

I. Introduction

A) Description of the Business Problem & Discussion of the Background

Problem: *Opening a Peruvian-Nikkei Restaurant in Toronto, Canada.*

Toronto, the capital of the province of Ontario in Canada is considered one of the most diverse cities in the world with almost half of its residents being foreign born and half of its population being a visible minority. Since the area of Toronto has the largest Latin American community in Canada, we need to determine if it's a profitable idea to open a Peruvian-Nikkei Restaurant in one of its neighborhoods.

We will analyze several boroughs/neighborhoods in Toronto with significant Latin American population in order to determine the most lucrative area to open a Peruvian-Nikkei restaurant by extracting their demographic data as well as Peruvian restaurants located in these neighborhoods.

B) Target Audience:

- 1) Investors or Restaurateurs who would like to invest or open a Peruvian-Nikkei restaurant in Toronto, Canada.
- 2) Latino population that enjoys Peruvian-Nikkei cuisine.

II. Data Description

A) I considered the data from different sources:

1) I will use Wikipedia in order to gather information about the neighborhoods in Toronto, CA such as their names, postal code and boroughs; therefore, we will use the “List of Postal Code of Canada: M”:

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

2) I will use Geospatial Data to obtain the geographical coordinates of the neighborhoods in Toronto.

3) I will use Wikipedia to obtain Toronto’s Neighborhoods’ Demographics and to find out the highly populated Latino neighborhoods.

https://en.wikipedia.org/wiki/Demographics_of_Toronto

4) I will use Foursquare’s explore API in order to obtain information about the various Peruvians restaurants located in the densely populated Latin American neighborhoods.

B) Methodology – Data Cleaning

- I. I scraped the data from the Wikipedia page “List of Postal code of Canada : M” and I cleaned it to obtain a dataframe with information pertaining to the Postcodes, Boroughs and Neighborhoods.

	Postcode	Borough	Neighbourhood
0	M1B	Scarborough	Rouge,Malvern
1	M1C	Scarborough	Highland Creek,Rouge Hill,Port Union
2	M1E	Scarborough	Guildwood,Morningside,West Hill
3	M1G	Scarborough	Woburn
4	M1H	Scarborough	Cedarbrae
5	M1J	Scarborough	Scarborough Village

- II. I added geographical coordinates to the neighborhoods by extracting data from the Geospatial CSV file.

	Postal Code	Latitude	Longitude
0	M1B	43.806686	-79.194353
1	M1C	43.784535	-79.160497
2	M1E	43.763573	-79.188711
3	M1G	43.770992	-79.216917
4	M1H	43.773136	-79.239476

- III. I used the PostCodes to merge both dataframes and created a new dataframe containing the following columns: Postcode, Borough, Neighbourhood, Latitude and Longitude.

	Postcode	Borough	Neighbourhood	Latitude	Longitude
0	M1B	Scarborough	Rouge,Malvern	43.806686	-79.194353
1	M1C	Scarborough	Highland Creek,Rouge Hill,Port Union	43.784535	-79.160497
2	M1E	Scarborough	Guildwood,Morningside,West Hill	43.763573	-79.188711
3	M1G	Scarborough	Woburn	43.770992	-79.216917
4	M1H	Scarborough	Cedarbrae	43.773136	-79.239476
5	M1J	Scarborough	Scarborough Village	43.744734	-79.239476
6	M1K	Scarborough	East Birchmount Park,Ionview,Kennedy Park	43.727929	-79.262029
7	M1L	Scarborough	Clairlea,Golden Mile,Oakridge	43.711112	-79.284577
8	M1M	Scarborough	Cliffcrest,Cliffside,Scarborough Village West	43.716316	-79.239476
9	M1N	Scarborough	Birch Cliff,Cliffside West	43.692657	-79.264848
10	M1P	Scarborough	Dorset Park,Scarborough Town Centre,Wexford He...	43.757410	-79.273304

IV. I scraped the Demographics of Toronto's Neighborhoods' Wikipedia Page in order to find out the neighborhoods with a high Latino population. There were only 4 neighborhoods: Davenport, York Centre, Humber River-Black Creek and York South-Weston.

