For a Better Criminal Justice System: Analyzing Recidivism and Prison Populations in the US

Connor Pate

Incarceration Reform Addresses

POVERTY

Percent of people with 2 or more arrests per year who have incomes below $10,000: 49%. Who are unemployed: 15%.

HOUSING INSECURITY

Rate of homelessness or housing insecurity among formerly incarcerated people: 5,700 per 100,000.

COST

The US government spends nearly $81 dollars annually on public correction agencies.

Sources:
Prison Policy Initiative, J Correct Health Care

Project Overview

Build a classification model to predict inmate recidivism.

Analyze Iowa's recidivism demographics.

Track and explore recidivism across Iowa's prison population in 3 year increments from 2010 to 2018.

A Look at the Numbers

"47% percent of people released in 2005 were re-arrested
within 3 years."
- US Department of Justice, Bureau of Justice Statistics

"The US locks up more people than per capita than any other nation,
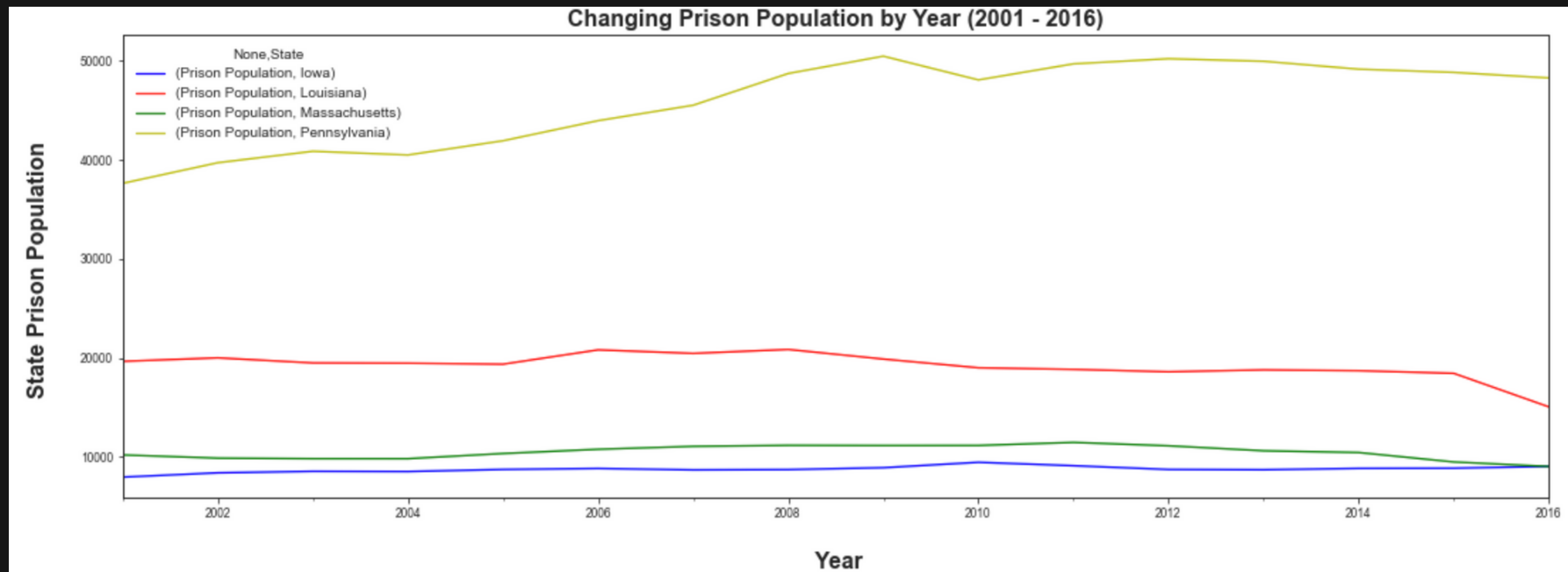at the staggering rate of 698 per 100,000 residents."
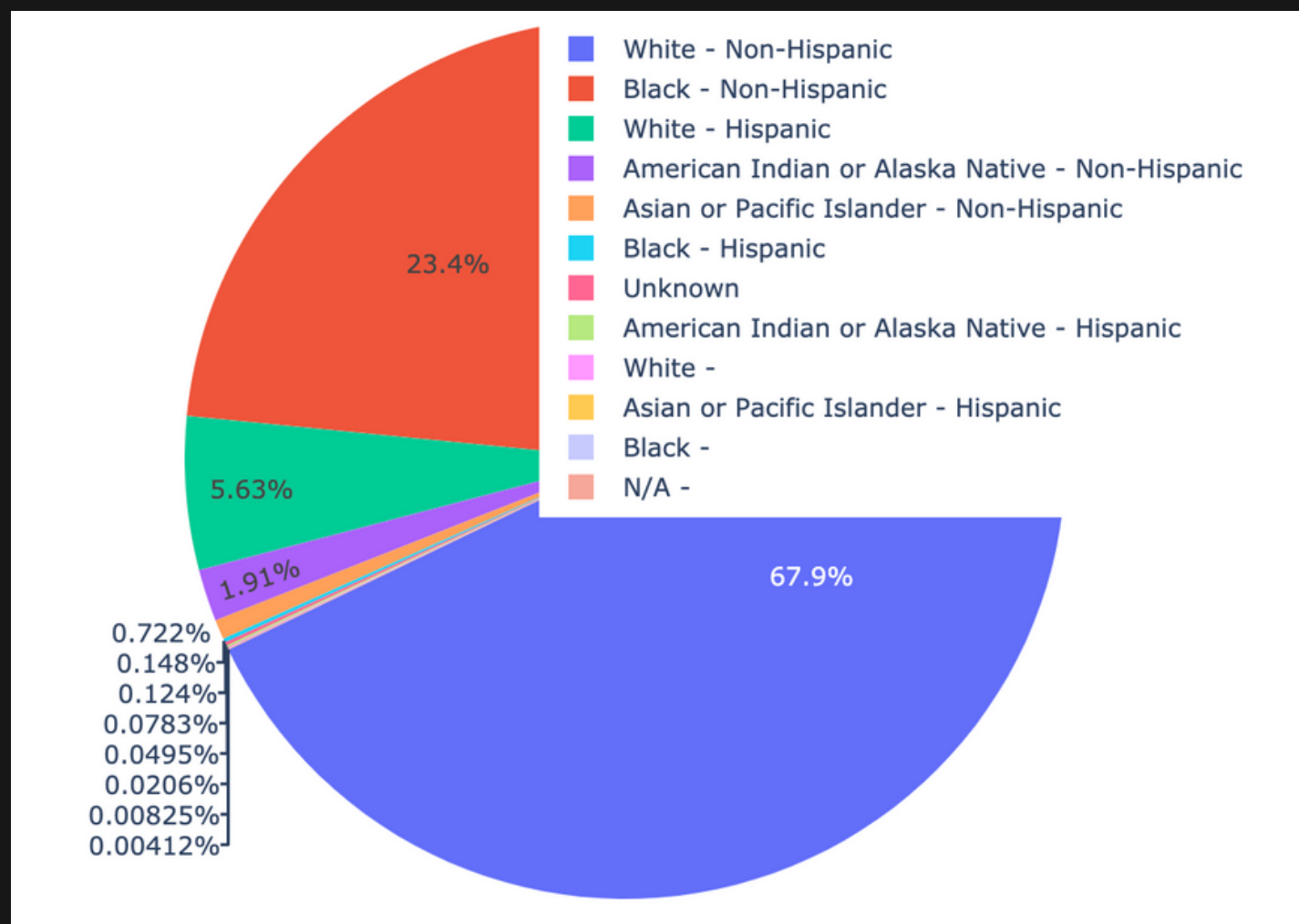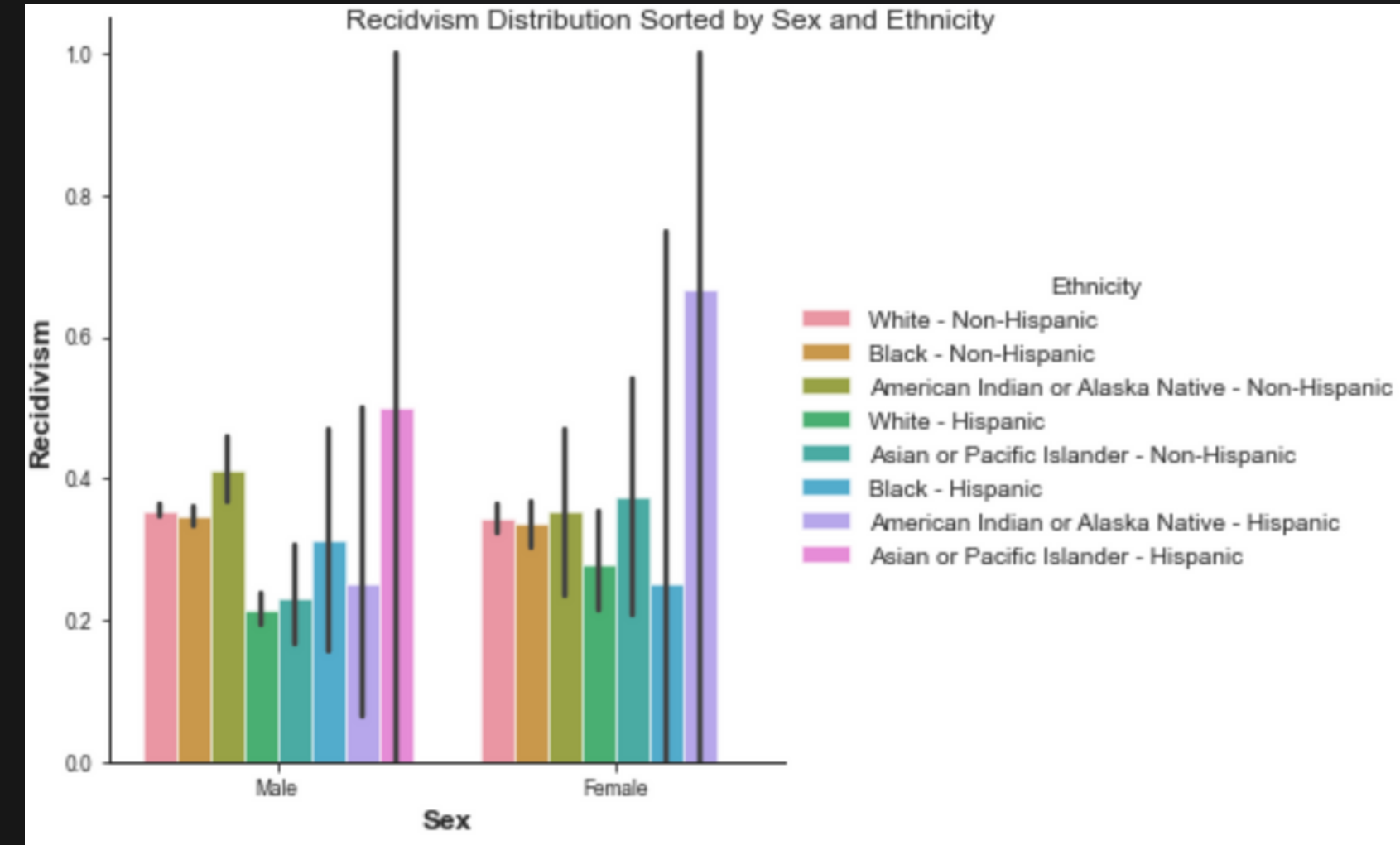- Prison Policy Initiative

