FINAL REPORT
Capstone Project
The Battle of the neighbourhoods!

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PROBLEM & BACKGROUND

Toronto and New York are the famous places in the world. They are diverse in many ways. Both are multicultural as well as the financial hubs of their respective countries. We want to explore how much they are similar or dissimilar in aspects from a tourist point of view regarding food, accommodation, beautiful places, and many more. Today Tourism is one of the pillars of the economy and the people most often visits those countries who are rich in heritage and developed enough from a foreign perspective, like a friendly environment.

Every city is unique in its way and give something new. And now the information is so common regarding the location of every place around the world on your fingertips which make it easier to explore. Therefore, tourists always eager to travel to different places based on available information, and the comparison (the part of the information) between the two cities always assist to choose the specific places or according to their choice.

Description of Problem

A restaurant is a business which prepares and serves food and drink to customers in return for money, either paid before the meal, after the meal or with an open account. The City of New York is famous for its excellent cuisine. Its food culture includes an array of international cuisines influenced by the city's immigrant history.

Central and Eastern European immigrants, especially Jewish immigrants - bagels, cheesecake, hot dogs, knishes, and delicatessens Italian immigrants - New York-style pizza and Italian cuisine Jewish immigrants and Irish immigrants - pastrami and corned beef Chinese and other Asian restaurants, sandwich joints, trattorias, diners, and coffeehouses are ubiquitous throughout the city mobile food vendors - Some 4,000 licensed by the city Middle Eastern foods such as falafel and kebabs examples of modern New York street food It is famous for not just Pizzerias, Cafe's but also for fine dining Michelin starred restaurants. The city is home to "nearly one thousand of the finest and most diverse haute cuisine restaurants in the world", according to Michelin. So it is evident that to survive in such a competitive market it is very important to strategically plan. Various factors need to be studied to decide on the Location such as.

New York Population New York City Demographics Are there any Farmer's Markets, Wholesale markets etc nearby so that the ingredients can be purchased fresh to maintain quality and cost? Are there any venues like Gyms, Entertainment zones, Parks etc nearby where the floating population is high etc Who are the competitors in that location? The cuisine served / Menu of the competitor's Segmentation of the Borough Untapped markets Saturated markets etc The list can go on... Even though well funded XYZ Company Ltd. need to choose the correct location to start its first venture. If this is successful they can replicate the same in other locations. The first move is very important, thereby the choice of location is very important.

Target Audience

To recommend the correct location, XYZ Company Ltd has appointed me to lead the Data Science team. The objective is to locate and recommend to the management which neighbourhood of New York city will be the best choice to start a restaurant. Management also expects to understand the rationale of the recommendations made.

This would interest anyone who wants to start a new restaurant in New York city.

Success Criteria
The success criteria of the project will be a good recommendation of borough/Neighborhood choice to XYZ Company Ltd based on Lack of such restaurants in that location and nearest suppliers of ingredients.

