**Introduction**

Due to the COVID-19 pandemic, there have been many people moving between cities to avoid virus hotspots. New York is one state that has seen a major spike in COVID-19 cases since the pandemic began. To escape the spread, a popular plan is to move to Toronto. Not only is it located in Canada, another country, but it is also closer to New York than some other states in the U.S

The only issue is that we must assess what commodities we will lose and gain by moving to Toronto. New York is known for its wide variety of stores, restaurants, and supermarkets. So how would Toronto compare? This project aims to compare the frequency and distribution of stores between New York and Toronto. This way we have a clear understanding of what we gain and lose by moving.

**Data**

We will be using location datasets from both New York and Toronto. The links to both datasets are as provided:

New York: <https://geo.nyu.edu/catalog/nyu_2451_34572>  
Toronto: <https://en.wikipedia.org/wiki/List_of_postal_codes_of_Canada:_M>

Because latitudinal and longitudinal coordinates are not provided, we will also be using the Geocoder package to retrieve this data manually. We will then compare the coordinates from these datasets to the Foursquare API. Nearby venues will be marked and analyzed side-by-side. Using this data, we will have a better understanding of how the two locations compare.

**Methodology**

The dataset for New York neighborhoods is available on the NYU website, as well as U.S. government databases. The NY dataset that will be used for this project contains a list of neighborhoods across the NY state, along with latitudinal and longitudinal coordinates.

Table

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Fig 1. Table of New York Neighborhood

The dataset for Toronto neighborhoods was acquired via Wikipedia and contains a list of postal codes along with the associated borough and neighborhood name. We then used the Geocoder package in Python to retrieve the coordinates for each location. Please note that multiple location data were not available. This lack of data may be due to Toronto being out of U.S. jurisdiction. Nonetheless, the resulting table provides suitable information for our project.

Text

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Fig 2. Data was unavailable in multiple locations within Toronto

Table

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Fig 3. Table of Toronto Neighborhood

After organizing the two datasets into tables, we will use the Foursquare API to retrieve nearby venues within each neighborhood. Venues will be classified by name and the type of business they represent.

A picture containing table

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Fig 4. Table of New York Venue

Graphical user interface, text, application

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Fig 5. Table of Toronto Venue

We then combine the Neighborhood table and the Venue table from both locations. Because venues can take on various forms, from restaurants to supermarkets to recreation, we organize the final table by top 10. This creates a fluid dataset that lists each neighborhood along with coordinates and its prominent venues.

Calendar

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Fig 6. Table of combined Neighborhood and Venue dataset

Finally, because we use datasets from two major locations, the combined table must be separated into clusters. This way, we have a better side-by-side comparison of the various neighborhoods.

**Results**

Text

Description automatically generatedWe ended up separating our dataset into 9 different clusters

Fig 7. Number of neighborhoods within each cluster

To gain the best analysis, we use the top 4 clusters that contain the largest number of neighborhoods. From these cluster maps, we can see that there are significantly more New York neighborhoods than there are Toronto neighborhoods. This is consistent across cluster 0, 4, 7, and 8.

Map

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Fig 8. Map of New York neighborhoods in Cluster 8

Map

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Fig 9. Map of Toronto neighborhoods in Cluster 8

An in-depth look into the cluster tables will also show what kinds of venues are most common within each neighborhood. In Cluster 8, for example, we can see that the majority of New York neighborhoods have Pizza restaurants as their number 1 venue. On the other hand, Toronto neighborhoods prefer cafes and coffee shops. Moreover, although New York does outnumber Toronto in terms of neighborhoods per cluster, they are equal in terms of venues per neighborhood.

Table

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Fig 10. Section of table in Cluster 8

In one outlier, Cluster 6 is evidence that Toronto holds more venues than any single New York neighborhood. As a result, the cluster tables serve as better analysis rather than the visual maps alone.

Table, calendar

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Fig 11. Table of Cluster 6

**Discussion**

Looking at just the cluster maps, we can state that New York significantly outnumbers Toronto in terms of neighborhoods. However, this could be attributed to a lack of data. Because Toronto is located outside the U.S. it may not be possible to retrieve enough information on neighborhood names and their coordinates. In a future study, it will be necessary to obtain an updated dataset of Toronto.

For the individual neighborhoods, we can see that there is little disparity between the two locations. In fact, Toronto seems to have equal or even more venues per neighborhood compared to New York. The biggest difference would be the types of venues offered. For a majority of New York neighborhoods, the most common venue is Pizza Place. Meanwhile, Toronto neighborhoods is highly populated with Coffee Shops.

For a person who may wish to move from New York to Canada, this can mean several things. First, their options for neighborhoods to move into are limited. However, the choice for stores, food, and entertainment are plentiful. Individual tastes may also play a factor, as the types of popular restaurants and stores may differ between locations. In the end, the freedom of choice is still present, which means the individual will not have to sacrifice much if they plan to move.

**Conclusion**

While New York and Toronto are located within different countries, the city aspects do not seem to change. Both locations offer a wide variety of venues across all available neighborhoods. From supermarkets to banks, everyday commodities stay the same. During a time of great stress and change, it is good that there are still constants no matter where we go.