New York Midnight Diner

Finding the Best Location

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Introduction

Midnight Diner (深夜食堂, Shinya shokudō) is a Japanese anthology TV series based on the manga of the same name by Yarō Abe. The show focuses on a midnight diner, the chef, known only as "The Master", and his involvement with his customers.

The setting of Midnight Diner is a small 12 seat Izakaya called "Meshiya" in Shinjuku, Tokyo. Despite the restaurant's strange opening hours, 12 am to 7 am, it is popular with the busy nightlife of Shinjuku. The Shinjuku setting, and the hours of operation, means that much of the Midnight Diner story takes place at night.

The show was well received when it started streaming on Netflix. It has an IMDB rating of 8.4.

The popularity of the show inspired one businessman to open a midnight diner in Manhattan, New York. This report aims to find the best location for such a diner. The selected location must be in a neighborhood with active night life scene, and maybe with some Asian culture influences.

Data

New York has a total of 5 boroughs and 306 neighborhoods. For NY geolocation data, I will use the same dataset used in the labs; available at https://geo.nyu.edu/catalog/nyu_2451_34572 or https://ibm.box.com/shared/static/fbpwbovar7lf8p5sgddm06cgipa2rxpe.json

I will also use Foursquare API to get information about night life venues in New York. Like the lab, the explore end point will be used but now the category will be specific to night life.

Methodology

In a nutshell this report is based on two data sources; New York geospatial data and Foursquare location dataset. So, the analysis is done in three steps.

The first step is to fetch and prepare New York geospatial data. The result of this is a list of Manhattan’s Neighborhoods along with the corresponding longitudes and latitudes.

The second step gets the needed location information for the above-found coordinates. I am going to use Foursquare API to get the number of nightlife spots and the number of Asian restaurants in each neighborhood.

The third step will be clustering Manhattan neighborhoods based on the information I got using K-means clustering algorithm.

Step-1 Getting Manhattan's Neighborhoods Coordinates

The search for the perfect midnight diner location starts by getting New York geospatial data from the above-mentioned repository. Now that I got the information in JSON format, I need to process it and load it into a pandas dataframe.

The dataframe shall have four columns – Borough, Neighborhood, Longitude, and Latitude. Furthermore, since we are only interested in Manhattan, we can filter out the neighborhoods which belong to Manhattan neighborhood.

There are 40 neighborhoods in Manhattan as you can see below.

