# Best Location for Opening an Indian Restaurant.
# NYC or Toronto?

## Introduction.

There are many good and delicious Indian restaurants in New York (USA) due to different factors. Among these drivers, we can mention big Indian diaspora living in New York, cultural diversity, food preferences of AMerican people, good purchasing power of city citizens. On the other hand, if we look at other North American capital - Toronto (Canada), we will not find huge verity of Indian food restaurants in spite of many common factors that have Toronto and New York:

- Both cities are North American capitals.
- Cities population numbers are similar (more than 3 millions).
- USA and Canada have almost the same dimension of the territory and quantities of countries' inhabitants.
- People in New York in Toronto have good purchasing power. Income levels in the capitals of USA and Canada are higher than in the rest of country.
- Indian culture and food can be interesting for both cities' residents, especially for immigrants from Indian Subcontinent.

The objective of this project is to find the best location for Indian restaurant in Toronto using the information regarding locations of Indian restaurants in New York. People who want to begin this kind of business in Toronto can be interested in this project.

## Data.

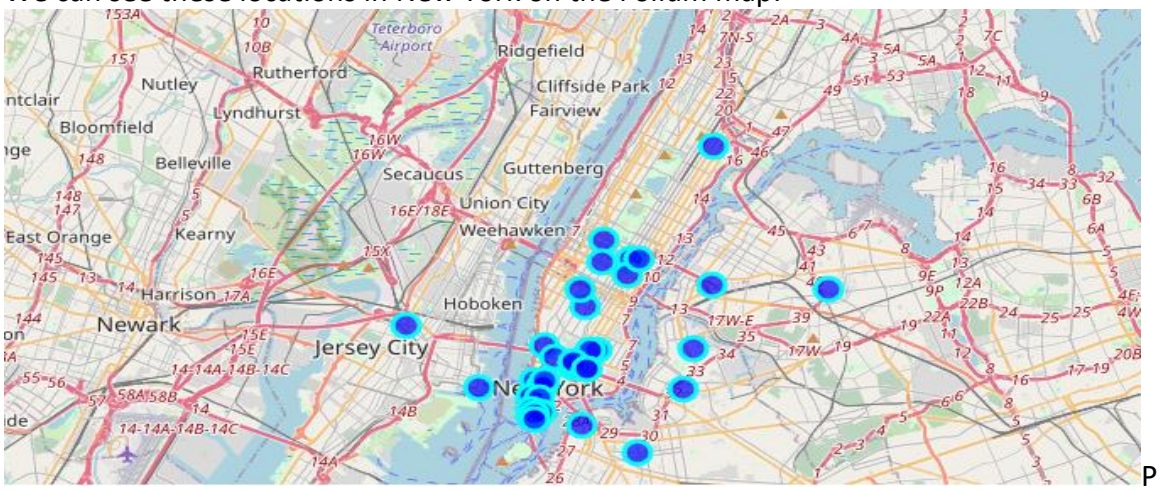
The main source of the data used in the project, is Foursquare geographical location information obtained from Foursquare developers web-portal (https://api.foursquare.com/v2/venues). I used search API's to find all Indian restaurants' locations in New York and Toronto. Found geographical information was cleaned up and transformed in the Python data frames in order to be able to use obtained data in further calculations.

We found 49 Indian restaurants in New York. Below is a part data frame of the found locations information.

