Spacial Location of Restaurants in Toronto and Possible Location for a New Site (This is ONLY for Week 1.)

Hideyuki SAKONO

June 21, 2021

1 Introduction/Business Problem

1.1 Introduction

The decision making on opening a new restaurant is always difficult problem for an individual owner or a company. Usually, deciding the location of the new restaurant or shop involves intensive data analysis not only on the location but also other aspects, such as the size of existing shops, demographic and transportation aspects of the surrounding area of the potential target location. However, in its early stage of the decision making process, a quick and basic graphical representation of data would give the stakeholders useful intuitions on the feasibility of opening-up a new restaurant.

1.2 Business Problem

It is natural to assume that the location of restaurants differs depending on the types of restaurants. In addition to the difference between fine and casual dining restaurant, difference in ethnic restaurants is necessary to be considered. In this process, the locations of ethnic enclaves in Toronto need to be considered. For example, there should be many Chinese restaurants in Chinatown and may be relatively large number of Japanese restaurants in Little Tokyo area. In this assignment, simple special distributions of several types of restaurant in Toronto downtown area will be shown based on the data

from Foursquare and the difference will be discussed according to the type. Then, based on the basic comparison, one type of restaurant, for example Italian restaurant, will be focused and the possible strategy for the location of a new shop based on the data.

2 Data

2.1 Target Data

For comparing several types of restaurants' locational data, three types of restaurants located in the same area will be searched, which will be Chinese, Italian, and Japanese. The target area will be the downtown area of Toronto, which will be circular area with radius of 2000 meters from the point of "Toronto, ON" generated by geolocator (43.6534817, -79.3839347) in this assignment.

2.2 Usage of Data

2.2.1 Target Area

This report focuses on downtown Toronto and several types of ethnic restaurants and target areas of this report will be discussed. There are two restrictions for the analysis in this report. One is the size of areas defined by radius from its center point and another is the numbers of venues within that area extracted via Foursquare API, which is 100 for free user. By looking at downtown area of Toronto considering ethnic enclaves, Chinese and Japanese restaurants' location of in this area may be affected because many ethnic restaurants tend to be densely located in these areas (see figure ??. https://www.mapdevelopers.com/draw-circle-tool.php?circles=%5B%5B1000%2C43.6534817%2C-79.3839347%2C%22%23AAAAAA%22%2C%22%23000000%22%2C0.4%5D%2C%5B2000%2C43.6534817%2C-79.3839347%2C%22%23AAAAAA%22%2C%22%23000000%22%2C0.4%5D%5D). In addition, its radius should be less than 2 km (12.4Miles) because the area of Lake Ontario will be contained if we put its radius longer than 2 km.

The number of data points extracted from Foursquare by changing the value of radius is shown in the figure . Maximum number of the data here is limited to 100 so the Chinese and Japanese restaurants' plots are not accurate in larger number of radius; however, the purpose of this map is showing