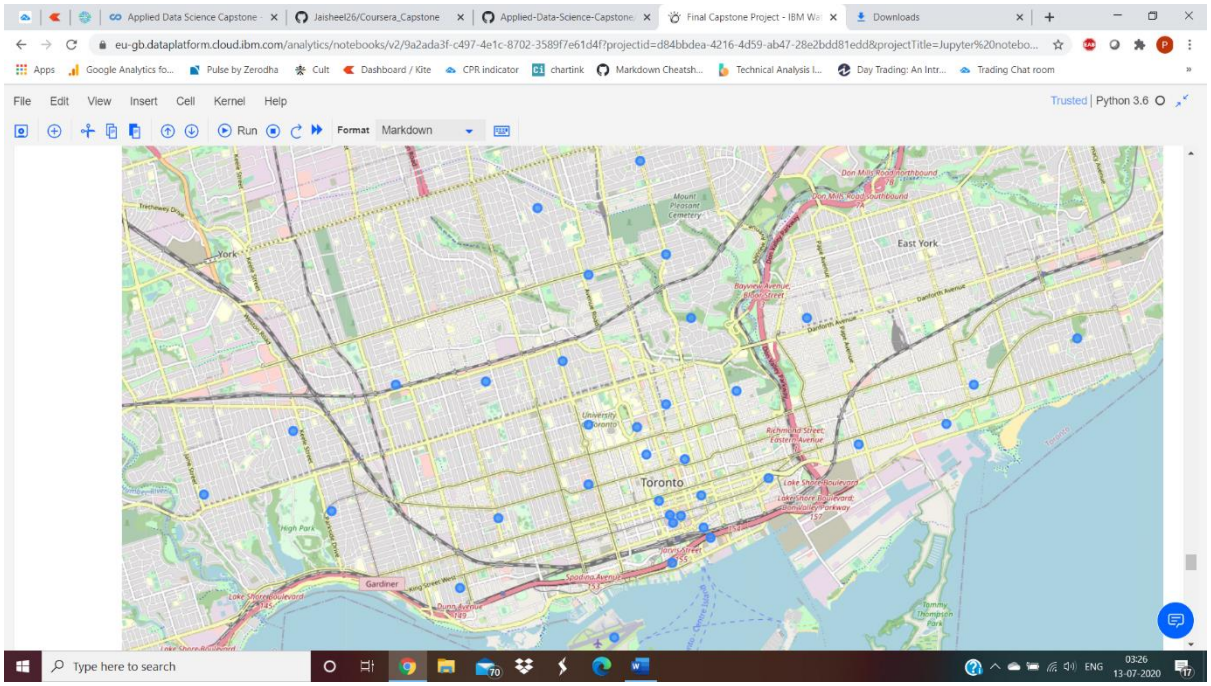
DATA DESCRIPTION
For this problem, we will get the services of Foursquare API to explore the data of two cities, in terms of their neighbourhoods. The data also includes information about the places around each neighbourhood like restaurants, hotels, coffee shops, parks, theatres, art galleries, museums and many more. We selected one Borough from each city to analyze their neighbourhoods. Manhattan from New York and Downtown Toronto from Toronto. We will use machine learning technique, “Clustering” to segment the neighbourhoods with similar objects based on each neighbourhood data. These objects will be given priority based on foot traffic (activity) in their respective neighbourhoods. This will help to locate the tourist’s areas and hubs, and then we can judge the similarity or dissimilarity between two cities on that basis.

path='https://en.wikipedia.org/wiki/List_of_postal_codes_of_Canada:_M

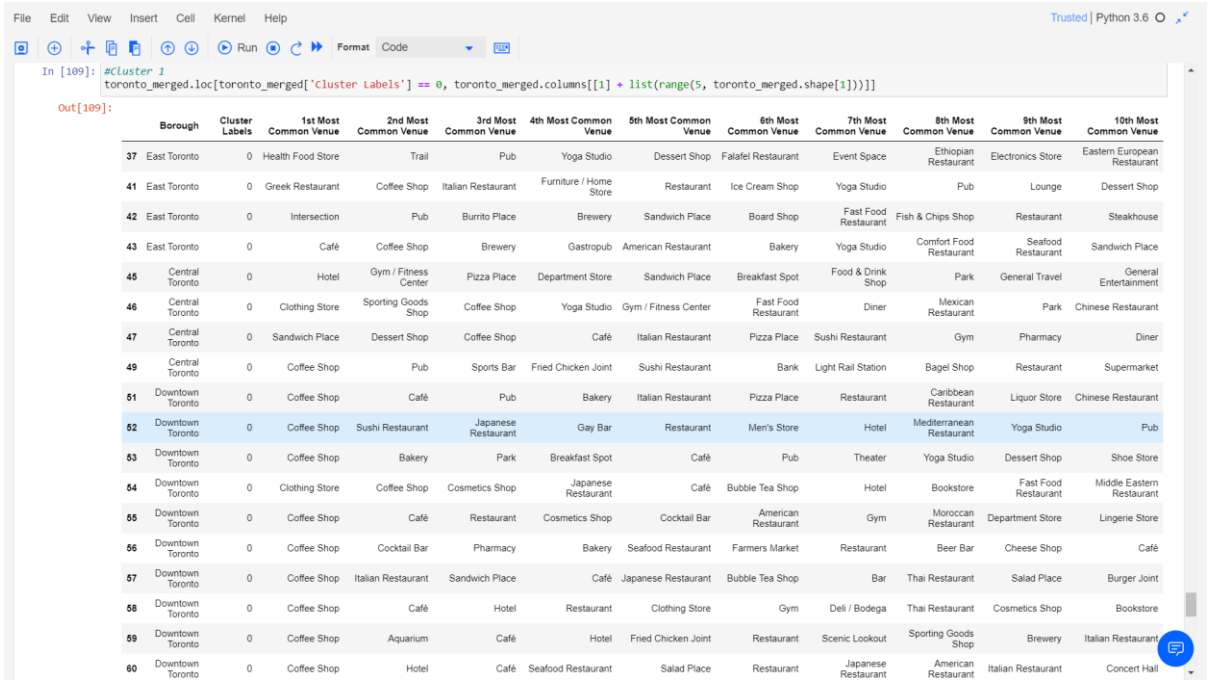
METHODOLOGY
As we have selected two cities Borough to explore their neighbourhoods. The data exploration, analysis and visualization for both boroughs are done in the same way but separately.

