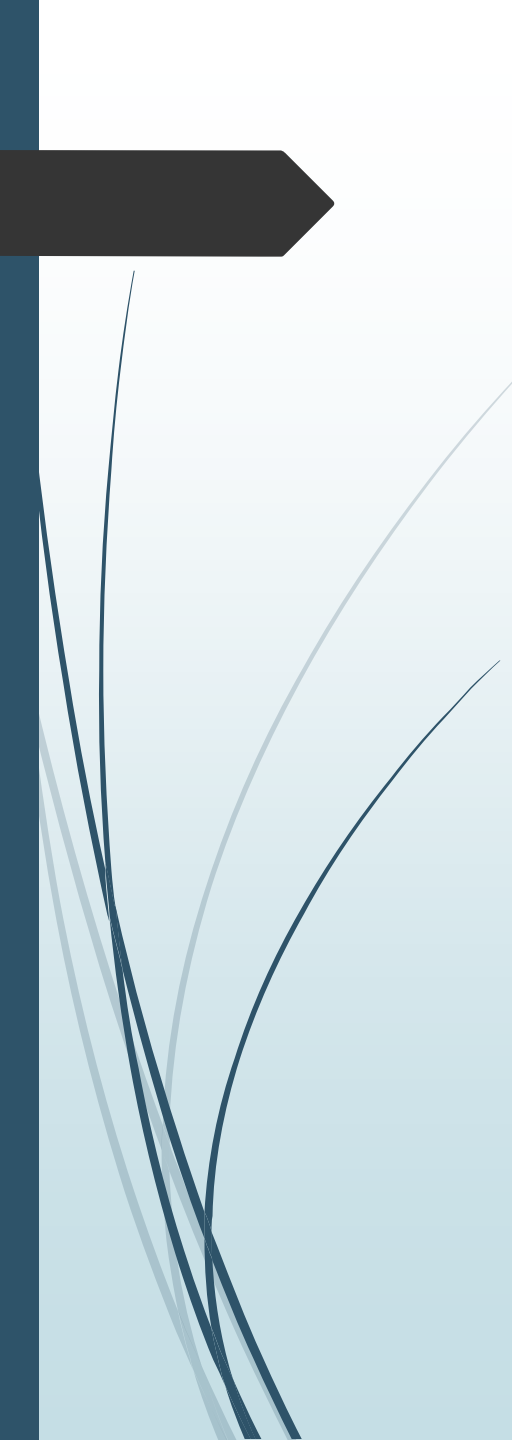




# Finding an optimal location for a bookstore in Toronto Canada

Capstone Project - The Battle of Neighborhoods

Roberto González



# Predicting the best location for establishing a bookstore

- The localization is one of the most important factors for the success of a business. Therefore, improving the analysis in this area will make more competitive and create economic advantages to the stakeholders.
- Target clients are related to the place where the bookstore is settled.
- Plan for performance due to the localization make easier to manage the marketing and advertising.



# Data acquisition and cleaning

- Following data sources will be needed to extract/generate the required information:
  - centers of candidate areas will be generated algorithmically and approximate addresses of centers of those areas will be obtained using **Google Maps API reverse geocoding**
  - number of bookstores and their type and location in every neighborhood will be obtained using **Foursquare API**
  - coordinate of Toronto center will be obtained using **Google Maps API geocoding** of well-known Toronto location

# One hot-encoding

- After obtaining and cleaning all the data We group all the venues for each neighborhood in one data frame by the technique of One hot-encoding.

