

Starting Restaurant Business in Toronto

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Introduction

With the development of tourism in Canada, restaurant industry has become an attractive area for investors over the world. From 1980, the immigration has introduced new funding resources, human resources, management methods and other different resources in food industry in Canada and according to a report [1], only the Chinese restaurant industry in Toronto, Vancouver, Montreal and Ottawa has reached a total investment of \$500 million in 1998.

Even the restaurant industry contains a small profit margins in Canada (around 2% to 6% on average [2]), a clear grown trend has been observed from \$61 billion in 2010 to \$85 billion in 2017 [3]. Also the development of Internet and artificial intelligence stimulates the restaurant industry from table online reservation to food-fast-ordering and restaurant recommendations by applications. Additionally, in order to attract new investors, the Canada Public Health Section has published several regulations to ease the process in starting food and restaurant business in Toronto [4].

In this research, the following questions, “Where are the best choices of neighbourhoods to start a restaurant business in Toronto city?” and “Which type of restaurants should be recommended to be opened in different neighbourhoods in Toronto city?”, will be answered. The recommended locations and restaurant types in some neighbourhoods are provided with a clarified explanation and analysis and the target audiences of this research are the stockholders who have interests in investing and starting restaurant business in Toronto.

Data

In order to answer the above questions, some data investigations of the neighbourhoods in Toronto city, in terms of the neighbourhood geographic information, the population distribution, the number of attractions and famous local venues such as universities, are required. Firstly, the local people's situations, such as income level and age group distribution, are used to select some target neighbourhoods to open the restaurant. The targeted neighbourhoods should contain high expense (or income) level. Then the current business saturation level, such as the number of different restaurant types, is used to obtain the recommendation of the types of restaurant in each targeted neighbourhood. Then the data used in this research is listed as follows:

- Foursquare API
- Toronto Open Data
- Google Maps API

The main geographic data resources are Toronto's neighbourhoods' information in Foursquare's database [5]. With the help of Google Maps API, the central locations of different neighbourhoods can be targeted. Toronto's Neighbourhood Profiles, provided by Toronto's city council's Open Data Website [6], are the main data resource for the population distribution in different age groups and

income levels. The above geographic data will be used to obtain the location distribution of the number of different restaurant types in each neighbourhood and then we could answer the first question about the best locations to open a restaurant. Usually, the best location contains the highest number of famous venues, highest income level and population level in a city.

Then the population information in different age groups in Toronto's Neighbourhood Profiles data is used to investigate which type of restaurants are the best choices in these best locations, along with the local restaurants' situations. Often new restaurant type leads to potential profits but the real needs in a neighbourhood, such as the age distribution, should be considered. Also the ranking of the same type of restaurants should be considered in order to answer the second question. For example, a Japanese restaurant could be a good choice in a neighbourhood with a small number of Japanese restaurant, and an Italian restaurant could be also a good choice if many Italian are living in this neighbourhood and the local Italian restaurants have low rating results.

Methodology

In order to have a good start, the datasets of Toronto are investigated and some datasets merge and data cleaning work has been. The main work has been done including investigate the number, the name and location information (latitude and longitude) of the neighbourhoods in Toronto. The map of all neighbourhoods is illustrated in Fig.1. There are 141 neighbourhoods in Toronto which are illustrated as blue points in Fig. 1, but the number of neighbourhoods used in this project is 131 due to the information missing in different datasets.

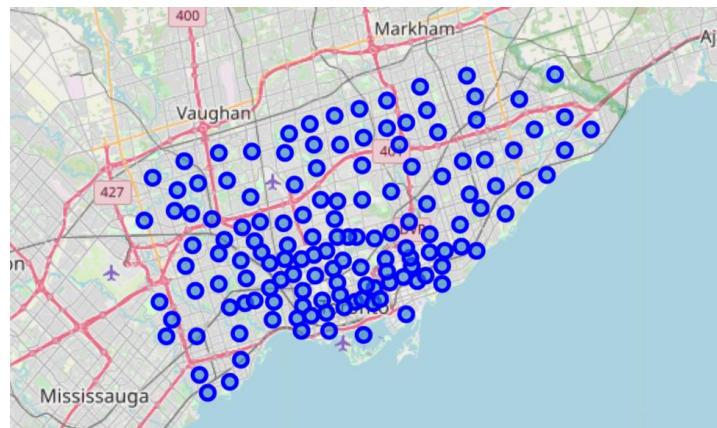


Fig. 1. The map of all neighbourhoods in Toronto.

The next work is to investigate the impact factors in starting a restaurant business, including the age groups, the income levels, the immigration distributions, and the top 5 popular restaurants in each neighbourhood. The age group distribution stands for the potential customer clusters and a neighbourhood with a higher total population contains a higher number in potential customers. The annual income level reflects the purchasing power which is very important to keep the business development. The immigration distribution indicates the diet habits and is important to the choice of the types of restaurant. Lastly, fierce competition is what a newly started business needs to avoid, so that the top 5 popular restaurants are considered in the research.

