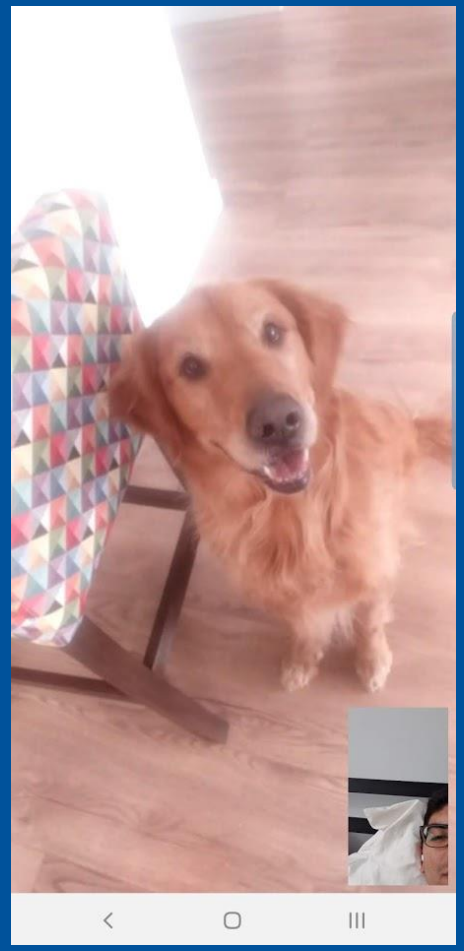
Getting our hairy friends a nice home

Factors that impact pet adoption

Juan David Martínez Gordillo

Duke MIDS
Master in Interdisciplinary Data Science

My motivation: Bingo!



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Some context

- Between 2010 and 2016, **33 thousand pets were abandoned** just in Colombia
- Is estimated that in Colombia there are about **one million stray pets**
- The Humane Society of the United States (HSUS) estimates that **three to four million animals die in American shelters each year**

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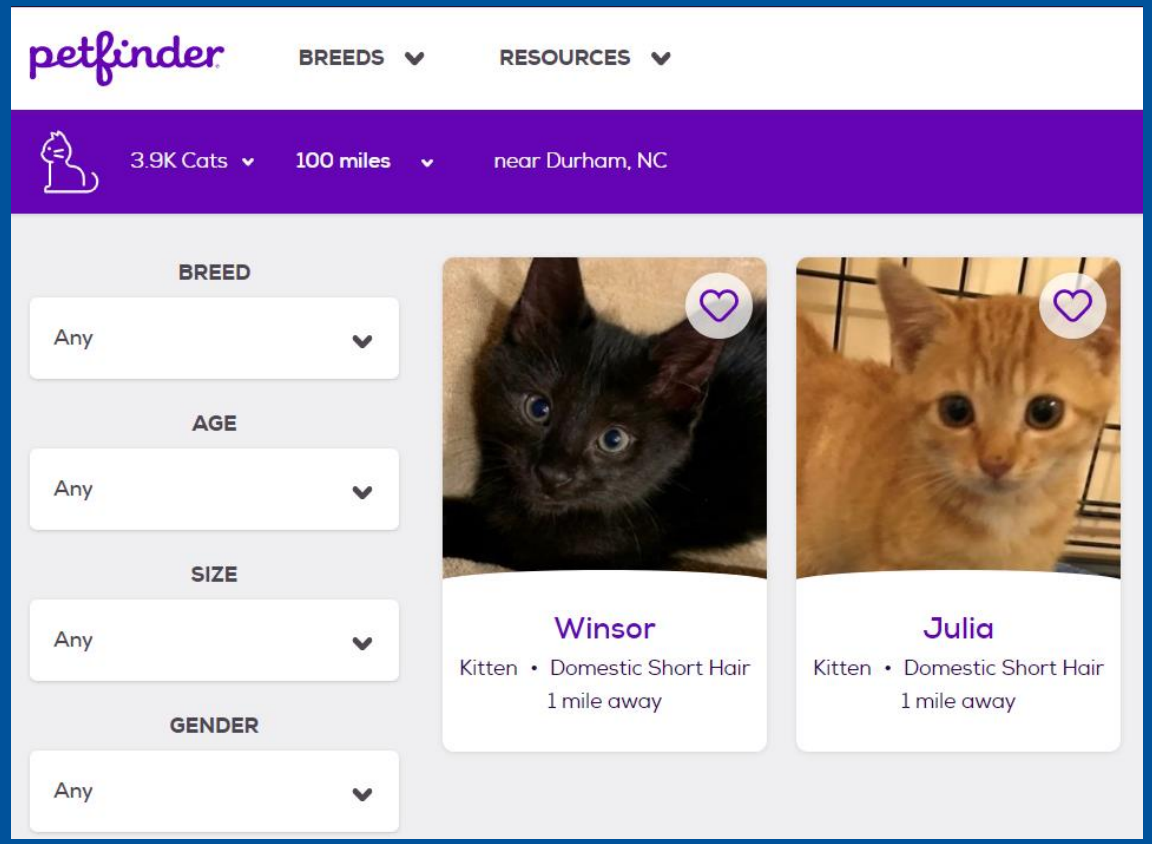
A novel solution: Petfinder.com



