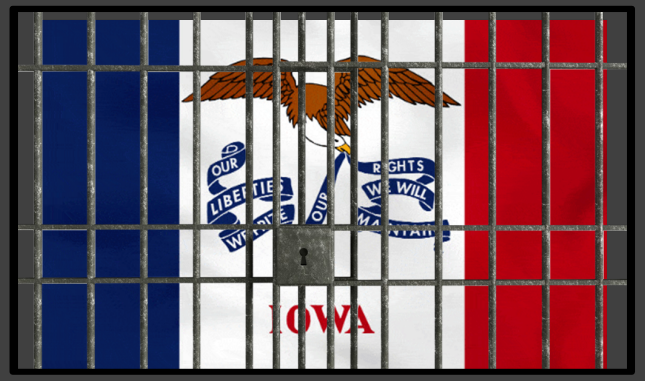
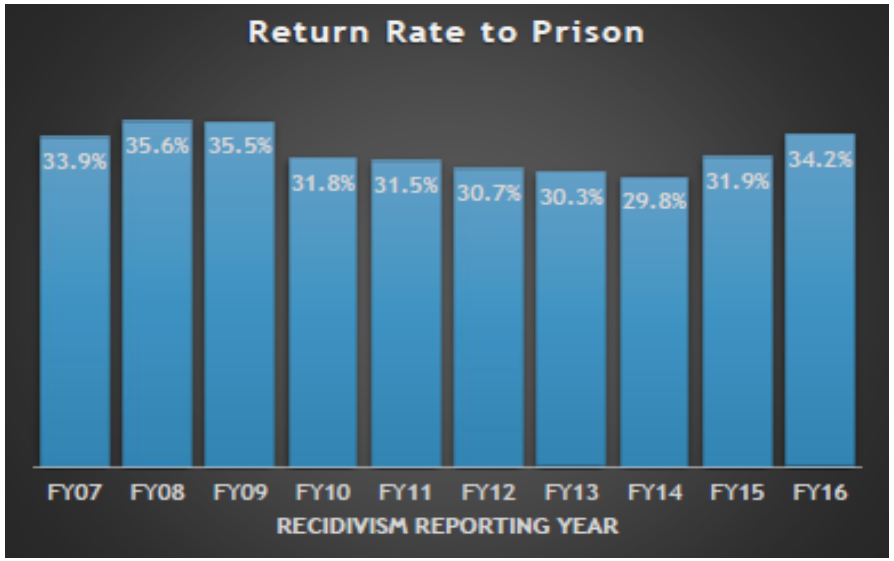
Using Machine Learning to Predict Which of Iowa's Prisoners Will Return to Crime

James M. Irving, Ph.D.

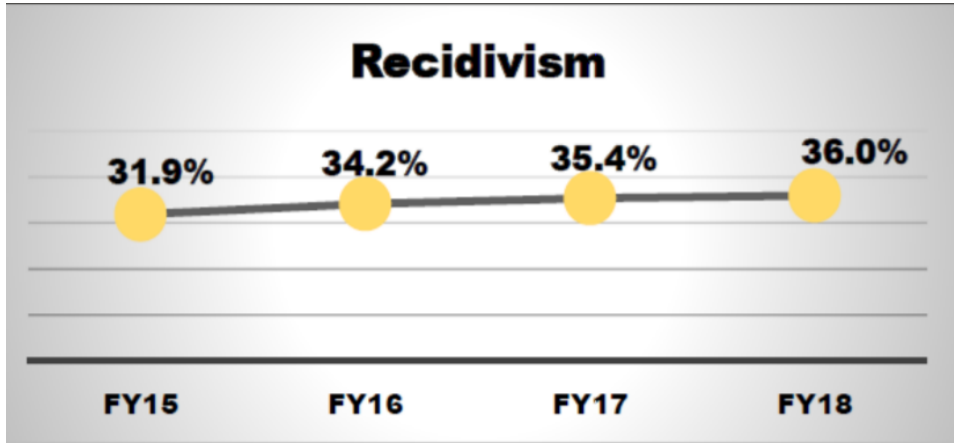


- By 2015, nearly 1/3 of all released prisoners from Iowa were returning to crime.
- In 2015, US Dept. of Justice gave Iowa $3M Grant to help reduce
- However recidivism rates continue to climb (36% 2018).

IOWA'S RECIDIVISM PROBLEM



From: https://doc.iowa.gov/data/prison-recidivism-fy2016



Excerpt form IOWA Dept of Corrections Annual Report - 2018

Can we use data describing Iowa's released prisoners to predict *which* prisoners will return to a life of crime?

