



THE BATTLE OF NEIGHBORHOODS

COURSERA CAPSTONE PROJECT – MIRANDA JIN

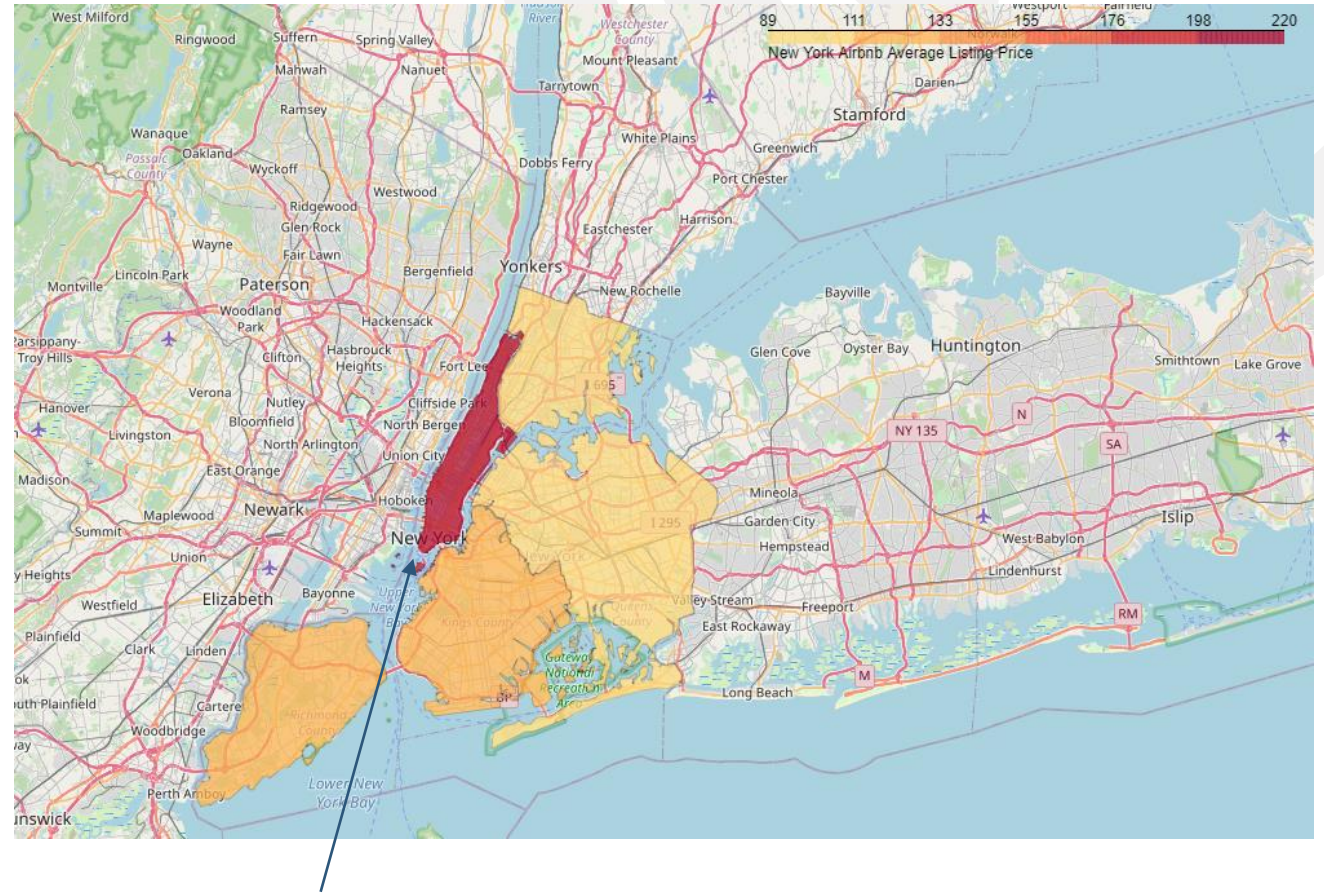
