

Applied Data Science Capstone Project: Location and Quantifying of Pet-Related Venues in the New York City Borough of Manhattan

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Introduction

Manhattan is one of the 5 boroughs of New York City, known to many in the world for its towering commercial skyscrapers and status as a global financial center. However, Manhattan is also home to over 1.6 million residents, all of whom require the same convenient access to goods and services as their neighbors who reside in more suburban areas. Pet owners are one of the many subsets of these Manhattan residents, and for these individuals locating a place of residence in close proximity to pet-related venues and activities is highly desirable. Additionally, potential pet-related business owners could also benefit from the knowledge of which neighborhoods in Manhattan contain the most pet-related venues. This information could serve as an indicator of which neighborhoods contain the highest number of pets, and thus the highest number of potential customers. This project will leverage the location data from Foursquare to identify neighborhoods in Manhattan with the greatest number of pet-related venues. There is clear value in this data for pet owners and potential pet-related business owners alike.

Data Description

This project will examine the numerous neighborhoods in the borough of Manhattan and identify which ones contain the most pet-related venues. This information will be obtained using Foursquare's location data. The relevant venue categories 'Pet Store,' 'Dog Run,' 'Pet Service,' 'Pet Café,' and 'Veterinarian' will be quantified and compared among Manhattan neighborhoods. The neighborhoods with the highest relevant venue totals will be nominated as prime locations for potential pet service businesses, as well as pet owners looking for ideal locations to live and visit. Neighborhoods with no listed relevant venues will be removed from the data set.

Methodology

The data analysis in this report relies heavily on an explore function to pull venue categories from the Foursquare API. Data is pulled specifically from neighborhoods in the New York City borough of Manhattan, and inserted into a Pandas dataframe. One hot encoding is utilized in order to assign integer values to the categorical data and essentially quantify the number of venues in each neighborhood. The dataframe is then filtered and only pet-related venue columns are left in the dataframe. From there only neighborhoods that contain 1 or more relevant venues are kept in the dataframe, neighborhoods with 0 relevant venues are removed. A 'Totals' column is added containing the sum of all relevant venues per neighborhood, and the neighborhoods are sorted in ascending order by 'Totals' values (Table 1). Finally, bar graphs are generated showing total pet-related venues by neighborhood (Figure 1), and another graph that breaks down totals per neighborhood by the specific venue category (Figure 2).

	Dog Run	Pet Café	Pet Service	Pet Store	Veterinarian	Totals
Neighborhood						
Battery Park City	0	0	0	1	0	1
Upper West Side	1	0	0	0	0	1
Upper East Side	0	0	0	1	0	1
Tribeca	1	0	0	0	0	1
Stuyvesant Town	0	0	1	0	0	1
Noho	0	0	0	1	0	1
Murray Hill	0	0	1	0	0	1
Manhattan Valley	1	0	0	0	0	1
Lower East Side	0	1	0	0	0	1
West Village	0	0	0	1	0	1
Little Italy	0	0	0	1	0	1
Greenwich Village	1	0	0	0	0	1
Financial District	1	0	0	0	0	1
Clinton	1	0	0	0	0	1
Chelsea	0	0	0	1	0	1
Carnegie Hill	0	0	0	1	0	1
Lenox Hill	0	0	0	1	0	1
Yorkville	1	0	0	0	0	1

	Dog Run	Pet Café	Pet Service	Pet Store	Veterinarian	Totals
Neighborhood						
Lincoln Square	1	0	0	1	0	2
Hudson Yards	2	0	0	0	0	2
Flatiron	0	0	0	2	0	2
East Village	1	1	0	0	0	2
Washington Heights	0	1	0	1	0	2
Inwood	1	0	0	1	1	3
Tudor City	2	0	0	1	0	3
Turtle Bay	2	0	0	1	0	3

Table 1. Manhattan neighborhoods containing pet-related venues reported from the Foursquare API