- The largest pet Web site on the Internet
- Connecting homeless animals with the people who want them
- Petfinder has been behind the placement of more than 25 million animals.

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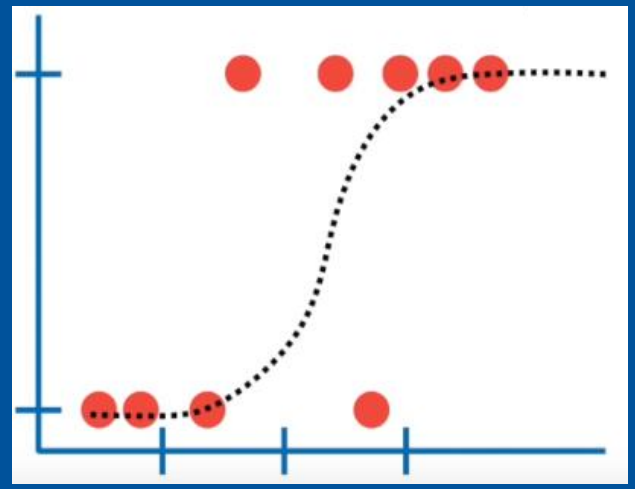
Objective

An interpretable modeling technique:

- Increase the likelihood of adoption for any new pet coming into the site



An accurate classification method:

- If we know which types of pets are less likely to adopt, we can increase the site's efforts on those to ensure they are adopted

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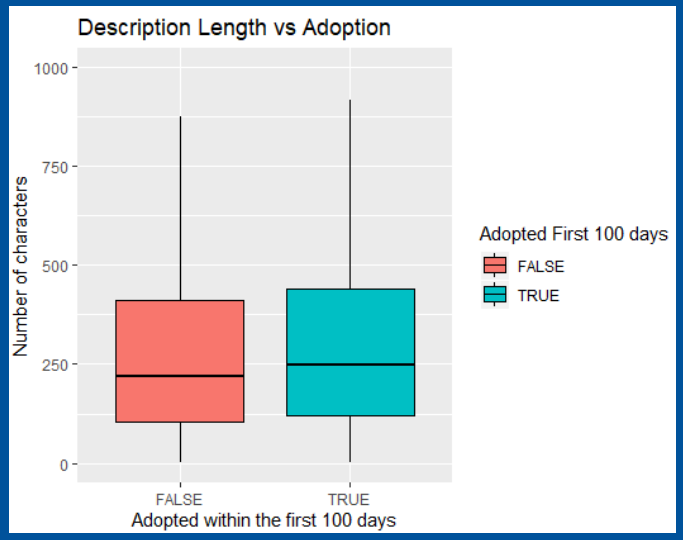
Data

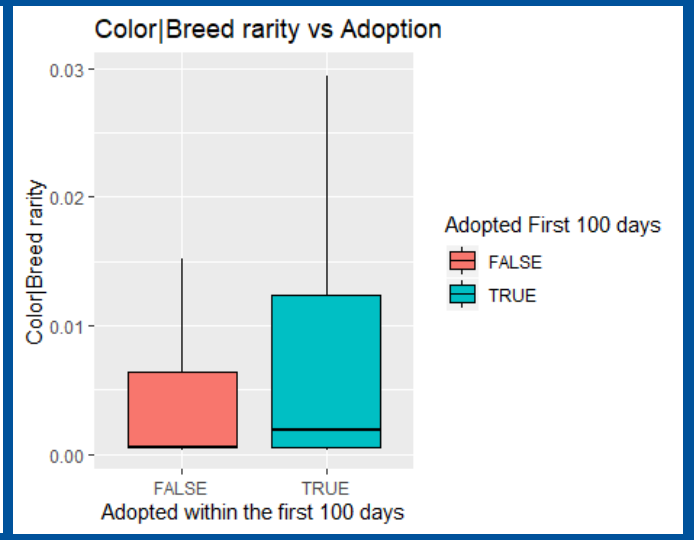
- Observations: 14,993 pet listings (Petfinder.my, 2018)
- Original variables: 24
  - Age, Gender, Color, Health, Type, Breed, Maturity Size, Fur length, Among others

