Choosing A Best Location in NYC For Operating a Restaurant

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1 Introduction

New York City is rich for its endless vitality and diversity. Food culture is one of the most important experiences that a curious foreign visitor wants to explore, and chiefs from all over the world come to New York to serve and learn. I am helping a friend in New York on solving a business problem. He is about to open a new Japanese-Italian fusion restaurant in New York City, but he is not sure where is the right place. However, New York is a big city and we do not want to blindly choose a location without research. We had three preferable locations in mind: the Vessel area, Broadway area and SOHO area. I helped him gather information on three aspects of each location: restaurants nearby, number of WiFi hot spots nearby, crime rates nearby, and the price range distribution of nearby restaurants.

2 Data

The first dataset is from Kaggle's 'New York City Crime Dataset'. It has 20,000 rows and 24 columns, and in this project we are utilizing the column Longitude and Latitude as the geographical location for each crime happened. Each row represents a crime happened in a location in New York, and the columns are features of that incident, including locations, crime description and crime id, etc. The second dataset is also from Kaggle's 'WiFi Hot Spot In New York City'. It has 2,566 rows and 29 columns, with each column being the feature of a WiFi spot in New York, and each row being a WiFi hot spot in NYC.In addition to dataset, we are also using Fourquare API to get the geographical location of each choice we have. Furthermore, we are also fetching data about nearby restaurants, including Italian restaurants and Japanese restaurants. The limit that we set for the distance is 1000 meters.

3 Methodology

For each spot, I measure four aspects. The first aspect is the number of restaurants nearby. Here the distance is set to be 0.005 in both longitude and latitude, which is pretty low. The more the restaurants of similar cuisine, the better the food culture and atmosphere. To do this, I fetch data about nearby restaurants from Foursquare API, and cast it into a dataframe. Then I simply get the number of rows for Japanese and Italian restaurants as the number of restaurants. The second aspect is the number of WiFi hot spot. I added this feature because foreign visitors need WiFi to learn about the history behind the buildings/cultures, and decide which place to visit, etc. WiFi is important and should be considered as a measuring metric when evaluating a location. To get the WiFi data, I loaded the WiFi hot spot data and iterate over rows to count the number of WiFi hot spots nearby. The third aspect is the number of crimes. Safety is crucial for foreigners, as they do not know much about the city, we need to protect customers when they are dining in our place. Therefore, I evaluate the location by the crime rate: the lower the crime rate, the better. So I loaded the crime dataset and iterate over the dataset to count the number of crimes nearby.The fourth aspect is the price range of nearby restaurants. For now I am not filtering out the type of cuisine, and only focus on the entire area. Since my friend wants to open a high-quality restaurant, we value the price range. To do this, I loaded data about New York restaurants, and collect restaurants that are nearby for each spot. Then I plot a pie chart to visualize the relative distribution of each price range. At the end, I also used folium library to mark the spots on the map that we are considering.

4 Results

First, the table shows the comparison between three locations on number of wifi hot spot and number of crimes happened nearby.

	Location	Number of Wifi	Number of Crimes
0	The Vessel	9	39
1	Broadway	68	153
2	SOHO	15	112

Figure 1: Comparison Table

The pie chart of price range for the Broadway and SOHO are also shown below. Notice that there is no pie chart for the Vessel because there is no

sufficient data to plot one.
Broadway:

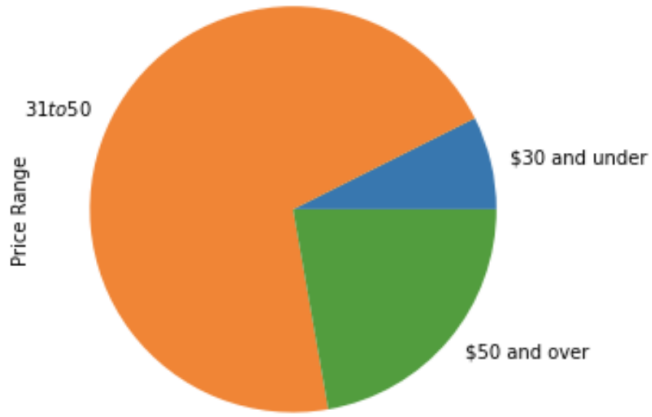

Figure 2: Pie chart

SOHO:

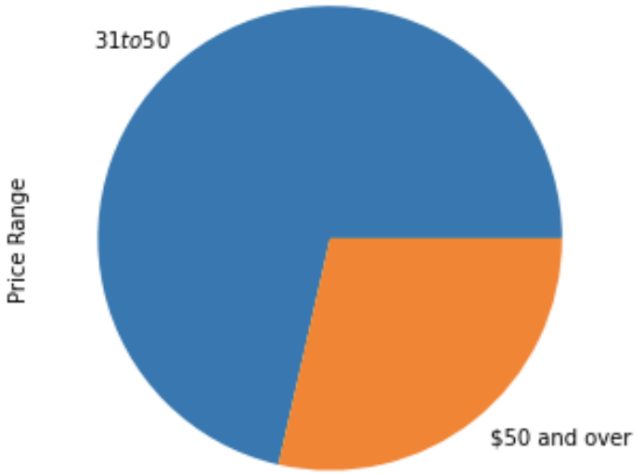

Figure 3: Pie chart

The map of New York City with three markers:

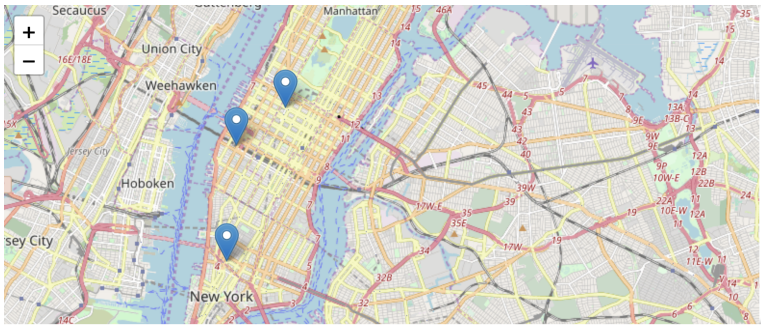

Figure 4: Pie chart

5 Discussion

First we take a look at the table. The vessel seems to be the safest place, but it also has the least number of WiFi hot spot. Broadway is too dangerous as the number of crimes is the highest. Therefore SOHO seems to be a great choice.
Then we compare the two pie charts, and it is easy to find out that broadway has a diverse restaurant culture, and the price range is also diverse. It covers cheap and expensive restaurants, but the SOHO has higher expensive restaurants percentage. Since my friend is intended to open a high-quality restaurant, SOHO might be a better choice.
Lastly, looking through the map, we can see that all three locations are in Manhattan. So all three satisfies my friend's requirement.

6 Conclusion

As we have seen so far, SOHO is a better choice among the other two. It has relatively low crime rate and sufficient number of WiFi hot spots, and it has mostly high and medium price range restaurants.