

# DATA SCIENCE CAPSTONE

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*Battle of the Neighborhoods*

*Megan W.*

# PROJECT PLAN

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- Problem Background: To ensure the project for the capstone is completed, we will limit our work to specify Halal and Kosher. For individual that have a protein intolerance or allergy to Pork, Halal and Kosher Restaurants can ensure the patron is safe, because Halal and Kosher restaurant will not bring pork on the premise. With this in mind, the project will be focused on answering the following question:
- Problem: “How many Halal or Kosher Restaurants can be found within the Downtown Toronto area, and how do the results compare to offering within New York City?” The analysis conducted within this project is to compare the downtown neighborhoods of Toronto and New York City and determine how similar or dissimilar they are.

# DATA

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- For this project, I intend to use data gathered from foursquare about halal and kosher restaurants and type of cuisine within downtown area for Toronto and New York City neighborhoods through use of API. I will use a supervised learning algorithms classify data points into categorical type of cuisine using best classification model.
- Following data sources will be needed to extract/generate the required information:
  1. Corresponding Postal Codes from Wikipedia for Toronto
  2. NYU New York City Neighborhood information
  3. Centers of candidate areas will collected from Wikipedia or will be generated algorithmically and approximate addresses of centers of those areas will be obtained using Google Maps API reverse geocoding
  4. Number of restaurants for each cuisine type in neighborhood i.e approximate radius of 500 meters will be obtained using Foursquare API

**Data Types - CSV, JSON, APIs**

**File Locations -**

1. <https://foursquare.com/>
2. [https://en.wikipedia.org/wiki/List\\_of\\_postal\\_codes\\_of\\_Canada:\\_M](https://en.wikipedia.org/wiki/List_of_postal_codes_of_Canada:_M)
3. [https://cocl.us/new\\_york\\_dataset](https://cocl.us/new_york_dataset)

# DATA METHODOLOGY

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- I plan to use variables pertaining to venue type, location, food type, etc., obtained from foursquare in relation to downtown Toronto and New York City to see what categories of Halal and Kosher food are available within the neighborhood. I will conduct exploratory analysis on data pulled from foursquare to see what patterns can be gleamed from the data. I will then compare results from Toronto with the New York City results to see what area has the best restaurant options for someone with a pork allergy.
- I will also use k-means to cluster the finding from downtown Toronto and New York City to support the comparison on the findings to see what else can be gleamed. This means that I will examine all the neighborhoods within downtown Toronto and New York City/Manhattan areas.
- This analysis will be conducted looking at venue information. I will use k-means to help map out the results on interactive map to help visualize where the restaurant is located.

# FINDINGS

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- Overall Finding: Manhattan has more safe eating options and had 3 Restaurants listed as Jewish or Kosher within the Category information pulled from Foursquare API.
- Kosher Findings Within Toronto:
- Question: How many Halal or Kosher Restaurants can be found within the Downtown Toronto area?
- Answer: No restaurant within in Toronto area was labeled Halal, Kosher, or Jewish within the Category information. However, a total number of possible safe restaurants found in the analysis is 22 within Downtown Toronto. These restaurants typically do not carry pork products: Afghan Restaurant 1, Ethiopian Restaurant 2, Falafel Restaurant 1, Persian Restaurant 1, Vegetarian / Vegan Restaurant 17.
- Kosher Findings Within Manhattan:
- Question: How many Halal or Kosher Restaurants can be found within the Downtown Toronto area?
- Answer: Total of 3 Restaurants in Manhattan area were labeled as Jewish or Kosher within the Category information. In addition, it was discovered that there are total number of possible safe restaurants 89 within Manhattan. These restaurants typically do not carry pork products: Afghan Restaurant 1, Ethiopian Restaurant 4, Falafel Restaurant 8, Indian Restaurant 32, Israeli Restaurant 2, Jewish Restaurant 3, Kebab Restaurant 1, Kosher Restaurant 1, Lebanese Restaurant 1, Middle Eastern Restaurant 6, Moroccan Restaurant 2, North Indian Restaurant 1, Pakistani Restaurant 1, Persian Restaurant 1, South Indian Restaurant 1, and Vegetarian / Vegan Restaurant 24.

