



Battle of Neighbourhoods

IBM Data Science Certificate
Final Capstone Project

Assessing the Best Neighbourhood in Toronto

Purpose

The major purpose of this project is to recommend the best neighbourhood to live in for a new comer relocating to Toronto. This project aims to provide insights and solutions to answer the business problem: What is the best neighbourhood to live in Toronto?

Approach

This project will use multiple data sources and data science methodologies to determine the best neighbourhoods in the City of Toronto by:

- Scraping Wikipedia to pull postal codes of neighbourhoods in Toronto
- Geocode the neighbourhoods with Longitudinal and Lattitudinal coordinates
- Visualize the neighbourhoods on a map
- Append location-based venue information using Foursquare API
- Apply unsupervised machine learning to cluster neighbourhoods based on the venue types
- Visualize the clusters on a map



Data Acquisition and Processing

Data Sources

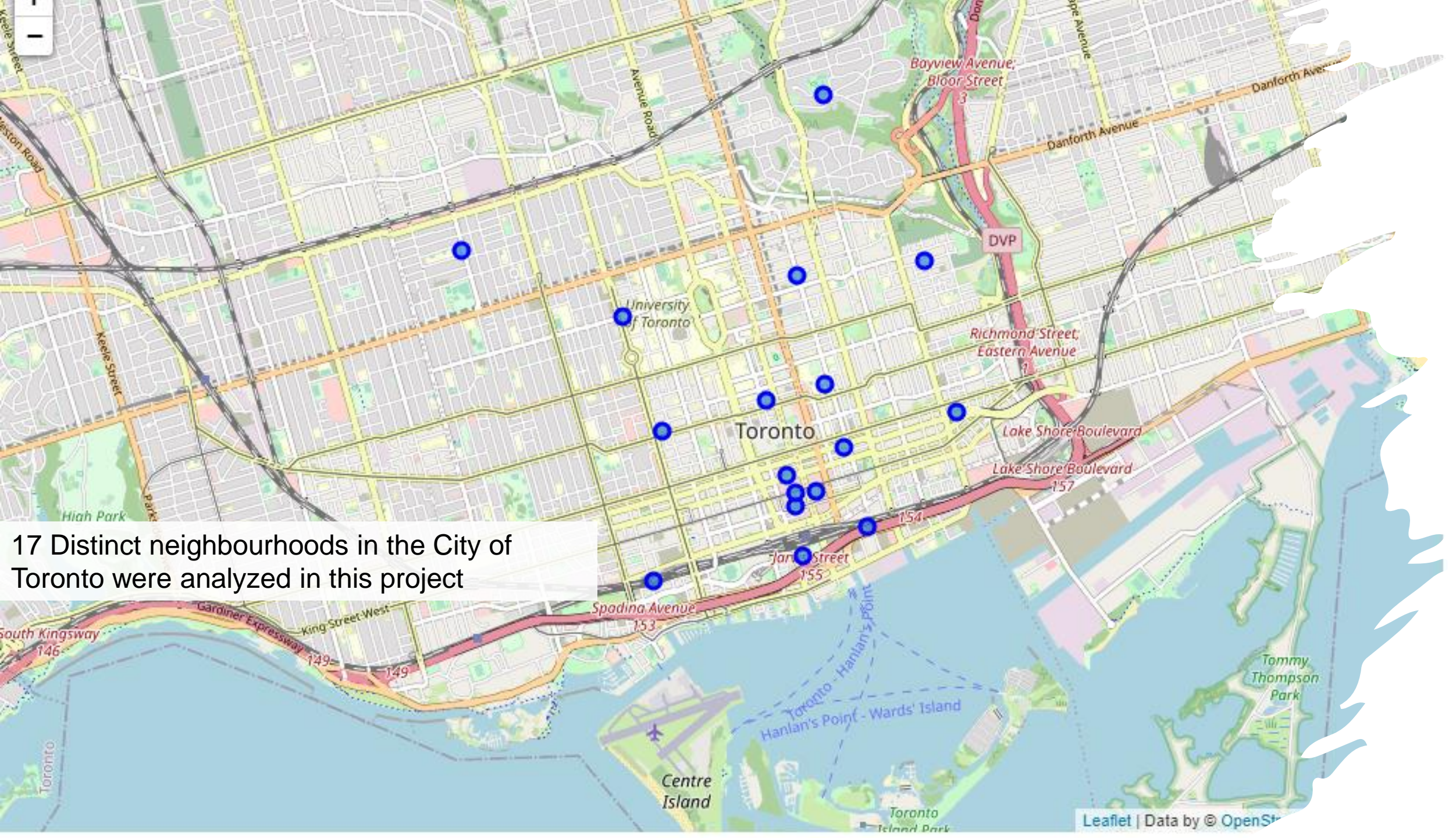
- Postal Code information for City of Toronto:
https://en.wikipedia.org/wiki/List_of_postal_codes_of_Canada:_M
- Venue information: [Foursquare](#)



