A low-angle, upward-looking photograph of several tall skyscrapers in Toronto. The buildings are covered in glass and reflect the vibrant colors of a sunset or sunrise sky, which is filled with soft, wispy clouds in shades of orange, pink, and blue. The perspective makes the buildings appear to converge towards the top of the frame.

Capstone Project - The Battle of Neighborhoods – Toronto Presentation

SELECTING LOCATION TO OPEN A DELI/BODEGA RESTAURANT IN
TORONTO

Introduction: Business Problem

Toronto is a diverse and cosmopolitan city in Canada with an excellent array of cuisine influenced by its immigrant history.

Deli restaurants are becoming popular and one is always popping up around the corner nearby. One needs to distinguish oneself from others to reap long-term success.

My client wants to expand its deli business into Toronto and is looking for appropriate locations in the city to begin its operations.

Data Acquisition & Cleaning

- ◆ The data for this project was scraped from a Wikipedia page that contains the lists of boroughs, neighborhoods and postal codes.
- ◆ The Python geocoder was used for the geolocations of neighborhoods with inputs of name plus city and country.
- ◆ In order to obtain venues and their categories FOURSQUARE (<https://foursquare.com/>) was used.

Data Selection

- ◆ To find the characteristics of potential competitors' venues in Toronto, we had to figure out the number of delis in the city and their locations.
- ◆ Based on their postal codes we were successful in finding their geographic coordinates.
- ◆ In Toronto, there are 3191 delis in currently in business.

```
toronto_venues_deli.shape
```

```
(3191, 7)
```

Data Selection

◇ Geographic coordinates of 5 deli locations for the deli restaurant.

	Neighborhood	Neighborhood Latitude	Neighborhood Longitude	Venue	Venue Latitude	Venue Longitude	Venue Category
3186	Business Reply Mail Processing Centre 969 Eastern	43.662744	-79.321558	Tim Hortons	43.662644	-79.309945	Coffee Shop
3187	Business Reply Mail Processing Centre 969 Eastern	43.662744	-79.321558	Measurement Park	43.666916	-79.312631	Park
3188	Business Reply Mail Processing Centre 969 Eastern	43.662744	-79.321558	Breakfast Club	43.662811	-79.310174	Breakfast Spot
3189	Business Reply Mail Processing Centre 969 Eastern	43.662744	-79.321558	Carters Landing	43.662414	-79.309898	Bistro
3190	Business Reply Mail Processing Centre 969 Eastern	43.662744	-79.321558	Ashbridges Bay Yacht Club (ABYC)	43.658210	-79.311004	Harbor / Marina

Methodology



Addresses were converted into their equivalent latitude and longitude values.



Foursquare API was used to explore neighborhoods in the city with part of their names being Toronto.



After that, explore function was used to get deli restaurant categories in each neighborhood.

Methodology

	Neighborhood	Zoo	Accessories Store	Airport	Airport Lounge	American Restaurant	Amphitheater	Animal Shelter	Antique Shop	Aquarium	Art Gallery	Arts & Crafts Store	Asian Restaurant	Athletics & Sports	Deal
0	Adelaide,King,Richmond	0.00	0.00	0.000000	0.000000	0.020000	0.00	0.00	0.00	0.00	0.010000	0.010000	0.020000	0.000000	
1	Berczy Park	0.00	0.00	0.000000	0.000000	0.010000	0.00	0.00	0.00	0.00	0.020000	0.000000	0.000000	0.000000	
2	Brockton,Exhibition Place,Parkdale Village	0.00	0.01	0.000000	0.000000	0.010000	0.00	0.00	0.00	0.00	0.010000	0.020000	0.000000	0.010000	
3	Business Reply Mail Processing Centre 969 Eastern	0.00	0.00	0.000000	0.000000	0.000000	0.00	0.00	0.00	0.00	0.000000	0.020833	0.000000	0.000000	
4	CN Tower,Bathurst Quay,Island airport,Harbourf...	0.00	0.00	0.066667	0.066667	0.000000	0.00	0.00	0.00	0.00	0.000000	0.000000	0.000000	0.000000	
5	Cabbagetown,St. James Town	0.00	0.00	0.000000	0.000000	0.027027	0.00	0.00	0.00	0.00	0.000000	0.000000	0.000000	0.000000	
6	Central Bay Street	0.00	0.00	0.000000	0.000000	0.010000	0.00	0.00	0.00	0.00	0.020000	0.020000	0.000000	0.000000	
7	Chinatown,Grange Park,Kensington Market	0.00	0.00	0.000000	0.000000	0.000000	0.00	0.00	0.00	0.00	0.030000	0.010000	0.000000	0.000000	
8	Christie	0.00	0.00	0.000000	0.000000	0.010000	0.00	0.00	0.00	0.00	0.010000	0.000000	0.000000	0.000000	
9	Church and Wellesley	0.00	0.00	0.000000	0.000000	0.010000	0.00	0.00	0.00	0.00	0.000000	0.010000	0.000000	0.000000	
10	Commerce Court,Victoria Hotel	0.00	0.00	0.000000	0.000000	0.020000	0.00	0.00	0.00	0.00	0.020000	0.000000	0.020000	0.000000	
11	Davisville	0.00	0.00	0.000000	0.000000	0.000000	0.00	0.00	0.00	0.00	0.000000	0.000000	0.000000	0.000000	

