Capstone Project : Comparing Metropolitan Neighborhoods

TORONTO/NEW YORK CITY

Report Outline

1. **Background**

2. **Toronto dataset review (Wikipedia and Foursquare)**
   - -Combine Postal Code, Borough, and Neighborhood information from Wikipedia
   - -Obtain Latitude and Longitude (lat/long) data from http://cocl.us/Geospatial data.
   - -Create Map of Toronto neighborhoods

3. **Explore Scarborough borough in Toronto with Foursquare**
   - -Scarborough venue and districts
   - -Clustering Scarborough neighborhood using K-means

4. **New York City dataset review (https://geo.nyu.edu/catalog/nyu) and http://cocl.us/Geospatial data.**
   - -Combine Postal Code, Borough, and Neighborhood information
   - -Create map of New York using latitude and longitude values
   - -Explore Flushing neighborhood using Foursquare API

5. **Explore the New York City borough of Queens**
   - -Identify and analyze Queens' venues borough neighborhoods combining location and Foursquare data
   - -Clustering Queens neighborhood using K-means

6. **Conclusion and Results**

Background

An international realtor has identified an opportunity to assist customers in relocating to large cities in North America. The realtor is seeking to a way provide a greater level of detail to their customers by developing information regarding the quantity and variety of venues within prospective cities. This information will allow customers to select the neighborhoods that best suit their interests.

The research identifies the type and frequency of venues which can assist in defining a city's culture and allow clients to align their living preferences with specific neighborhoods.

The realtor has chosen to evaluate their clients' most common destinations are Toronto and New York City. To illustrate the available data and provide a comparative analysis, a report is provided that describes each city's respective neighborhoods and analyzes the most available venues. This data is arrayed in illustrative maps that allow customers to examine and explore a wide array of neighborhoods which comprise each city.

Toronto

The geographical coordinates of Toronto, Canada are 43.6534817, -79.3839347.

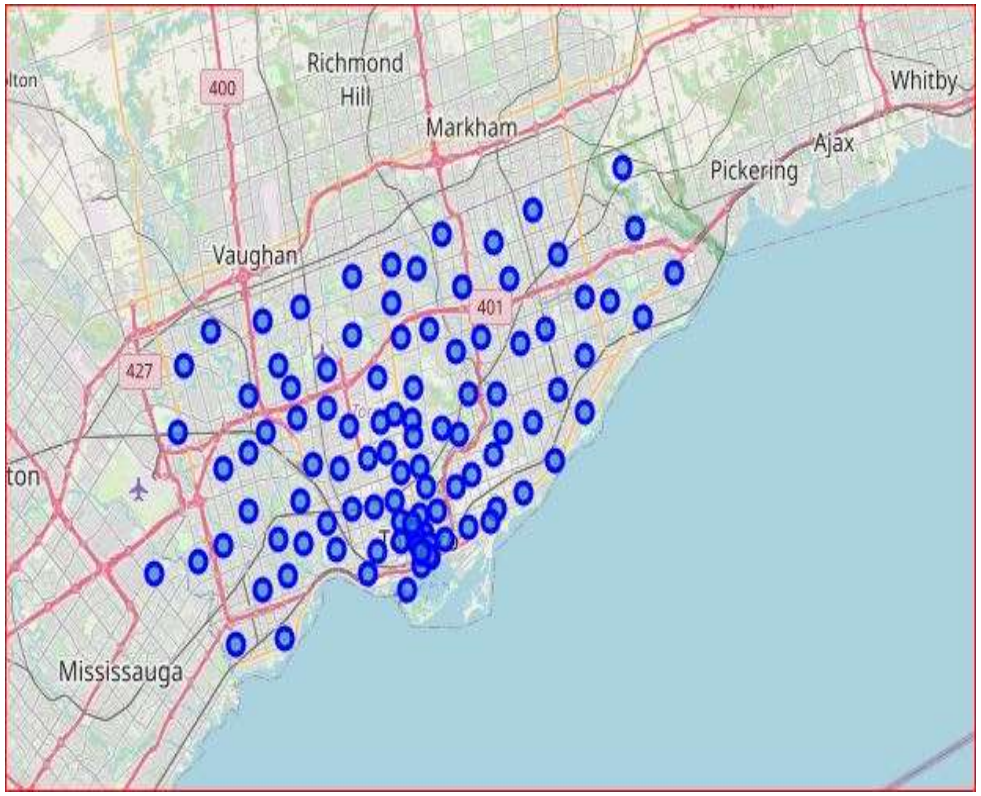
Toronto has 10 boroughs and 103 neighborhoods.

Toronto is the capital city of the Canadian province of Ontario and the most populous city in Canada. It is comprised of various districts including East York, Etobicoke, North York, Old Toronto, Scarborough, York.

