An Analysis on The Reliability of The COMPAS Recidivism Algorithm

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Overview

- The COMPAS dataset contains variables used by the COMPAS algorithm in scoring defendants, along with their outcomes, for over 10,000 criminal defendants in Broward County, Florida.
- We performed EDA on this dataset and more specifically looked for examples of bias, from the COMPAS algorithm itself.
- We saw blatant racism in misclassifying African-Americans as more high risk than Caucausians, even with less criminal history.
- We're going to focus on comparing its performance between these two groups

Two Drug Possession Arrests

DYLAN FUGETT

Prior Offense
1 attempted burglary

Subsequent Offenses
3 drug possessions

BERNARD PARKER

Prior Offense
1 resisting arrest without violence

Subsequent Offenses
None

LOW RISK 3

HIGH RISK 10

Fugett was rated low risk after being arrested with cocaine and marijuana. He was arrested three times on drug charges after that.

The COMPAS algorithm grossly misperforms, and this is not the only example in an article by Propublica, there are lots more examples of obvious mistakes like this happening over and over.

Two DUI Arrests

GREGORY LUGO

Prior Offenses
3 DUIs, 1 battery

Subsequent Offenses
1 domestic violence battery

LOW RISK 1

MALLORY WILLIAMS

Prior Offenses
2 misdemeanors

Subsequent Offenses
None

MEDIUM RISK 6

Lugo crashed his Lincoln Navigator into a Toyota Camry while drunk. He was rated as a low risk of reoffending despite the fact that it was at least his fourth DUI.

