



A Recommendation System for restaurant Contractors



Part 1- problem description

- Restaurant contractors specialize in managing the supply chain for restaurants in consumables like groceries, bakery items, fruits, dairy products and other consumables.
- Contractors in Toronto would like to see which areas in Toronto have high revenue potential
- The objective is to explore the areas in Toronto holding huge earning potential where their services could be used to full extent
- The contractors would also like to focus on the North York area of Toronto and examine areas in and around the neighborhood of North York which provides more service opportunities.
- The contractors want to build a storage unit for the groceries they buy from villagers and farmers inside the borough and also reduce the transportation costs for the Restaurant owners with Transportation logistic services



Who would be interested in this project

- Restaurant managers in Toronto would like to explore the Toronto area to see what kind of venues exist and what kind of restaurants will be suitable for the neighborhood
- Transportation service providers would like to see which areas in Toronto would need time crucial transportation services especially perishables
- Residents of Toronto would like to know about the kind of restaurants available in Toronto and know where specialty restaurants like Thai Restaurant or Vietnamese restaurants are available
- Residents of North York, Toronto would like to see the most common venues in their area

Part 2 - DATA description

- **Wikipedia :**

https://en.wikipedia.org/wiki/List_of_postal_codes_of_Canada:_M

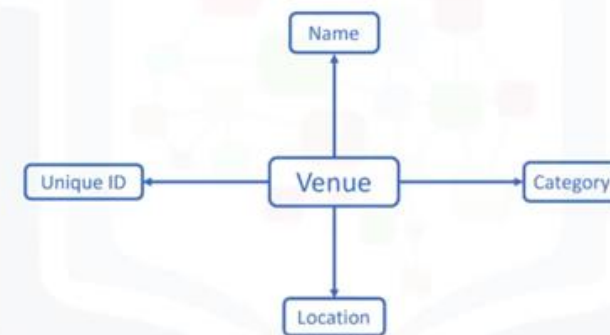
Is used to collect information about Toronto neighborhoods and their postal codes

- **Geospatial coordinates csv file** of the neighborhoods using the Geocoder package, having geographical coordinates of each postal code:

http://cocl.us/Geospatial_data

- <https://api.foursquare.com> api is used to get Location details like venues

Venues Data





Methodology

- ▶ Scripting Language - Python (Python 3x)
- ▶ IDE - <https://labs.cognitiveclass.ai/tools/jupyterlab>
- ▶ Packages used
 - BeautifulSoup package for web scraping
 - Sklearn for forming neighborhood clusters based on venue categories using unsupervised k-means clustering algorithm

Python packages :

- Pandas - Library for Data Analysis
- NumPy - Library to handle data in a vectorized manner
- JSON - Library to handle JSON files
- Geopy - To retrieve Location Data
- Requests - Library to handle http requests
- Matplotlib - Python Plotting Module
- Sklearn - Python machine learning Library
- Folium - Map rendering Library

Toronto – Boroughs with postal codes

► Representative list :

	Postcode	Borough	Neighborhood
0	M9A	Etobicoke	Islington Avenue
1	M4H	East York	Thorncliffe Park
2	M1B	Scarborough	Rouge, Malvern
3	M9W	Etobicoke	Northwest
4	M9L	North York	Humber Summit
5	M4Y	Downtown Toronto	Church and Wellesley
6	M9N	York	Weston
7	M3J	North York	Northwood Park, York University
8	M2H	North York	Hillcrest Village
9	M2J	North York	Henry Farm
10	M5S	Downtown Toronto	University of Toronto
11	M1T	Scarborough	Tam O'Shanter
12	M6L	North York	Maple Leaf Park
13	M1W	Scarborough	Steeles West

Toronto neighborhood with Latitude & Longitude information

	Postcode	Borough	Neighborhood	Latitude	Longitude
0	M9A	Etobicoke	Islington Avenue	43.667856	-79.532242
1	M4H	East York	Thorncliffe Park	43.705369	-79.349372
2	M1B	Scarborough	Rouge, Malvern	43.806686	-79.194353
3	M9W	Etobicoke	Northwest	43.706748	-79.594054
4	M9L	North York	Humber Summit	43.756303	-79.565963
5	M4Y	Downtown Toronto	Church and Wellesley	43.665860	-79.383160
6	M9N	York	Weston	43.706876	-79.518188
7	M3J	North York	Northwood Park, York University	43.767980	-79.487262
8	M2H	North York	Hillcrest Village	43.803762	-79.363452
9	M2J	North York	Henry Farm	43.778517	-79.346556
10	M5S	Downtown Toronto	University of Toronto	43.662696	-79.400049
11	M1T	Scarborough	Tam O'Shanter	43.781638	-79.304302
12	M6L	North York	Maple Leaf Park	43.713756	-79.490074
13	M1W	Scarborough	Steeles West	43.799525	-79.318389

