

Battle of the Neighborhood Week 2

Toronto versus San Francisco

Agenda

- ▶ Introduction
- ▶ Data Sources
- ▶ Methodology
- ▶ Results
- ▶ Discussion
- ▶ Conclusion

INTRODUCTION

RECOMMEND A LOCATION TO OPEN A FRENCH RESTAURANT IN A MAJOR METROPOLITAN CITY IN NORTH AMERICA

- ▶ Owners of a French restaurant in New-York want to expand their business in another city in North America
- ▶ They have selected 2 cities, but requested assistance to make a final decision
- ▶ The analysis needs to define which option between San Francisco and Toronto would be best.

Requirements

- ▶ San Francisco and Toronto have highly diverse populations and are prosperous metropolitan areas with developed business centers and are popular touristic destinations.
- ▶ The owners want to open a French restaurant, like the one they own in New York. In addition to the diverse demographic and prosperous metropolitan area, they expressed the desire to open their business in a safe and easily accessible area, where they will have business year around.

CITIES OVERVIEW

- ▶ **Toronto** is not only the largest city in Canada, but also one of the most populous city in North America. Over 50% of its over 2.7 Millions inhabitants belong to visible minorities (non-caucasian in race or not white in color) from over 200 ethnic origins and make Toronto one of the most multicultural city in the world. While English is the main language, its population speak over 160 reported languages, creating an extraordinary melting pot. (<https://en.wikipedia.org/wiki/Toronto#Demographics>)
- ▶ **San Francisco**, the cultural, financial and commercial center of North California, is the second most densely populated US city with close to 900,000 residents over an area of 121 000 Km². Like Toronto, over 50% of its inhabitants are from minorities, among which Asians account for the biggest share with 30% of the population. While the number of languages other than English spoken at home is lower than in Toronto, 45% of household would speak a different language than English at home, making it one of the most diverse city on North America with New York and Toronto.
(https://en.wikipedia.org/wiki/San_Francisco#Demographics)

BUSINESS PROBLEM

- ▶ Analysis
 - ▶ One of the criteria safety, is somewhat at odd with crime rate in bigger metropolitan areas. Our data will have to find the right balance between crime rate, accessibility and the year-around activity restaurant owners are looking for.
 - ▶ Another major parameter to assess in our analysis is how competitive the specific location will be, i.e how many French restaurants and other higher end eating places could this family have to share the customer base with.
 - ▶ Finally, we will have to validate the location's demographics is aligned with their desire to open a French place..

AUDIENCE & RECOMMENDATION

- ▶ AUDIENCE: owners of a French restaurant in New York
- ▶ FINAL RECOMMENDATION: narrow down the location to a borough or a specific neighborhood with the most potential based on an ideal combination of low crime rate, high enough population density and accessibility data. We will also offer a breakdown of the existing restaurants in the location chosen based on Foursquare data to give our clients a good overview of the competitive market they will have to work with.

DATA SOURCES

- ▶ Maps, demographics and crime statistics scraped or downloaded from the following sources:
 - ▶ <https://www.toronto.ca/city-government/data-research-maps/open-data/Toronto>
 - ▶ <http://data.torontopolice.on.ca/search?q=crime&tags=major%20crime%20indicators%2Ccrimes%2Cmc>
 - ▶ <https://datasf.org/opendata/>
 - ▶ <https://data.sfgov.org/Public-Safety/SFPD-Incidents-2016-Daily/8b9n-iqj8>
 - ▶ https://en.wikipedia.org/wiki/List_of_postal_codes_of_Canada:_M
 - ▶ <https://en.wikipedia.org/wiki/Toronto>
 - ▶ https://en.wikipedia.org/wiki/San_Francisco

DATA USED FOR THE ANALYSIS

- ▶ Crime statistics, to pick the safest city/area to open a restaurant
- ▶ Venues analysis and competition in the vicinity from existing French restaurants or other popular places with a similar price tag, most notably steakhouses and Italian restaurants based on **Foursquare data**
- ▶ Demographics information to guarantee the local demographics would not be at odd with the style of cuisine offered based on data from Wikipedia combined with neighborhood analysis using Foursquare data
- ▶ Accessibility based on public transportation and/or parking facilities within the location recommended based on Folium Maps and/or Foursquare data

Boroughs/Neighborhoods Dataframes

- ▶ Page scraping & data cleanup to create dataframes with boroughs and/or neighborhoods Latitude & Longitude coordinates

	PostalCode	Borough	Neighborhood	Latitude	Longitude
0	M3A	North York	Parkwoods	43.753259	-79.329656
1	M4A	North York	Victoria Village	43.725882	-79.315572
2	M5A	Downtown Toronto	Harbourfront	43.654260	-79.360636
3	M5A	Downtown Toronto	Regent Park	43.654260	-79.360636
4	M6A	North York	Lawrence Heights	43.718518	-79.464763

