

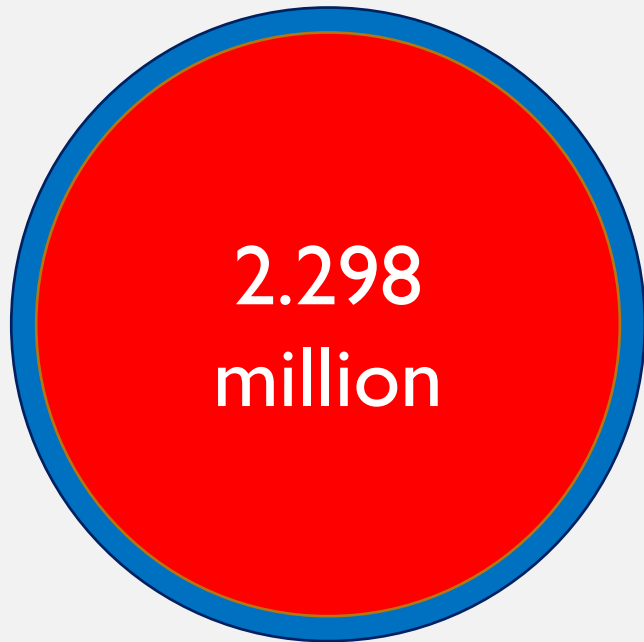
PREDICTING PRISON RECIDIVISM WITH SUPERVISED LEARNING MODELS

Max Barry

February 13, 2019



Incarcerated
Population Metro Chicago
Population of US



Ex-Offenders Released
from Prison
Population of Portland



650,000 p/yr

2 out of 3 of whom will
go back to prison

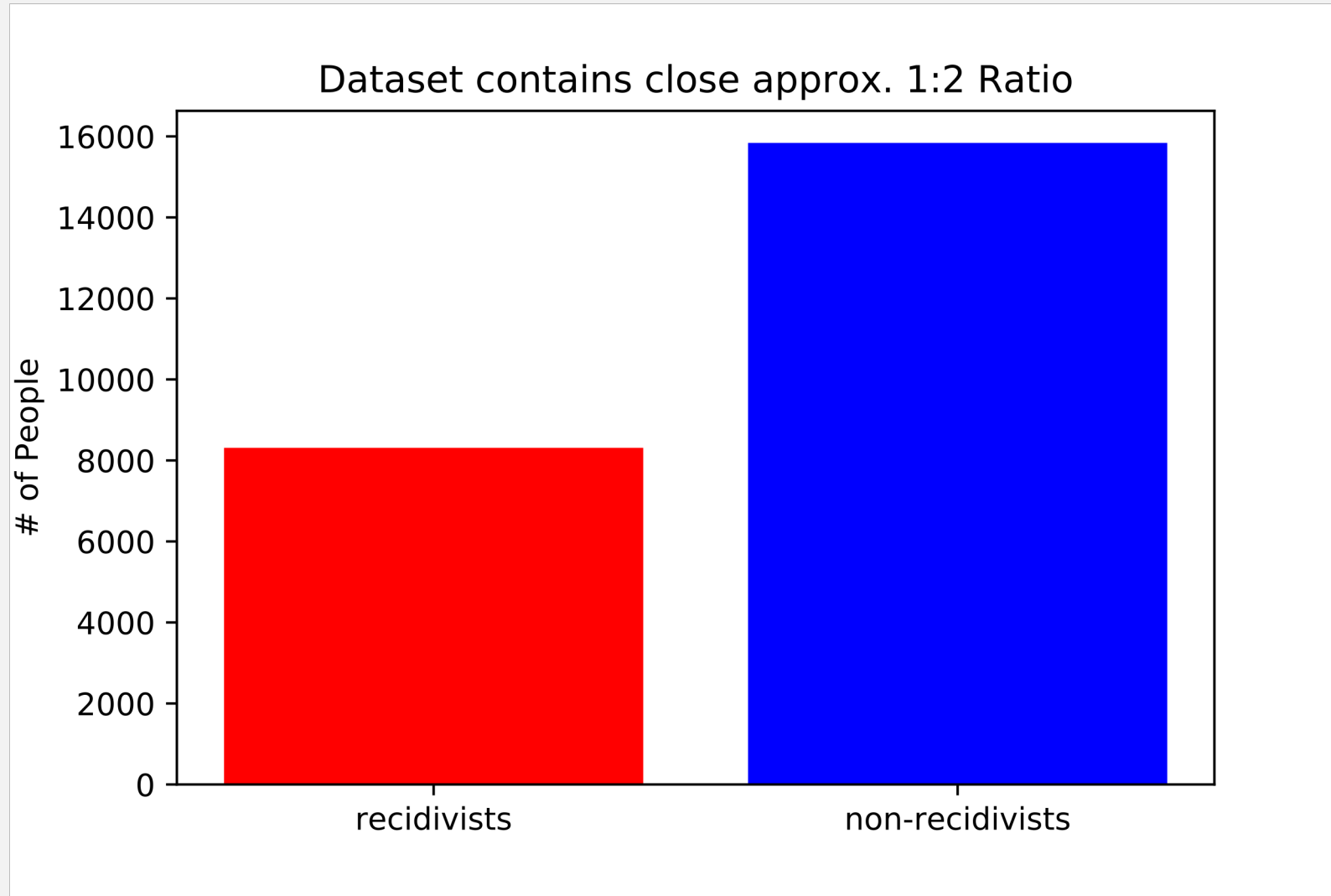
IOWA DATA SET