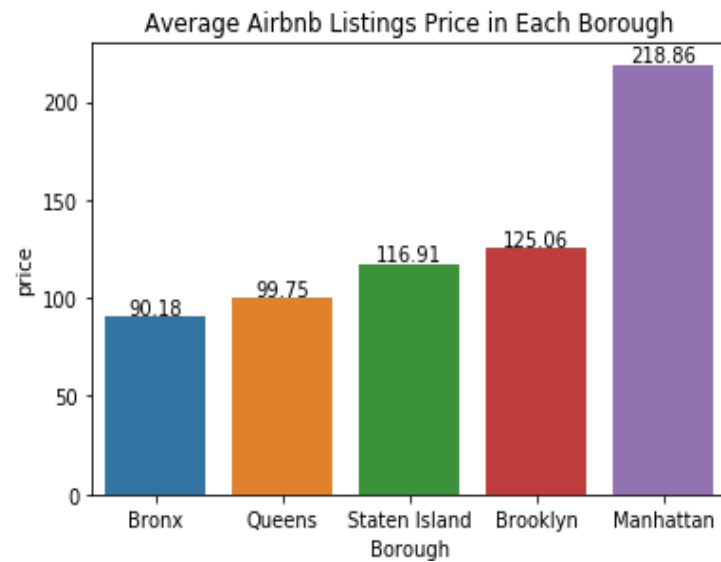
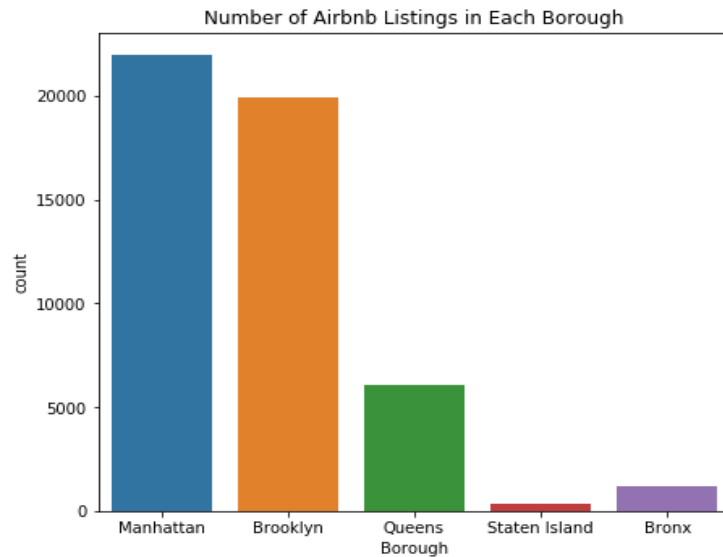