Two Petty Theft Arrests

VERNON PRATER

Prior Offenses
2 armed robberies, 1 attempted armed robbery

Subsequent Offenses
1 grand theft

LOW RISK 3

BRISHA BORDEN

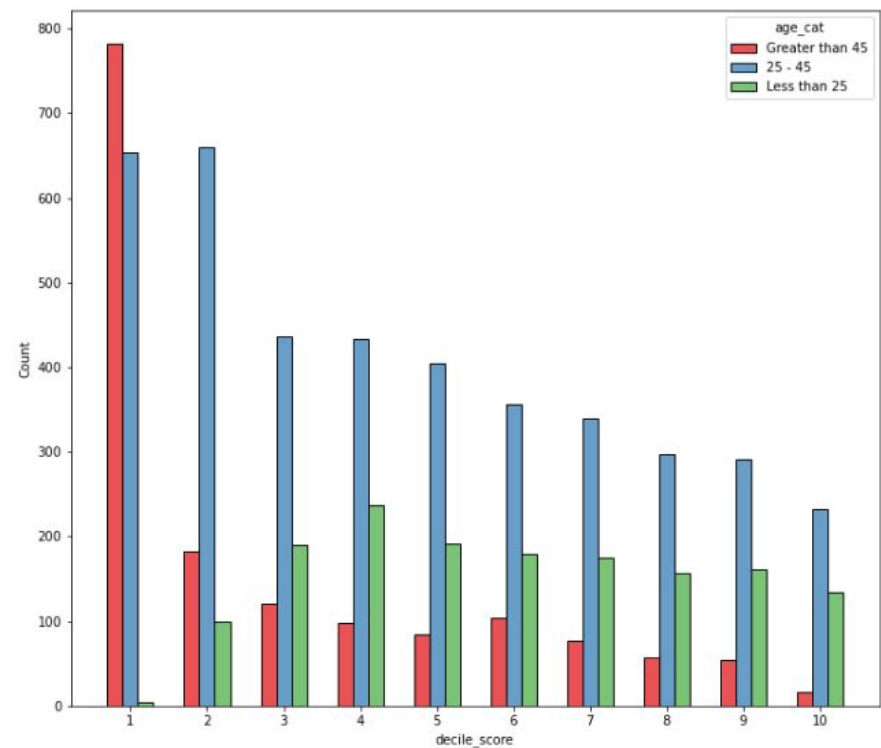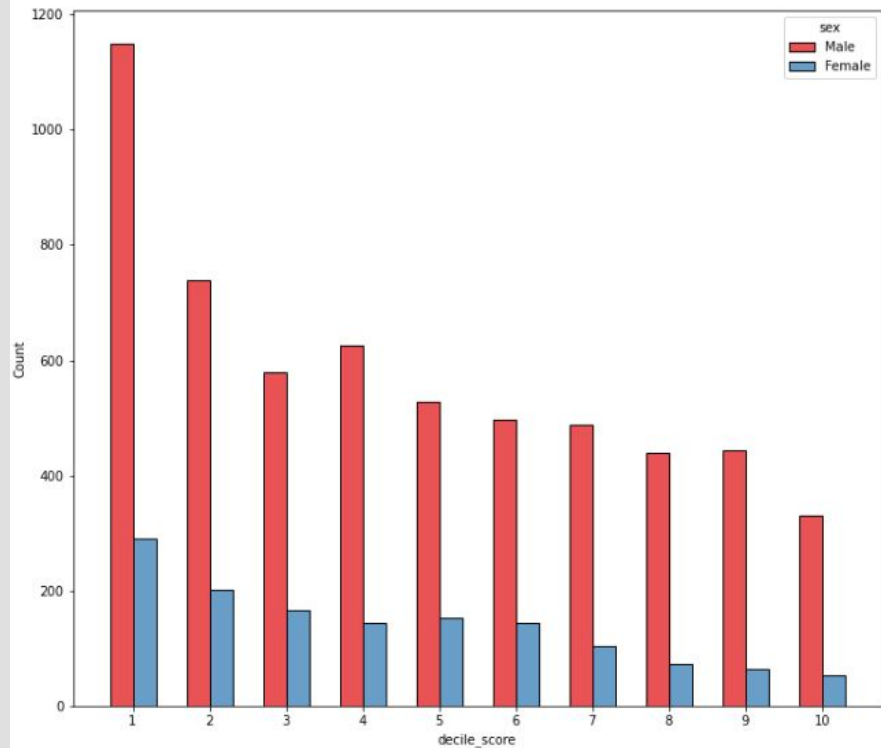Prior Offenses
4 juvenile misdemeanors
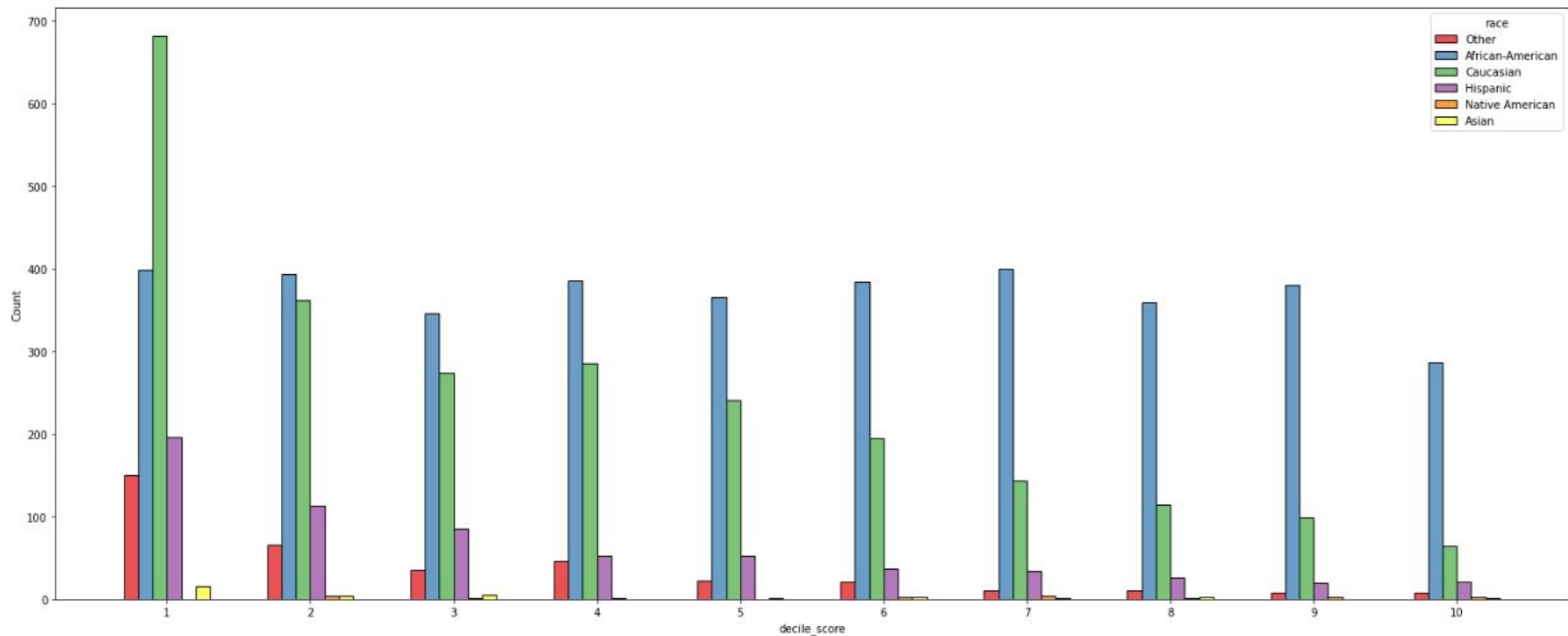
Subsequent Offenses
None