# FINDING – CONTINUE

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- Based on findings, I am disappointed in the fact that my question and its analysis did not provide enough data on Halal, kosher, and jewish restaurants.
- I had to compare Manhattan and Downtown Toronto in the same way that class assignment to ensure that I was able to meet all the requirements for the assignment. I tried a number of different way to pull the data and most these attempt came with issues- including searching on the category ids for halal and kosher restaurants.
- I am glad that I was able to gather results within NYC that directly stated kosher and jewish with radius of 500, even knowing there are many kosher and halal restaurants with NYC.
- I do think the category information for the venues is not easy to gather from the API and the data is dependent on whether it was entered correctly by the user.

# TOP 10 VENUES FOR EACH NEIGHBORHOOD - 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
0	Adelaide, King, Richmond	Coffee Shop	Café	Steakhouse	Thai Restaurant	Bar	American Restaurant	Hotel	Restaurant	Burger Joint	Cosmetics Shop
1	Berczy Park	Coffee Shop	Cocktail Bar	Seafood Restaurant	Italian Restaurant	Bakery	Steakhouse	Beer Bar	Cheese Shop	Café	Farmers Market
2	CN Tower, Bathurst Quay, Island airport, Harbo...	Airport Lounge	Airport Terminal	Airport Service	Harbor / Marina	Boutique	Plane	Coffee Shop	Bar	Airport Gate	Airport Food Court
3	Cabbagetown, St. James Town	Coffee Shop	Restaurant	Park	Pub	Café	Bakery	Italian Restaurant	Pizza Place	Breakfast Spot	Butcher
4	Central Bay Street	Coffee Shop	Café	Italian Restaurant	Middle Eastern Restaurant	Sandwich Place	Burger Joint	Japanese Restaurant	Bubble Tea Shop	Bar	Bakery
5	Chinatown, Grange Park, Kensington Market	Café	Vegetarian / Vegan Restaurant	Coffee Shop	Mexican Restaurant	Dumpling Restaurant	Bar	Bakery	Chinese Restaurant	Vietnamese Restaurant	Gaming Cafe
6	Christie	Grocery Store	Café	Park	Baby Store	Italian Restaurant	Diner	Nightclub	Convenience Store	Restaurant	Coffee Shop
7	Church and Wellesley	Coffee Shop	Japanese Restaurant	Sushi Restaurant	Gay Bar	Restaurant	Café	Pub	Hotel	Fast Food Restaurant	Gym
8	Commerce Court, Victoria Hotel	Coffee Shop	Hotel	Café	Restaurant	Italian Restaurant	Seafood Restaurant	Gastropub	Deli / Bodega	American Restaurant	Steakhouse
9	Design Exchange, Toronto Dominion Centre	Coffee Shop	Café	Hotel	Restaurant	Bakery	Italian Restaurant	Steakhouse	Gastropub	Bar	Deli / Bodega
10	First Canadian Place, Underground city	Coffee Shop	Café	Restaurant	Steakhouse	Hotel	Seafood Restaurant	Asian Restaurant	Bakery	Deli / Bodega	American Restaurant
11	Harbord, University of Toronto	Café	Bookstore	Restaurant	Japanese Restaurant	Bar	Italian Restaurant	Bakery	Nightclub	Chinese Restaurant	Beer Store