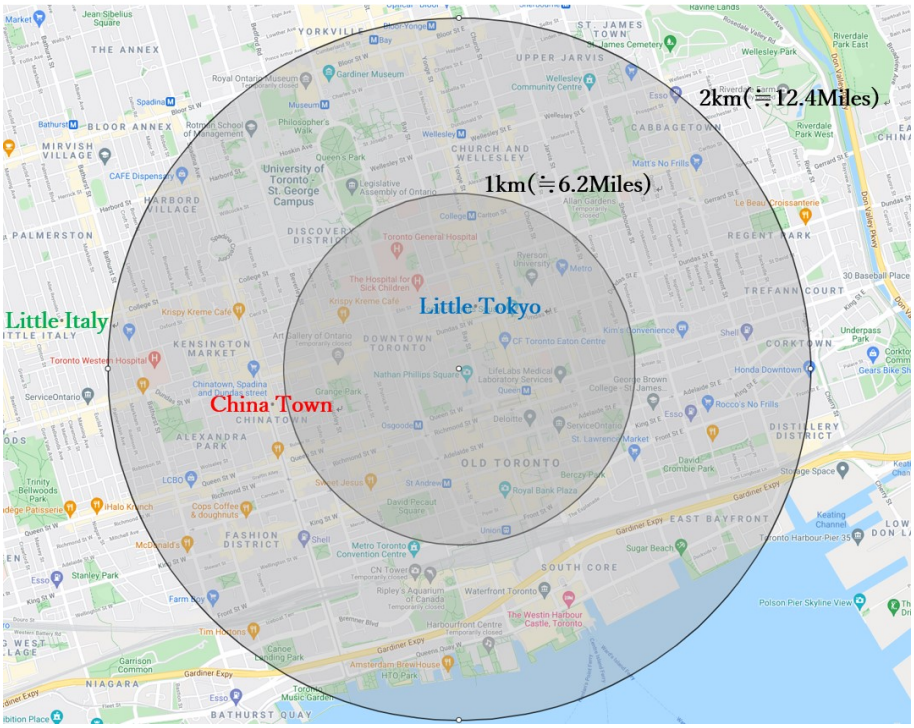
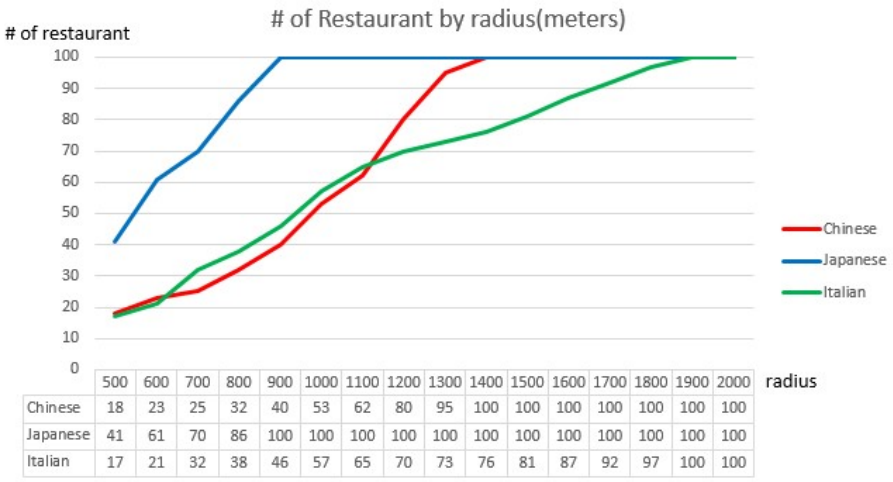


Figure 1: Target Areas by Radius

overall difference and influence of ethnic enclaves can be seen. Japanese restaurants are densely located close to the center of this area and it could be because there is Little Tokyo area within this area. Many Chinese restaurants are located close to Chinatown so the steep increase can be seen in the area with radius greater than 1 km. As the only small portion of Little Italy is included in the target area, the number of venues goes up gradually until radius becomes 1.9 km (see also figure 2). This report will focus on the locational data of Italian restaurants because the distribution of Italian restaurants can be said that spread within the target area and there will not be strong bias during the analysis(see also figure 3).

2.2.2 Simple 2D Plot

By plotting the locational data, the difference in special distribution will be observed.



	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	radius
Chinese	18	23	25	32	40	53	62	80	95	100	100	100	100	100	100	100	
Japanese	41	61	70	86	100	100	100	100	100	100	100	100	100	100	100	100	
Italian	17	21	32	38	46	57	65	70	73	76	81	87	92	97	100	100	

Figure 2: Number of Restaurants by Radius

3 Analysis

After the basic comparison, two dimensional Voronoi diagram will be used for illustrates theoretical trade area of each shop for the purpose of discussing possible location of a new site. This analysis will be conducted by using the locational data of Japanese restaurants.
(Here will be discussed in the final report next week.)

