The Battle of the Neighborhoods

Relocation between Toronto and New York City

by

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BACKGROUND

- Efficient and fast relocation services is needed for skilled workers, businessmen, science and technology professionals, entrepreneurs, etc.
- Business opportunity in relocation services.
- Proposal: Leverage Foursquare location data.
- Objective: offer an effective package to clients wanting to relocate to another neighborhood/city as similar as possible to their original place.
- Model: A client who wants to move from Toronto and New York City or vice versa.

EXAMPLE: TORONTO AND NEW YORK CITY

- Datasets: Toronto/New York (coordinates, neighborhoods, boroughs) available on the web.
  - https://geo.nyu.edu/catalog/nyu_2451_34572
  - https://en.wikipedia.org/wiki/List_of_postal_codes_of_Canada:_M
- Tools:
  - Foursquare API
  - Pandas
  - Numpy
  - Requests
  - Folium library
  - K-means algorithm

METHODOLOGY

- Foursquare developer account;
  - Client ID
  - Client Secret
- Interrogate Foursquare:
  - Define Function: getNearbyVenues
  - Request url =

```
'https://api.foursquare.com/v2/venues/explore?&client_id={}&client_secret={}&v={}&ll={},{}&radius={}'.format(
            CLIENT_ID,
            CLIENT_SECRET,
           VERSION,
            lat,
            lng,
            radius)
```

  - Use url to make GET request

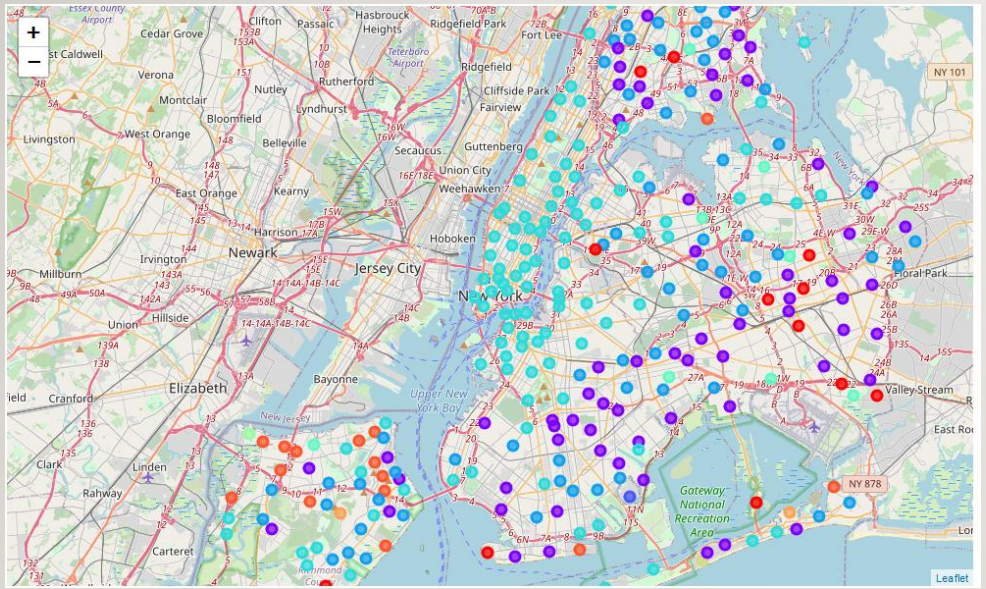
METHODOLOGY (contd.)

- Data preparation:
  - One-hot encoding – Toronto and New York City
  - Group venues by neighborhood.
- New dataframes from:
  - Most common venues
  - K-means clustering algorithm
- Add clustering labels to original datasets.
- Visualize clusters in maps of Toronto and New York - Folium

