

Adoptable Dogs

Looking into the Shelter Life

Overview.

- Introduction and Motivation.
- Data Source and Wrangling.
- Data Insights.
- Predicting Shelter Outcome Type and Time Spent in the Shelter.
- Future Improvements.
- Conclusion.

Introduction and Motivation

Every Dog Should Have its Day.

Dogs in shelters wind up adopted, transferred, are dead.

Which dogs are more likely to end up adopted versus not adopted?

Looking into the Austin City Shelter data will give some answers.

All this will lead to better awareness and hopefully help find homes for every dog, especially those that need it the most.

Every dog should have a fair and equal chance at finding a loving home.

Data Source and Wrangling

Thank You for Freely Accessible Data.

Data Source

- Austin City Animal Shelter data.
- Continuously updated and freely accessible online database.
- Contains intake and outtake features such as sex, age, color, breed, etc.
- Intake and outtake data is in separate files.

Wrangling

- A few formatting, consistency, nulls, and multi-feature encoded column issues.
- Intake and outtake data were joined into one dataframe.
- Pandas was used to wrangle, manipulate, and store the data.

We can always use more data.

Additional Potential Data Sources

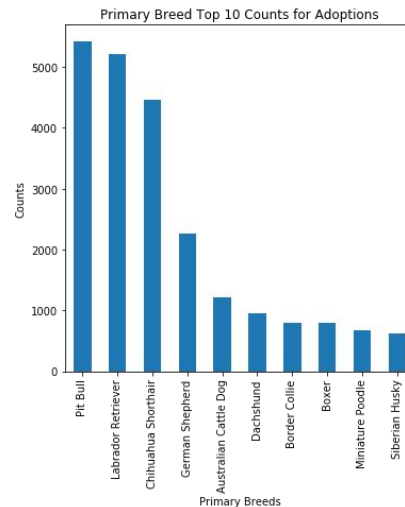
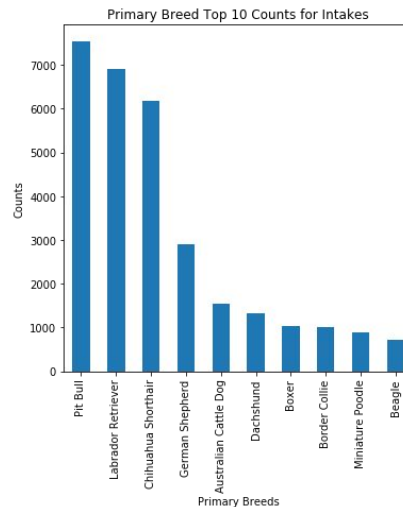
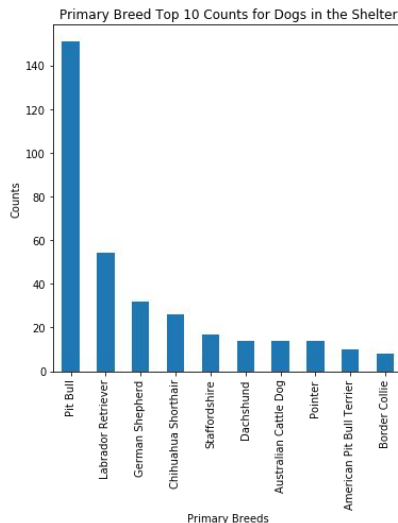
- Data from more shelters.
- Data from adoption websites.
- More features from the other animal information in the current data (Cats, farm animals, etc).
- Features from dog pictures and adoption descriptions.

Data Insights

Pedigree is more than just dog food.

Breed

- Staffordshire Terriers sit in shelters longer.
- Siberian Husky not a top intake but a top adoption.

