



Choosing the best neighborhood

Introduction



- The use of machine learning and data analytics techniques in real estate has become very beneficial to provide and satisfy customer needs.
- Toronto is a big city with 103 neighborhoods having different life styles and different venue categories.
- A Japanese customer decided to move from the Glencairn neighborhood in North York borough towards the Downtown borough.
- Customer requires support to choose the best neighborhood for him.

Data Acquisition

- Data required for analysis is obtained from multiple sources:
 1. Toronto Neighborhoods and boroughs obtained through web scraping using beautiful soap from Wikipedia https://en.wikipedia.org/wiki/List_of_postal_codes_of_Canada:_M
 2. The coordinates of Toronto neighborhoods were obtained using Geospatial dataset which can be obtained from http://cocl.us/Geospatial_data
 3. Foursquare API was used to explore the available venues in each neighborhood in Toronto.

Data Cleaning

- Data processing was done to clean the data from the different sources and combine it together to have the top 10 venue Categories for each neighborhood in Toronto

[81]:

	Neighbourhood	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	Adelaide, King, Richmond	Coffee Shop	Café	Bar	Steakhouse	Thai Restaurant	Asian Restaurant	Burger Joint	Restaurant	Breakfast Spot	Hotel
1	Agincourt	Lounge	Furniture / Home Store	Breakfast Spot	Skating Rink	Doner Restaurant	Dim Sum Restaurant	Diner	Discount Store	Dive Bar	Dog Run
2	Agincourt North, L'Amoreaux East, Milliken, St...	Park	Playground	Dog Run	Department Store	Dessert Shop	Dim Sum Restaurant	Diner	Discount Store	Dive Bar	Doner Restaurant
3	Albion Gardens, Beaumond Heights, Humbergate, ...	Grocery Store	Fried Chicken Joint	Pharmacy	Coffee Shop	Pizza Place	Fast Food Restaurant	Sandwich Place	Beer Store	Dive Bar	Dessert Shop
4	Alderwood, Long Branch	Pizza Place	Coffee Shop	Skating Rink	Pharmacy	Pool	Pub	Sandwich Place	Gym	Airport Terminal	Doner Restaurant

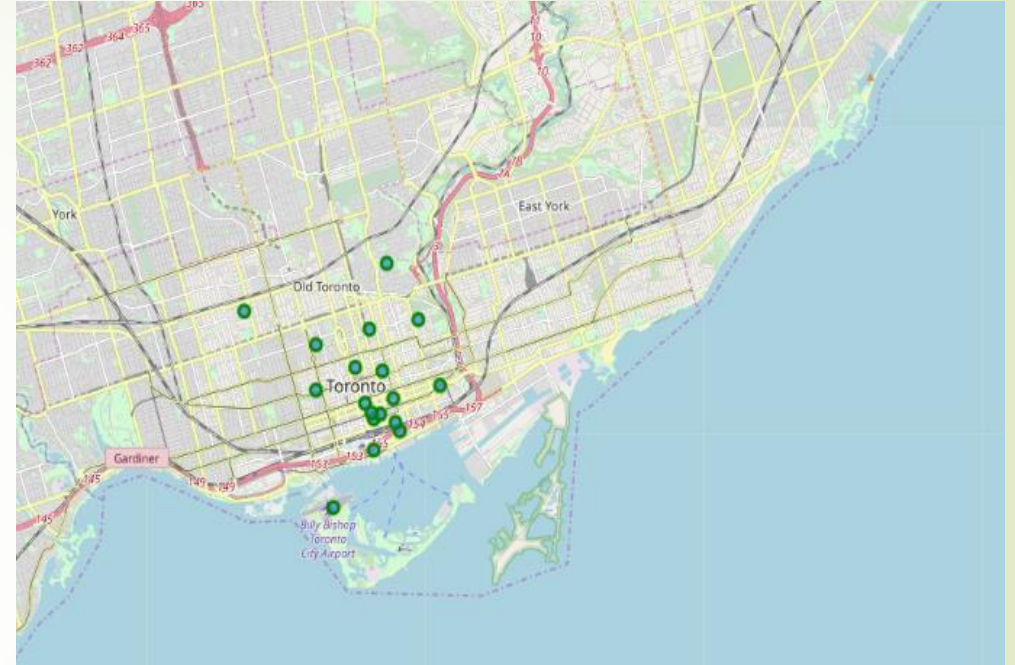
Top 10 venues Categories in each Neighborhood



Toronto Neighborhoods

Methodology

- Downtown Toronto has 18 neighborhoods.
- K-Means clustering is required to divide Toronto neighborhoods in 5 clusters based on top 10 Venue Categories.
- Neighborhood candidates for the customer to be in the same cluster of neighborhoods as Glencairn.
- Filtering to be done on the candidate clusters based on the existence of Japanese restaurants.



