Capstone Project
The Battle of the Neighborhood

Applied Data Science Capstone by IBM/Coursera

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Introduction

With the development of the global economy, more and more people change their places of residence due to the needs of study and work.

- **Case Intro:**
    - Our client currently lives in the downtown Toronto, Ontario, Canada.
    - Looking for similar neighborhoods in Manhattan

- **Project Goal:**
    - Use data science to help identify the most identical neighborhoods in Manhattan to the clients current residential area.
    - For Customers/readers who are interested in finding similar neighborhoods around the world.
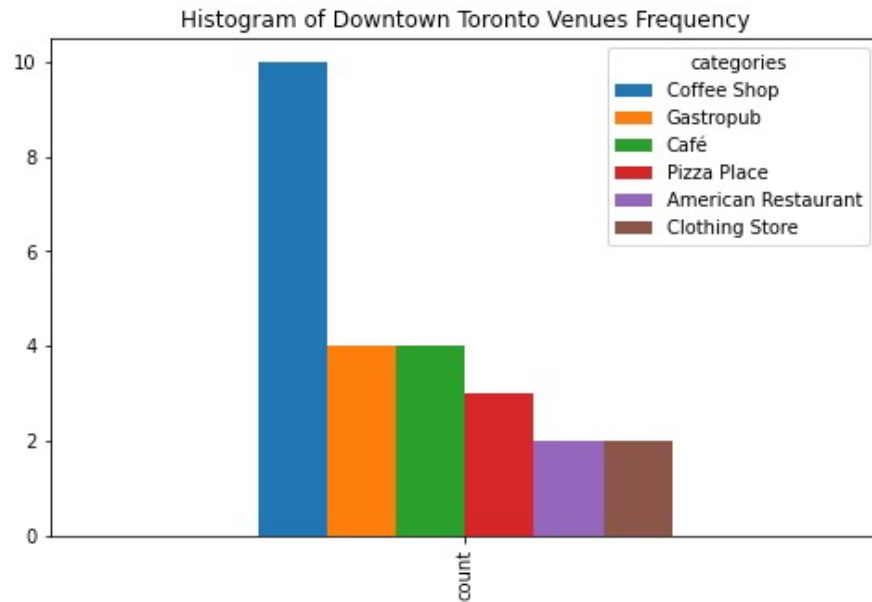
Data Description

- **Data Sources :**
  - Venues data of the targeted neighborhoods are from Foursquare.
  - The geographic location data of the Manhattan dataset can be downloaded from
    https://cf-courses-data.s3.us.cloud-object-storage.appdomain.cloud/IBMDeveloperSkillsNetwork-DS0701EN-
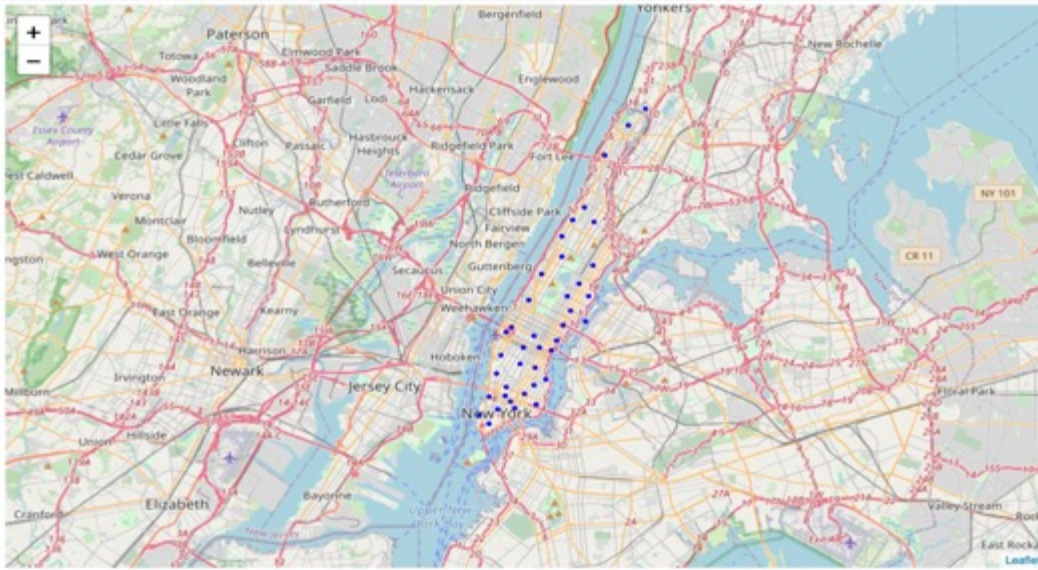   SkillsNetwork/labs/newyork_data.json.

