# Capstone Project – The battle of Neighborhoods

## Introduction

The cuisine of [New York City](https://en.wikipedia.org/wiki/New_York_City) comprises many [cuisines](https://en.wikipedia.org/wiki/Cuisine) belonging to various [ethnic groups](https://en.wikipedia.org/wiki/Ethnic_group) that have entered the [United States](https://en.wikipedia.org/wiki/United_States) through the city. Almost all ethnic cuisines are well represented in New York City, both within and outside the various [ethnic neighborhoods](https://en.wikipedia.org/wiki/New_York_City_ethnic_enclaves).

People of all cultures have settled in New York, and there are blocks full of people from all walks of life including Asians, Jewish, Russian, Mexican, and all types of backgrounds. This is what makes the city so unique, there is so much diversity in one area. Food plays a big role in New York. New York’s restaurants come in every size, style and price point, as well in every ethnic variety.

The city has more than one Chinatown and Little Italy, whole neighborhoods full of Greek, Albanian, Indian, Korean, Japanese, Thai and Korean restaurants, and you’ll find endless debates among New Yorkers in each borough as to who serves the best pizza, sushi, ramen and pastrami.

So, as a part of this project, I have decided to perform a comparative study of Sushi restaurants within New York city based on their location, ratings and likes. The goal is to list and visualize places within New York city that have great Sushi restaurants. This will also help decide what boroughs and neighborhoods will be good candidates if somebody wishes to open a new sushi restaurant. So we will attempt to study and make a data driven decision to:

* Estimate best area for opening a Sushi restaurant in New York city.
* Locate areas that are scarce on Sushi restaurants.
* Locate areas that are popular for Sushi restaurants.
* Locate best Sushi places within the city.

## Data

For this project we need the following data:

* New York city data that contains Boroughs and neighborhoods with their latitudes and longitudes.
  + Data source: <https://cocl.us/new_york_dataset>
  + This dataset will be used to explore neighborhoods of New York City.
* Sushi Restaurants in New York
  + Data source: Foursquare API
  + We will use the Foursquare API to get all the sushi venues in New York
* Geo space data
  + Data source: <https://data.cityofnewyork.us/City-Government/tqmj-j8zm>
  + This data will be used to plot New York borough boundaries on a choropleth map for visualization.

## Methodology

1. Data gathering and formatting: Download and explore New York City data set
   1. Filter data to list Borough, Neighborhood, latitude and longitude.
   2. Visualize distribution of number of neighborhoods by boroughs.
   3. Visualize a map of neighborhoods within New York city to realize their distribution.
2. Explore Neighborhoods in New York using the Four Square API to find all venues for each neighborhood.
   1. We will get 100 nearby venues in the New York neighborhoods within a radius of 500meters.
3. Filter out and analyze each neighborhood for Sushi restaurants.
4. Find Rating, tips and like count for each Sushi Restaurant using the Foursquare API.
5. Sort and analyze the data based on Rating.
6. Visualize the ranking of neighborhoods for Sushi restaurants using Folium library.

## Results

1. New York City data

A screenshot of a cell phone

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There are 5 Boroughs and 306 neighborhoods across New York City.

1. Exploratory Analysis: Visualize number of neighborhoods by boroughs

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Queens has highest number of neighborhoods.

1. Map of New York with neighborhoods superimposed on top.

A close up of a map

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1. Listing of Venues within Neighborhoods using Foursquare API

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1. Slice the data listing venue categories that contain “Sushi”

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There are 106 Sushi Restaurants within New York City.

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1. Let’s see which borough has the most Sushi Restaurants by visualizing the distribution of Sushi restaurants across New York City by borough.

A screenshot of a social media post

Description automatically generated

Manhattan has the highest number of Sushi restaurants.

1. Let’s look at distribution of Sushi restaurants by neighborhoods.

A screenshot of a cell phone

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4 neighborhoods – Eltingville, Lenox Hill, Turtle Bay and Yorkville all have 4 Sushi restaurants.

The maximum Sushi restaurants that a neighborhood has is 4

1. Let’s look at one Sushi-popular neighborhood.

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1. Let’s visualize all Sushi places on a folium map.

