

Peer-graded Assignment:

Capstone Project - The Battle of Neighborhoods (Week 2)

- Introduction: Business Problem

In this project we will look for the best place to open a ramen shop in New York. This report will be a good help for anyone who is considering opening a new ramen restaurant. New York is the largest city in the United States with a diverse population. It is also a city with many busy working people. On the other hand, there are many Asians living in New York. In Asia, ramen is a familiar menu item to many people, and recently it has become a universal language. Therefore, I think that ramen, which can be eaten quickly and cheaply and is liked by everyone, will become a popular food in New York. In this report, we will use data science to visualize the characteristics of each district using raw data to find the most suitable district to open a ramen restaurant.

- Data

The following data is required for this project.

Geographic data such as latitude and longitude of New York City

[https://cf-courses-data.s3.us.cloud-object-](https://cf-courses-data.s3.us.cloud-object-storage.appdomain.cloud/IBMDeveloperSkillsNetwork-DS0701EN-SkillsNetwork/labs/newyork_data.json)

[storage.appdomain.cloud/IBMDeveloperSkillsNetwork-DS0701EN-](https://cf-courses-data.s3.us.cloud-object-storage.appdomain.cloud/IBMDeveloperSkillsNetwork-DS0701EN-SkillsNetwork/labs/newyork_data.json)

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This data will be used to analyze the districts of New York.

Ramen restaurants in New York Foursquare API Using this API to extract information about ramen restaurants from restaurants in New York.

- Methodology

The goal of this project is to find the best place to open a ramen restaurant in New York City. We have obtained the following data:

Geographic data of New York City

Information on Japan-related restaurants in New York

We used the FourSquare API.

Data for a Japanese restaurant near New York City was extracted from the Foursquare API and is shown below.

	id	name	categories	referralId	hasPerk	location.address	location.crossStreet	location.lat	location.lng	location.labeledLatLng	
0	4e6aaa3d164c37bf4b2539d	Sumo Japanese Cuisine	'[{"id": "4bf58dd8d48988d111941735", "name": "J..."}]	1617105643	v-	False	104 John St	at Cliff St	40.707714	-74.006226	'[{"label": "display", "lat": 40.70771408081055, "lng": -74.0062261117167}]'
1	5464f27c498e2e01c60151af	Kaede Japanese Restaurant	'[{"id": "4bf58dd8d48988d111941735", "name": "J..."}]	1617105643	v-	False	90 Chambers St	NaN	40.714623	-74.007270	'[{"label": "display", "lat": 40.714622861117167, "lng": -74.0072701117167}]'
2	4e4e4c34bd4101d0d7a717d	Aoi Japanese Restaurant	'[{"id": "4bf58dd8d48988d111941735", "name": "J..."}]	1617105643	v-	False	325 Broadway	NaN	40.716120	-74.005278	'[{"label": "display", "lat": 40.71612035753943, "lng": -74.0052781117167}]'
3	4c45d523dd1f2d7f64c681f9	Mana Japanese	'[{"id": "4bf58dd8d48988d111941735", "name": "J..."}]	1617105643	v-	False	59 Nassau St	NaN	40.709251	-74.008797	'[{"label": "display", "lat": 40.70925140380859, "lng": -74.0087971117167}]'
4	4f326c4819836c91c7d658ff	Nagoya Japanese Restaurant	'[{"id": "4d4b7105d754a06374d81259", "name": "F..."}]	1617105643	v-	False	59 Nassau St	NaN	40.709251	-74.008797	'[{"label": "display", "lat": 40.70925140380859, "lng": -74.0087971117167}]'

For next step, define the important information.