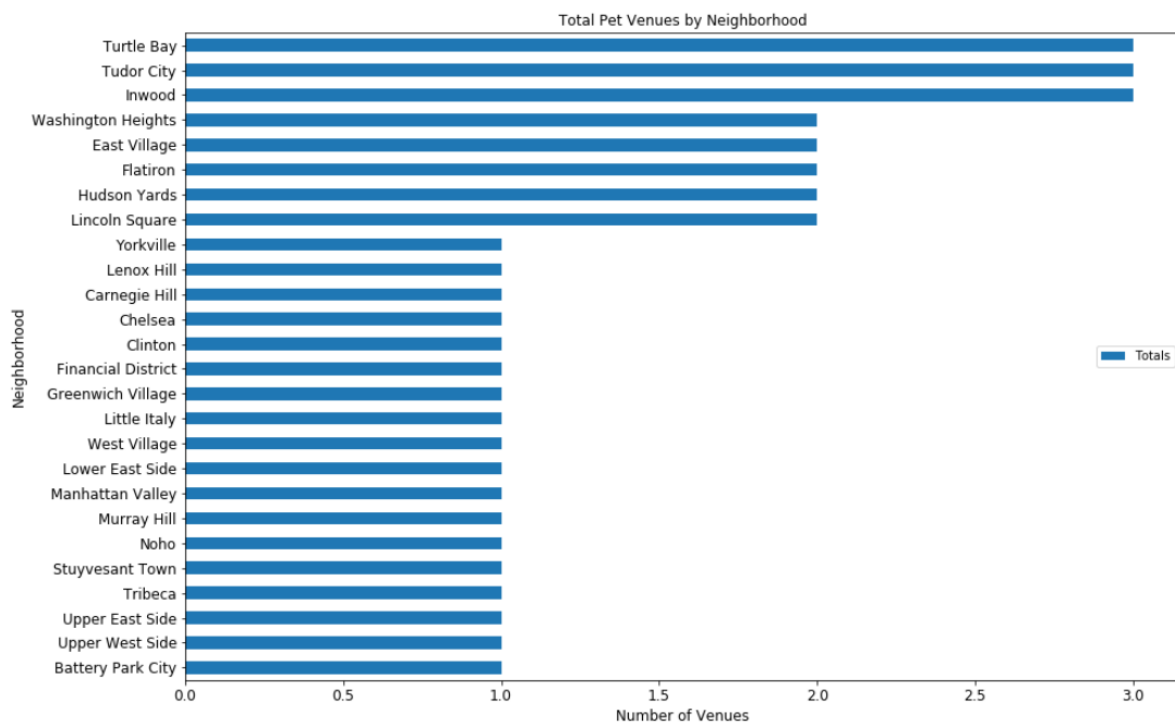


Figure 1. Total number of pet-related venues per Manhattan neighborhood.