Latitude and longitude data frame with neighborhood and postal code

Postal Code	Borough	Neighborhood	Latitude	Longitude
M1B	Scarborough	Malvern, Rouge	43.806686	-79.194353
M1C	Scarborough	Rouge Hill, Port Union, Highland Creek	43.784535	-79.160497
M1E	Scarborough	Guildwood, Morningside, West Hill	43.763573	-79.188711
M1G	Scarborough	Woburn	43.770992	-79.216917
M1H	Scarborough	Cedarbrae	43.773136	-79.239476

Map of Toronto neighborhoods



Scarborough

The geographical coordinate of Scarborough, CA are 43.7729744, -79.2576479

The report 88 venues in 17 neighborhoods

There are 78 distinct venues in 52 categories.

The report examines each cluster and determines the discerning venue categories that distinguish each cluster. Based on the defining categories, you can then assign a name to each cluster.

Customers can evaluate the frequency of each venue to ensure the neighborhood meets their needs.

	Postal Code	Borough	Neighborhood	Latitude	Longitude	Cluster Labels	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
0	M1B	Scarborough	Malvern, Rouge	43.806686	-79.194353	0	Fast Food Restaurant	Vietnamese Restaurant	Thai Restaurant	Hobby Shop	Hakka Restaurant	General Entertainment	Gas Station
1	M1C	Scarborough	Rouge Hill, Port Union, Highland Creek	43.784535	-79.160497	0	Home Service	Bar	College Stadium	Hobby Shop	Hakka Restaurant	General Entertainment	Gas Station
2	M1E	Scarborough	Guildwood, Morningside, West Hill	43.763573	-79.188711	0	Intersection	Bank	Restaurant	Rental Car Location	Breakfast Spot	Electronics Store	Medical Center
3	M1G	Scarborough	Woburn	43.770992	-79.216917	0	Coffee Shop	Soccer Field	Korean BBQ Restaurant	Vietnamese Restaurant	Hakka Restaurant	General Entertainment	Gas Station

Top ten venues for each neighborhood

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
Agincourt	Skating Rink	Latin American Restaurant	Breakfast Spot	Lounge	Vietnamese Restaurant	College Stadium	General Entertainment	Gas Station	Gaming Cafe	Fried Chicken Joint
Birch Cliff, Cliffside West	General Entertainment	Skating Rink	Café	College Stadium	Vietnamese Restaurant	Coffee Shop	Hakka Restaurant	Gas Station	Gaming Cafe	Fried Chicken Joint
Cedarbrae	Thai Restaurant	Athletics & Sports	Bakery	Bank	Hakka Restaurant	Gas Station	Lounge	Caribbean Restaurant	Fried Chicken Joint	Discount Store
Clarks Corners, Tam O'Shanter, Sullivan	Pizza Place	Noodle House	Thai Restaurant	Gas Station	Shopping Mall	Bank	Italian Restaurant	Fried Chicken Joint	Fast Food Restaurant	Chinese Restaurant
Cliffside, Cliffcrest, Scarborough Village West	American Restaurant	Motel	Home Service	Hakka Restaurant	General Entertainment	Gas Station	Gaming Cafe	Fried Chicken Joint	Fast Food Restaurant	Electronics Store
Dorset Park, Wexford Heights, Scarborough Town...	Indian Restaurant	Vietnamese Restaurant	Pet Store	Gaming Cafe	Chinese Restaurant	Bank	Bar	Athletics & Sports	Hakka Restaurant	General Entertainment
Golden Mile, Clairlea, Oakridge	Bakery	Bus Line	Ice Cream Shop	Soccer Field	Intersection	Bus Station	Park	Metro Station	Department Store	General Entertainment
Guildwood, Morningside, West Hill	Intersection	Bank	Restaurant	Rental Car Location	Breakfast Spot	Electronics Store	Medical Center	Mexican Restaurant	Vietnamese Restaurant	College Stadium
Kennedy Park, Ionview, East Birchmount Park	Coffee Shop	Hobby Shop	Discount Store	Department Store	Thai Restaurant	Hakka Restaurant	General Entertainment	Gas Station	Gaming Cafe	Fried Chicken Joint
Malvern, Rouge	Fast Food Restaurant	Vietnamese Restaurant	Thai Restaurant	Hobby Shop	Hakka Restaurant	General Entertainment	Gas Station	Gaming Cafe	Fried Chicken Joint	Electronics Store
Milliken, Agincourt North, Steeles East, L'Amo...	Park	Intersection	Playground	Chinese Restaurant	General Entertainment	Gas Station	Gaming Cafe	Fried Chicken Joint	Fast Food Restaurant	Electronics Store

K-Means Clustering Scarborough

```
2]: # set number of clusters
    kclusters = 3

    scarborough_grouped_clustering = scarborough_grouped.drop('Neighborhood', 1)

    # run k-means clustering
    kmeans = KMeans(n_clusters=kclusters, random_state=2).fit(scarborough_grouped_clustering)

    # check cluster labels generated for each row in the dataframe
    #kmeans.labels_[0:10]
    kmeans.labels_
```

New York City

The geographical coordinate of New York City are 40.7127281, -74.0060152.

