Most Dog-Friendly Neighborhoods in Manhattan

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1. Introduction

The city can be a tricky place to raise a dog. Dogs need open spaces, accepting communities, pet supply and grooming locations, and plenty of dog-friendly establishments and eateries. That's why dog owners are always looking for the perfect neighborhood to raise their pup, and it can be challenging to find. Manhattan is one of the more dog-welcoming cities, but what is the perfect area in Manhattan for a dog owner? This analysis will find a solution to the problem by identifying the top dog-friendly neighborhoods to live in Manhattan.

2. Data

A dataset of New York City neighborhoods, as well as their latitude and longitude, will be used to create a database of neighborhoods in Manhattan to analyze (https://geo.nyu.edu/catalog/nyu_2451_34572). In addition, Foursquare location data will be used to find the neighborhoods that provide the most extensive list of top dog related establishments (https://developer.foursquare.com). Venues identified as dog-friendly include Dog Run, Outdoors & Recreation, Park, Pet Café, Pet Service, Pet Store, Trail, and Veterinarian. Finally, neighborhoods will be rated using a 'Dog Friendly Factor' based on the frequency of the dog-friendly venues identified above within the neighborhood.

3. Methodology

First the data was downloaded and cleaned. After downloading the New York City dataset, information regarding Borough, Neighborhood, Latitude, and Longitude were pulled and transformed into a pandas dataframe. The resulting dataframe included 5 boroughs and 306 neighborhoods. A geopy library was used to get the latitude and longitude values of New York City and create a map of the neighborhoods from the dataset.

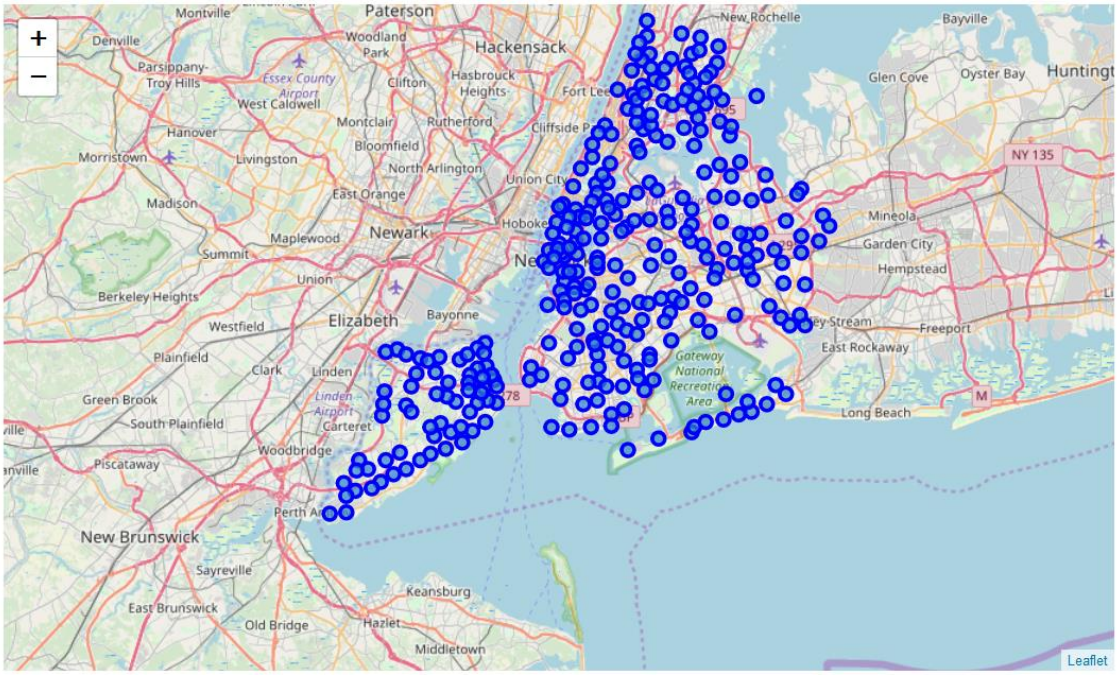
Next, in order to focus on Manhattan neighborhoods, the New York City dataframe was sliced to create a new dataframe of Manhattan data only. A similar process was used here, identifying the latitude and longitude values of Manhattan and creating a map of Manhattan only neighborhoods.

Once the Manhattan neighborhoods to be analyzed had been visualized, Foursquare API was used to evaluate and segment the neighborhoods. Using a radius of 500 meters, the top 100 venues in each neighborhood were identified and structured into a pandas dataframe. There were 332 unique venues identified. The final step in creating the aggregate database was grouping each row by neighborhood and taking the mean of the frequency of occurrence of each venue.