Reported Crimes Dataframes

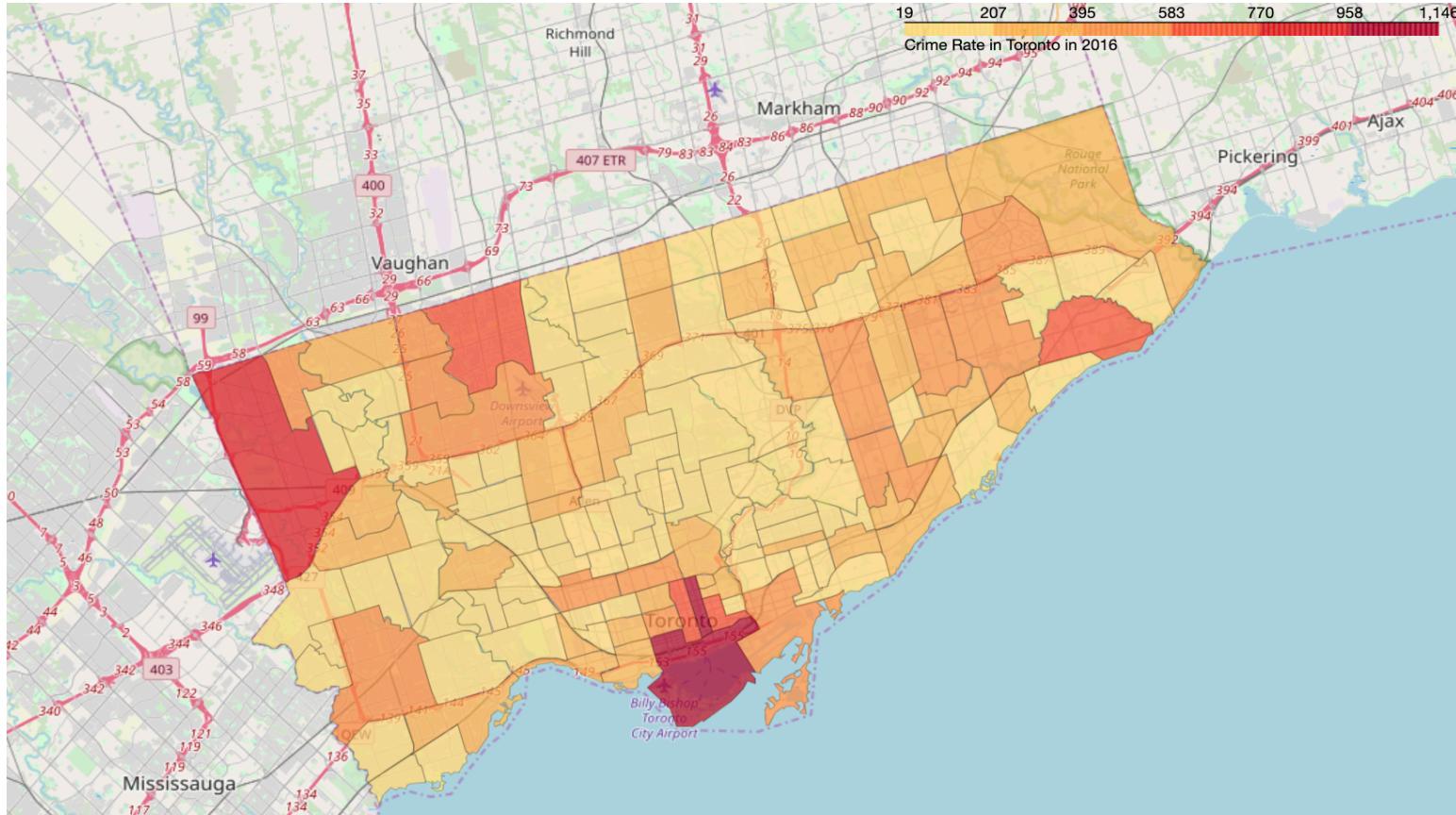
- ▶ Import and cleanup crime statistics for Toronto and San Francisco
- ▶ Selected year for data: 2016 for both cities

	premisetype	offence	occurrenceyear	MCI	Division	Neighborhood	Lat	Long
354	Outside	Assault	2016	Assault	D52	Waterfront Communities-The Island (77)	43.645374	-79.392059
356	Outside	Assault	2016	Assault	D52	Waterfront Communities-The Island (77)	43.645374	-79.392059
357	Apartment	Assault	2016	Assault	D14	Niagara (82)	43.636761	-79.402389
358	House	Assault	2016	Assault	D11	Roncesvalles (86)	43.647343	-79.443878
359	Commercial	Robbery - Business	2016	Robbery	D51	North St.James Town (74)	43.667637	-79.372208

	IncidentNum	Category	Descript	DayOfWeek	Date	Time	Neighborhood	Resolution	Address	X	Y
0	120058272	WEAPON LAWS	POSS OF PROHIBITED WEAPON	Friday	01/29/2016 12:00:00 AM	11:00	SOUTHERN	ARREST, BOOKED	800 Block of BRYANT ST	-122.403405	37.775421
1	120058272	WEAPON LAWS	FIREARM, LOADED, IN VEHICLE, POSSESSION OR USE	Friday	01/29/2016 12:00:00 AM	11:00	SOUTHERN	ARREST, BOOKED	800 Block of BRYANT ST	-122.403405	37.775421
2	141059263	WARRANTS	WARRANT ARREST	Monday	04/25/2016 12:00:00 AM	14:59	BAYVIEW	ARREST, BOOKED	KEITH ST / SHAFTER AV	-122.388856	37.729981

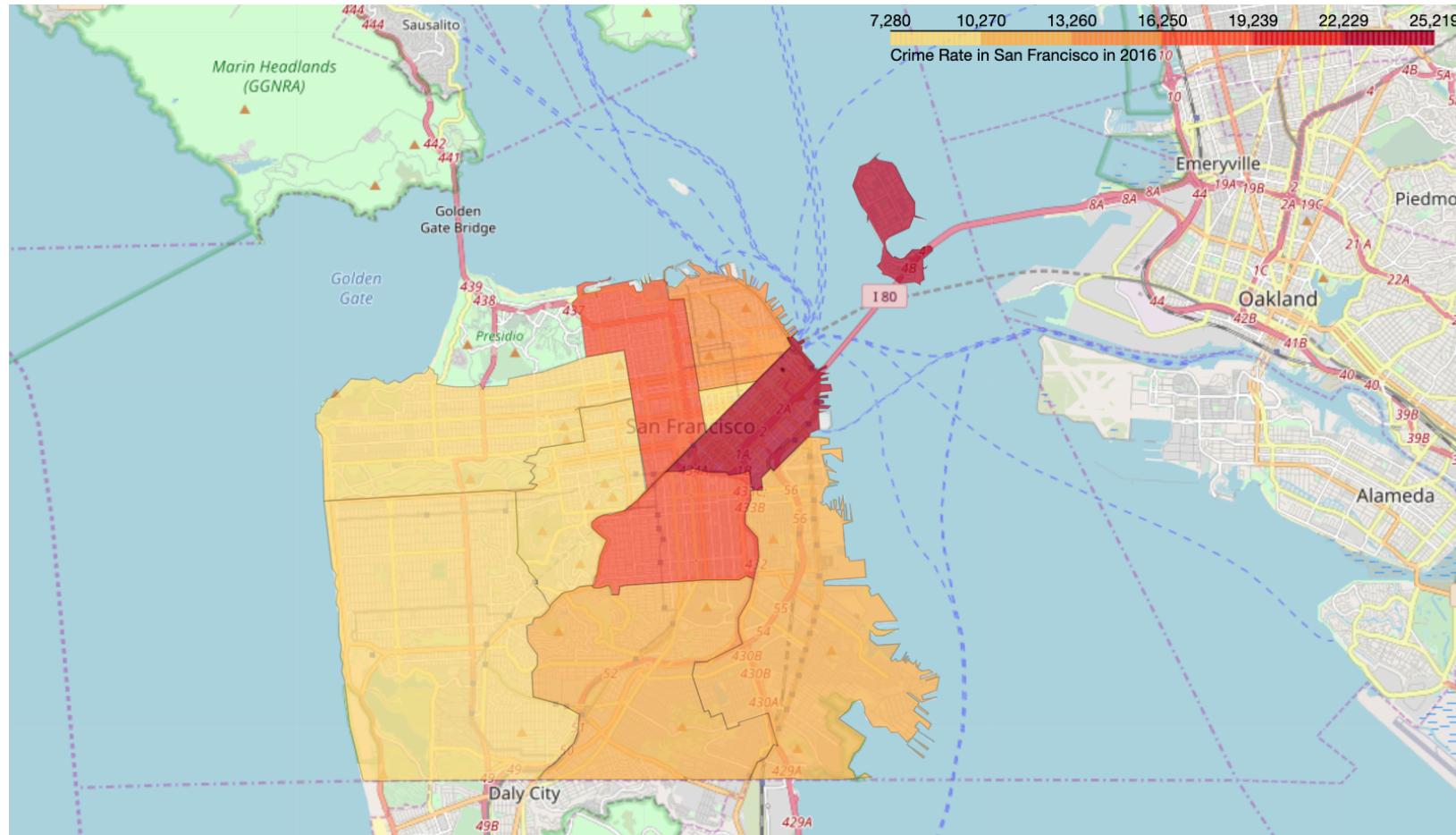
Chloropleth Map (Toronto)