	Riding	Population	Ethnic Group #1	%	Ethnic Group #2	%1	Ethnic Group #3	%2	Ethnic Group #4	%3
0	Spadina-Fort York	114315	White	56.3	Chinese	14.8	South Asian	8.3	Black	5.1
1	Beaches-East York	108435	White	64.5	South Asian	10.9	Black	6.6	Chinese	5.7
2	Davenport	107395	White	66.9	Black	6.4	Chinese	5.9	Latin American	5.4
3	Parkdale-High Park	106445	White	72.4	Black	5.3	NaN	NaN	NaN	NaN
4	Toronto-Danforth	105395	White	65.5	Chinese	12.3	South Asian	5.4	Black	5.0
5	Toronto-St. Paul's	104940	White	70.8	Black	5.1	NaN	NaN	NaN	NaN
6	University-Rosedale	100520	White	66.5	Chinese	14.0	NaN	NaN	NaN	NaN
7	Toronto Centre	99590	White	48.8	South Asian	11.8	Chinese	11.1	Black	9.1

	Riding	Population	Ethnic Group #1	%	Ethnic Group #2	%1	Ethnic Group #3	%2	Ethnic Group #4	%3	Ethnic Group #5	%4	Ethnic Group #6	%5
0	Willowdale	117405	White	33.1	Chinese	25.3	West Asian	10.9	Korean	10.3	South Asian	5.9	Filipino	5.4
1	Eglinton-Lawrence	112925	White	67.7	Filipino	10.7	Black	5.5	NaN	NaN	NaN	NaN	NaN	NaN
2	Don Valley North	109060	Chinese	31.3	White	29.4	South Asian	10.2	West Asian	7.6	NaN	NaN	NaN	NaN
3	Humber River-Black Creek	107725	White	25.4	Black	22.8	Latin American	9.5	Southeast Asian	8.9	Filipino	5.5	NaN	NaN
4	York Centre	103760	White	53.1	Filipino	16.5	Black	7.9	Latin American	5.1	NaN	NaN	NaN	NaN
5	Don Valley West	101790	White	57.9	South Asian	13.3	Chinese	10.6	NaN	NaN	NaN	NaN	NaN	NaN
6	Don Valley East	93170	White	40.9	South Asian	17.1	Black	9.3	Chinese	7.5	Filipino	7.4	West Asian	5.5

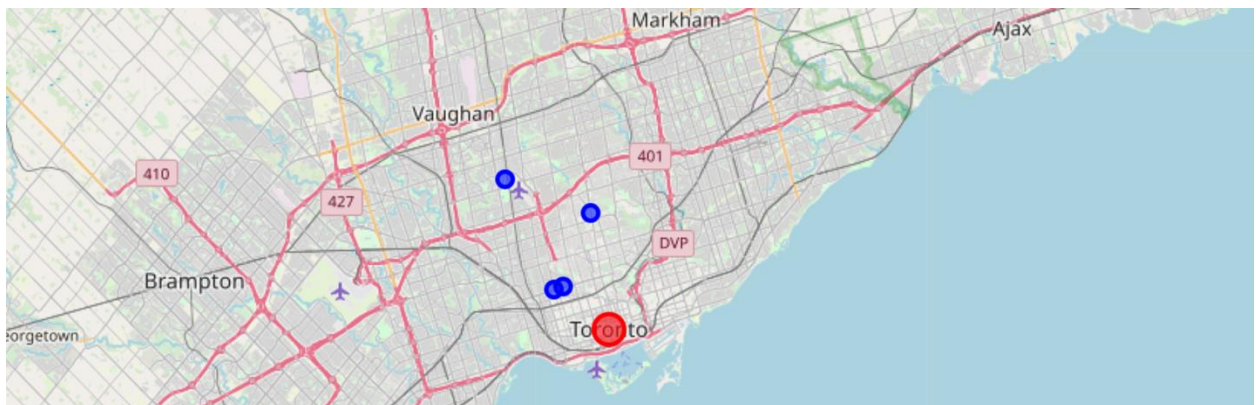
	Riding	Population	Ethnic Group #1	%	Ethnic Group #2	%1	Ethnic Group #3	%2	Ethnic Group #4	%3	Ethnic Group #5	%4
0	Etobicoke-Lakeshore	127520	White	71.3	South Asian	5.5	Black	5.0	NaN	NaN	NaN	NaN
1	Etobicoke North	116960	South Asian	28.9	White	23.8	Black	23.4	NaN	NaN	NaN	NaN
2	Etobicoke Centre	116055	White	72.3	South Asian	5.9	Black	5.9	NaN	NaN	NaN	NaN
3	York South-Weston	115130	White	44.2	Black	23.2	Latin American	8.5	Filipino	5.9	South Asian	5.7