FUNDAMENTAL QUESTION

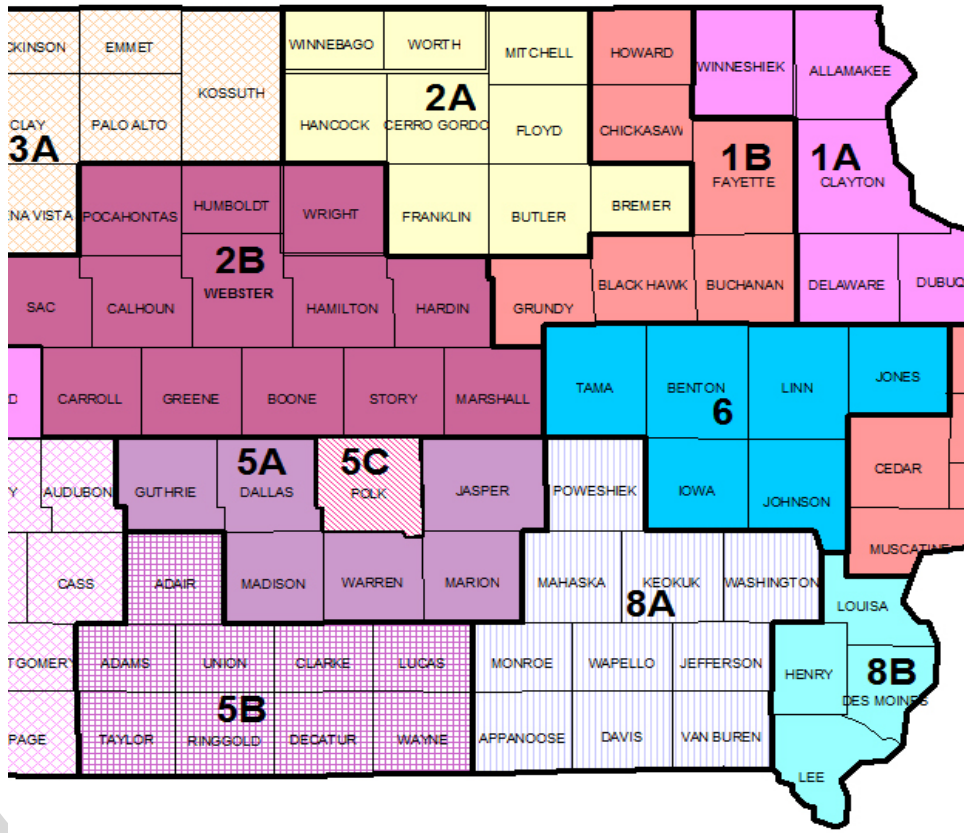
Data Source:
Iowa Dept. of Corrections

Features Analyzed:

- Convicting Offense Classification
- Convicting Offense Type
- Convicting Offense Subtype
- Release Type
- Main Supervising Judicial District

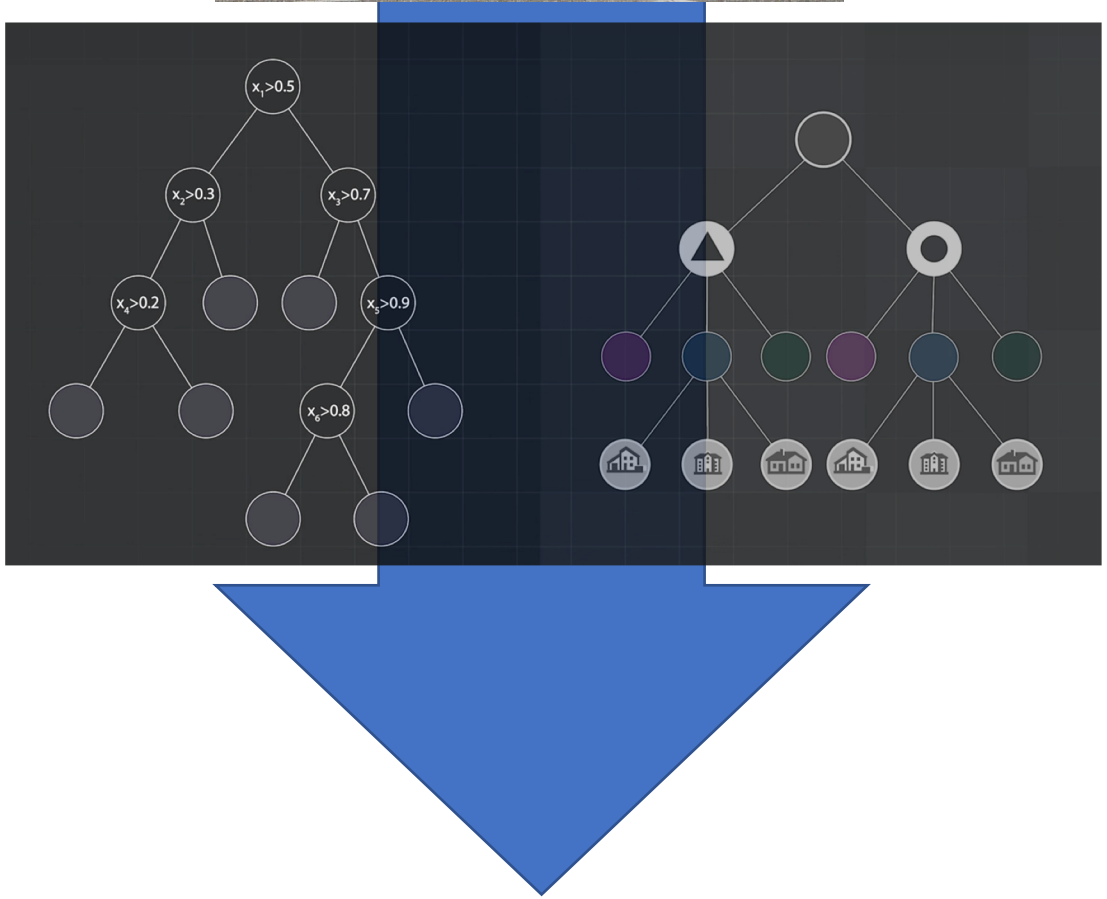
- Race - Ethnicity
- Part of Target Population