Python Libraries Used

- Pandas: For creating and manipulating dataframes.
- Folium: Python visualization library would be used to visualize the neighborhoods cluster distribution of using interactive leaflet map.
- Scikit Learn: For importing k-means clustering.
- JSON: Library to handle JSON files.
- XML: To separate data from presentation and XML stores data in plain text format.
- Geocoder: To retrieve Location Data.
- Beautiful Soup and Requests: To scrap and library to handle http requests.
- Matplotlib: Python Plotting Module.

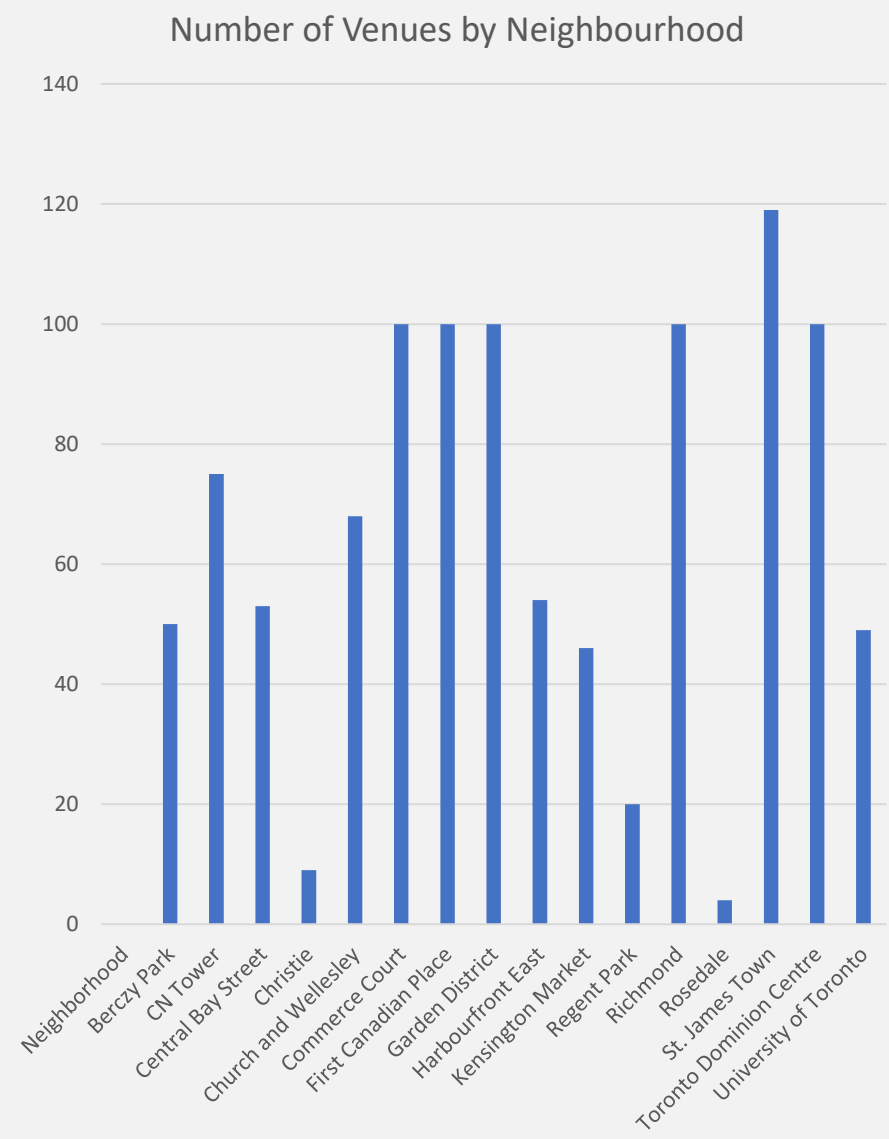




17 Distinct neighbourhoods in the City of Toronto were analyzed in this project

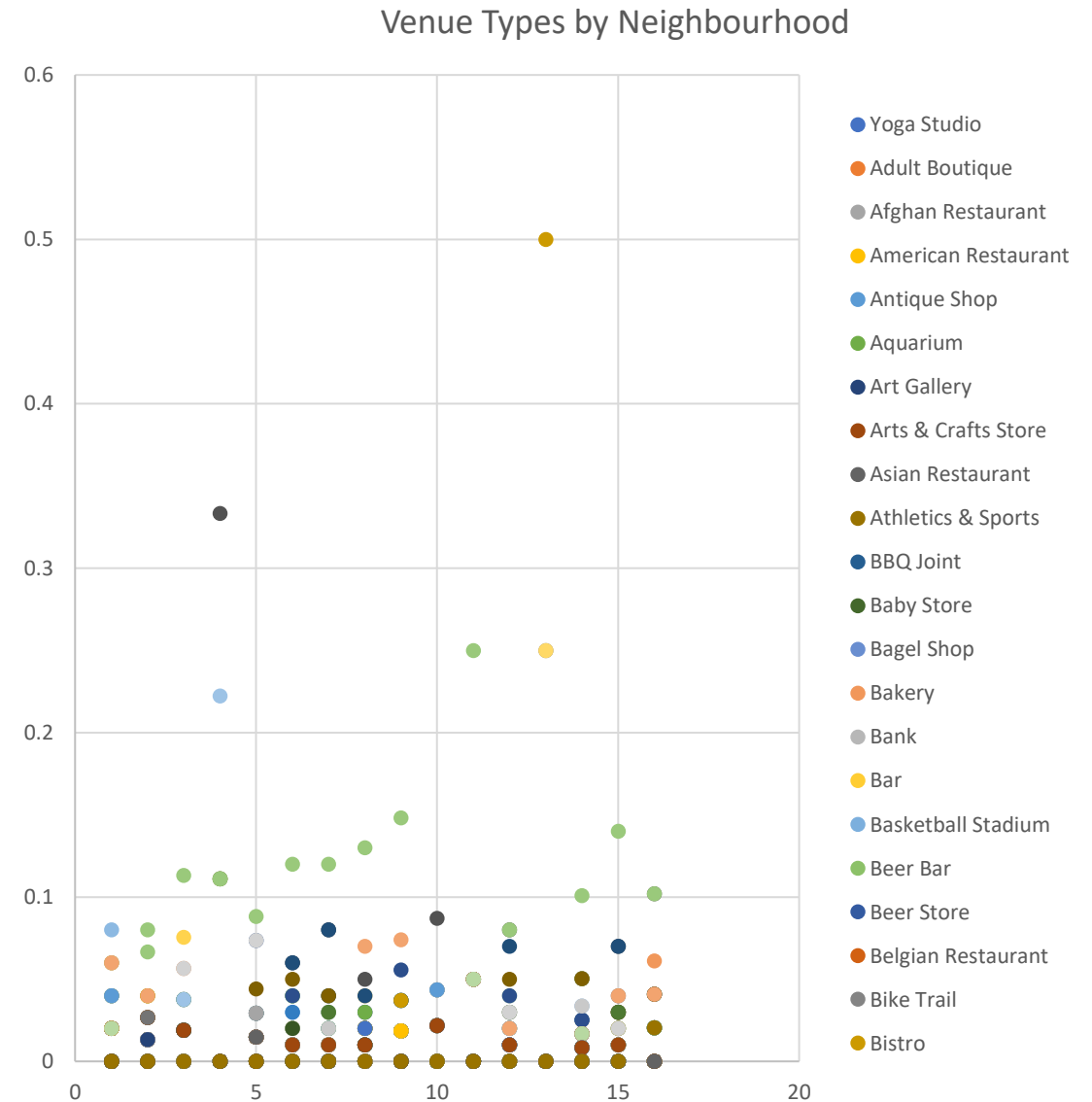
More venues and amenities means more options

St. James had the most venues located in its neighbourhood, followed by Commerce Court, First Canadian Place, Garden District, Richmond, and Toronto Dominion Centre.



