

Dogs in shelter: Final Project Report

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Project Link: <https://observablehq.com/@yuanpei/animal-shelter-data-visualization>

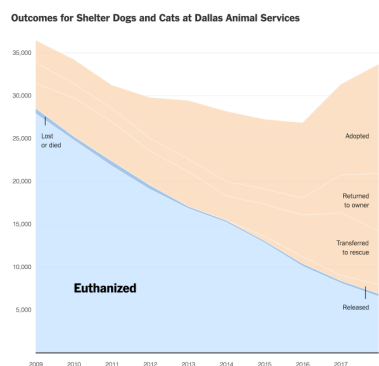
PROJECT GOALS

This visualization is based solely on the data obtained from an animal shelter in Austin, Texas, with the aim of better informing the public of the adoption situation within this animal shelter. Throughout this process, we also try to visualize and interpret the possible reasons behind the adoption pattern (e.g. adoption and euthanasia).

Moreover, we want to increase public awareness of the frequently overlooked and neglected animals, with a focus on their mental health.

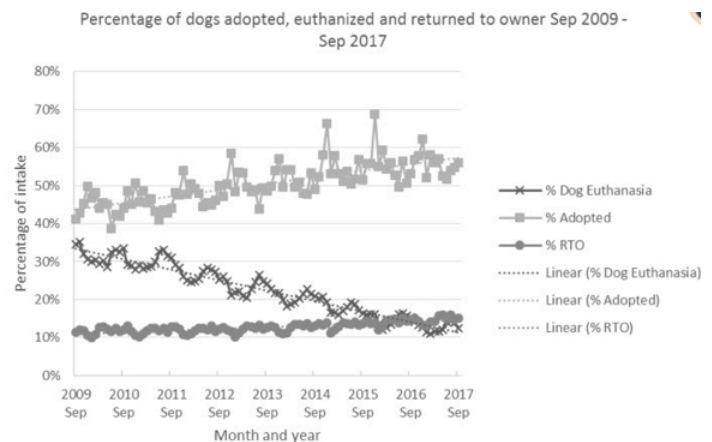
RELATED WORK

1) Why Euthanasia Rates at Animal Shelters Have Plummeted¹



This article by New York Times indicates that Spaying and neutering may increase the chances of animal being adopted in animal shelters. Spaying and neutering also helps to reduce the number of animals that shelters take in. Other factors that contribute to the drop in euthanasia rate nationwide include programs aimed at helping people resolve problems that might otherwise compel them to abandon their pets.

2) Dog Population & Dog Sheltering Trends in the United States of America²



This article shows that along with increased responsible pet ownership behaviors, sterilization efforts in shelters and private veterinary hospitals have played a role driving and sustaining the decline in

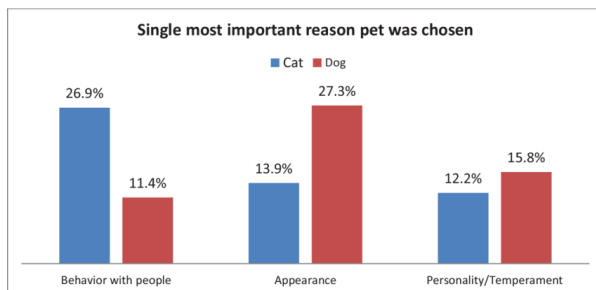
¹ <https://www.nytimes.com/2019/09/03/upshot/why-euthanasia-rates-at-animal-shelters-have-plummeted.html>

² <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5981279/#B27-animals-08-00068>

unwanted animals entering shelters (and being euthanized). Additionally, adoption numbers are rising slowly across the US and have become an additional driver of declining euthanasia numbers in the last decade. Cultural shift in how society and pet owners relate to dogs has produced positive shelter trends beyond the decline in intake. The increased level of control and care dog owners provide to their dogs, as well as the increasing perception of dogs as family members, are all indicators of the changing human-dog relationship in the US.

3) Why Did You Choose This Pet?: Adopters and Pet Selection Preferences in Five Animal Shelters in the United States³

This study examined reasons why adopters chose their pet in an animal shelter, what behaviors were first exhibited by the pet to the adopter, what information was important



during their selection process, and the relative importance of seeing the animals' behavior in various contexts.

³ https://www.researchgate.net/publication/256486104_Why_Did_You_Choose_This_Pet_Adopters_and_Pet_Selection_Preferences_in_Five_Animal_Shelters_in_the_United_States

⁴ <https://www.ingentaconnect.com/contentone/ufaw/aw/1992/00000001/00000003/art00004>

⁵ <https://www.sciencedirect.com/science/article/abs/pii/S0168159108003080>

Appearance of the animal, social behavior with adopter, and personality were the top reasons for adoption across species and age groups. Most adopters stated that information about the animal from a staff member or volunteer was more important than information on cage cards, and health and behavior information was particularly important.

