

Using Animal Control Incident Data to Develop Community Assistance Programs

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Which Domain?

According to research estimates from the American Society for the Prevention of Cruelty to Animals (ASPCA), over 6.5 million animals enter shelters each year [7]. Of those, approximately 1.5 million animals are euthanized [7]. Animals of all species and breeds enter shelters in multiple ways. They can be surrendered by their former owners, rescued by individuals or authorities as strays, or confiscated from a cruelty case. [8] Most municipalities have an animal control or humane law entity that is responsible for responding to animal complaints and emergencies. Sometimes these agencies are publicly funded, and sometimes they are part of a private nonprofit animal welfare organization. [9] Animal control officers can receive a bad reputation, but often their desire is to maintain the best quality of life for animals in the community. Analyzing the incident data collected by animal control agencies can provide vital information that can be used to address animal welfare problems specific to each community. Common problems that can benefit from a closer look at animal control statistics include pet overpopulation, cruelty and dogfighting, feral cat community control, and community access to veterinary resources.

Which Data?

The dataset used for this analysis comes from the Baton Rouge Animal Control and Rescue Center (ACRC) who describes their mission as “protecting animals from people and people from animals” in the community. [3] The ACRC is responsible for investigating animal related complaints, resolving animal related issues, and enforcing the local laws surrounding animals. They work with the Companion Animal Alliance (CAA) which is the nonprofit agency that takes care of animal sheltering, adoptions, rescue, fostering and euthanasia. [3]

The initial dataset that inspired this project is a log of incidents handled by from Baton Rouge Animal Control and Rescue Center from 2012-2019 with some initial preprocessing found on Kaggle at <https://www.kaggle.com/dustinec/2019-baton-rouge-la-animal-control-calls>. [1] The raw data was also downloaded from Baton Rouge’s Open data website at <https://data.brla.gov/Public-Safety/Animal-Control-Incidents/qmns-hw3s>. [4] The previously cleaned dataset offers some benefits such as geocoding for locations; however, additional time and date-based variables are available in the raw data. The two files can be joined on the file number.

The previously cleaned dataset contains 52585 observations with 16 variables between 1/1/2012 and 10/3/2019. Names and identifying information were removed to protect the people involved in the incidents. [1] The dataset consists of mostly categorical variables including incident request type, species, breed, sex, size, age, condition, temperament, and disposition. The address, city, and zip were geocoded using Census.gov and Google geocoding services in addition to custom Python scripts. [1] The incident date is included in the cleaned dataset, but additional time variables can be joined from the raw data include incident time, dispatched time, arrival time, available time, impound date, and impound time.

These variables may could be used to create features based on response time. Other variables from the raw data worth exploring include dispatched situation, vaccination number, and collar.

Research Questions? Benefits? Why analyze these data?

Animal control agencies work in partnership with local rescues and nonprofits to solve problems that cause animal related incidents. In general, this project will seek to find an answer on if animal control incident data can provide justification to support the development of programs to assist the community's animal welfare challenges thus leading to a safer community overall. Some specific questions to explore include:

- Are certain types of incidents, species, breeds, conditions, etc. prevalent in specific areas?
- Can community outreach programs such as spay/neuter services, community veterinary and microchip services, and trap/neuter/return services for feral cats be tailored to the areas that need it the most?
- Can the areas reported be cross referenced with income statistics for those locations to be used to apply for grants for these proposed programs?
- Are there specific times of the day when certain calls come in? When do most calls come in?
- Can the animal control officers be better staffed to respond to incidents quicker based on the answers to the questions above?
- Can we predict any factors about an animal incident based on the other variables? Can the type of call be predicted by the region and time of call? Can the condition or disposition be predicted by the region, time of call or time of response?

What Method?

The Exploratory Data Analysis process will be helpful in narrowing the expectations of which questions above can be answered by the data provided.

- R will be used for initial data mining and exploratory data analysis for the categorical variables with the help of libraries like ggplot and dplyr.
- Tableau will be used for graphing geocoded locations by the different categorical variables to look for trends and patterns.
- Income statistics for the Baton Rouge area will need to be downloaded to answer income-based questions to be used for grant programs. A preliminary search of local government sites was unsuccessful, but Kaggle contains multiple income datasets that are already geocoded. Geohashing will be used through Python to create an index of mean incomes to be searched for the closest region to the incident locations.
- Tableau will be used to visualize time series data for incident calls and response time to determine if any additional features can be derived.
- Python will be used for feature analysis, extraction, and modeling. Because most of the variables are categorical, any predictive algorithms will most likely be classification.

Potential Issues?

As a budding data scientist, the incorrect selection of methods can create an issue. My scope for this project may also be too broad, and I may face an issue narrowing down the specific questions that can be answered by the data.

Unexpected issues with data may arise because it has already received preprocessing and geocoding. To mitigate this issue, I have also downloaded the raw dataset that I can clean myself.

As with any data science project, I also may not be able to derive any meaning from the data provided or find any predictable variables that would aid the animal welfare community.

Concluding Remarks

Animal control entities and nonprofit animal rescues often work together to improve the lives of animals in their local communities. Common problems that face the animal community and can benefit from a closer look at animal control statistics include pet overpopulation, cruelty and dogfighting, feral cat community control, and community access to veterinary resources.

Pet overpopulation is caused by factors like allowing animals to breed without the likelihood of finding homes for the animals. [5] This should not be confused with reputable breeders who specialize in a specific breed of dog or cat because they often have an audience of people searching for those animals. Unintentional breeding happens when owners do not spay and neuter their pets due to a lack of education or resources and allow them to reproduce. The data can be used to identify communities with a larger number of incidents involving young animals that can benefit from spay and neuter education and programs to combat this issue.

Dogfighting is a brutal underground criminal activity that has led to a bad reputation for pit bull type dogs. In Louisiana specifically, our shelters are overrun with “bully” type breeds and are among the hardest to place in homes. Dogs who win fights are often overbred and their puppies are sold for high dollar values. The weaker dogs are often used as bait dogs to train the fighters or are disposed of in an inhumane manner. [2] Animal control incident records indicating the conditions of dogs with wounds indicative of fighting can bring attention to a potential ring in the area.

Feral cats are free roaming cats that are considered wild and do not easily be domesticated. [10] They can offer benefits to their respective communities but are often picked up by animal control because they are considered a nuisance by neighbors. These benefits include offering rodent and other pest control as well as giving the community members who may not be able to care for a pet of their own a sense of purpose. [6] Feral cats are difficult to place once in a shelter because they are not used to human contact and are very likely to be euthanized. Locations that have a high population of cat incidents may benefit from education about the benefits of feral cat colonies and may be eligible for grants to start new feral cat programs.

One of the reasons a pet owner may want to surrender their pet to a shelter is that they can no longer afford to care for the medical needs of a pet. Sometimes, these issues can be prevented by routine wellness visits but in some communities, transportation to veterinary offices or the financial resources to pay for care may not be available. Using the location data, areas where sick animals are picked up and often returned to owners can provide opportunities for remote veterinary clinics to provide low cost or free veterinary exams and vaccinations.

The scenarios above provide a few opportunities of how animal control incident data can be used to drive decisions on development the best programs to serve the people and pets in the community.

References

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