EXPLORATION
For Downtown Toronto case, we have extracted the table of Toronto’s Borough from Wikipedia page. Then we arrange the data according to our requirements. In the arrangement phase, which applied multiple steps including but not limited to, eliminating “Not assigned” values, combine neighbourhoods which have the same geographical coordinates at each borough and sorted against the concerned borough. For data verification and further exploration, we use Foursquare API to get the coordinates of Downtown Toronto and explore its neighbourhoods. The neighbourhoods are further characterized as venues and venue categories. For Manhattan, we used a saved data file which is already explored through foursquare API in which we have extracted all the boroughs of New York and then sorted against the concerned borough. Then we explored the Manhattan neighbourhoods as venues and venue categories.

Vizualisatioin of Clusters:



Examining the Clusters



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In [109]: #Cluster 1
toronto_merged.loc[toronto_merged['Cluster Labels'] == 0, toronto_merged.columns[[1] + list(range(5, toronto_merged.shape[1]))]]
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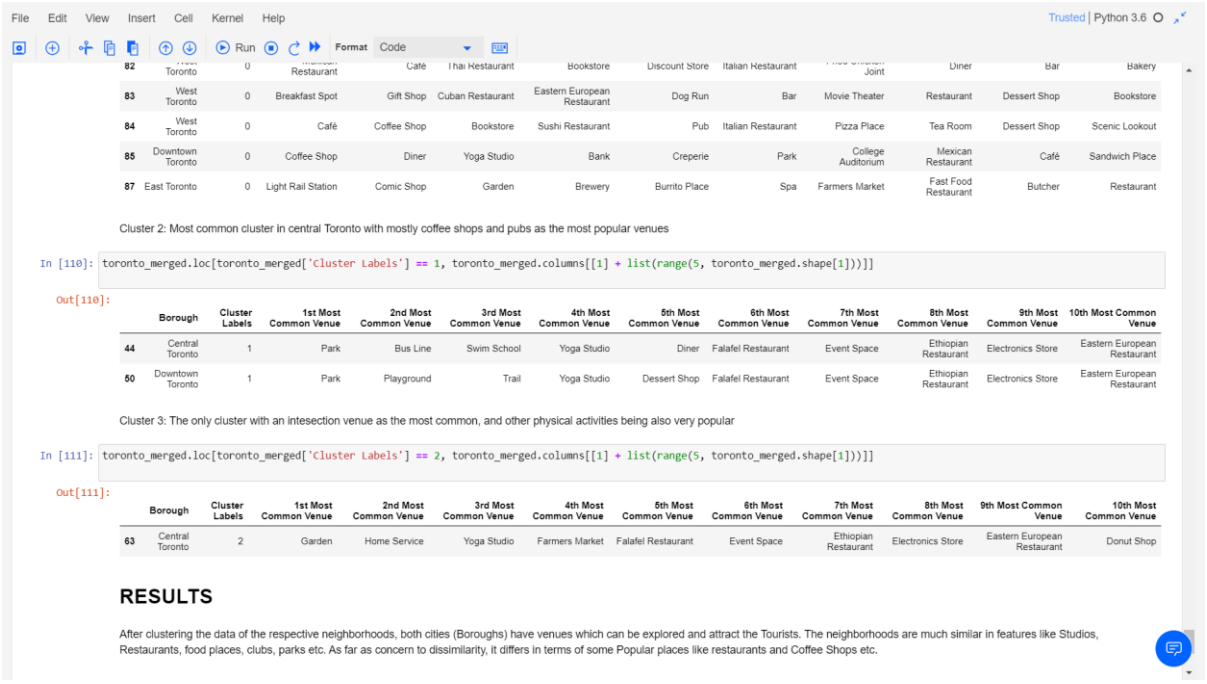
Out[109]:

