Introduction

New York City is a major financial hub, and has diverse cultural. There are variety of restaurants in New York featuring various international cuisines, like sushi, Korean, Mexican etc. The competition among restaurants are intense.

Before opening a new restaurants in New York, careful analysis has to be made in order to pick the right location, taking into accounts of factors like demographics, neighborhood income level in order to reduce business risk.

Business Problem

One of your client is asking you for a recommendation as to where he should open a new sushi restaurant in New York. Restaurant business in New York is very competitive. Various factors needs to be consider carefully.

1. Ease of commuting, is public transportation within walking distance. It is very expensive to maintain a car in the city, being easily accessible from public transportation will be a plus.
2. Income level of the neighborhood is important, as most likely customers will be from the neighborhood. People with higher income will be more likely to visit restaurant more often.
3. Average age in the neighborhood is also important. Younger people is more likely to visit restaurant to gathering.
4. Competitors in the neighborhood is also another important factor to consider.
5. population density around the neighborhood

Data

In order to solve this problem, we need to gather data to address each concern mentioned above.

1. List of Neighborhoods around New York City.

   https://geo.nyu.edu/catalog/nyu_2451_34572

2. Income level within New York City

   https://www.baruch.cuny.edu/nycdata/income-taxes/med_hhold_income.htm

3. Population Density, demographics around New York City

   https://en.wikipedia.org/wiki/New_York_City

4. Number of Restaurant, especially Japanese or sushi restaurant in each Neighborhood

   Foursquare Developers Access to venue data: https://foursquare.com/.

5. Average age within New York City.

   https://www.baruch.cuny.edu/nycdata/population-geography/age_distribution.htm

Methodology

New York City has 5 boroughs, we gather the statistics for 5 boroughs from the data source above.

First we consider the median income for each borough, as higher income earner usually dine out more often, and spend more when they dine out.

Younger people usually go out more often, and more people in the neighborhood, the better will be for the restaurant business, so we also need consider these factors and use the statistics from 5 borough to decide which borough to open the restaurant.

Once we have the above information, we should consider the top 2 borough that we should open the restaurant. Then we use the foursquare API to find out which neighborhood does not have Japanese and Sushi Restaurant.

And for those Neighborhood that has no Japanese/Sushi Restaurant, we used the foursquare API to find out how many existing restaurants are there, they are the competitors. We want the location to be in the neighborhood that has the least competition.

Also, we want the restaurant to be in a neighborhood that offers easy commute. Owning a car in New York is very expensive, not everyone has a car. Using the foursquare API we can find out if there a nearly bus stop, bus station in the neighborhood.

Results

The following table shows the median income for 5 boroughs

	Borough	Median Income
0	The Bronx	$37,397
1	Brooklyn (Kings)	$56,942
2	Manhattan	$85,071
3	Queens	$64,509
4	Staten Island (Richmond)	$79,201

It appears the median income for Bronx is unattractive.

Next we consider the population density

	Borough	County	Population Estimate (2018)	persons/sq. mi
0	The Bronx	Bronx	1,432,132	34,653
1	Brooklyn	Kings	2,582,830	37,137
2	Manhattan	New York	1,628,701	72,033
3	Queens	Queens	2,278,906	21,460
4	Staten Island	Richmond	476,179	8,112

It appears the population density is very low compared to other boroughs

Then we consider age, we prefer the borough that has on average younger population.

	Age	NYC	Manhattan	The Bronx	Brooklyn	Queens	Staten Island
0	Under 5 years	6.40%	4.80%	7.20%	7.30%	6.20%	5.70%
1	5 to 9 years	5.50%	3.80%	6.80%	5.90%	5.40%	5.90%
2	10 to 14 years	5.60%	3.70%	6.80%	6.20%	5.40%	6.40%
3	15 to 19 years	5.30%	4.20%	6.80%	5.40%	5.10%	5.80%
4	20 to 24 years	6.70%	7.00%	7.70%	6.40%	6.10%	6.50%
5	25 to 29 years	9.40%	11.80%	8.70%	9.60%	8.50%	7.20%
6	30 to 34 years	8.60%	10.80%	7.40%	8.90%	7.90%	6.20%
7	35 to 39 years	7.30%	8.20%	6.40%	7.50%	7.40%	5.80%
8	40 to 44 years	6.40%	6.10%	6.20%	6.40%	6.40%	7.00%
9	45 to 49 years	6.40%	6.30%	6.30%	6.00%	6.80%	6.90%
18	Median Age (years)	36.6	37.3	34	35.2	38.7	40.4
19	age < 50	67.60%	66.70%	70.30%	69.60%	65.20%	63.40%

It appears Bronx and Brooklyn has younger generator.

Based on the above, we then further analyze the neighborhood in Manhattan and Brooklyn.

Using the foursquare API to find out in Manhattan and Brooklyn which neighborhood does not have existing Japanese/Sushi restaurant, and there are 48 of them

Then out of this 48 neighborhoods, we use foursquare API again, find out which top 5 neighborhoods that has least existing restaurants (which are competitors). The top 5 of them are listed below

```
least_competitor = list(groupby.sort_values()[:5].index)
least_competitor
```

['Marine Park', 'Bergen Beach', 'Stuyvesant Town', 'New Lots', 'Madison']

We again use foursquare API to see out of this 5 top neighborhoods, which one has more bus stop, bus station which is used as a proxy for easy commute. And there is only one neighborhood that has bus station. It is Madison in Brooklyn

	Borough	Neighborhood	Latitude	Longitude
296	Brooklyn	Madison	40.609378	-73.948415

Discussions

A lot of assumptions has been made in locating the best neighborhoods above. Like easy commute, which I use bus stop, bus stations in the neighborhood as proxy to easy commute. If Foursquare is able to provide further category that represents public transportation, which should improve the confidence for the current research.

There is lot of other factors that should be considered like rent, which needs further research.

Conclusions

Based on the statistics on New York Boroughs, we initially picked Manhattan and Brooklyn as potential candidate to open the Restaurant. Then we narrow down the neighborhood by picking one that has the least competitors, and easy commute. And finally arrive at Madison in Brooklyn.