

# Capstone Project

## The Battle of Neighborhoods

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## Introduction

Individuals and families migrate to different cities across the globe for multifarious reasons. Some migrate to join families, and some migrate to find better livelihood. Not much research goes into picking a place other than what is evident / on-the-table. Not to mention, family-members' and friends' experiences are relied upon the most.

With factual research in place, one can take decisions on quantifiable basis. I'd like to use quantifiable data to show how one can pick a place like their current habitat. This will be useful for all who are looking to change their existing address with a new one, and maintain a similar, if not the same, lifestyle.

I will be using the foursquare API to compare different localities – their neighborhoods and available amenities – to establish the best option for migration.

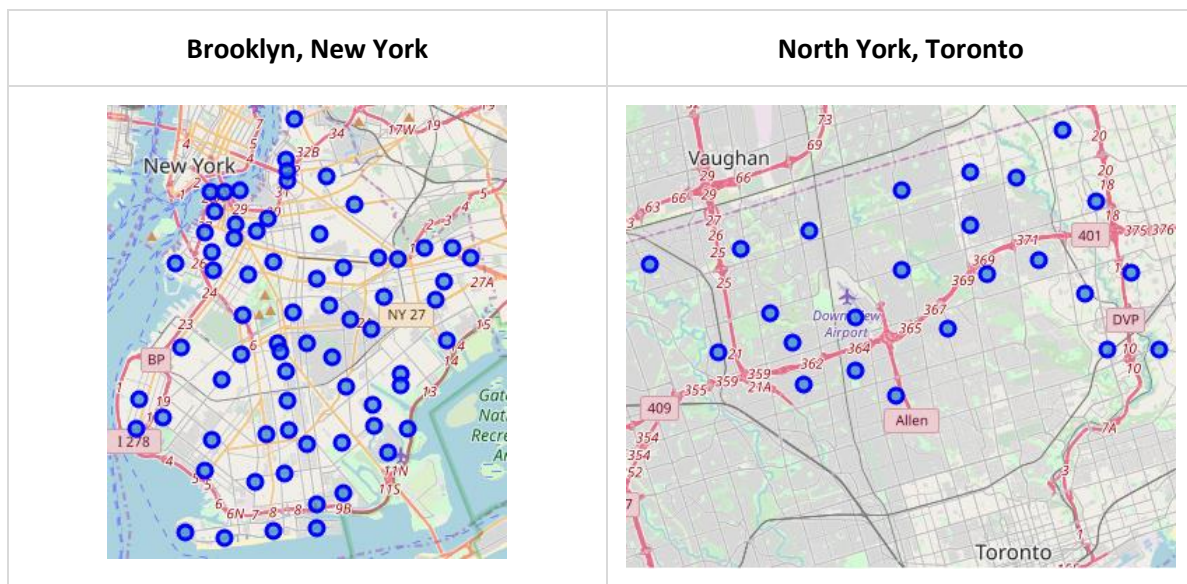
## Data

I will be comparing Brooklyn, New York with North York, Toronto. This comparison will help individuals and families evaluating to permanently or temporarily move between the two areas. The comparison will be based upon the amenities available in the neighborhoods of the respective cities. Using this comparison one can evaluate how similar or dissimilar their choice of destination will be, to their existing one.

The data would be based upon different cuisines, coffee shops, health facilities, parks, etc. Information based on these dimensions plays a vital role in deciding on a place to live.

## Methodology

Following are maps for Brooklyn and North York, with their respective neighborhoods highlighted on them. It is evident, from the illustration, that North York is not as populated as Brooklyn.



The same is reflected from the numbers below:

	Neighborhood	Venue	Venue Categories
Brooklyn	70	2831	287
North York	24	251	111

This would be an attractive point for someone looking for a quieter neighborhood. Extracting the common areas between the two cities we come up with the following venue categories:

American Restaurant	Dog Run	Miscellaneous Shop
Arts & Crafts Store	Electronics Store	Movie Theater
Asian Restaurant	Event Space	Other Repair Shop
Athletics & Sports	Falafel Restaurant	Park
Bakery	Fast Food Restaurant	Pet Store
Bank	Food & Drink Shop	Pharmacy
Bar	Food Court	Pizza Place
Baseball Field	Food Truck	Plaza
Basketball Court	Fried Chicken Joint	Pool
Beer Store	Frozen Yogurt Shop	Pub
Bike Shop	Furniture / Home Store	Ramen Restaurant
Boutique	General Entertainment	Restaurant
Bridal Shop	Golf Course	Salon / Barbershop
Bubble Tea Shop	Greek Restaurant	Sandwich Place
Burger Joint	Grocery Store	Shoe Store
Burrito Place	Gym	Shopping Mall
Bus Line	Gym / Fitness Center	Smoke Shop
Bus Station	Home Service	Spa
Butcher	Hotel	Sporting Goods Shop
Café	Ice Cream Shop	Steakhouse
Candy Store	Indian Restaurant	Supermarket
Caribbean Restaurant	Intersection	Supplement Shop
Chinese Restaurant	Italian Restaurant	Sushi Restaurant
Clothing Store	Japanese Restaurant	Tea Room
Coffee Shop	Juice Bar	Thai Restaurant
Convenience Store	Kids Store	Theater
Cosmetics Shop	Korean Restaurant	Toy / Game Store
Deli / Bodega	Liquor Store	Video Game Store
Department Store	Lounge	Video Store
Dessert Shop	Massage Studio	Vietnamese Restaurant
Dim Sum Restaurant	Mediterranean Restaurant	Wings Joint
Diner	Metro Station	Women's Store
Discount Store	Middle Eastern Restaurant	

The following tables give a snapshot of the information that was extracted from various sources for the two cities:

## Brooklyn, New York

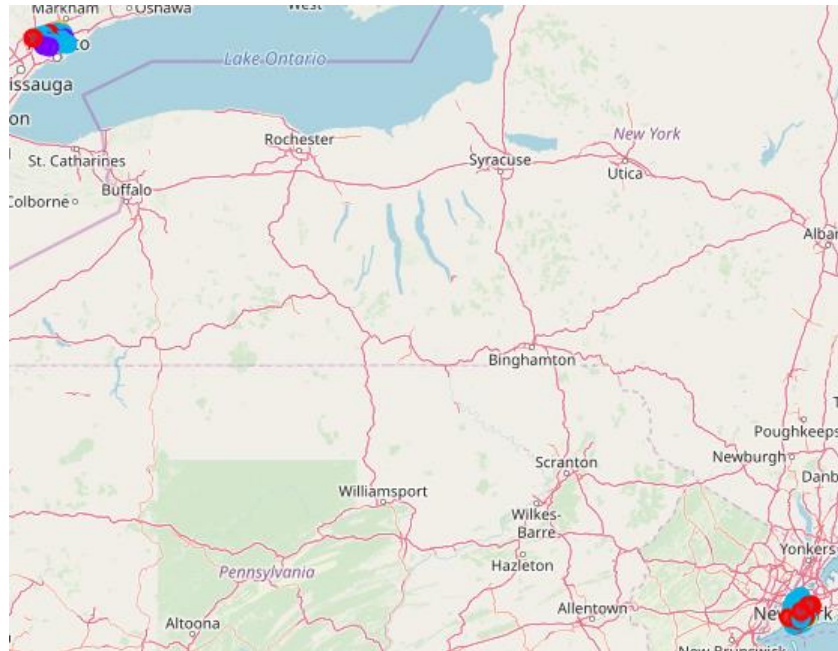
Neighborhood	Neighborhood Latitude	Neighborhood Longitude	Venue	Venue Latitude	Venue Longitude	Venue Category
Bay Ridge	40.625801	-74.030621	Pilo Arts Day Spa and Salon	40.624748	-74.030591	Spa
Bay Ridge	40.625801	-74.030621	Cocoa Grinder	40.623967	-74.030863	Juice Bar
Bay Ridge	40.625801	-74.030621	Brooklyn Market	40.626939	-74.029948	Grocery Store
Bay Ridge	40.625801	-74.030621	Mimi Nails	40.622571	-74.031477	Spa
Bay Ridge	40.625801	-74.030621	A.L.C. Italian Grocery	40.623051	-74.031224	Grocery Store