AIRBNB IN NEW YORK CITY

According to data from analytics website AirDNA, New York City had over **38,000** Airbnb listings and generated over **800** million U.S. dollars as of June 2019. With such a variety of options, it is challenging but crucial for visitors to find the most suitable accommodation to optimize their visiting experience.



Airbnb in New York Overview

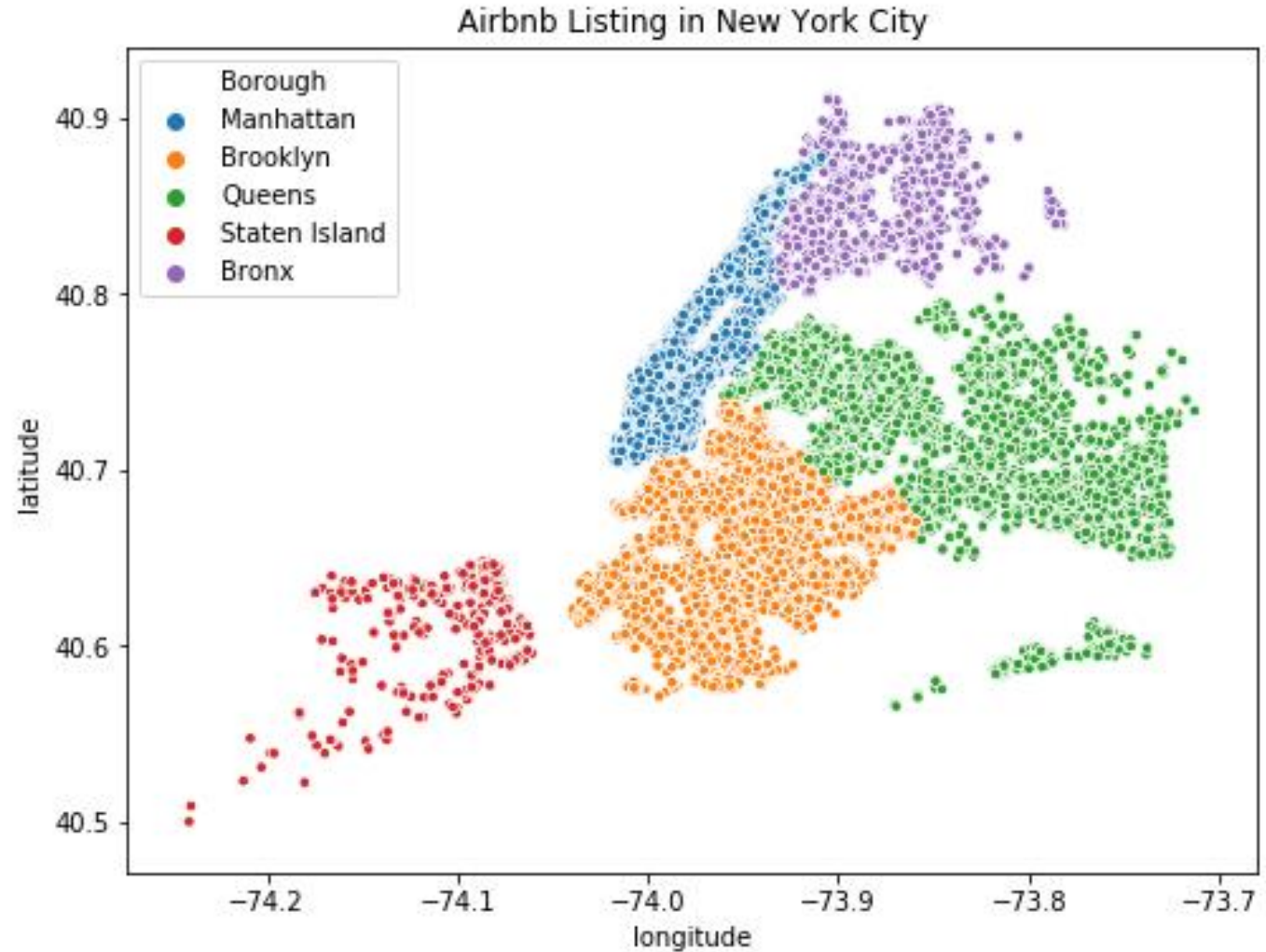


Manhattan borough has the highest average Airbnb listing price

Problem to be solved:

I will stay in New York for a day to explore the lower Manhattan area as much as possible, so I want to find an Airbnb in Manhattan based on following criteria:

- Budget: between \$150 and \$500 per night
- Room type: entire home or apartment
- Reviews: at least 5 reviews before
- Restaurants: the nearby restaurants should be similar to the ones in Manhattanville where I lived before
- Venues: the more, the better



Data Source and Description

- New York City Data
 - Data Source: https://cocl.us/new_york_dataset
 - Description: This data contains 5 Borough and 306 Neighborhoods of New York city along with their latitude and longitude.
- Airbnb Listing Data
 - Data Source: <http://insideairbnb.com/get-the-data.html>
 - Description: This data contains the entire Airbnb listings in New York city on 08 June, 2020. It provides the essential information of each listing including id, name, neighbourhood group, neighbourhood, latitude, longitude, room type, price, minimum nights, number of reviews, available days, and etc..
- Foursquare Location Data
 - Data Source: Foursquare API
 - Description: From Foursquare API, we can get the Manhattan Venue data which contains the top 100 venues that are in each Manhattan neighborhood within a radius of 500 meters. It will be filtered to get all the restaurants in each neighborhood which will be utilized for clustering purpose.
- Borough Boundaries Data
 - Data Source: <https://data.cityofnewyork.us/City-Government/Borough-Boundaries/tqmj-j8zm>
 - Description: This json file contains the geographic data of 5 borough boundaries. It will be paired with other data set to create a choropleth map of New York City for data visualization.