| | Name | Category | Address | City | Latitude | Longitude |
|---|---|---|---|---|---|---|
| 0 | Indian Biryani Delights (Cart) | Food Truck | Water St | New York | 40.713165 | -74.010219 |
| 1 | A Saffron Thread Fresh Indian | Indian Restaurant | 98 Chambers St | New York | 40.714823 | -74.007689 |
| 2 | Bismilla Indian Biryani House | Food Truck | NaN | New York | 40.715357 | -74.011315 |
| 3 | Indian king Biriyani House | Food Truck | 140 Broadway | New York | 40.702540 | -74.012727 |
| 4 | National Museum of the American Indian | Museum | 1 Bowling Grn | New York | 40.704304 | -74.013759 |
| 5 | National Museum of the American Indian Museum ... | Souvenir Shop | 1 Bowling Grn | New York | 40.704048 | -74.013737 |
| 6 | Asya Indian Restaurant | Indian Restaurant | 46 Henry St | Brooklyn | 40.699607 | -73.992110 |
| 7 | Indian Express | Indian Restaurant | 18 Murray St | New York | 40.713413 | -74.008469 |
| 8 | Indian Beautiful Art (IBA) Crafts PVT Ltd | Clothing Store | 100 Church St | New York | 40.712281 | -74.010129 |
| 9 | Indian Beautiful Art (IBA) Crafts PVT Ltd | Design Studio | 100 Church St | New York | 40.716135 | -74.006610 |
| 10 | Panna II Garden Indian Restaurant | Indian Restaurant | 93 1st Ave | New York | 40.726273 | -73.986273 |
| 11 | Aahar Indian Cuisine | Indian Restaurant | 10 Murray St | New York | 40.713307 | -74.007994 |
| 12 | Ruchi Indian Cuisine | Indian Restaurant | 120 Cedar St | New York | 40.709962 | -74.012969 |
| 13 | Baluchi's Indian | Indian Restaurant | 176 Church Street | New York | 40.715672 | -74.007652 |
| 14 | smart indian cuisine | Indian Restaurant | 53 Nassau St | New York | 40.709022 | -74.009117 |
| 15 | Deep Indian Kitchen | Indian Restaurant | 25 W 23rd St | New York | 40.742025 | -73.990558 |
| 16 | Indian Grill & Biryani House | Food Truck | NaN | New York | 40.704245 | -74.009117 |

Pic. 1. Locations of Indian restaurants in New York. Head of Python data frame.

We can see these locations in New York on the Folium map:




Pic. 2. Locations of Indian restaurants in New York in Folium map.

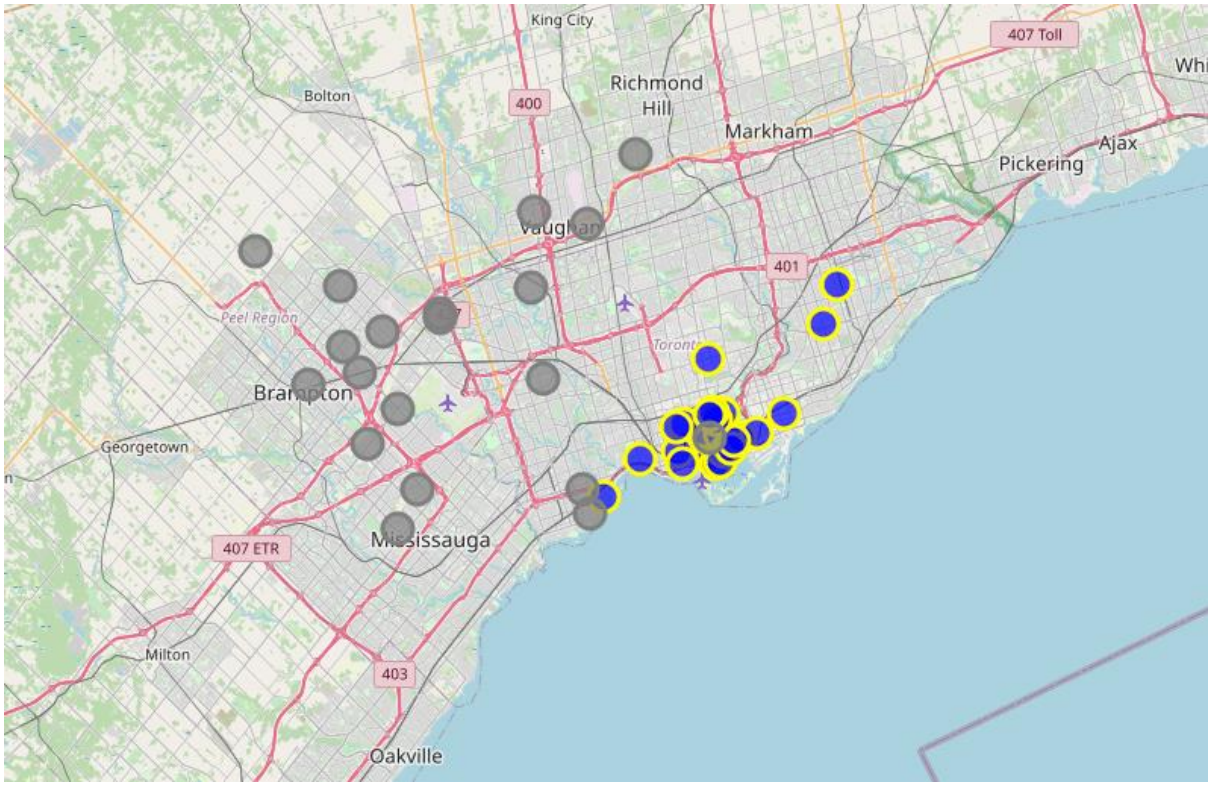
In Toronto 36 Indian restaurants were found. Results table (Pic. 3.) and locations marked on map( Pic. 4.) are below.

