

# **A Study of Neighbourhoods in the City of Toronto**

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## **1. Introduction**

Every year, millions of people from around the world come to Canada to visit, work, or study temporarily. In addition, more than 300,000 people are approved to make Canada their permanent home each year [1]. The Greater Toronto Area (GTA), currently welcomes 77 percent of new immigrants to Ontario, which translated to 106,000 newcomers to the GTA in 2018 [2]. This number amounts to one third of the total immigration number to Canada each year. As a successful immigration city, every aspect of it is related to the local immigration group. In this study, the relationship between the number of immigrants from Eastern Asia and the number of Eastern Asian restaurant in the City of Toronto is analyzed to provide information on decision making for both potential business owners and new immigrants from Eastern Asia.

## **2. Data Acquisition and Cleaning**

Toronto Open Data Portal provides a census data of the City of Toronto which contains the comprehensive data of all 140 neighbourhoods in the City of Toronto. It includes immigration and citizenship and other categories of demographic information. Since only the relationship between immigration from Eastern Asia and its according restaurants in the City of Toronto is of interest, the rest of the demographical aspects were removed. And a Total column was added since the influence of each individual Eastern Asian country is not of interest in this study.

Toronto Open Data Portal also provides a Geojson file for the neighbourhoods in the City of Toronto which contains their name, id, and boundary information. It is used to map the neighbourhoods in the city of Toronto.

At last, Foursquare API has been used to acquire the information and location of East Asian restaurants in the City of Toronto for the last section of the study.

### 3. Methodology

Folium library was used intensively to visualize the neighbourhoods, immigration distribution and restaurant distribution in the City of Toronto. Also, the regression plot from seaborn library was used to explore if there is any apparent of direct linear relationship between the immigration distribution and the restaurant distribution.

### 4. Data Analysis

There is a total of 140 neighbourhoods in the City of Toronto, their distribution is depicted in the following figure.

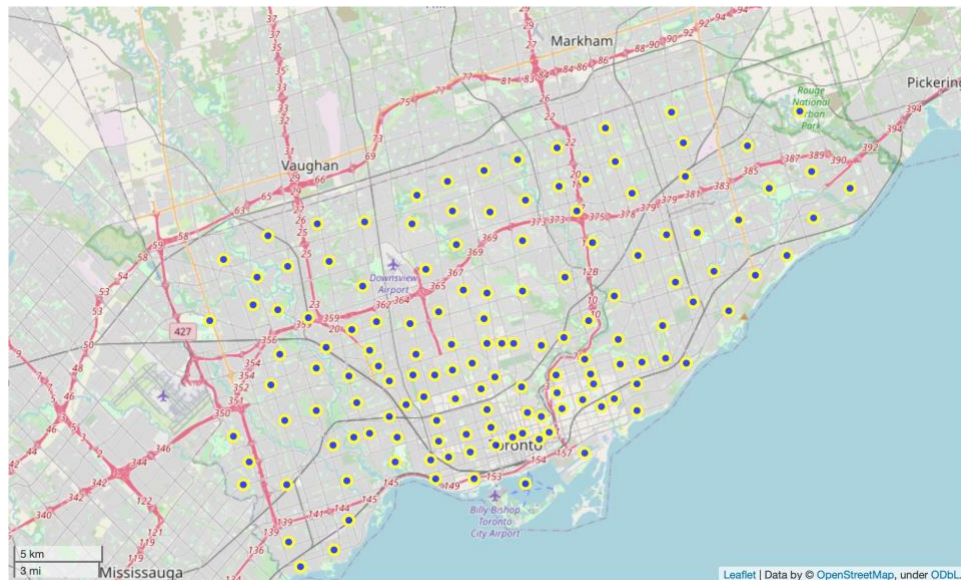


Figure 1: Visualization of the 140 neighbourhoods in the City of Toronto

The following figure shows the top 15 countries where most immigrants came from. It is also shown that Chinese consists of the largest immigration group in the City of Toronto. Since Eastern Asian countries share some common food cultures and to obtain more data from the Foursquare API, immigration groups from Eastern Asia will be studied in the following section.

