Capstone Project - The Battle of Neighborhoods (Part-2)

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Title: How to choose the Best Hotel for a family that is going on vacation depending on everyone needs?

Introduction/Business Problem:

Mr X and Mrs Y are taking their kids on a family trip to New York City for one week. For this special weekend everyone wants to do something special they will remember forever. The kids want to go to an exhibit Zoo, Mrs Y wants to be close to a Chinese restaurant and Mr X desires is to be next to gym so he can keep working out even during the family trip. So the family wants a hotel that matches will all their needs. As a data scientist they called me so I can help them to reach their expectations.

What about New York City?

New York City, often called simply **New York** and abbreviated as **NYC**, is the most populous city in the United States. Situated on one of the world's largest natural harbors, New York City is composed of five boroughs, each of which is a county of the State of New York. The five boroughs—Brooklyn, Queens, Manhattan, the Bronx, and Staten Island—were consolidated into a single city in 1898. In its center is Manhattan, a densely

populated borough that is one of the main commercial, financial and cultural centers of the world. Its must-see sites include skyscrapers like the Empire State Building and the huge Central Park. The Broadway theater is located in Times Square.

So from what read above about New York City. This is a big city with a lot to offer. So we won't have much problem to resolve Mr. X and Mrs. Y issue. For our datasets we will be using **Foursquare** in order to get the data we need.

Data Section:

As mentioned in the business problem section, New York City is composed of five boroughs, each of which is a county of the State of New York. The five boroughs—Brooklyn, Queens, Manhattan, the Bronx, and Staten Island. To get information about hotels in New York, we will retrieve data from Foursquare in a radius of 2 kilometers. After gathering these information, we will clean the dataset to keep only the information about the locations and then we will show them in a map of New York City.

Remember that the kids want to go to zoo, using foursquare again, we will retrieve data about zoos in New York, and we'll clean the data and show them on a map of New York. The same process will be repeated for venue such as Chinese restaurant and gym. Then we will put all the data on the same map in order to find the best hotels with venues like zoo, Chinese restaurants and gyms nearby.

DATA SOURCES

All our data comes from foursquare. First of all, we retrieve the data and we put them in a data frame. The result looks like below:

Figure 1: list of the hotels in NY in an area of 2 kilometers

Out[224]:

	id	name	categories	referralId	hasPerk	location.address	location.crossStreet	location.lat	location.lng	lc
0	4a50f449f964a5204fb01fe3	Sheraton New York Times Square Hotel	[{'id': '4bf58dd8d48988d1fa931735', 'name': 'H...	v-1595040449	False	811 7th Ave # 53	at W 53rd St	40.762386	-73.982019	
1	49d18dfdf964a5208f5b1fe3	The Plaza Hotel	[{'id': '4bf58dd8d48988d1fa931735', 'name': 'H...	v-1595040449	False	768 5th Ave	at Central Park S	40.764519	-73.974488	
2	4d7ad1263fbf6dcbb60b6423	Sanctuary Hotel New York	[{'id': '4bf58dd8d48988d1fa931735', 'name': 'H...	v-1595040449	False	132 W 47th St	btwn 6th & 7th Ave.	40.758358	-73.983262	
3	4690ac4cf964a520a0481fe3	Park Central Hotel New York	[{'id': '4bf58dd8d48988d1fa931735', 'name': 'H...	v-1595040449	False	870 7th Ave	btwn W 55th & W 56th St	40.764810	-73.981400	
4	503f8544e4b05b1413761889	Baccarat Hotel	[{'id': '4bf58dd8d48988d1fa931735', 'name': 'H...	v-1595040449	False	28 W 53rd St	NaN	40.760656	-73.976784	