❑ Exploratory Data Analysis:

1. Exploring Airbnb Listing Data

Filtering the Airbnb Listing data that meet the following criteria:
price (\$150 - \$500), room type (entire home/apt), review (>5)

	name	host_id	Borough	Neighborhood	latitude	longitude	price
0	2 bedroom - Upper East Side-great for kids	61491	Manhattan	Upper East Side	40.77065	-73.95269	200
1	Great Large 1 BR apt in East Village!	72062	Manhattan	East Village	40.72555	-73.97965	225
2	NYC Zen	143048	Manhattan	East Village	40.72354	-73.98295	195
3	City Room - Private Penthouse Apt.	256161	Manhattan	Harlem	40.81035	-73.94598	160
4	Huge Studio in Heart of TriBeCa	454497	Manhattan	Tribeca	40.72118	-74.01191	240

❑ Exploratory Data Analysis:

2. Acquiring Venue Data from Foursquare API

	Neighborhood	Neighborhood Latitude	Neighborhood Longitude	Venue	Venue Latitude	Venue Longitude	Venue Category
0	Marble Hill	40.876551	-73.91066	Arturo's	40.874412	-73.910271	Pizza Place
1	Marble Hill	40.876551	-73.91066	Bikram Yoga	40.876844	-73.906204	Yoga Studio
2	Marble Hill	40.876551	-73.91066	Tibbett Diner	40.880404	-73.908937	Diner
3	Marble Hill	40.876551	-73.91066	Starbucks	40.877531	-73.905582	Coffee Shop
4	Marble Hill	40.876551	-73.91066	Astral Fitness & Wellness Center	40.876705	-73.906372	Gym

❑ Exploratory Data Analysis:

