

# Capstone Project - The Battle of Neighborhoods (Week 2): Best Place for Pet Store in Seattle

This analysis is part of my Applied Data Science Capstone course in Coursera. In this assignment I use my new skills in exploring, segmenting and clustering data and for the first time I prepare full report on my findings. Instruction for this assignment was to compare neighborhoods or cities and use Foursquare location data to solve a business problem.

In my analysis I explore what would be the best place to establish a new pet store in Seattle.

## 1. Introduction - Description of the Problem

Pet owners are spending lots of money on their pets - their food, treats, toys and other supplies.

According to the article of Directory of Major Malls pet owners in United States spent \$500 on their animals in 2017. In 2018 total pet sales was \$72 billion and in 2019 over \$75 billion. Retail pet stores are expanding their retail network by dozens of new stores around the nation and the total sales of pet stores is increasing every year and not likely to slow anytime soon.

Pet stores seem to be very profitable business. The city of Seattle has about 30 pet stores, 50 000 active pet licenses and 600 000 residents. Would there be room for another pet store? Where would it be?

I'm exploring the possibilities in these viewpoints:

- How many active pet licenses there is in each neighborhood of Seattle? What is the population in these neighborhoods?
- What are the most popular venues in each neighborhood?
- What about competitors? Are there other pet stores nearby?
- Are there other pet related venues that make one neighborhood more attractive than another?

This analysis can provide interesting observations for new entrepreneur starting a pet business or current pet stores that consider growing their retail network in Seattle.

## 2. Data

I used four datasets in this analysis.

1. **Seattle Pet Licenses.** Data includes 50 000 active pet licenses in Seattle, license issue dates, license numbers, species, animal's names and owners' zip codes.

The data is hosted by the City of Seattle and updated quarterly. Dataset is available in Kaggle: <https://www.kaggle.com/city-of-seattle/seattle-pet-licenses>

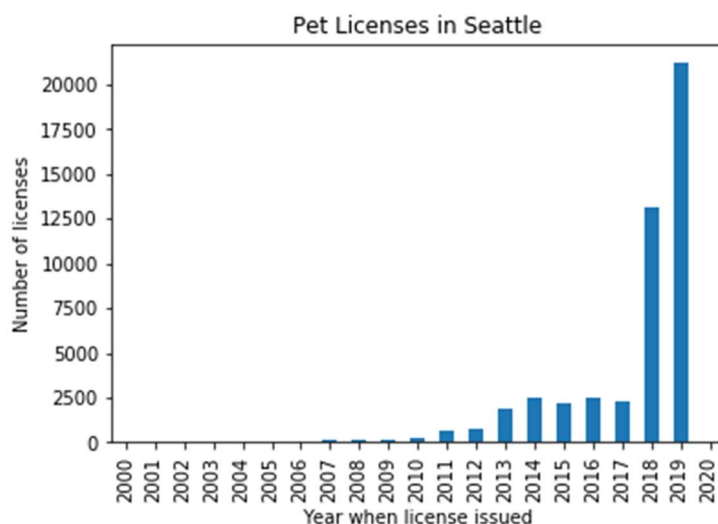
2. **US Zip Codes.** This dataset includes all zip codes in the US, states, counties and cities, coordinates and population data. I used this data to get the latitudes and longitudes of each zip code area and in exploring the population of Seattle neighborhoods. The dataset is available in three levels: basic, pro and comprehensive. For this analysis the free basic version contained enough data, so that is what I used. You can download the data here: <https://simplemaps.com/data/us-zips>
3. **Sub-Regional, City and Neighborhood Designations by Zip Code.** This data is in pdf file and available here: <http://www.agingkingcounty.org/wp-content/uploads/sites/185/2016/09/SubRegZipCityNeighborhood.pdf>. I found it much faster to copy the tables that I needed to excel rather than read pdf file in python. The data includes zip codes, city names, sub regions and Seattle neighborhoods. This dataset was useful in finding the right neighborhood for each zip code.
4. **Foursquare location data.** I used Foursquare for exploring the venues in Seattle: the most popular venues, other pet stores and pet related venues. More about Foursquare here: <https://foursquare.com/>

### 3. Methodology

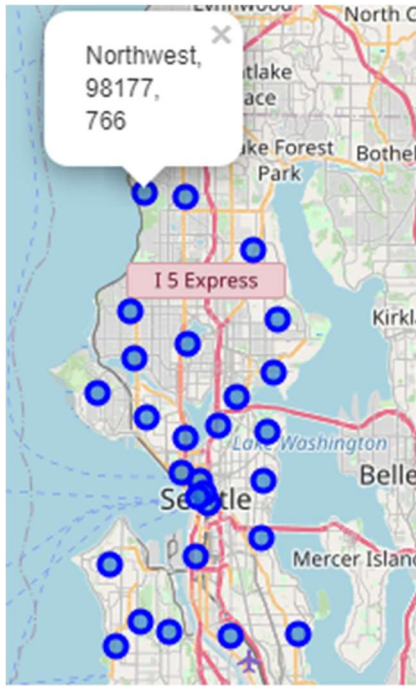
First, I explored how many pet licenses there is in each neighborhood of Seattle and what is the population in the neighborhoods.