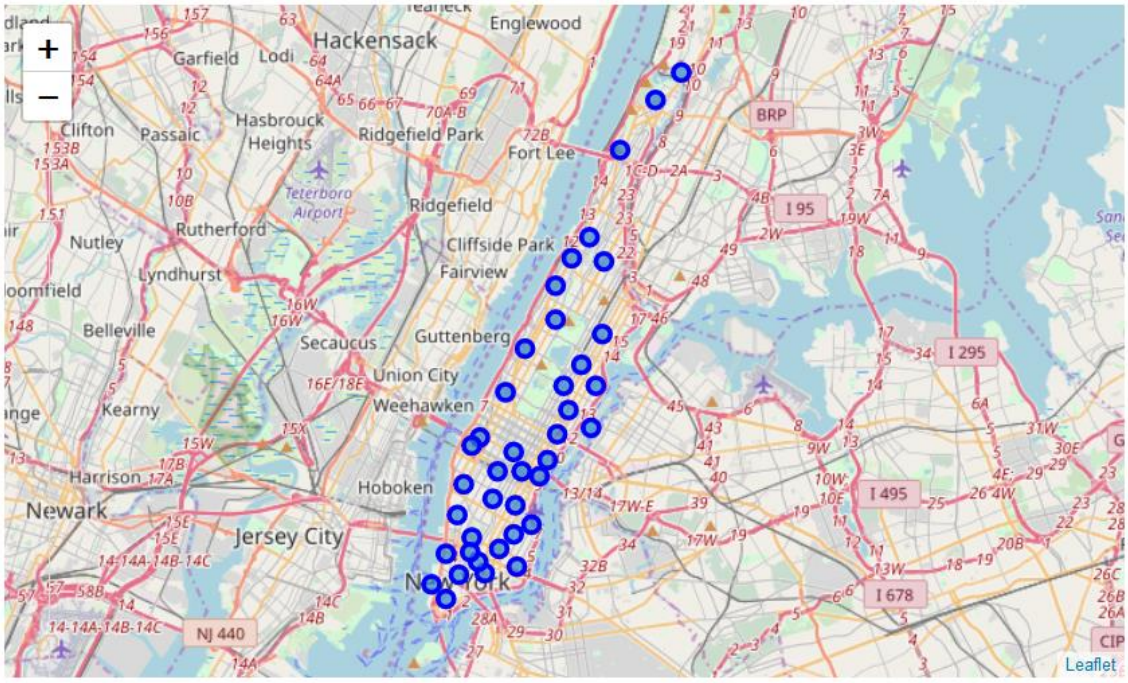
Lastly, dog-friendly venue frequencies were identified and combined in a new database. As mentioned above, these venues were assumed to include Dog Run, Outdoors & Recreation, Park, Pet Café, Pet Service, Pet Store, Trail, and Veterinarian. The 'Dog Friendly Factor' was defined as the sum of frequencies across all dog-friendly venues for each neighborhood. Adding this factor to the database created a means to rank the neighborhoods. Adjusting the final database by sorting on the 'Dog Friendly Factor' in descending order identified the top dog-friendly neighborhoods.

4. Analysis

The following is the New York City map of neighborhoods identified from the New York City dataset:



Refining the neighborhoods to Manhattan only produced the following map of Manhattan neighborhoods:



Next, the top 50 venues in each neighborhood were found and the list of venue categories per neighborhood was transformed into a dataframe (see full dataframe in Python Notebook):

	Neighborhood	Accessories Store	Adult Boutique	African Restaurant	American Restaurant	Antique Shop	Arcade	Arepa Restaurant	Argentinian Restaurant	Art Gallery	Art Museum	Arts & Crafts Store
0	Marble Hill	0	0	0	0	0	0	0	0	0	0	0
1	Marble Hill	0	0	0	0	0	0	0	0	0	0	0
2	Marble Hill	0	0	0	0	0	0	0	0	0	0	0
3	Marble Hill	0	0	0	0	0	0	0	0	0	0	0
4	Marble Hill	0	0	0	0	0	0	0	0	0	0	0

The frequency of each type of venue per neighborhood was identified (see full dataframe in Python Notebook):

	Neighborhood	Accessories Store	Adult Boutique	Afghan Restaurant	African Restaurant	American Restaurant	Antique Shop	Arcade	Arepa Restaurant	Argentinian Restaurant	Art Gallery	Art Museum	Arts & Crafts Store
0	Battery Park City	0.000000	0.00	0.00	0.000000	0.010000	0.00	0.00	0.000000	0.000000	0.000000	0.00	0.000000
1	Carnegie Hill	0.000000	0.00	0.00	0.000000	0.010000	0.00	0.00	0.000000	0.010000	0.000000	0.01	0.000000
2	Central Harlem	0.000000	0.00	0.00	0.069767	0.046512	0.00	0.00	0.000000	0.000000	0.023256	0.00	0.000000
3	Chelsea	0.000000	0.00	0.00	0.000000	0.040000	0.01	0.00	0.000000	0.000000	0.020000	0.00	0.000000
4	Chinatown	0.000000	0.00	0.00	0.000000	0.040000	0.00	0.00	0.000000	0.000000	0.000000	0.00	0.000000