	Neighborhood	Accessories Store	Afghan Restaurant	Airport	Airport Food Court	Airport Gate	Airport Lounge	Airport Service	Airport Terminal	American Restaurant	...	Vegetarian / Vegan Restaurant	Video Game Store	Video Store
0	Agincourt	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.000000	...	0.0	0.0	0.000
1	Aldenwood, Long Branch	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.000000	...	0.0	0.0	0.000
2	Bathurst Manor, Wilson Heights, Downsview North	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.000000	...	0.0	0.0	0.000
3	Bayview Village	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.000000	...	0.0	0.0	0.000
4	Bedford Park, Lawrence Manor East	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.041667	...	0.0	0.0	0.000
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
90	Willowdale, Willowdale West	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.000000	...	0.0	0.0	0.000
91	Woburn	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.000000	...	0.0	0.0	0.000
92	Woodbine Heights	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.000000	...	0.0	0.0	0.125
93	York Mills West	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.000000	...	0.0	0.0	0.000
94	York Mills, Silver Hills	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.000000	...	0.0	0.0	0.000

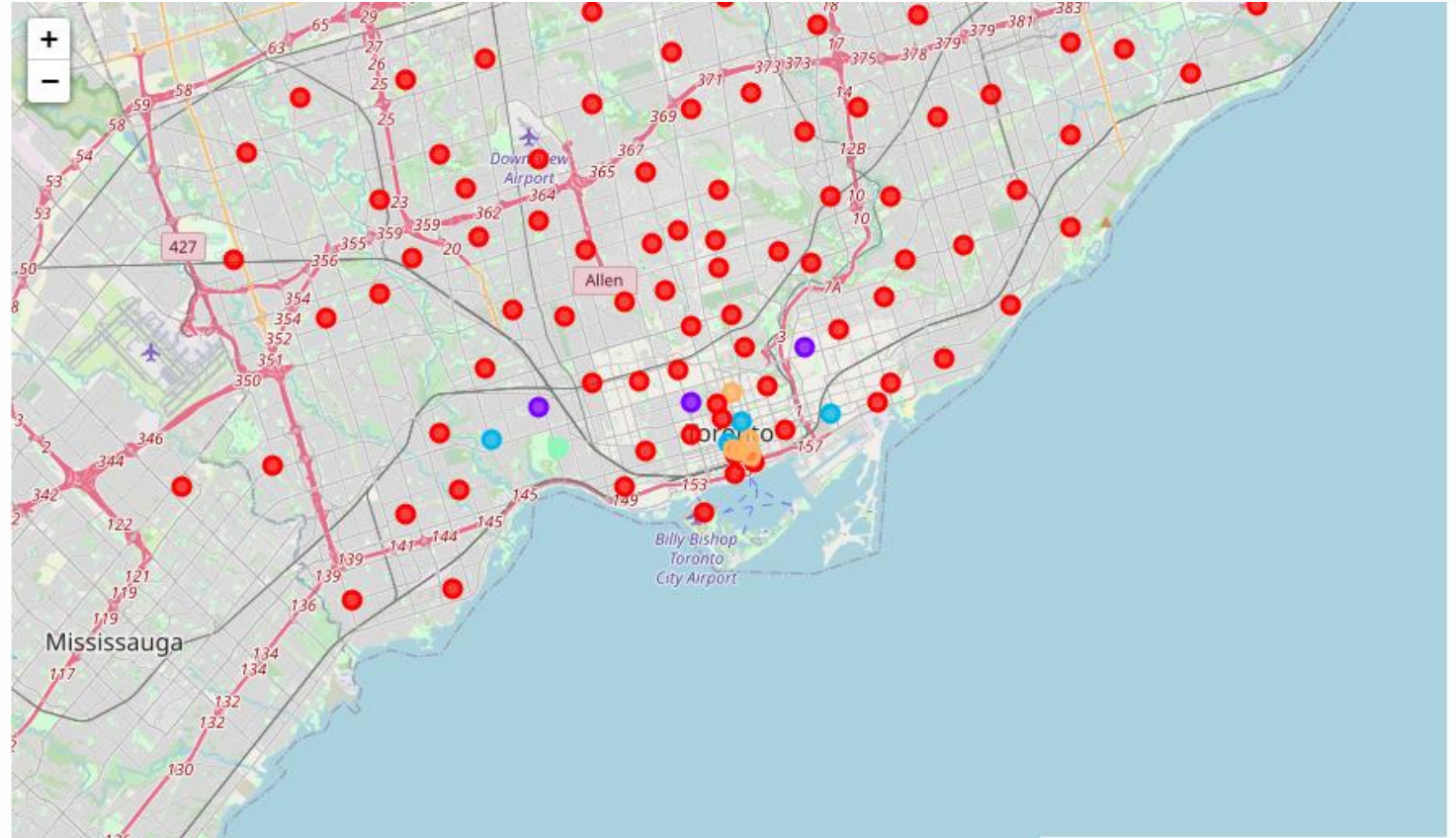
# Scustering by Bookstore data

- From the data of the amount of bookstores per neighborhood We cluster all the zones.

	Neighborhood	Bookstore
0	Agincourt	0.0
1	Alderwood, Long Branch	0.0
2	Bathurst Manor, Wilson Heights, Downsview North	0.0
3	Bayview Village	0.0
4	Bedford Park, Lawrence Manor East	0.0
...	...	...
90	Willowdale, Willowdale West	0.0
91	Woburn	0.0
92	Woodbine Heights	0.0
93	York Mills West	0.0
94	York Mills, Silver Hills	0.0

# Bookstore density in Toronto

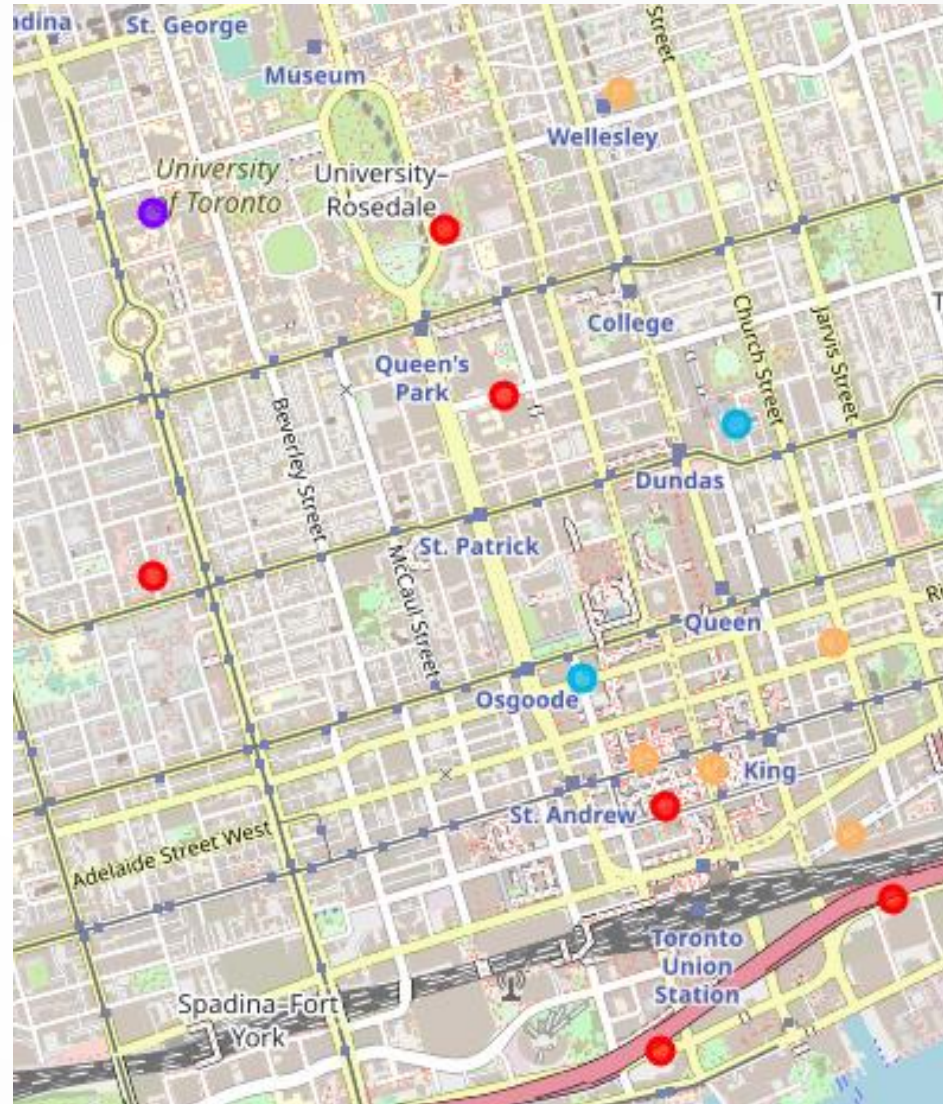
- Plotting all the neighborhoods colored by the cluster they belong, we can see that the city center is the zone which has the most amount of bookstores in the city.





