Thesis Project Portfolio

Applications of Machine Learning to Pretrial Sentencing: A Literature Review (Technical

Report)

The Social Construction of Digital Justice (STS

Research Paper)

An Undergraduate Thesis

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Sociotechnical Synthesis

As tech companies race to prove the old adage that "knowledge is power", society continues to find ways to convert any source of information into numbers that can be manipulated and put in context by machine learning algorithms. Across various industries, data scientists are revolutionizing the ability of different disciplines to be more effective, even proactive in fighting the battles that they set out to engage. In the criminal justice field, these algorithms are used to first study the history of criminals and understand the factors that brought them to their current point, and then to forecast those who may join their ranks in the future, all in the name of preserving a safe society for the majority.

This capstone project will attempt to study the extent to which machine learning algorithms have a place in criminal justice and to what extent they are able to help. From police to judges to government officials tasked with writing laws that we all have to abide by, the ability to understand what factors can push one down a given path and predict their future ability to get off of it is priceless, as it could help bring a more humane perception to the system by providing a more direct approach as opposed to simply throwing out a wide net and hoping for the best. The success of this, however, depends on the ability of computer scientists and criminologists to work together to create models that are truly predictive as well as the ability of societal leaders to explain the benefits of the algorithms while being careful not to oversell in hopes of expediting what could be a disastrous product launch.

The technical project portion of this capstone will entail a literature review of current thoughts on the use of predictive analytics in pretrial sentencing. The interdisciplinary nature of the topic necessitates that opinions are read from a wide group of experts, from computer scientists to statisticians to legal experts and criminologists. I will use a framework developed by

computer scientists at Cornell and Harvard about the potential roles for computing in social change in an attempt to make clear the potential successes and pitfalls of deploying these algorithms in criminal justice settings. I hope that this attempt to synthesize current thought on risk assessment tools will make it simpler to understand the various points of view on their use, and how the ultimate acceptance or denial may rest on the acceptance of one or more definitions of fairness, multiple of which contradict one another directly.

The STS research paper will attempt to look at the creation of these algorithms through the Social Construction of Technology (SCOT) framework. I will ask and attempt to answer what does the deployment of these algorithms in their current state mean for different societal stakeholders, and whether there is a way to remedy these disagreements. I hope that this will show that the algorithms can have wildly different interpretations among different groups and that the way that they are presented and explained initially has a large impact on their eventual adoption.

In combination, these will serve to shine light on what I believe could be a significant problem going forward for computer scientists: the want to deal with computer science problems as solely technical issues when there are larger societal issues at stake. Technology is not slowing down and will only become more useful as time goes on, but it is important that we take time to understand not only the impacts that we can gain from technological enhancements, but also the way that those technologies in turn impact our way of life. In order to maximize the positive impact machines can have, we will have to make sure we are taking equal effort to improve ourselves and our ways of thinking.