New York vs. Toronto

Abstract

In this report, downtown neighbourhoods of two large cosmopolitan cities in North America, i.e. New York and Toronto was investigated. Their cultural diversity was tested through variety of cuisines was offered in their restaurants. In addition, the parks and playgrounds were considered the main criteria to examine their green spaces. According to findings of this report, New York beats Toronto by a huge margin in terms of quantity. However, the quality of service in both cities was nearly matched.

Introduction

New York is the second largest city in North America after Mexico City and the most populated city in the USA. Toronto ranks the first largest city in Canada. Both cities are considered the financial capitals of their respective countries. Toronto is often called New York North; therefore, the objective of this report is to compare these two cities through their neighbourhoods. Two major categories for their comparison will be discussed in this report. First, both cities' diversity will be tested through availability of different food options. Second, their green space will be examined through their parks and playgrounds.

Data Description

The data used for this project were gathered from different sources. The initial unprocessed New York data was downloaded from a given online source, i.e. https://cocl.us/new_york_dataset in JSON data format. Contrary to New York, no json dataset was available for Toronto. However, a similar dataset for Toronto by scraping Wikipedia web (https://en.wikipedia.org/wiki/List_of_postal_codes_of_Canada:_M) and another online link (http://cocl.us/Geospatial_data) for geographical coordination of different neighbourhoods in Toronto was created.

Finally, Foursquare was used to obtain information about venues including restaurants and parks in downtown Toronto and New York. Foursquare as a popular location data platform allows its subscriber to explore venues around a geographical location. However, only limited number of inquiries is permitted per day. Foursquare is a helpful tool to get a general idea such as ratings and tips about restaurants, parks, hotels and other venues in vicinity of a geographical location.

Methodology

As mentioned in Data Description section, different online sources were applied to obtain decent raw materials for this report. Nevertheless, further pre-processing stages were required to have useful and cleaned datasets. For instance, after downloading New York JSON file only four selected columns, i.e. Borough, Neighbourhood, Latitude and Longitude, were kept to form a simplified, useful Pandas dataframe.

On the other hand, obtaining a similar Pandas dataframe for Toronto required more pre-processing steps including scraping Wikipedia link to extract its table consisting of three columns, i.e. Borough, Neighbourhood, and Postal Code. The extracted table was needed further pre-processing to deal with missing values. First, the rows with missing values for borough columns were dropped. Second, assigning the same values for neighbourhood with missing data with their corresponding borough was performed.

Third, rows with similar postal codes in one borough but different neighbourhoods were merged into a single row with different neighbourhoods. Fourth, the rows were ordered alphabetically based on their postal code in order to match with their corresponding geographical coordination from second dataset. Finally, the two datasets through their common denominator, i.e. boroughs were combined.

This report focus was to explore only downtown neighbourhoods for both cities, i.e. Manhattan Borough and Downtown Borough in New York and Toronto, respectively. As a result, new dataframes were formed. By passing valid foursquare credentials the names, IDs, coordinates and categories of 100 venues in 500 m radius of each neighbourhood in downtown New York and Toronto were obtained. It must be noted that often a venue located at border of two neighbourhoods was reported several times. Hence, the duplicated values must be dropped.

The foursquare has more than 500 categories and sub categories; nevertheless, the main objective of this report was food and green space. The first part of this report was dedicated to examine the strength of food diversity in both cities in terms of specific dietary choices. Gluten-free, fast food, halal, kosher, seafood, vegetarian/vegan restaurants as well as salad, sandwich and soup places were selected categories. The main interests were to find the number of aforementioned categories in downtown areas and their qualities for specific categories. Moreover, 13 different categories corresponding to world popular cuisines were chosen to further investigate multiculturalism in both cities. Similarly, the numbers of parks and playgrounds were used to test both cities commitment to provide enough green spaces for their residents and visitors.

