# Recidivism Project: Literature Review

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One of the most enticing prospects of employing Data Science is the objective nature of machines to model and predict outcomes based on raw data over subjective assessments. This common, and inherently flawed, intuition discounts the many potential sources of bias introduced into the data presented to a predictive algorithm. A particularly relevant instance of this misapplication of data science techniques is present in models predicting recidivism in individual criminal offenders.

Two widely used methods for predicting recidivism in the US, including Wisconsin [1], are the Correctional Offender Management Profiling for Alternative Sanctions (COMPAS) risk assessment tool [2] and proxy score prescreening [3]. While proxy scores possess some correlational relevance to recidivism [1], they are not explicitly constructed on statistical modeling. The proxy score system that was adopted by correctional departments in Hawaii [3] and Wisconsin [1] proposes that age, prior offenses, and age of first offense are the most valuable variables in the determination of recidivism. While a similar list of variables could be deduced from the COMPAS questionnaire the application of those variable within the model is not available due to its proprietary nature, but age has been determined to be a strong predictor of recidivism and a component of the COMPAS model [2, 4, 5, 6].

The opaque nature of the COMPAS model is particularly distressing as it is routinely used as a factor in sentencing during criminal proceedings [7]. The result of this "black box" model being given a role in life-changing proceedings has been a body of research into the accuracy and application of the model, with somewhat conflicting conclusions. Some research has demonstrated the ability of the COMPAS model to reasonably predict recidivism [4]. However, it has also been demonstrated that the COMPAS model does not predict recidivism significantly better than untrained human assessors regardless of the inclusion of race as a determining factor [2]. What's more, both the COMPAS model, and untrained human assessors, disproportionately and falsely assigned black offenders as being at high risk of recidivism, as compared to their white counterparts [2, 5]. This suggests a strong bias for associating black offenders with recidivism, despite race not being one of the 137 variables used by the COMPAS model. Further an attempt to determine if the comparison of similar models could reveal an indirect association between COMPAS variables and race did not produce significant results [6]. This creates a confusing space into which the particulars of bias are not immediately evident, but the evidence for bias is present and the value of the applied models is questionable.

The Iowa Department of Corrections (DOC) freely distributes data on it's operations through the Iowa Data webservice, including a dataset on recidivism within the Iowa DOC [8]. This dataset includes many factors common to other models including age, gender, race, and offense. However, the dataset also includes a measure of whether the Iowa DOC targeted an individual for programs intended to reduce recidivism [8]. This presents an interesting opportunity to experiment with a dataset capable of recreating the failures purported to exist in distributed models, as well as investigate the impact of the Iowa DOCs intervention on recidivism rates.

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## References

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