- ▶ Create Chloropleth map based on crime rates reported in 2016 in Toronto's neighborbood



Chloropleth Map (San Francisco)

- ▶ Create Chloropleth map based on crime reported in San Francisco's neighborhoods in 2016

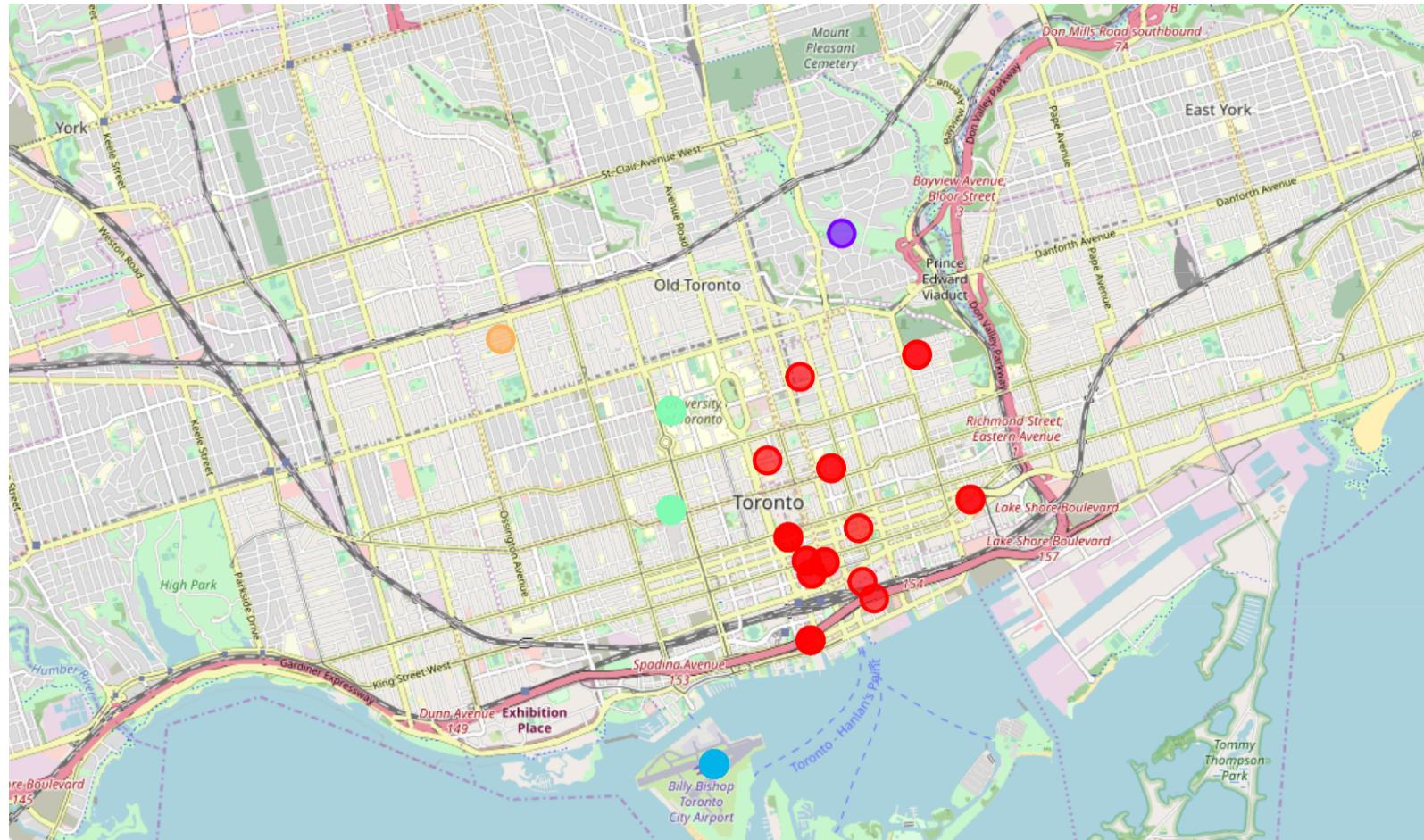


Crime Rate Calculation & Foursquare Venues Analysis

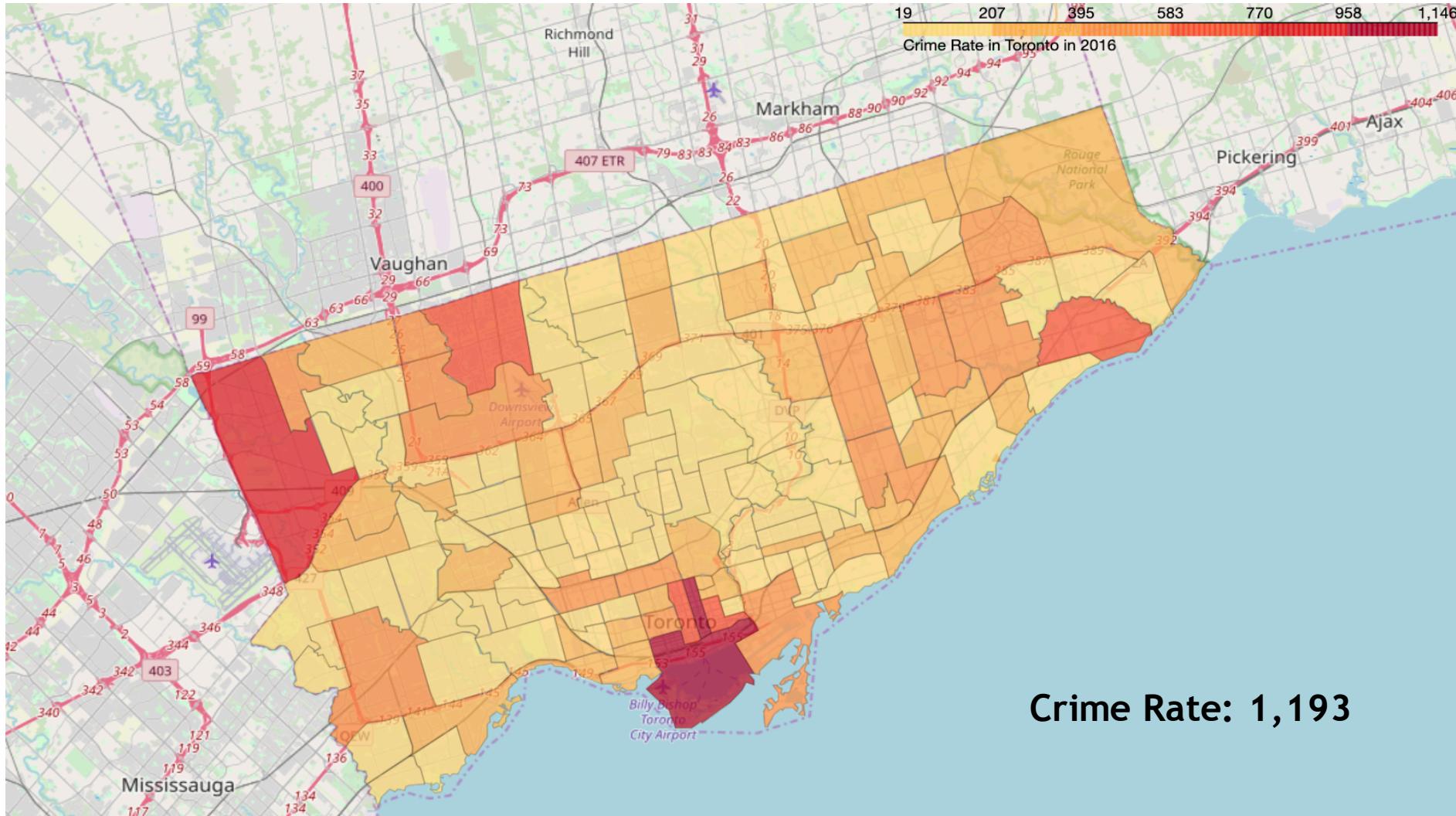
- ▶ Calculate crime rates to select safest city
 - ▶ $(\text{Crime}/\text{Population}) * 100,000$
- ▶ Leverage Foursquare data to analyze neighborhoods demographics, venues popularity and overall competition for a French restaurant

K-Mean Clustering & Folium Mapping

- ▶ Use K-mean to create clusters within the neighborhoods picked to chose locations which best fit the established parameters

