

## **Introduction**

Toronto is the most populous city in Canada with over 6 million people. Being a multicultural and cosmopolitan city, people of varied ethnic backgrounds dwell here. As Toronto is also a business hub, visitors from around the globe arrive here and hang out in restaurants, pubs and shopping malls. With an influx of people, new restaurants pop up on a frequent basis to satiate the visitors' palates.

A study by Ohio State University revealed that nearly 60% of restaurants close or change ownership within the first year and 80% fail within the first 5 years. With the average restaurant profit margins falling between 3-5%, it's vital to set the business up for success from the beginning by having a strategic plan for significant foot fall and minimum competition.

Two important points to consider before setting up a restaurant in Toronto are to understand the ethnic backgrounds of its residents and keep the competition at a bare minimum.

**This project focuses on assisting any party interested in opening a restaurant by:**

- a) Identifying the ethnic backgrounds of residents in a given neighbourhood in Toronto and**
- b) Locating a neighbourhood where the competition of similar restaurants is lowest**

**Any potential entrepreneur looking to open a restaurant in the city of Toronto can be benefited by this analysis** as the objective of this project is to cluster the neighbourhoods based on the ethnicity of its residents and also intend to identify the presence of similar restaurants which would minimize competition.

Based on the food preferences of people living in the vicinity of the restaurant the right type of cuisine can be offered to the customers. When there is limited competition more customers can be expected to visit our restaurants and thereby maximizing business and profits. We use Foursquare API to retrieve and study any existing competitors in the neighbourhood. This is done by filtering the specific list of restaurants from the overall list of venues we obtain from the Foursquare API query.

Hence, it is imperative that anyone interested in opening a new restaurant should study the demographic distribution of the neighbourhood and identify any competition before deciding on the type of restaurant and its location.

## **Data**

Demographic data about Toronto is available on the [www.toronto.ca](http://www.toronto.ca) website.

Data: [https://www.toronto.ca/ext/open\\_data/catalog/data\\_set\\_files/2016\\_neighbourhood\\_profiles.csv](https://www.toronto.ca/ext/open_data/catalog/data_set_files/2016_neighbourhood_profiles.csv)

The above file has comprehensive data of the residents of Toronto city which includes:

- a) Population
- b) Income

- c) Education
- d) Ethnic origin
- e) Languages spoken
- f) Mobility

Below is how the data looks:

	Category	Topic	Data Source	Characteristic	City of Toronto	Agincourt North	Agincourt South-Malvern West	Alderwood	Annex	Banbury-Don Mills	...	Willowdale West	Willow Martin Ric
0	Neighbourhood Information	Neighbourhood Information	City of Toronto	Neighbourhood Number	NaN	129	128	20	95	42	...	37	
1	Neighbourhood Information	Neighbourhood Information	City of Toronto	TSNS2020 Designation	NaN	No Designation	No Designation	No Designation	No Designation	No Designation	...	No Designation	Desig
2	Population	Population and dwellings	Census Profile 98-316-X2016001	Population, 2016	2,731,571	29,113	23,757	12,054	30,526	27,695	...	16,936	4
3	Population	Population and dwellings	Census Profile 98-316-X2016001	Population, 2011	2,615,060	30,279	21,988	11,904	29,177	26,918	...	15,004	4
4	Population	Population and dwellings	Census Profile 98-316-X2016001	Population Change 2011-2016	4.50%	-3.90%	8.00%	1.30%	4.60%	2.90%	...	12.90%	

For our analysis we need only the 'Ethnic Origin Population' data available under the column 'Characteristic' and the different neighbourhoods available along with their respective populations. The neighbourhoods are provided as columns 6 to 144. Each neighbourhood contains data split on its residents with respect to different ethnicities.

The remaining of the columns in this data are redundant to our analysis and can be dropped.

Only ethnic origins with high number of residents (such as Chinese, English & other European countries, Indian) are retained to simplify our analysis and the rest are left out as their numbers are not quite significant.

### **Foursquare API**

Foursquare API offers location based experiences with diverse information about venues, users, photos and check-ins. Using Foursquare API, a free application providing geographical data, we can retrieve the different venues available in the various neighbourhoods of Toronto city.

The link to this application is: <https://foursquare.com/developers/apps>

This website is easy to use and has excellent documentation on creating developer account and how to retrieve the location data. Our interest lies in obtaining the list of restaurants and other eateries in various neighbourhoods using Foursquare API. The retrieved data can be used to filter out the type of restaurant we are looking for and then be compared against the existing ethnic population and competitors to make a calculated decision on setting up any new restaurant.

Once the neighbourhood coordinates are provided into the Foursquare API query, we can retrieve a list of venues within a particular radius of that coordinates. An example of the retrieved list of venues is:

```
{
  "meta": {
    "code": 200,
    "requestId": "5ac51d7e6a607143d811cecb"
  },
  "response": {
    "venues": [
      {
        "id": "5642aef0498e51025c4a7a5",
        "name": "Mr. Purple",
        "location": {
          "address": "180 Orchard St",
          "crossStreet": "btwn Houston & Stanton St",
          "lat": 40.72173744277209,
          "lng": -73.98806687282996,
          "labeledListings": [
            {
              "label": "display",
              "lat": 40.72173744277209,
              "lng": -73.98806687282996
            }
          ]
        },
        "distance": 8,
        "postalCode": "10002",
        "cc": "US",
        "city": "New York",
        "state": "NY",
        "country": "United States",
        "formattedAddress": [
          "180 Orchard St (btwn Houston & Stanton St)",
          "New York, NY 10002",
          "United States"
        ]
      },
      {
        "id": "4bf58dd8d48988d1d5941735",
        "name": "Hotel Bar",
        "pluralName": "Hotel Bars",
        "shortName": "Hotel Bar",
        "icon": {
          "prefix": "https://ss3.4sqi.net/img/categories_v2/travel/hotel_bar_",
          "suffix": ".png"
        },
        "primary": true
      }
    ],
    "venuePage": {
      "id": "150747252"
    }
  }
}
```

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The above data can be filtered out and only the required type of restaurants be retained for our analysis. Using the coordinates of the neighbourhood and by looking at the existing types of restaurants and their numbers, one can come to a decision whether it's a reasonable location to start a new restaurant.