3. Processing the Manhattan Venue Dataframe

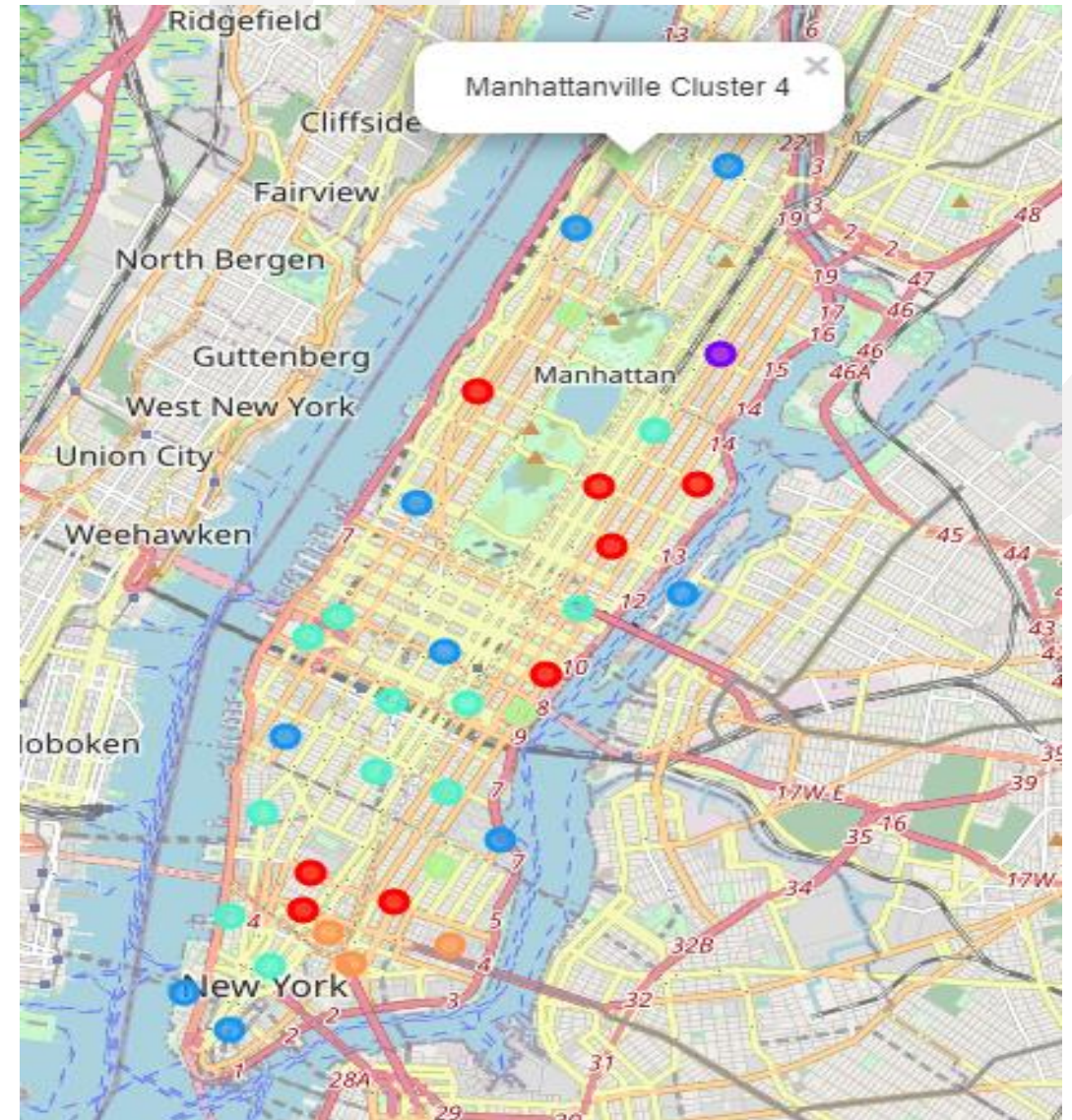
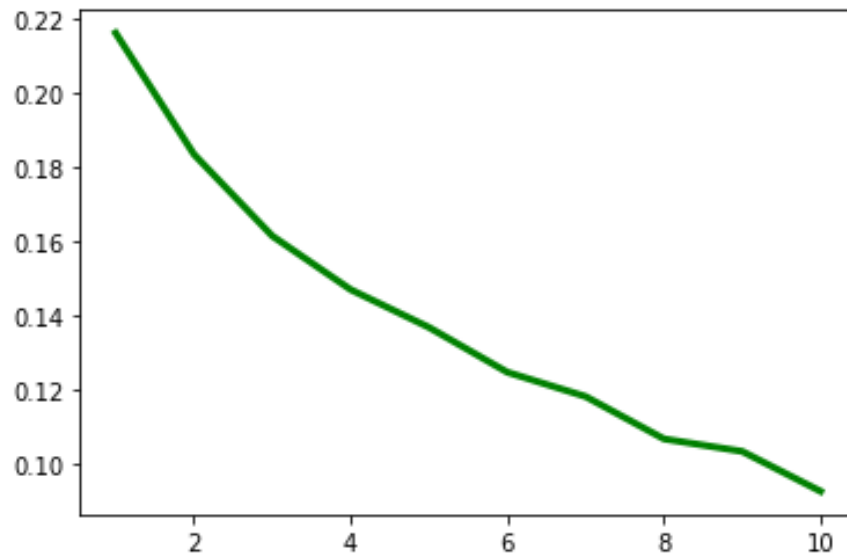
Transform the categorical data into binary entries