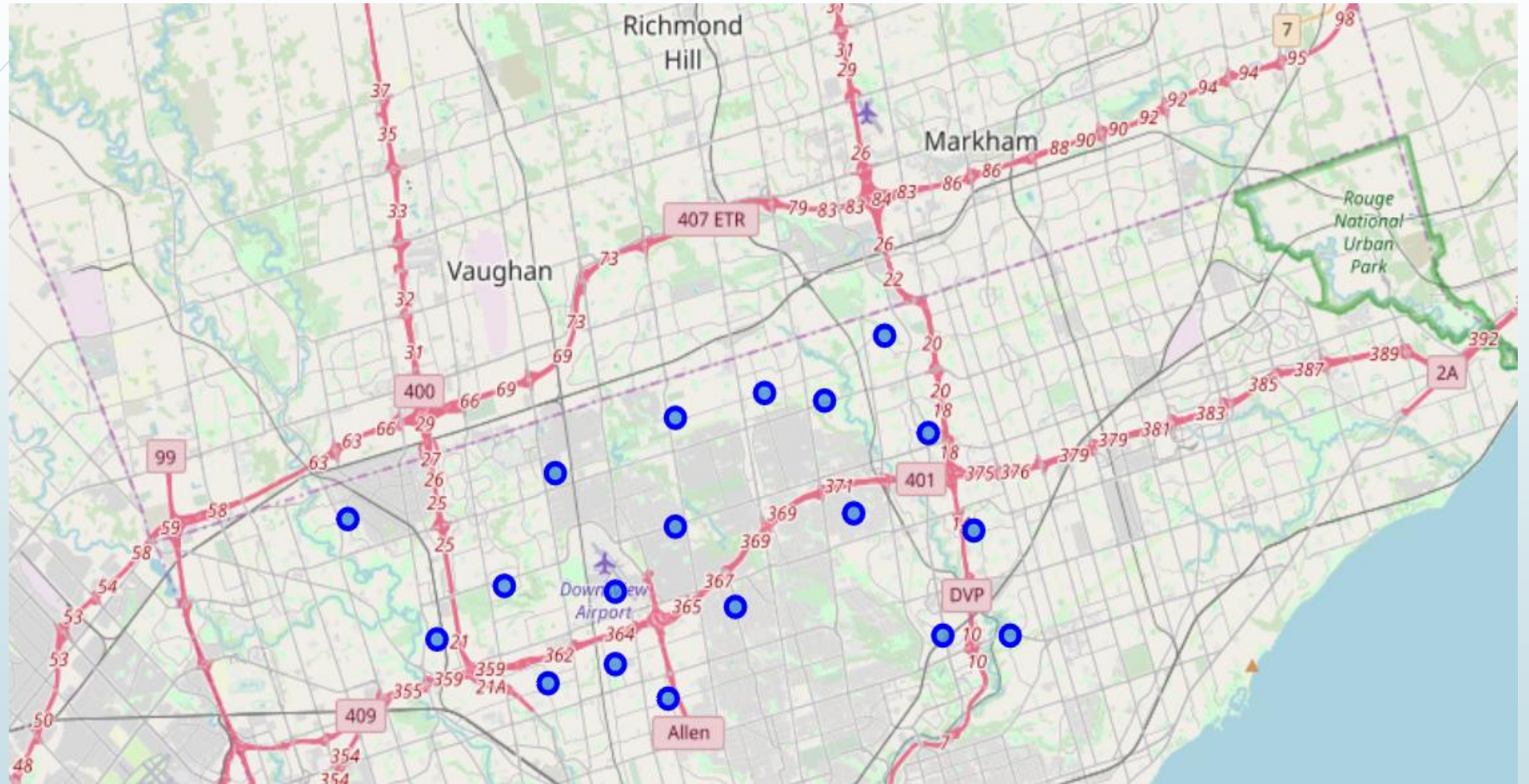
North York- longitude and Latitudes

North York / Coordinates

43.7615° N, 79.4111° W



Map of North York, Toronto



Venues in North York, Toronto

Representative sample

	venue.name	venue.categories	venue.location.lat	venue.location.lng
0	The Captain's Boil	[{'id': '4bf58dd8d48988d1ce941735', 'name': 'S...}	43.773255	-79.413805
1	Loblaws	[{'id': '4bf58dd8d48988d118951735', 'name': 'G...}	43.768648	-79.412597
2	Dakgogi	[{'id': '4bf58dd8d48988d113941735', 'name': 'K...}	43.773010	-79.413875
3	Burrito Boyz	[{'id': '4bf58dd8d48988d153941735', 'name': 'B...}	43.773054	-79.414082
4	Aroma Espresso Bar	[{'id': '4bf58dd8d48988d16d941735', 'name': 'C...}	43.769449	-79.413081
5	The Keg	[{'id': '4bf58dd8d48988d1cc941735', 'name': 'S...}	43.766579	-79.412131
6	Starbucks	[{'id': '4bf58dd8d48988d1e0931735', 'name': 'C...}	43.768192	-79.413021
7	Cineplex Cinemas Empress Walk	[{'id': '4bf58dd8d48988d17f941735', 'name': 'M...}	43.768625	-79.412613
8	Konjiki Ramen	[{'id': '55a59bace4b013909087cb24', 'name': 'R...}	43.766998	-79.412222
9	Sushi Bong	[{'id': '4bf58dd8d48988d1d2941735', 'name': 'S...}	43.775428	-79.413654
10	St. Louis Bar & Grill	[{'id': '4bf58dd8d48988d14c941735', 'name': 'W...}	43.773040	-79.413771
11	Mel Lastman Square	[{'id': '4bf58dd8d48988d164941735', 'name': 'P...}	43.767701	-79.412975
12	Toronto Centre for the Arts	[{'id': '4bf58dd8d48988d137941735', 'name': 'T...}	43.766228	-79.414115

Venues in North York, Toronto with categories

	name	categories	lat	lng
0	The Captain's Boil	Seafood Restaurant	43.773255	-79.413805
1	Loblaws	Grocery Store	43.768648	-79.412597
2	Dakgogi	Korean Restaurant	43.773010	-79.413875
3	Burrito Boyz	Burrito Place	43.773054	-79.414082
4	Aroma Espresso Bar	Café	43.769449	-79.413081
5	The Keg	Steakhouse	43.766579	-79.412131
6	Starbucks	Coffee Shop	43.768192	-79.413021
7	Cineplex Cinemas Empress Walk	Movie Theater	43.768625	-79.412613
8	Konjiki Ramen	Ramen Restaurant	43.766998	-79.412222
9	Sushi Bong	Sushi Restaurant	43.775428	-79.413654
10	St. Louis Bar & Grill	Wings Joint	43.773040	-79.413771
