

Choosing the best place to stay in NYC

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1. Introduction

1.1. Background

Everyday dozens of thousands of people are taking and planning their business trips. Some of them take their pet with themselves. Travelling with a pet can be a challenging endeavor – there are lots of problems and difficulties, and the selection of a hotel is one of them.

1.2. Problem

I will visit NY City this summer for a business trip. I will take with me my beloved mini pig Sammy. I adore Sammy, but I am afraid that because of stress and jet lag Sammy may catch a cold or some kind of “mal de mer”. So, I need to make a list of vet clinics in the areas (boroughs) of NYC and put them on a map to help me to identify the best place for a room rent, where I will stay for the trip.

1.3. Interest

The main stakeholder here is my pet and me.

2. Data acquisition and cleaning

2.1. Data sources

All the data about NYC clinics, hotels, and their ratings can be taken via Foursquare API. AT first, we need to get the coordinates of NYC centre. According to <https://www.latlong.net> the latitude of New York City, NY, USA is 40.730610, and the longitude is -73.935242. Then, according to Wikipedia (https://en.wikipedia.org/wiki/New_York_City#Geography) the area of NYC is 1213.37 square km, so if we assume that 1213.37 is the square of the circle, we can easily count its radius - 8.921 km. Of course NYC is not circular by its shape, so we will need to make sure that vet clinics are situated in NYC, but not in New Jersey or other places. Using Foursquare API we will get (collect) the data frame of vet clinics.

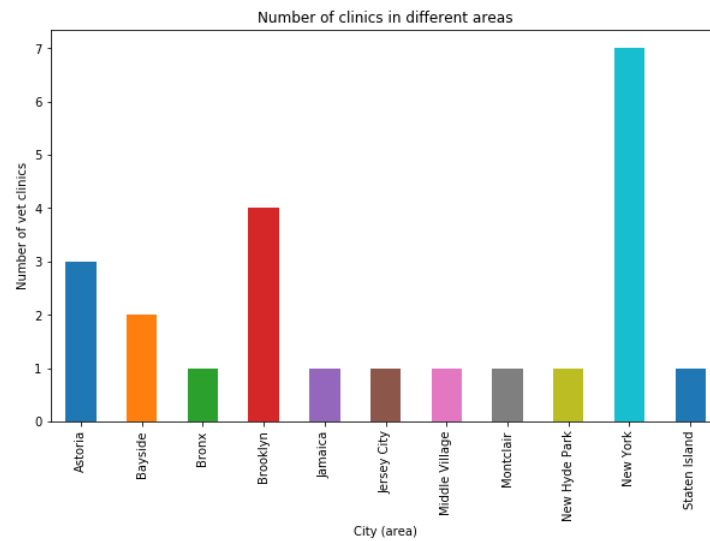
Table 1. Simple vet clinics data frame taken via Foursquare API

	name	categories	address	cc	city	country	crossStreet	distance	formattedAddress	labeledLatLngs	lat	lng	postalCode	state	id
0	Steinway Veterinarian	Veterinarian	32-41 Steinway St #R	US	Astoria	United States	NaN	3300	[32-41 Steinway St #R, Astoria, NY 11103, Unit...	[[{"label": "display", "lat": 40.75782592499892...	40.757826	-73.919707	11103	NY	4b91517df964a520b3b233e3
1	A Veterinarian	Veterinarian	NaN	US	Middle Village	United States	NaN	5526	[Middle Village, NY 11379, United States]	[[{"label": "display", "lat": 40.71308945030248...	40.713089	-73.873949	11379	NY	4cb86d6ea33bb1713eb80fd
2	The Village Veterinarian	Veterinarian	340 E 11th St	US	New York	United States	btwn 1st & 2nd Ave	4158	[340 E 11th St (btwn 1st & 2nd Ave), New York...	[[{"label": "display", "lat": 40.72961372822549...	40.729614	-73.984522	10003	NY	4c3c83e04bc9a5932fcd271
3	steinway court veterinarian steinway court vet...	Pet Service	42-06 Steinway Street	US	Astoria	United States	NaN	3286	[42-06 Steinway Street, Astoria, NY, United St...	[[{"label": "display", "lat": 40.75765723326018...	40.757657	-73.919635	NaN	NY	55043316498e6198e7f41f46
4	Dr. Pet Daddy Veterinarian, PC	Pet Store	27-15 24th Ave	US	Astoria	United States	NaN	5022	[27-15 24th Ave, Astoria, NY 11102, United Sta...	[[{"label": "display", "lat": 40.77362398634759...	40.773624	-73.917280	11102	NY	56324b4d4498eb5f2697403d

2.2. Data cleaning

Data collected from Foursquare needs cleaning, for example, data frame from table 1 contains vet clinics not only from NYC, but also from New Jersey and other areas around NYC, this can be seen in the fig 1.

Fig 1. Bar chart of the data frame areas (cities)



In addition, we need to drop the data about unnecessary venues such as "Port Veterinarian Airport Terminal" or "Dr. Pet Daddy Veterinarian, Pet Store".

Fig 2. Data frame taken via Foursquare API with unnecessary venues

name	categories	address	cc	city
Steinway Veterinarian	Veterinarian	32-41 Steinway St #R	US	Astoria
A Veterinarian	Veterinarian	NaN	US	Middle Village
The Village Veterinarian	Veterinarian	340 E 11th St	US	New York
steinway court veterinarian steinway court vet...	Pet Service	42-06 Steinway Street	US	Astoria
Dr. Pet Daddy Veterinarian, PC	Pet Store	27-15 24th Ave	US	Astoria

2.3. Feature selection

After data cleaning, there were 12 samples and 16 features in the data. Upon examining the meaning of each feature, it was clear that there was some unnecessary features. After discarding redundant features I got the final vet clinics data frame.