Methodology

◇ Delis in Toronto



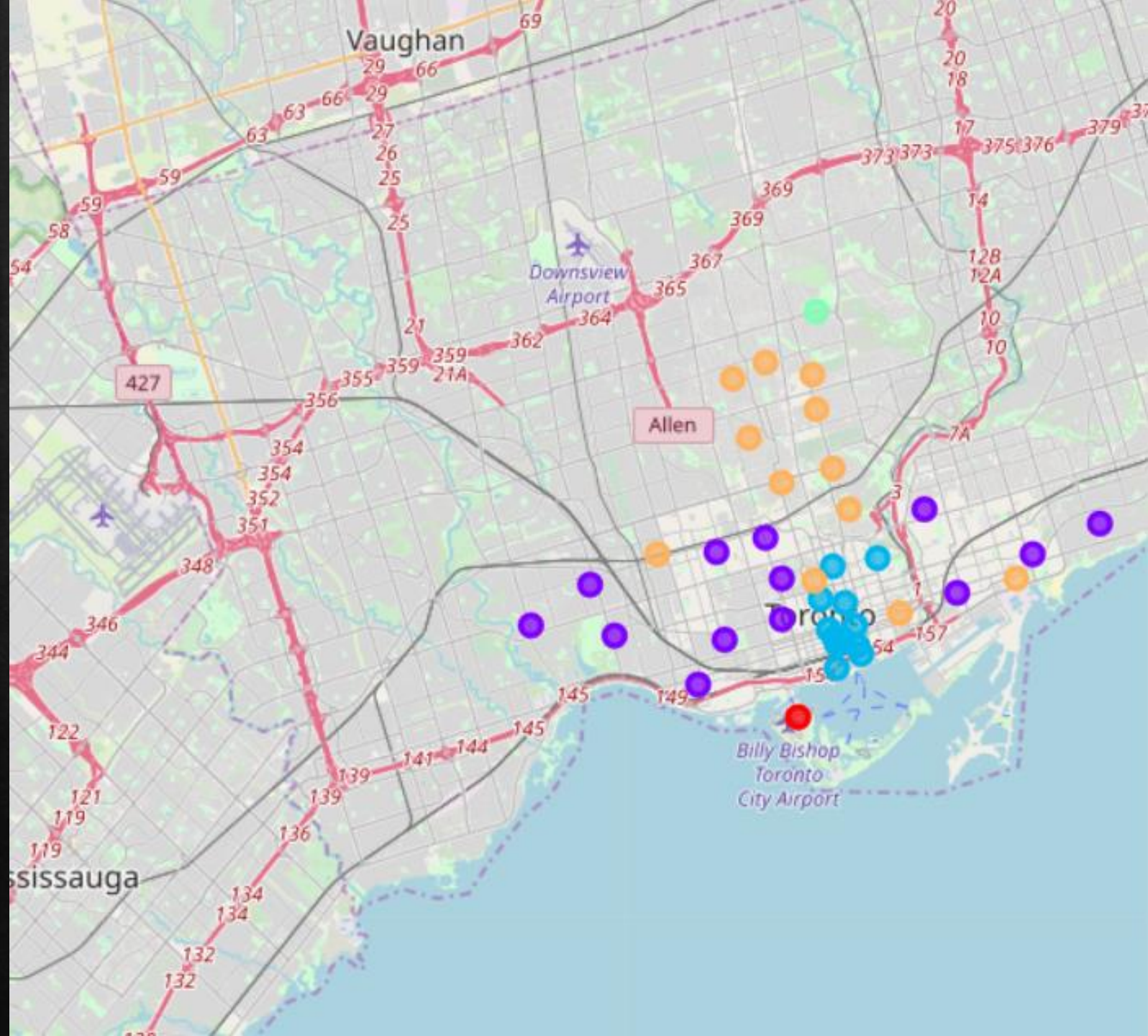
Methodology

- ◆ The feature was used to group the neighborhoods into clusters using K-means clustering algorithm. The Folium library helped to visualize the neighborhoods in Toronto and its emerging clusters.