Iowa vs. the Nation

According to The Sentencing Project's analysis of state incarceration populations:
- Louisiana ranks 1st with 680 imprisoned per 100k.
- Pennsylvania ranks 25th with 355 per 100k.
- Iowa ranks 35th with 293 per 100k.
- Massachusetts ranks 50th with 133 per 100k.

As of May 2021, Iowa is one of the few states providing incarceration records and recidivism rates.

Changing Prison Population by Year (2001 - 2016)

Non-Returned v. Returned

Recidivism Distribution Sorted by Sex and Ethnicity
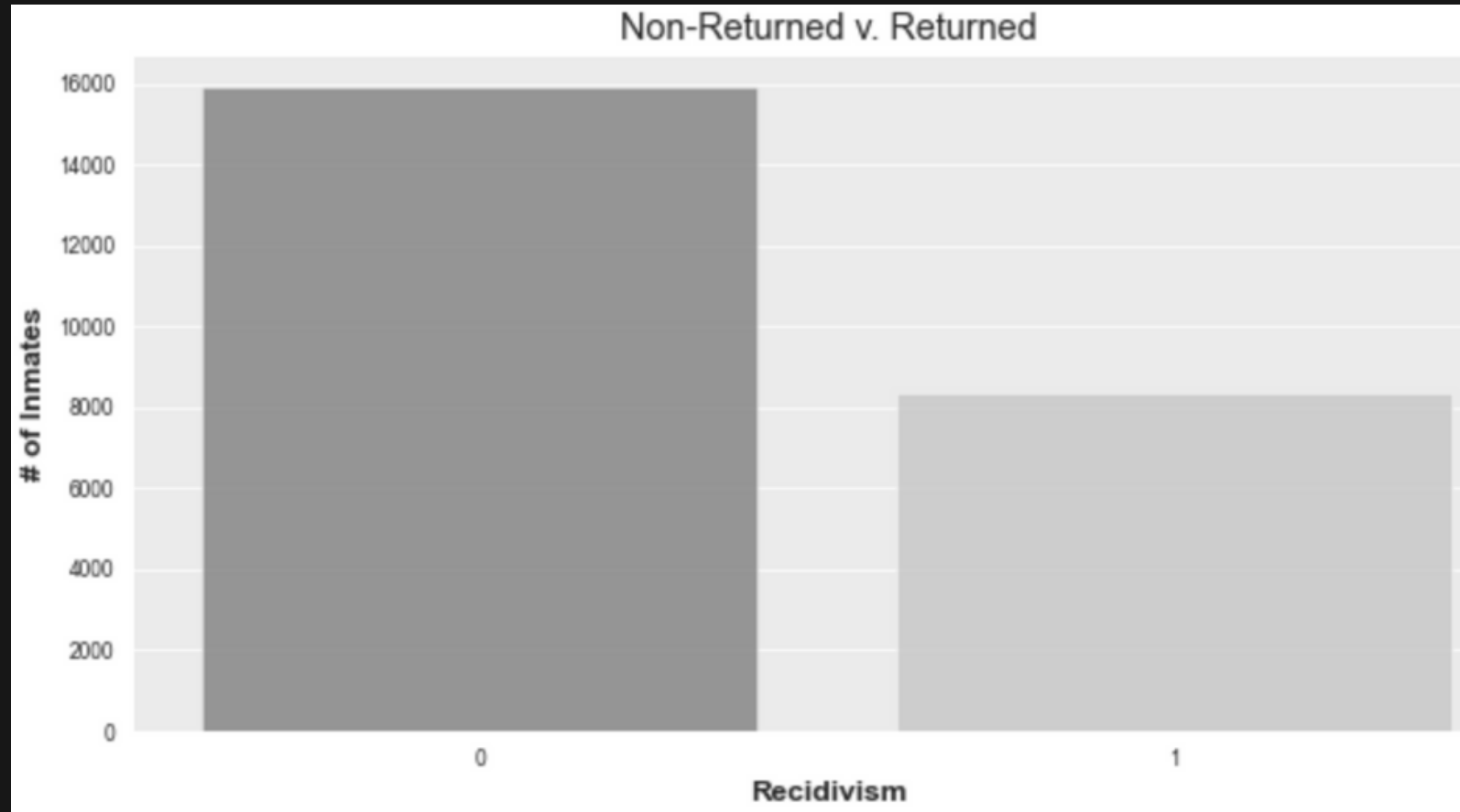

RECIDIVISM STATISTICS

Out of the over 26,000 inmates in Iowa's detention centers (2010-2018), nearly 1/3 returned to prison (8,330).

ETHNICITY DISTRIBUTION

The majority (67.9%) of those incarcerated in Iowa between 2010 and 2018 were White, Non-Hispanic, however minorities return at a similar or increased rate compaared to White inmates.