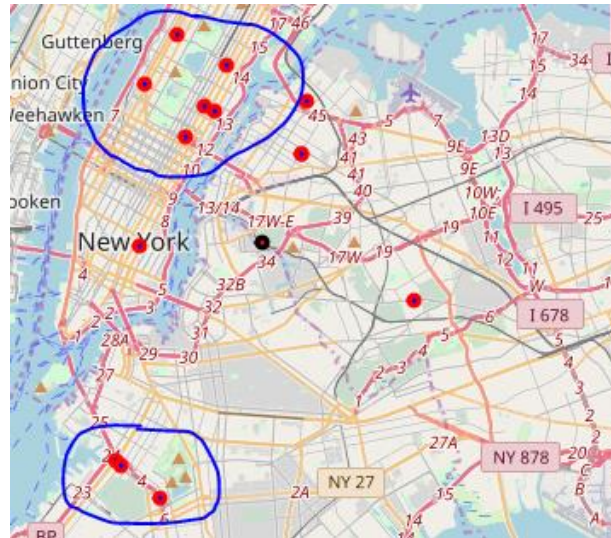
Table 2. Vet clinics data frame after data cleaning

	name	categories	address	city	lat	lng	id
0	The Village Veterinarian	Veterinarian	340 E 11th St	New York	40.729614	-73.984522	4c3c83e04bc9a5932fbcd271
1	Dr. Cindy Bressler House Call Veterinarian NYC...	Veterinarian	170 East 66th Street	New York	40.762975	-73.966141	54e1f61c498eee7bd0893ee5
2	City Veterinarian	Veterinarian	220 West ZEnd	New York	40.779000	-73.982633	4b8abb03f964a520107d32e3
3	VetPronto - Mobile Veterinarians	Veterinarian	1461 1st Ave	New York	40.770706	-73.954305	5ab6c4ac9411f2343fa8168f
4	Lenox Hill Veterinarians	Veterinarian	204 E 76th St	New York	40.771973	-73.958382	4bc08ba9920eb713e10b192c
5	Symphony Vet Center	Veterinarian	170 W 96th St	New York	40.793844	-73.969912	4e2af41da809f1b1640a346b
6	MVA Veterinarian	Veterinarian	NaN	Brooklyn	40.595377	-73.977255	50c360bbe4b0e0fa34731cf9
7	Park Slope Veterinary Center	Veterinarian	639 4th Ave	Brooklyn	40.663775	-73.994416	4d948000af67370459027d09
8	Carnegie Hill Veterinarians	Veterinarian	1707 3rd Ave	New York	40.784921	-73.949326	53c54703498efa2cc64107e7
9	Call Ahead Vet	Veterinarian	654 5th Ave	Brooklyn	40.662501	-73.992441	4ea88fe46c253859bb057061
10	Animal Hospital of Morris Park	Veterinarian	1135 Morris Park Avenue	Bronx	40.850245	-73.851805	4ca63f8ef47ea143bec25e21
11	Windsor Terrace Veterinarians	Veterinarian	1252 Prospect A	Brooklyn	40.652579	-73.976160	4b2112e9f964a5209e3624e3
12	Dongan Hills Veterinary Practice	Veterinarian	289 Dongan Hills Ave	Staten Island	40.584474	-74.093292	4c34d4594308b7136589c430

3. Exploratory Data Analysis

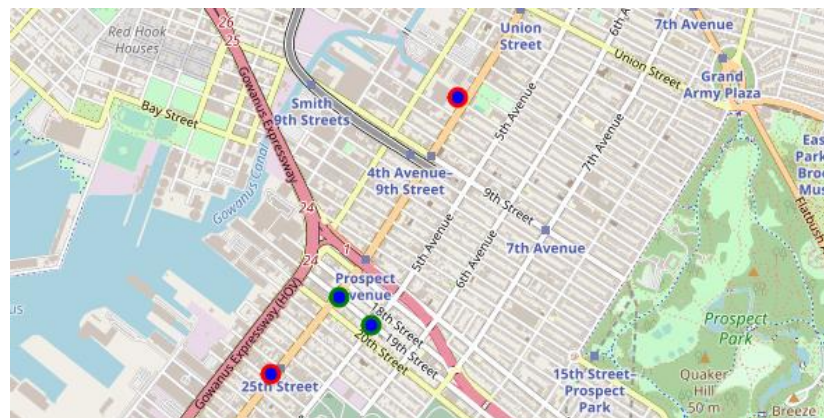
After I generated the map of NYC with vet clinics markers I found 2 clusters of clinics – the first in Manhattan and the second in Brooklyn.

Fig 3. Two clusters of vet clinics in NYC



Manhattan is too expensive and noisy for me personally, so I decided to examine the second cluster of clinics in Brooklyn. Using Foursquare API I got another data frame, with the Brooklyn hotels data. After visualizing the locations of Brooklyn hotels and Brooklyn vet clinics on map I found out that only two hotels are situated near the Brooklyn vet clinics cluster, they are: "Brooklyn Way Hotel, BW Premier Collection" and "Hotel le bleu".

Fig 4. Hotels near vet clinics in Brooklyn



After the comparison of these hotels ratings, I decided to choose "Hotel le bleu" as my place of residence during my future business trip.

4. Conclusions

In this study, I analyzed the data about NYC hotels and vet clinics. I identified the best hotel to stay in NYC according to my tastes and opportunities.

5. Future directions

I am convinced that this data science approach to business trip planning can be used in other similar cases and needs. Foursquare provides great opportunities for further researches and investigations.