**Austin Animal Shelter Write-up**

SMU Data Science

10/18/2021

By:

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**Inspiration**

As awareness about animal wellbeing grows, the concern with animal shelters and stray animals grows as well. Many campaigns have been created to promote the adoption of pets versus purchasing them, but what do we know about pets available for adoption?

Our group is formed by animal lovers, and we would like to provide some type of help for people that are looking to adopt a pet or for organizations that working to get them off the streets and care for them. By collecting, sorting and plotting data about the pets in shelters, our group hopes that people looking to adopt will have an easier time finding a pet they love, and local organizations might be able to better manage their resources and demand.

**Data Source**

Once the group decided to look at animal shelter data, we began our search for a viable data source. Originally, we wanted to look at Dallas, TX animal shelters as we are all from the DFW area. However, the data sets we found did not contain location data. Without location points, it would not have been impossible to create a map, so we kept searching.

We settled on a data set which contained information centered around Austin animal shelters. It was found on Kaggle.com, a website centered around data science. The data set contained 41 columns of relevant information. It had 79,673 rows of animal information including the address where the animal was picked up.

In order to clean the data, we eliminated the years 2013 and 2018 from the dataset. The information in these years was incomplete and did not cover the entire year. We also decided to only focus on animals which were dogs and cats. These two animal types composed the majority of animals in the dataset and made filtering the data much easier and straight-forward.

**Dashboard Design**

From the start, we had the end user in mind when it came to designing our dashboard. Given limited time, we had to prioritize the data we felt was most important in an easy-to-understand way. We decided people would most want to know – 1) Why animals were taken into shelters, 2) What happened to them once they go there, 3) What breeds of animals were most found in shelters, and 4) What were the peak months animals were taken to shelters.

The goal from the start was to have a single dashboard to house the majority of our visuals. One of the first things we decided on as a team was what filters we were going to use. This allowed us to work on our visuals independently but then bring them together at the end to create a single cohesive interactive dashboard.

For the color theme of the website, one of our teammates had the ingenious idea of using the colors that a dog would be able to see. Dogs don’t see red, purple or orange like humans do. Instead, they see shades of dark yellow (sort of brownish), blue and grey. Thus, our color scheme was decided! We used coolor.co, a color schemes generator website, to cycle through colors until we found the exact shades of yellow, blue and grey we wanted to use throughout our website.

One of the web-design features we were really excited about was the side navigation bar used to navigate throughout the site. It collapsed completely giving more space for content but was also easy to navigate back to using the hamburger icon found at the top left-hand corner of each page. Bootstrap was also heavily utilized for our website framework.

**Animal Intakes per Month**

The group wanted to determine any trends related to animal intake and the date animals were taken into a shelter. We created a time series line graph to see the number of cats and dogs taken into the shelter. The graph was made with Plotly js.

The graph had two filters. The first was ‘Dog’ and ‘Cat’ and the second filter changed the year from 2013 thru 2017. The X-axis represented the month of the year. The Y-axis showed the total number of the selected animal taken into the shelter. This created a month by month look at animal intake and revealed several trends.

Focusing first at dogs, it was obvious that more dogs were being taken into shelters than cats. The value of dogs typically ranged from 800 to 1000 each month. The number of intakes was on average higher in summer months such as June and July rather than winter months like January and February.

Cats were more inconsistent. The range of cat intakes went from 300 to 900 within each year. Cats followed the same trend as dogs with more cats in shelter in the summer months and much less in the winter.

Looking at this information, the group drew several conclusions. First, there are more dogs in Austin than cats. The number of dogs taken in each month was largely consistent and was much higher than cats, especially in the winter months. However, it would make sense that more dogs are taken into shelters than cats. Dogs are typically larger and could potentially be more dangerous if they are unattended. Cats are often allowed to roam outside, which makes it less likely that people will call a shelter to pick them up. Finally, we expect the bump in intakes during the summer months to hold as a trend. Pet owners are more likely to let their animals outside when its warm out, and animals are less likely to stay near there home.

Chart, line chart

Description automatically generated

**Outcome Type vs Income Type**

We knew pretty early on after choosing this data set, that we wanted to dig into why the majority of animals were taken into shelters and of those taken in, what actually happened to them. There were 4 different intake reasons documented for the city of Austin: Euthanasia Request, Owner Surrender, Public Assist and Stray. We decided to remove Euthanasia Request from the analysis because it represented only .31% of the data set. With only 3 intake reasons remaining, we decided a trio of side-by-side bar charts would be the best way to display the intake vs outcome data. The Plotly Javascript library was used to make these charts.

Each bar chart was filtered for a specific intake type. The count of each intake type was included in the title of each chart to provide context. For both cats and dogs across all years analyzed, we quickly found that Stray was the primary reason documented for pets in shelters, followed by Owner Surrender and Public Assist.

Earlier versions of these bar charts included count of outcome type. While the bar charts looked similar side by side, the default Y axis ranges varied greatly from one chart to the next because of the size differences between each intake type group. It was decided it would be easier for the viewer to understand the likelihood of outcome type if it was displayed as a percentage rather than a count. The Y axes were also kept consistent across all 3 charts for additional clarity. Uncommon outcome types were grouped together in an Other category. These outcome times included Died, Disposal, Euthanasia, and Missing, and represented less than 5% of the overall outcome types.