HIGH RISK 8

Borden was rated high risk for future crime after she and a friend took a kid's bike and scooter that were sitting outside. She did not reoffend.

COMPAS Sex and Age
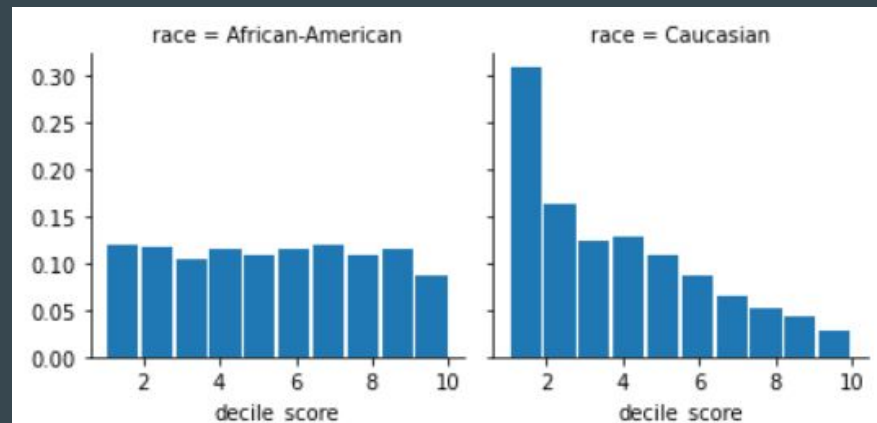
Dataset Racial Makeup

COMPAS Performance

Caucasian

- False positive rate: 0.23
- False negative rate : 0.48
- Positive predictive value (tp/(tp+fp))): 0.59
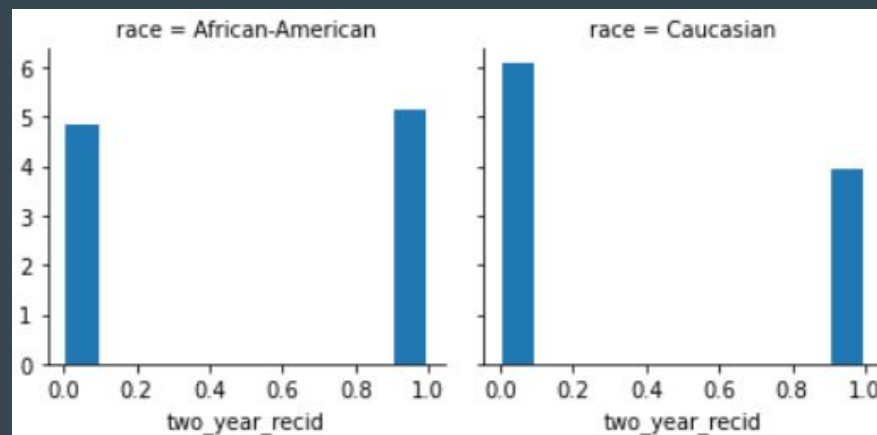- Negative predictive value (tn/(tn+fn))): 0.71