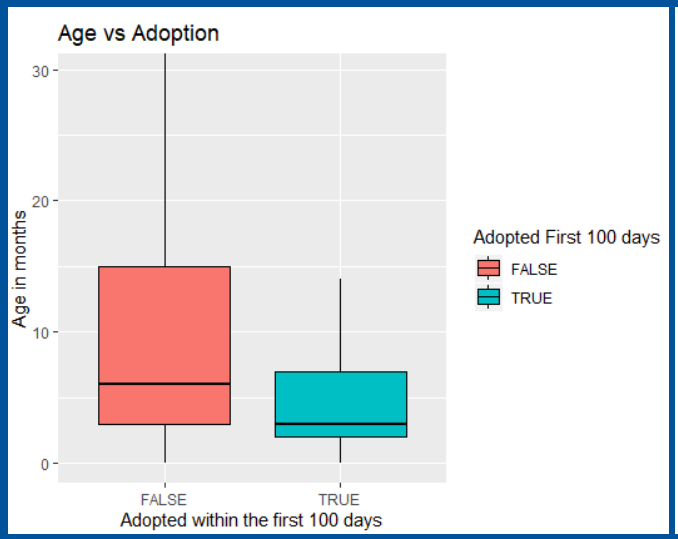
Exploratory Data Analysis

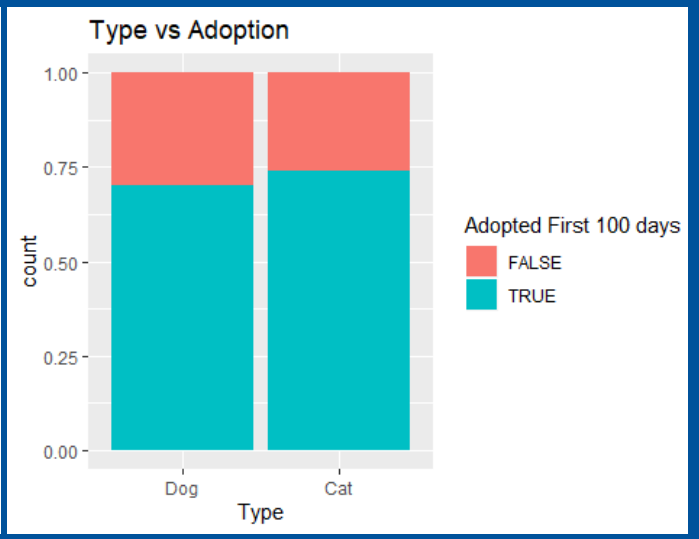
- **Target variable:** Pet adopted in 100 days or less.

- Feature engineering:
  - Mixed Breed
  - Multicolor
  - Life Stage
  - Description length
  - Fee per capita
  - Num rescues
  - Color/Breed rarity
  - Color rarity

