

Wellness-Fitness Center in Manhattan

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Capstone Project - The Battle of Neighborhoods

Introduction

Stakeholders asks us
to find an optimal
location in Manhattan
for a new Wellness-
Fitness center



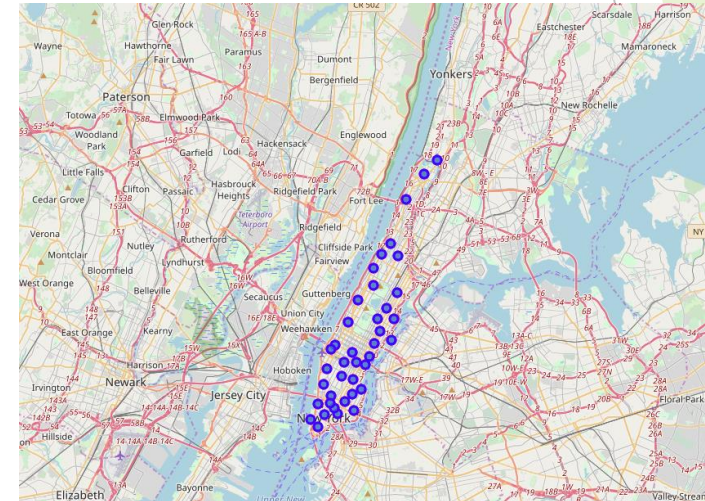
We will try to
detect locations that
are mediumly
crowded with these
services.

Data acquisition and cleaning

- Dataset that contains the 5 boroughs and the 306 neighborhoods of New York
https://geo.nyu.edu/catalog/nyu_2451_34572

	Borough	Neighborhood	Latitude	Longitude
0	Bronx	Wakefield	40.894705	-73.847201
1	Bronx	Co-op City	40.874294	-73.829939
2	Bronx	Eastchester	40.887556	-73.827806
3	Bronx	Fieldston	40.895437	-73.905643
4	Bronx	Riverdale	40.890834	-73.912585
5	Bronx	Kingsbridge	40.881687	-73.902818
6	Manhattan	Marble Hill	40.876551	-73.910660
7	Bronx	Woodlawn	40.898273	-73.867315
8	Bronx	Norwood	40.877224	-73.879391
9	Bronx	Williamsbridge	40.881039	-73.857446
10	Bronx	Baychester	40.866858	-73.835798

	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



Data acquisition and cleaning

► Foursquare queries

GYM

	Neighborhood	Neighborhood Latitude	Neighborhood Longitude	Venue	Venue Latitude	Venue Longitude	Venue Category
0	Marble Hill	40.876551	-73.910660	Winston Churchill Gym	40.874714	-73.911467	Gym
1	Marble Hill	40.876551	-73.910660	Planet Fitness	40.874088	-73.909137	Gym / Fitness Center
2	Marble Hill	40.876551	-73.910660	Astral Fitness & Wellness Center	40.876705	-73.906372	Gym
5	Chinatown	40.715618	-73.994279	Gym	40.716540	-73.996871	Gym
6	Chinatown	40.715618	-73.994279	The Gym at The Crossroads	40.714009	-73.990495	Gym
8	Chinatown	40.715618	-73.994279	The Tombs Gym	40.716429	-73.999910	Gym
9	Chinatown	40.715618	-73.994279	Downstairs Gym	40.717605	-73.999299	Gym
10	Chinatown	40.715618	-73.994279	1789 Star Gym	40.713344	-74.000211	Gym
12	Chinatown	40.715618	-73.994279	NOMO Gym	40.719797	-74.000572	Gym / Fitness Center
13	Chinatown	40.715618	-73.994279	Fitness Center	40.719171	-74.000200	Gym
14	Washington Heights	40.851903	-73.936900	Castle Village Gym	40.853471	-73.939900	Gym