	Neighborhood	African Restaurant	American Restaurant	Arepa Restaurant	Argentinian Restaurant	Asian Restaurant	Australian Restaurant	Austrian Restaurant	Brazilian Restaurant	Cambodian Restaurant	...	Swiss Restaurant	Szechuan Restaurant	Taiwanese Restaurant	Tapas Restaurant	Thai Restaurant	Theme Restaurant	Turkish Restaurant	Udon Restaurant	Vegetarian / Vegan Restaurant	Vietnamese Restaurant
0	Battery Park City	0.000000	0.014493	0.00	0.000000	0.00	0.0	0.00	0.0	0.0	...	0.0	0.0	0.00	0.000000	0.00	0.0	0.0	0.0	0.000000	0.000000
1	Carnegie Hill	0.000000	0.010870	0.00	0.01087	0.00	0.0	0.00	0.0	0.0	...	0.0	0.0	0.00	0.000000	0.00	0.0	0.0	0.0	0.01087	0.01087
2	Central Harlem	0.066667	0.044444	0.00	0.000000	0.00	0.0	0.00	0.0	0.0	...	0.0	0.0	0.00	0.022222	0.00	0.0	0.0	0.0	0.000000	0.000000
3	Chelsea	0.000000	0.040000	0.01	0.000000	0.00	0.0	0.00	0.0	0.0	...	0.0	0.0	0.00	0.000000	0.00	0.0	0.0	0.0	0.000000	0.000000
4	Chinatown	0.000000	0.030000	0.00	0.000000	0.02	0.0	0.01	0.0	0.0	...	0.0	0.0	0.01	0.000000	0.01	0.0	0.0	0.0	0.01000	0.03000

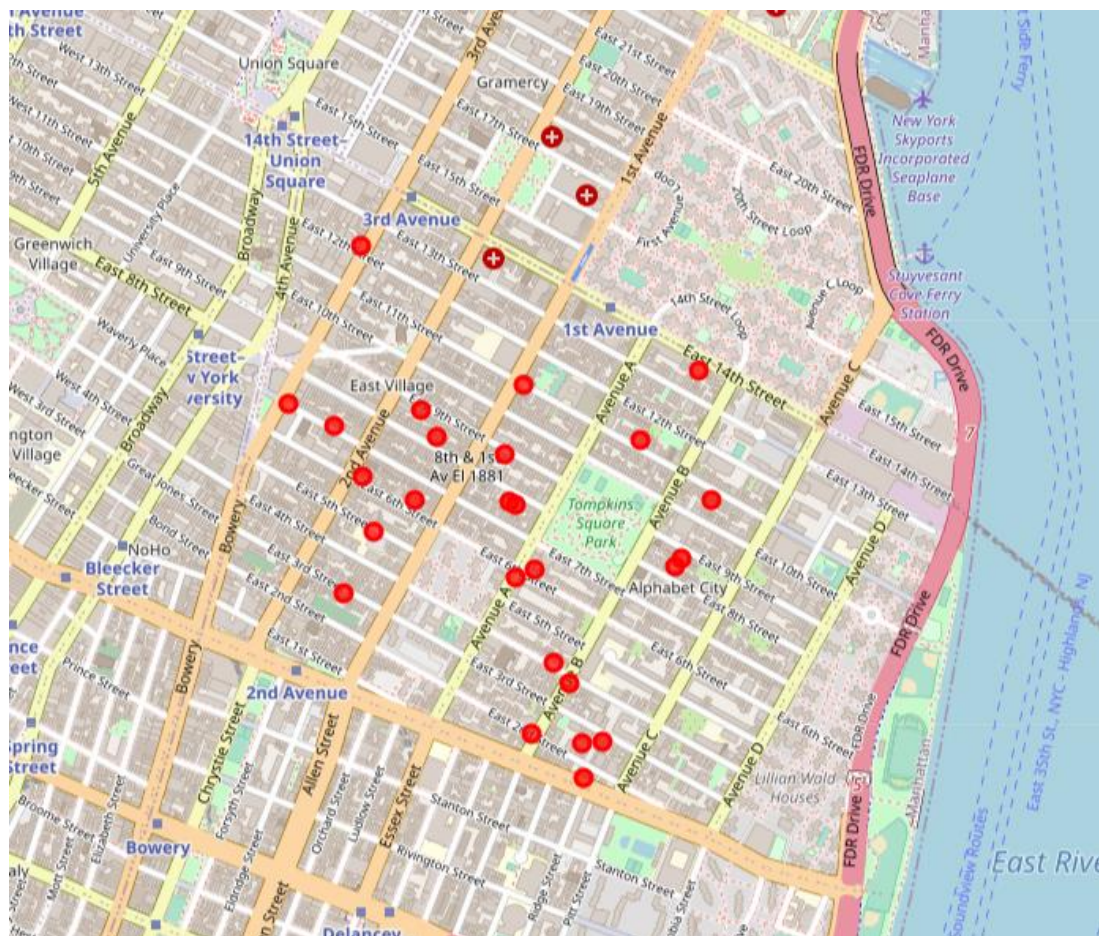
□ Exploratory Data Analysis:

4. Clustering Manhattan Neighborhood

Elbow method finding the optimal k



RECOMMENDATION LIST



0	Great Large 1 BR apt in East Village!	72062	Manhattan	East Village	40.72555	-73.97965	225
1	NYC Zen	143048	Manhattan	East Village	40.72354	-73.98295	195
2	Large Studio - Heart of East Village	462776	Manhattan	East Village	40.72843	-73.98895	159
3	East Village House -- Unique!	272730	Manhattan	East Village	40.72956	-73.97903	250
4	Quiet ST MARK'S PLACE ARTIST'S GEM	5364702	Manhattan	East Village	40.72739	-73.98815	195
6	Large 2BR apartment East Village	2208993	Manhattan	East Village	40.72210	-73.98356	420
7	2Br East Village VERY Spacious Apt.	5048868	Manhattan	East Village	40.72815	-73.98059	295
8	East Village Duplex Penthouse	1472225	Manhattan	East Village	40.72820	-73.98615	267
9	NaN	11395220	Manhattan	East Village	40.73215	-73.98821	200
11	Woodsy-chic Lofted 1BR, Office, AC	1019170	Manhattan	East Village	40.72312	-73.98255	175
12	Large eclectic studio East Village	1420868	Manhattan	East Village	40.72570	-73.97950	230
13	Quaint 1 Bedroom in Happenin' E.V	44862166	Manhattan	East Village	40.72689	-73.98676	199
15	Cozy, quiet, studio apartment	1598283	Manhattan	East Village	40.72926	-73.98377	169
17	Cozy 1 bedroom, Lower East Side	40438814	Manhattan	East Village	40.72117	-73.98215	160
18	Best East Village location St Marks 2 bedroom ...	2552603	Manhattan	East Village	40.72681	-73.98401	190
20	Spacious 3 bedroom in Manhattan	166066107	Manhattan	East Village	40.72193	-73.98162	280
21	Cozy & quiet 2 bedroom apt in a great location!	9973967	Manhattan	East Village	40.72626	-73.98784	310
22	Modern and spacious 2 bedroom in Manhattan	185981519	Manhattan	East Village	40.72189	-73.98219	260
23	Stylish & Tranquil East Village Three Bedroom	11305249	Manhattan	East Village	40.72499	-73.98867	450
24	Spacious Centrally Located 1 Bedroom Apartment	33225521	Manhattan	East Village	40.72888	-73.99019	300
25	Stylish bright and newly renovated	219558480	Manhattan	East Village	40.72876	-73.98655	187
27	XL 3 bedroom full floor E. Village Apt. Scrubbed!	160356	Manhattan	East Village	40.72530	-73.98401	250
28	ST MARKS /heart of EAST VILLAGE sleep up to 8	95892016	Manhattan	East Village	40.72687	-73.98416	396
29	Entire 2 bedroom apt in the heart of East Village	259066380	Manhattan	East Village	40.72690	-73.97866	173
30	Lower East Side Private entrance 2 bedroom suite	1187935	Manhattan	East Village	40.72548	-73.98349	285



THANK YOU

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