| | Name | Category | Address | City | Latitude | Longitude |
|---|---|---|---|---|---|---|
| 0 | Aroma Fine Indian Restaurant | Indian Restaurant | 287 King St. W | Toronto | 43.646463 | -79.389644 |
| 1 | 309 Dhaba Indian Excellence | Indian Restaurant | 309 King Street West | Toronto | 43.646394 | -79.390418 |
| 2 | Indian Biriyani House | Indian Restaurant | 181 Dundas St W | Toronto | 43.655120 | -79.386645 |
| 3 | Indian Biriyani House | Indian Restaurant | 120 Adelaide Street West | Toronto | 43.650050 | -79.380662 |
| 4 | Indian Flavour | Indian Restaurant | 123 Dundas St W | Toronto | 43.655649 | -79.384119 |
| 5 | Amaya Fine Indian Cuisine | Indian Restaurant | NaN | NaN | 43.646989 | -79.393345 |
| 7 | Marigold Indian Bistro \| Indian Restaurants in... | Fast Food Restaurant | 552 Mt Pleasant | Toronto | 43.644302 | -79.390002 |
| 8 | Jodpore Club Indian Cuisine | Indian Restaurant | NaN | Toronto | 43.655946 | -79.393504 |
| 9 | Indian Roti House | Indian Restaurant | 256 Queens Quay W | Toronto | 43.639060 | -79.385422 |
| 10 | Mami's Indian Cuisine | Food Truck | NaN | Toronto | 43.656986 | -79.385840 |
| 11 | Ram's Indian kitchen | Indian Restaurant | 199 Bay St 6 | Toronto | 43.648026 | -79.379819 |

Pic. 3. Locations of Indian restaurants in Toronto. Python data frame.

Hence it was clear that Toronto would be better choice for opening up a restaurant chain in Northern America.


In addition, I prepared 20 random locations in Toronto using Microsoft Excel and then loaded these locations in Python notebook. Below are the locations reflected in the Folium map (Pic. 6.).