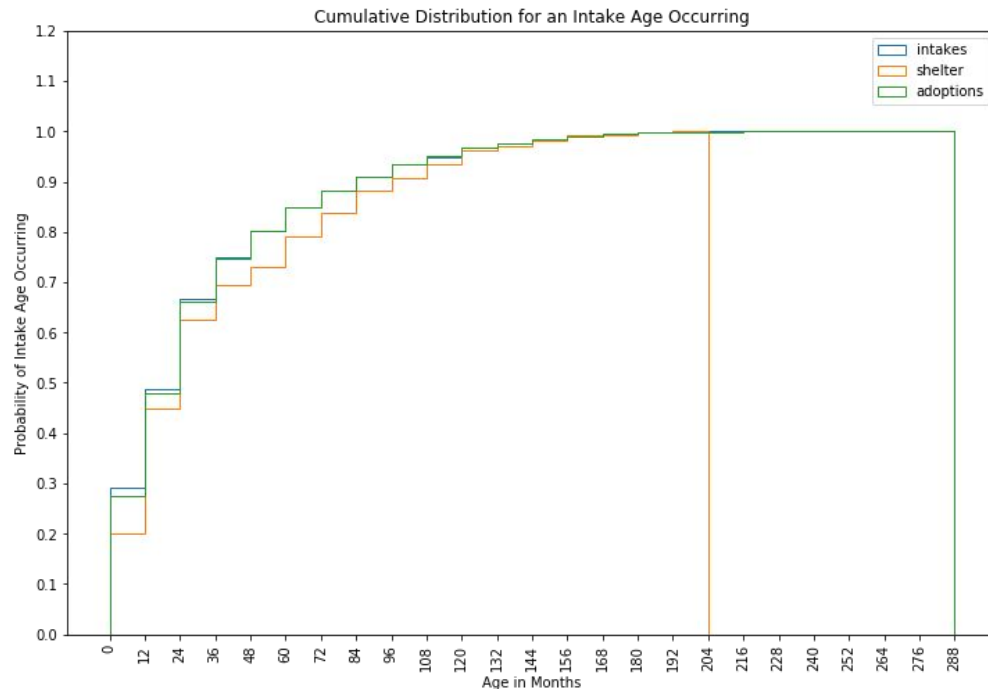


Breed is an important factor in determining the outcome type of dogs. There is an imbalance of adoptions based on breed.

Young and the restless.

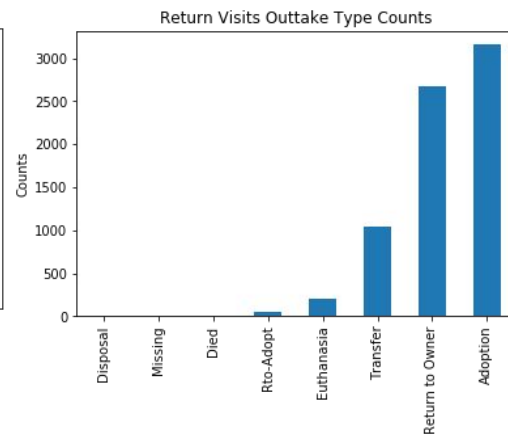
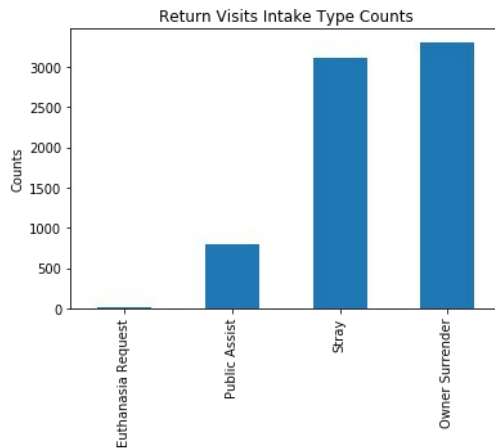
Age

- Younger dogs are adopted more than Older dogs.



Shelters are not free boarding.

- Takes up valuable resources.
- No guarantees on getting your dog back.
- Multiple intakes heavily due to Owner Surrenders.
- Outtakes are more often adoptions than return to owner.
- Overall owner surrenders that end up as return to owner: 4.4%.



Significantly Significant.