- Fiscal Year Released
- Recidivism Reporting Year



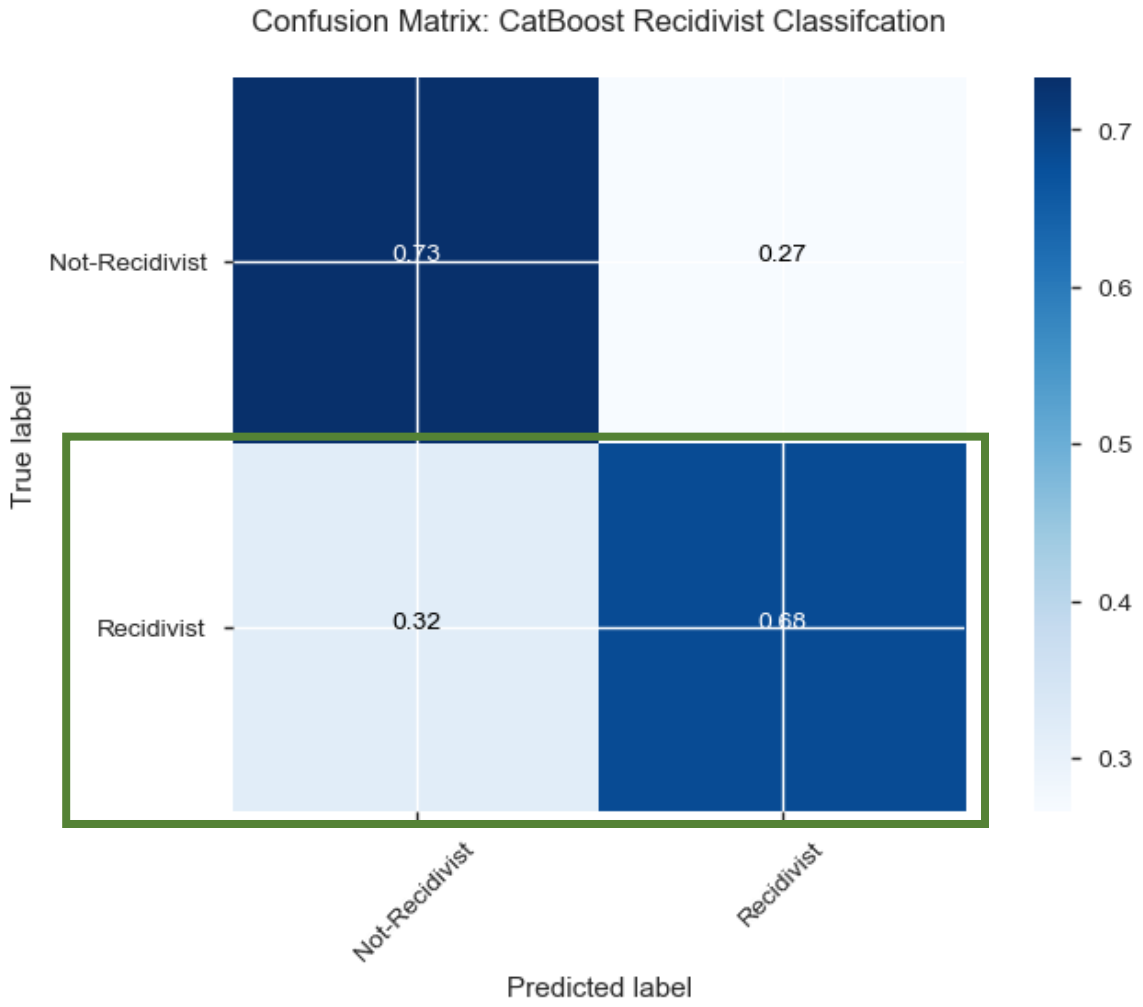
OUR MODEL FOR PREDICTING IOWA'S PRISONER- RECIDIVISM