Additionally, the frequency of each venue in every neighbourhood was examined to determine the most popular venues in each neighbourhood. Also, the neighbourhoods were divided into 5 groups via K-means clustering to examine the similarity and dissimilarities of each neighbourhood. Bar charts and folium map were used for illustration of the results in the next chapter.

Results

Dietary Options

Quantitatively

Fig.1 shows the number of restaurants in downtown New York and Toronto with special dietary options, i.e. gluten-free, fast food, halal, kosher, seafood and vegetarian/vegan restaurants as well as salad, sandwich and soup places. The Fig.1 clearly illustrates the superiority of New York over Toronto quantitatively in all categories but gluten-free and fast food restaurants.

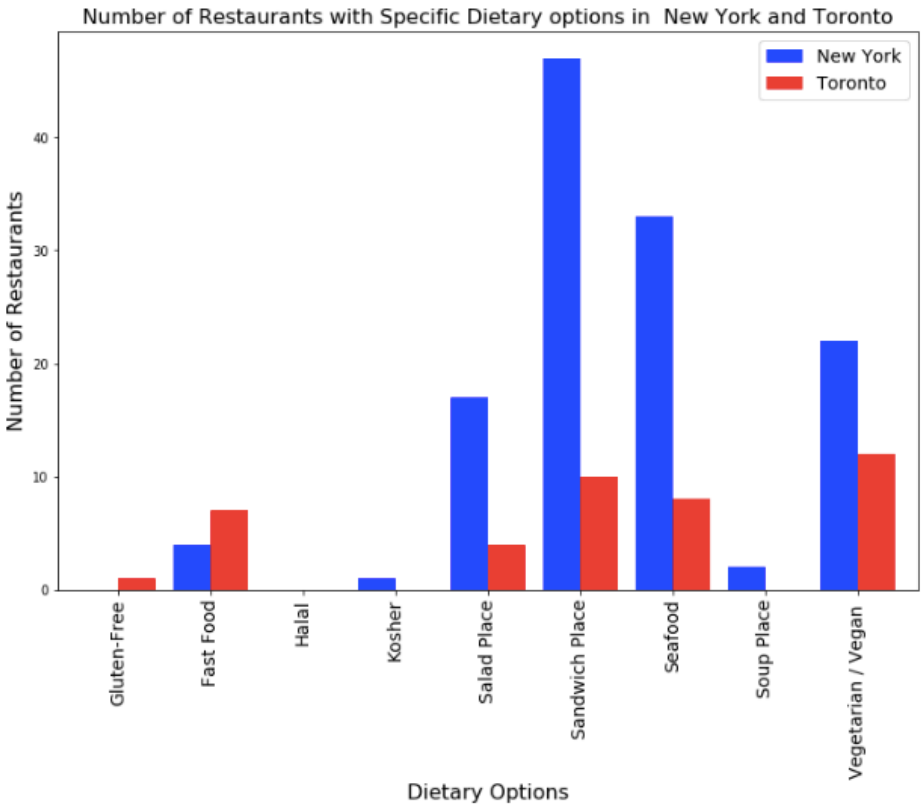

Fig. 1. Dietary Options in New York and Toronto

Qualitatively

The average rating for restaurants with healthy and unhealthy dietary options in both cities are shown in the following bar chart. As shown in this figure, the quality of the restaurants in both cities is outstanding in all categories.