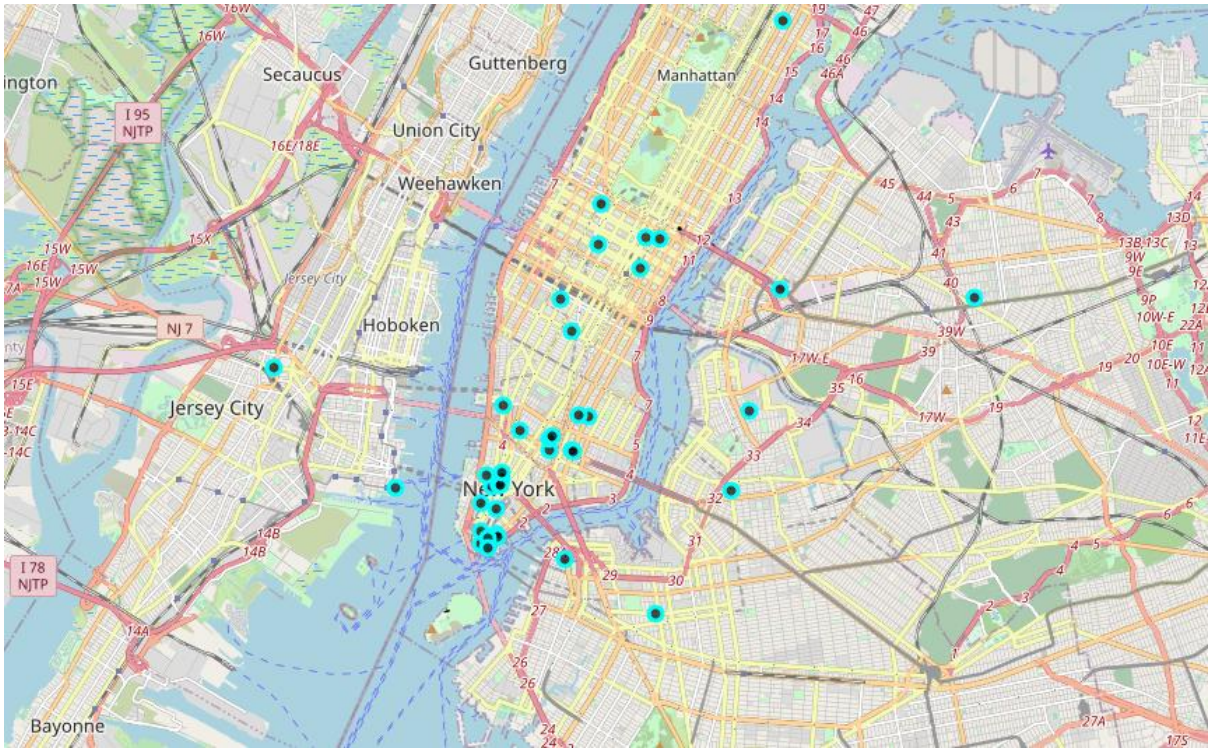



- The best locations in Toronto for opening new Indian restaurant, considering the existing geographical locations of Indian restaurants in New York. In this case some of random locations will belong to the best cluster (cluster with the biggest quantities of existing restaurants in New York city).

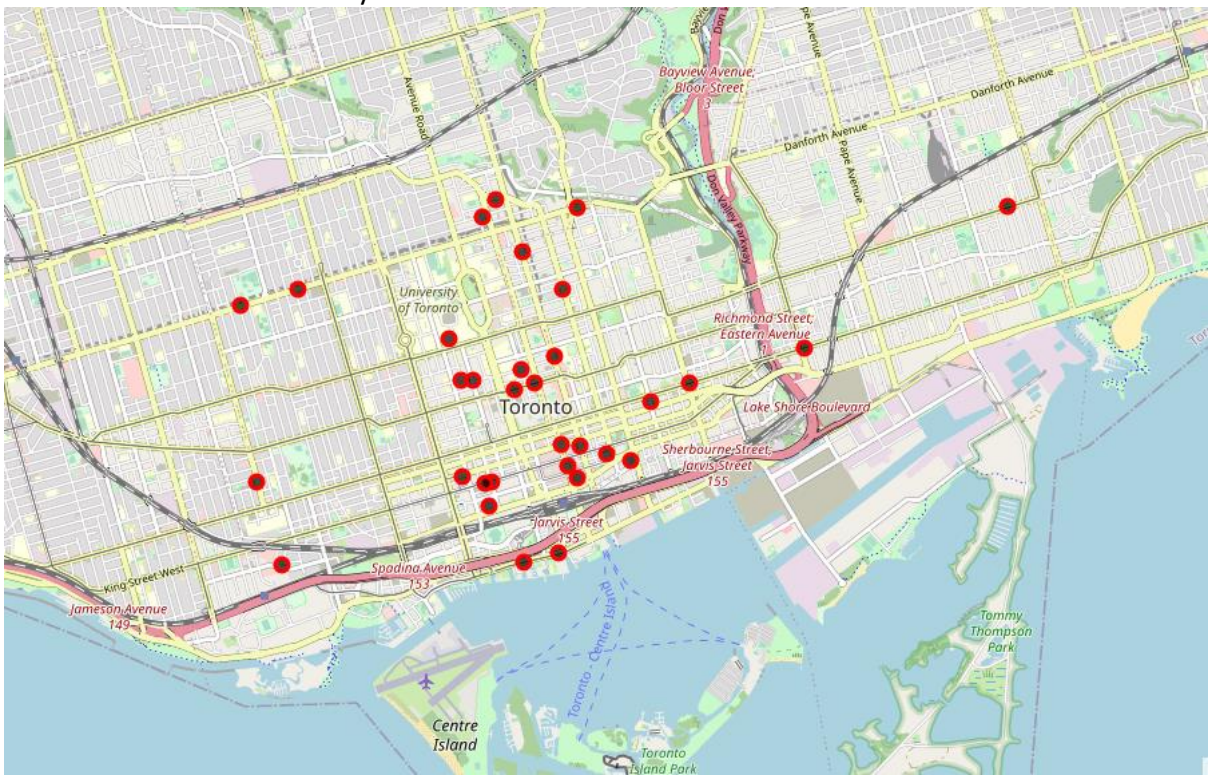
- Check if current locations of existing Indian restaurants in Toronto are good, looking at New York experience. Location is good if existing Toronto restaurant location belongs to the best cluster (cluster with the biggest quantities of existing restaurants in New York city).