Figure 2: list of the zoos in NY in an area of 2 kilometers

Out[253]:

	id	name	categories	referralId	hasPerk	location.address	location.crossStreet	location.lat	location.lng
0	4a09f665f964a52077741fe3	Central Park Zoo	[{'id': '4bf58dd8d48988d17b941735', 'name': 'Z...	v-1595041012	False	Central Park	btwn E 63rd & E 65th St	40.767655	-73.971827
1	4bc22d23461576b081fd7c32	Central Park Zoo - Tisch Children's Zoo	[{'id': '4bf58dd8d48988d17b941735', 'name': 'Z...	v-1595041012	False	66th Street & 5th Avenue	NaN	40.768509	-73.970561
2	4dbadb926e815ab0de5bf9a6	Central Park Zoo - Penguins & Seabirds	[{'id': '58daa1558bbb0b01f18ec1fd', 'name': 'Z...	v-1595041012	False	64th St	5th Ave	40.767745	-73.971826
3	4f9d85f2e4b087d95e3bd792	Central Park Zoo - Red Panda	[{'id': '58daa1558bbb0b01f18ec1fd', 'name': 'Z...	v-1595041012	False	NaN	NaN	40.768099	-73.972626
4	5bb124e43149b9002c7da00c	Central Park Zoo - Grizzly Bears	[{'id': '58daa1558bbb0b01f18ec1fd', 'name': 'Z...	v-1595041012	False	NaN	NaN	40.767827	-73.971921
5	4d98babaa2c65481d04ff853	Central Park Zoo - Snow Leopard	[{'id': '58daa1558bbb0b01f18ec1fd', 'name': 'Z...	v-1595041012	False	Central Park Zoo	NaN	40.768432	-73.972648

Figure 3: list of the Chinese restaurant in NY in an area of 2 kilometers

Out[181]:

	id	name	categories	referralId	hasPerk	location.address	location.crossStreet	location.lat	location.lng
0	4a987360f964a520192c20e3	Philippe	[{'id': '4bf58dd8d48988d142941735', 'name': 'A...	v-1595039611	False	33 E 60th St	btwn Park & Madison Ave	40.764071	-73.970479
1	5d669c759c03190008143b31	Red Peony Chinese Cuisine	[{'id': '4bf58dd8d48988d145941735', 'name': 'C...	v-1595039611	False	24 W 56th St	NaN	40.762675	-73.975974
2	4f32581919836c91c7ce7f27	East Ocean Chinese Fast Food	[{'id': '4bf58dd8d48988d145941735', 'name': 'C...	v-1595039611	False	159 E 55th St	NaN	40.759296	-73.968773
3	4ad0e5d5f964a520e5da20e3	Shanghai Tea Garden	[{'id': '4bf58dd8d48988d145941735', 'name': 'C...	v-1595039611	False	141 E 55th St	btwn lexington and 3rd ave	40.759736	-73.969696
4	4bc7cc058b7c9c74dd3d37cf	szechuan garden restaurant	[{'id': '4bf58dd8d48988d145941735', 'name': 'C...	v-1595039611	False	242 W 56th St	8th st & broadway	40.765606	-73.982948

Figure 4: list of the gyms in NY in an area of 2 kilometers

	id	name	categories	referralId	hasPerk	location.address	location.lat	location.lng	location.labeledLatL
0	4e6531a5e4cdf1e2c079eaf0	Gym@Central Park Place	[{'id': '4bf58dd8d48988d175941735', 'name': 'G...	v-1595039854	False	301 W 57th St	40.767162	-73.982903	[{'label': 'display', 40.767162322998
1	4af0bb31f964a520a8de21e3	Gold's Gym	[{'id': '4bf58dd8d48988d176941735', 'name': 'G...	v-1595039854	False	250 W 54th St	40.764616	-73.983438	[{'label': 'display', 40.764615942882
2	4d37a8befe80a1cddb0d7e9f	The Marc Gym	[{'id': '4bf58dd8d48988d176941735', 'name': 'G...	v-1595039854	False	260 W 54th St	40.763942	-73.984289	[{'label': 'display', 40.763941975781
3	4d375978c47db1f71628efa5	Gym On Top	[{'id': '4bf58dd8d48988d176941735', 'name': 'G...	v-1595039854	False	NaN	40.765812	-73.982059	[{'label': 'display', 40.765811536942
4	4d6f8dc256dea093cc35c18c	Gym La Premiere	[{'id': '4bf58dd8d48988d176941735', 'name': 'G...	v-1595039854	False	NaN	40.764798	-73.982914	[{'label': 'display', 40.764798017717