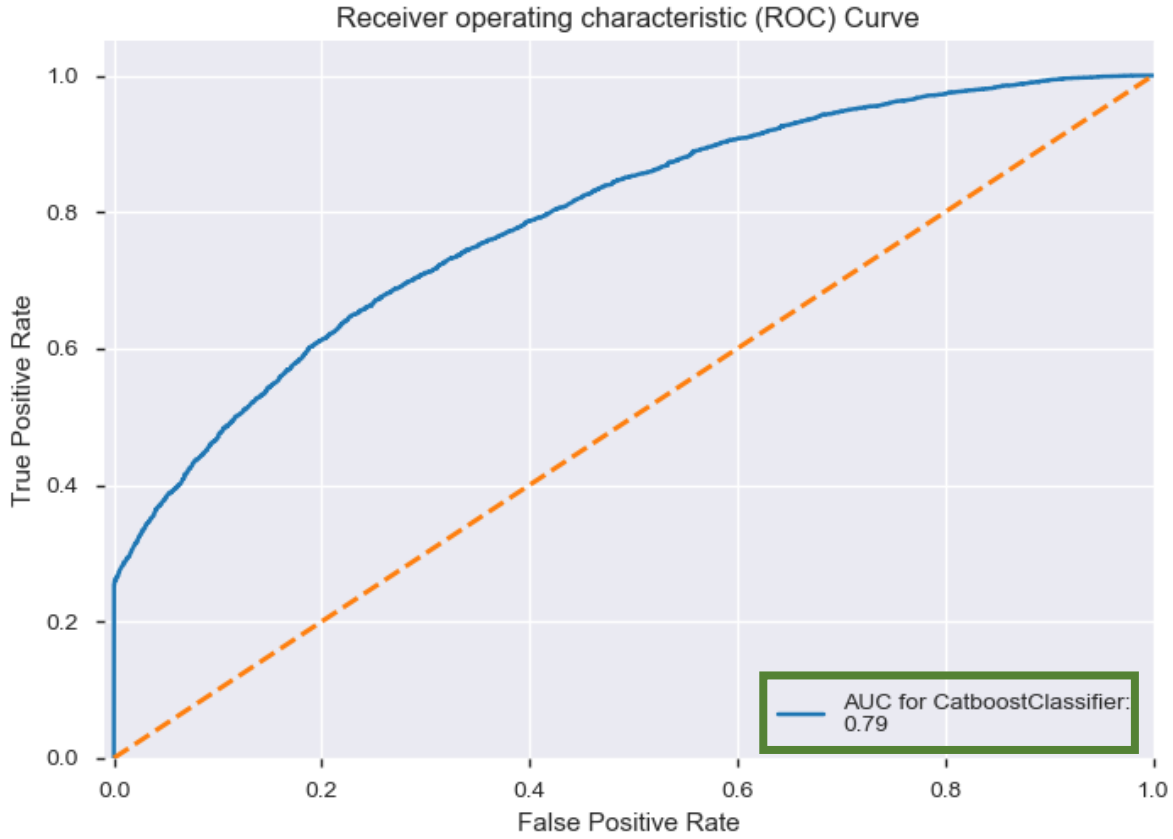
- Used Next-Generation Algorithms
  - Tree-based classification to find critical points in prisoner data.
- <u>Our Model Performance:</u>
  - 70% Accuracy
  - 72% Precision
  - 0.79 AUC (random chance=0.50)



