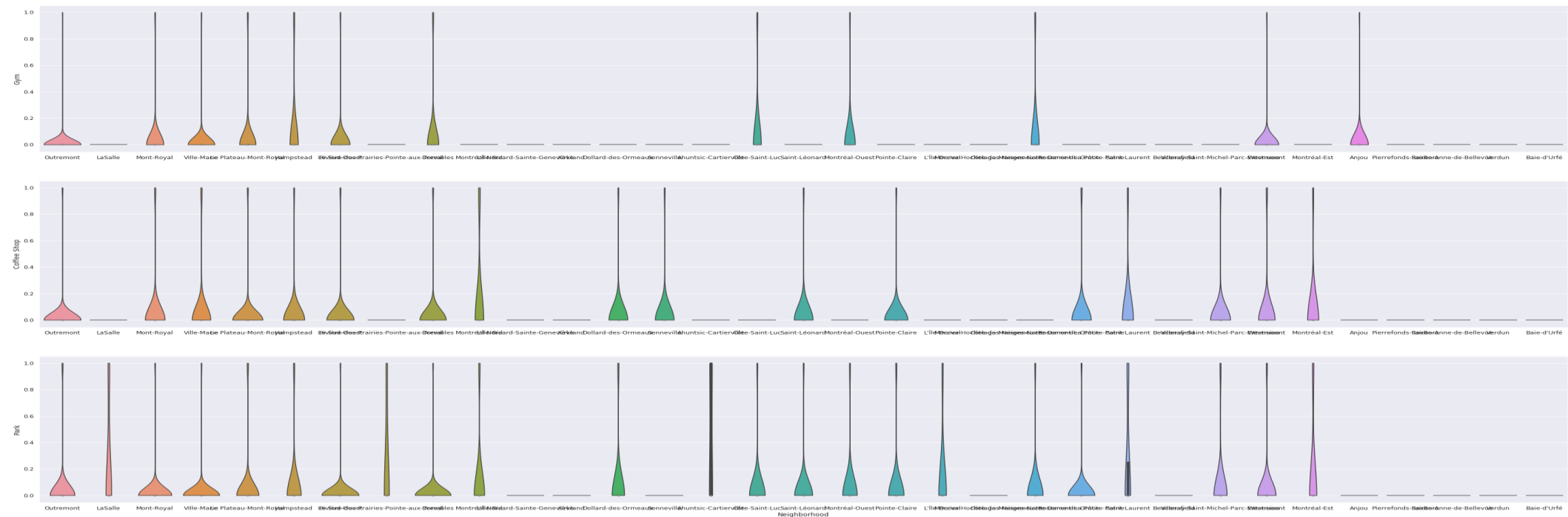
Then I figured that restaurants would help narrow down even more the data.

Frequency of Restaurants for each neighborhood
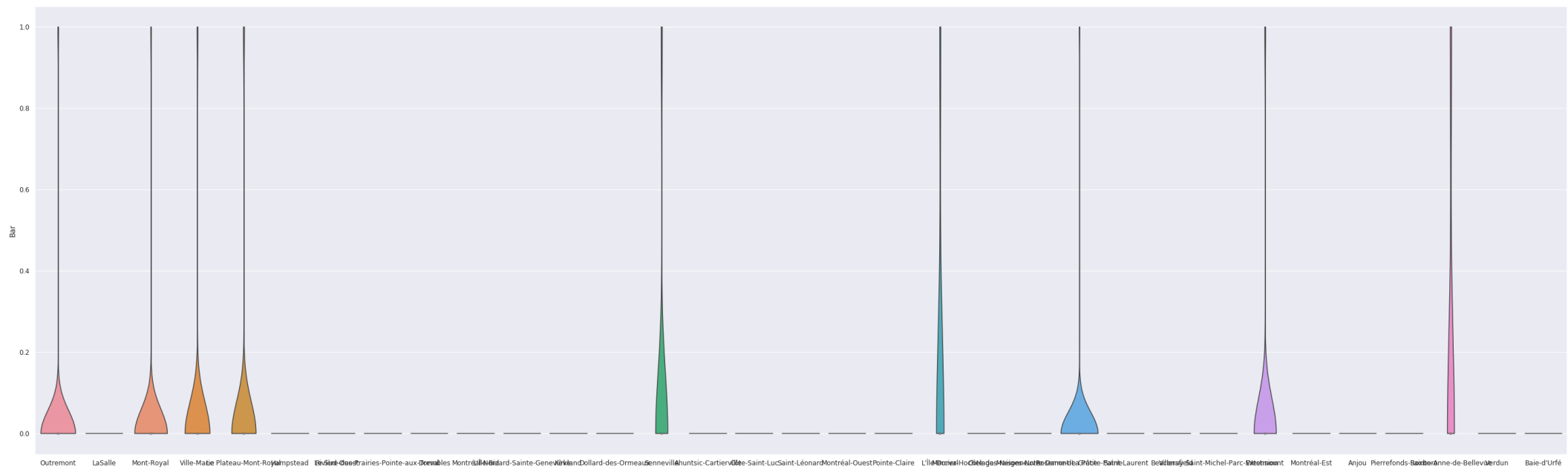
DISCUSSIONS