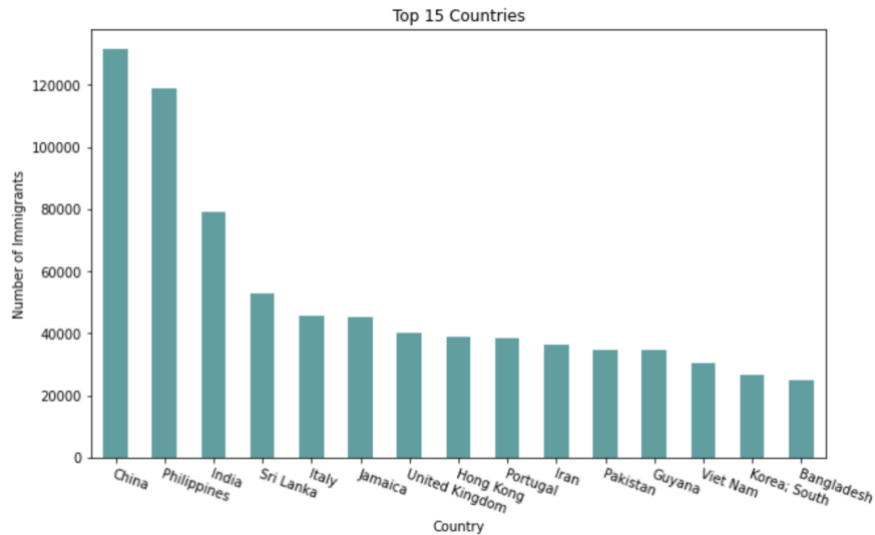


Figure 2: Top 15 immigration source countries.

As shown in the following choropleth map, the distribution of eastern Asian immigrants in the City of Toronto does has a pattern. North of Scarborough which borders with the city of Markham and North York which borders with the city of Richmond Hill contains significant more eastern Asian immigrants than the rest areas of the city of Toronto. Also, areas around downtown Toronto also has higher number of eastern Asian immigrants.

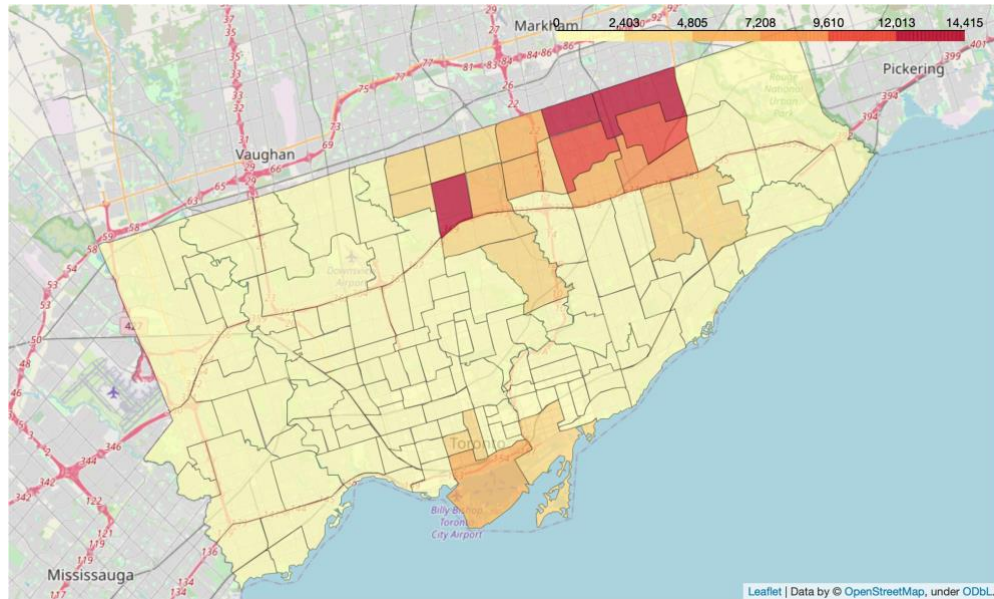


Figure 3: Visualization of Eastern Asian immiratns in the City of Toronto

All the Eastern Asian restaurants return by the Foursquare API are plotted in the following map. As it is shown, there are some Eastern Asian restaurants clustered together at the top right corner of Toronto and a lot of Eastern Asian restaurant resides along the Yonge street. Other than these, there is no apparent patterns shown in the map.