RECIDIVIST NON-RECIDIVIST

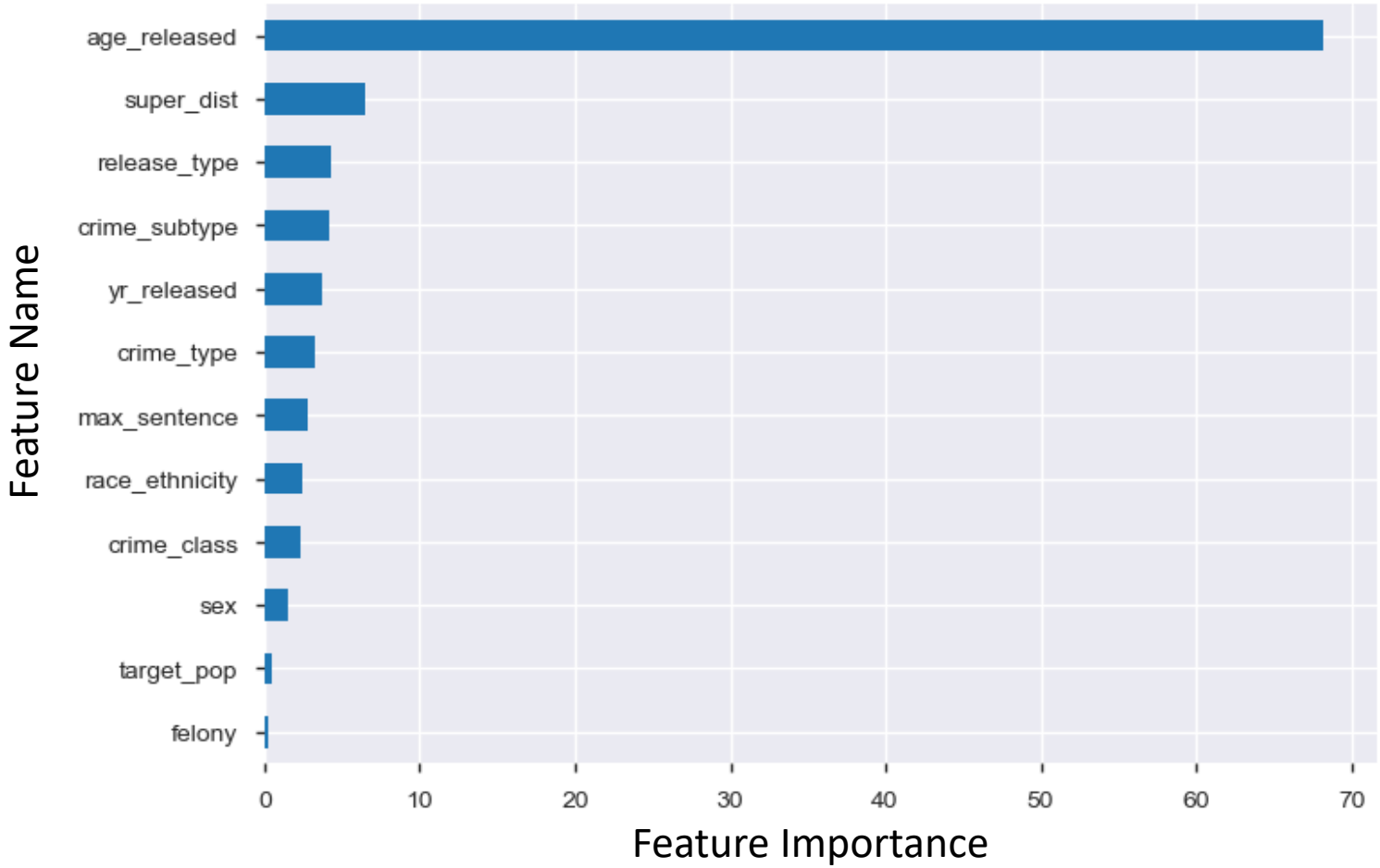
Classification Model Performance



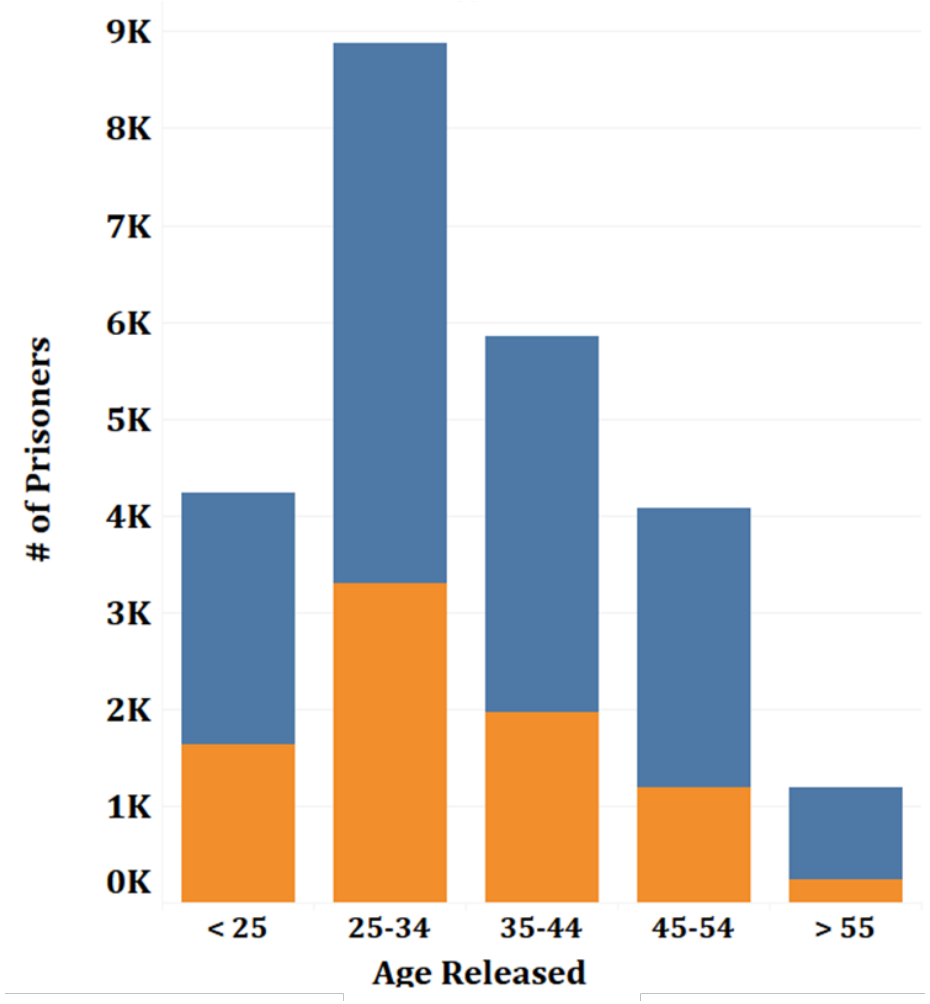