Iowa -Demographics and recidivism #1
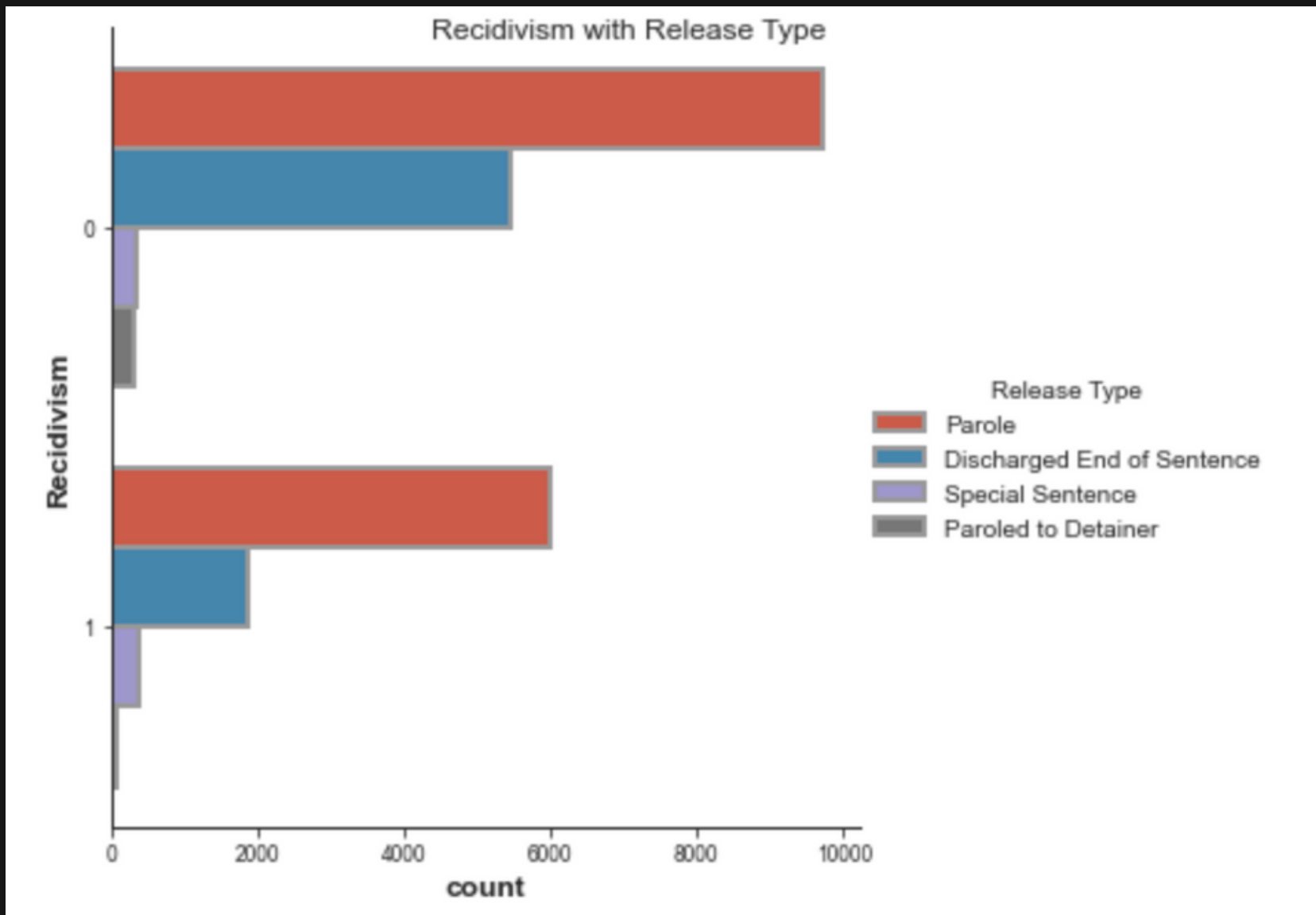
RELEASE TYPE