## Methodology.

All collected data frames (existing Indian restaurants in New York, existing Indian restaurants in Toronto and randomly generated geographical locations in Toronto) were combined in one data set. We performed cluster analysis of this data set using k-means clustering method. Analysis was done in Jypyter notebook with Foursquare APIs geographical data location information. We investigated all venues located in the radius of 500 meters within each restaurant. Data set was divided in 25 clusters basing on venues similarity near each restaurant: shop, park, river, Chinese restaurant, bar, bus stop, office etc. Results are reflected in folium maps of New York (Pic. 6.) and Toronto (Pic. 7.).



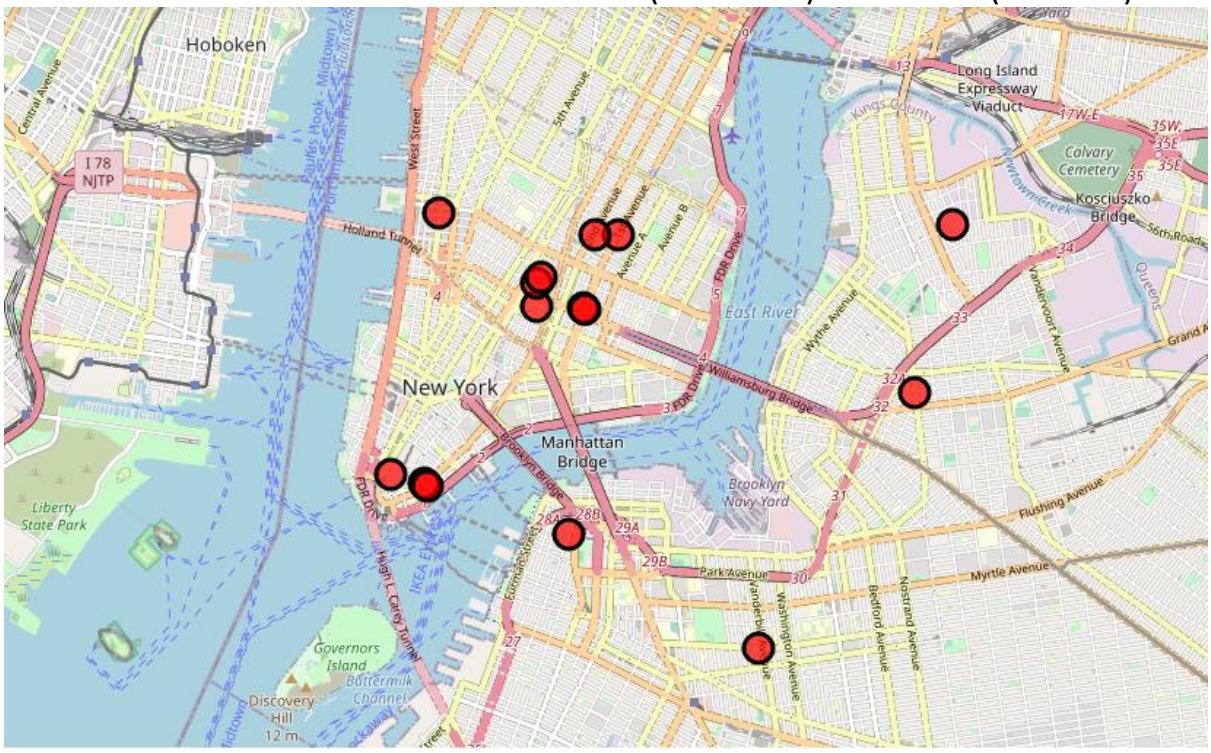
Pic. 6. Results of cluster analysis in New York.