Outcome Type Results (Cats) – The top two outcome types for Stray cats were Transfer (45-56%) and Return to Owner (33-43%). The top two outcome types for Owner Surrender cats were Adoption (58-73%) and Transfer (19-33%). The top outcome types for Public Assist cats varied. Transfer was the top outcome type for 2014 (52%) and 2016 (37%) and Return to Owner was the top outcome type for 2015 (58%) and 2017 (50%).

Outcome Type Results (Dogs) – The top two outcome types for Stray dogs were Adoption (45-51%) and Return to Owner (28-31%). The top two outcome types for Owner Surrender dogs were Adoption (52-63%) and Transfer (28-32%). The top outcome type for Public Assist dogs was Return to Owner (70-80%). Transfer was the second in 2017 (20%) and Adoption was second for 2014-2016 (9-13%).

Graphical user interface

Description automatically generated

**Top 5 Breeds**

The group decided to investigate the top breeds of dogs and cats being brought to the shelters. It is understood that some breeds become trendy or popular over time depending on pop culture aspects like a famous movie with animals or the need for pets that are hypoallergenic. So, the team wanted to see if, after these waves of popularity, one could find any trends in the data or peaks of specific breeds being admitted into the shelters. However, once we sorted the data for the top 10 breeds of dogs and cats in shelters, we noticed that the there was no variation during the period analyzed for the top breeds.

As one can probably imagine, mixed breeds are by far the most popular type of pet found in the shelters, with the Pit Bull, Chihuahua and Labrador-Retriever mixes being the top breeds for dogs. For cats, the Domestic Shorthair, Domestic Medium Hair and Domestic Longhair mixes were the most popular. It’s more difficult to identify breeds of cats, specially when mixed, so the shelters use a visual description of the cat to describe the breed for them.

By adding the breed information to the data, we hope that people looking to adopt specific breeds, or specific fur type/color, might be able to more easily find what they desire.

Chart, pie chart

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Chart, pie chart

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**The Map**

The map tool is an option that can be utilized by individual consumers and government organizations alike. Consumers can utilize this map when they have a lost pet and are currently in the process of trying to recover their loved one. They can search the points nearby their home for a description of the animals that were recovered. The markers include the animal ID # and can be used as a reference when contacting the local animal shelter. Local governments can utilize this tool in many ways such as assisting in owner recovery by updating their pickup information as quickly as possible, identifying areas of high frequency to maximize the efficiency of their animal control officers, and also to anticipate times of the year where demand may be higher. The faster owners recover their pets the lower the cost burden will be on the animal shelters as they will a reduction in average length of stay. This resource can also be used to identify areas for opening animal shelters in the future.

Map

Description automatically generated Graphical user interface

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**Future Work**

As always with these projects, there is always a list of things we wished we could have included in the final product but were just not possible due to time limitations. Given unlimited time, below is a list of enhancements we would like to make.

* **Filter Enhancements -** Experiment with additional filters on the Dashboard, such as Breed, Color, Intake Condition. We would also like to add “Both Animal Types” as an option to the Animal filter to allow for side-by-side comparison of both cats and dogs. This could be accomplished with stacked bar charts, a multiline time series and either a combined pie chart or two side by side pie charts.
* **Data Exploration** - Further exploration of data points not currently included in analysis, such as Age Upon Intake, Time in Shelter, and Intake Condition to uncover trends and possible relationships between datapoints.
* **Data Cleaning** – The Austin Animal Shelter data set was actually very clean and easy to work with, except for the address information. Addresses weren’t listed in a typical address format. Many address only included cross streets and/or had special characters. With additional time, we would further scrub the address data and find a faster way to parse through locations to identify latitude and longitude.
* **Website Design –** The Home, Works Cited, Data Tables and Meet the Team pages could use some additional attention. Additional pictures could be added to the Home page and throughout the website. On the Tables page, we would like to add scroll bars to each table, lock the headers in place and add filters. For the Meet the Team pages, we would like to make each container holding our information consistent sizes. The same goes for the containers holding the source information on the Work Citing page.
* **Map Enhancements –** With future enhancements to the site we can add filters for breed, date/time, and plot out the animal shelter locations. Working with the local animal control teams will also enhance the functionality of the site. With more accurate address information no entries will have to be removed due to inaccurate latitude and longitude results. The animal control team can also update this information at the time of pick up and potentially reduce the length of time that the animal is in the care of the animal shelter. Shorter stays would ultimately mean less food and resources for the animals, hopefully resulting in tax savings for the consumer. This site could also be linked to animal chipping companies to alert the owner or the pet’s veterinarian that a pet has been found.

**Resources**

* [**https://github.com/chris-krokus/Project-3-Group-4/tree/master/Resources**](https://github.com/chris-krokus/Project-3-Group-4/tree/master/Resources)
* [**https://pubmed.ncbi.nlm.nih.gov/7493905/**](https://pubmed.ncbi.nlm.nih.gov/7493905/)

**Website created by the group**

* [**https://kellidsmith.github.io/SMU\_Project3\_Group2/Website%20-%20Copy/dashboard.html**](https://kellidsmith.github.io/SMU_Project3_Group2/Website%20-%20Copy/dashboard.html)