Data acquisition and cleaning

► Foursquare queries

SPA

	Neighborhood	Neighborhood Latitude	Neighborhood Longitude	Venue	Venue Latitude	Venue Longitude	Venue Category
0	Marble Hill	40.876551	-73.910660	Spa Nail	40.879232	-73.906792	Nail Salon
1	Marble Hill	40.876551	-73.910660	The Spa at TCR the Club of Riverdale	40.878632	-73.914774	Spa
2	Marble Hill	40.876551	-73.910660	Studio Esthetique Day Spa	40.878686	-73.915209	Spa
3	Marble Hill	40.876551	-73.910660	Blue Skin Laser Spa	40.879808	-73.906175	Spa
4	Marble Hill	40.876551	-73.910660	Narcisses Spa	40.880133	-73.907131	Spa
7	Marble Hill	40.876551	-73.910660	Hello Nails & Spa Inc	40.879631	-73.906282	Spa
8	Chinatown	40.715618	-73.994279	Zu Yuan Spa	40.715469	-73.998627	Spa
9	Chinatown	40.715618	-73.994279	Season Spa	40.717693	-73.996678	Spa
10	Chinatown	40.715618	-73.994279	GoGreen Organic Spa	40.717014	-73.995847	Spa
11	Chinatown	40.715618	-73.994279	Sunny Spa E Broadway	40.713917	-73.993970	Massage Studio
12	Chinatown	40.715618	-73.994279	Rich Nail Spa	40.718334	-73.998345	Nail Salon

Data acquisition and cleaning

► Foursquare queries

YOGA

	Neighborhood	Neighborhood Latitude	Neighborhood Longitude	Venue	Venue Latitude	Venue Longitude	Venue Category
32	Lenox Hill	40.768113	-73.958860	Elahi Yoga	40.767293	-73.961594	Yoga
37	Roosevelt Island	40.762160	-73.949168	Wild Blossom Yoga with Natalie	40.764398	-73.953602	Yoga
91	Greenwich Village	40.726933	-73.999914	Yoga to the People	40.724210	-73.997347	Yoga
132	Little Italy	40.719324	-73.997305	Yoga to the People	40.724210	-73.997347	Yoga
154	Soho	40.722184	-74.000657	Yoga to the People	40.724210	-73.997347	Yoga
195	Financial District	40.707107	-74.010665	NYSE Yoga Class 8th floor	40.707648	-74.011776	Yoga
219	Noho	40.723259	-73.988434	Egil's Yoga	40.725074	-73.991478	Yoga
269	Midtown South	40.748510	-73.988713	NEWLIFE NY Yoga & Raw Food Expo	40.752183	-73.993284	Yoga
274	Midtown South	40.748510	-73.988713	NudeYorkYoga	40.745546	-73.991824	Yoga
281	Sutton Place	40.760280	-73.963556	Pilates/Yoga	40.757895	-73.967837	Pilates Studio
353	Lenox Hill	40.768113	-73.958860	Elahi Yoga	40.767293	-73.961594	Yoga
358	Roosevelt Island	40.762160	-73.949168	Wild Blossom Yoga with Natalie	40.764398	-73.953602	Yoga
412	Greenwich Village	40.726933	-73.999914	Yoga to the People	40.724210	-73.997347	Yoga
453	Little Italy	40.719324	-73.997305	Yoga to the People	40.724210	-73.997347	Yoga
475	Soho	40.722184	-74.000657	Yoga to the People	40.724210	-73.997347	Yoga
516	Financial District	40.707107	-74.010665	NYSE Yoga Class 8th floor	40.707648	-74.011776	Yoga
540	Noho	40.723259	-73.988434	Egil's Yoga	40.725074	-73.991478	Yoga
590	Midtown South	40.748510	-73.988713	NEWLIFE NY Yoga & Raw Food Expo	40.752183	-73.993284	Yoga
595	Midtown South	40.748510	-73.988713	NudeYorkYoga	40.745546	-73.991824	Yoga
602	Sutton Place	40.760280	-73.963556	Pilates/Yoga	40.757895	-73.967837	Pilates Studio

Analysis

- Reducing the data to medium crowded neighborhoods (80-130 venues)

	Neighborhood Latitude	Neighborhood Longitude	Venue	venlat	venlon	vencat
Neighborhood						
Battery Park City	80	80	80	80	80	80
Carnegie Hill	92	92	92	92	92	92
Chelsea	96	96	96	96	96	96
Chinatown	110	110	110	110	110	110
Clinton	124	124	124	124	124	124
East Village	100	100	100	100	100	100
Gramercy	100	100	100	100	100	100
Greenwich Village	118	118	118	118	118	118
Lenox Hill	130	130	130	130	130	130
Lincoln Square	110	110	110	110	110	110
Noho	108	108	108	108	108	108
Tudor City	98	98	98	98	98	98
Turtle Bay	112	112	112	112	112	112
West Village	84	84	84	84	84	84
Yorkville	112	112	112	112	112	112