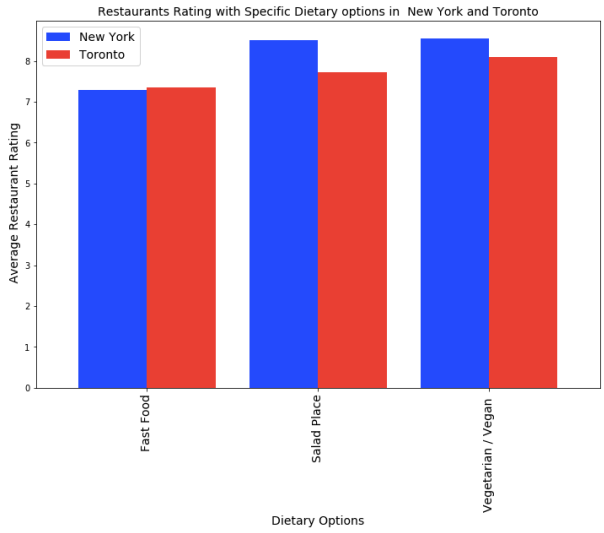

Fig. 2. Average Ratings of Restaurants with Special Dietary Options

Ethnic Cuisines

Fig.3. depicts numbers of restaurants for popular ethnic cuisines including Asian, European, Middle Eastern, Latin American cuisines each with three globally recognized ethnic foods as well as Ethiopian food representing Africa. As shown in the figure, Italian food is the most popular cuisine in both cities.

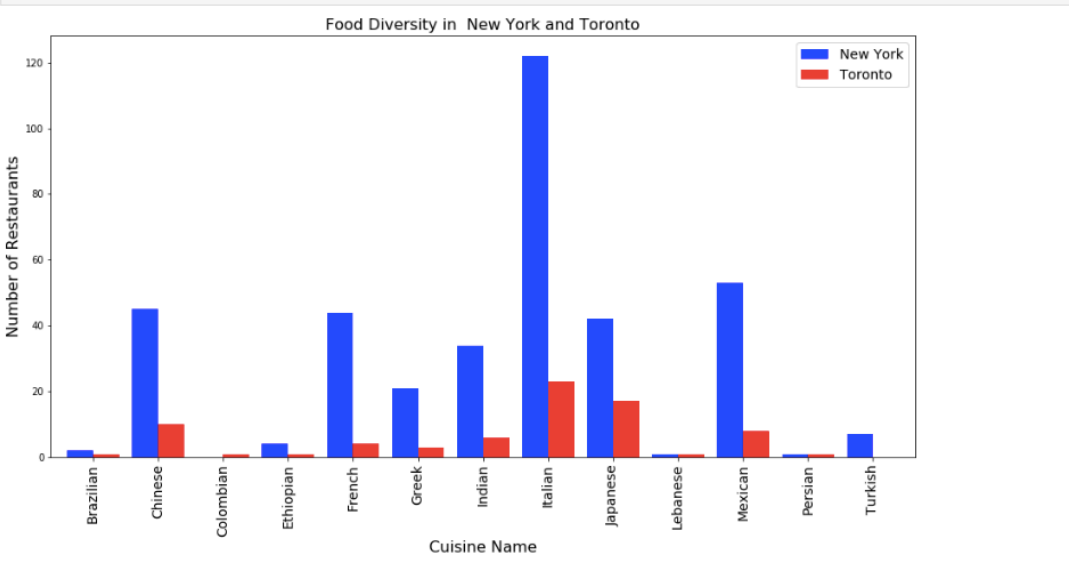

Fig. 3. Food Diversity

Green Space

As shown in Fig.4. New York city offers more parks and playground to its residents and tourist than Toronto. Also, the quality of playgrounds in both cities was shown in Fig. 5.