	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	Adelaide,King,Richmond	Coffee Shop	Café	Theater	Hotel	Restaurant	Pizza Place	Pub	Steakhouse	Clothing Store	Beer Bar
1	Berczy Park	Coffee Shop	Café	Hotel	Japanese Restaurant	Restaurant	Beer Bar	Park	Bakery	Seafood Restaurant	Cocktail Bar
2	Brockton,Exhibition Place,Parkdale Village	Café	Coffee Shop	Bar	Bakery	Restaurant	Furniture / Home Store	Tibetan Restaurant	Arts & Crafts Store	Hotel	Lounge
3	Business Reply Mail Processing Centre 969 Eastern	Park	Coffee Shop	Brewery	Pizza Place	Pet Store	Italian Restaurant	Sushi Restaurant	Burrito Place	Bistro	French Restaurant
4	CN Tower,Bathurst Quay,Island airport,Harbourf...	Café	Harbor / Marina	Coffee Shop	Park	Sculpture Garden	Airport	Airport Lounge	Dog Run	Scenic Lookout	Dance Studio

Results

- ◆ After running the K-means clustering we accessed each cluster created to see which neighborhoods were assigned to each of the five clusters. Visualized the clustered neighborhoods on a map using folium library.
- ◆ Each cluster is color coded; we can see that majority of the neighborhood falls in the purple cluster (cluster 2) followed by yellow (cluster 5) and blue (cluster 3). Cluster 1 (red) and cluster 4 (green) are next.



Result

Cluster 1

Cluster 1

```
toronto_merged.loc[toronto_merged['Cluster Labels'] == 0, toronto_merged.columns[[1] + list(range(5, toronto_merged.shape[1]))]]
```

	Borough	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	9th Most Common Venue	10th Most Common Venue
27	Downtown Toronto	0	Café	Harbor / Marina	Coffee Shop	Park	Sculpture Garden	Airport	Airport Lounge	Dog Run	Scenic Lookout	Dance Studio

Result

Cluster 2

Cluster 2

```
toronto_merged.loc[toronto_merged['Cluster Labels'] == 1, toronto_merged.columns[[1] + list(range(5, toronto_merged.shape[1]))]]
```

	Borough	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	9th Most Common Venue	10th Most Common Venue
0	East Toronto	1	Pub	Coffee Shop	Beach	Pizza Place	Japanese Restaurant	Breakfast Spot	Bar	Café	Sandwich Place	Bakery
1	East Toronto	1	Greek Restaurant	Coffee Shop	Café	Pub	Spa	Ice Cream Shop	Italian Restaurant	Pizza Place	Fast Food Restaurant	Discount Store
2	East Toronto	1	Indian Restaurant	Coffee Shop	Café	Beach	Park	Gym	Fast Food Restaurant	Brewery	Sandwich Place	Restaurant
3	East Toronto	1	Coffee Shop	Bar	Brewery	Café	American Restaurant	Bakery	Vietnamese Restaurant	Italian Restaurant	French Restaurant	Diner
24	Central Toronto	1	Vegetarian / Vegan Restaurant	Café	Coffee Shop	Italian Restaurant	Museum	Gym	Grocery Store	Bakery	Restaurant	Pub
25	Downtown Toronto	1	Café	Bakery	Bar	Vegetarian / Vegan Restaurant	Coffee Shop	Restaurant	Mexican Restaurant	Bookstore	Park	Vietnamese Restaurant
26	Downtown Toronto	1	Café	Vegetarian / Vegan Restaurant	Bar	Dessert Shop	Tea Room	Art Gallery	Bakery	Coffee Shop	Vietnamese Restaurant	Mexican Restaurant
30	Downtown Toronto	1	Korean Restaurant	Café	Coffee Shop	Grocery Store	Ice Cream Shop	Cocktail Bar	Karaoke Bar	Comedy Club	Bar	Ethiopian Restaurant
32	West Toronto	1	Café	Bar	Restaurant	Bakery	Vegetarian / Vegan Restaurant	Pizza Place	Italian Restaurant	Cocktail Bar	Coffee Shop	Asian Restaurant

Result

Cluster 3

Cluster 3

```
toronto_merged.loc[toronto_merged['Cluster Labels'] == 2, toronto_merged.columns[[1] + list(range(5, toronto_merged.shape[1]))]]
```