4) The Behavior of Dogs in a Rescue Shelter⁴

This research examined the behavior of stray and unwanted dogs on their first, third and fifth days in an animal shelter. Results revealed no significant difference between the behavior of stray and unwanted dogs although the public viewed stray dogs as much less desirable than unwanted dogs. Time in the shelter had no adverse effects on the dogs' behavior. Indeed those changes which did occur during captivity, dogs being more relaxed in the presence of people and eating food more quickly, may be considered as positive changes.

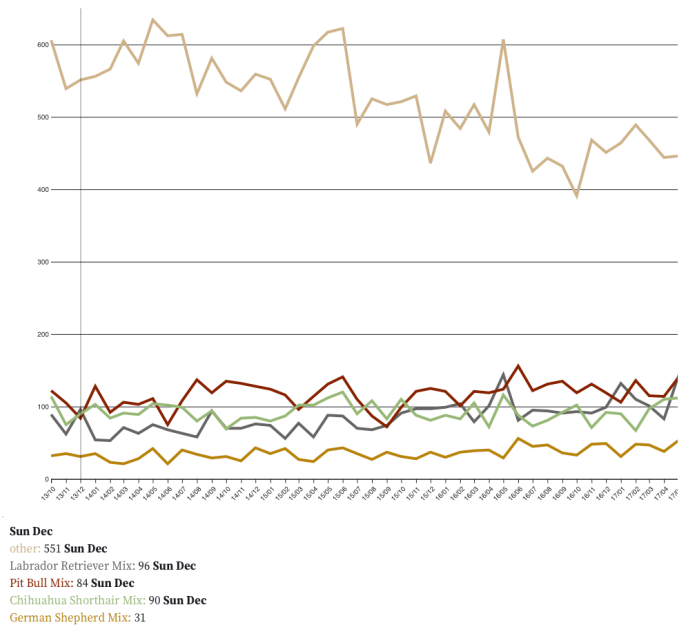
5) The effects of training and environmental alterations on adoption success of shelter dogs⁵

The study demonstrated that training shelter dogs increases adoptability.

Based on our literature review, we conclude that spaying and neutering helps to reduce the number of dogs that shelters take in and euthanize. Also, better pet ownership behaviors has contributed to the increase in adoption rate. Moreover, social behavior with

adopter, personality of dogs top reasons for adoption. These valuable insights gave us a new focus on visualizing mental and physical conditions and how they affect adoption or euthanasia decisions.

OUR VISUALIZATION



To achieve our project goals, we told the story of dogs in shelter in three sections.

Intake and Outcome Trends Over Time by Breed:

Intake and Outcome Trends Over Time by Breeds

Here we intend to provide our audience with a general idea of the adoption and intake situation in this shelter.

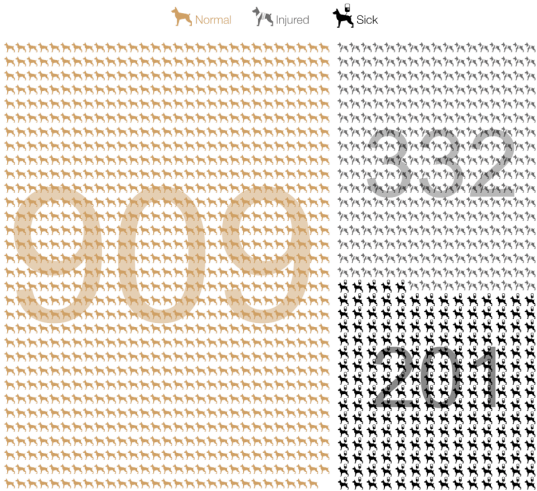
This image measures the number of dogs taken in from Oct, 2013 to May, 2017. The yellow up above represents the total number of other breeds excluding the four major ones. The four lines below are the four most common breeds in this shelter.

Interestingly, we found that there was a peak of animal intake every year from May to July. Also, The proportion of the four most common breeds in this shelter has increased over time as the number of other breeds taken in has declined. This shows that the four major breeds still remain a problem for this shelter.