I started by cleaning the dataframes. From datasets *US Zip Code* and *Sub-regional, city and neighborhood designation by zip code* I took only the data that concerned Seattle: zip codes, coordinates and population.

The pet license dataset had lots of information, but the most important information for my analysis was the number of active licenses and the zip codes. I took only the licenses that were issued since 1st January 2010. The licenses in the dataset should be active, but some licenses were issued in 2000-2009. I found it safe to drop those licenses out from this analysis.



By merging these dataframes I could easily see the most populated neighborhood, the neighborhood that has most pet licenses and their coordinates.



Second, I segmented and analyzed the Seattle neighborhoods using Foursquare location data.

I searched popular nearby venues in 5000 meters and limited the results in 500 venues. I had three goals: to find out what are the most popular venues in each neighborhood, is there other pet stores nearby and is there other pet related venues, for example dog runs.

I knew that there would be lots of restaurants and cafés in popular venues, so with these limits I would get pet shops for result.

Then I divided the most popular venues into five clusters and combined the data on neighborhoods, pet stores, parks and other pet venues in one dataframe.

## 4. Results

The goal in this analysis was to find the best place for a new pet store in Seattle. Now let's see what kind of results we got.

### Seattle neighborhood with most pet licenses and population

Northeast is the biggest neighborhood in population and has the most licenses in Seattle neighborhoods. But when we compare the neighborhood in how many licenses per person or people per license they have, Ballard has relatively most pet owners in Seattle.

Seattle Neighborhood	Population	Number of Licenses	Licenses per person	People per license
Northeast	102343	5923	0.06	17.28
Southeast	80281	4017	0.05	19.99
Queen Anne/Magnolia	76818	5448	0.07	14.10
Southwest	71077	4173	0.06	17.03
Northwest	68866	2402	0.03	28.67
Ballard	60831	5736	0.09	10.61
Lake Union	51377	3874	0.08	13.26
Capitol Hill	50874	3241	0.06	15.70
Delridge	50500	3503	0.07	14.42
Downtown	45231	2044	0.05	22.13
North	42475	2617	0.06	16.23
Central	38620	2357	0.06	16.39
Duwamish	24784	1068	0.04	23.21

# The most popular venues in Seattle neighborhoods

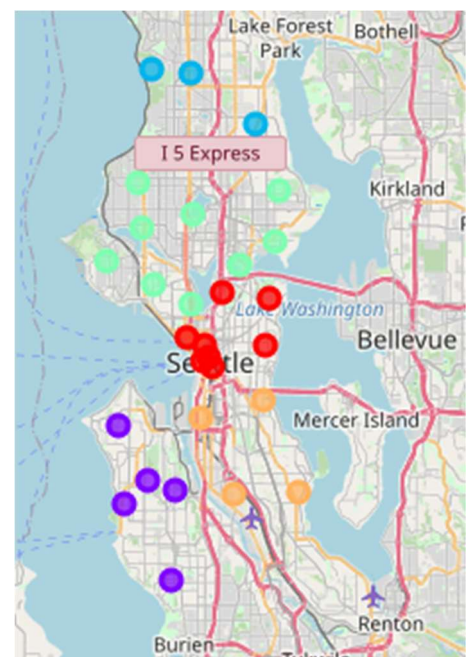
I listed the most popular venues in each neighborhood.

It appeared that coffee shops are the 1st most common venue categories several neighborhoods. In top 10 there are lots of restaurants, pizza places and bars. Would the pet owners drop by to a pet store when going to café or restaurant? Surprisingly, there are also many parks among the popular venues.