V. I utilized Foursquare's API to find out how many Peruvian Restaurants were located in the Toronto Neighborhoods, and I was only able to find 4 Peruvian Restaurants in the Toronto area.

	name	categories	address	cc	city	country	formattedAddress	labeledLatLngs	lat	lng	postalCode	state	
0	Pisco Peruvian Cuisine	Peruvian Restaurant	3249 Yonge St	CA	Toronto	Canada	[3249 Yonge St, Toronto ON, Canada]	[{"label": 'display', 'lat': 43.72896548616577...	43.728965	-79.403125	NaN	ON	518fd
1	Paracas	Peruvian Restaurant	992 St Clair Ave W	CA	Toronto	Canada	[992 St Clair Ave W, Toronto ON, Canada]	[{"label": 'display', 'lat': 43.67939, 'lng': ...	43.679390	-79.436953	NaN	ON	54430
2	Kay Pacha	Peruvian Restaurant	744 St Clair Ave W	CA	Toronto	Canada	[744 St Clair Ave W, Toronto ON M6C 1B5, Canada]	[{"label": 'display', 'lat': 43.68141, 'lng': ...	43.681410	-79.427892	M6C 1B5	ON	5a1a2
3	Carmen y Pepe Peruvian Cuisine	Peruvian Restaurant	40 Carl Hall Rd	CA	North York	Canada	[40 Carl Hall Rd, North York ON M3K 2C1, Canada]	[{"label": 'display', 'lat': 43.751127, 'lng'::...	43.751127	-79.480103	M3K 2C1	ON	5dbf2

III. Data Analysis

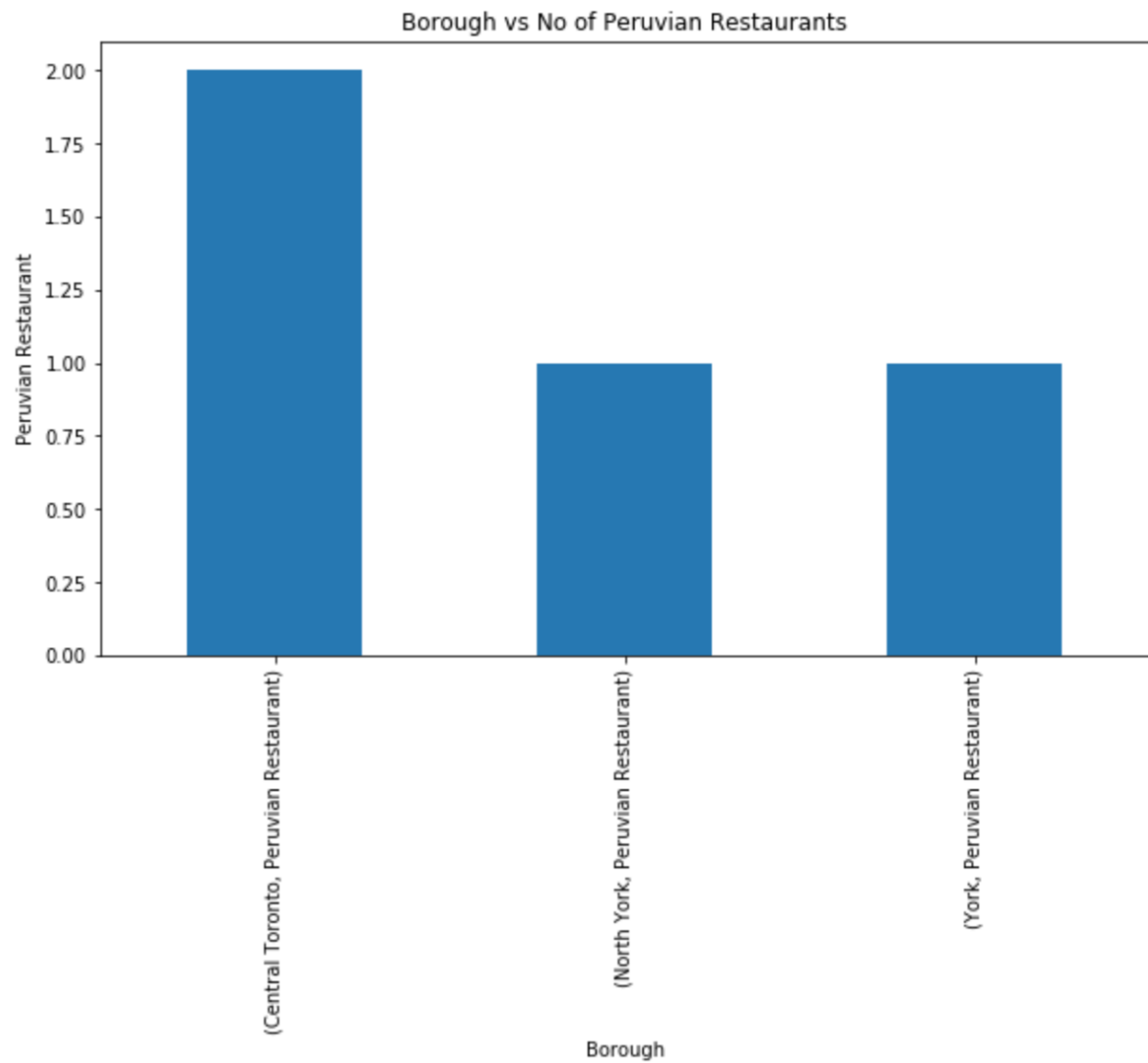
A. I used folium library to visualize the Peruvian restaurants' locations in each borough of Toronto.