Parolees show a significantly
higher rate of return than
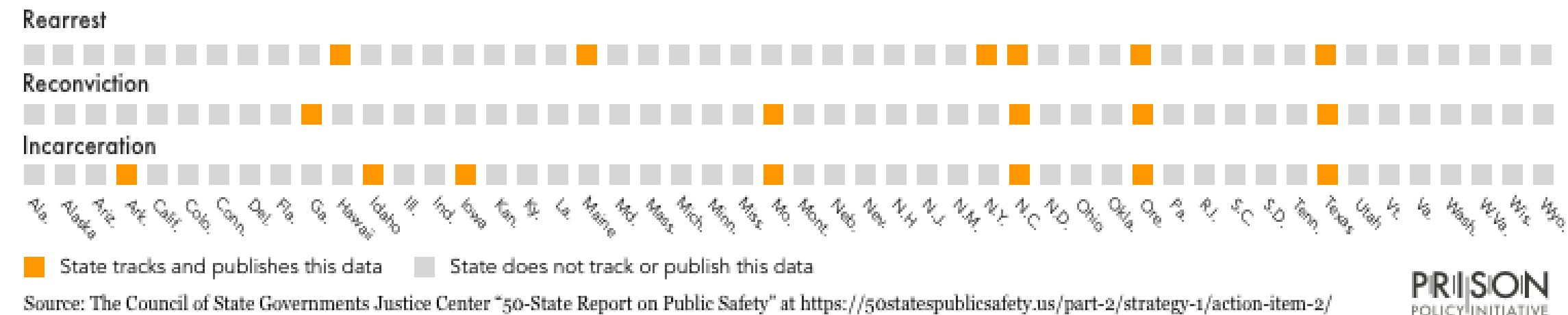other release types.
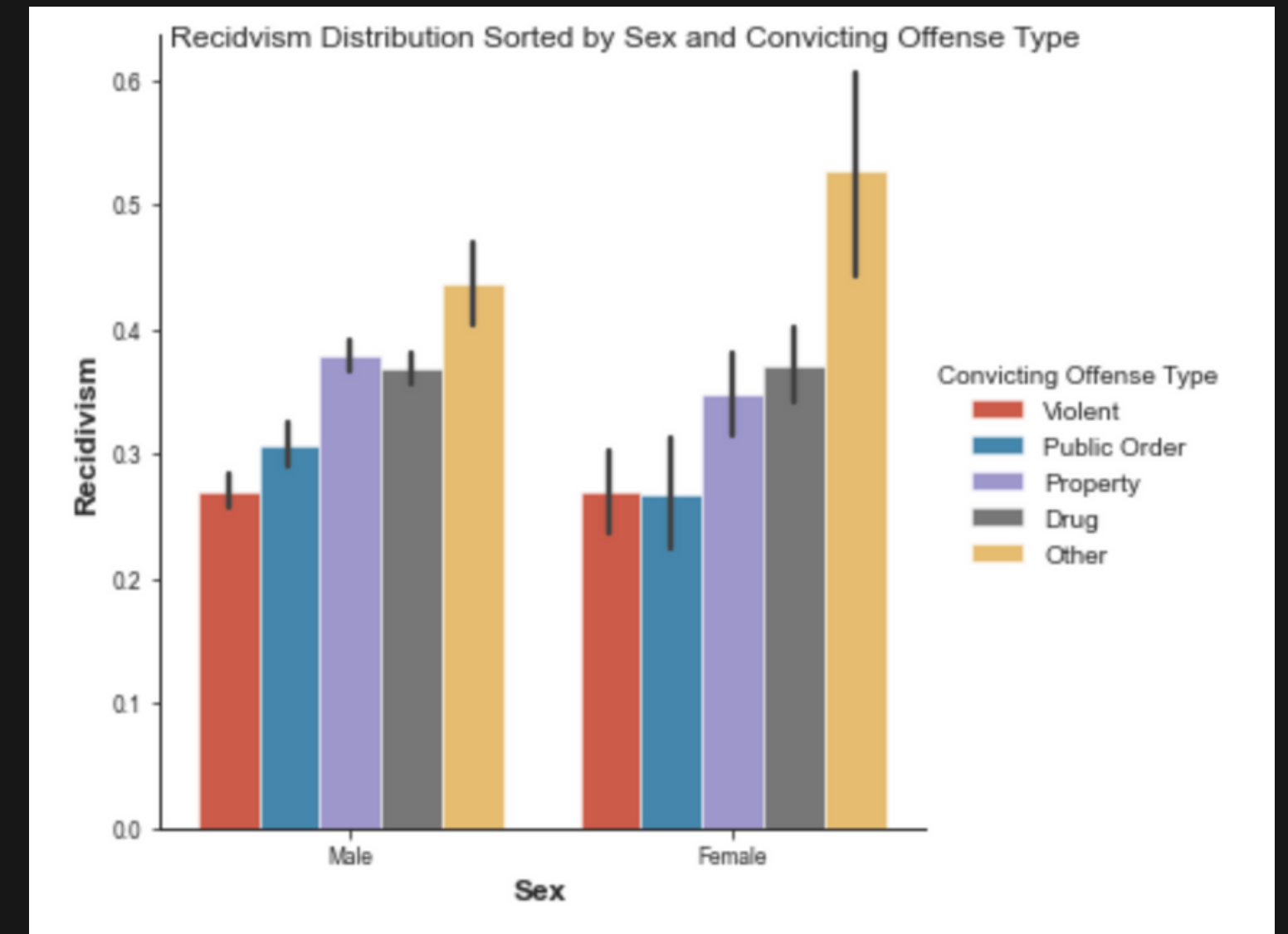
SEX AND OFFENSE