Different strokes for Different Folks

Depending on what amenities are important to a newcomer to the City of Toronto, different neighbourhoods over-index on different venue types



Top 10 List

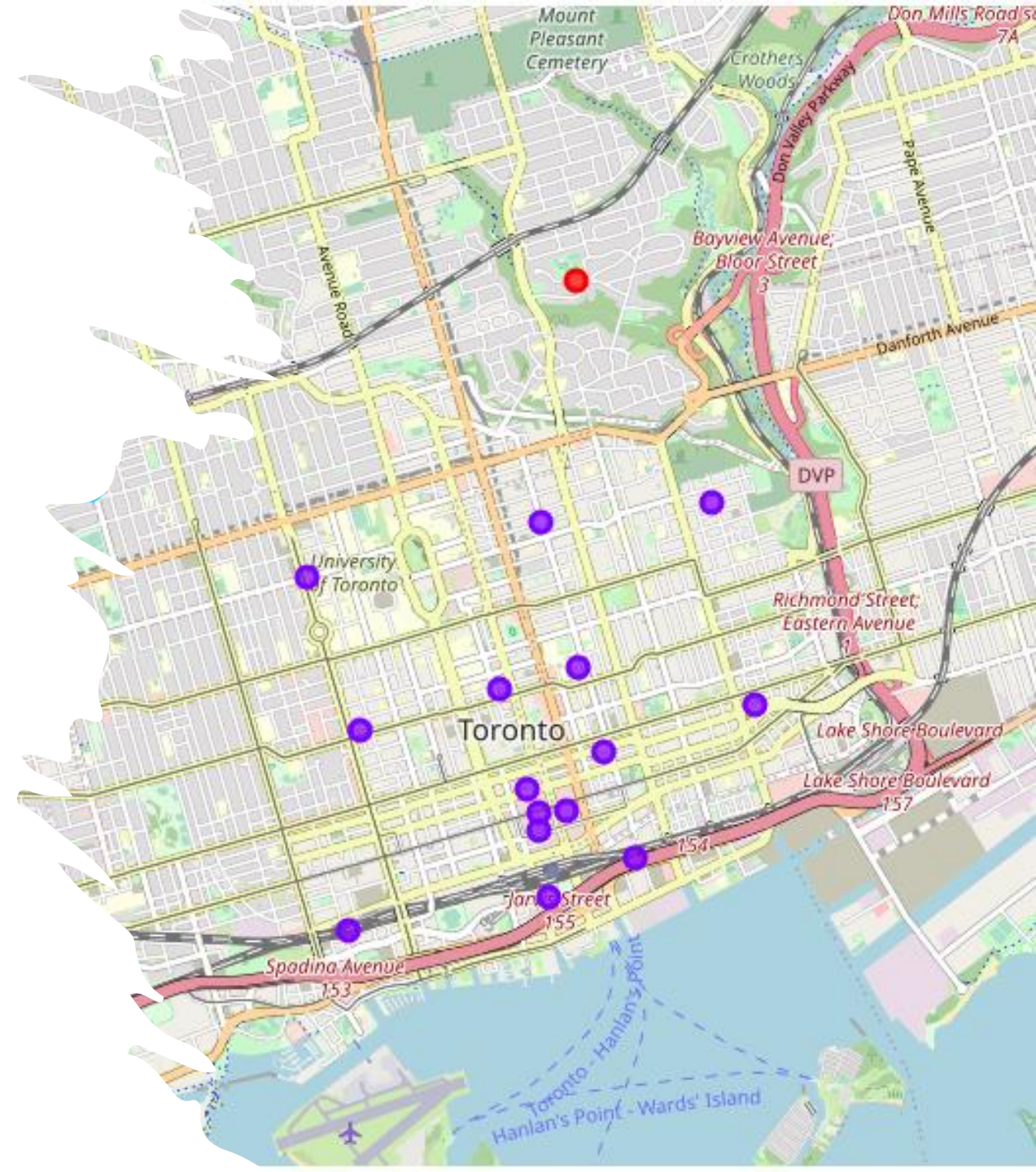
Depending on the combination of venues newcomers look for in a new neighbourhood (e.g. coffee shops, restaurants, and parks) there are many options that provide convenience