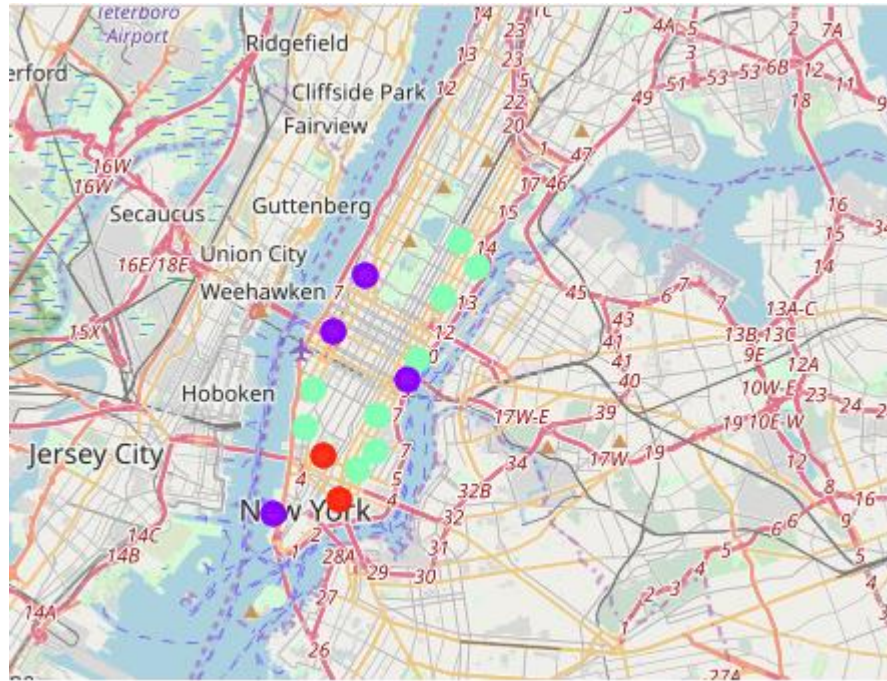
Analysis

- Grouping by neighborhood and by taking the mean of the frequency of occurrence of each category.

	Neighborhood	Athletics & Sports	Basketball Court	Boxing Gym	Climbing Gym	Gym	Gym / Fitness Center	Gym Pool	Gymnastics Gym	Health & Beauty Service	Massage Studio	Nail Salon	Outdoor Gym	Rock Climbing Spot	Spa	Yoga
0	Battery Park City	0.025000	0.000000	0.000000	0.000000	0.650000	0.175000	0.000000	0.025000	0.000000	0.000000	0.000000	0.000000	0.000000	0.125000	0.000000
1	Carnegie Hill	0.021739	0.021739	0.000000	0.000000	0.347826	0.065217	0.000000	0.021739	0.021739	0.043478	0.195652	0.000000	0.000000	0.260870	0.000000
2	Chelsea	0.000000	0.020833	0.000000	0.000000	0.250000	0.125000	0.000000	0.020833	0.020833	0.041667	0.208333	0.000000	0.000000	0.312500	0.000000
3	Chinatown	0.000000	0.000000	0.000000	0.000000	0.109091	0.018182	0.000000	0.000000	0.054545	0.181818	0.036364	0.000000	0.000000	0.600000	0.000000
4	Clinton	0.016129	0.000000	0.000000	0.000000	0.435484	0.161290	0.000000	0.000000	0.000000	0.016129	0.080645	0.000000	0.016129	0.274194	0.000000
5	East Village	0.020000	0.000000	0.000000	0.000000	0.300000	0.080000	0.000000	0.020000	0.000000	0.080000	0.100000	0.000000	0.000000	0.400000	0.000000
6	Gramercy	0.000000	0.020000	0.000000	0.000000	0.200000	0.100000	0.000000	0.000000	0.020000	0.140000	0.320000	0.000000	0.000000	0.200000	0.000000
7	Greenwich Village	0.000000	0.000000	0.033898	0.000000	0.237288	0.000000	0.000000	0.000000	0.067797	0.016949	0.101695	0.000000	0.000000	0.525424	0.016949
8	Lenox Hill	0.015385	0.000000	0.000000	0.000000	0.261538	0.123077	0.000000	0.000000	0.015385	0.092308	0.184615	0.000000	0.000000	0.292308	0.015385
9	Lincoln Square	0.018182	0.000000	0.000000	0.018182	0.436364	0.163636	0.000000	0.000000	0.000000	0.018182	0.127273	0.000000	0.000000	0.218182	0.000000
10	Noho	0.018519	0.000000	0.000000	0.000000	0.296296	0.092593	0.000000	0.000000	0.018519	0.055556	0.203704	0.000000	0.000000	0.296296	0.018519
11	Tudor City	0.040816	0.000000	0.000000	0.000000	0.346939	0.183673	0.020408	0.000000	0.000000	0.020408	0.183673	0.020408	0.000000	0.183673	0.000000
12	Turtle Bay	0.017857	0.000000	0.000000	0.000000	0.267857	0.142857	0.000000	0.000000	0.017857	0.017857	0.250000	0.017857	0.000000	0.267857	0.000000
13	West Village	0.000000	0.000000	0.000000	0.000000	0.238095	0.023810	0.000000	0.000000	0.047619	0.023810	0.357143	0.000000	0.000000	0.309524	0.000000
14	Yorkville	0.017857	0.000000	0.000000	0.000000	0.321429	0.196429	0.000000	0.017857	0.000000	0.000000	0.160714	0.000000	0.000000	0.285714	0.000000