	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
37	East Toronto	0	Health Food Store	Trail	Pub	Yoga Studio	Dessert Shop	Falafel Restaurant	Event Space	Ethiopian Restaurant	Electronics Store	Eastern European Restaurant
41	East Toronto	0	Greek Restaurant	Coffee Shop	Italian Restaurant	Furniture / Home Store	Restaurant	Ice Cream Shop	Yoga Studio	Pub	Lounge	Dessert Shop
42	East Toronto	0	Intersection	Pub	Burrito Place	Brewery	Sandwich Place	Board Shop	Fast Food Restaurant	Fish & Chips Shop	Restaurant	Steakhouse
43	East Toronto	0	Café	Coffee Shop	Brewery	Gastropub	American Restaurant	Bakery	Yoga Studio	Comfort Food Restaurant	Seafood Restaurant	Sandwich Place
45	Central Toronto	0	Hotel	Gym / Fitness Center	Pizza Place	Department Store	Sandwich Place	Breakfast Spot	Food & Drink Shop	Park	General Travel	General Entertainment
46	Central Toronto	0	Clothing Store	Sporting Goods Shop	Coffee Shop	Yoga Studio	Gym / Fitness Center	Fast Food Restaurant	Diner	Mexican Restaurant	Park	Chinese Restaurant
47	Central Toronto	0	Sandwich Place	Dessert Shop	Coffee Shop	Café	Italian Restaurant	Pizza Place	Sushi Restaurant	Gym	Pharmacy	Diner
49	Central Toronto	0	Coffee Shop	Pub	Sports Bar	Fried Chicken Joint	Sushi Restaurant	Bank	Light Rail Station	Bagel Shop	Restaurant	Supermarket
51	Downtown Toronto	0	Coffee Shop	Café	Pub	Bakery	Italian Restaurant	Pizza Place	Restaurant	Caribbean Restaurant	Liquor Store	Chinese Restaurant
52	Downtown Toronto	0	Coffee Shop	Sushi Restaurant	Japanese Restaurant	Gay Bar	Restaurant	Men's Store	Hotel	Mediterranean Restaurant	Yoga Studio	Pub
53	Downtown Toronto	0	Coffee Shop	Bakery	Park	Breakfast Spot	Café	Pub	Theater	Yoga Studio	Dessert Shop	Shoe Store
54	Downtown Toronto	0	Clothing Store	Coffee Shop	Cosmetics Shop	Japanese Restaurant	Café	Bubble Tea Shop	Hotel	Bookstore	Fast Food Restaurant	Middle Eastern Restaurant
55	Downtown Toronto	0	Coffee Shop	Café	Restaurant	Cosmetics Shop	Cocktail Bar	American Restaurant	Gym	Moroccan Restaurant	Department Store	Lingerie Store
56	Downtown Toronto	0	Coffee Shop	Cocktail Bar	Pharmacy	Bakery	Seafood Restaurant	Farmers Market	Restaurant	Beer Bar	Cheese Shop	Café
57	Downtown Toronto	0	Coffee Shop	Italian Restaurant	Sandwich Place	Café	Japanese Restaurant	Bubble Tea Shop	Bar	Thai Restaurant	Salad Place	Burger Joint
58	Downtown Toronto	0	Coffee Shop	Café	Hotel	Restaurant	Clothing Store	Gym	Deli / Bodega	Thai Restaurant	Cosmetics Shop	Bookstore
59	Downtown Toronto	0	Coffee Shop	Aquarium	Café	Hotel	Fried Chicken Joint	Restaurant	Scenic Lookout	Sporting Goods Shop	Brewery	Italian Restaurant
60	Downtown Toronto	0	Coffee Shop	Hotel	Café	Seafood Restaurant	Salad Place	Restaurant	Japanese Restaurant	American Restaurant	Italian Restaurant	Concert Hall