B. Then, I try to find out the relationship between Latin American neighborhoods and Peruvian Restaurants.

	Postcode	Neighbourhood	Restaurant Name	Restaurant	Address	City	Country	state
Borough								
North York	M3K	CFB Toronto,Downsview East	Carmen y Pepe Peruvian Cuisine	Peruvian Restaurant	40 Carl Hall Rd	North York	Canada	ON
Central Toronto	M4N	Lawrence Park	Pisco Peruvian Cuisine	Peruvian Restaurant	3249 Yonge St	Toronto	Canada	ON
Central Toronto	M4N	Lawrence Park	Paracas	Peruvian Restaurant	992 St Clair Ave W	Toronto	Canada	ON
York	M6C	Humewood-Cedarvale	Kay Pacha	Peruvian Restaurant	744 St Clair Ave W	Toronto	Canada	ON

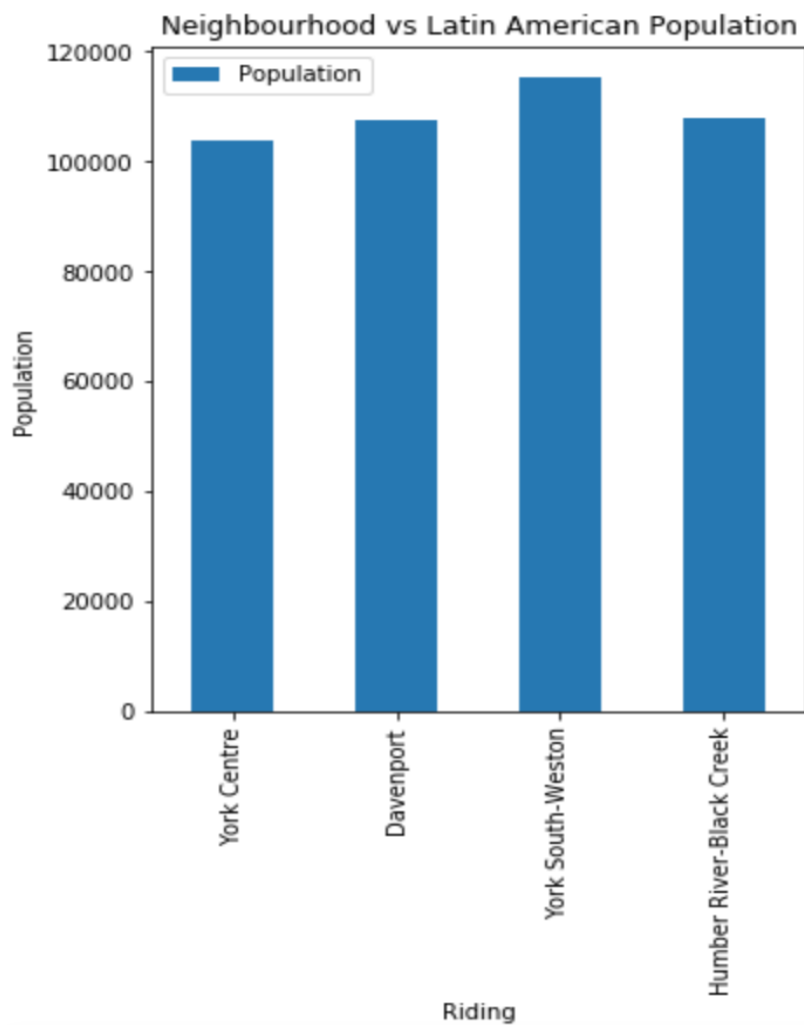
I try to visualize the relationship by using bar charts:



C. Analyze the relationship between neighborhoods and Latino Population. I extracted the neighborhoods with the highest number of Latin American

population and created a new dataframe.