What leads to Euthanasia:

Euthanasia is the most concerning topic whenever

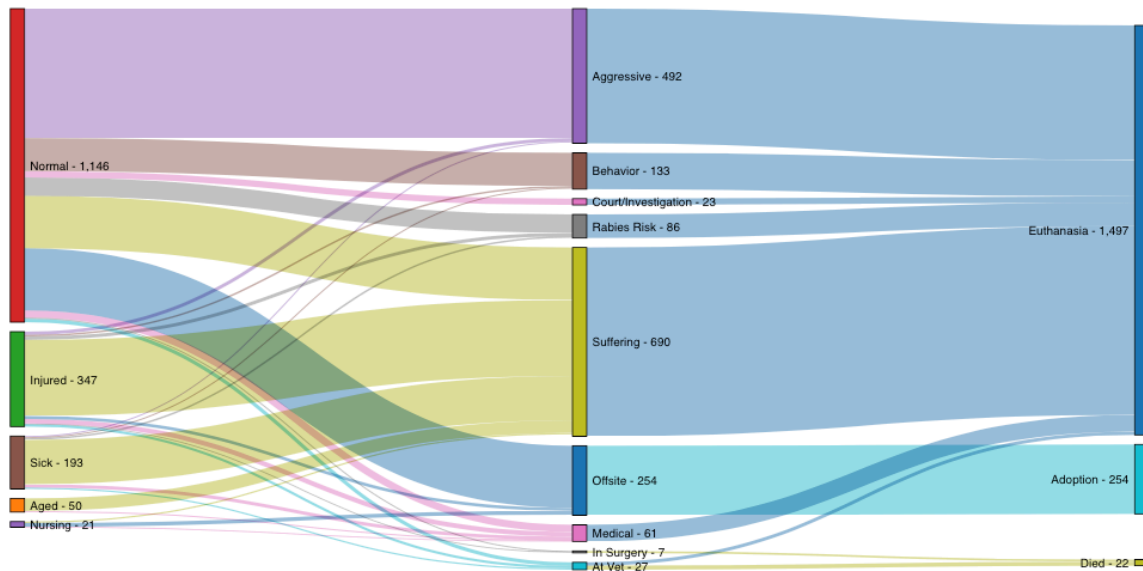
Among all the dogs euthanized in this shelter, 909 of them were healthy and normal upon intake.



The composition of euthanized dogs

it comes to animal shelters. Inspired by our literature review, here we use visualizations to dig deeper into the conditions of dogs prior to euthanasia or adoption.

To grab the users' attention, we start with a shocking image showing the the composition of euthanized dogs. Black means normal, red means injured and blue means sick. Contrary to common views, our image reveals the fact that a huge proportion of dogs euthanized were actually normal upon intake.



Then, through two sankey graphs, we wished to explore the flow of changes in animal conditions. Our first round of usability test shows that our initial sankey designs were ambiguous, as the lines appeared opaque and stacked together, which hinged

Three stages of animal condition

user comprehension. So we re-designed the sankey graphs to include only the animals who suffered from a bad condition. Also, we also enable users to switch the color of the sankey graph to highlight the some information.

The left column represents animal condition upon intake, in other words, describes the condition of the animal when it first entered the shelter. Note that the left column only contains their physical conditions.

The column in the middle represents the middle stage, which means animals' conditions when they are in the shelter. The middle stage also take into consideration not only the physical but also the mental conditions of animals.

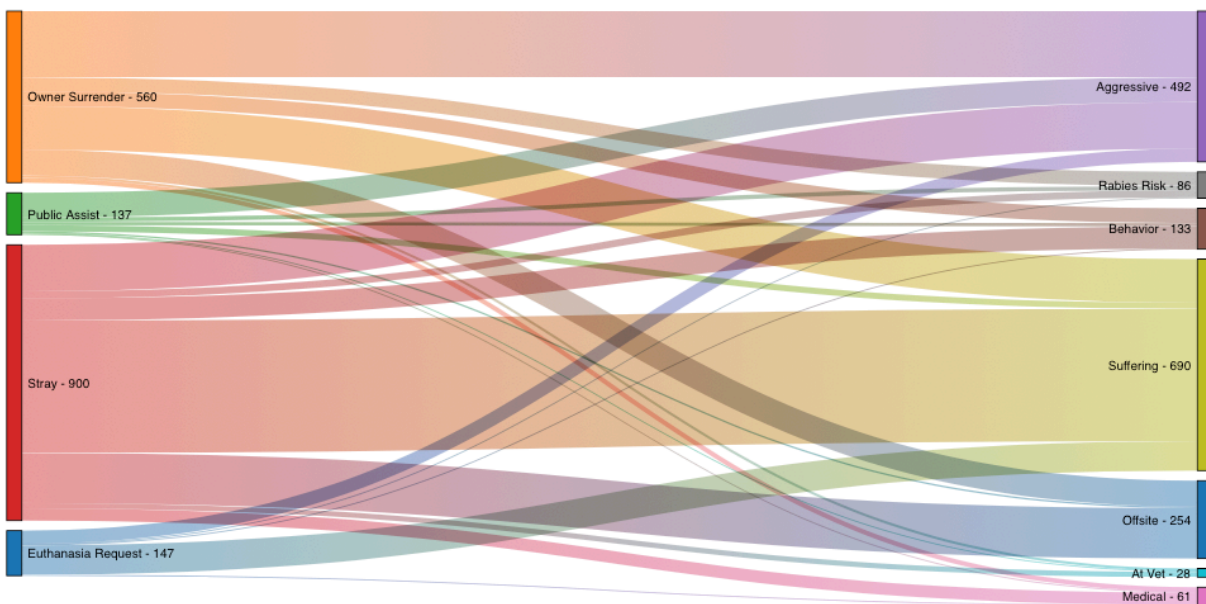
The column to the right represents the final stage, which is the outcome.