The data frame has 5 boroughs and 306 neighborhoods.

New York City is the most populous city in the United States. The constituent counties, also known as boroughs include Bronx (The Bronx), Kings (Brooklyn), New York (Manhattan), Queens (Queens), Richmond (Staten Island).

Queens

The geographical coordinate of Queens are 40.7498243, -73.7976337.

Found 2097 venues in 81 neighborhoods.

There are 1729 distinct venues in 273 categories

	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	Arverne	Surf Spot	Metro Station	Playground	BBQ Joint	Bus Stop	Pizza Place	Café	Board Shop	Sandwich Place	Beach
1	Astoria	Bar	Middle Eastern Restaurant	Greek Restaurant	Indian Restaurant	Seafood Restaurant	Mediterranean Restaurant	Hookah Bar	Café	Food Truck	Deli / Bodega
2	Astoria Heights	Italian Restaurant	Chinese Restaurant	Playground	Bakery	Bus Station	Plaza	Motel	Supermarket	Bowling Alley	Food
3	Auburndale	Italian Restaurant	Miscellaneous Shop	Comic Shop	Supermarket	Noodle House	Fast Food Restaurant	Mobile Phone Shop	Bar	Mattress Store	Toy / Game Store
4	Bay Terrace	Clothing Store	Shoe Store	Cosmetics Shop	Women's Store	Donut Shop	Kids Store	American Restaurant	Mobile Phone Shop	Men's Store	Pharmacy
5	Bayside	Bar	Sushi Restaurant	Indian Restaurant	Pizza Place	Bakery	Mexican Restaurant	Steakhouse	Café	Chinese Restaurant	Pub

K-means Clustering in Queens

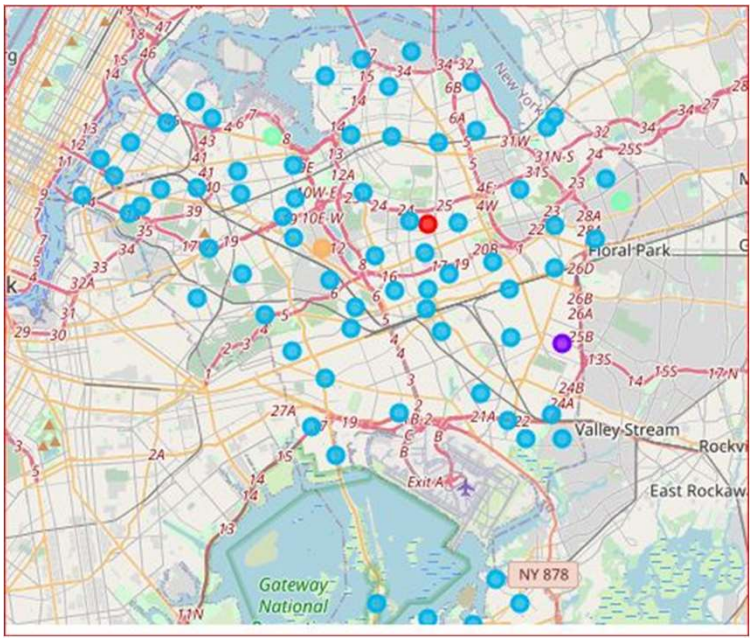
Cluster the Queens Borough using K-Means

```
# set number of clusters
kclusters = 5

queens_grouped_clustering = queens_grouped.drop('Neighborhood', 1)

# run k-means clustering
kmeans = KMeans(n_clusters=kclusters, random_state=2).fit(queens_grouped_clustering)

# check cluster labels generated for each row in the dataframe
#kmeans.labels_[0:10]
kmeans.labels_
```



Results and Discussion. Both Scarborough and Queens borough consist of neighborhood cluster that contain majority of the neighborhoods, and the remaining cluster had 1-5 neighborhoods. Although Toronto and New York City are the largest metropolitan cities in their respective countries, the depth and breadth of neighborhoods and venues in New York City far outpaces Toronto. It is interesting to identify the similarities between both broughs given their large and diverse metropolitan populations while in some ways reflecting the local cultures of the neighborhoods.

Conclusions. Based on analysis of the data, both locations offer a wide array of venues for dining and entertainment. However, if someone was looking for which borough offers the greatest number of venues, Queens offers a much larger array of choices across all categories. It was interesting to evaluate and analyze the data while learning more about each of these locations.

This tool would prove useful to clients seeking to evaluate neighborhoods in large metropolitan areas. By understanding the venues that populate specific neighborhoods, clients can be more confident in their relocation.

If interested in learning more, the presentation, notebook and report are located in the Capstone-Project-Battle of the Neighborhoods located at **https://github.com/mkess76/Capstone-Project-Battle-of-the-Neighborhoods**