	Riding	Population	Ethnicity	Percentage
0	Davenport	107395	Latin American	5.4
1	Humber River-Black Creek	107725	Latin American	9.5
2	York Centre	103760	Latin American	5.1
3	York South-Weston	115130	Latin American	8.5



D. Since there were only a few Peruvian Restaurants in the Latino Neighborhoods, I decided to use Foursquare to see the types of Restaurants around the Toronto

area. Then, I merged the Foursquare dataframe with the neighborhood dataframe to see the restaurants' neighborhoods' location.

	Postal Code	Borough	Neighborhood	Latitude_x	Longitude_x	Restaurant Name	categories
0	M4W	Downtown Toronto	Rosedale	43.679563	-79.377529	Matisse Restaurant And Bar	Restaurant
1	M4Y	Downtown Toronto	Church and Wellesley	43.665860	-79.383160	Cottage Restaurant & Lounge	Thai Restaurant
2	M5B	Downtown Toronto	Garden District, Ryerson	43.657162	-79.378937	Studio Restaurant	Breakfast Spot
3	M5C	Downtown Toronto	St. James Town	43.651494	-79.375418	Victoria's Restaurant	Restaurant
4	M5E	Downtown Toronto	Berczy Park	43.644771	-79.373306	The Hot House Restaurant & Bar	American Restaurant
5	M5G	Downtown Toronto	Central Bay Street	43.657952	-79.387383	Hemispheres Restaurant & Bistro	American Restaurant
6	M5G	Downtown Toronto	Central Bay Street	43.657952	-79.387383	Hong Shing Chinese Restaurant	Chinese Restaurant

Predictive Modeling:

We have different restaurants in the Toronto area neighborhood; therefore, I used the unsupervised learning K-means algorithm to cluster the neighborhoods.

Clustering the Toronto Neighborhoods Using K-Means with K = 5

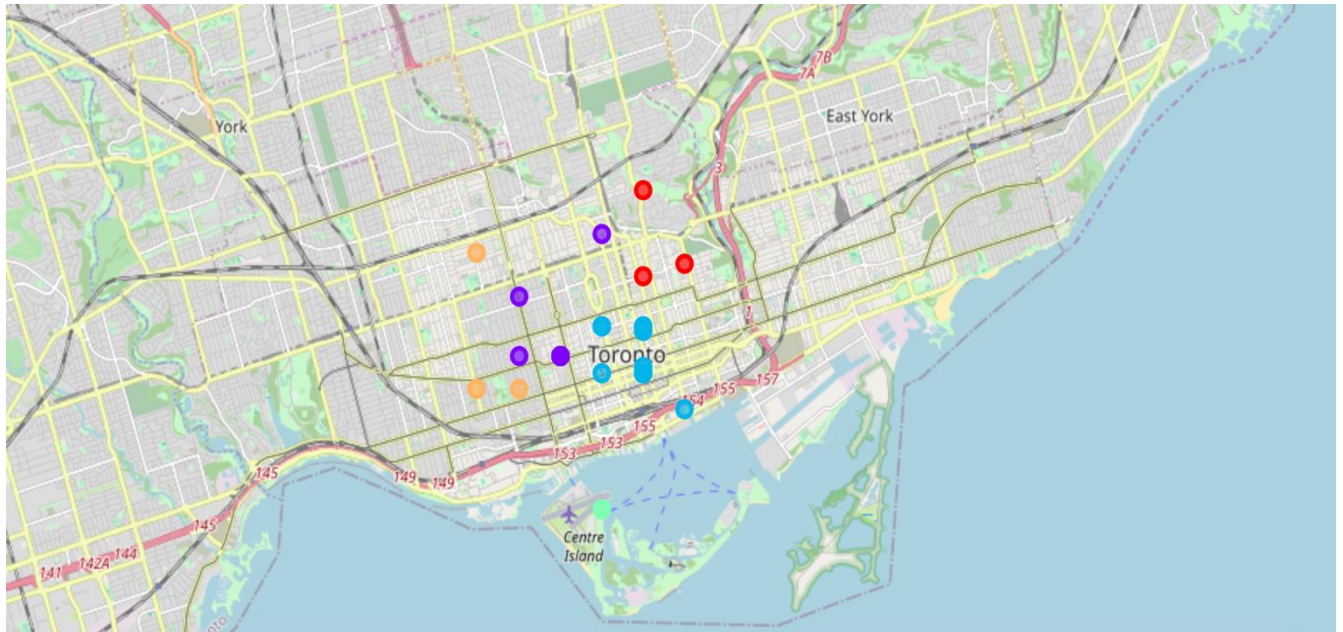
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: from sklearn.cluster import KMeans
k=5
Restaurant_Toronto = dfRestaurantToronto.drop(['Postal Code', 'Borough', 'Neighborhood', 'Restaurant Name', 'categories'],1)
kmeans = KMeans(n_clusters = k,random_state=0).fit(Restaurant_Toronto)
kmeans.labels_