Statistically Significant Features

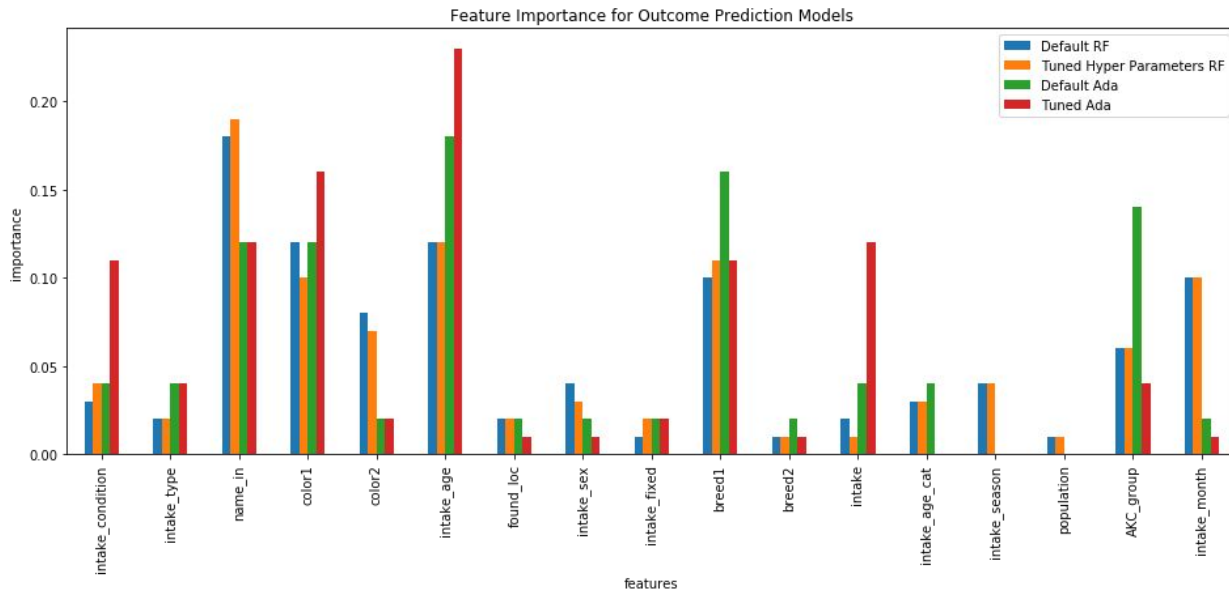
- Age (People love puppies).
- Breed (Aggressive Stigmatism harm some dogs' chances).
- American Kennel Club Group (Herding dogs for the win).
- Season (Winter time for a warm furry friend).
- Season (Spring cleaning to prep for that new family member).

Machines tell us the real importance.

Random Forests and AdaBoost Feature Importance

Outcome Type Prediction

- Age.
- Breed.
- Name.
- Color.