Property and drug charges
show the highest rates of
recidivism.
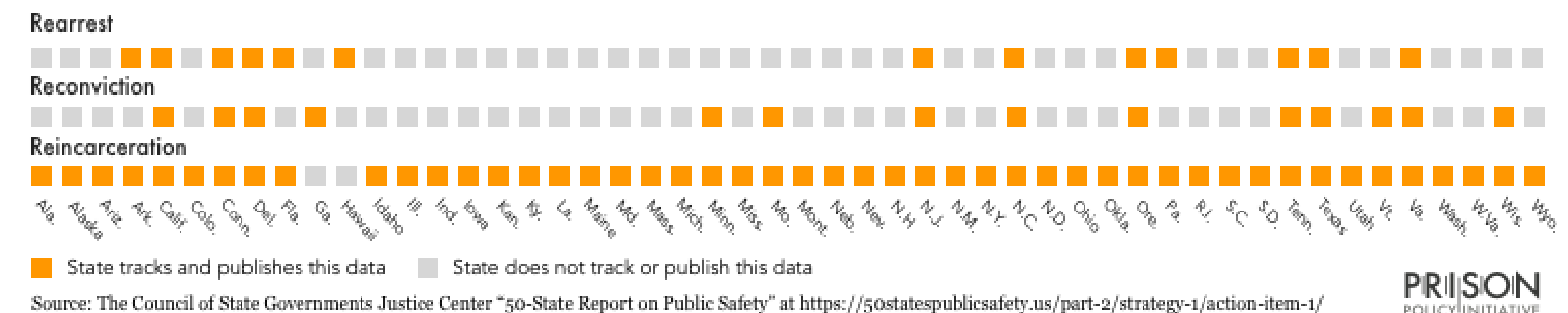
Iowa -Demographics and
recidivism #2

A Note on Data

As the Prison Policy Initiative notes, the amount of states publishing complete recidivism data is inconsistent at best and incomplete at worst.

States publishing recidivism information, unfortunately, do not include the same demographics, making national analysis near impossible.

Very few states track and publish any recidivism data for people on probation

Rearrest

Reconviction

Incarceration

Ala. Alaska Ariz. Ark. Calif. Colo. Conn. Del. Fla. Ga. Hawaii Idaho Ill. Ind. Iowa Kan. Ky. La. Maine Md. Mass. Mich. Minn. Miss. Mo. Mont. Neb. Nev. N.H. N.J. N.M. N.Y. N.C. N.D. Ohio Okla. Ore. Pa. R.I. S.C. S.D. Tenn. Texas Utah Vt. Va. Wash. W.Va. Wis. Wyo.

◼ State tracks and publishes this data   ◻ State does not track or publish this data

Source: The Council of State Governments Justice Center "50-State Report on Public Safety" at https://50statespublicsafety.us/part-2/strategy-1/action-item-2/

PRISON POLICY INITIATIVE

Most states track and publish just one measure of post-release recidivism

Rearrest

Reconviction

Reincarceration

Ala. Alaska Ariz. Ark. Calif. Colo. Conn. Del. Fla. Ga. Hawaii Idaho Ill. Ind. Iowa Kan. Ky. La. Maine Md. Mass. Mich. Minn. Miss. Mo. Mont. Neb. Nev. N.H. N.J. N.M. N.Y. N.C. N.D. Ohio Okla. Ore. Pa. R.I. S.C. S.D. Tenn. Texas Utah Vt. Va. Wash. W.Va. Wis. Wyo.

◼ State tracks and publishes this data   ◻ State does not track or publish this data

Source: The Council of State Governments Justice Center "50-State Report on Public Safety" at https://50statespublicsafety.us/part-2/strategy-1/action-item-1/

PRISON POLICY INITIATIVE

METHOD

Prepare data for a supervised, binary classification task, recidivism being the target, demographics and attributes being the features.

MODEL IMPLEMENTATION

Use a variety of classification models (e.g., Decision Trees, Random Forest, SVC, etc.) to filter recidivism among Iowa's prison populataion.