26,020

rows of data

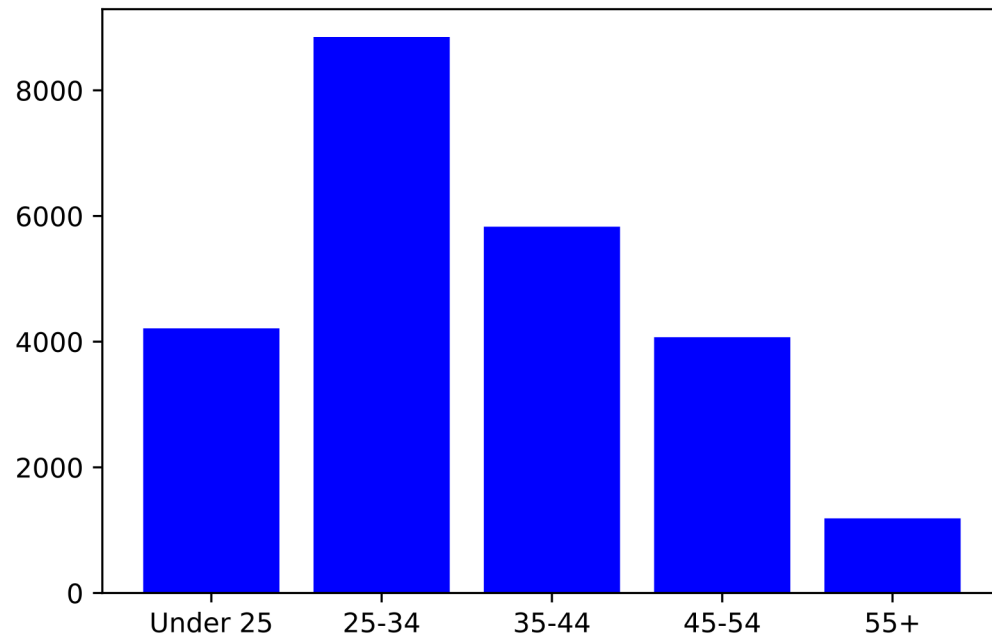


RECIDIVISM IN THE DATASET

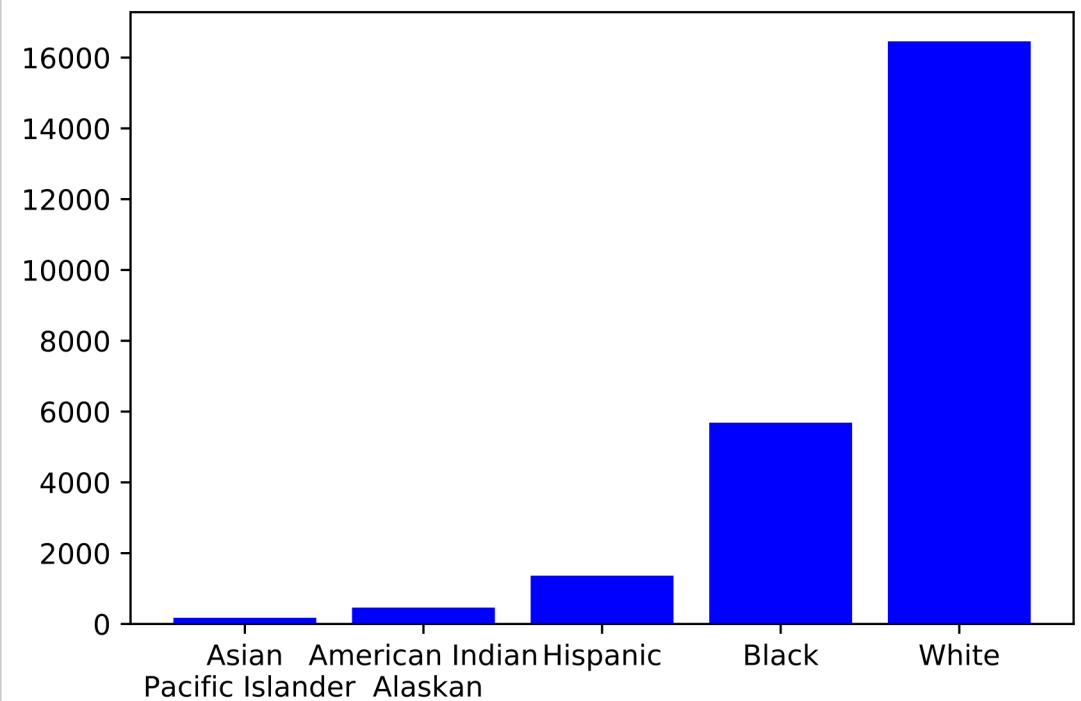


AGE AND RACE DISTRIBUTION

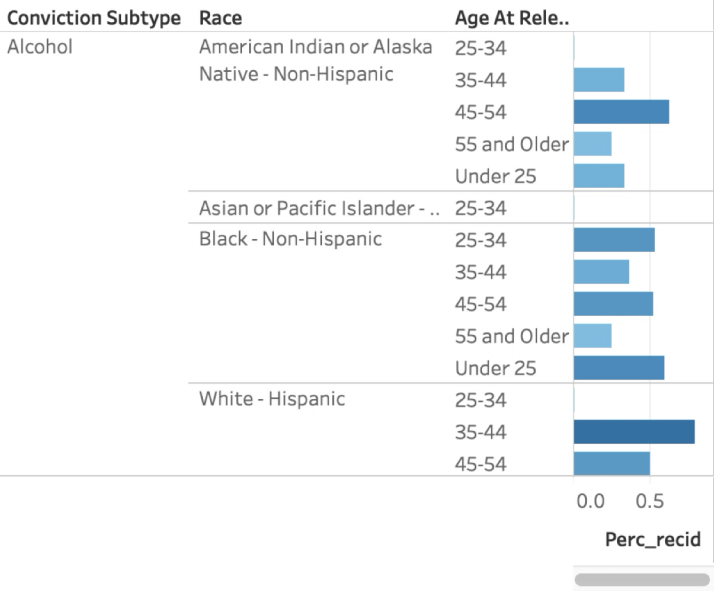
Age Distribution of Dataset



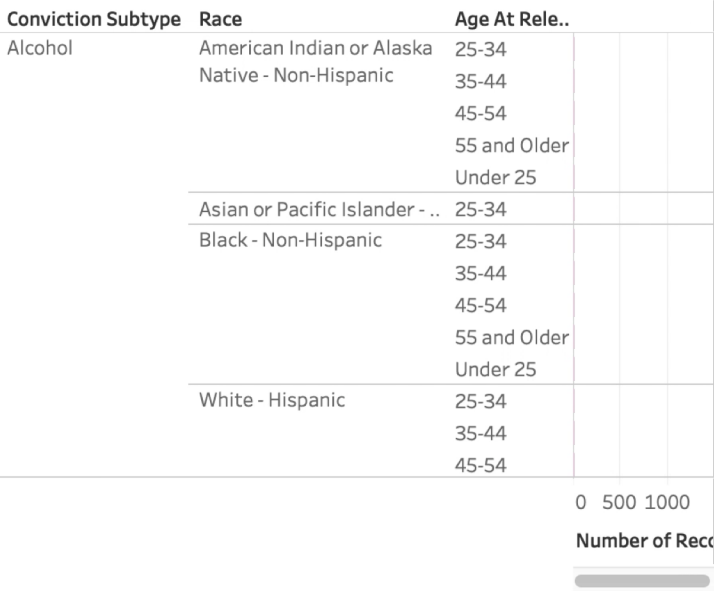
Racial Distribution of Dataset



Percent Recidivism



Number of Records