## North York, Toronto

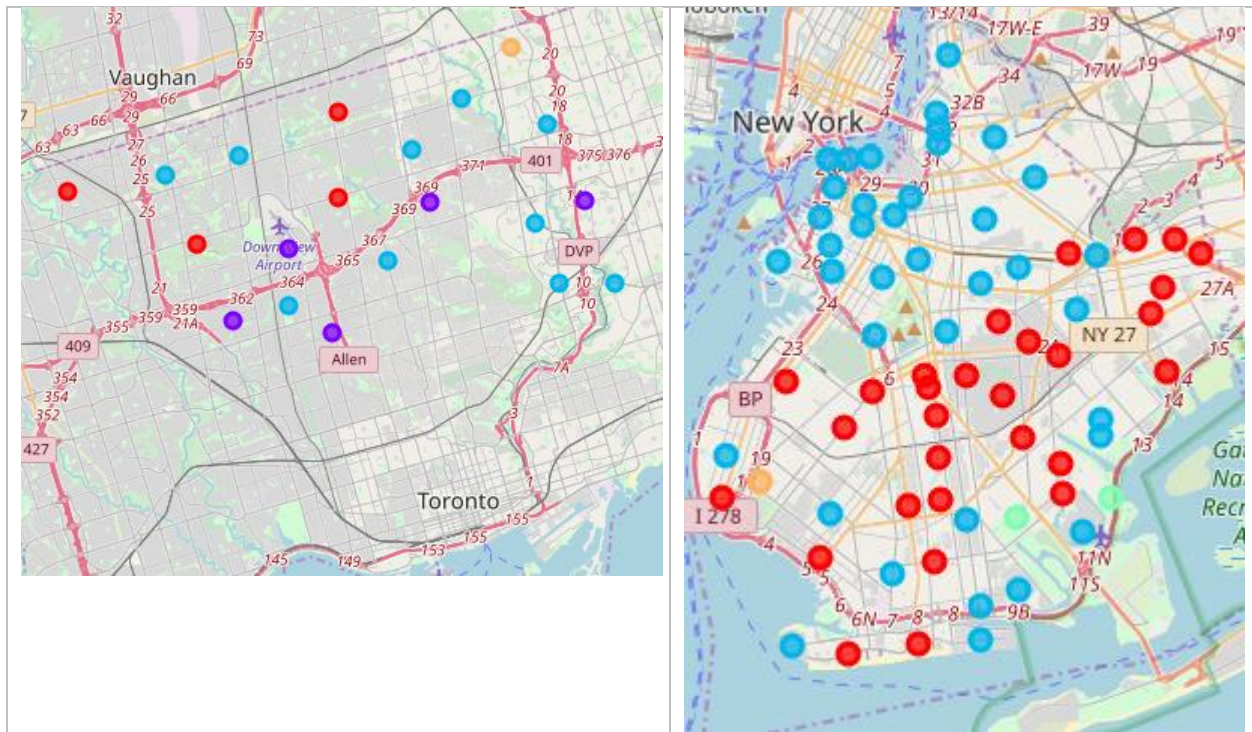
Neighborhood	Neighborhood Latitude	Neighborhood Longitude	Venue	Venue Latitude	Venue Longitude	Venue Category
Hillcrest Village	43.803762	-79.363452	Eagle's Nest Golf Club	43.805455	-79.364186	Golf Course
Hillcrest Village	43.803762	-79.363452	AY Jackson Pool	43.804515	-79.366138	Pool
Hillcrest Village	43.803762	-79.363452	Villa Madina	43.801685	-79.363938	Mediterranean Restaurant
Hillcrest Village	43.803762	-79.363452	Duncan Creek Park	43.805539	-79.360695	Dog Run
Fairview, Henry Farm, Oriole	43.778517	-79.346556	The LEGO Store	43.778207	-79.343483	Toy / Game Store

## Machine Learning Technique

I've used the above information to extract similarities between the two cities through the means of clustering. K-means algorithm has been used to classify the neighborhoods of Brooklyn and North York. Following is the result of the clustering analysis:



The same when zoomed results in the following:



The color scheme shows the neighborhoods that are similar in characteristics.

The same can be conducted for a reduced number of clustering parameters, depending on the likes and dislikes of the migrant.

## Results

Based on the multi-dimensional analysis of the data we were able to help the user establish similar migration destination(s). The data is rich enough for the migrate to be able to pick and choose the basis for analysis as well.

## Discussion

As an option, the same strategy can be extended to determine movement within the city of New York as well. Also, based on the migrant's interest, the selection of venue categories can be changed to suite any specific needs.

## Conclusion

The study provides data on the top venue categories for each city / neighborhood. The user/migrant may use this data to make an informed decision with respect to choosing a target city.