

COURSERA CAPSTONE

FINAL REPORT

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Introduction/Business Problem

A local late-night food restaurant owner in Montréal wants to expand his business and open another restaurant in a new location in the middle part of Montréal island, which is already specified with longitudes and latitudes. The owner firmly believes that his customers are people who enjoy nightlife and he wants to find areas that has high ratio of nightlife spot to other types of venue. He is confident that if nightlife spot is one of the top 5 common types of venues in an area, his expansion in the area will be successful. He hired a data scientist to find the areas that satisfy the said conditions.

Data

This project used various information of different venues in Montréal from foursquare data, including latitude and longitude of the venues, names of the venues, categories of the venues.

Methodology

As requested by the business owner, this project limited the area of analysis to the middle part of Montréal island. The area of interest is described in the Figure 1. The region enclosed by the red rectangle was be divided into 16 different areas with radius of 2.11 km. By using Foursquare API, 100 different venues' information including names, locations and categories in each area was collected. From the information collected, the frequency of each type of venues was calculated by utilizing one hot encoding method. For each area, the top 5 frequent types of venues were identified. Finally, areas with frequent nightlife spots were identified and recommended.

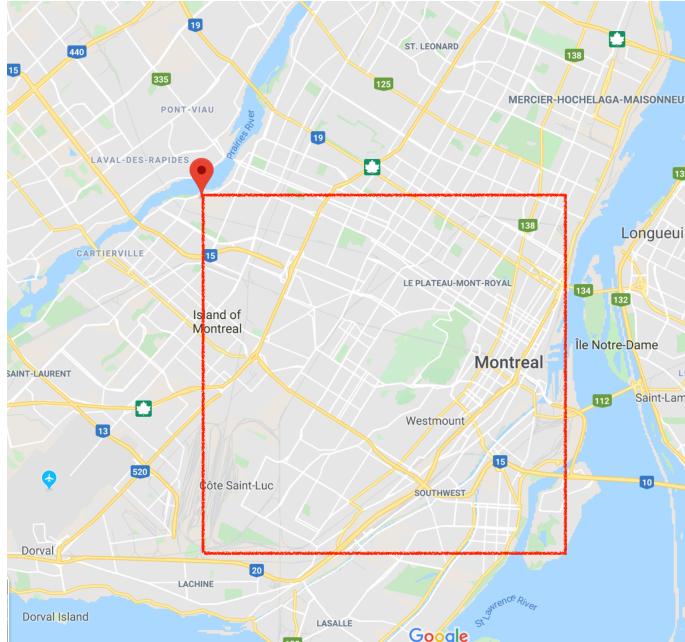


Figure 1: Area of interest, middle part of Montréal.

Results

The 16 different regions under study is described in Figure 2. Each area is circle with radius of 2.11km.

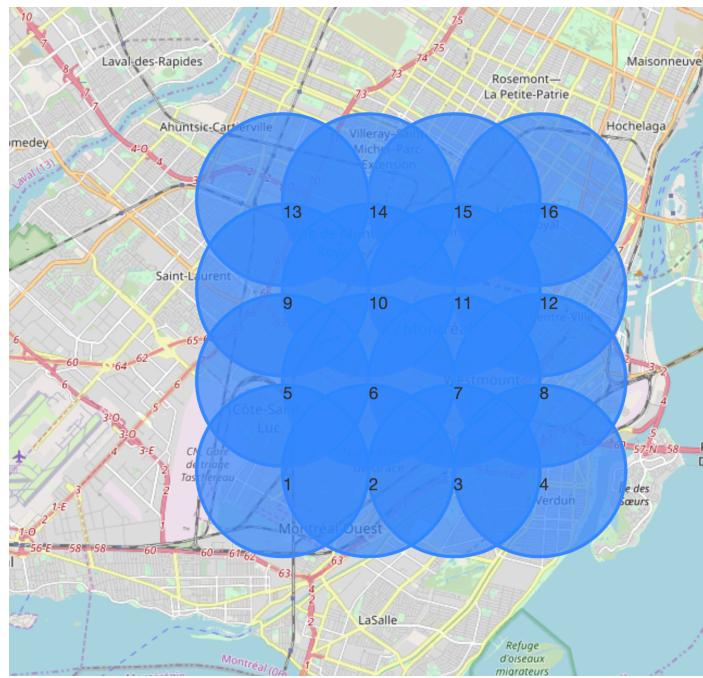


Figure 2: 16 different areas under study.

Frequency of venue types for each area in Figure 2 was calculated and shown in Table 1. Different areas show different combinations of venue types. Among 16 different areas, 4 areas had Nightlife Spot as one of their frequent venue types. These areas are area 3, area 4, area 15 and area 16. These areas are shown in a separated and plotted in Figure 3.