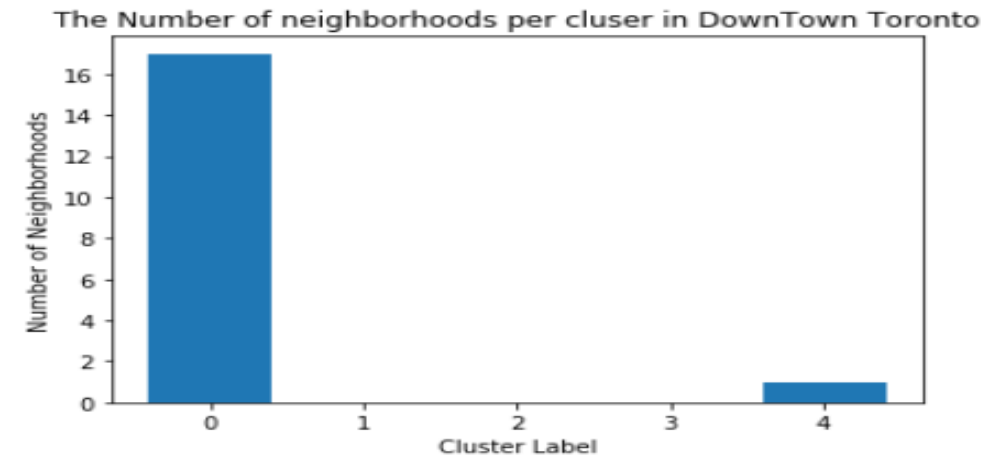
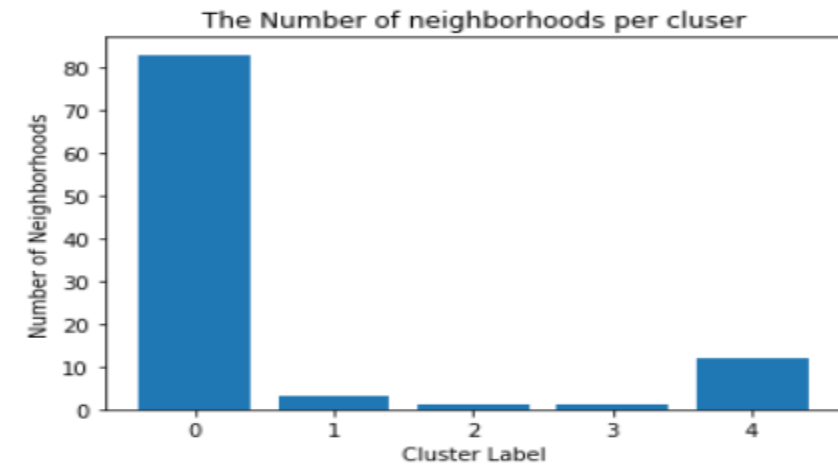
Downtown Toronto
Neighborhoods

Results and Analysis: k-Means output

- K-Means clustering was done resulting in the following cluster distribution.
- When focusing on the Downtown Toronto, the target neighborhood, 17 neighborhoods are found to be in cluster 0 and 1 neighborhood is cluster 0
- Glencairn is in cluster 0, therefore 17 neighborhoods are candidates for the customer



**Downtown
Toronto
neighborhood
cluster
distribution**



Results and Analysis: Japanese restaurant filtrations

- After performing filtration on the 17 candidate clusters with the Japanese restaurants existence requirement, 2 neighborhoods are found to have Japanese restaurant.
- Church and Wellesley neighborhood and Harbord, University of Toronto neighborhood are the best neighborhoods for the customer to relocate to

[132]:

	Postalcode	Borough	Neighbourhood	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	8th Most Common Venue
80	M5S	Downtown Toronto	Harbord, University of Toronto	43.662696	-79.400049	0.0	Café	Bookstore	Bakery	Restaurant	Bar	Japanese Restaurant	Beer Bar	Beer
99	M4Y	Downtown Toronto	Church and Wellesley	43.665860	-79.383160	0.0	Coffee Shop	Japanese Restaurant	Sushi Restaurant	Gay Bar	Restaurant	Pub	Men's Store	Mediterranean Restaurant



Conclusion

- In conclusion, Church and Wellesley neighborhood and Harbord, University of Toronto neighborhood are the best neighborhoods for the customer to relocate satisfying his requirements including the same life style as Glencairn and containing Japanese restaurants.
- 2 KM Radius and Top 10 venue category are considered as limitations for the analysis and could be reviewed in future studies.