Then gathering the age distribution, income level and the popular restaurants, a dataset for clustering the neighbourhoods is obtained. The K-Means clustering algorithm is implemented to cluster the neighbourhoods, with a cluster number of 5. The data used for K-Means clustering are the densities (the ratio between the value and the total value in this section) and we use the top 5 popular

restaurants instead of all the restaurant due to the difference between these two values is very small but the computational complexity is reduced. The map of the clustered neighbourhoods is illustrated in Fig. 2. As we can see, the geographic locations of the two main groups are divided clearly, except very few outliers.

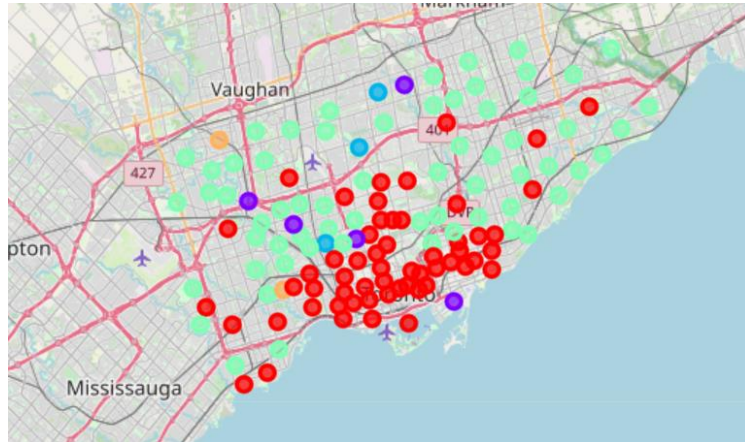


Fig. 2. The map of the clustered neighbourhoods in Toronto by age, income and top 5 popular restaurants.

Then by grouping the information of the neighbourhoods in each cluster, we obtained some insights of the clusters. The details are introduced in the following section.

Results

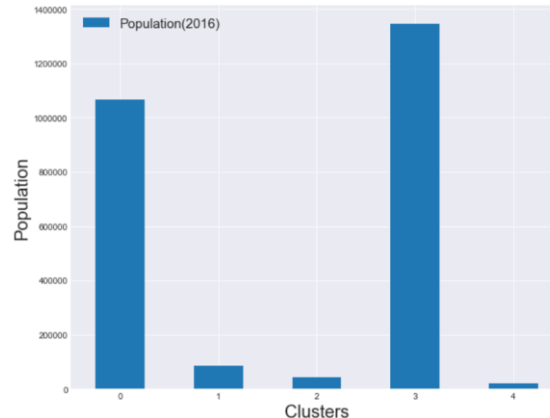


Fig. 3. Populations in each cluster.

In Fig. 3, the population in each cluster is illustrated. As we can see, the main clusters illustrated in Fig. 2 are Cluster 0 and 3, which contains the highest number of potential customers, compared to the other clusters. Followed the population distribution, in Fig. 4, the total income in each cluster is compared. It is clearly the income level is proportional to the population, which indicates the cluster 0 and 3 contains the highest purchasing power and potential customer levels.

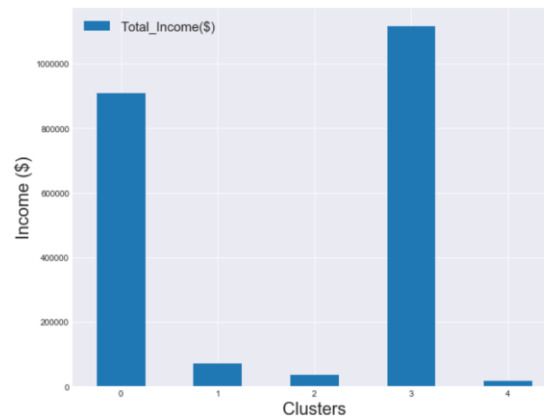


Fig. 4. Income level in each cluster.

The number of top 5 popular restaurants in each cluster is shown in Fig. 5. It is interestingly to find that the number of restaurants in cluster 0 is about 1.5 times bigger than that in cluster 3, while the annual income and population level in cluster 3 is higher than that in cluster 0. In this case, the best choice of starting a restaurant business is the neighbourhoods in cluster 3, which contains a lower number of restaurants but the top purchasing power and potential customer level.

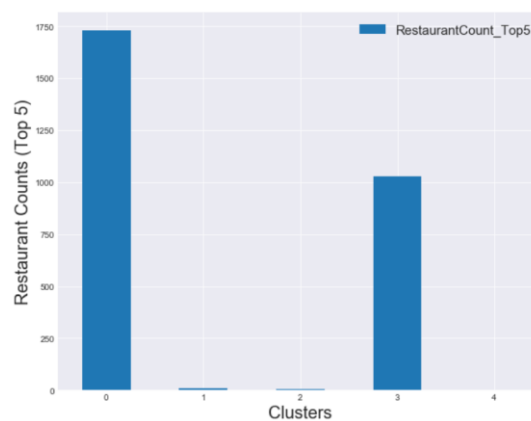


Fig. 5. The number of most popular restaurants (Top 5) in each cluster.