- Age At Release
- ☒ (All)
 - ☒ Null
 - ☒ 25-34
 - ☒ 35-44
 - ☒ 45-54
 - ☒ 55 and Older
 - ☒ Under 25
- Conviction Subtype
- ☒ (All)
 - ☒ Alcohol
 - ☒ Animals
 - ☒ Arson
 - ☒ Assault
 - ☒ Burglary
 - ☒ Drug Possession
 - ☒ Flight/Escape
 - ☒ Forgery/Fraud
 - ☒ Kidnap
 - ☒ Murder/Manslaugh...
 - ☒ Other Criminal
 - ☒ Other Drug
 - ☒ Other Public Order
 - ☒ Other Violent
 - ☒ OWI
 - ☒ Prostitution/Pimping
 - ☒ Robbery
 - ☒ Sex
 - ☒ Sex Offender Regis...
- Race
- ☒ (All)
 - ☒ Null
 - ☒ American Indian or ...
 - ☒ American Indian or ...
 - ☒ Asian or Pacific Isla...
 - ☒ Asian or Pacific Isla...
 - ☒ Black -
 - ☒ Black - Hispanic
 - ☒ Black - Non-Hispanic
 - ☒ N/A -
 - ☒ White -
 - ☒ White - Hispanic
 - ☒ White - Non-Hispanic