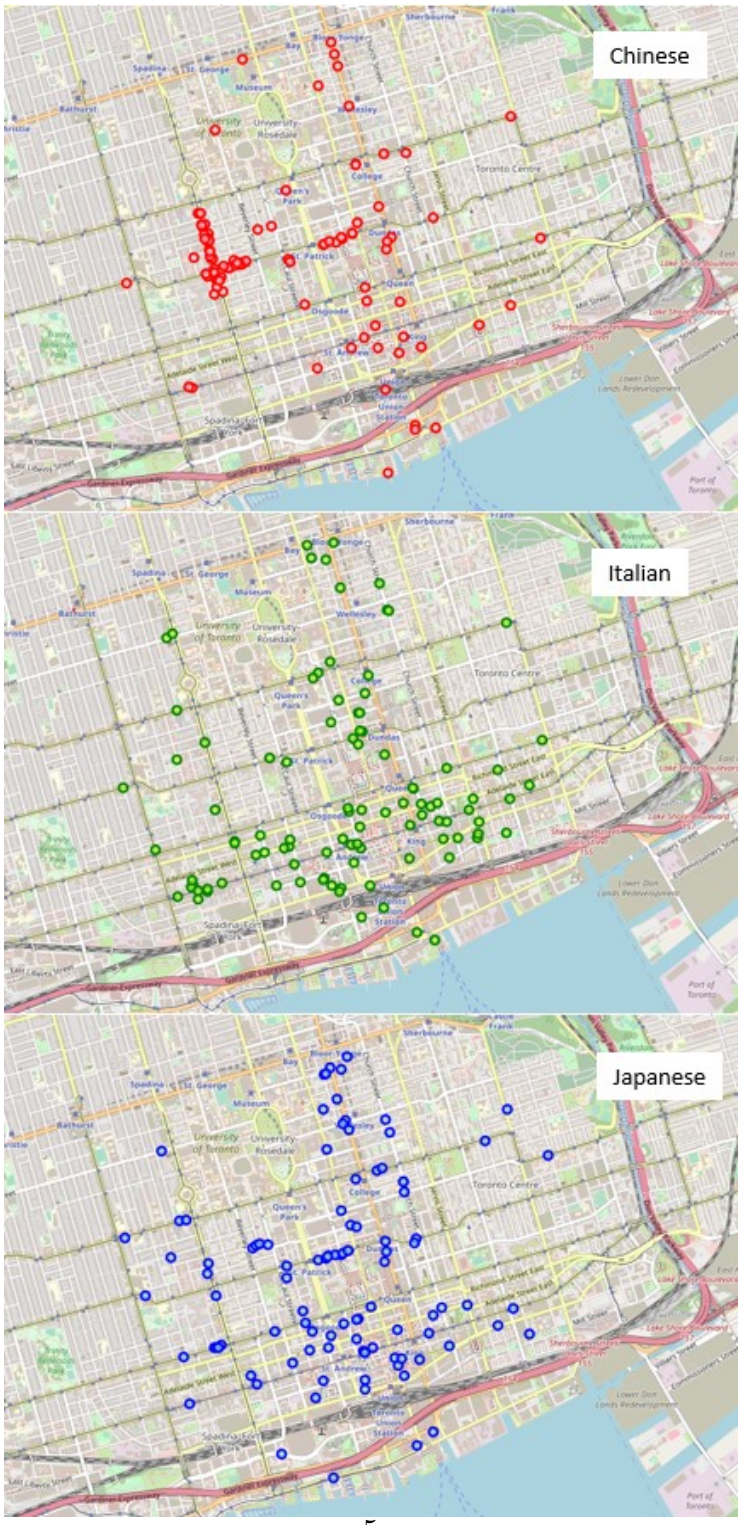


Figure 3: Spacial Distribution of Three Types