Discussion

As we have obtained the best choices of neighbourhoods to start a restaurant business, we will discuss the choices of the type of the restaurant. In order to answer this question, the number of the top 10 popular restaurants and the nation distribution in cluster 0 and 3 are investigated, as illustrated in Fig. 6 and 7.

As illustrated in Fig.6, the restaurant types are very different in cluster 0 and 3, which leads to the debit habits of the people in cluster 0 are distinguished from that in cluster 3. More small restaurants, such as coffee shops, pizza and sandwich restaurants, are more popular in cluster 0. While in cluster 3, numbers of coffee and fast food restaurants are opened, but the total number is much less than that in cluster 0. Additionally, foreign restaurants, such as Chinese, Caribbean and Indian, contributes the restaurant with second, fifth and seventh ranking.

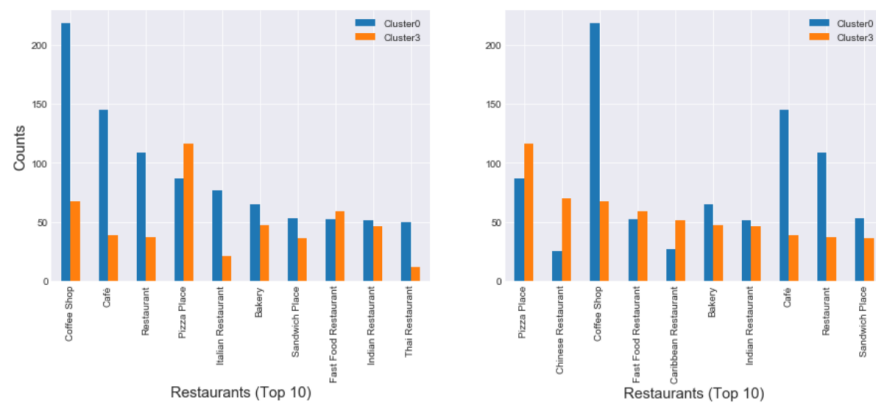


Fig. 6. The top 10 popular restaurants in cluster 0 and 3 sorted by cluster 0 and 3.

Let's have a look at the nation distribution in cluster 0 and 3. As we can see, the local people occupies the largest population in both clusters, followed by Chinese, Philippines and Indian. However, the Chinese and Philippine restaurants are out of top 10 popularity in cluster 0. While in cluster 3, Chinese restaurants is the second popular restaurant. In this case, the debit habits of the people in cluster 0 and cluster 3 are very different from each other.

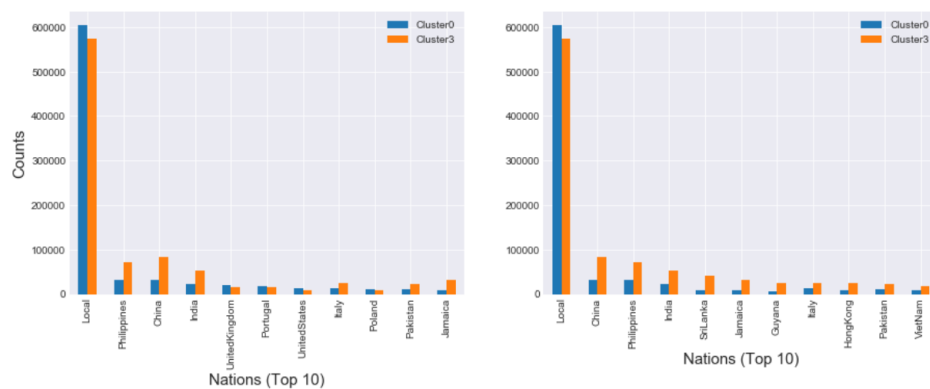


Fig. 7. The top 10 nations in cluster 0 and 3 sorted by cluster 0 and 3.

Conclusion

In this project, the optimal choices of neighbourhoods to start a restaurant business is investigated based on the information of the neighbourhoods. To opening a restaurant business is actually complex and more practical conditions need to be considered, such as the development level of the neighbourhood and the investment level, etc. According to our research, the optimal neighbourhoods to start a restaurant business are the neighbourhoods in cluster 0 and 3. And the restaurant choices are Chinese or Philippine restaurant in neighbourhoods in cluster 0 and Philippine restaurant in neighbourhoods in cluster 3. If the restaurant business is a chain, then Philippine restaurant is the first recommendation.

Reference

[1]. Q. Ye, 'Business and Management Strategy in Canadian Chinese Restaurant', Overseas Chinese Journal of Bagui, No. 2, June 2010.

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- [5]. Foursquare, <https://foursquare.com/>
- [6]. City of Toronto's Open Data Portal, <https://open.toronto.ca/>