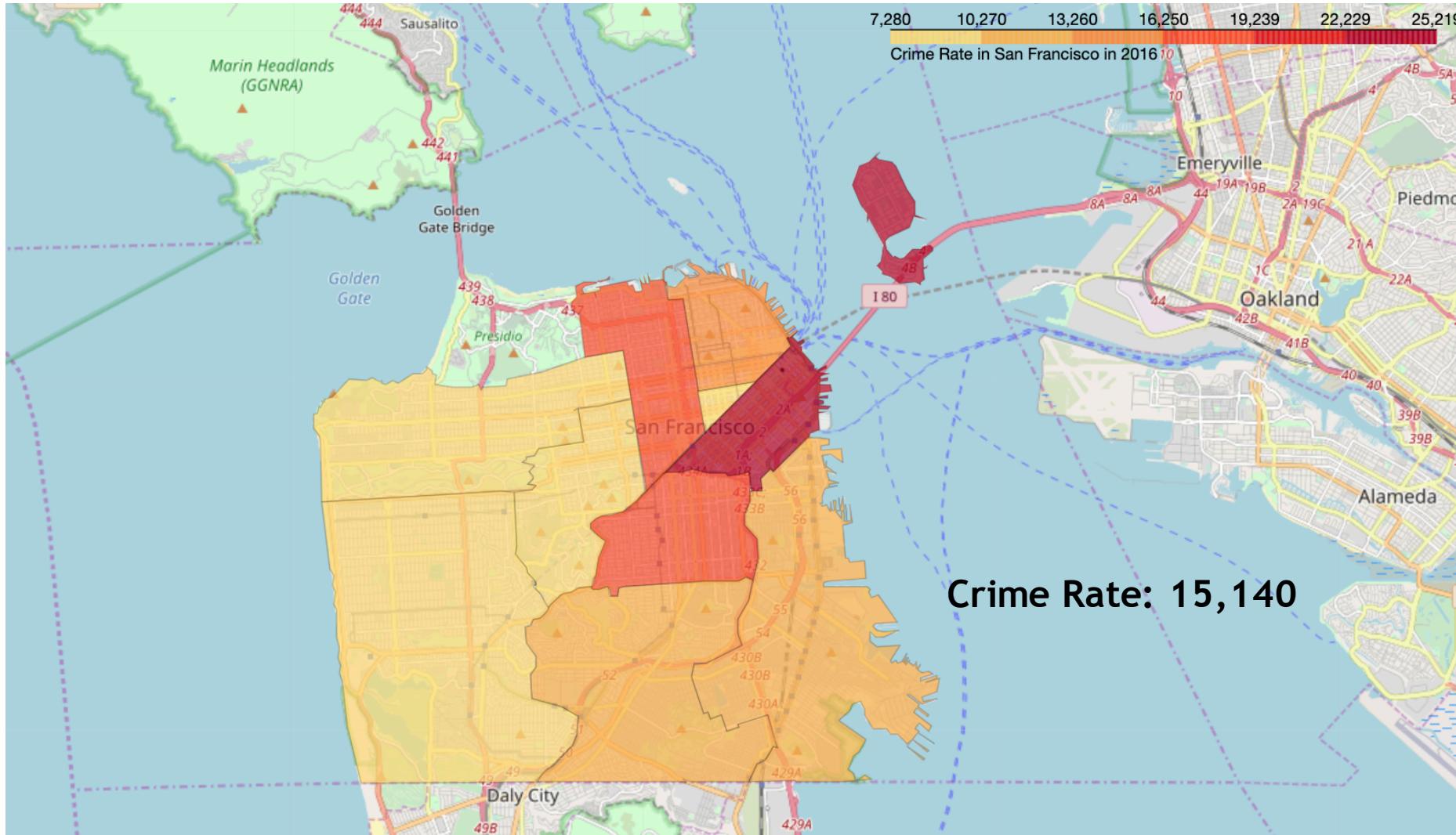


CRIME ANALYSIS TORONTO



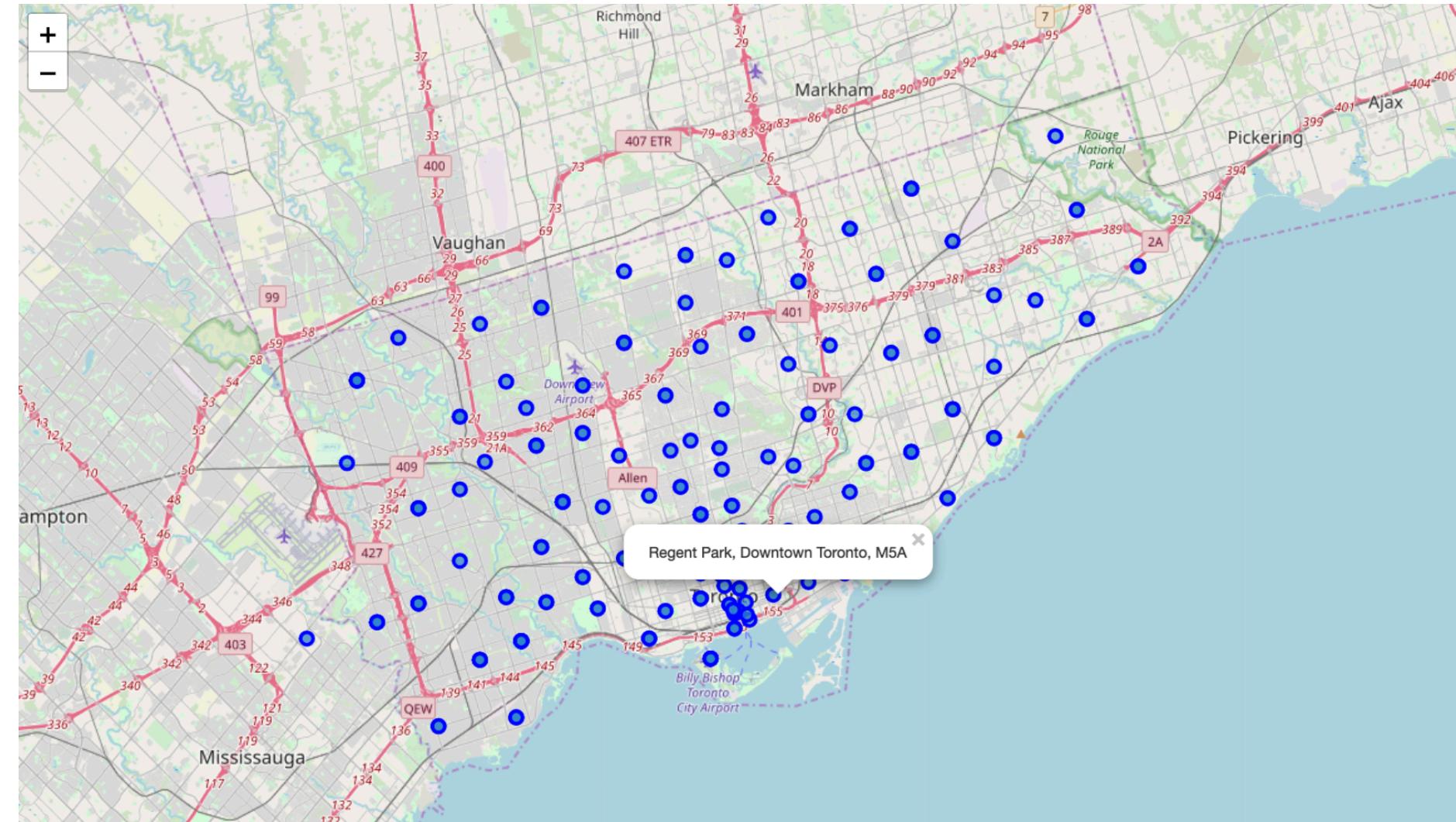
- Population: 2.732 Millions
- 46 categories reported
- Crimes reported in 2016: **32601**

CRIME ANALYSIS SAN FRANCISCO



- Population: 0.876 Million
- 38 categories reported
- Crimes reported in 2016:
132634

Map Toronto Neighborhoods



Folium map with overlay display of Toronto's neighborhood

Venues Analysis of Downtown Toronto's Borough

	Neighborhood	Neighborhood Latitude	Neighborhood Longitude	Venue	Venue Latitude	Venue Longitude	Venue Category
0	Harbourfront	43.65426	-79.360636	Roselle Desserts	43.653447	-79.362017	Bakery
1	Harbourfront	43.65426	-79.360636	Tandem Coffee	43.653559	-79.361809	Coffee Shop
2	Harbourfront	43.65426	-79.360636	Toronto Cooper Koo Family Cherry St YMCA Centre	43.653191	-79.357947	Gym / Fitness Center
3	Harbourfront	43.65426	-79.360636	Body Blitz Spa East	43.654735	-79.359874	Spa
4	Harbourfront	43.65426	-79.360636	Morning Glory Cafe	43.653947	-79.361149	Breakfast Spot

Group rows by neighborhood and calculate the mean of the frequency of occurrence for each venue category

	Neighborhood	Accessories Store	Afghan Restaurant	Airport	Airport Food Court	Airport Gate	Airport Lounge	Airport Service	Airport Terminal	American Restaurant	Antique Shop	Aquarium	Art Gallery	Art Museum	Arts & Crafts Store
0	Adelaide	0.010000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.030000	0.000000	0.00	0.010000	0.010000	0.000000
1	Bathurst Quay	0.000000	0.000000	0.071429	0.071429	0.071429	0.142857	0.142857	0.142857	0.000000	0.000000	0.00	0.000000	0.000000	0.000000
2	Berczy Park	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.00	0.017241	0.000000	0.000000
3	CN Tower	0.000000	0.000000	0.071429	0.071429	0.071429	0.142857	0.142857	0.142857	0.000000	0.000000	0.00	0.000000	0.000000	0.000000
4	Cabbagetown	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.021277	0.000000	0.00	0.000000	0.000000	0.000000
5	Central Bay Street	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.012821	0.000000	0.00	0.000000	0.012821	0.000000