	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
82	West Toronto	0	Restaurant	Café	Thai Restaurant	Bookstore	Discount Store	Italian Restaurant	Joint	Diner	Bar	Bakery
83	West Toronto	0	Breakfast Spot	Gift Shop	Cuban Restaurant	Eastern European Restaurant	Dog Run	Bar	Movie Theater	Restaurant	Dessert Shop	Bookstore
84	West Toronto	0	Café	Coffee Shop	Bookstore	Sushi Restaurant	Pub	Italian Restaurant	Pizza Place	Tea Room	Dessert Shop	Scenic Lookout
85	Downtown Toronto	0	Coffee Shop	Diner	Yoga Studio	Bank	Creperie	Park	College Auditorium	Mexican Restaurant	Café	Sandwich Place
87	East Toronto	0	Light Rail Station	Comic Shop	Garden	Brewery	Burrito Place	Spa	Farmers Market	Fast Food Restaurant	Butcher	Restaurant

Cluster 2: Most common cluster in central Toronto with mostly coffee shops and pubs as the most popular venues

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In [110]: toronto_merged.loc[toronto_merged['Cluster Labels'] == 1, toronto_merged.columns[[1] + list(range(5, toronto_merged.shape[1]))]]
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Out[110]:

	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
44	Central Toronto	1	Park	Bus Line	Swim School	Yoga Studio	Diner	Falafel Restaurant	Event Space	Ethiopian Restaurant	Electronics Store	Eastern European Restaurant
50	Downtown Toronto	1	Park	Playground	Trail	Yoga Studio	Dessert Shop	Falafel Restaurant	Event Space	Ethiopian Restaurant	Electronics Store	Eastern European Restaurant

Cluster 3: The only cluster with an intesection venue as the most common, and other physical activities being also very popular

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In [111]: toronto_merged.loc[toronto_merged['Cluster Labels'] == 2, toronto_merged.columns[[1] + list(range(5, toronto_merged.shape[1]))]]
```

Out[111]:

	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
63	Central Toronto	2	Garden	Home Service	Yoga Studio	Farmers Market	Falafel Restaurant	Event Space	Ethiopian Restaurant	Electronics Store	Eastern European Restaurant	Donut Shop

RESULTS

After clustering the data of the respective neighborhoods, both cities (Boroughs) have venues which can be explored and attract the Tourists. The neighborhoods are much similar in features like Studios, Restaurants, food places, clubs, parks etc. As far as concern to dissimilarity, it differs in terms of some Popular places like restaurants and Coffee Shops etc.

RESULTS

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Observations & Recommendations

When we compare the places, we observe that there are more Food places situated in Toronto Neighborhoods. Similarly, Gyms, Supermarkets, Restaurants and even more.
As far as a concern to recommendations, we recommend Toronto Neighborhoods will be considered first to visit. The tourists have easily travelling access due to Airport facility, which not only saves time but also to experience the heritage of Toronto. This will explore more, the attracting venues.

Conclusion

The Places of Toronto neighbourhoods have more like similar venues. As we know that every place is unique in its way, so that's argument is present in both neighbourhoods. The dissimilarity exists in terms of some different venues and facilities but not on a larger extent.