Figure 1 Manhattan Neighborhoods Map

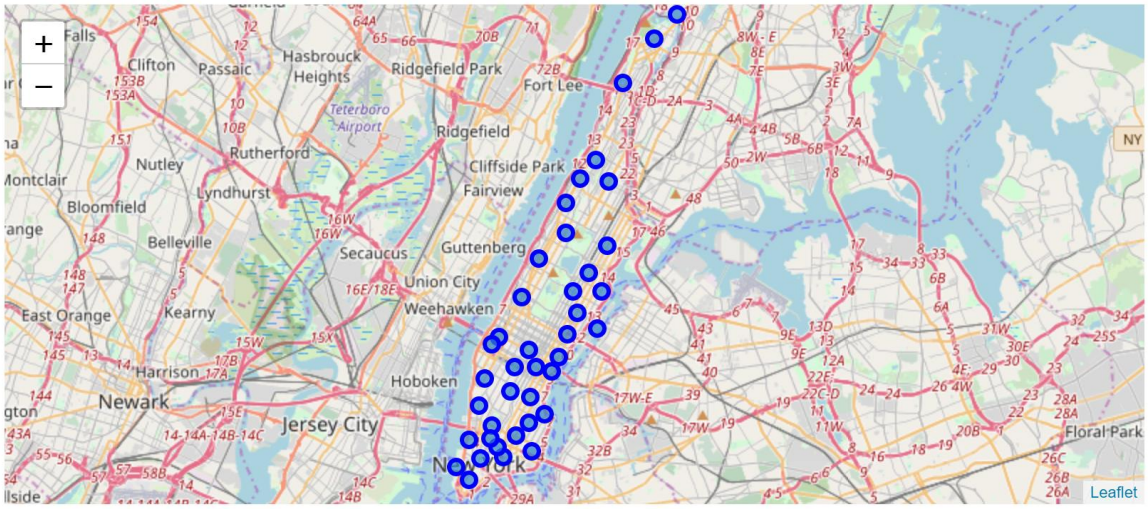


Figure 2 Manhattan Neighborhoods List

	Borough	Neighborhood	Latitude	Longitude
0	Manhattan	Marble Hill	40.876551	-73.910660
1	Manhattan	Chinatown	40.715618	-73.994279
2	Manhattan	Washington Heights	40.851903	-73.936900
3	Manhattan	Inwood	40.867684	-73.921210
4	Manhattan	Hamilton Heights	40.823604	-73.949688
5	Manhattan	Manhattanville	40.816934	-73.957385
6	Manhattan	Central Harlem	40.815976	-73.943211
7	Manhattan	East Harlem	40.792249	-73.944182
8	Manhattan	Upper East Side	40.775639	-73.960508
9	Manhattan	Yorkville	40.775930	-73.947118
10	Manhattan	Lenox Hill	40.768113	-73.958860
11	Manhattan	Roosevelt Island	40.762160	-73.949168
12	Manhattan	Upper West Side	40.787658	-73.977059
13	Manhattan	Lincoln Square	40.773529	-73.985338
14	Manhattan	Clinton	40.759101	-73.996119
15	Manhattan	Midtown	40.754691	-73.981669
16	Manhattan	Murray Hill	40.748303	-73.978332
17	Manhattan	Chelsea	40.744035	-74.003116
18	Manhattan	Greenwich Village	40.726933	-73.999914
19	Manhattan	East Village	40.727847	-73.982226
20	Manhattan	Lower East Side	40.717807	-73.980890
21	Manhattan	Tribeca	40.721522	-74.010683
22	Manhattan	Little Italy	40.719324	-73.997305
23	Manhattan	Soho	40.722184	-74.000657
24	Manhattan	West Village	40.734434	-74.006180
25	Manhattan	Manhattan Valley	40.797307	-73.964286
26	Manhattan	Morningside Heights	40.808000	-73.963896
27	Manhattan	Gramercy	40.737210	-73.981376
28	Manhattan	Battery Park City	40.711932	-74.016869
29	Manhattan	Financial District	40.707107	-74.010665
30	Manhattan	Carnegie Hill	40.782683	-73.953256
31	Manhattan	Noho	40.723259	-73.988434
32	Manhattan	Civic Center	40.715229	-74.005415
33	Manhattan	Midtown South	40.748510	-73.988713
34	Manhattan	Sutton Place	40.760280	-73.963556
35	Manhattan	Turtle Bay	40.752042	-73.967708
36	Manhattan	Tudor City	40.746917	-73.971219
37	Manhattan	Stuyvesant Town	40.731000	-73.974052
38	Manhattan	Flatiron	40.739673	-73.990947
39	Manhattan	Hudson Yards	40.756658	-74.000111

Step-2 Getting Manhattan's Venues Data

I am using Foursquare regular API endpoint '`explore`'. The parameter `CategoryId` is used to get recommendations for nighlife spots as well as Asian restaurants. Nightlife spot category ID: `4d4b7105d754a06376d81259`. Asian Resturants category ID: `4bf58dd8d48988d142941735`

Figure 3 Manhattan's Top Neighborhoods based on Nightlife Spots Count

	Borough	Neighborhood	Latitude	Longitude	Nightlife Spot	Asian Resturants
31	Manhattan	Noho	40.723259	-73.988434	246	227
18	Manhattan	Greenwich Village	40.726933	-73.999914	242	181
23	Manhattan	Soho	40.722184	-74.000657	220	234
16	Manhattan	Murray Hill	40.748303	-73.978332	206	218
38	Manhattan	Flatiron	40.739673	-73.990947	206	223

