

# MEMO



Dear Mayor McConnell,

On average, the country spends \$80 billion annually in order to send at least 2.4 million individuals behind bars.<sup>1</sup> In our state of California alone, the financial costs of incarceration totaled at \$81,203 per inmate as of 2019.<sup>2</sup> The costs of incarceration extend past the initial onset and create burdens for families. There are severe emotional and social costs impacting families such as 65% of families with an incarcerated family member unable to afford their basic needs, and 80% of inmates below the poverty line.

Mayor McConnell, with your support, the city of Vallejo has the ability to create a fair and effective system that integrates ex-offenders into society and prevents recidivism by developing a comprehensive ex-offender job program. This program may include services such as, basic skills training, resume and cover letter building, interview preparation, English language courses, and direct job education courses. We propose that this program budget \$25,000 per ex-offender. This is based on the Governor's General Fund for Employment Services for Ex-offenders and Supportive Services as Needed, as well as the costs for tuition and books at our local adult educational institute, Solano Community College.<sup>3</sup>

Northpointe developed an algorithm named COMPAS based on a variety of factors and results that were self-reported from ex-offenders to determine the rate at which someone will recidivate. With this new tool, the COMPAS algorithm has been adopted by police departments across the countries such as those in Florida.<sup>4</sup>

However, this algorithm has proved to create disparate impact, the legal theory that a policy or program will have unintended discriminatory effects. ProPublica found that Northpointe's algorithm had embedded racial bias that disproportionately affects African-Americans.<sup>5</sup> We want to prevent the use of the current algorithm in order to create a more equitable and just city.

As of 2018, Vallejo comprised 21.2% African-Americans and 24.2% Caucasians. However, 50% of African-Americans were arrested compared to the 25% of Caucasians.<sup>6</sup> With this in mind, immediate action must be taken to correct the history of unjustly placing African-Americans behind bars motivated by racial bias.

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1 "The True Cost of Incarceration on Families." Who Pays. September 2015. <http://whopaysreport.org/>.

2 "Statewide Prison to Employment Initiative." The 2018-19 Budget: Statewide Prison to Employment Initiative. March 12, 2018. Accessed November 17, 2021. <https://lao.ca.gov/Publications/Report/3781>.

3 Ibid.

4 Steif, Ken, and Sydney Goldstein. "Algorithmic Fairness: A Code-based Primer for Public-sector Data Scientists." February 2019. [https://urbanspatial.github.io/AlgorithmicFairness\\_ACodebasedPrimerForPublicSectorDataScientists/](https://urbanspatial.github.io/AlgorithmicFairness_ACodebasedPrimerForPublicSectorDataScientists/).

5 Julia Angwin, Jeff Larson. "Machine Bias." ProPublica. May 23, 2016. Accessed November 17, 2021. <https://www.propublica.org/article/machine-bias-risk-assessments-in-criminal-sentencing>.

6 Scales, Bob. "Police Force Analysis System First Summary Report." July 2020. [https://vallejopd.net/public\\_information/crime\\_data/use\\_of\\_force\\_analysis](https://vallejopd.net/public_information/crime_data/use_of_force_analysis).

As a data scientist for the Department of Prisons, I have developed an algorithm that yields greater recidivism accuracy and program enrollment. With this algorithm in place, we can recommend an ex-offender to enroll into the reintegration program based on the rate at which they may recidivate. My research design allows for us to decrease disparate impact and disproportionate effects on communities of color and African-Americans by ensuring that the rate of recidivism is adjusted by race.