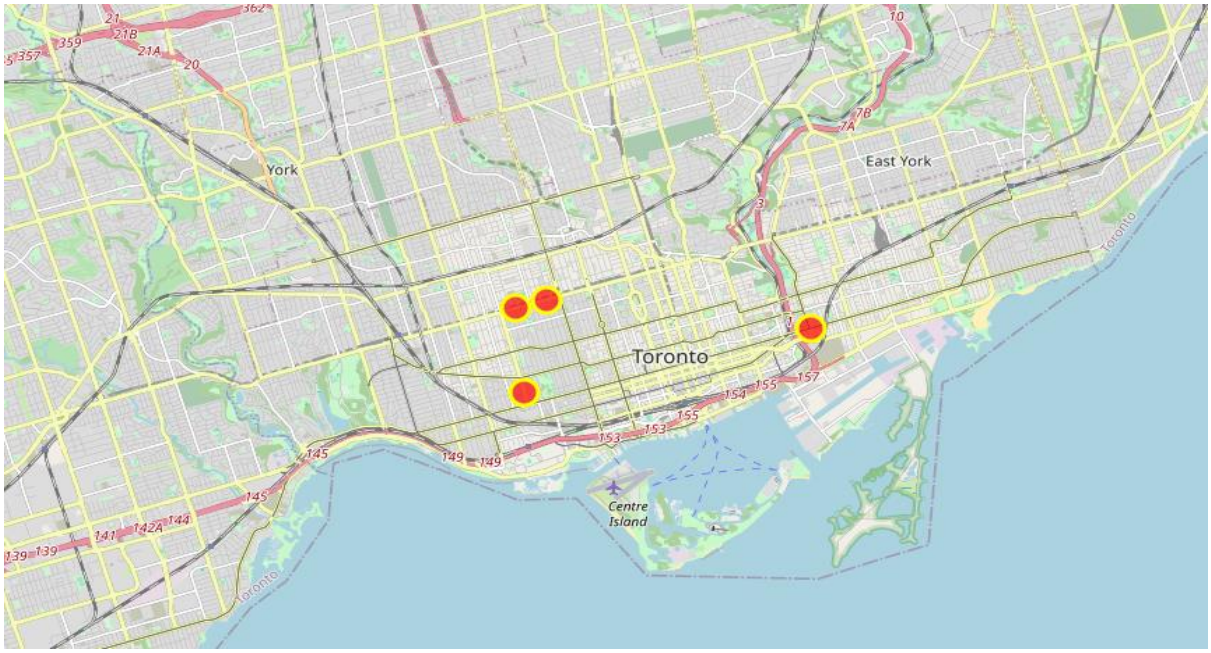
*Results.* Examining the clusters, we see that there are only two clusters with both New York and Toronto geographical locations. On the other hand, we also noticed that New York venues generally are different in comparison with Toronto locations. In cluster 2 we have only New York Indian restaurants located mostly in the northern part of New York. Also in cluster 9 there are only New York locations, mainly city center. It means that these locations are

very similar but in the same time, these locations differ from Toronto. In addition, we see that in Toronto there are many locations that are not similar to other locations in Toronto. We have 21 cluster with only one, two or three Toronto locations.