Figure 4 Manhattan's Nightlife Spots Per Neighborhood

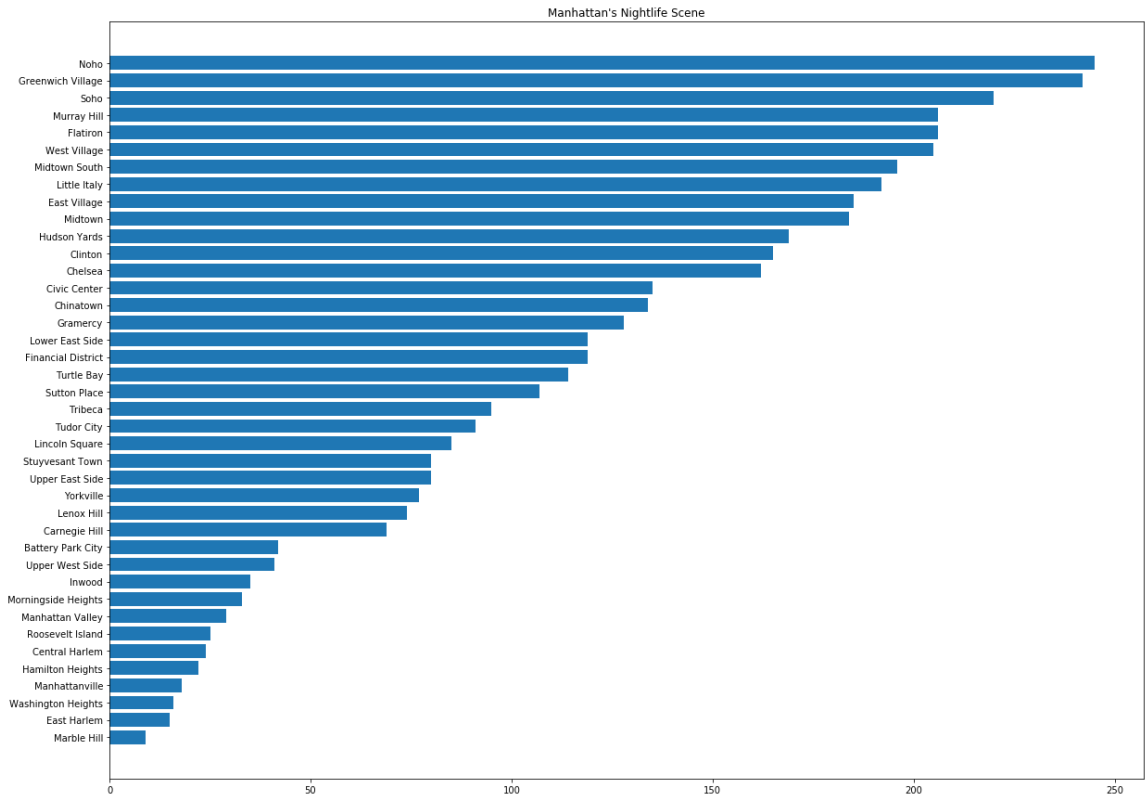
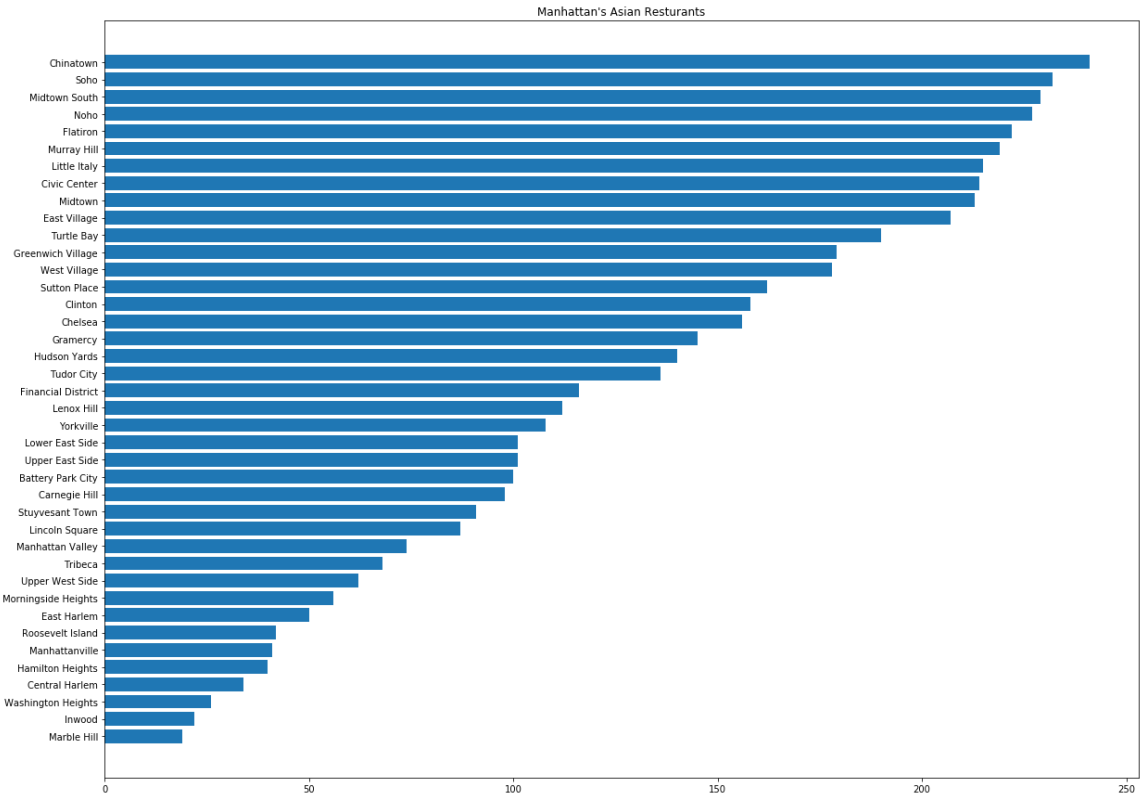