Extract of Top 10 Venues Analysis in Downtown Toronto's Borough

----Regent Park----

	venue	freq
0	Coffee Shop	0.15
1	Café	0.09
2	Pub	0.07
3	Bakery	0.07
4	Park	0.07
5	Breakfast Spot	0.04
6	Mexican Restaurant	0.04
7	Theater	0.04
8	Brewery	0.02
9	Spa	0.02

----University of Toronto----

	venue	freq
0	Café	0.17
1	Bar	0.06
2	Bakery	0.06
3	Restaurant	0.06
4	Bookstore	0.06
5	Japanese Restaurant	0.06
6	Nightclub	0.03
7	Beer Bar	0.03
8	Beer Store	0.03
9	French Restaurant	0.03

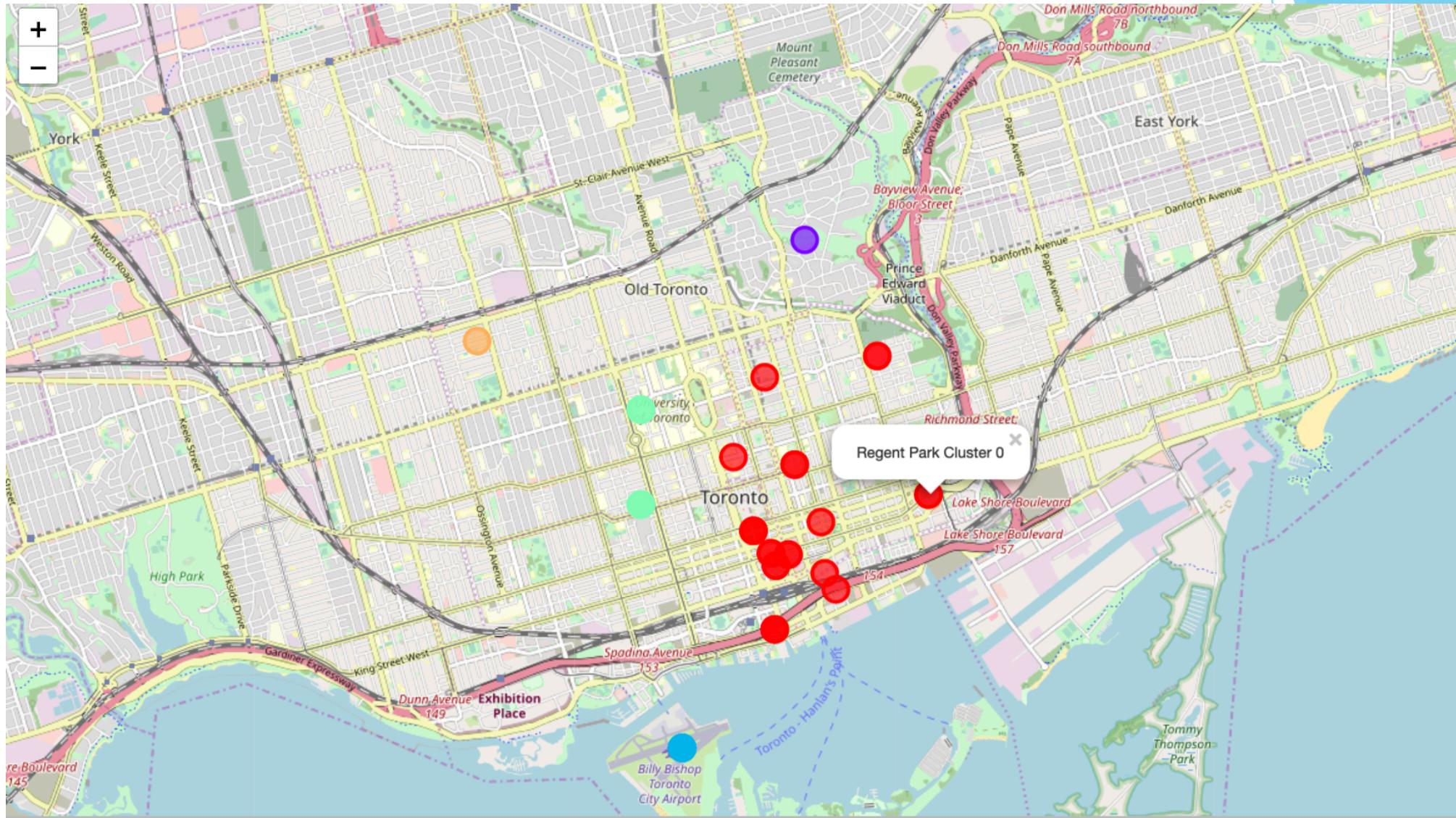
----Central Bay Street----

	venue	freq
0	Coffee Shop	0.17
1	Italian Restaurant	0.05
2	Café	0.05
3	Bar	0.04
4	Burger Joint	0.04
5	Chinese Restaurant	0.03
6	Sandwich Place	0.03
7	Thai Restaurant	0.03
8	Sushi Restaurant	0.03
9	Salad Place	0.03