11	Mel Lastman Square	Plaza	43.767701	-79.412975
12	Toronto Centre for the Arts	Theater	43.766228	-79.414115

Neighborhood with venue details

----Bathurst Manor, Wilson Heights----

	venue	freq
0	Coffee Shop	0.11
1	Shopping Mall	0.05
2	Restaurant	0.05
3	Diner	0.05
4	Bridal Shop	0.05

----Bayview Village----

	venue	freq
0	Bank	0.2
1	Chinese Restaurant	0.1
2	Pharmacy	0.1
3	Café	0.1
4	Restaurant	0.1

----Bedford Park----

	venue	freq
0	Coffee Shop	0.10
1	Italian Restaurant	0.10
2	Fast Food Restaurant	0.07
3	Cosmetics Shop	0.03
4	Café	0.03

Most common Venues

	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	Bathurst Manor, Wilson Heights	Coffee Shop	Sandwich Place	Bridal Shop	Restaurant	Pizza Place	Pharmacy	Deli / Bodega	Shopping Mall	Park	Community Center
1	Bayview Village	Bank	Grocery Store	Restaurant	Japanese Restaurant	Skate Park	Skating Rink	Chinese Restaurant	Pharmacy	Café	Community Center
2	Bedford Park	Coffee Shop	Italian Restaurant	Fast Food Restaurant	Butcher	Pub	Pizza Place	Pharmacy	Café	Liquor Store	Juice Bar
3	CFB Toronto	Park	Airport	Coffee Shop	Sandwich Place	Dessert Shop	Chinese Restaurant	Clothing Store	Comfort Food Restaurant	Community Center	Construction & Landscaping
4	Downsview West	Moving Target	Coffee Shop	Shopping Mall	Bank	Grocery Store	Pizza Place	Park	Vietnamese Restaurant	Clothing Store	Chinese Restaurant

[illegible]



Explore restaurants in North York, Toronto

Total Restaurants	
Neighborhood	
Henry Farm	14
Bedford Park	12
Flemingdon Park	9
Northwood Park, York University	4
Lawrence Heights, Lawrence Manor	4
Glencairn	4
Bathurst Manor, Wilson Heights	3
Bayview Village	3
Hillcrest Village	2
Humber Summit	1
Downsview West	1
Parkwoods	1
Victoria Village	1



Neighborhood recommendation

- Below are the areas where the number of restaurants are the highest hence having potential for higher revenues for Restaurant operational service support
- The best Neighborhood is Henry Farm with 14 restaurants
- Second best Neighborhood is Bedford Park with 12 restaurants
- Third best Neighborhood is Flemington Park with 9 restaurants



Thank you