BEST PERFORMING MODELS

Random Forest

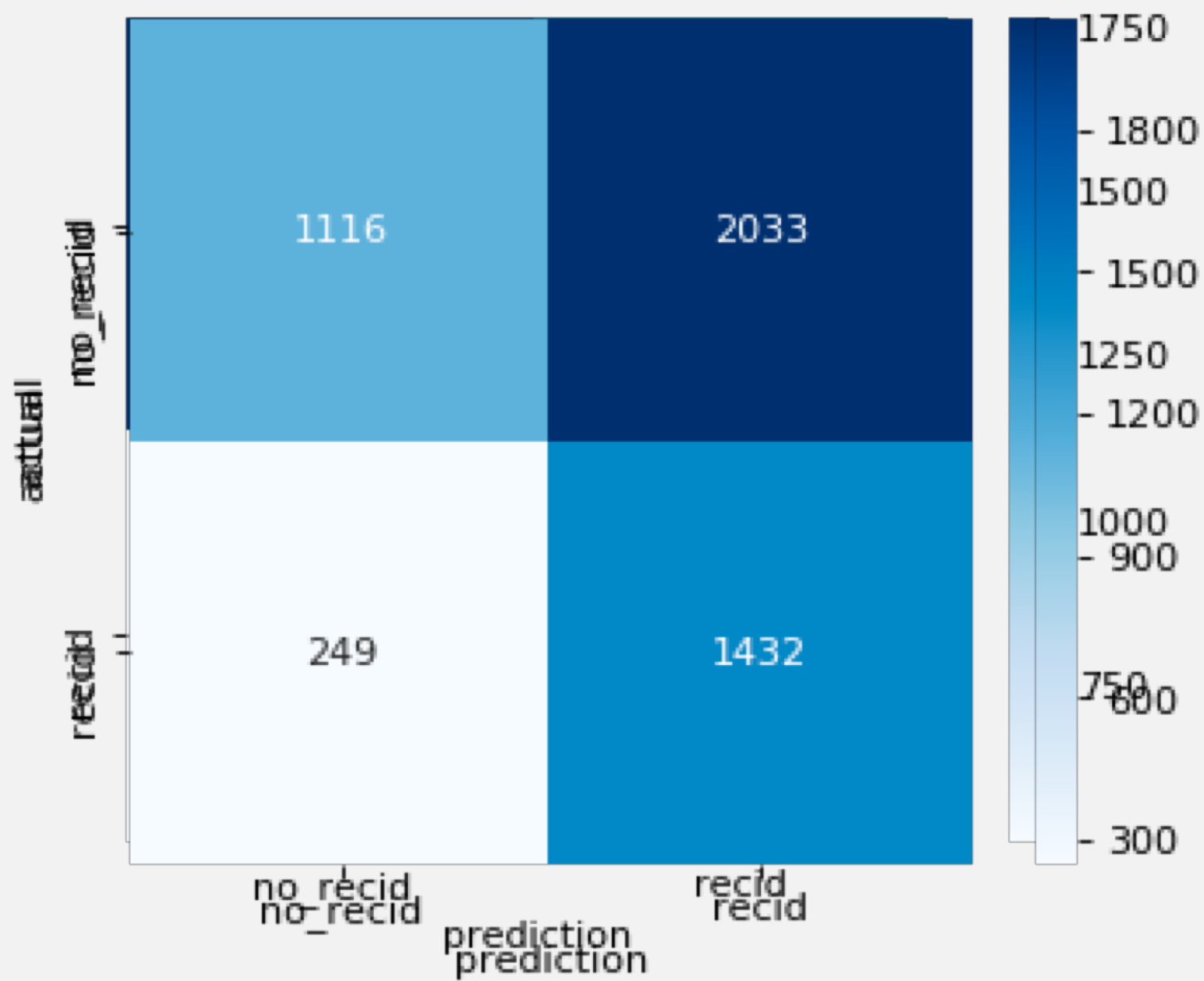
Max Depth 8
roc_auc = .654

Logistic

C = 1.21
roc_auc = .669

Naïve-Bayes
(Bernouli)

roc_auc = .646



MOST IMPORTANT FEATURES

<u>Race</u>	<u>Age</u>	<u>Offense Subtype</u>
Hispanic	55 and older	Murder
Black	25-34	Assault
White	45-54	Sex