1]: array([0, 0, 0, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 1, 1, 1, 1, 1, 1,
        1, 1, 1, 1, 1, 3, 3, 3, 3, 3, 3, 4, 4, 4], dtype=int32)

```

Folium Map for the clusters of the restaurants' neighborhoods



I analyze each cluster to determine the type of restaurant (cuisine) located in each neighborhood:

Cluster1:

```
dfRestaurantToronto.loc[dfRestaurantToronto['Cluster Labels'] == 0]
```

$$:] :$$

Cluster Labels	Postal Code	Borough	Neighborhood	Latitude_x	Longitude_x	Restaurant Name	categories	
0	0	M4W	Downtown Toronto	Rosedale	43.679563	-79.377529	Matisse Restaurant And Bar	Restaurant
1	0	M4X	Downtown Toronto	St. James Town / Cabbagetown	43.667967	-79.367675	Tender Trap Restaurant	Chinese Restaurant
2	0	M4Y	Downtown Toronto	Church and Wellesley	43.665860	-79.383160	Cottage Restaurant & Lounge	Thai Restaurant

Cluster2:

	Cluster Labels	Postal Code	Borough	Neighborhood	Latitude_x	Longitude_x	Restaurant Name	categories
16	1	M5R	Central Toronto	The Annex / North Midtown / Yorkville	43.672710	-79.405678	Sassafras Cafe Restaurant Private Events	Event Space
17	1	M5S	Downtown Toronto	University of Toronto / Harbord	43.662696	-79.400049	Insomnia Restaurant and Lounge	Restaurant
18	1	M5T	Downtown Toronto	Kensington Market / Chinatown / Grange Park	43.653206	-79.400049	Swatow Restaurant 汕頭小食家	Chinese Restaurant
19	1	M5T	Downtown Toronto	Kensington Market / Chinatown / Grange Park	43.653206	-79.400049	Goldstone Noodle Restaurant 金石	Noodle House
20	1	M5T	Downtown Toronto	Kensington Market / Chinatown / Grange Park	43.653206	-79.400049	New Sky Restaurant 小沙田食家	Chinese Restaurant
21	1	M5T	Downtown Toronto	Kensington Market / Chinatown / Grange Park	43.653206	-79.400049	Rol San Restaurant 龍笙樓	Dim Sum Restaurant
22	1	M5T	Downtown Toronto	Kensington Market / Chinatown / Grange Park	43.653206	-79.400049	Green Tea Restaurant Downtown	Chinese Restaurant
23	1	M5T	Downtown Toronto	Kensington Market / Chinatown / Grange Park	43.653206	-79.400049	Kensington Cornerstone Restaurant	Breakfast Spot
24	1	M5T	Downtown Toronto	Kensington Market / Chinatown / Grange Park	43.653206	-79.400049	Ka Chi Korean Restaurant	Korean Restaurant

Cluster3:

	Cluster Labels	Postal Code	Borough	Neighborhood	Latitude_x	Longitude_x	Restaurant Name	categories
3	2	M5B	Downtown Toronto	Garden District, Ryerson	43.657162	-79.378937	Studio Restaurant	Breakfast Spot
4	2	M5C	Downtown Toronto	St. James Town	43.651494	-79.375418	Victoria's Restaurant	Restaurant
5	2	M5E	Downtown Toronto	Berczy Park	43.644771	-79.373306	The Hot House Restaurant & Bar	American Restaurant
6	2	M5G	Downtown Toronto	Central Bay Street	43.657952	-79.387383	Hemispheres Restaurant & Bistro	American Restaurant
7	2	M5G	Downtown Toronto	Central Bay Street	43.657952	-79.387383	Hong Shing Chinese Restaurant	Chinese Restaurant
8	2	M5G	Downtown Toronto	Central Bay Street	43.657952	-79.387383	Hendricks Restaurant & Bar	Restaurant
9	2	M5G	Downtown Toronto	Central Bay Street	43.657952	-79.387383	Cali Restaurant	Vietnamese Restaurant
10	2	M5G	Downtown Toronto	Central Bay Street	43.657952	-79.387383	Spring Rolls Japanese Restaurant in Toronto	Theme Restaurant
