Order versus Justice: The Struggle over Predictive Policing in the U.S.

A Research Paper Submitted to the Department of Engineering and Society
Presented to the Faculty of the School of Engineering and Applied Science
University of Virginia – Charlottesville, Virginia

In the Partial Fulfillment of the Requirements for the Degree
Bachelor of Science, School of Engineering

By

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Spring, 2022

On my honor as a university student, I have neither given nor received unauthorized aid on this assignment as defined by the Honor Guidelines for Thesis-Related Assignments.

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Introduction

Looking at the general research problem, I will be looking into how social groups in the US are seeking to improve public security and safety? In regard to security and integrity of the public, it is crucial to look into this seriously as malicious techniques continue to improve with the lives, reputation, and property of innocent people at risk. In digital systems, security, privacy, justice, and malice are in dynamic and unstable tension. Efforts to bolster security or to thwart malice may degrade privacy or justice. Efforts to enforce justice or protect privacy can compromise security, shelter malice, or be misrepresented as malice. Efforts to subvert justice or to invade privacy may be misrepresented as efforts to thwart malice.

For the capstone, I will be looking into how may computer science students be better prepared to develop secure applications? I will investigate this by seeing how the computer science curricula can be improved to help students be prepared to develop secure applications. Cyber security concerns in the United States have become an increasingly big issue. Having these concerns become ever more persistent, it is becoming quite clear that students who are studying in computer science must become more ready in being able to create and develop applications that are secure. I propose the idea of a synthesized course combined with CS3420 (Advanced Software Development Techniques) and CS4630 (Defense Against the Dark Arts).

Through this synthesis, the goal is to create a course that teaches students how to develop applications with an emphasis on implementing security techniques and design practices that prevent applications from being hackable. This in turn will accomplish helping students be comfortable with security practices that can be beneficial in the United States' fight to improve

cyber security. Based on what is possible to do right now, in CS3240, a course that focuses on having students develop web apps, could require students to implement security aspects into their applications. However, given the nature of the course, it is unlikely that meaningful security techniques can be taught to students without taking away core concepts specific to CS3240 from its curriculum. A separate synthesized course solely dedicated to teaching security techniques within applications would be more beneficial for students.

For the sociotechnical problem, I will be looking into how, in the U.S, are advocacies, law enforcement agencies, police unions, and tech companies competing to determine the proper extent and applications of predictive policing? Predictive policing in the United States has become a topic of concern and controversy due to its implementation. Predictive policing relies on algorithms that have been heavily criticized for being discriminatory and biased. This can be a result of misrepresentative data sets that do not reflect real circumstances due to reasons such as improper or incomplete reports of criminal charges and arrests. This can lead to over policing in communities where minorities are primarily affected. While predictive policing has shown to help fight crime, its adverse effects cannot be ignored, and it must be investigated how this imbalance can be solved.

Literature Review

Over the last 15 years, predictive policing, which uses algorithms to anticipate crimes before they happen, has proliferated in the United States. Predictive policing algorithms have been accused of perpetuating and exacerbating racism in law enforcement. Algorithmic bias is seldom intentional. Barton (2019) attributes bias to incomplete or misrepresented datasets and

historical human bias in the datasets that train algorithms. Insufficient population variety in datasets can distort algorithmic decision making (Turner Lee, 2018). Algorithms that are of practical value in society must be trained on data gathered from society, and if the society has encoded institutionalized inequities, racial or otherwise, these inequities will be encoded in the algorithms as well. For example, in the United States, districts of disinvestment, deprivation, and discrimination are likely to have had a higher crime rate and to have been subjected to intensive and discriminatory policing, such that arrests per crime will be greater than elsewhere. Algorithms trained on arrest data from such districts are likely to overestimate the actual crime risk in them. O'Donnell (2019) documents numerous cases in the U.S. in which law-abiding people of color have been subject to aggressive policing; because of such policing, predictive policing algorithms are twice as likely to flag Black subjects as risks than white subjects.

For example, a predictive policing AI system assigned James Rivelli, a white convicted shoplifter who had served five years in Massachusetts state prison, a risk score of 3/10. Robert Cannon, a black man who had committed the same crime, received a score of 6/10 from the same system (Angwin et al., 2016). Similarly, 18-year-old Brisha Borden, a Black woman, was charged for petty theft in 2014 for $80 worth of items. 41-year-old Veron Prater, a white man and repeat offender, committed a similar crime for $86.35 dollars' worth of goods. Prater had served a five-year sentence in the past while Borden had a misdemeanor on her record. However, when a computer gave them a risk score, Borden was given a high-risk score while Prater was given a low-risk score. In the following two years, Borden had not committed any crimes while Prater was sentenced to 8 years in prison for committing another crime. In online searches with African American names, results with the word "arrest" appeared at greater frequency in

advertisements and pop-ups associated with the search (Silva et al., 2018). According to Megan Smith, former Chief Technology Officer of the United States, algorithmic biases cause excessive surveillance in communities of color. This in turn imparts social stigma, which diminishes employment and educational opportunities (AJL, n.d.). According to Bratingham (2018), some police officers selectively fail to report crimes by geographic area, thereby distorting algorithms that are trained on crime data. Missing data results in algorithms in a misrepresentation of crime tendencies of an area that can lead to unfair bias. The Human Rights Data Analysis Group found that due to inaccuracies in crime data, police are more likely to be sent to American communities (Shapiro, 2017).