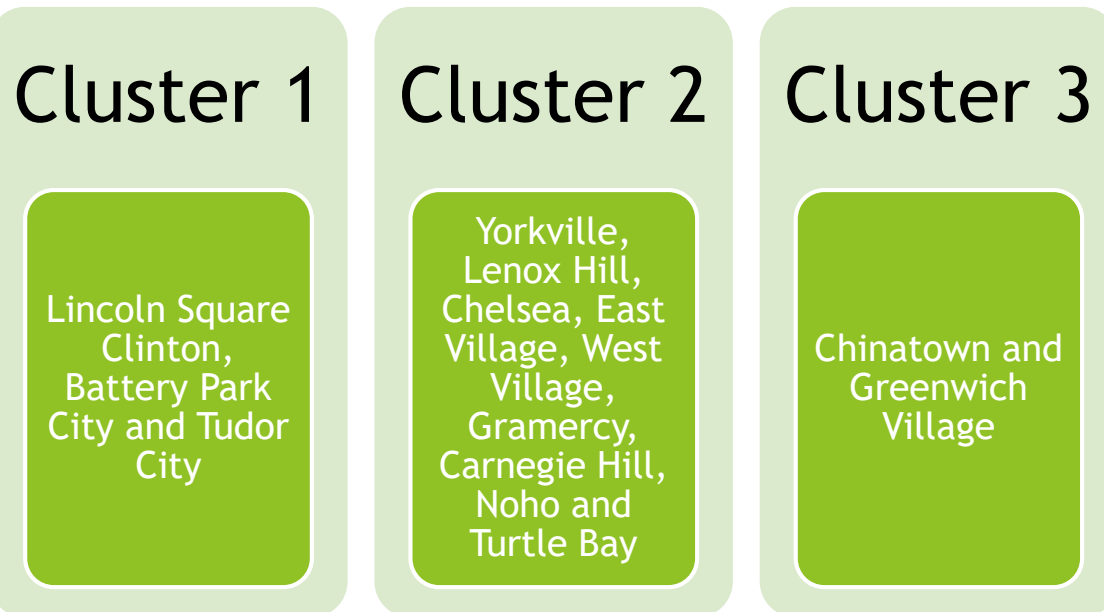
Analysis

- Clustering the data



Results and dicussion

- ▶ In Manhattan there are 1662 gyms or fitness centers, 1834 spas, massage studios and so on and only 20 yoga centers.
- ▶ They are distributed in 39, 40 and 9 neighborhoods, respectively.
- ▶ Midtown South has the large amount of gyms and spas (180) whereas Morningside Heights, Manhattanville, Stuyvesant Town and Central Harlem only have 12 yoga centers.
- ▶ By clustering the data:



Conclusion

- ▶ We only have 15 medium-crowded neighborhoods to chose.
- ▶ Only Noho, Lenox Hill and Greenwich Village have yoga centers.
- ▶ Cluster 2 is the biggest one and includes Noho and Lenox Hill.
- ▶ Since due to the scope of the cluster 2, it will be easier to find variety in additional factors.
- ▶ Best location: Noho, Lenox Hill or other from cluster 2.