Often times it is the animals with bad conditions that have a hard time finding a

permanent home. Normal and healthy animals are more likely to be adopted, while animals that exhibit aggressiveness or behavior problems are less likely to find a home.

Sadly, we see that the majority of the animals with a bad condition were euthanized in the end.

Here, the users can see that the animals who were in a bad mental state (aggressiveness, behavior problems) or physical state (suffering, rabies) were all put down. Moreover, we would like users to see that even for the initially normal dogs, they might



later suffer from mental or physical illnesses, which lead them to being euthanized.

users better understand the how the dogs was treated before entering the shelter could shape its behavior and personality and bring physical harms, which will in turn affect their chances of getting adopted.

Conditions before intake vs conditions at shelter

The column to the left shows the four conditions before intake, and the column to the right shows the condition of animals in the shelter.

For example, a dog who was a stray before entering the shelter, could be diagnosed with behavior problems in the shelter.

Dogs can be traumatized if they are abandoned by previous owners or they were once strays. Here we can see that surprisingly, a large portion of dogs were abandoned by their owners!

We wished to explore the correlations between conditions before intake and both mental and physical states. It might help

Sometimes people keep a dog without setting the right expectations. For example, a lot of people adopt Chihuahua because of its tiny size and cute face, but actually Chihuahua could be grumpier than other breeds.

Helping people to set the right expectations and better inform adopters of potential responsibilities are extremely important.

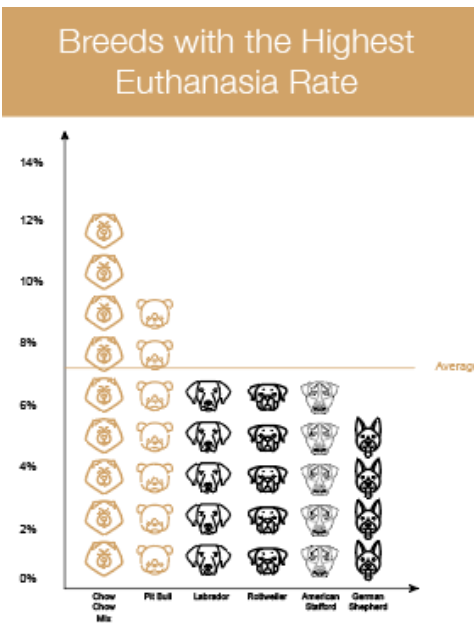
Moreover, through these two sankey graphs, we would like to raise more awareness towards the issue of mental illnesses in dogs. Often times, we are way too focused on the physical condition of sheltered animals that we neglect the fact that their mental health is just as important. Dogs are much more sensitive and emotional than we often think. For example, if a dog has a miserable past or was mistreated by human, the dog is more likely to show

aggressiveness towards human and less likely to build the bond.

Euthanasia and Adoption

In this section we hope to show users different factors that influence euthanasia and adoption rate.

First, we showed the top 10 most adopted



and unwanted breeds, also the 10 breeds with the highest euthanasia rate.