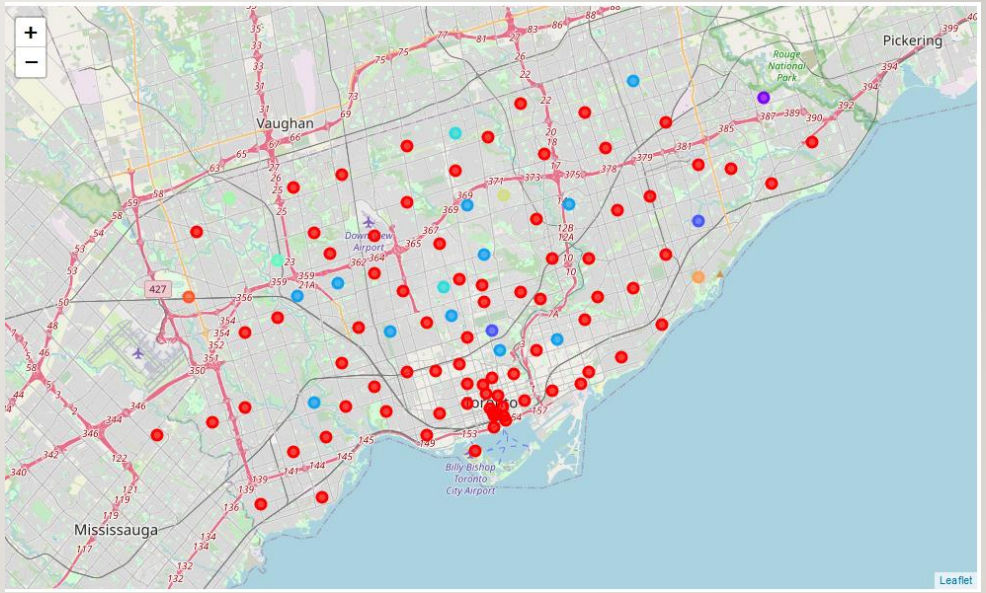
RESULTS

- Ten clusters from each city: New York and Toronto.
- Clusters not of equal size, -some of them one, others > 70 neighborhoods
- Detailed list of clusters:
  - https://github.com/Ricardo-Reategui/Coursera_Capstone/blob/master/Capstone%20Project.ipynb
- Clusters with Neighborhood, Buroughs, Latitude/Longitude, 10 most common venues are tabulated

TEN CLUSTERS ON EACH MAP OF TORONTO AND NEW YORK



New York City: 5 boroughs and 300 neighborhoods



Toronto: 10 boroughs and 96 neighborhoods

EXAMPLE: Compare a Cluster from Toronto and New York.

Borough	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
North York	Parkwoods	Bus Stop	Park	Food & Drink Shop	Women's Store	Drugstore	Donut Shop	Dog Run	Distribution Center	Discount Store	Diner
York	Caledonia-Fairbanks	Park	Women's Store	Pool	Curling Ice	Drugstore	Donut Shop	Dog Run	Distribution Center	Discount Store	Diner
East York	East Toronto	Park	Coffee Shop	Convenience Store	Women's Store	Dance Studio	Eastern European Restaurant	Drugstore	Donut Shop	Dog Run	Distribution Center
North York	North Park, Maple Leaf Park, Upwood Park	Park	Construction & Landscaping	Bakery	Women's Store	Deli / Bodega	Eastern European Restaurant	Drugstore	Donut Shop	Dog Run	Distribution Center
Central Toronto	Lawrence Park	Park	Swim School	Bus Line	Dance Studio	Drugstore	Donut Shop	Dog Run	Distribution Center	Discount Store	Diner
York	Weston	Park	Women's Store	Dance Studio	Eastern European Restaurant	Drugstore	Donut Shop	Dog Run	Distribution Center	Discount Store	Diner
North York	York Mills West	Park	Bank	Convenience Store	Women's Store	Deli / Bodega	Eastern European Restaurant	Drugstore	Donut Shop	Dog Run	Distribution Center
Central Toronto	Forest Hill North & West	Park	Jewelry Store	Trail	Sushi Restaurant	Curling Ice	Drugstore	Donut Shop	Dog Run	Distribution Center	Discount Store
Scarborough	Milliken, Agincourt North, Steeles East, L'Amo...	Park	Playground	Bakery	Curling Ice	Drugstore	Donut Shop	Dog Run	Distribution Center	Discount Store	Diner
Downtown Toronto	Rosedale	Park	Playground	Trail	Cuban Restaurant	Drugstore	Donut Shop	Dog Run	Distribution Center	Discount Store	Diner
Etobicoke	The Kingsway, Montgomery Road, Old Mill North	River	Park	Women's Store	Drugstore	Donut Shop	Dog Run	Distribution Center	Discount Store	Diner	Dim Sum Restaurant

Toronto

Borough	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
Queens	Somerville	Park	Women's Store	Irish Pub	Entertainment Service	Ethiopian Restaurant	Event Service	Event Space	Exhibit	Factory	Falafel Restaurant
Staten Island	Todt Hill	Park	Women's Store	Irish Pub	Entertainment Service	Ethiopian Restaurant	Event Service	Event Space	Exhibit	Factory	Falafel Restaurant

New York City

DISCUSSION

- Somerville in Queens and Todt Hill in Staten Island share similar characteristics as Rosedale, York Mills West, and Weston in Toronto
- Similar analysis can be performed by comparing clusters between Toronto and New York
- Clusters are dispersed across both cities, Toronto and New York
- A relocation company would be able to take advantage of this example. Imagine having aclient moving from Toronto to New York or vice versa
- Additionally, all this information can be obtained by interrogating Foursquare in less than a day, allowing the relocation company to have a competitive advantage.

SUMMARY AND CONCLUSION

- The Foursquare database was interrogated to obtain information about most common venues clustered and grouped by neighborhoods in Toronto and New York City.
- A relocation company could take advantage of this methodology by offering relocation services to individuals who wanted to move, for example, from New York City to Toronto.
- Analysis of the clusters would allow the company to recommend its client that neighborhoods in Toronto such as Rosedale, York Mills West, or Weston are somehow similar as Somerville or Todt Hill in New York.
- This relocation company could apply this methodology to other cities across the globe providing rapid and targeted information to its clients who wants to make informed decisions when they move to one place to another.