	Borough	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	9th Most Common Venue	10th Most Common Venue
11	Downtown Toronto	2	Japanese Restaurant	Diner	Gastropub	Café	Park	Coffee Shop	Rock Club	Bistro	Steakhouse	Italian Restaurant
12	Downtown Toronto	2	Coffee Shop	Japanese Restaurant	Park	Sushi Restaurant	Café	Men's Store	Bookstore	Bubble Tea Shop	Burger Joint	Restaurant
14	Downtown Toronto	2	Coffee Shop	Cosmetics Shop	Middle Eastern Restaurant	Restaurant	Clothing Store	Diner	Italian Restaurant	Japanese Restaurant	Plaza	Tea Room
15	Downtown Toronto	2	Coffee Shop	Café	Restaurant	Hotel	Bakery	Cosmetics Shop	Italian Restaurant	Breakfast Spot	Seafood Restaurant	American Restaurant
16	Downtown Toronto	2	Coffee Shop	Café	Hotel	Japanese Restaurant	Restaurant	Beer Bar	Park	Bakery	Seafood Restaurant	Cocktail Bar
17	Downtown Toronto	2	Coffee Shop	Café	Japanese Restaurant	Italian Restaurant	Cosmetics Shop	Park	Tea Room	Thai Restaurant	Bar	Burger Joint
18	Downtown Toronto	2	Coffee Shop	Café	Theater	Hotel	Restaurant	Pizza Place	Pub	Steakhouse	Clothing Store	Beer Bar
19	Downtown Toronto	2	Hotel	Coffee Shop	Aquarium	Café	Gym	Park	Scenic Lookout	Japanese Restaurant	Restaurant	Brewery
20	Downtown Toronto	2	Coffee Shop	Café	Hotel	Steakhouse	Restaurant	Italian Restaurant	Thai Restaurant	Concert Hall	Park	Monument / Landmark
	Downtown								Japanese			Farmers

Result

Cluster 4

Cluster 4

```
toronto_merged.loc[toronto_merged['Cluster Labels'] == 3, toronto_merged.columns[[1] + list(range(5, toronto_merged.shape[1]))]]
```

	Borough	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	9th Most Common Venue	10th Most Common Venue
4	Central Toronto	3	Pool	College Quad	Bookstore	Café	Trail	Coffee Shop	College Gym	Gym / Fitness Center	Park	Design Studio

Result

Cluster 5

Cluster 5

```
toronto_merged.loc[toronto_merged['Cluster Labels'] == 4, toronto_merged.columns[[1] + list(range(5, toronto_merged.shape[1]))]]
```

	Borough	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	9th Most Common Venue	10th Most Common Venue
5	Central Toronto	4	Coffee Shop	Italian Restaurant	Café	Pharmacy	Gym	Sushi Restaurant	Dessert Shop	Pizza Place	Fast Food Restaurant	Movie Theater
6	Central Toronto	4	Park	Coffee Shop	Italian Restaurant	Sporting Goods Shop	Café	Mexican Restaurant	Diner	Skating Rink	Sushi Restaurant	Food & Drink Shop
7	Central Toronto	4	Coffee Shop	Italian Restaurant	Sushi Restaurant	Middle Eastern Restaurant	Pizza Place	Café	Dessert Shop	Indian Restaurant	Gym	Pub
8	Central Toronto	4	Coffee Shop	Italian Restaurant	Gym	Grocery Store	Park	Bagel Shop	Sandwich Place	Thai Restaurant	Restaurant	Café
9	Central Toronto	4	Coffee Shop	Sushi Restaurant	Park	Italian Restaurant	Thai Restaurant	Gym	Liquor Store	Grocery Store	Pizza Place	Pub
10	Downtown Toronto	4	Coffee Shop	Park	Grocery Store	Filipino Restaurant	Sandwich Place	Bistro	Bank	Japanese Restaurant	BBQ Joint	Trail
13	Downtown Toronto	4	Coffee Shop	Pub	Diner	Café	Park	Theater	Bakery	Restaurant	Breakfast Spot	Italian Restaurant
22	Central Toronto	4	Sushi Restaurant	Italian Restaurant	Café	Bank	Pharmacy	Coffee Shop	Japanese Restaurant	Dry Cleaner	Gastropub	Bakery
23	Central Toronto	4	Park	Café	Coffee Shop	Skating Rink	Italian Restaurant	Gym / Fitness Center	Burger Joint	Sushi Restaurant	Trail	Bank
31	West Toronto	4	Café	Coffee Shop	Park	Sushi Restaurant	Portuguese Restaurant	Bar	Italian Restaurant	Supermarket	Bakery	Art Gallery

Discussion



The aim of this project was to help a deli business trying to open new restaurants in Toronto find the best locations to set up in order to maximize their return on investments.



It was observed that both **Clusters 1** (Downtown Toronto) and **4** (Central Toronto) did not have a lot of deli places and hence it would be worthwhile on the part of the company to set up their restaurants in those places.



Clusters 2, 3 and 5 seem to be places of extremely high competition among deli businesses and hence would be risky to open the business from there.

Conclusion

The goals of the project were met and with some additional work can be developed to support the opening of a deli restaurant in an unknown location in a city.

The future of this project includes taking other factors such as the cost of living in that cluster into consideration in order to recommend an area for opening the deli business.