DATA CLEANING

After retrieving the data we had to clean them and take out all the unnecessary parts to keep only those we need such as: name, address, latitude, longitude, full address. After the cleaning part the data look like as shown below:

Figure 5: final data frame of the hotels

Entrée [10]: `df2.head()`

Out[10]:

	name	address	Latitude	Longitude	full address
0	The Beekman, A Thompson Hotel	123 Nassau St	40.711173	-74.006702	[123 Nassau St (Beekman St), New York, NY 1003...
1	Smyth Hotel	85 W Broadway	40.715144	-74.009183	[85 W Broadway (Chambers St), New York, NY 100...
2	The Roxy Hotel	2 Avenue of the Americas	40.719341	-74.005044	[2 Avenue of the Americas (btwn Walker & White...
3	Four Seasons Hotel New York Downtown	27 Barclay St	40.712612	-74.009380	[27 Barclay St (Broadway), New York, NY 10007,...
4	Soho Grand Hotel	54 Watts St	40.723911	-74.005224	[54 Watts St (Between Grand Street & Canal Str...

Figure 6: final data frame of the Zoos

Entrée [33]: `df3_.head()`

Out[33]:

	name	address	Latitude	Longitude	full address
0	Prospect Park Zoo	450 Flatbush Ave	40.665015	-73.964467	[450 Flatbush Ave (at Ocean Ave.), Brooklyn, N...
1	Sea Lion Court @ Prospect Park Zoo	Flatbush Ave	40.665597	-73.964764	[Flatbush Ave, Brooklyn, NY 11238, United States]
2	Central Park Zoo	Central Park	40.767655	-73.971827	[Central Park (btwn E 63rd & E 65th St), New Y...
3	Bronx Zoo	2300 Southern Blvd	40.853107	-73.878094	[2300 Southern Blvd (at Boston Rd), Bronx, NY ...
4	Central Park Zoo - Tisch Children's Zoo	66th Street & 5th Avenue	40.768509	-73.970561	[66th Street & 5th Avenue, New York, NY 10065,...

Figure 7: final data frame of the Chinese restaurants

Out[52]:

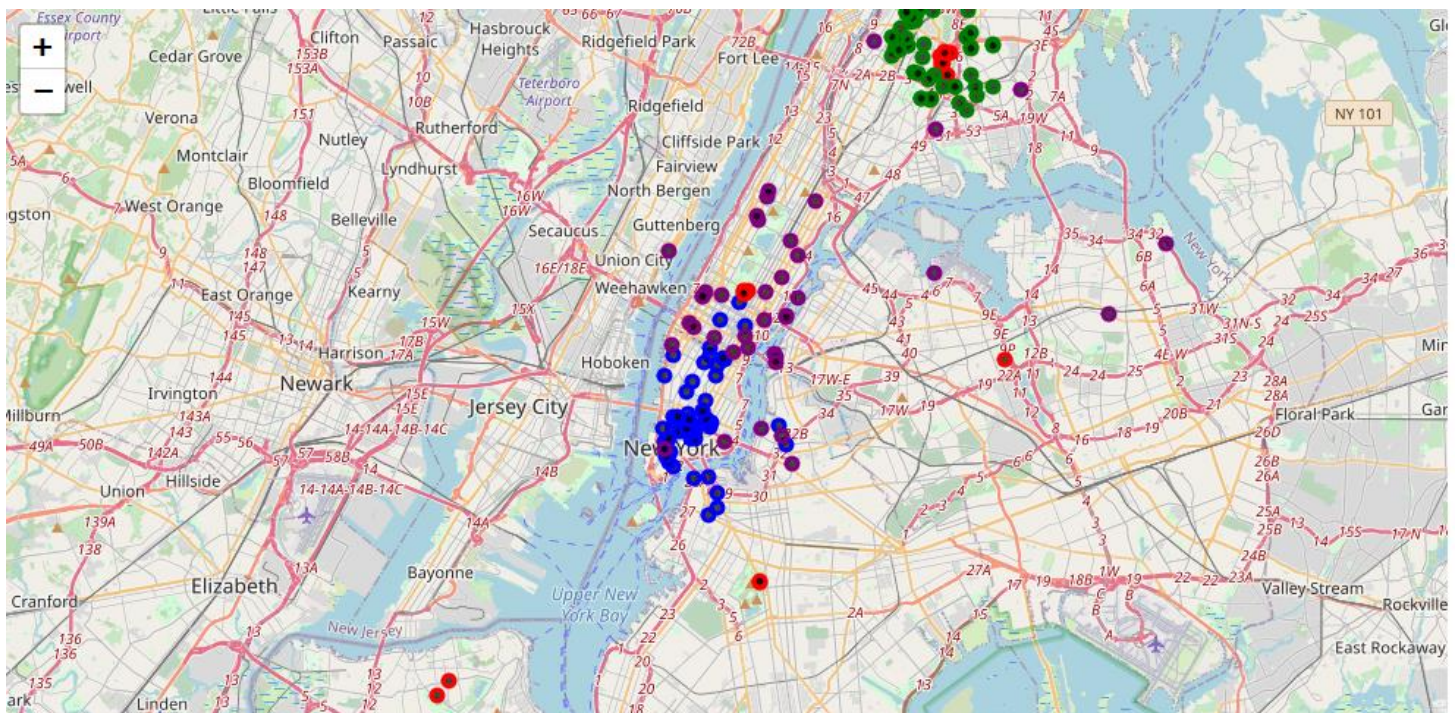|	name	address	Latitude	Longitude	full address
0	No. 8 Chinese Restaurant	694 Thwaites Pl	40.858553	-73.868267	[694 Thwaites Pl, Bronx, NY 10467, United States]
1	Mr. Q's Chinese Restaurant	2115 Williamsbridge Rd	40.855790	-73.855455	[2115 Williamsbridge Rd, Bronx, NY 10461, Unit...
2	Lucky Chinese Restaurant	653 E 182nd St	40.851396	-73.888245	[653 E 182nd St, Bronx, NY 10457, United States]
3	Rainbow Chinese Restaurant	613 E Tremont Ave	40.846241	-73.892555	[613 E Tremont Ave, Bronx, NY 10457, United St...
4	Nice Food Chinese Restaurant	571 E 187th St	40.856001	-73.888063	[571 E 187th St, Bronx, NY 10458, United States]

Figure 8: final data frame of the gyms

Out[78]:

	name	address	Latitude	Longitude	full address
0	Daro's Extreme Gym	1123 Close Ave	40.825661	-73.882614	[1123 Close Ave (Watson), Bronx, NY 10472, Uni...
1	Alumni Gymnasium - CUNY Bronx Community College	2155 Dr Martin L King Jr Blvd	40.856683	-73.911255	[2155 Dr Martin L King Jr Blvd (181 st), Bronx...
2	The Bayas Gym	NaN	40.848153	-73.907015	[Bronx, NY, United States]
3	Gym	1 Morningside Dr	40.802107	-73.961297	[1 Morningside Dr (Avalon Morningside Park), N...
4	Gym	NaN	40.713591	-74.044625	[Jersey City, NJ 07302, United States]

Results and Discussion

After retrieving the data, cleaning them and showing them on a map of New York City,

next step is to put all of them i.e. the hotels, the zoos, the Chinese restaurants and the

gyms on the same in order to compare them and see which ones are closer to another.

The map looks like as shown below:

CONCLUSION AND RECOMMENDATIONS

For our study we have a lot of places next to each other's and for our recommendations we will recommend our clients venues like: **the plaza hotel, Sanctuary hotel, the Kimberly hotel, gym central park place, AKA gym, the Gym at the Atlas, central park zoo - tropic zoo, central park zoo - Tish children's zoo, central park zoo – snow leopard, Nong Xin Chinese Kitchen, Chinese Take Out.**