CONCLUSIONS

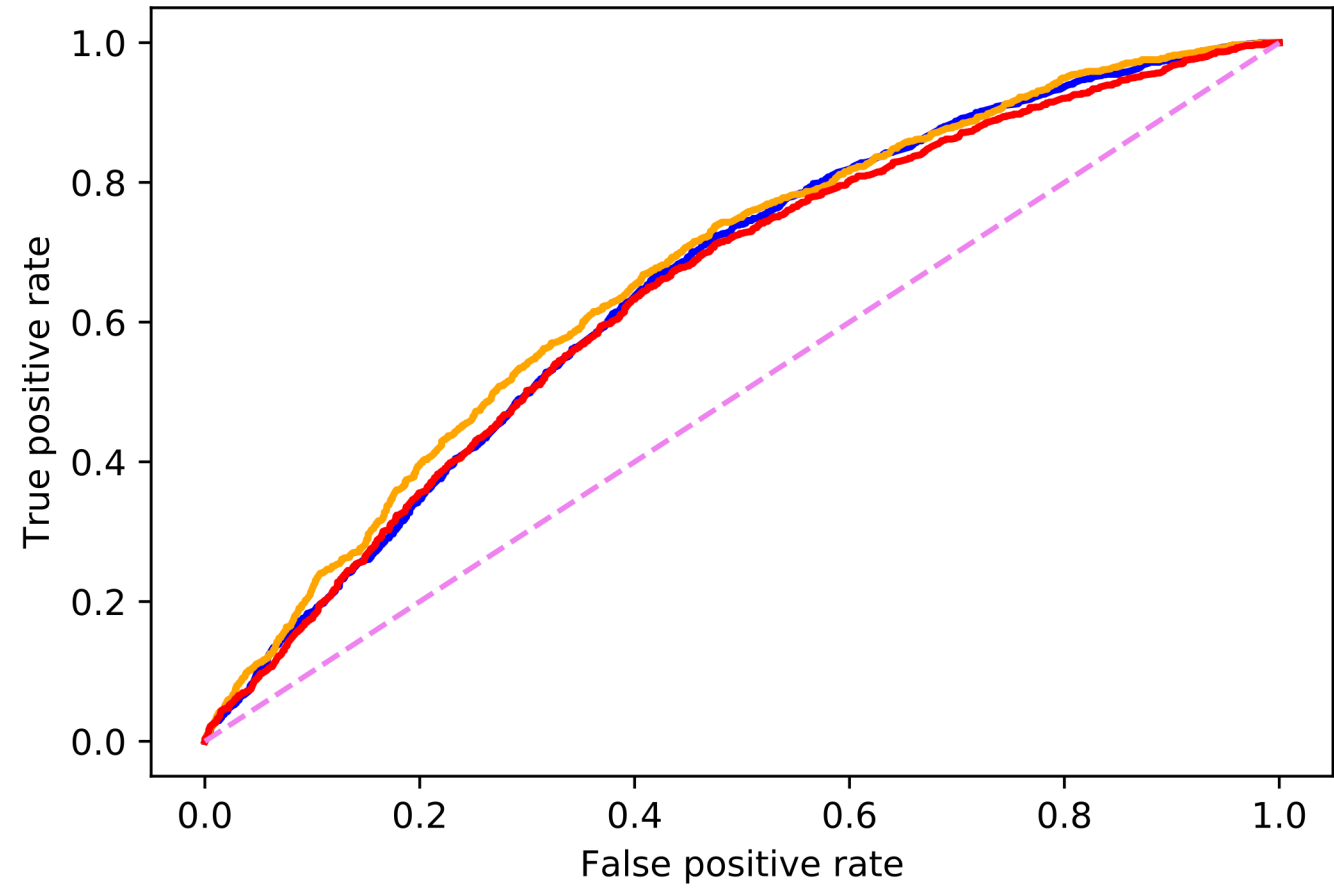
Increase attention on:

- Violent offenders
- Black and white populations
- Fifth Judicial District
- Ages 25-34 and 45-54

FUTURE WORK

- More data from different states
- Look at the effect of prison programs: education, art, re-entry assistance
- Compare private prison

ROC curve for Recidivism



APPENDIX

),
('convicting_type_Violent', 0.03479034565604832),
('release_type_Discharged – End of Sentence', 0.0467081817202875),
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conviction_subtype_Murder/Manslaughter 0.01615808716695809
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conviction_subtype_Sex 0.011277773505339381
conviction_subtype_OWI 0.009323779685884775
conviction_subtype_Burglary 0.008065651912288505
conviction_subtype_Other Criminal 0.006954823083670453
conviction_subtype_Kidnap 0.004488567654634593
conviction_subtype_Alcohol 0.004456767538388503
conviction_subtype_Traffic 0.00432762834360309
conviction_subtype_Other Violent 0.004095889550283228