# Best candidate in the city center

- This map shows higher density of existing bookstores in the downtown, with closest pockets of **low bookstore density positioned somewhere near from city center.**
- Based on this we will now focus our analysis on areas *Berczy Park, Central Bay Street, Kensington Market, Chinatown, Grange Park, Toronto Dominion Centre, Design Exchange and Queen's Park, Ontario Provincial Government.*



# Candidates analysis

- **Queen's Park, Ontario  
Provincial Government**
- Analysis of the candidates we can see that Queen's Park is an interesting zone where we can establish a new bookstore.

	Cluster Labels	Neighborhood	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue
5	0	Berczy Park	Coffee Shop	Cocktail Bar	Restaurant	Seafood Restaurant	Beer Bar
13	0	Central Bay Street	Coffee Shop	Café	Italian Restaurant	Japanese Restaurant	Sandwich Place
43	0	Kensington Market, Chinatown, Grange Park	Café	Coffee Shop	Vegetarian / Vegan Restaurant	Vietnamese Restaurant	Mexican Restaurant
62	0	Queen's Park, Ontario Provincial Government	Coffee Shop	Sushi Restaurant	Yoga Studio	Arts & Crafts Store	Smoothie Shop
83	0	Toronto Dominion Centre, Design Exchange	Coffee Shop	Hotel	Café	Restaurant	Deli / Bodega





# Queen's Park, Ontario Provincial Government

- Because some important buildings and institutions related to academic and scholar topics, as:
  - *The Ontario Legislative Building is a structure in central Toronto, Ontario, Canada. It houses the Legislative Assembly of Ontario, and the viceregal suite of the Lieutenant Governor of Ontario and offices for members of the provincial parliament.*
  - *University Avenue is a major north–south road in Downtown Toronto, Ontario, Canada. Beginning at Front Street West in the south, the thoroughfare heads north to end at College Street just south of Queen's Park. At its north end, the Ontario Legislative Building serves as a prominent terminating vista. "*
  - *University of Toronto - St. George Campus blends historical architecture and inviting green spaces as a backdrop to a truly remarkable community. Set in the centre of Toronto, it is a place where students, staff and faculty engage with a vibrant academic life and countless co-curricular activities.*
- Really close to Universities and Institutions, also relatively close to city center and well connected, this borough appear to fit very well what we are trying to find.



# Conclusion

- Purpose of this project was to identify Toronto areas close to center with low number of bookstores in order to aid stakeholders in narrowing down the search for optimal location for a new store.
- By calculating the number of bookstores distribution from Foursquare data we have first identified general boroughs that justify further analysis. Clustering of those locations was then performed in order to create major zones of interest (containing greatest number of potential locations) and addresses of those zone centers were created to be used as starting points for final exploration by stakeholders.
- Final decision on optimal restaurant location will be made by stakeholders based on specific characteristics of neighborhoods and locations in every recommended zone.