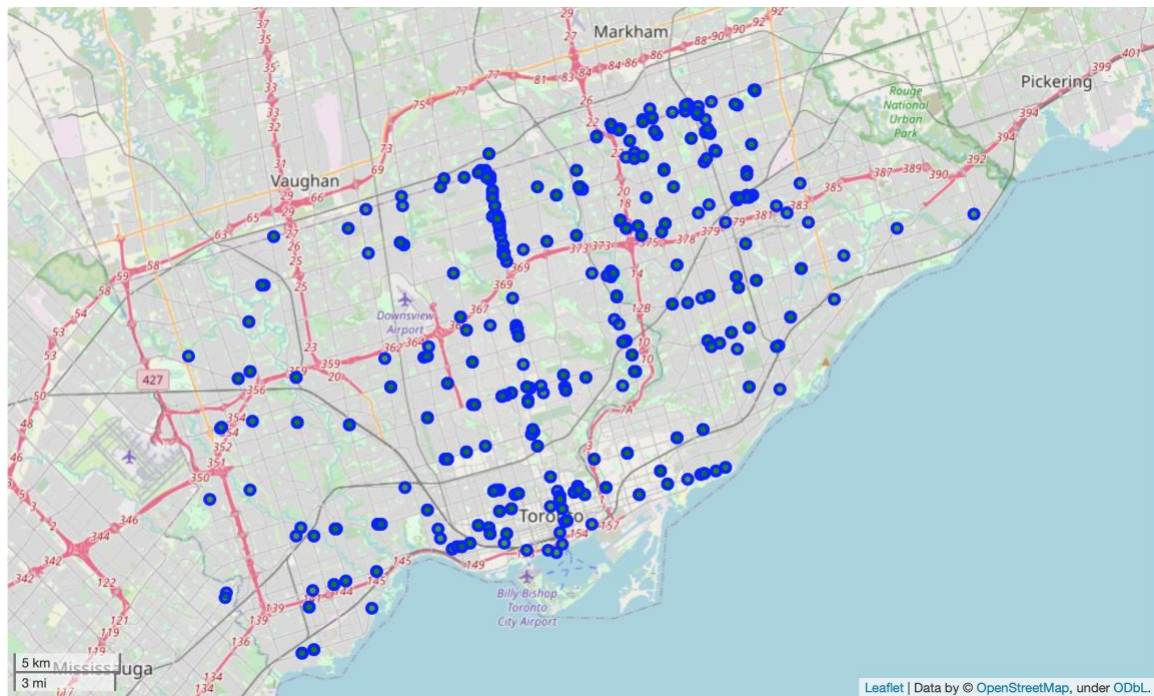


Figure 4: Distribution of Eastern Asian restaurants in the City of Toronto



By using clustered plot, the pattern mentioned above is more obvious.