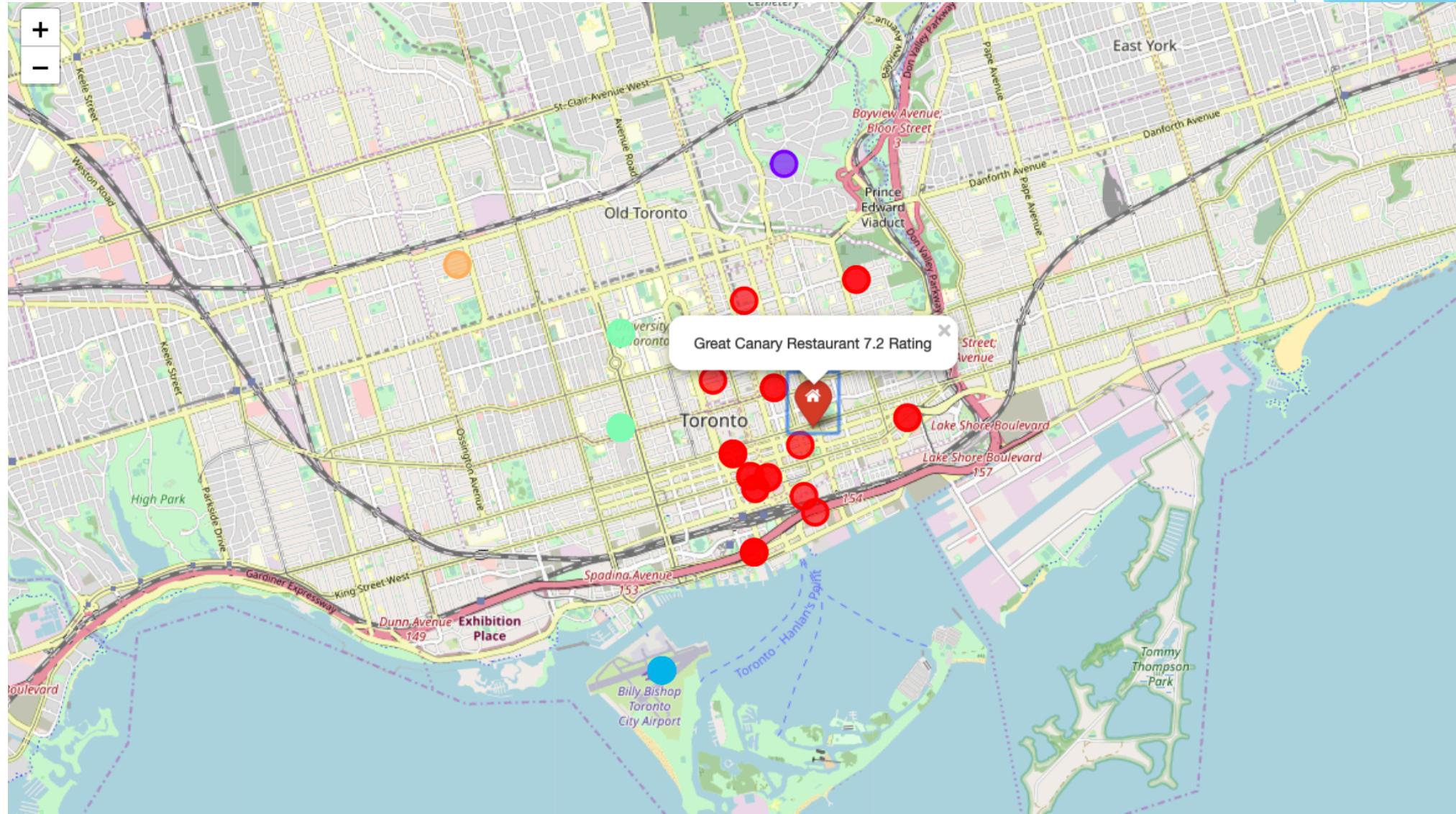
----Richmond----

	venue	freq
0	Coffee Shop	0.06
1	Café	0.04
2	Steakhouse	0.04
3	Thai Restaurant	0.04
4	Bar	0.04
5	Sushi Restaurant	0.03
6	Bakery	0.03
7	Burger Joint	0.03
8	Gym	0.03
9	Asian Restaurant	0.03