Figure 5 Manhattan's Top Neighborhoods based on Asian Restaurants Count

	Borough	Neighborhood	Latitude	Longitude	Nightlife Spot	Asian Resturants
1	Manhattan	Chinatown	40.715618	-73.994279	134	241
23	Manhattan	Soho	40.722184	-74.000657	220	232
33	Manhattan	Midtown South	40.748510	-73.988713	196	229
31	Manhattan	Noho	40.723259	-73.988434	245	227
38	Manhattan	Flatiron	40.739673	-73.990947	206	222

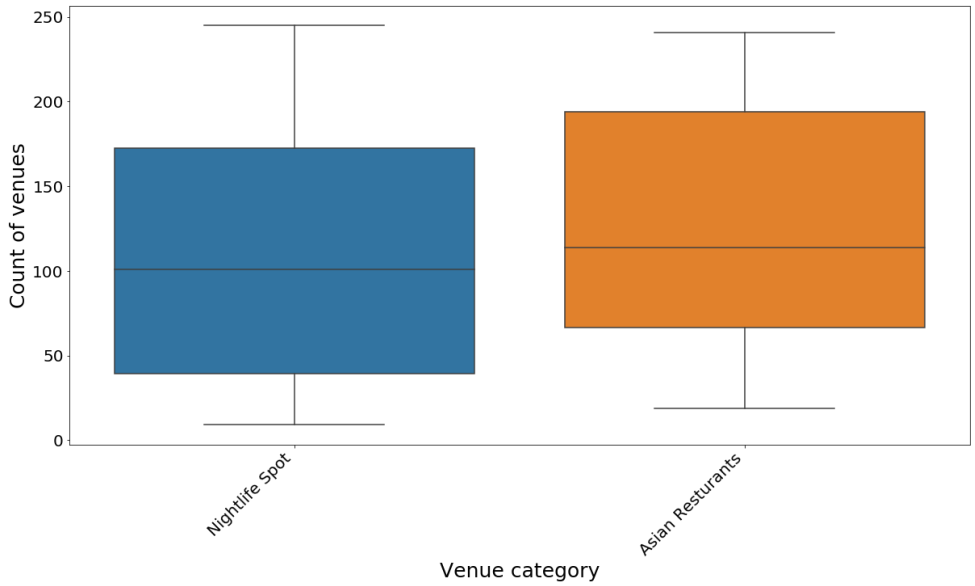
Figure 6 Manhattan's Asian Restaurants Count per Neighborhood