# K-MEANS TORONTO

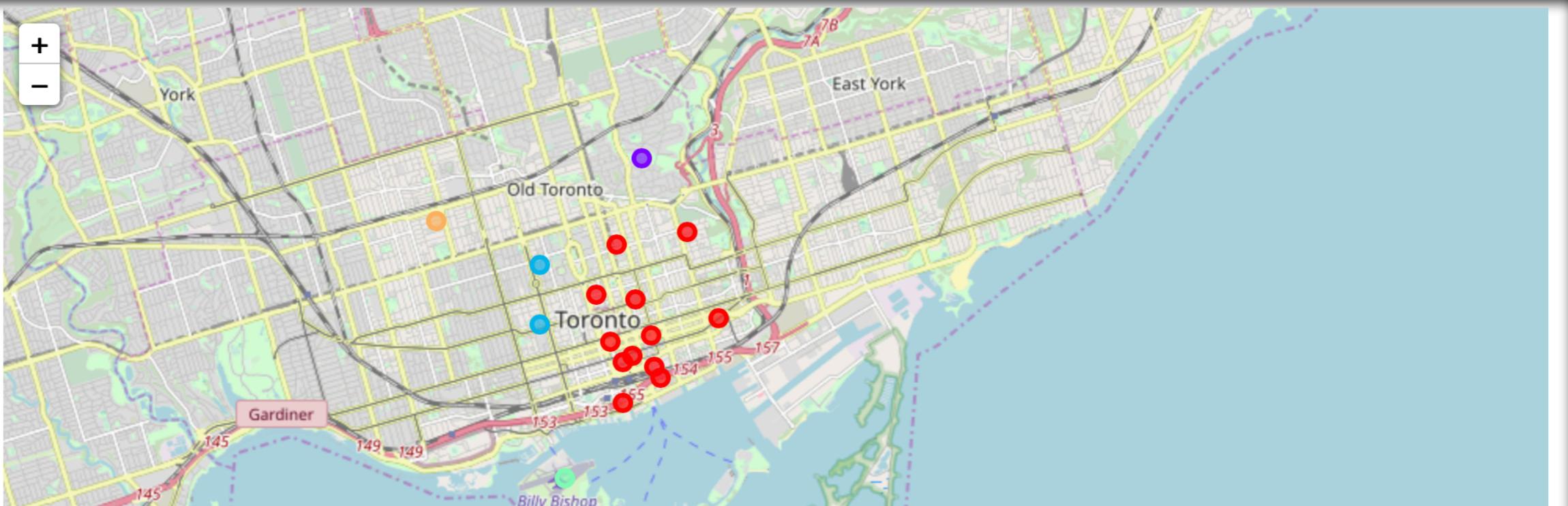
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colors_array = cm.rainbow(np.linspace(0, 1, len(ys)))
rainbow = [colors.rgb2hex(i) for i in colors_array]

for lat, lon, poi, cluster in zip(scarb_merged['Latitude'], scarb_merged['Longitude'], scarb_merged['Neighbourhood'], s
    label = folium.Popup(str(poi) + ' Cluster ' + str(cluster), parse_html=True)
    folium.CircleMarker(
        [lat, lon],
        radius=5,
        popup=label,
        color=rainbow[cluster-1],
        fill=True,
        fill_color=rainbow[cluster-1],
        fill_opacity=0.7).add_to(map_clusters)

map_clusters
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Out[40]:



# TOP 10 VENUES FOR EACH NEIGHBORHOOD - MANHATTAN

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Out[77]:

	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	Memorial Site	Wine Shop	Clothing Store	Italian Restaurant	Department Store	Women's Store
1	Carnegie Hill	Coffee Shop	Pizza Place	Café	Yoga Studio	Bookstore	Cosmetics Shop	French Restaurant	Bar	Japanese Restaurant	Spa
2	Central Harlem	African Restaurant	Art Gallery	Seafood Restaurant	American Restaurant	Gym / Fitness Center	French Restaurant	Cosmetics Shop	Chinese Restaurant	Public Art	Grocery Store
3	Chelsea	Coffee Shop	Italian Restaurant	Ice Cream Shop	Nightclub	Bakery	Seafood Restaurant	American Restaurant	Theater	Art Gallery	Hotel
4	Chinatown	Chinese Restaurant	Cocktail Bar	American Restaurant	Dumpling Restaurant	Spa	Ice Cream Shop	Bakery	Vietnamese Restaurant	Bubble Tea Shop	Dim Sum Restaurant

# K-MEANS MANHATTAN