Figure 1: Confusion matrix rates by race

Threshold: 50%

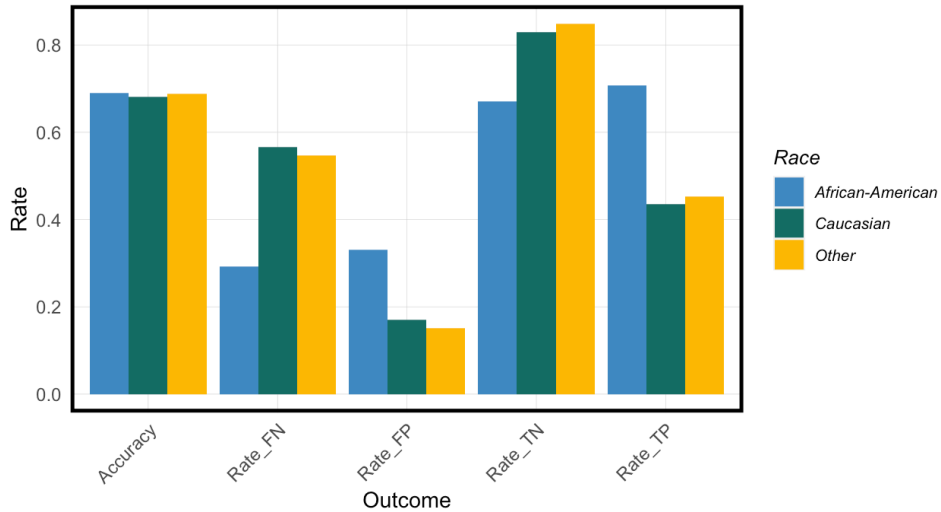


Figure 2: Confusion matrix rates by race

Thresholds: 48% African-American, 39% Caucasian, 37% Other

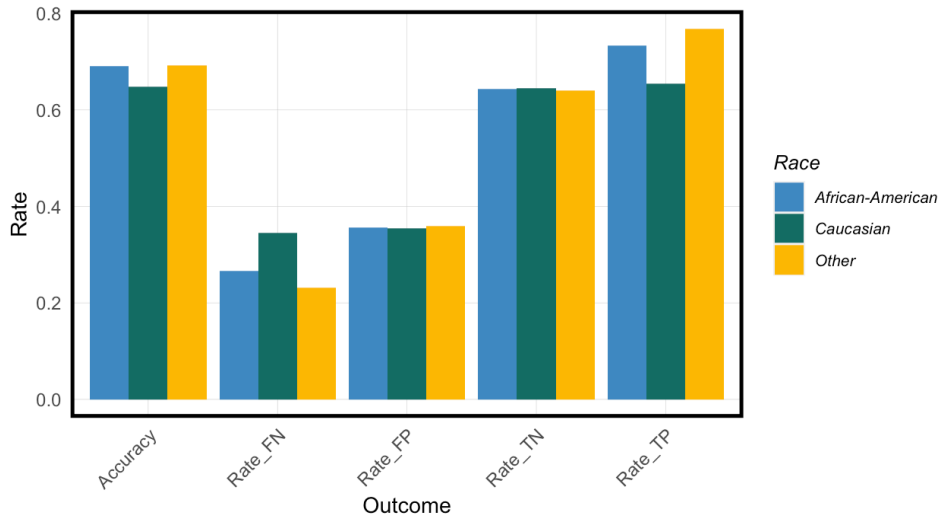


Figure 1 evaluates recidivism rates at the 50% threshold. This threshold provides startling results. Examining the false positives (Rate\_FP), we predicted that an ex-offender would recidivate and they did not. With the 50% threshold in place, African-Americans are more likely predicted to recidivate compared to other racial groups, this results in racial bias amongst police officers. Across the board, the result of all variables by race have vastly different rates.

However we found that adjusting thresholds by race yields more equal rates. In figure 2 we assign the thresholds of 48%, 39%, and 37% to African-American, Caucasian, and Other respectively. The results of this model provided an almost equal outcome for those predicted to recidivate but did not (Rate\_FP), and those who would not recidivate (Rate\_TN). Although the predictions for those who would recidivate (Rate\_TP) and those who were predicted not to recidivate but did (Rate\_FN) still have differing rates, the margin between them is substantially lower when compared to the 50% threshold.

This analysis brings into conversation, accuracy vs generalizability. While our first algorithm yields accuracy, it does not necessarily take race into account. Our second algorithm however, does take race into account and yields generalizability. On one hand while accuracy is good, it causes severe unintended impacts. Meanwhile generalizability appropriates data by its characteristics which can even drive greater accuracy.

The 50% threshold creates a job program that costs \$5 million. However using our optimal thresholds, the total cost would be \$7.5 million. These costs yield financial and social benefits. Financially, although costing \$2.5 million more, we are investing in our citizens to provide a better future and improve our local workforce. Socially we will decrease racial bias and disparate impact by keeping families together, decrease the disproportionate policing on African-Americans, and avoid financial and emotional hardships for households.

Mayor McConnell, you have the power to implement this algorithm into our justice to influence the execution of the job training program. This algorithm understands our country's past and strives for equity. I urge you to take action now to improve our local economy and economy community: a better future for Vallejo and our citizens.