- **Data Pre-processing:**
  - Collecting the Venues data of Downtown Toronto and Manhattan venues information using Foursquare API;
  - Using Pandas cleaning the data and combined the datasets.

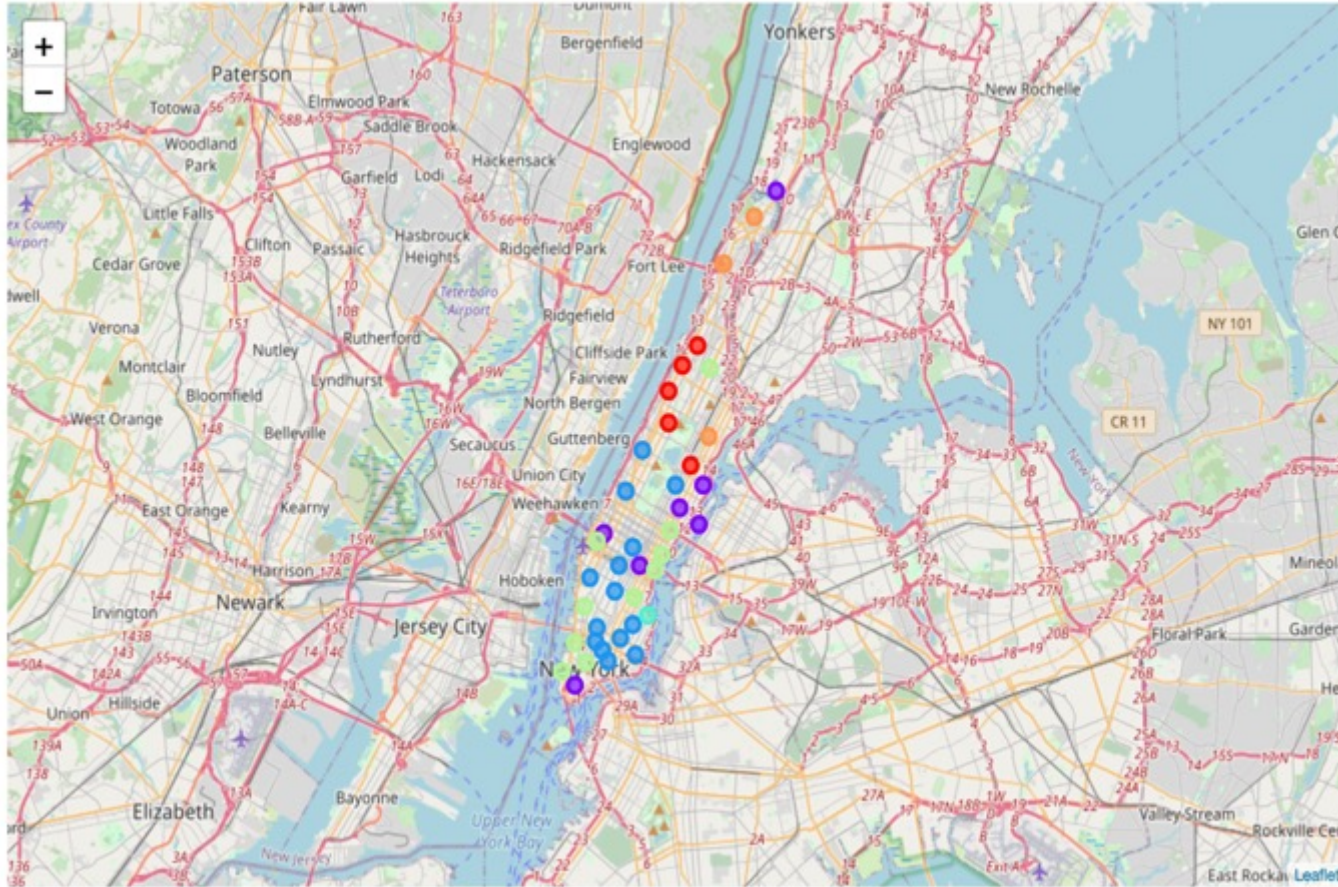# Explore the Client 's Current Neighborhood in Toronto