Pet-friendly venues frequencies for each neighborhood were isolated in a new database, summed to create a relative metric for ranking (the 'Dog Friendly Factor'), and sorted from highest ranking to lowest (see full dataframes in Python Notebook):

	Neighborhood	Dog Run	Outdoors & Recreation	Park	Pet Café	Pet Service	Pet Store	Trail	Veterinarian
0	Battery Park City	0.0	0.0	0.080000	0.0	0.0	0.01	0.0	0.0
1	Carnegie Hill	0.0	0.0	0.000000	0.0	0.0	0.01	0.0	0.0
2	Central Harlem	0.0	0.0	0.023256	0.0	0.0	0.00	0.0	0.0
3	Chelsea	0.0	0.0	0.010000	0.0	0.0	0.01	0.0	0.0
4	Chinatown	0.0	0.0	0.000000	0.0	0.0	0.00	0.0	0.0

	Neighborhood	Dog Run	Outdoors & Recreation	Park	Pet Café	Pet Service	Pet Store	Trail	Veterinarian	Dog Friendly Factor
0	Battery Park City	0.0	0.0	0.080000	0.0	0.0	0.01	0.0	0.0	0.090000
1	Carnegie Hill	0.0	0.0	0.000000	0.0	0.0	0.01	0.0	0.0	0.010000
2	Central Harlem	0.0	0.0	0.023256	0.0	0.0	0.00	0.0	0.0	0.023256
3	Chelsea	0.0	0.0	0.010000	0.0	0.0	0.01	0.0	0.0	0.020000
4	Chinatown	0.0	0.0	0.000000	0.0	0.0	0.00	0.0	0.0	0.000000

5. Results

The following was the final list of top 10 dog-friendly neighborhoods in Manhattan:

Neighborhood	Dog Run	Outdoors & Recreation	Park	Pet Café	Pet Service	Pet Store	Trail	Veterinarian	Dog Friendly Factor
Stuyvesant Town	0.000000	0.000000	0.105263	0.0	0.052632	0.000000	0.000000	0.000000	0.157895
Tudor City	0.036585	0.000000	0.060976	0.0	0.000000	0.012195	0.012195	0.000000	0.121951
Roosevelt Island	0.038462	0.038462	0.038462	0.0	0.000000	0.000000	0.000000	0.000000	0.115385
Inwood	0.017544	0.000000	0.035088	0.0	0.000000	0.017544	0.017544	0.017544	0.105263
Battery Park City	0.000000	0.000000	0.080000	0.0	0.000000	0.010000	0.000000	0.000000	0.090000
Morningside Heights	0.000000	0.000000	0.071429	0.0	0.000000	0.000000	0.000000	0.000000	0.071429
Tribeca	0.010000	0.000000	0.050000	0.0	0.000000	0.000000	0.000000	0.000000	0.060000
Hudson Yards	0.027397	0.000000	0.027397	0.0	0.000000	0.000000	0.000000	0.000000	0.054795
Turtle Bay	0.010000	0.000000	0.030000	0.0	0.000000	0.010000	0.000000	0.000000	0.050000
Lincoln Square	0.010000	0.000000	0.030000	0.0	0.000000	0.010000	0.000000	0.000000	0.050000

6. Discussion

The analysis enabled a breakdown of which neighborhoods are best suited for a dog owner. Venues such as parks, pet cafés, veterinarians, and other dog-related locations were analyzed to create a metric for dog-friendliness. There are several items that should be taken into account while digesting these results: 1) Assumptions were made, for example assuming that all ‘Parks’ identified here are dog-friendly; 2) This was not an exhaustive list of dog-friendly venues available to dog owners, and only those identified in the dataset available were used; and 3) The ‘Dog Friendly Factor’ was a simple metric and a more complex metric could be used to achieve the next level of accuracy.

7. Conclusion

This analysis involved an initial review of dog-friendly neighborhoods in Manhattan and provided several great options, including Stuyvesant Town, Tudor City, Roosevelt Island, and Inwood among the top picks. Future analysis could build upon this base by including an even more detailed list of dog-friendly venues and constructing a more complex statistical metric for ranking. Furthermore, the analysis could be adapted to evaluate additional cities around the world.