MODEL ANALYSIS

Analyze given metrics for model selection, focusing on precision and recall.
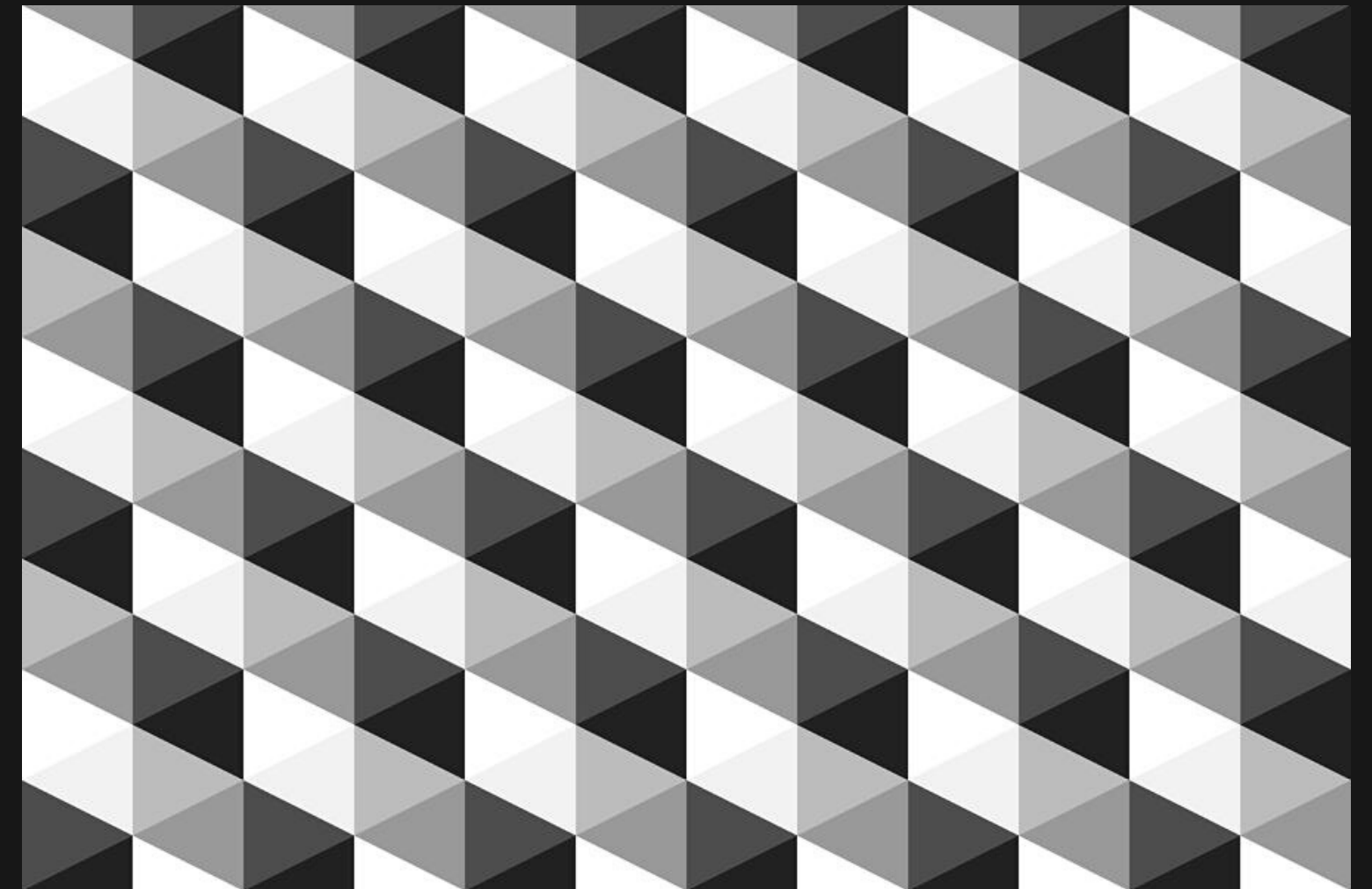
Classification Modeling

63%

OUR ATTEMPT IS TO IDENTIFY AS MANY RECIDIVISTS AS POSSIBLE - IMAGINE A LARGE NET CATCHING FISH

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LinearSVC with SMOTE and Feature Selection


Confusion Matrix
[[1782 1385]
 [ 616 1059]]
--------------------------------------------------------------------------------
Classification Report
              precision    recall  f1-score   support

           0       0.74      0.56      0.64      3167
           1       0.43      0.63      0.51      1675

    accuracy                           0.59      4842
   macro avg       0.59      0.60      0.58      4842
weighted avg       0.64      0.59      0.60      4842


--------------------------------------------------------------------------------
Accuracy 58.67 %
Accuracy on training set: 0.602
Accuracy on test set: 0.587


=== All AUC Scores ===
0.632030270676512


=== Mean AUC Score ===
Mean AUC Score - LinearSVC with SMOTE, Gridsearch and Feature Selection:  0.632030270676512
```

Recommendations

RELEASE TYPE

Parolees and those on probation necessitate further attention, allowing officers to preempt recidivism or lessen its frequency among those groups.

OFFENSE TYPE

Public correction agencies should work to differentiate types of recidivists: larceny v. assault, drug use v. parole violation, etc.

DEMOGRAPHICS

Effort should be spent on a local level to care for incarcerated communities and their respective demographics, identifying individual needs.

Future Steps

- Improve data collection.
  - We cannot properly care for those in need or provide adequate recommendations if we do not know who is most vulnerable.
- Expand demographic categories.
  - Include LBGTQ representation and differentiation between gender and sex.
- Broaden model use and analysis.
- Expand data collection period.
  - Identify trends across decades and months, assessing seasonality and yearly spikes.

Thank You

Connor Pate