Predicting Shelter Animal Outcomes

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Research Question:

What factors contribute to a positive outcome for rescue/shelter animals?

Name: Bolt
Age: 3 months
Health: Vaccinated, Neutered
Gender: Male

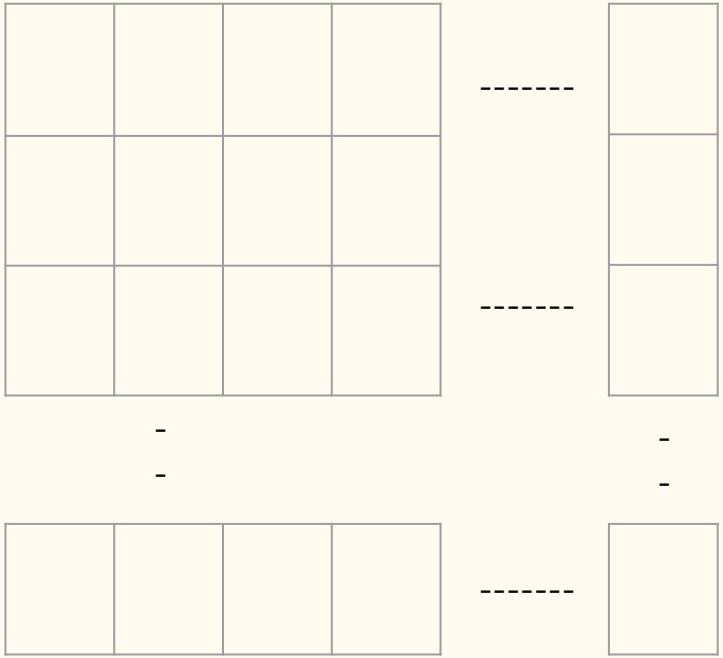
VS.

NO PHOTO AVAILABLE

Name: F24G43LK2
Age: Approx. 9 years
Health: Rabies Risk
Gender: Female

The Data

“Austin Animal Shelter Outcomes”
Dataset from Kaggle
Contains 78,256 observations and 12 Features



Target: Shelter Outcome

- Includes: Adoption, Transfer, Euthanasia, etc.
  :(

Model Features:

- age_upon_outcome
- monthyear
- animal_type
- name
- fixed_status
- gender

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

Overview

Preparing Data

- Cleaning
- EDA
- Feature Engineering

Model/Parameter Search

- RandomizedSearchCV()
- Sklearn Classifier Models:
  - RandomForestClassifier()
  - RidgeClassifier()
  - Logistic Regression()

Fitting and Evaluating Final Model

- Random Forest model
- Evaluation Metrics:
  - Accuracy
  - F1_Score

Final Model: Random Forest

Search Space:

- RandomForestClassifier()
- RidgeClassifier()
- LogisticRegression()

(also involved hyperparameter grid search)

Best Model:

```
RandomForestClassifier
{
    max_depth: 10
    min_samples_leaf: 4
    min_samples_split: 4
}
```

Evaluation Metrics

Accuracy Score:

- Measure of how often the model makes a correct classification
- Value on Test Data: 0.775
- Value on Training Data: 0.783

F1 Score:

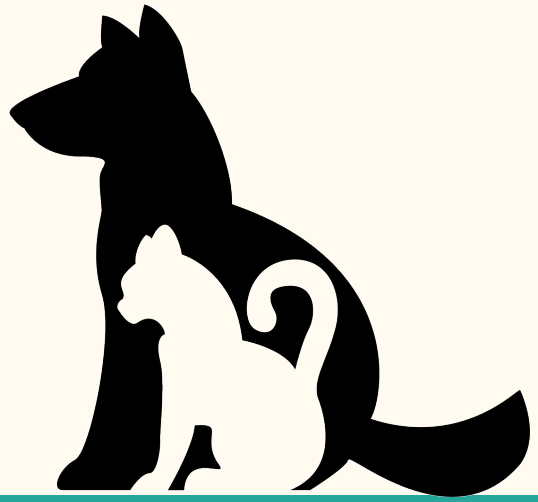
- Measure of model precision and robustness
- Value on Test Data: 0.237
- Value on Training Data: 0.255

Future Directions

- Incorporate other available variables, specifically breed and color
  - Need more complex feature engineering
- Do more feature importance analysis
- Consider consolidating some of the target variable values

Model Applications:

Help animal shelter workers/volunteers set up optimal profiles to give shelter dogs/cats the best chance of finding families of their own.



Thank you!