Important Features in Predicting Recidivism

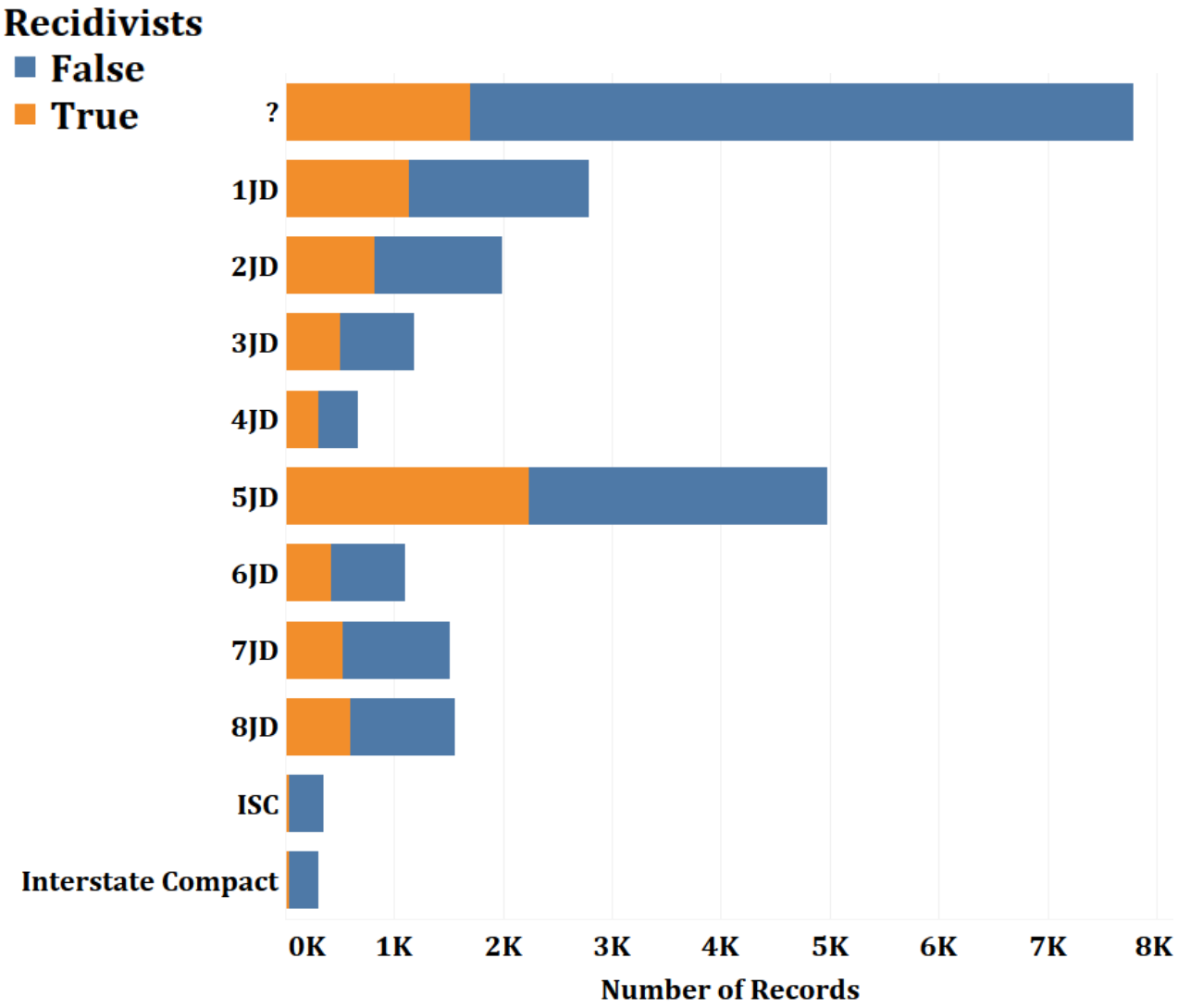
1. Age-At-Release
2. Supervising Judicial District
3. Type of Release
4. Crime Subtypes



