Thesis Project Portfolio

Analyzing Candidates for Home Electronic Incarceration on Return-to-Custody Rates for Inmates

(Technical Report)

Coding Criminality: Sociotechnical Joint Optimization for Efficacy and Efficiency in the Criminal Justice System

(STS Research Paper)

An Undergraduate Thesis

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Stella Catherine Banino

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Sociotechnical Synthesis

83% of Americans who spend time in prison return within 9 years (Alper et al., 2018), indicating the justice system's failure to adequately rehabilitate inmates or deter them from committing future crimes. This failure hurts both inmates, whose lives suffer from instability and incarceration, as well as the general public and their safety. Dornfeld et al. (2023) found that inmates processed through the Albemarle-Charlottesville Regional Jail (ACRJ) who served their sentence on home electronic incarceration (i.e., house arrest, HEI), are significantly less likely to recidivate (be convicted of a new crime) than those who served their sentence in the physical jail. Inmates serving their sentence on HEI remain plugged into their routines and support networks and are able to keep their jobs, which allows them to continue paying bills and rent. This provides emotional, financial, and housing stability and smoothes full reentry into society.

Given these benefits, my team hopes to maximize the utilization of HEI by determining who will benefit most from it. We analyzed data collected by ACRJ during booking, disaggregated by demographic, crime severity, and other notable factors. We were able to validate Dornfeld et al.'s findings, this time controlling for crime severity, pre- vs. post-trial, and HEI eligibility; with all of these factors accounted for, those who served their sentence on HEI were 32% less likely to return to custody at ACRJ than those who served their sentence in the prison. These benefits were particularly salient for Black people, for whom HEI halves the return-to-custody rate. This helps close the return-to-custody rate gap between Black and White offenders in our dataset. We also found that people who had a high school degree (including GEDs) were less likely to return to custody than those who didn't and also benefited more, in terms of return-to-custody likelihood, from serving their sentence on HEI. These findings have important implications for ACRJ's HEI program, their rehabilitation efforts, and other jails' adoption of HEI.

For my ethical paper, I wanted to look into the ethics of using algorithms to make decisions in the criminal justice system, as we had initially contemplated making such an algorithm to assign people to HEI. I learned that there is no way to construct an algorithm completely free from bias; even an algorithm free from statistical bias will contain social bias if the data it is modeled on is biased. Given this information, I analyzed the criminal justice system through the lens of sociotechnical systems analysis to determine how algorithms could take some cognitive load off of humans without exacerbating existing biases in the criminal justice system. I determined algorithms can be most useful in providing human decision-makers with additional information, rather than making the decisions themselves.

My team met with officials of several criminal justice organizations, including ACRJ, to discuss expansion of HEI based on our findings, who were very impressed and are now exploring ways to act on this information with the goal of reducing recidivism in Albemarle-Charlottesville. The ethical component of this project informed work on the technical project and could shape the development of many other algorithms in the criminal justice system. It represents one of the first significant attempts to analyze the justice system through the lens of sociotechnical joint optimization, balancing the strengths and limitations of both humans and algorithms.

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