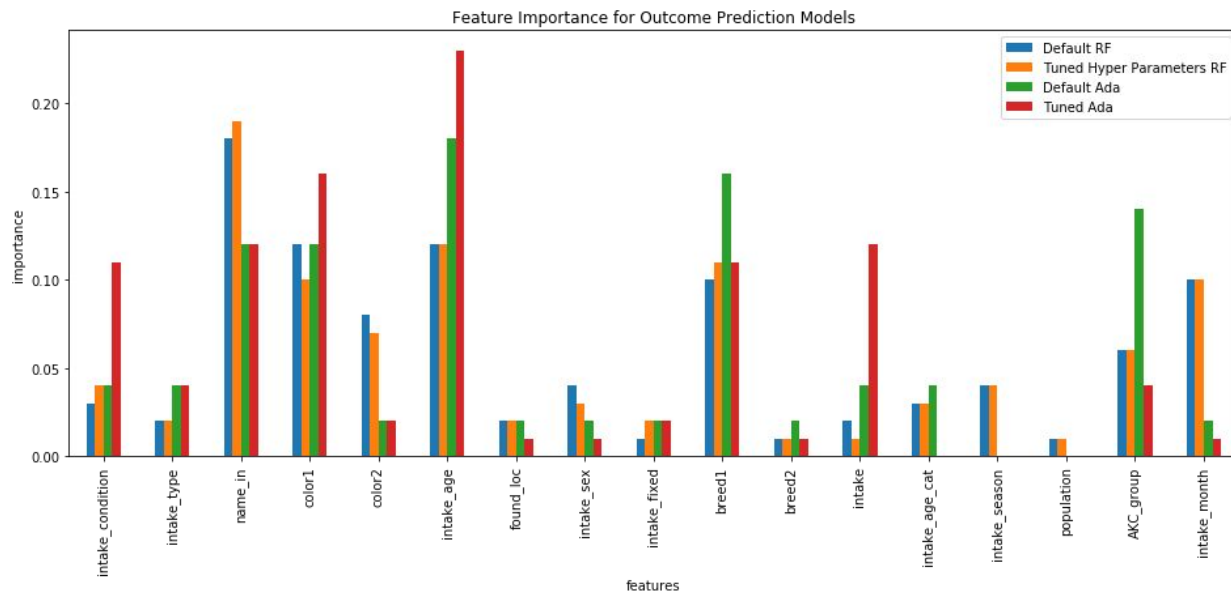


Machines tell us the real importance.

Random Forests and AdaBoost Feature Importance

Shelter Time Prediction

- Age.
- Breed.
- Name.



Predicting Shelter Outcome Type and Time Spent in the Shelter

Building the models.

- Random Forests and AdaBoost (decision tree base estimator).
- Tuned hyper parameters via RandomizedSearchCV.
 - 3 folds.
 - 100 iterations.
- F1 score used to measure overall model performance.
- Predicting outcome type.
 - Adoption.
 - Transfer.
 - Death.
- Predicting shelter time.
 - Less than 7 days.
 - 8-21 days.
 - 22-50 days.
 - 50+ days.

Insights are mightier than predictions.

Outcome Type Top Performer

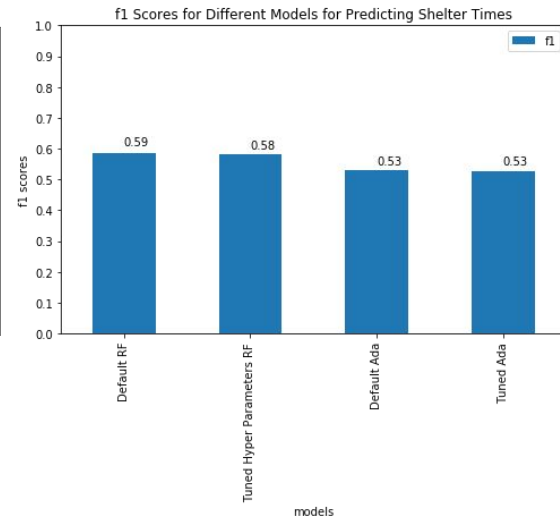
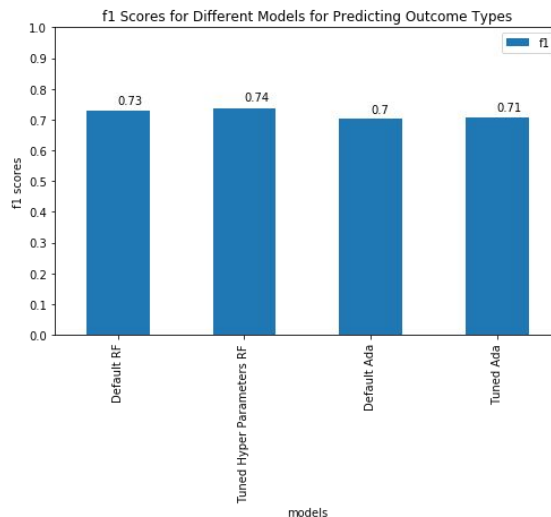
- Tuned Random Forests.
 - F1 score 0.74.

Shelter Time Top Performer

- Default Random Forests.
 - F1 score 0.59.

Selection bias is heavy.

Uneven class sizes.



Future Improvements

Making a mightier model.

- More data.
- More features captured by the shelter.
- Different prediction class selections could ease the selection bias.
- Use the rest of the shelter data (other shelter animal species).
- Build features out of the information for dogs currently in the shelter.
- Try different algorithms (logistic regression, kNN, SVM, etc).
- Further fine tuning of hyper parameters via GridSearchCV.
- Use regression models to predict shelter time.

Conclusion

All dogs need love.

There is a world full of a broad variety of furry face friends just waiting for someone to give them a chance, some food, some love, and time. We should try to not discriminate by age, breed, and any other dog characteristic when choosing a pet. Make well educated decisions. Go in open minded and open hearted, make a connection, and come out with a new friend.