11	2	M5H	Downtown Toronto	Richmond / Adelaide / King	43.650571	-79.384568	Restaurant Adelaide	Restaurant
12	2	M5H	Downtown Toronto	Richmond / Adelaide / King	43.650571	-79.384568	Richtree Natural Market Restaurants	Restaurant
13	2	M5H	Downtown Toronto	Richmond / Adelaide / King	43.650571	-79.384568	Maezo Restaurant & Bar	Indian Restaurant
14	2	M5H	Downtown Toronto	Richmond / Adelaide / King	43.650571	-79.384568	Osgoode Hall Restaurant	New American Restaurant
15	2	M5H	Downtown Toronto	Richmond / Adelaide / King	43.650571	-79.384568	Maezo Restaurant	Indian Restaurant

Cluster4:

	Cluster Labels	Postal Code	Borough	Neighborhood	Latitude_x	Longitude_x	Restaurant Name	categories
27	3	M5V	Downtown Toronto	CN Tower / King and Spadina / Railway Lands / ...	43.628947	-79.39442	360 Restaurant	Wine Bar
28	3	M5V	Downtown Toronto	CN Tower / King and Spadina / Railway Lands / ...	43.628947	-79.39442	Aroma Fine Indian Restaurant	Indian Restaurant
29	3	M5V	Downtown Toronto	CN Tower / King and Spadina / Railway Lands / ...	43.628947	-79.39442	Azure Restaurant & Bar	Restaurant
30	3	M5V	Downtown Toronto	CN Tower / King and Spadina / Railway Lands / ...	43.628947	-79.39442	Victor Restaurant & Bar	Bar
31	3	M5V	Downtown Toronto	CN Tower / King and Spadina / Railway Lands / ...	43.628947	-79.39442	Arriba Restaurant	Restaurant
32	3	M5V	Downtown Toronto	CN Tower / King and Spadina / Railway Lands / ...	43.628947	-79.39442	Little India Restaurant	Indian Restaurant

Cluster5:

	Cluster Labels	Postal Code	Borough	Neighborhood	Latitude_x	Longitude_x	Restaurant Name	categories
33	4	M6G	Downtown Toronto	Christie	43.669542	-79.422564	Imonay House Restaurant 뉴 - 이모네집	Korean Restaurant
34	4	M6J	West Toronto	Little Portugal / Trinity	43.647927	-79.419750	Woodlot Restaurant & Bakery	New American Restaurant
35	4	M6J	West Toronto	Little Portugal / Trinity	43.647927	-79.419750	The Lakeview Restaurant	Diner

Results:

I started analyzing the Latino neighborhoods and the number of Peruvian restaurants located in those neighborhoods by extracting the demographic data of Toronto and by using Foursquare. However, I was only able to find a few Peruvian restaurants located in the densely Latino populated neighborhoods. Therefore, I decided to look at the type of restaurants located in the Toronto area and found multiple cuisines. When I used k-means and clustered the neighborhoods, I realized the best location to open a Peruvian restaurant is in Downtown Toronto. This area seems to have a variety of restaurants ranging from American to Indian to Chinese cuisine, etc.

Discussion:

We still need to look further to determine the best neighborhood within the downtown Toronto area since we will be competing with multiple cuisines. Also, another factor we need to determine is how well known is the Peruvian gastronomy in Canada. Even though Lima, the capital of Peru, is considered one of the top culinary adventure destinations, we need to find out if Canadians are adventurous enough to try something delicious and exotic.