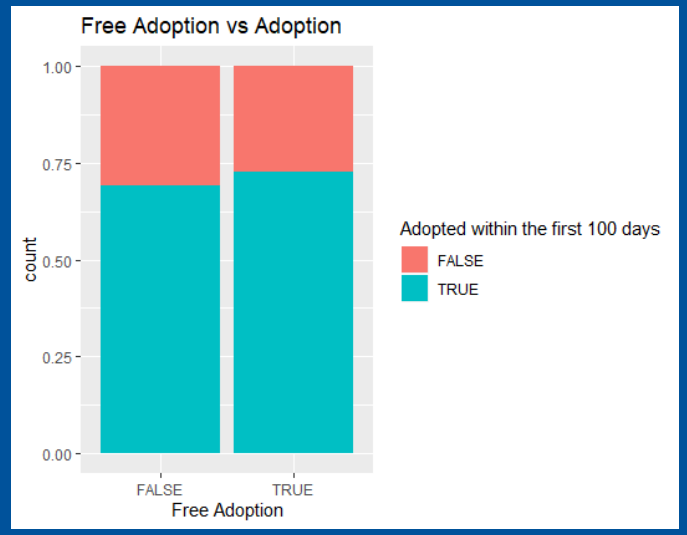


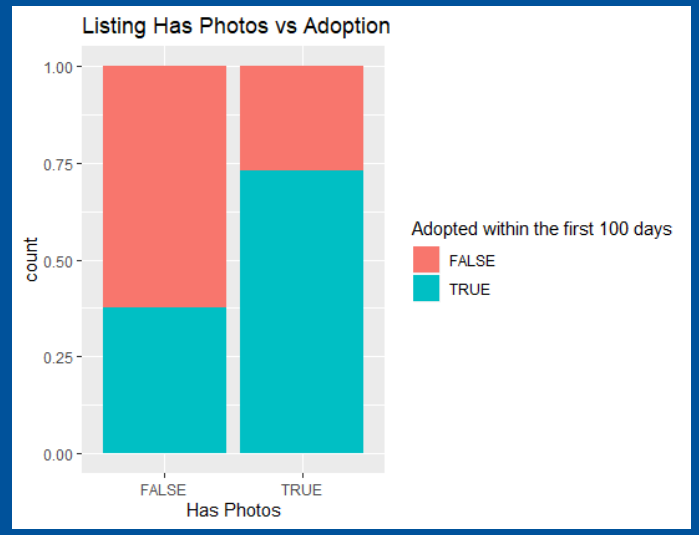


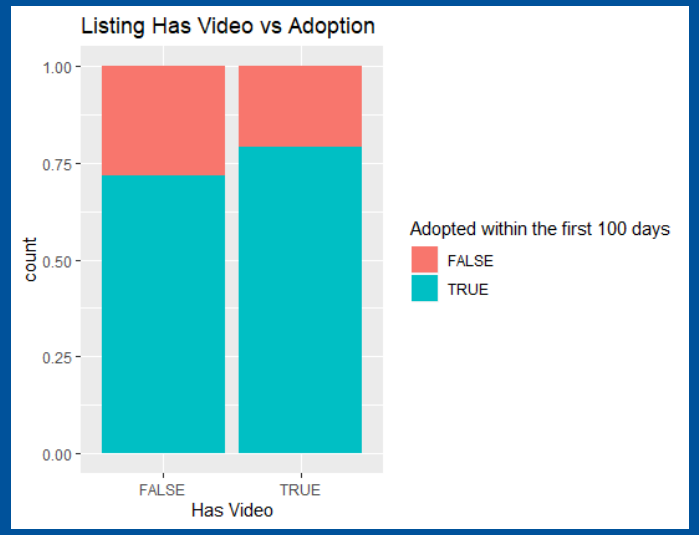


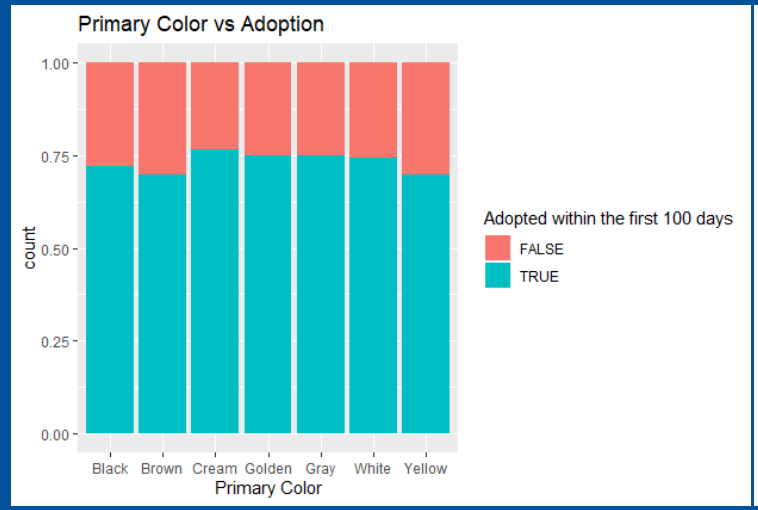


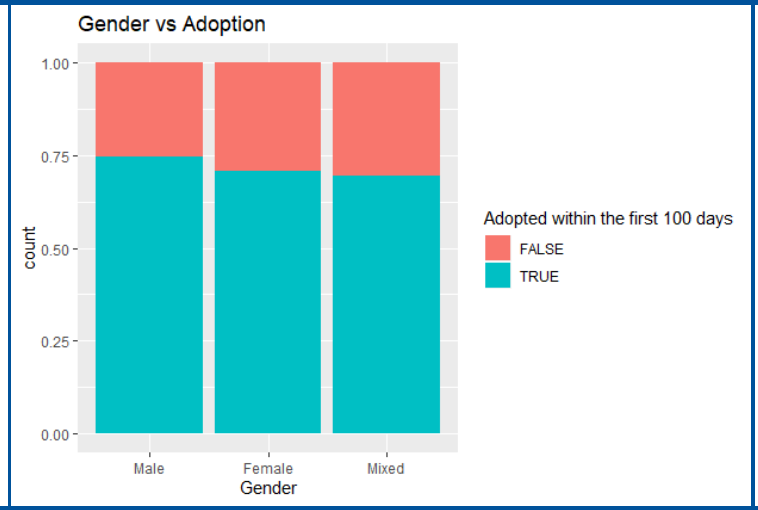
Exploratory Data Analysis

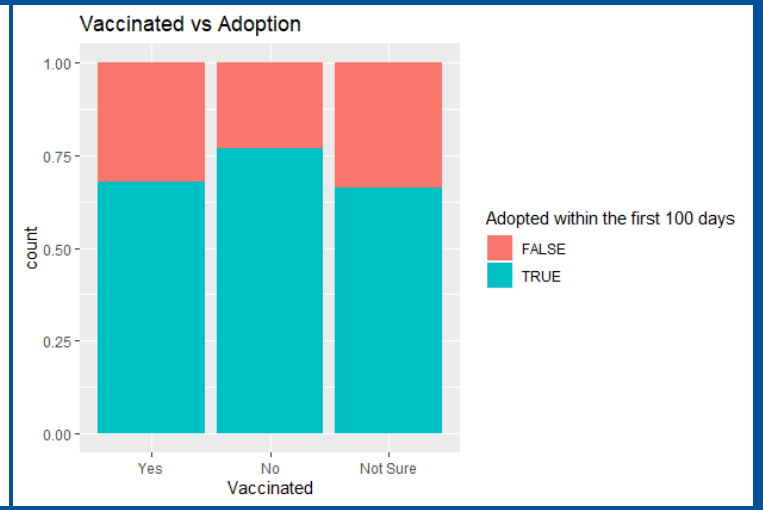












Model: Logistic regression

- Main significant results:

Variable	Type of Change	Effect on likelihood of being adopted within 100 days
Age	A shift in the life stage (Puppy, Junior, Mature, Senior)	↓
Group	If the listing is a group of pets	↓