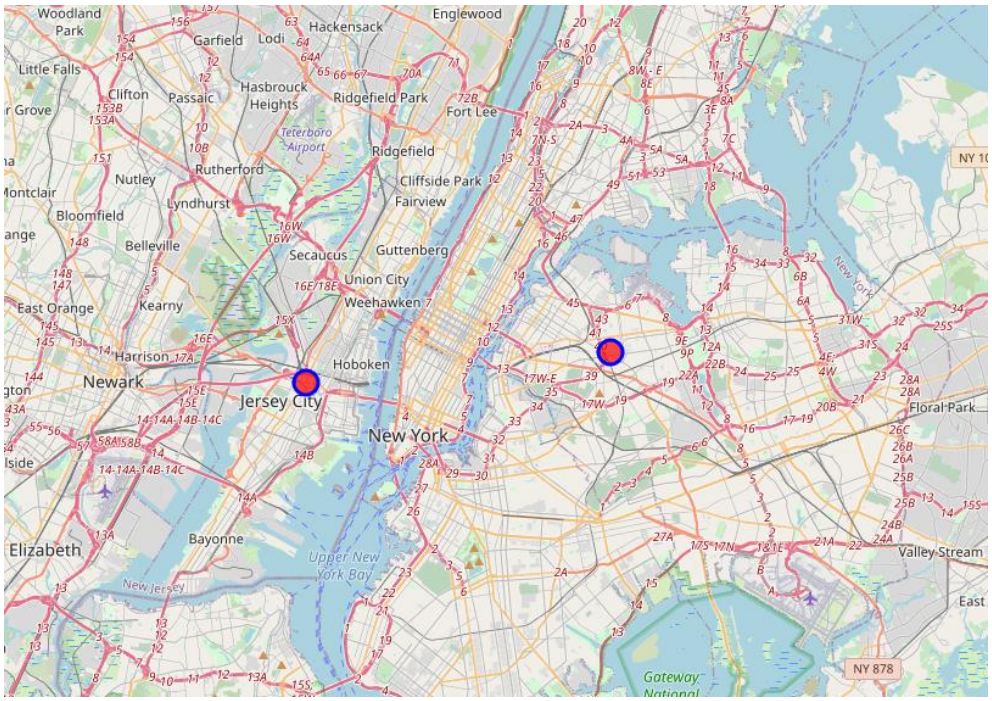
We can see cluster 3 coordinates in Pic. 7. (New York) and Pic. 8. (Toronto).

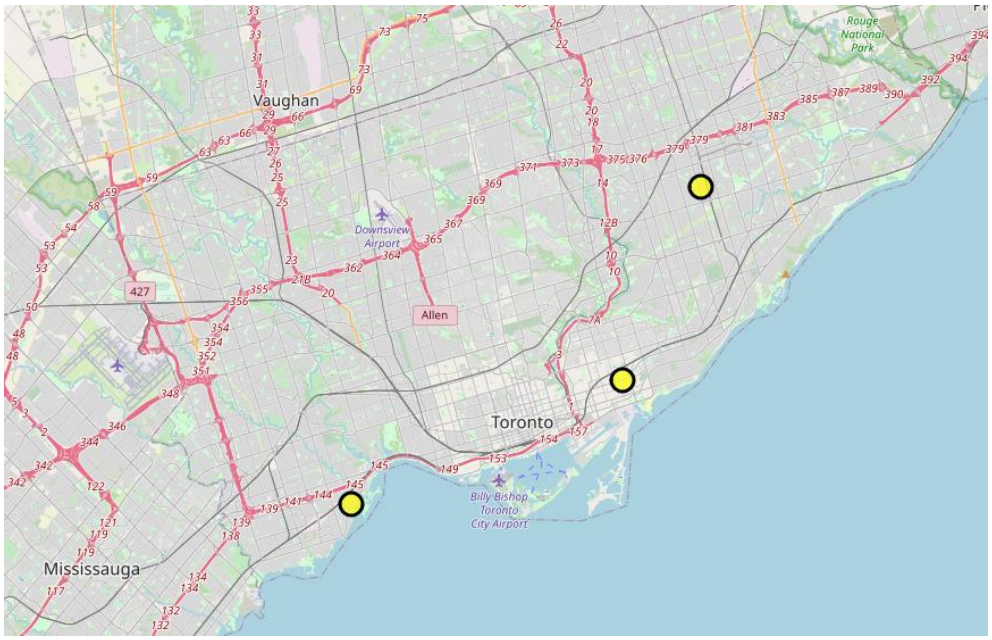



Cluster 3 contains 14 Indian restaurants located in the NY city center and 4 locations situated in Toronto mainly in center and in inhabited districts of Toronto.



Cluster 8 is presented in Pic. 9. (New York) and Pic. 10. (Toronto). In this cluster we see six New York Indian restaurants located mostly far from city center, and eleven geographical locations in Toronto. Locations of these two restaurants correlate with locations of Indian restaurants in New York.




This analysis based only on the similarity of the venues situated near existing or possible locations of Indian restaurant. Other drivers, such as administrative permissions, competitors' activities, economic factors or cultural preferences are good objectives for further investigations.