Step-3 Clustering the Neighborhoods

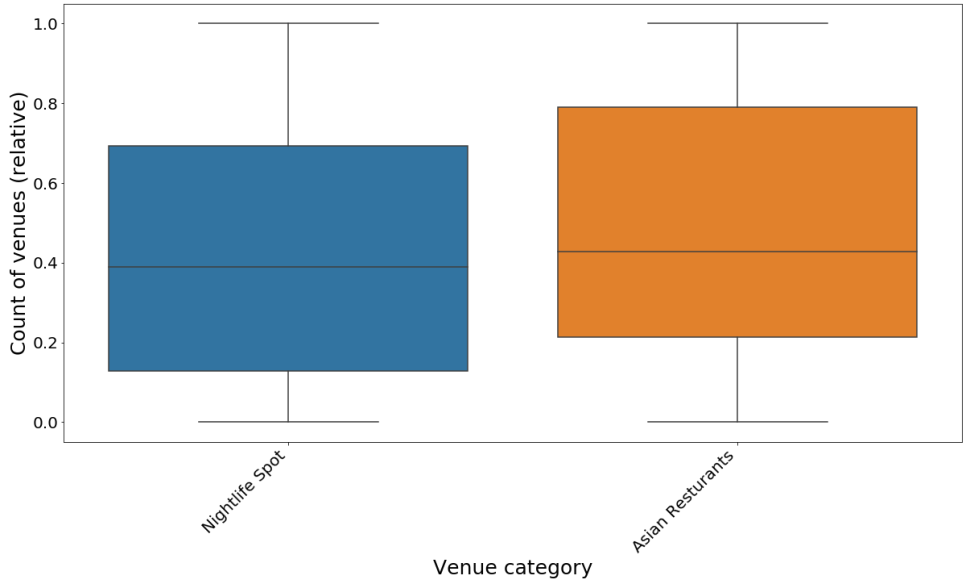
A quick look at the features selected for clustering shows that they are in the same range, so we may be able to proceed without scaling. See the boxplot below.

Figure 7 Count of Venues Boxplot

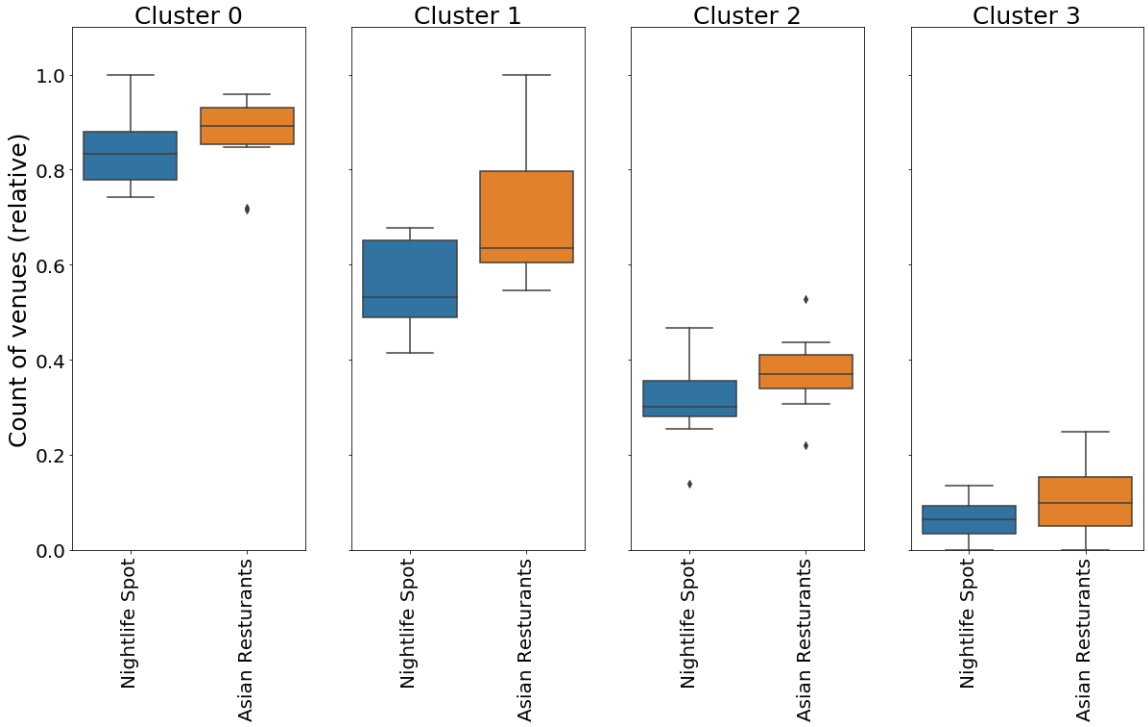


However, and for the sake of good practice, I used MinMaxScaler to prepare the data.