Neighborhood	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue	6th Most Common Venue	7th Most Common Venue	8th Most Common Venue	9th Most Common Venue	10th Most Common Venue
Ballard	Pizza Place	Park	Brewery	Bar	Mexican Restaurant	Caribbean Restaurant	Burger Joint	Seafood Restaurant	Bakery	Ice Cream Shop
Capitol Hill	Coffee Shop	Park	Italian Restaurant	Sandwich Place	Grocery Store	Bakery	Cocktail Bar	Yoga Studio	Donut Shop	Sushi Restaurant
Central	Coffee Shop	Vietnamese Restaurant	Italian Restaurant	French Restaurant	Scenic Lookout	Cocktail Bar	Bakery	Bookstore	Thai Restaurant	Beach
Delridge	Coffee Shop	Brewery	Burger Joint	Pizza Place	Beach	Grocery Store	Bakery	Lounge	Pub	Bar
Downtown	Coffee Shop	Bakery	Hotel	Cocktail Bar	Vietnamese Restaurant	Sandwich Place	Italian Restaurant	French Restaurant	Sushi Restaurant	Japanese Restaurant
Duwamish	Coffee Shop	Brewery	Vietnamese Restaurant	Pub	Pizza Place	Bakery	Bar	Park	Mexican Restaurant	Mediterranean Restaurant
Lake Union	Park	Brewery	Pizza Place	Burger Joint	Coffee Shop	Ice Cream Shop	Bookstore	Bakery	Mediterranean Restaurant	Café
North	Coffee Shop	Pub	Park	Café	Thai Restaurant	Pizza Place	Mexican Restaurant	Bookstore	Bakery	Burger Joint
Northeast	Park	Coffee Shop	Grocery Store	Café	Bookstore	Italian Restaurant	American Restaurant	Burger Joint	Brewery	Thai Restaurant
Northwest	Coffee Shop	Thai Restaurant	Park	American Restaurant	Grocery Store	Pizza Place	Mexican Restaurant	Korean Restaurant	Gym / Fitness Center	Food Truck
Queen Anne/Magnolia	Park	Bakery	Brewery	Coffee Shop	Seafood Restaurant	Bar	Grocery Store	Scenic Lookout	Sandwich Place	Museum
Southeast	Coffee Shop	Pizza Place	Brewery	Park	Vietnamese Restaurant	Bakery	Pub	Bar	Mediterranean Restaurant	Italian Restaurant
Southwest	Coffee Shop	Pizza Place	Park	Burger Joint	Grocery Store	Beach	Bakery	Scenic Lookout	Brewery	Pub

I divided the venues into five clusters:

1. **Red cluster:** Coffee shops, bakeries, restaurants, hotels (Central, Capitol Hill, Downtown)
2. **Purple cluster:** Coffee shops, breweries, pizza places, parks (Southwest, Delridge)
3. **Blue cluster:** Coffee shops, restaurants, parks (North, Northwest)
4. **Green cluster:** Parks, coffee shops, breweries, bars, restaurants (Northeast, Lake Union, Ballard, Queen Anne)
5. **Orange cluster:** Coffee shops, pizza places, restaurants (Southeast, Duwamish)



## Competitors and other pet related venues

What about the other pet stores nearby? It appeared that there is almost in every neighborhood least one pet store. Northeast and Delridge had two and Southwest as many as four pet stores.

I also wanted to see if there are other pet related venues in the neighborhoods. I searched for pet cafés, dog runs, veterinarians, pet services and animal shelters, and my result in other pet venues was mostly dog runs. The large number of parks surprised me – Northeast, Queen Anne and Southwest in top 3 with 10-15 parks. I think they could attract more dog owners to those neighborhoods.

	Pet Stores	Parks	Other Pet Venues
Neighborhood			
Northeast	2	15	2
Southeast	1	6	-
Queen Anne/Magnolia	1	13	-
Southwest	4	10	1
Northwest	-	5	1
Ballard	1	7	-
Lake Union	1	7	-
Capitol Hill	1	6	-
Delridge	2	6	1
Downtown	1	5	-
North	-	5	3
Central	1	2	-
Duwamish	1	4	1

## 5. Discussion

As a result for this analysis I would say that there is space for a new pet store in Seattle. Northeast, Ballard, Queen Anne and Magnolia ended up being the most interesting places for pet business.

Considering the viewpoints that I presented in the beginning of this analysis the best neighborhood would be Northeast. It has the highest population in Seattle neighborhoods (102 000 people), lots of parks (15), dog runs, and various categories in most popular venues. The number of pet licenses per person is not the highest compared to other neighborhoods, but in my opinion with the total amount of 5 900 licenses and only two competitors, Northeast turned out to be best neighborhood for new pet store.

## 6. Conclusion

The purpose of this analysis was to explore what would be the best place for new pet store in Seattle and to provide interesting and useful information by analyzing the data on pet licenses, Seattle neighborhoods and venues in Foursquare.

Of course, there are many other important things to consider when establishing new pet store. For example, the availability of business premises, rental costs and sales potential were not included in this analysis.

If you want to read more about this analysis, here's link to my GitHub repository:

[https://github.com/RiikkaEve/Coursera\\_Capstone/blob/master/Best%20Place%20for%20Pet%20Store%20in%20Seattle%20-%20Full%20Analysis.ipynb](https://github.com/RiikkaEve/Coursera_Capstone/blob/master/Best%20Place%20for%20Pet%20Store%20in%20Seattle%20-%20Full%20Analysis.ipynb)

## 7. References

- Retail Pet Stores Bringing in Significant Sales and Showing Major Growth, <https://shoppingcenters.com/article/retail-pet-stores-bringing-in-significant-sales-and-showing-major-growth/>
- Seattle Pet Licenses, <https://www.kaggle.com/city-of-seattle/seattle-pet-licenses>
- US Zip Codes, <https://simplemaps.com/data/us-zips>
- Sub-Regional, City and Neighborhood Designations by Zip Code, <http://www.agingkingcounty.org/wp-content/uploads/sites/185/2016/09/SubRegZipCityNeighborhood.pdf>
- Foursquare location data, <https://foursquare.com/>