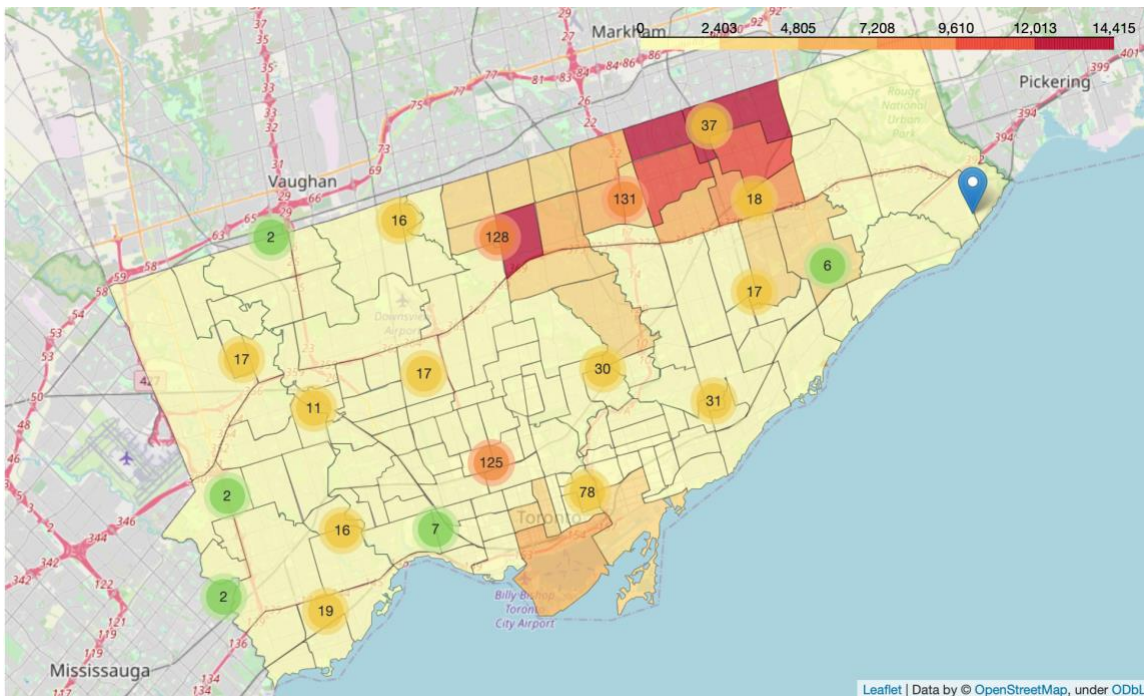


Figure 5: Cross-comparison of the distribution of Eastern Asian immigrants and Eastern Asian restaurants.

The following figure shows that there is no direct linear relationship between the Eastern Asian immigration distribution and the restaurant distribution in Toronto, even if they do relate to each other as analyzed before. This is probably because neighbourhood is too small as a unit to analyze this relationship. Borough can be used in the future work to further reveal this relationship.

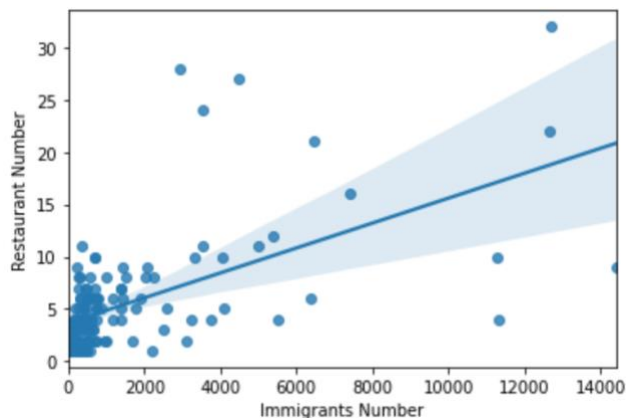


Figure 6: replot of Eastern Asian immigrant number vs Eastern Asian restaurant number

## 5. Conclusions

The analysis of the immigration distribution in the City of Toronto reveals that most of the immigrants from Eastern Asia reside at north of Scarborough and North York. And around these two areas, there are more Eastern Asian restaurants than the rest areas of the City of Toronto.

## 6. Future Directions

Foursquare API developer policies do not allow scraping-style requests, it only returns a maximum of 100 venues around a given location, even if a higher limit value is given. In this study, the request parameter radius was carefully tested to ensure a reasonable result. Equally distributed locations could be used in the requests in the future research to obtain a more accurate result. Only immigration information has been used to cross-compare with the restaurant distribution in this study. To obtain more useful guiding information for potential business owner and immigrants, data such as crime rate, local income level can also be compared with the immigration distribution.

## 7. References

- [1] Immigration, Refugees and Citizenship Canada  
<https://www.canada.ca/en/immigration-refugees-citizenship>
- [2] CIC News: Canada Immigration Newsletter  
<https://www.cicnews.com>

This is a report submitted to the Coursera in partial fulfillment of the requirements for the *IBM Data Science Professional Certificate*.