address	crossStreet	lat	lng	labeledLatLngs	distance	postalCode	cc	city	state	country	formattedAddress	neighborhood	id
104 John St	at Cliff St	40.707714	-74.006226	[[{"label": "display", "lat": 40.70771408081055, "lng": -74.0062261117167}]]	558	10038	US	New York	NY	United States	[104 John St (at Cliff St), New York, NY 10038, United States]	NaN	4e6aaaa3d164c37bf4b2539d
90 Chambers St	NaN	40.714623	-74.007270	[[{"label": "display", "lat": 40.714622861117167, "lng": -74.0072701117167}]]	236	10007	US	New York	NY	United States	[90 Chambers St, New York, NY 10007, United States]	NaN	5464f27c498e2e01c60151af
325 Broadway	NaN	40.716120	-74.005278	[[{"label": "display", "lat": 40.71612035753943, "lng": -74.0052781117167}]]	382	10007	US	New York	NY	United States	[325 Broadway, New York, NY 10007, United States]	NaN	4e4e4c34bd4101d0d7a717d
59 Nassau St	NaN	40.709251	-74.008797	[[{"label": "display", "lat": 40.70925140380859, "lng": -74.0087971117167}]]	452	10038	US	New York	NY	United States	[59 Nassau St, New York, NY 10038, United States]	NaN	4c45d523dd1f2d7f64c681f9
59 Nassau St	NaN	40.709251	-74.008797	[[{"label": "display", "lat": 40.70925140380859, "lng": -74.0087971117167}]]	452	10038	US	New York	NY	United States	[59 Nassau St, New York, NY 10038, United States]	NaN	4f326c4819836c91c7d658ff
49 Fulton St	NaN	40.708168	-74.003960	[[{"label": "entrance", "lat": 40.708304, "lng": -74.003960, "type": "entrance"}]]	536	10038	US	New York	NY	United States	[49 Fulton St, New York, NY 10038, United States]	NaN	4e4c4fbd413c4cc68689c3
57 Warren St	Church St	40.714824	-74.009404	[[{"label": "display", "lat": 40.71482437714839, "lng": -74.0094041117167}]]	369	10007	US	New York	NY	United States	[57 Warren St (Church St), New York, NY 10007, United States]	Tribeca	4af5d65ff964a52091fd21e3
59 Nassau St	btwn Maiden Lane & John St	40.709178	-74.008958	[[{"label": "display", "lat": 40.70917839380905, "lng": -74.0089581117167}]]	466	10038	US	New York	NY	United States	[59 Nassau St (btwn Maiden Lane & John St), New York, NY 10038, United States]	NaN	4a982c7af964a520cc2a20e3

