

Location for a new animal shelter in Toronto

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1 Introduction

There are a lot of street animals and pet cats in Toronto. According to the Canadian Animal Health Institute (CAHI) the amount of pet cats in Canada was about 8.8 million in 2016, up from 7.0 million in 2014. The pet dog population was 7.6 million in 2016, up from 6.4 million in 2014.[2]. On the website of the government of Toronto [4] there are 2.8 million people in Toronto and 230 thousand dogs. According to Owen Mundy[3] who owns the I Know Where Your Cat Lives (IKWYCL) website that crawls information about location of cats from numerous public APIs, Ontario has the largest amount of crawled cat pictures among all first-level administrative subdivisions of Canada. According to IKWYCL, Toronto has the fifth highest amount of crawled cat pictures among major cities all over the world. While a high amount of crawled cat pictures isn't necessarily indicative of an unusually high cat population, it is indeed evidence that Toronto has many pet cats in addition to the 230 thousand dogs.

Since Toronto has a lot of pets Torontonians clearly love animals. However there are always people who abandon their pets. With a large pet population a large population of feral animals appear. According to Toronto Humane Society [6] the number of homeless cats in Toronto is between 20,000 and 100,000. In fact there are so many feral cats in Toronto that the city contributes \$100,000 to help keep the feral cat population under control according to a CBC article.[1] Due to a really large stray cat population Toronto may be in need of animal shelters. Using Foursquare website it is easy to see that there are 4 results for animal shelters including one for an animal hospital without zooming out. On the other hand there are a lot of results for pet stores. To be fair this situation is not unique in Toronto because using a simple search it is easy to see that the amount of animal shelters are also small compared to the amount of pet stores in Boston, MA and Berlin, Germany. Instead of buying a pet adopting one is humane especially in cities as cold as Toronto.

This report is mostly for animal lovers who want to establish their own shelters. I hope that it will be useful in helping more stray animals to find loving homes!

2 Data

We will use the data from Foursquare. In particular we will look up the latitude and longitude of all existing animal shelters, pet stores, pet services, vets and pet cafes aka pet-related venues or PRVs in and near neighborhoods of Toronto. For the purpose of this report the word "neighborhood" is identical to the phrase "postal area". Hence each neighborhood corresponds to the first three symbols of the Canadian Postal Code used in the neighborhood. We will use the longitude and latitude of each neighborhood obtained in Week 3 of the course and then use Foursquare API to request nearby PRVs up to 1 km from the location. Then we will count the amount of results, add one to it due to the proposed new animal shelter and then label the result the PetScore (PS) of a neighborhood. For example 9 PRVs are found in the postal area M4K. As a result the PetScore of M4K is 10.

3 Methodology

As someone with no previous business experience I had no idea how to determine whether a given location is good for business. After some searching on the internet I have found that it is good for a competitive business to be located near other businesses of the same type. Since Toronto is generally a safe city and the official stats do not actually adequately cover how many people pass through and work in a particular neighborhood and pet-ownership in Canada is so prevalent [5] that we assume that the amount of demand people in a neighborhood have for pets correlate positively with the amount of PRVs we can find. We restrict the definition of nearby PRVs to 1km because it is fairly walkable and the existence of a PRV does not help another PRV if their distance is too long.

We used the Foursquare search feature with checkin intent to generate our PS. There are indeed misclassified venues such as wildlife control that sneaked through. No efforts were spent to remove them because they are fairly rare. The Foursquare database is not infallible. However it is mostly good so let's stick to it.

After obtaining the results we calculate the PetScore of a neighborhood. Note that there exist two postal areas that are technically not really neighborhoods but we still used them because what we essentially did is taking samples all over Toronto and calculating their PetScores.

4 Results

There are 103 neighborhoods in Toronto. As we can see from Table 1 the highest PetScore is 24 corresponding to postal area M5A, followed by M6J and M5B with 23 respectively.

On the other hand as we can see from Table 2 there are also neighborhoods with really low PetScores. For example there are 13 neighborhoods with the PetScore exactly 1 which means there are literally no current pet-related locations near them.

Postal Area	Borough	Neighborhood	PetScore
M5A	Downtown Toronto	Harbourfront, Regent Park	24
M6J	West Toronto	Little Portugal, Trinity	23
M5B	Downtown Toronto	Ryerson, Garden District	23
M5T	Downtown Toronto	Chinatown, Grange Park, Kensington Market	22
M5L	Downtown Toronto	Commerce Court, Victoria Hotel	22

Table 1: Postal areas in Toronto with the highest PetScores

Postal Area	Borough	Neighborhood	PetScore
M1X	Scarborough	Upper Rouge	1
M6M	York	Del Ray, Keelesdale, Mount Dennis, Silverthorn	1
M9A	Etobicoke	Islington Avenue	1
M9M	North York	Emery, Humberlea	1
M1N	Scarborough	Birch Cliff, Cliffside West	1

Table 2: Postal areas in Toronto with the lowest PetScores

In order to have some general idea on what PetScores of different neighborhoods are we have included some Folium maps. The following figures the map of Toronto together with the neighborhoods and their PetScores are plotted. The green ones have PetScore of at least 20, the yellow ones have 15-19, the orange ones have 10-14 and the red ones have PetScore below 10.