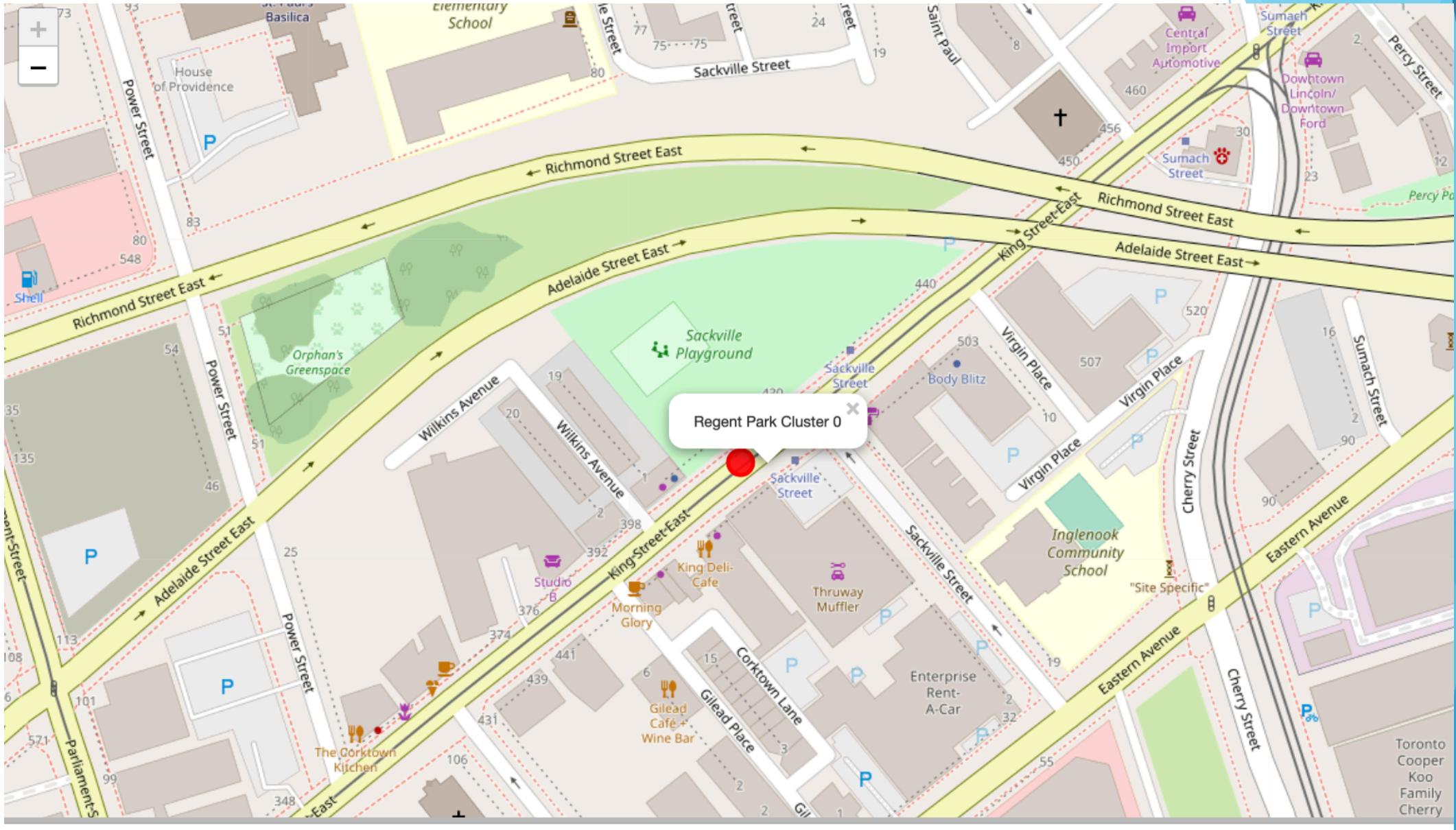
Toronto Downtown K-mean Clusters



Analyze direct competing venue in the selected neighborhood



Regent Park Cluster Downtown Toronto Details



Choice of City based on crime rates

- ▶ The first analysis done was to evaluate the crime rates in both cities:
 - ▶ The data collected was narrowed down to 2016, for which both cities had well documented and granular enough data for our analysis at the neighborhood level.
 - ▶ After cleaning up the data sets and filtering out non-criminal data included in the dataset for San Francisco, Chloropleth maps were created for both cities to identify the areas with the most crime reported.
- ▶ The crime rates calculated for 2016 were 1,193 and 15,140 respectively for Toronto and San Francisco. This gap between the cities made the selection of the “safest” city rather easy: Toronto, would be the best choice.

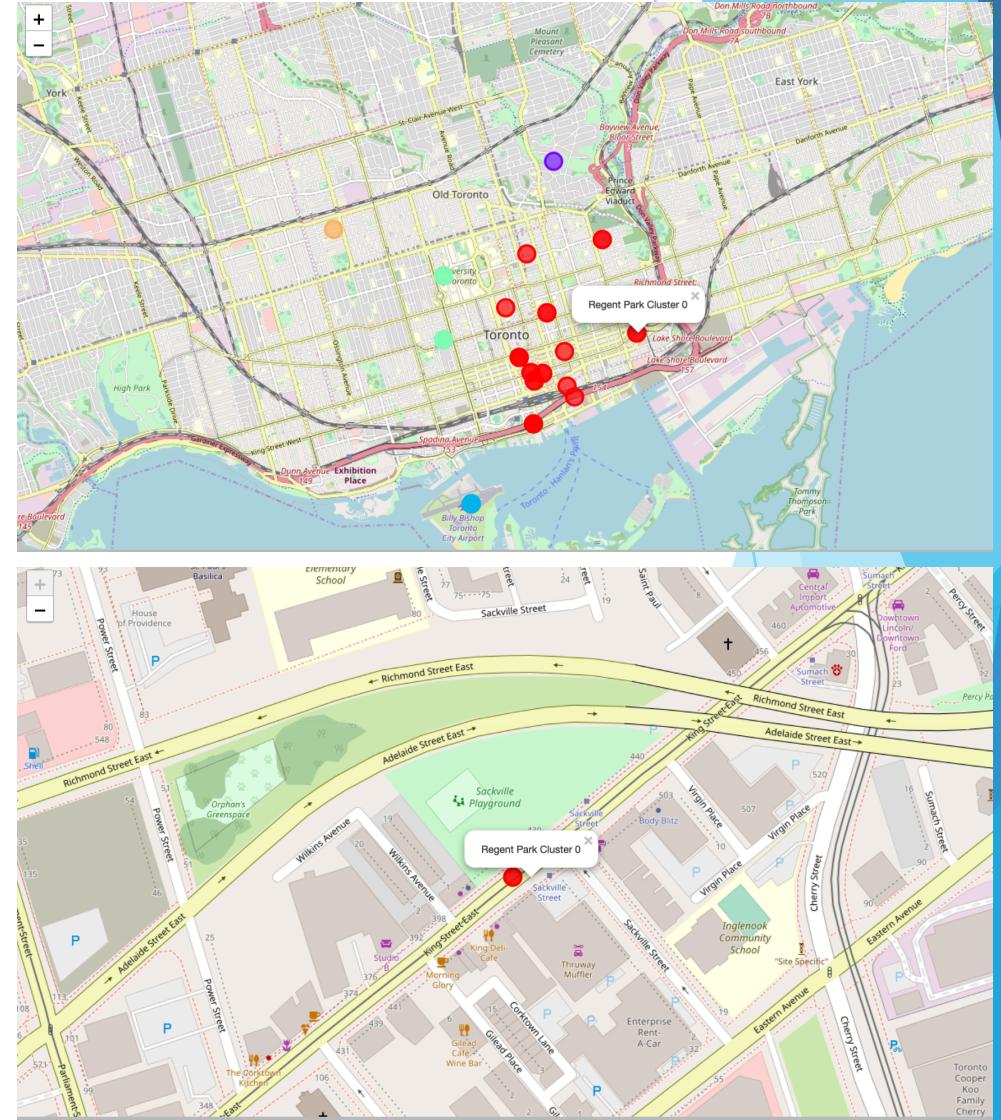
Borough & Neighborhood Selection in Toronto

- ▶ Downtown's Toronto's borough, despite a higher level of crimes reported, was a good choice to explore as the proximity to the main business centers, touristic areas and shore, made it an attractive option for year-around business
- ▶ Only one neighborhood in Downtown Toronto includes French Restaurants among the top 10 menus reported from Foursquare
- ▶ One neighborhood was particularly attractive: Regent Front
 - ▶ Relatively low crime rate with 178 crimes reported in 2016
 - ▶ Close vicinity to the city center and its amenities, thus easily accessible

Regent Park Neighborhood Venue Competitive and Accessibility Analysis

Regent Park fits all the criteria:

- ▶ No French Restaurant listed in the top 10 venues reported in Foursquare
- ▶ No public transportation reported within 100m in Foursquare, but plenty of parking options listed in the vicinity and close proximity to city center make the area easily accessible
- ▶ Only one competing French restaurant reported within 2km with a 7.2 rating



Final Recommendation

- ▶ Based on crime rates analyzed, Toronto was selected as the safest city to open a new French restaurant
- ▶ Among the boroughs and neighborhoods in Toronto, Regent Park met all the criteria:
 - ▶ Low crime rate
 - ▶ Proximity to the city center, major financial districts, popular tourist destinations, water front
 - ▶ Easily accessible and available various parking options
- ▶ The proximity of the location to New-York is an additional benefit as it would make it easier for the family to manage both locations.

Notebook Link

<https://gist.github.com/5177c128e04afc80263b542b557ac00b>