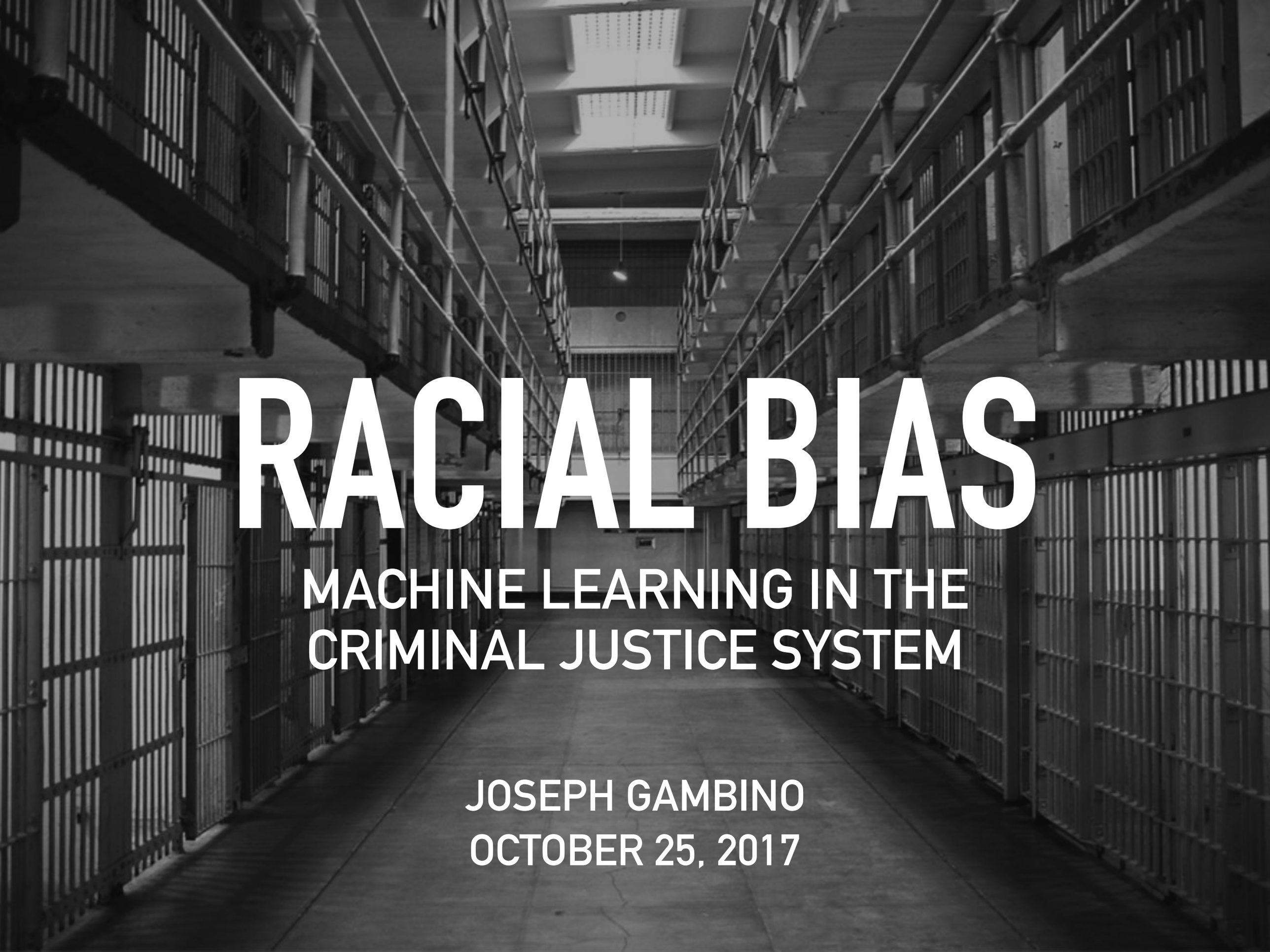


RACIAL BIAS

MACHINE LEARNING IN THE CRIMINAL JUSTICE SYSTEM

JOSEPH GAMBINO

OCTOBER 25, 2017

MACHINE LEARNING IN THE CRIMINAL JUSTICE SYSTEM

RISK OF RECIDIVISM

RISK OF RECIDIVISM

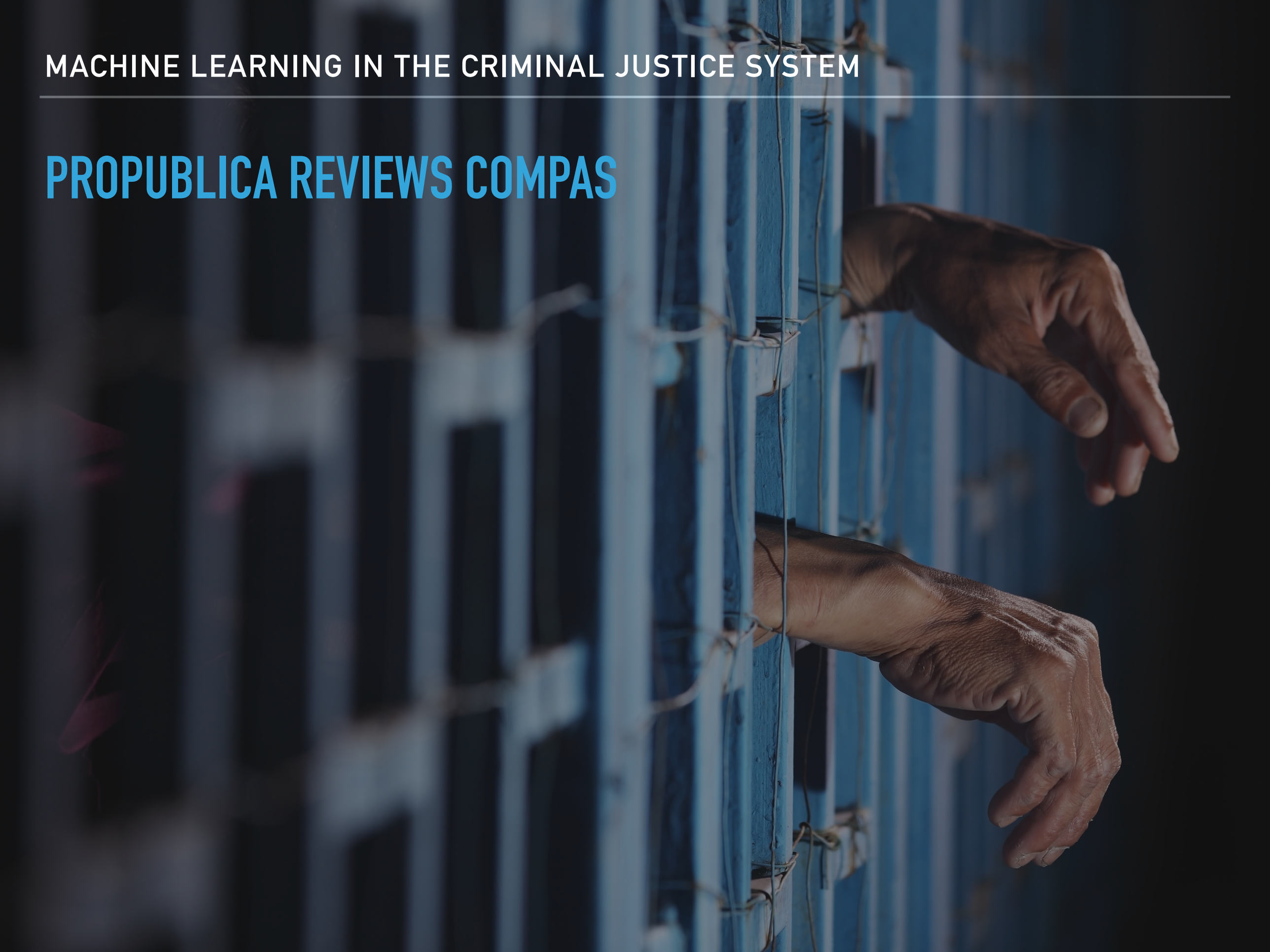
- Risk Assessment

RISK OF RECIDIVISM

- Risk Assessment
- Used at all stages
  - Bail/Bond Hearing
  - Sentencing
  - Release on Parole

MACHINE LEARNING IN THE CRIMINAL JUSTICE SYSTEM

PROPUBLICA REVIEWS COMPAS



PROPUBLICA REVIEWS COMPAS

- Recidivism - 60% accurate
- Violent recidivism - 20% accurate

PROPUBLICA REVIEWS COMPAS

- Recidivism - 60% accurate
- Violent recidivism - 20% accurate
- Black defendants were twice as likely to be mis-labeled as high risk
- White defendants were twice as likely to be mis-labeled as low risk

DATA

- U.S. Dept. of Justice: Recidivism of Felons on Probation, 1986-1989
- Older data, but thorough
- 12,369 probationers across 32 jurisdictions

OPTIMIZING A MODEL FOR PRECISION

CONFUSION MATRIX

		Model Prediction	
		Yes	**No**
Actual Behavior	**Yes**	True Positive	False Negative