Free Adoption	If the adoption fee is zero	↑
Has Photos	If the listing has photos	↑
Breed/Color Rarity	The breed and color of the pet is not frequent	↑

Variable	Type of Change	Effect on likelihood of being adopted within 100 days
Type	Being a Cat	↑
Gender	Being a female	↓
Multicolor	If the pet has more than one color	↑
Description Length	Higher number of characters in the listing description	↑
Number of rescues	Rescues made by the listing creator	↑

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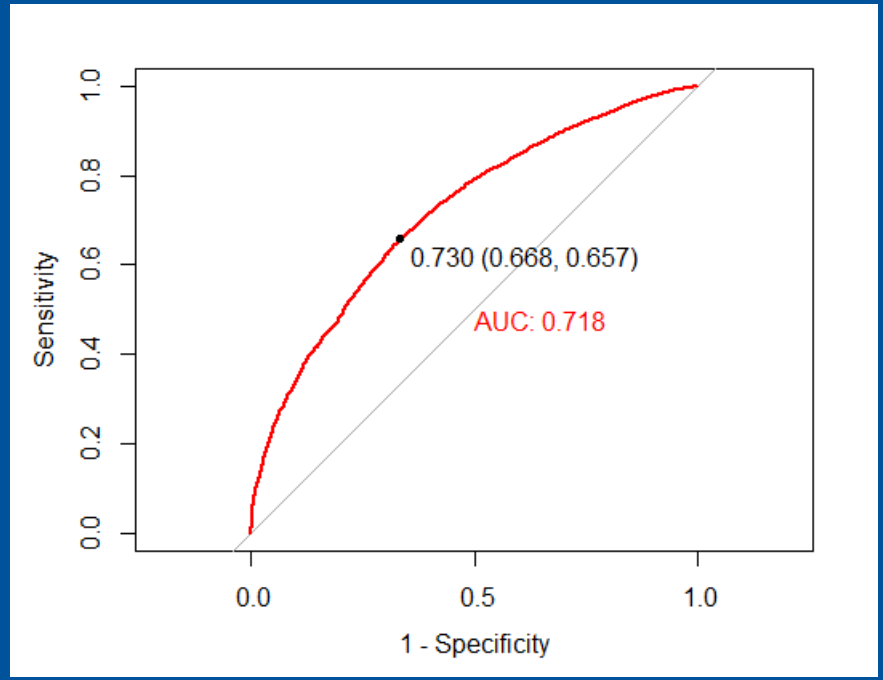
Model: Logistic regression