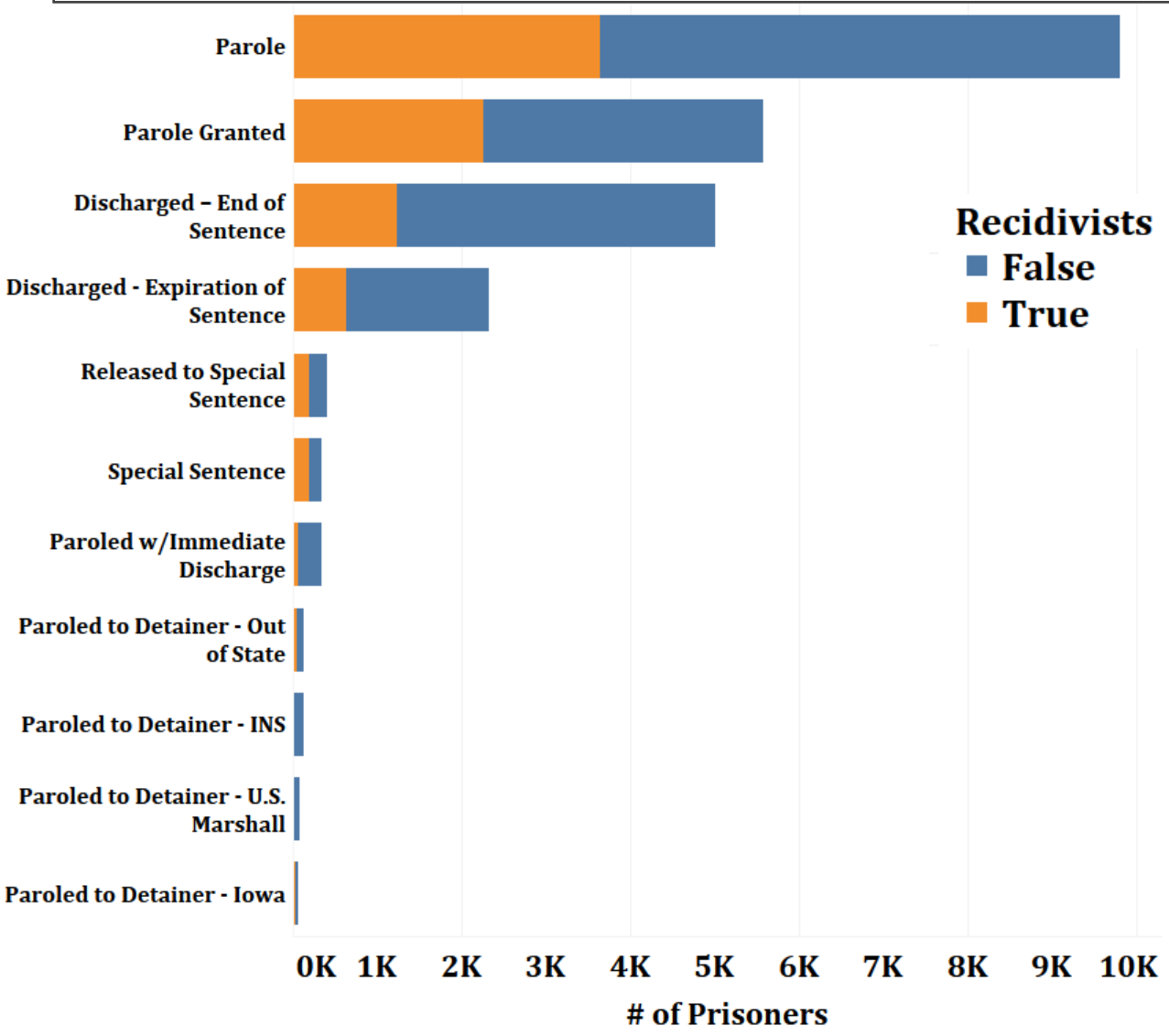
#1) Age at Release



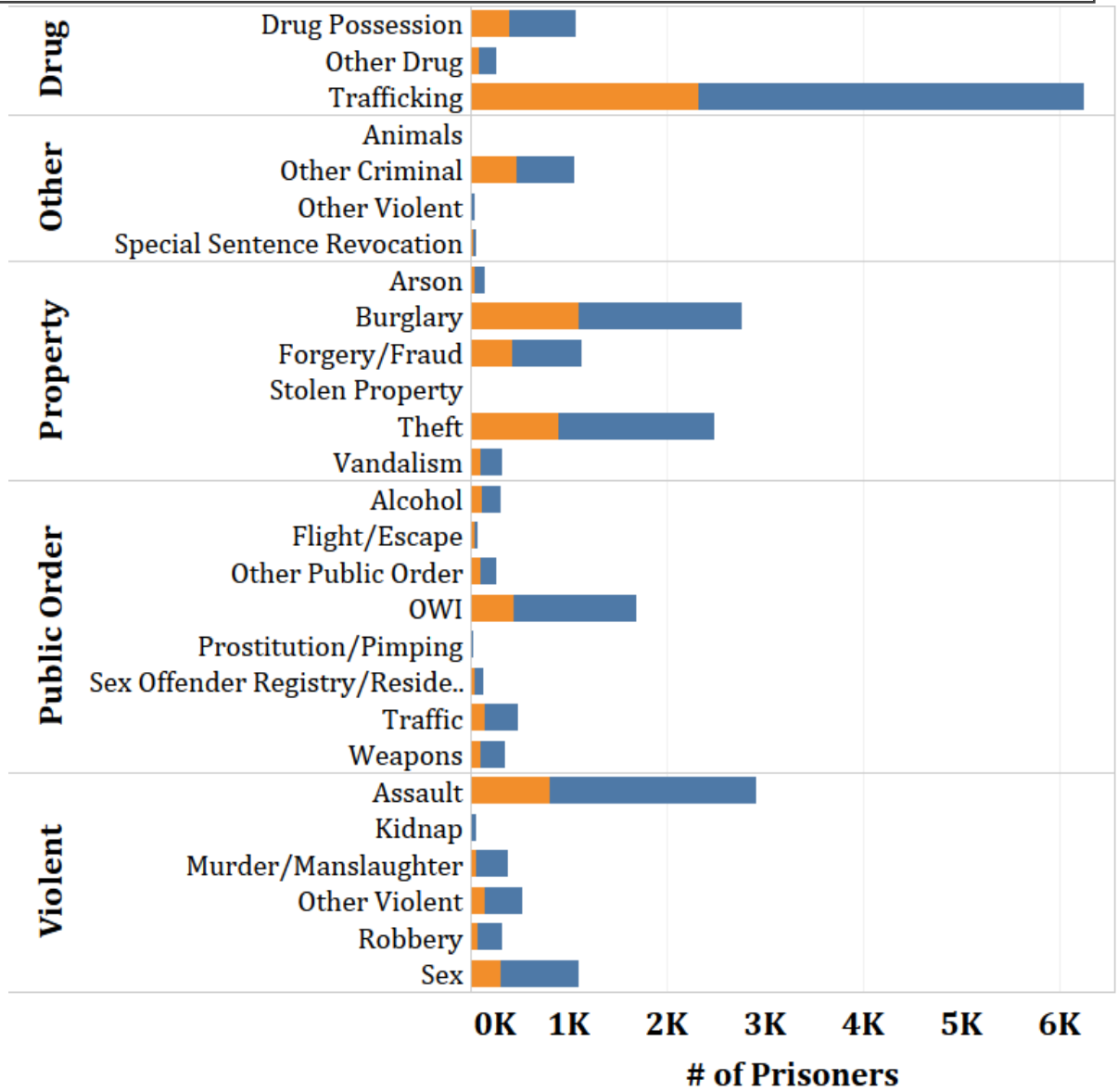
#2) Judicial District



#3) Release Type



#4) Crime Type-Subtypes



Conclusions & Recommendations

- Using our model,
  Iowa Department of corrections can predict which prisoners may become recidivist.
- Using this information, Iowa can **implement pre-release educational programs** to target at-risk prisoners.
- Following release, Iowa could also **provide post-release support and intervention** to at-risk prisoners.

THANK YOU

- Michael Moravetz – Collaborator
- Flatiron School – Data Science Bootcamp
  - Brandon Lewis – Instructor
  - Jeff Herman – Advisor
- CatBoost Machine Learning Package
  - Superior Modeling with categorical data.