Pet Store Location Study

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1. Introduction

According to the Instituto Pet Brasil there has been an increase in the number of pets in Brazil over the last few years. In this study they have identified that in 2018 the highest pet concentration was in the South West region of Brazil, with 47,4% and that more than one fourth of the brasilian pets were in the state of São Paulo. Therefore, pet stores are a promising business in São Paulo.

Seeking this opportunity, in this project, we will try to find an optimal location for a pet store in São Paulo (capital). Specifically, this report will be targeted to stakeholders interested in opening a Pet Store in São Paulo, Brasil.

Since there are lots of Pet Stores in São Paulo we will try to detect locations that are not already crowded with competitors.

We will use data science to generate a few most promising neighborhoods based on this criteria. Advantages of each area will then be clearly expressed so that best possible final location can be chosen by stakeholders.

2. Data acquisition and cleaning

2.1. Data sources

Based on the definition of our problem, factors that will influence our decision are: number of existing Pet Stores in the neighborhood and population.

We decided to use a list of neighborhoods in São Paulo, from: https://www.prefeitura.sp.gov.br/cidade/secretarias/subprefeituras/subprefeituras/dados_demograficos/index.php?p=12758 and obtained the location using the arcgis method from geocoder.

The number of Pet Stores and locations in every neighborhood will be obtained using Foursquare API.

Coordinates of the São Paulo center will be obtained using Nominatim from geopy.

2.2. Data cleaning

In order to obtain the list of neighborhoods from the website table we used the package Beautiful Soup, separated the rows with the grouped neighborhoods and ignored the rows with ‘TOTAL’. We created two dataframes (neighborhoods and population_data), one with the neighborhoods and another with the neighborhood and population. 96 neighborhoods were analysed in this study.

The latitude and longitude of each neighborhood was extracted and inserted into the data frame. Using foursquare, we obtained the venue name, location and category for each neighborhood of São Paulo. With the category of each venue, we created a dataframe grouped by neighborhood with the mean of each category.

Finally, using the category of pet stores: 4bf58dd8d48988d100951735, we obtained a dataframe with 239 pet stores in São Paulo.

3. Methodology

In this project we will direct our efforts on detecting neighborhoods of São Paulo that have low pet store density and high population, considering that the population of pets is proportional to the population of people in the neighborhood.

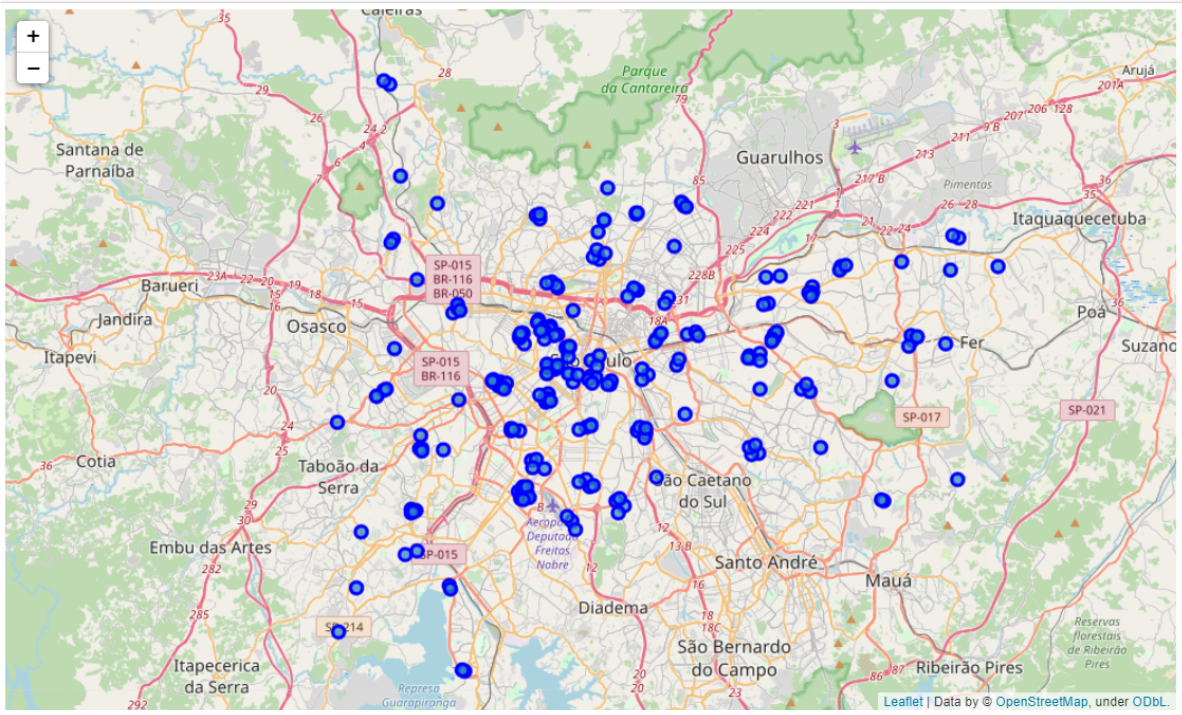
In the first step we have collected the required data: location, venues of each neighborhood and pet store venues in each neighborhood (according to Foursquare categorization).

The second step in our analysis will be to cluster the neighborhoods according to the types of venues, using k-means clustering. We will select a cluster that has the most promising areas: highest population, nearest to the city center and highest pet store density.

In the third and final step we will select the most promising neighborhoods from the cluster: taking into consideration the distance from the city center (less than 6 km), the number of pet stores (1-3 maximum) and the population of the neighborhood.

4. Results and Discussion

Our analysis shows that although there is a great number of pet stores in São Paulo, there are pockets of low pet store density fairly close to the city center.



Highest concentration of pet stores was detected in the Cluster 0, so we focused our attention on these neighborhoods.

Cluster	Pet Stores	Population (2010)
0	163	4,027,251
1	27	1,212,261
2	7	1,207,612
3	42	2,081,285

After directing our attention to this more narrow area of interest, we first filtered the nearest neighborhoods to the city center, with a distance of less than 6 km. Then we filtered the neighborhoods with less than four pet stores in the area.

Neighborhood	Pet Stores	Population	Distance
Água Rasa	2	84,963	5.42
Bom Retiro	1	33,892	3.00
Sé	3	23,651	0.24
Barra Funda	3	14,383	3.78

Result of all this is 4 potential neighborhoods for new pet store locations. Purpose of this analysis was to only provide info on areas close to São Paulo center, but not crowded with existing pet stores - it is entirely possible that there is a very good reason for the small number of pet stores in any of those areas, reasons which would make them unsuitable for a new pet store regardless of lack of competition in the area. Recommended neighborhoods should therefore be considered only as a starting point for more detailed analysis which could eventually result in location which has not only no nearby competition but also other factors taken into account and all other relevant conditions met.

5. Conclusion

The purpose of this project was to identify São Paulo neighborhoods close to the center with a low number of pet stores in order to aid stakeholders in narrowing down the search for optimal location for a new pet store. By calculating pet store density distribution from Foursquare data we have first identified general neighborhoods that justify further analysis, and then using population data found the top neighborhoods that satisfy the basic requirements.

Final decision on optimal pet store location will be made by stakeholders based on specific characteristics of the neighborhoods, for example, the population of pets in the area,

attractiveness of each neighborhood (proximity to parks), levels of noise / proximity to major roads, real estate availability, prices, social and economic dynamics of every neighborhood etc.

6. References

[1] Dados demográficos dos distritos pertencentes às Subprefeituras. Cidade de São Paulo Subprefeituras. 06/01/2021.
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