Table 1: 5 most common types of venues in each area

Area	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue
1	Pharmacy	Ice Cream Shop	Skating Rink	Shopping Mall	Grocery Store
2	Coffee Shop	Café	Pharmacy	Fast Food Restaurant	Korean Restaurant
3	Nightlife Spot	Café	Coffee Shop	Park	Restaurant
4	Café	Nightlife Spot	Restaurant	Breakfast Spot	Bakery
5	Fast Food Restaurant	Gym	Restaurant	Coffee Shop	Indian Restaurant

6	Coffee Shop	Park	Café	Pharmacy	Vietnamese Restaurant
7	Café	Bakery	Park	Breakfast Spot	French Restaurant
8	Café	Restaurant	Japanese Restaurant	French Restaurant	Coffee Shop
9	Fast Food Restaurant	Pharmacy	Coffee Shop	Pizza Place	Chinese Restaurant
10	Coffee Shop	Pharmacy	Bakery	Park	Bar
11	Park	Bakery	Café	French Restaurant	Bar
12	Café	Restaurant	Hotel	Park	Vegetarian / Vegan Restaurant
13	Coffee Shop	Pharmacy	Liquor Store	Indian Restaurant	Italian Restaurant
14	Café	Bakery	Restaurant	Pizza Place	French Restaurant
15	Café	Restaurant	Nightlife Spot	Pizza Place	Breakfast Spot
16	Café	French Restaurant	Bakery	Nightlife Spot	Park

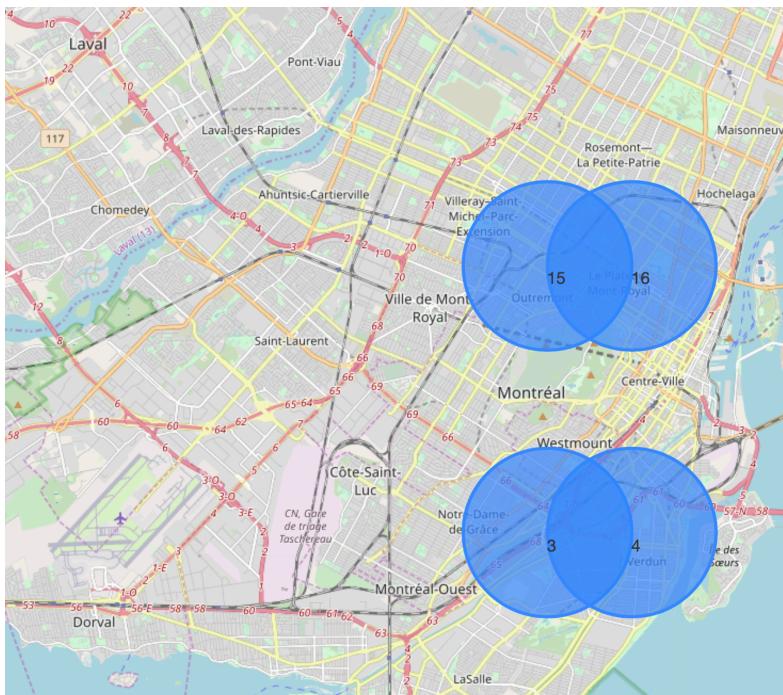


Figure 3: Areas with high density of nightlife spots.

Discussion

Area 15 and Area 16 having high frequency of nightlife spot aligns with the actual google search ‘nightlife’, which is shown in Figure 4. This area has many spots including nightclubs, cocktail bars and others. However, what is interesting is that downtown area, area 7 and area 8, did not have nightlife spot as one of the most frequent venue types. One possible explanation is that the frequency of nightlife spots is diluted by the other types of venues. In downtown area, while it is true that the number of nightlife spots are larger than other areas, it is also true that it has even more venues of other types. Therefore, the downtown region, area 7 and 8 were also included in the recommendation, which includes area 3, 4, 7, 8, 15 and 16.

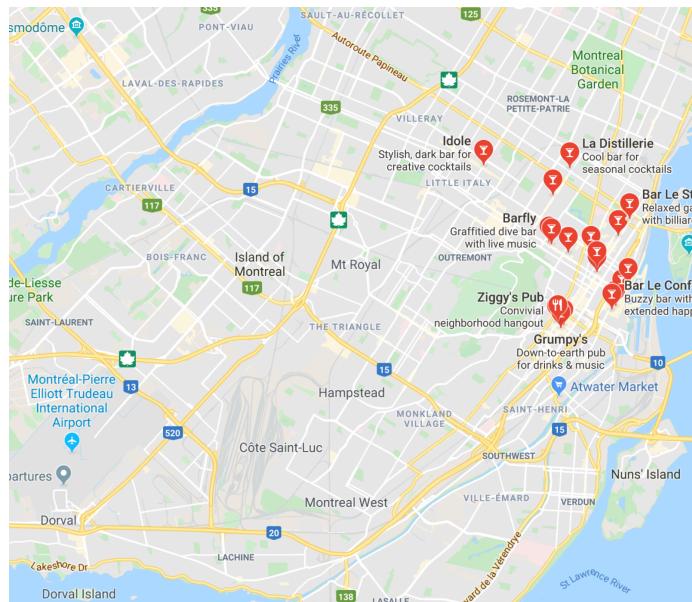


Figure 4: Google search result of nightlife in Montréal

Conclusion

Recommendation on areas for new restaurant locations were made using Foursquare data for calculating the frequency of different types of venues in each area. The resulting recommendation included area 3, 4, 7, 8, 15 and 16. However, with current data and strategy, the analysis of the python script seems to output a limited analysis and was not able to recognize downtown as a possible location business expansion. Therefore, fixing of strategy is required. A possible alternative direction is searching for successful business already in place in Montréal or in other city and find the similar location in Montréal using clustering.