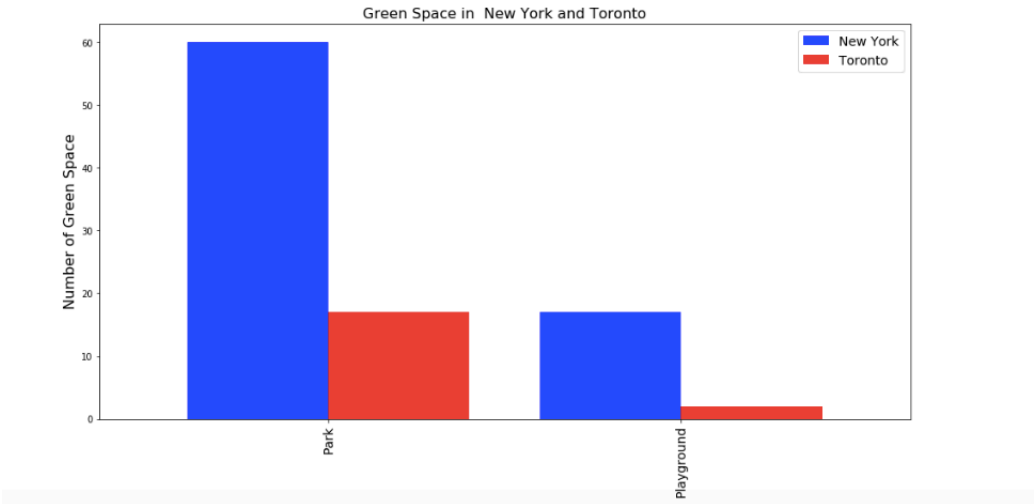

Fig. 4. Green Spaces in New York and Toronto

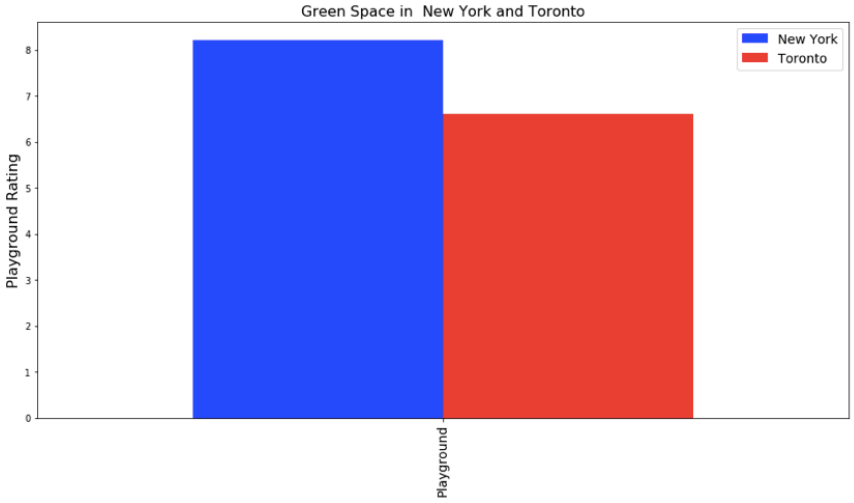

Fig. 5. Quality of Playgrounds

Neighbourhoods Clustering

In order to measure neighbourhoods' similarities, K mean clustering method was used. According to clustered data, the most common venues in both cities alternates between coffee shops, Italian restaurants and gyms. The following figures show the map of clustered neighbourhood downtown New York and Toronto.