African American

- False positive rate: 0.45
- False negative rate : 0.28
- Positive predictive value (tp/(tp+fp))): 0.63
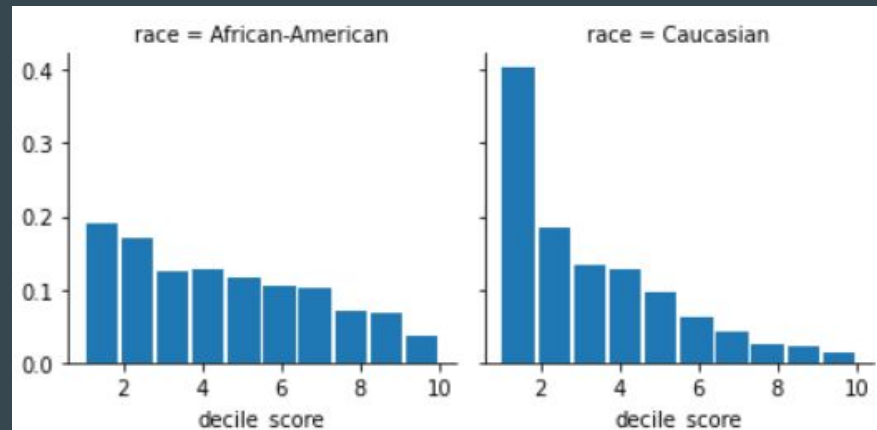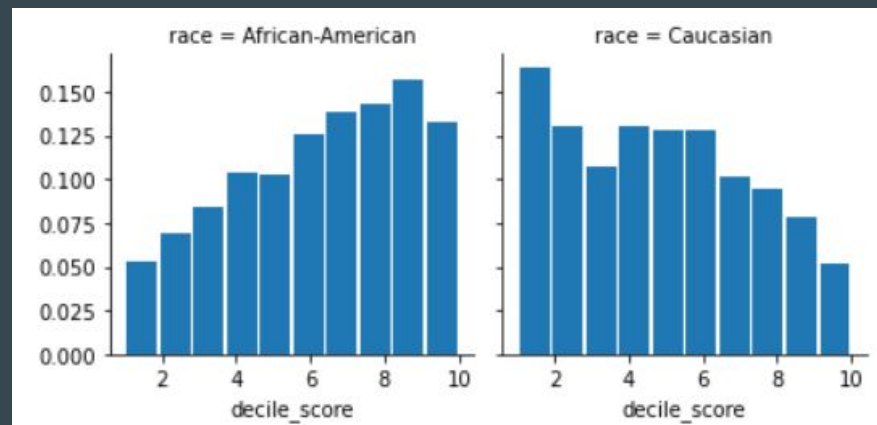- Negative predictive value (tn/(tn+fn))): 0.65

COMPAS Predictions

Actual Outcomes

Decile Scores for no Recidivism

Decile Scores for Recidivism

	two_year_recid	is_med_or_high_risk	decile_score
race			
African-American	0.514340	0.588203	5.368777
Caucasian	0.393643	0.348003	3.735126

- African Americans are only at a 1.3x more risk to reoffend, but are labeled a medium or high risk at 1.7x the rate as Caucasians.
- Also it looks like, the mean decile score for African-Americans is also larger by 1.5, in a scale out of 10.

Conclusion:
Through the case examples, and the data we analyzed from the COMPAS dataset, Caucasians were heavily favored in recidivism prediction.

References

1. https://www.propublica.org/article/how-we-analyzed-the-compas-recidivism-algorithm
2. https://github.com/propublica/compas-analysis