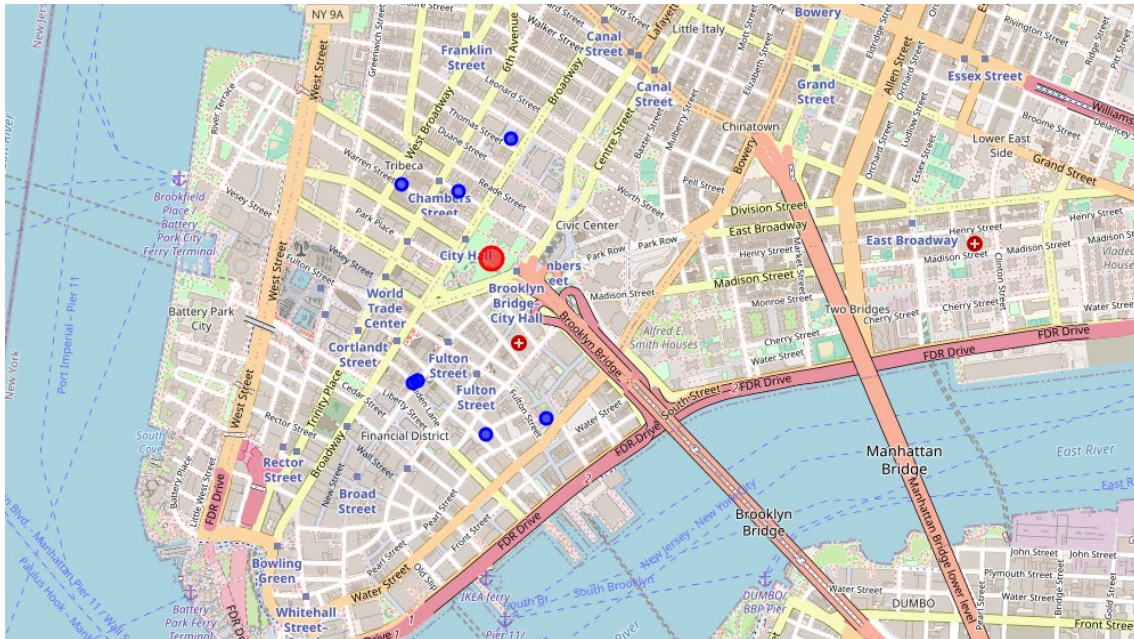
We visualized Japanese restaurants nearby New York in this map.

```
venues_map = folium.Map(location=[latitude, longitude], zoom_start=13) # generate map centred around the Conrad Hotel

# add a red circle marker to represent the Conrad Hotel
folium.features.CircleMarker(
    [latitude, longitude],
    radius=10,
    color='red',
    popup='Conrad Hotel',
    fill = True,
    fill_color = 'red',
    fill_opacity = 0.6
).add_to(venues_map)

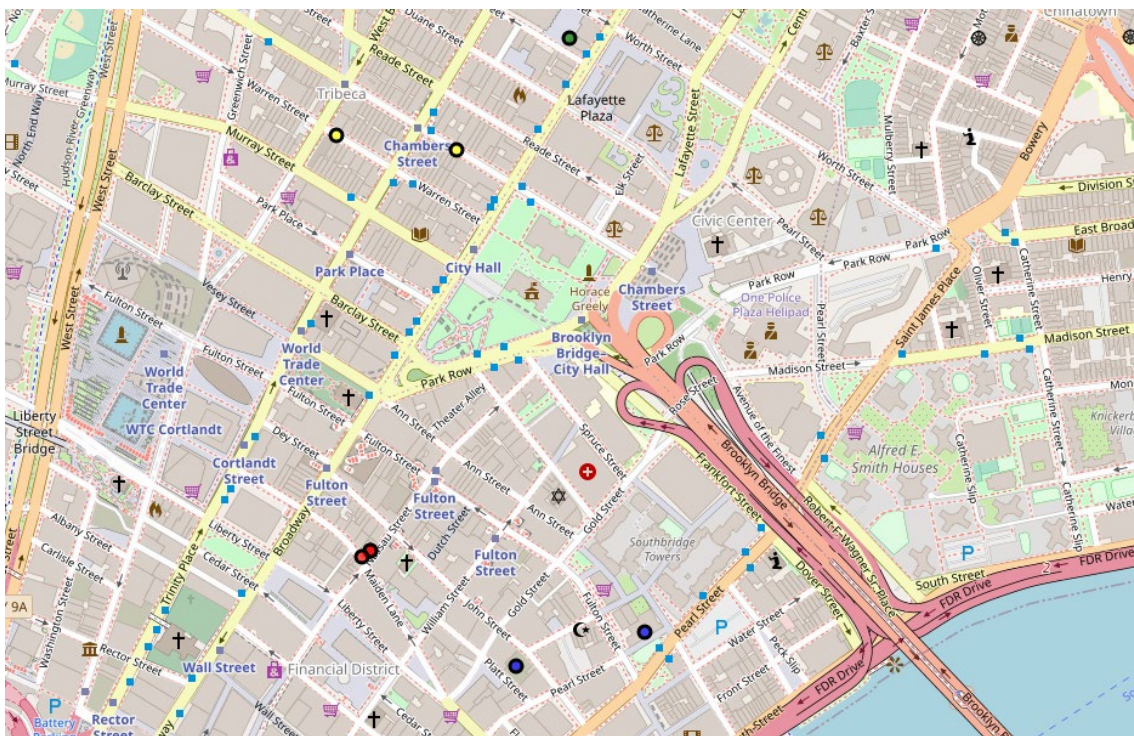
# add the Italian restaurants as blue circle markers
for lat, lng, label in zip(venue_filtered.lat, venue_filtered.lng, venue_filtered.categories):
    folium.features.CircleMarker(
        [lat, lng],
        radius=5,
        color='blue',
        popup=label,
        fill = True,
        fill_color='blue',
        fill_opacity=0.6
    ).add_to(venues_map)

# display map
venues_map
```



• Analysis

Cluster these Neighborhoods and visualize.



• Result and Discussion

The results of the exploratory data analysis and clustering are summarized below.

Restaurants associated with Japanese cuisine are distributed throughout central and southern New York.

There was no solid distribution.

Based on these results, it can be concluded that the least competition for future Japanese restaurants will be in upstate New York. On the other hand, opening a restaurant in the southern part of New York is more likely to attract customers who came to other Japanese restaurants in close proximity. This clustering is based on information from the Foursquare API. Therefore, it may not be accurate because it does not include other information such as land prices.

• Conclusion

The goal of this project is to find the best location to open a ramen restaurant in New York. We applied the k-means clustering algorithm to select the areas in New York with the most Japanese restaurants.

Finally, all of these analyses rely on Foursquare data. So I figured I would need to get information from other external databases for a more comprehensive analysis.