Law enforcement agencies welcome predictive policing as a cost-effective crime prevention tool and see it useful to achieving their goal of reducing crime (Pearsall, 2010). Former Los Angeles Police Department Chief Bill Bratton says that "so much of what creates tension with the community is crime; by reducing crime, we reduce tension" (Uchida, 2009). Some members of heavily policed populations, especially people of color, allege bias and have organized to challenge predictive policing on this basis (Angwin et al., 2016). "Any time you take out the human perspective or interaction, I do not believe there is any positives. You are making algorithms off a false narrative that has been created for people — the gang documentation thing is the state defining people according to what they believe," says Aaron Harvey, a resident of San Diego who fended off charges of alleged gang conspiracy (Winston et al., 2018). Some organized advocacies seek reform in predictive policing (Stop LAPD Spying Coalition, n.d.). The Algorithmic Justice League has called for algorithmic transparency (AJL, n.d.). PredPol (n.d.), however, contends that predictive policing is necessary, cost-effective, and

fair. With so much conflict of interest amongst several social groups, it becomes necessary that a solution that is deemed fair and reasonable must be found.

Methodology

To collect the data mentioned in the literature, many of these sources used extensive means to back up their claims and findings. To see that predictive policing algorithms are not always reliable, ProPublica studied the algorithm's usage when the U.S. Sentencing Commission decided not to do so. For their studies, they looked at arrests made in Broward County, Florida and got the risk scores associated with over 7,000 people in 2013 and 2014. They used the same standards, COMPAS Core, which was used by the creators of the algorithms used to make risk scores of individuals in Broward County. They then checked to see how many people who were predicted to commit crimes committed them over the course of two years. In their findings, it was revealed that only 20 percent of individuals that were predicted to commit a violent crime did. When looking at all types of crime, the algorithm was more accurate, but with only 61 percent of individuals committing a subsequent crime. Their findings also revealed that the algorithm was twice as likely to incorrectly flag Black individuals as repeat offenders than white individuals. Conversely, white individuals were incorrectly labeled as minimal risk more often than Black individuals. To further cement the validity of their findings, ProPublica also conducted a statistical test that confined the effects of race, age, and gender from a person’s criminal history. Black individuals were still shown to be flagged to be more likely to commit a future violent crime by 77 percent and more likely to commit any type of crime by 45 percent.

In the AJL's findings of how algorithmic biases can cause issues socially for people, these findings were provided by Megan Smith who is now the former Chief Technology Officer of the United States which is an official position in the United States the Office of Science and Technology Policy. This involves using data and data science capabilities to understand how to improve technology for governmental services and its effects. When Barton mentions in his findings that online searches with names associated with black people get more ads associated with arrest, he cites the findings of Latanya Sweeney, a Harvard researcher who did an in-depth experiment to justify her claims. For her data collection, she investigated the types of ads that would be displayed by Google AdSense by doing searches of names that are typically associated with Black and white individuals. 2184 names were used as searches in two different websites. Names associated with Black people had ads associated with arrests in 81-86 percent of names and 92-95 percent of names on the two websites. White sounding names only had arrest associated ads appear on 23-29 percent of names and 0-60 percent of names on the two websites.

Results

Based on the literature review and looking at the ways the authors of these claims have collected their data, claims of predictive policing algorithms are discriminatory, biased, and flawed. Despite authoritative social groups and companies producing these algorithms many times maintaining that their systems are mostly fair, data shows otherwise. Then, how can we make sure that we are using predictive algorithms to its proper extent? The main key is to reduce the bias involved. One of the serious issues with the predictive algorithms is the skewed dataset that algorithms use for training data, does not accurately represent the reality of the situation. As mentioned in the literature, many times police officers selectively do not report crimes which

creates skewed data that may make one area look like it needs more policing than others, or vice versa. To fix this problem, there needs to be more accountability on the police departments' part to make sure that their officers are properly submitting crime reports. A check needs to be implemented and it would not be unreasonable for laws to be implemented in regard to how officers report crimes. Not properly reporting crimes should also have some sort of punishment associated with it. Another issue with algorithms is how many companies that make the algorithms that are most used do not disclose their methods of creating them. Transparency is important in situations where decisions are made for people's livelihood. If algorithm making companies were more open in regard to how they come up with their methods, it would allow for the general public and other experts to be able to identify where their issues are. As technology improves and as the field of data science and machine learning continues to advance, new implementations on predictive policing are to occur. It is important to fix our current errors to not allow things to accumulate into worse situations in the future.

Conclusion

Predictive policing is a newer, still developing, yet popular construct in the justice system that is being used in hopes of reducing crimes and stopping crime before it even happens. While it is good in theory, its execution has been highly scrutinized and accused of being discriminatory and biased. These biases have negatively affected people of color and have shown to wrongly label them perpetrators of possible future crimes. These systems have given people of color higher risk scores compared to white people even when their criminal history suggests otherwise. Biases in these algorithms can be attributed to incomplete data sets that are used as training data for predictive policing algorithms. This causes over policing in areas that have

inaccurate statistics related to their actual crime tendencies. There must be more accountability on the part of law enforcement to create a more accurate and fair policing system.

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