Figure 1: Neighborhoods of Toronto and their PetScores (small)

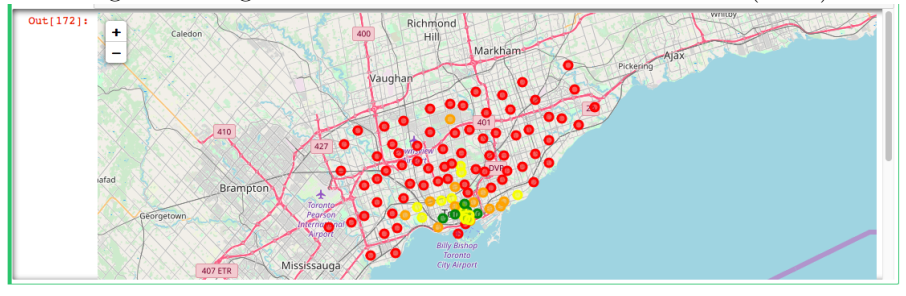


Figure 2: Neighborhoods of Toronto and their PetScores (medium)

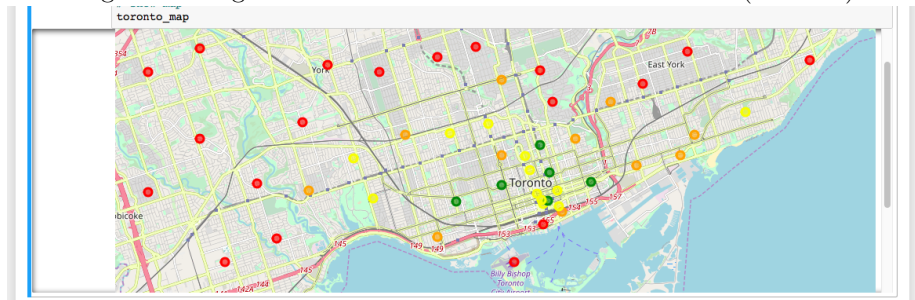
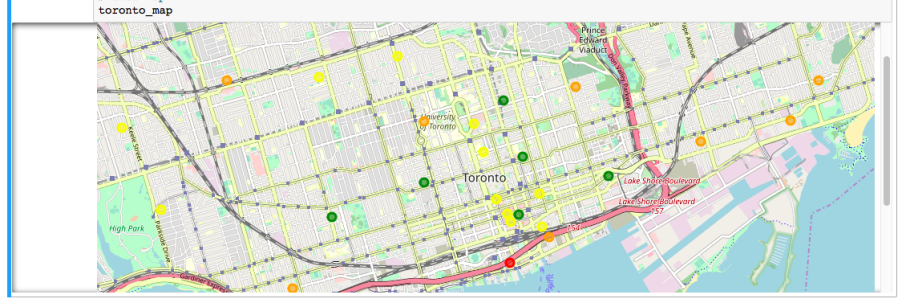


Figure 3: Neighborhoods of Toronto and their PetScores (large)



Borough	PetScore
Downtown Toronto	16.666667
Queen's Park	15.000000
West Toronto	14.500000
East Toronto	12.600000
Central Toronto	10.555556
East York	7.200000
Mississauga	4.000000
York	3.800000
Etobicoke	3.333333
North York	3.291667
Scarborough	2.882353

Table 3: Average PetScores of boroughs of Toronto

We can also calculate the average PetScores of boroughs as shown in the table above. Downtown Toronto, Queen's Part, West Toronto and East Toronto have relatively high PetScores while Scarborough, North York, Etobicoke and York have low PetScores.

5 Discussion

It is easy to see that locations with higher PetScores are predominantly urban. This is not surprising simply because everything is more common in urban areas for they have higher population density compared to the suburbs. This isn't really unfair because in order to choose a good location for an animal shelter which is similar to a retail business we need a lot of customers which is why urban areas are better than suburban and rural ones on average if all other conditions are equalized.

In our analysis we haven't considered the factors of population, income, rent and crime rates both are relevant to starting a new and viable animal shelter. Since Toronto is predominantly safe we assumed that crime is not actually a problem. As for rent maybe in future models we can take them into account. There is also an elephant in the room that we ignored, namely the actual population of people who pass through each neighborhood regularly, their income and attitude towards pets. That's something not available right

now. We need surveys to figure out this information.

From what we know we recommend that the proposed animal shelter be built in Downtown Toronto especially on the area shown in Figure 3.

6 Conclusion

The best postal area for the animal shelter is M5A, namely Harbourfront & Regent Park. If it can not be built there then the next choices should be M6J (Little Portugal & Trinity) and M5B (Ryerson & Garden District).

References

- [1] Canadian Broadcasting Corporation, City commits \$100K to reduce Toronto's feral cat population, 2015.
- [2] Canadian Animal Health Institute, Latest Canadian Pet Population Figures Released, 2017
- [3] Owen Mundy, I know where your cat lives, fetched 2018.
- [4] City of Toronto, Dogs in the City, fetched 2018.
- [5] Statista, Share of consumers who own a pet in Canada as of May 2016, by type, fetched 2018.
- [6] Toronto Humane Society, Toronto Feral Cats, fetched 2018.