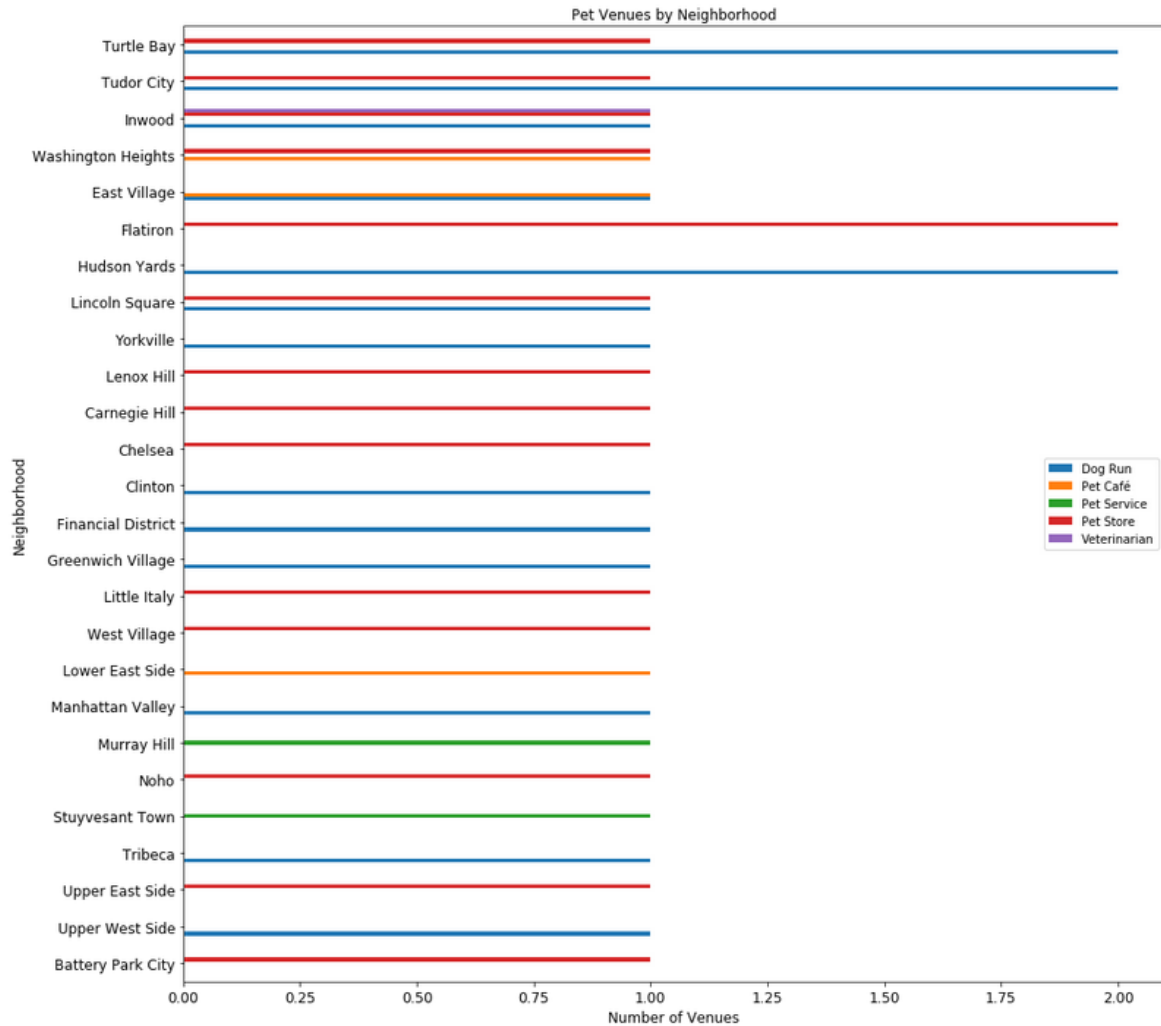


Figure 2. Number of pet-related venues per Manhattan neighborhood by description

Results

Of the 40 Manhattan neighborhoods, 26 contain pet-related venues as reported by the Foursquare API. The top 3 neighborhoods with the highest number of pet-related venues are Turtle Bay, Tudor City, and Inwood, with each neighborhood containing 3 relevant venues. These 3 neighborhoods are followed by Washington Heights, East Village, Flatiron, Hudson Yards, and Lincoln Square, who each have 2 reported pet-related venues (Figure 1). Inwood has the most diversity among total pet-related venues, containing 3 different relevant venues (Veterinarian, Pet Store, and Dog Run) (Figure 2).

Discussion

Based on available data from the Foursquare API and the model produced for analyzing the data in the report, there are 3 neighborhoods identified within the New York City borough of Manhattan that can serve as attractive places of residence for pet owners, or potential areas to open pet-related businesses. For the sake of clarity, 2 of these 3 neighborhoods, Turtle Bay and Tudor City, are essentially one neighborhood. Tudor City is a massive residential apartment complex located in the Southern region of Turtle Bay, so despite the manner in which the data is presented it may be more appropriate to consider these 2 locations as part of one neighborhood. Another consideration may be that for some users, total number of venues may not be the most compelling attribute. For instance, a user may be interested in only one particular venue such as 'Dog Run,' in which case the neighborhood of Hudson Yards would be just as attractive as Turtle Bay/Tudor City. It is up to the user's discretion to decide which neighborhood provides the exact pet-related experience they are looking for. An analysis of the results reveals a major caveat to the data generated from the Foursquare API in this application; there is an apparent lack of relevant information available in regards to pet-related venues. For example, for the category 'Veterinarian,' there is a total of only 1 listed within Manhattan, located in the neighborhood of Inwood. The likelihood of only one Veterinary office existing within the entire borough of Manhattan is highly unlikely, and suggests information on the other pet-related venues reported may also be inaccurate. Due to this caveat, this report may best serve as a supplement to other sources of data that may be needed in order to support the findings stated within.