Histogram of Downtown Toronto Venues Frequency

Neighborhood	Coffee Shop	Park	Café	Farmers Market	Gastropub	Japanese Restaurant	Beer Bar	Plaza	Thai Restaurant	Hotel	Sandwich Place	American Restaurant	Pizza Place
Downtown Toronto	0.13	0.06	0.05	0.04	0.04	0.03	0.03	0.03	0.03	0.03	0.03	0.02	0.02

Explore the Neighborhoods in Manhattan, NYC

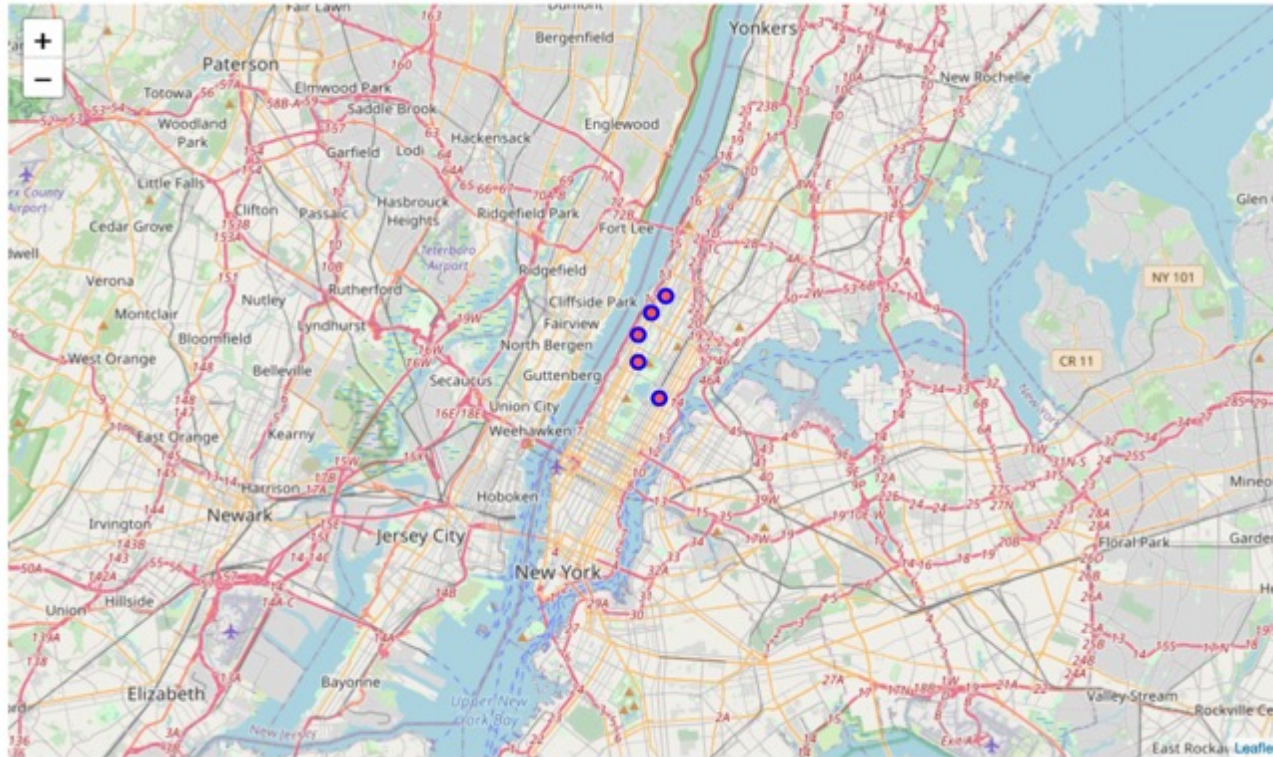|	Neighborhood	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue	6th Most Common Venue	7th Most Common Venue	8th Most Common Venue	9th Most Common Venue	10th Most Common Venue
0	Battery Park City	Park	Coffee Shop	Hotel	Gym	Gourmet Shop	Shopping Mall	Sandwich Place	Plaza	Pizza Place	Cosmetics Shop
1	Carnegie Hill	Coffee Shop	Café	French Restaurant	Gym	Bookstore	Pizza Place	Grocery Store	Bakery	Cosmetics Shop	Italian Restaurant
2	Central Harlem	American Restaurant	Art Gallery	French Restaurant	Restaurant	Dessert Shop	Park	Pizza Place	Gym	Cosmetics Shop	Grocery Store
3	Chelsea	Coffee Shop	Bakery	American Restaurant	Art Gallery	French Restaurant	Italian Restaurant	Park	Thai Restaurant	Bookstore	Café
4	Chinatown	Bakery	American Restaurant	Dessert Shop	Sandwich Place	Bubble Tea Shop	Coffee Shop	Vietnamese Restaurant	Spanish Restaurant	Vegetarian / Vegan Restaurant	Italian Restaurant