- From the results acquired and the 4 plots, it is clear we can focus in four neighborhoods:
  - Outremont;
  - Mont-Royal;
  - Ville-Marie;
  - Plateau-Mont-Royal;

- Plateau-Mont-Royal, however, is already saturated with hipster stores and other related business. Therefore, it would not be a great idea to start a new business in such a hostile and competitive environment.

- Following this rationale, we will proceed with Outremont, Mont-Royal and Ville-Marie.

PROSPECTIVE NEIGHBORHOODS

Using Folium and Geopy, we marked the 3 top neighborhoods in the Montreal map:
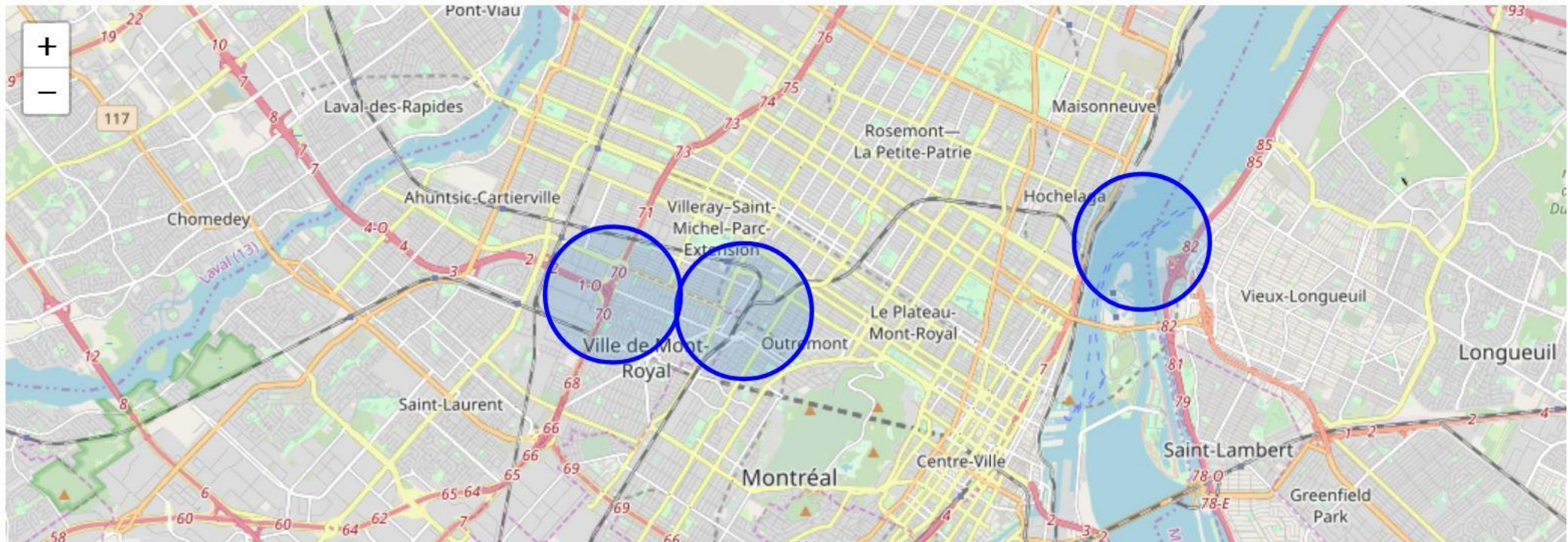
CONCLUSIONS

- It is definitely not a surprise that these neighborhoods are all very centrally located in Montreal. Locations fitting the criteria for popular venues would normally be in central locations in many cities of the world.

- I have narrowed down significantly the search area from 34 regions to 3 prospective neighborhoods, which should be a great location to open a new business. In this case, a hipster retail store.

- I also have to agree that it was a very simplistic analysis, not taking into account socioeconomic data, statistics on interests and expenditure level in the community, or really any data that would be actually helpful to the recommendation system except trending venues in each neighborhood.

- This analysis is not the final answer, it is rather a starting point that will guide the next part of the process to find specific store locations.