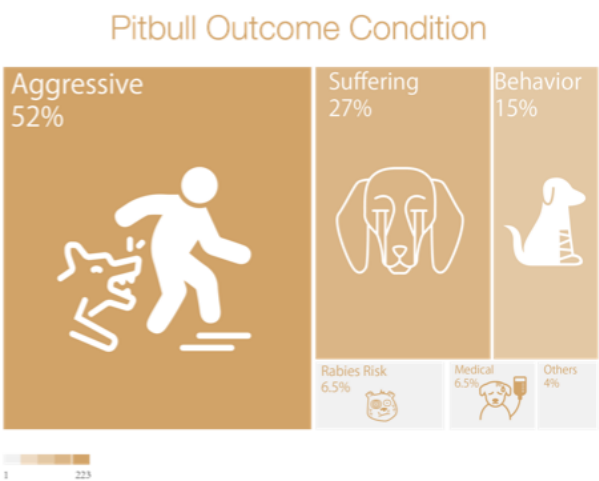
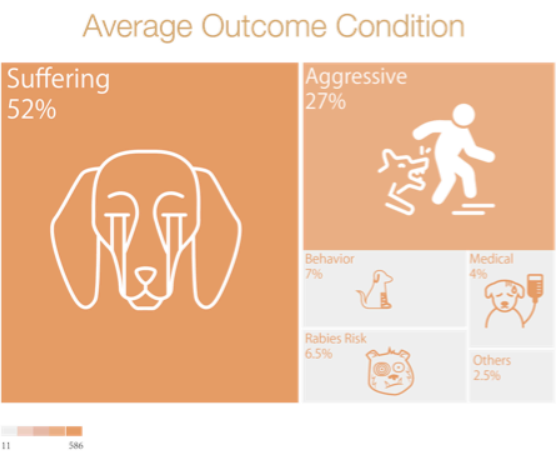
We examined three factors: age, spaying and neutering and gender.

Here, we can conclude that breeds such as Pitbull and Chow chow mix are less likely favored compared to other breeds.

Also, it is not surprising that as the animal gets older, its chances of getting adopted tend to decrease. On the other hand, the older the dog is, in general the more likely that it will be euthanized.

Also, spaying and neutering do help to increase the chances of adoption returned to owner.

Throughout this process, Pitbull caught our attention. Pitbull is the most prevalent and unwanted breed in this animal shelter.



Moreover, it has the highest euthanasia rate.

So in the next section we provided users with more information on pit-bulls. We used squares to show the percentage of each

category. Here, each category represents different mental and physical conditions. Users can see that pit bulls are more likely to exhibit aggressiveness(52% vs 27%) and behavior problems(15% vs 7%). Those are possible reasons why pit-bulls are always less favored.

Actually, mental disorder such as behavior problem and aggressiveness can all be cured and corrected through proper training. Are there any other ways to save these poor animals from the fate of euthanasia?

Potential solutions include improving the living conditions of dogs to prevent mental illness, ensuring better sanitary conditions to prevent contagious diseases among animals.

If we could allocate more resources to provide more training and medical treatment towards those dogs in need, maybe we can help them to take the leap into a whole new life.

DATA SOURCE

This project is based on a dataset on [kaggle.com](https://www.kaggle.com/aaronschlegel/austin-animal-center-shelter-outcomes-and) called “Austin Animal Center Shelter Outcomes”.⁶

TOOLS USED

To create our visualizations, we used the following tools: D3, Adobe Illustrator and Tableau. We also referred to the code by Mike Bostock⁷ to create the sankey diagrams.

EVALUATION PROCEDURE

The usability study aims to find out how effective the visualization is.

1. Is the story understandable if designers do not give any background information about the story in the first place?

2. Are we using the right type of graph?

3. What attracts users attention and what confuses them?

We then used quantitative and qualitative approaches to assess our project performance. To be more specific, we created three questions sets for users to measure their understanding of and level of satisfaction with the visualizations. We also observed facial expressions(smiling, looking confused, laughing) to see which part is more engaging.

- Question set 1 aims to find out if the interviewee is familiar with animal adoption and how the shelter functions.

- Question set 2 aims to measure how well the information was absorbed by the participants.

- Question set 3 is to obtain advice and suggestions from the users.

⁶ <https://www.kaggle.com/aaronschlegel/austin-animal-center-shelter-outcomes-and>

⁷ <https://observablehq.com/@d3/sankey-diagram>

Tasks		Chuhan	Yuanpei
Literature Review		50%	50%
Search for data and statistics		100%	0%
Data cleaning and preparation		100%	0%
Exploratory Data Analysis	Python,Jupyter	100%	0%
	Tableau	0%	100%
Prototyping		0%	100%
Creating visualizations in D3	Swipe	0%	100%
	Sankey	100%	0%
Other visualizations without D3		0%	100%
User research design and usability testing	Design	30%	70%
	Test	33%	66%
	Usability Test Write up	0%	100%
Final Report Writeup		100%	0%

WORK ALLOCATION