Figure 8 Relative Count of Venues Boxplot



The result of running k-means is shown below. It is clear that Cluster 0 is the best neighborhood for our endeavor. It has the highest concentration of nightlife spots and Asian restaurants.



Results

A Manhattan neighborhood typically has 50-170 night spots and 60 to 200 Asian restaurants, Cluster 0 has the highest numbers of all others. Here's a list of the suitable neighborhoods for opening a midnight diner.

Figure 9 Neighborhoods for Midnight Diner

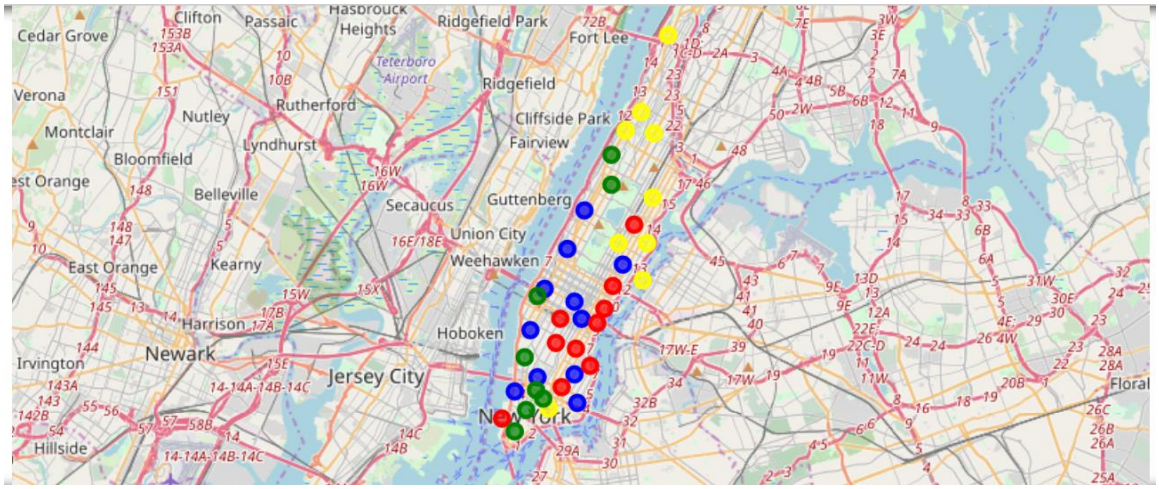
	Nightlife Spot	Asian Resturants	Cluster	Neighborhood	Longitude	Latitude
27	0.830508	0.716216	0	Gramercy	-73.981376	40.737210
28	0.987288	0.720721	0	Battery Park City	-74.016869	40.711932
30	0.745763	0.846847	0	Carnegie Hill	-73.953256	40.782683
31	0.741525	0.873874	0	Noho	-73.988434	40.723259
33	0.775424	0.882883	0	Midtown South	-73.988713	40.748510
34	0.834746	0.900901	0	Sutton Place	-73.963556	40.760280
35	0.834746	0.914414	0	Turtle Bay	-73.967708	40.752042
36	1.000000	0.936937	0	Tudor City	-73.971219	40.746917
37	0.792373	0.945946	0	Stuyvesant Town	-73.974052	40.731000
38	0.894068	0.959459	0	Flatiron	-73.990947	40.739673

Discussion

Based on the count of the two selected venue categories, 4 clusters of neighborhoods were identified – shown below.

The red cluster is the best cluster to open a midnight diner (cluster 0). Neighborhoods in the same cluster were found to be geographically close to each other (in general).

Figure 10 The Four Clusters (red=0, green=1, blue=2, yellow=3)



Conclusion

A midnight diner in Manhattan can be a good idea. Manhattan is the most densely populated area in New York. It has a variety of nightlife spots and a lot of Asian pubs and restaurants.