A close up of a map

Description automatically generated

Sushi places appear relatively evenly distributed across New York City with a concentration in the Manhattan area.

1. Let’s use the Foursquare API to get likes, ratings and tips for the Sushi restaurants. Here’s a glimpse of the ranking data.

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1. Likes & Tips are converted to float data type to enable comparisons.

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1. Restaurant with maximum likes is “Sushi Yasuda” in the “Manhattan” borough with 599 likes

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1. Restaurant with maximum rating is “Sushi By Bou” in the “Manhattan” borough with a rating of 9.4

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1. Restaurant with maximum tips is the “Sushi Yasuda” restaurant in the Manhattan borough with 260 tips.

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1. Let’s look at top 10 neighborhoods with maximum average rating of restaurants.

A screenshot of a social media post

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1. Let’s compare boroughs by average rating of Sushi restaurants.

A screenshot of a social media post

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Sushi restaurants in Manhattan followed by Bronx and Queens boroughs have decent average ratings and popularity.

1. Let’s visualize Average Ratings of Sushi Restaurants by Boroughs on a chart.

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1. Let’s identify neighborhoods with sushi restaurants having average rating greater or equal 9.0.

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Description automatically generated

3 Neighborhoods within Manhattan have Sushi restaurants with high average rating.

1. Let’s draw the high average rating neighborhoods on a map.

A picture containing text, map

Description automatically generated

1. Now let’s visualize boroughs based on average ratings on a choropleth map. In this map, boroughs will be shaded in proportion to average rating of Sushi restaurants in the New York City.

A picture containing text, map

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Popularity of Sushi Restaurants in the New York Area from more to less is : Manhattan, Bronx, Queens, Brooklyn and Staten Island.

## Discussion

Above data study covers some preliminary analysis of Sushi restaurants in New York city. While Sushi entrees are usually on the pricey side, the study could further be amended with income data within different sections of New York. Sushi also involves heavy usage for fresh sea food as such ease of availability of supplies can also play a vital role in determining location for a new Sushi restaurant. The study can further also be amended with additional details for each popular Sushi restaurant like comparing prices or the staff or the interior, bar and such.

Study done so far gives us a feel for the market vibe and popularity of Sushi restaurants within New York City. Thus it provides us a great head start to determine location and predict customer flow and popularity for the restaurant.

## Conclusion

Data Analytics and facts derived from this study are:

* There are 5 Boroughs and 306 neighborhoods across New York City
* Queens borough has highest number of neighborhoods
* **There are 106 Sushi Restaurants within New York City – a number that is not very big compared to other types of cuisines like Pizza places.**
* **Manhattan has the highest number of Sushi restaurants.**
* 4 neighborhoods – Eltingville, Lenox Hill, Turtle Bay and Yorkville all have the highest number of Sushi restaurants which is 4.
* **The maximum Sushi restaurants that a neighborhood has is 4**
* **Sushi restaurants appear relatively evenly distributed across New York City with a concentration in the Manhattan area.**
* Restaurant with maximum likes is “Sushi Yasuda” in the “Manhattan” borough with 599 likes
* Restaurant with maximum rating is “Sushi By Bou” in the “Manhattan” borough with a rating of 9.4
* Restaurant with maximum tips is the “Sushi Yasuda” restaurant in the Manhattan borough with 260 tips.
* **Sushi restaurants in Manhattan followed by Bronx and Queens boroughs have decent average ratings and popularity. These should be the areas to consider for potentially opening a new restaurant.**
* 3 Neighborhoods within Manhattan have Sushi restaurants with high average rating.
* Popularity of Sushi Restaurants in the New York Area from more to less is : Manhattan, Bronx, Queens, Brooklyn and Staten Island.

So overall, we can conclude the following:

You must absolutely try out “Sushi Yasuda” in the “Manhattan” area and let me know how you like it!

Manhattan, Bronx, Queens are decent locations for Sushi restaurants while Staten Island ranks last in average rating of Sushi restaurants.

Manhattan is the best place to stay if you want to have Sushi cuisine for Dinner!