	No	False Positive	True Negative

OPTIMIZING A MODEL FOR PRECISION

PRECISION

Actual Behavior	Model Prediction: Yes	Model Prediction: No
Yes	True Positive	False Negative
No	False Positive	True Negative

OPTIMIZING A MODEL FOR PRECISION

NEED AN INTERPRETABLE MODEL

OPTIMIZING A MODEL FOR PRECISION

NEED AN INTERPRETABLE MODEL

- Logistic Regression
  - Can look at weights for each feature
- Did not use Random Forest
- Flask App

WHEN TO USE PREDICTIVE MODELS

- Do not use when deciding a person's freedom
- Ok to use when assigning parole supervision

APPENDIX

OPTIMIZING A MODEL FOR PRECISION

ACCURACY

Actual Behavior	Model Prediction: Yes	Model Prediction: No
Yes	True Positive	False Negative
No	False Positive	True Negative

OPTIMIZING A MODEL FOR PRECISION

FALSE POSITIVE RATE

Actual Behavior	Model Prediction: Yes	Model Prediction: No
Yes	True Positive	False Negative
No	False Positive	True Negative

OPTIMIZING A MODEL FOR PRECISION

FALSE NEGATIVE RATE

Actual Behavior	Model Prediction: Yes	Model Prediction: No
Yes	True Positive	False Negative
No	False Positive	True Negative