Cluster Analysis

There are totally 6 neighborhood clusters represented in different colors

Discussion & Conclusion

- The results show that Downtown Toronto is classified as cluster 0.
- There are five neighborhoods in Manhattan that are similar to the Downtown Toronto: **Carnegie Hill, Hamilton Heights, Manhattan Valley, Manhattanville, and Morningside Heights**

Discussion & Conclusion

- the Morningside Heights neighborhood might be the most similar one to the Downtown Toronto neighborhood
- It's not only because it has the most distribution of Coffee shop and Café, but also, it's the only neighborhood that has the Farmers Market, which venues is the fourth popular venues in Downtown Toronto.

	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	Cluster
1	Carnegie Hill	Coffee Shop	Café	French Restaurant	Bookstore	Pizza Place	Gym	Grocery Store	Bakery	Cosmetics Shop	Spa	0
13	Hamilton Heights	Pizza Place	Coffee Shop	Café	Bakery	Liquor Store	Park	Sandwich Place	Historic Site	Food Truck	Hotel	0
20	Manhattan Valley	Coffee Shop	Thai Restaurant	Pizza Place	Vietnamese Restaurant	Hostel	Furniture / Home Store	French Restaurant	Farmers Market	Park	Grocery Store	0
21	Manhattanville	Coffee Shop	American Restaurant	Café	Gastropub	Liquor Store	Food Truck	Diner	Park	Ramen Restaurant	Bakery	0
25	Morningside Heights	Coffee Shop	American Restaurant	Park	Bookstore	Café	Sandwich Place	Food Truck	Farmers Market	Mediterranean Restaurant	Pizza Place	0
40	Downtown Toronto	Coffee Shop	Café	Park	Farmers Market	Thai Restaurant	Beer Bar	Sandwich Place	Gastropub	Japanese Restaurant	Plaza	0

Thank You!