- Baseline: 44 variables
- Backward BIC Stepwise selection: 14 variables:
  - Age
  - Group
  - FreeAdoption
  - HasPhotos
  - PrimaryColor
  - Type
  - Gender
  - MaturitySize
  - FurLength
  - Sterilized
  - Multicolor
  - Breed/Color Rarity
  - DescriptionLength
  - NumRescues
- CV Accuracy: 74.05%



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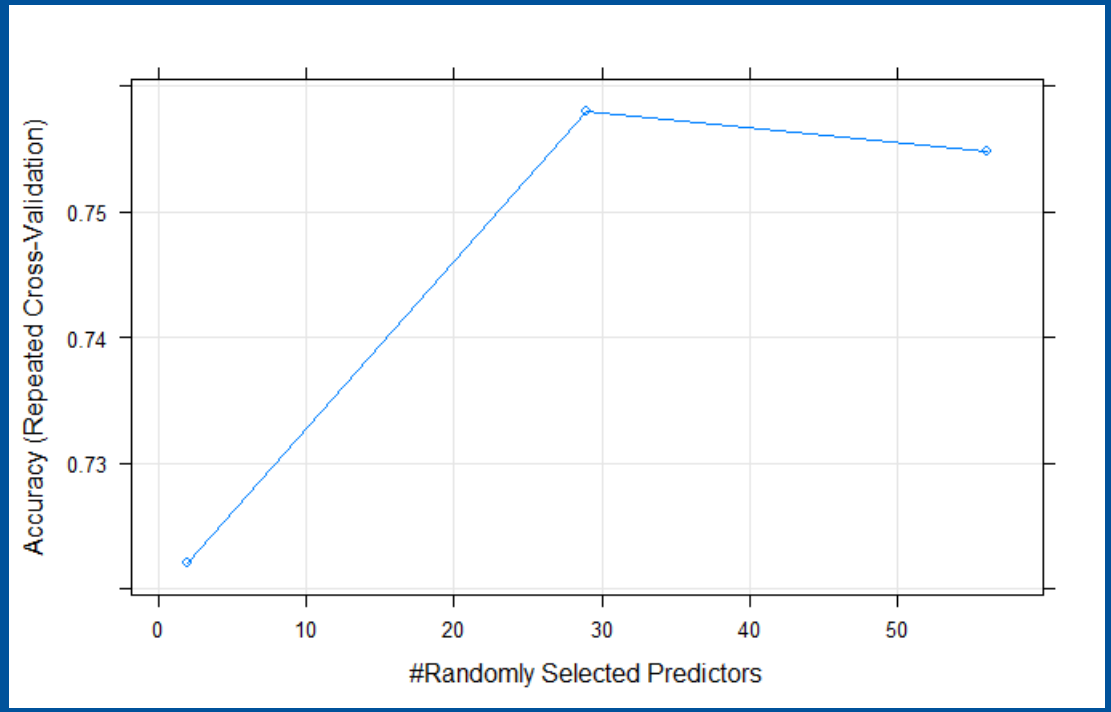
Model: Random Forest

- Repeated CV accuracy: 75.8%
- Random Variables selected for each tree: 29 (out of 42)
- Number of trees: 500



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Conclusions & Action Items

- To increase the owner-pet match the listings should require to upload a picture
- The system should not allow the creation of Group listings, instead, there should be created a separate listing for each pet
- Zero adoption fee should be implemented for pets that have a lower likelihood of being adopted within 100 days
- The rescuers should be motivated to write longer descriptions to increase the chances of adoption for the pet
- Experienced rescuers could play a role in the adoption of unusual pets

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Thank you!

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