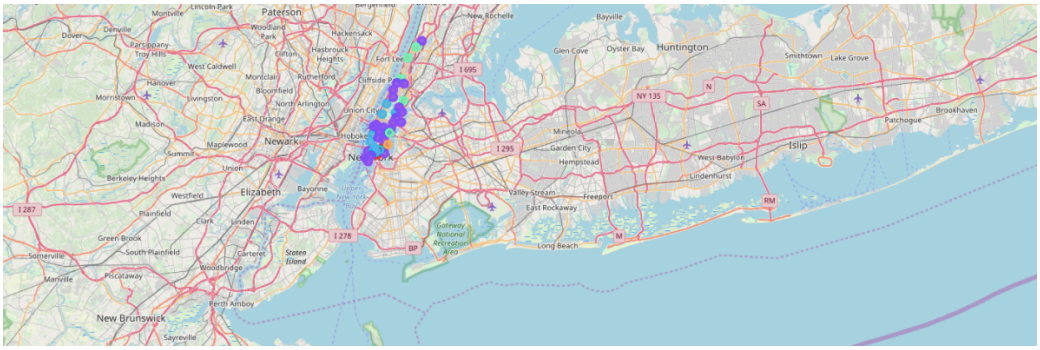

Fig. 6. Downtown New York Map

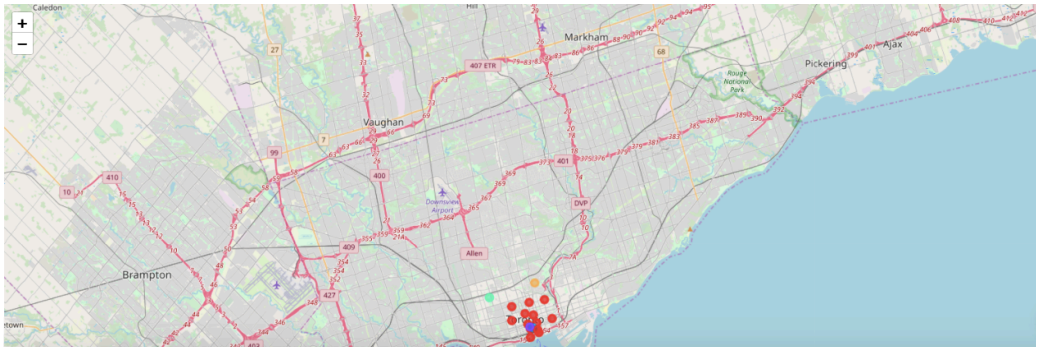

Fig. 7. Downtown Toronto Map

Discussion

According to the results, New York offers more variety of food options with higher number of restaurants in almost all categories than Toronto. In terms of ethnic diversity, Italian cuisine is by far the most popular food with 121 and 24 restaurants in New York and Toronto, respectively. Mexican food ranks second with 55 restaurants in New York, while the second most popular food in Toronto is Chinese cuisine with 17 restaurants. The least popular food in both cities was Middle Eastern cuisines. In general, New York has 5 times more ethnic restaurants for categories offered in both cities.

Nevertheless, the discrepancies between service quality for three specific dietary options, i.e. fast food, salad and vegetarian/vegan diet were less than 10%. The average ratings for unhealthy food, i.e. fast food, were 7.3 and 7.36 for New York and Toronto, respectively. While the highest difference in service quality between two cities was related to salad places with 8.51 and 7.73 for New York and Toronto, respectively. These values represent superiority of New York over Toronto in service quality only by 9%. Moreover, both cities failed to offer religious dietary options with no halal restaurant reported in both cities and only one Kosher restaurant.

A similar pattern can be observed for green spaces, i.e. parks and playgrounds, quantitatively. Where, New Yorkers and tourists can enjoy the city green space with 60 parks and 17 playgrounds. On the other hand, only 17 parks and 2 playgrounds are offered in downtown Toronto. Additionally, the average playground rating drops for Toronto by 19.2% in comparison to New York playgrounds with only medium rate of 6.6.

Furthermore, the most common venues in clustered neighbourhoods of New York are Italian and Mexican restaurants, and coffee shops, while coffee shops, gyms and bars are most common venues reported in Toronto.

Finally, one should interpret the results obtained from Foursquare platform cautiously. Despite being a useful platform to gather the general idea about a geographical location, the categories' labelling can be confusing and often incorrect. For instance, the number of Asian restaurants is less than the number of Chinese restaurants, as its subdivision, in both New York and Toronto cities. Additionally, the provided information by Foursquare is not updated or complete. In another example, I know for fact there is a halal restaurant in my city, i.e. downtown Toronto, but no halal restaurants was reported for both cities. This can be explained by mislabelling of restaurants' categories. In another words, each venue is labelled only with one category while in fact it may or may not be included in other categories and sub-categories. Additionally, in this report the population and size of cities were not considered. These factors can enhance the quality of report by offering normalized datasets that can facilitate us with better method of comparison.

Conclusion

In conclusion, this report can be used to compare downtown New York with Toronto in terms of food diversity as well as green spaces. The results demonstrate the supremacy of New York quantitatively with a large margin in nearly all categories. Nevertheless, the service quality in both cities is approximately equal for food sector, while in terms of offering high quality green space Toronto is behind New York with nearly 20% difference. In addition, the quality of this report can be improved significantly by considering the population and broadness of both cities.