	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	Berczy Park	Cocktail Bar	Sandwich Place	Coffee Shop	Bakery	Beer Bar	Farmers Market	Vegetarian / Vegan Restaurant	Seafood Restaurant	Butcher	Bistro
1	CN Tower	Italian Restaurant	Coffee Shop	Café	Park	Restaurant	Sandwich Place	Bar	French Restaurant	Gym / Fitness Center	Japanese Restaurant
2	Central Bay Street	Coffee Shop	Clothing Store	Pizza Place	Sushi Restaurant	Sandwich Place	Japanese Restaurant	Cosmetics Shop	Middle Eastern Restaurant	Restaurant	Plaza
3	Christie	Café	Grocery Store	Baby Store	Coffee Shop	Italian Restaurant	Department Store	Ethiopian Restaurant	Escape Room	Electronics Store	Distribution Center
4	Church and Wellesley	Coffee Shop	Japanese Restaurant	Sushi Restaurant	Restaurant	Dance Studio	Gym	Grocery Store	Indian Restaurant	Sandwich Place	Gay Bar
5	Commerce Court	Coffee Shop	Café	Hotel	Restaurant	Italian Restaurant	Beer Bar	Gym	Japanese Restaurant	Gastropub	Cocktail Bar
6	First Canadian Place	Coffee Shop	Hotel	Café	Gym	Japanese Restaurant	Restaurant	Concert Hall	Deli / Bodega	Steakhouse	Asian Restaurant
7	Garden District	Coffee Shop	Sandwich Place	Clothing Store	Café	Hotel	Middle Eastern Restaurant	Japanese Restaurant	Cosmetics Shop	Italian Restaurant	Pizza Place
8	Harbourfront East	Coffee Shop	Sandwich Place	Japanese Restaurant	Bank	Park	Aquarium	Boat or Ferry	Hotel	History Museum	Beer Bar
9	Kensington Market	Café	Art Gallery	Gaming Cafe	Vegetarian / Vegan Restaurant	Pizza Place	Burger Joint	Noodle House	Farmers Market	Comfort Food Restaurant	Restaurant
10	Regent Park	Coffee Shop	Italian Restaurant	Greek Restaurant	Pub	Discount Store	Restaurant	Breakfast Spot	Distribution Center	Electronics Store	Sandwich Place
11	Richmond	Café	Coffee Shop	Hotel	Restaurant	Japanese Restaurant	Gym	Breakfast Spot	Steakhouse	Asian Restaurant	Sushi Restaurant
12	Rosedale	Park	Playground	Bike Trail	College Rec Center	Department Store	Ethiopian Restaurant	Escape Room	Electronics Store	Distribution Center	Discount Store
13	St. James Town	Coffee Shop	Café	Italian Restaurant	Restaurant	Cocktail Bar	Pizza Place	Clothing Store	Bakery	Japanese Restaurant	Cosmetics Shop
14	Toronto Dominion Centre	Coffee Shop	Hotel	Café	Sandwich Place	Asian Restaurant	Japanese Restaurant	Pharmacy	Steakhouse	Restaurant	Deli / Bodega
15	University of Toronto	Café	Coffee Shop	Bakery	Sandwich Place	Bar	Pub	Japanese Restaurant	Gym	Restaurant	French Restaurant

Take Your Pick!

In order to assess the clusters of neighbourhoods based on the venue type surrounding the neighbourhoods, we used k-means unsupervised machine learning to determine the distinct clusters that exist between neighbourhoods and the key amenities that exist such as:

- Cocktail Bar
- Restaurants
- Coffee Shops
- Clothing Stores
- Pubs
- Hotels
- Café's
- Playgrounds
- Parks
- Grocery Stores
- Bakeries



Conclusion and Future Considerations

- Built a useful model to assess the various neighbourhoods in Toronto
- Accuracy of models has room for improvement
- Venue/amenities provides one layer to evaluate the quality of neighbourhoods but others data points should be considered, such as:
 - Schools
 - Crime
 - Demographics





Thank You!