Experiential Learning Through an Internship at Capital One

AI and Law Enforcement: The Effects of Predictive Policing

A Thesis Prospectus
In STS 4500
Presented to
The Faculty of the
School of Engineering and Applied Science
University of Virginia
In Partial Fulfillment of the Requirements for the Degree
Bachelor of Science in Computer Science

By
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November 1, 2021

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N/A

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

One of the exciting areas in Computer Science is artificial intelligence, or AI, because of its potential to solve problems more easily and accurately than a program with logic explicitly defined by a human. AI encompasses several techniques, but all of them strive to replicate human decision-making through reasoning about data. From recognition of cancerous tumors to intelligent voice assistants, artificial intelligence is a promising tool for a range of applications (IBM Cloud Education, 2020). However, there are some areas where AI's use is more controversial. In trying to fight crime more effectively, some police forces have implemented AI-based predictive policing strategies. These approaches utilize geographic crime data, personal information, or both to predict criminal activity. While these efforts may help fight crime, the results are dubious given the issues present in modern policing, i.e., racial bias, and the legal and ethical issues in using this technology (JOLT, 2020).

This prospectus will outline an STS look into the aforementioned topic and my reflection on a software engineering internship. Experiential learning is important for many computer science students. Therefore, the extent to which classroom learning supports and prepares students for their experiences is a significant topic to discuss. I will use my recent internship at Capital One to examine this relationship. In doing so, I will describe the project I completed, the technologies I used, and elaborate on my learnings from the experience. These projects are unrelated in their subject and significance.

STS Project

In their work, “Targeted,” McGrory and Bedi describe how a predictive policing program has developed in Pasco County, Florida. In 2011, the Pasco County sheriff’s office began using geographic information and data from previous arrests to predict where crime might happen. Overtime, more personal information has been incorporated into the data analysis, including social media activity, bank records, and surveillance images. Based on the collected data, an algorithm awards points to suspects, indicating how likely they are to commit a crime. A human then decides if a person needs to be contacted by the police for further investigation. This usually involves repeated random visits from the police, bordering on harassment from the suspect’s perspective. Some of these potential criminals have never committed a crime before, were victims of previous crimes, or are minors. The police will also involve family and friends of the suspect in regular visits and questioning, leading to confusion and distrust of the police (McGrory & Bedi, 2020).

While McGrory and Bedi found no concrete evidence of racial bias in the Pasco County sheriff’s program, other predictive policing initiates have produced clear racially biased results (McGrory & Bedi, 2020). In “Heat Listed,” Matt Stroud describes how the Chicago Police Department implemented a program similar to Pasco County’s called, “the heat list.” It also began using only geographic data, but evolved to incorporate personal information too. Communities that were already over policed saw even more interaction with officers, and those identified as suspects drew suspicion and even violence from their community because they appeared to be cooperating with law enforcement. Facing increasing homicides and scrutiny, Chicago ended the “heat list” in 2019 (Stroud, 2021).

Bias in other applications of AI is not uncommon either. As an example, an art project called ImageNet Roulette revealed the racial and gender biases in the popular image database ImageNet. ImageNet contains many collections of pictures to train object recognition models (*ImageNet*, n.d.). This includes people, but as ImageNet Roulette showed, the way we label training data for these models can be encoded with bias, producing a biased AI as a result. For example, ImageNet Roulette labeled black people using the installation predominately by race, while it labeled white people based on occupation (Solly, 2019).

People want to feel safe in their communities, and the people hired to protect them want to do their job well. But, as the above story from the Tampa Bay Times shows, the results are not entirely positive. Pasco County is not the only locality to implement data-driven policing, nor is adoption limited or slowing down. Meanwhile, some large cities, like Chicago, are ending their predictive policing programs (Sweeney & Gorner, 2020). With this in mind, how is AI shaping policing and the public's trust of the police?

The main arguments against predictive policing can be broken down into transparency issues, legal rights, and social justice (Lau, 2020). Some cite the lack of transparency in predictive policing as a cause for concern. This is because the data collection methods and software the police use are not always public information (Lau, 2020). For example, the New York City Police Department kept the algorithms and source data for its crime prediction program secret for several years, preventing others from assessing the extent of bias in their system (Winston, 2018). When it comes to legal rights, some claim arrests or searches based on data analytics may not meet the standards of the Fourth amendment (JOLT, 2020). Additionally, some police departments hold on to data captured through procedures deemed unlawful. So

called, “dirty data,” persists in the predictive policing program and any use of said data should be unlawful (Richardson et al., 2019). The final argument combines elements from the ones previously discussed: predictive policing ultimately replicates the racial bias patterns already present in policing across the country. Since predictive policing uses data from the past that was in part influenced by racial bias, some argue that it can only be the case that the bias propagates into the algorithm (Winston, 2019).

Meanwhile, arguments for predictive policing conclude that the practice can predict crimes far better than a human can and is, therefore, a worthwhile technology. In theory, it could reduce the reliance on intuition that is normally plagued by bias. Using predictive policing can also lead to better resource allocation and cut costs for police forces. More specifically, Brayne et al. argue that the problem is not the technology, but the humans who use it. Predictive policing is merely a tool, and only through negligence or malice at the hands of humans, it is dangerous (Brayne et al., 2015).

To analyze predictive policing in an STS context, I will use Winner’s political artifacts framework. In “Do Artifacts have Politics,” Langdon Winner discusses the relationship between technology and politics. He concludes that this relationship can play out in two ways. The first is that technologies can be flexible enough in their use to have a variety of political impacts. In this scenario, it is the designers and users of technology that influence its role in the world. The other possibility is that a particular technology inherently requires a kind of political hierarchy. For example, nuclear power requires, “a techno-scientific-industrial-military elite (Winner, 1980).”

Using this framework, I will argue how predictive policing technology falls into the first category.

Technical Project

In the summer of 2021, I completed a software engineering internship at Capital One. I was assigned to a team with 3 other interns in the card-technology division. The project I completed was an extension to an existing web application that allows managers to monitor call center employee performance. We added a new senior manager user type that could view performance across several teams and manage team assignments. The existing technology stack used JavaScript and Vue.js for the frontend and AWS JavaScript Lambdas with Elasticsearch as the backend. To assess the quality of our work, we also implemented extensive unit and functional tests. We divided the work along the frontend and backend, with two interns working on each. I will focus on describing the frontend, since that was my area of work during the summer.

By the end of the summer, we had satisfied all the design requirements set out at the beginning of the internship and presented our work to a group of managers and project stakeholders with positive reception. Throughout the experience, I learned frontend development with Vue, functional testing with Cucumber and Gherkin, and the code review process. These different learnings have allowed me to synthesize together knowledge from various courses in the CS curriculum.

The technical report will give greater detail into the work done and describe the difficulties and learnings from the project. The main difficulties were related to making safe

changes to an already existing application and navigating an Agile team environment. Using examples from course work, I will also analyze how my CS classes prepared me for this experience. The main conclusion I will make is that the CS courses I have taken were secondary to the skills I actually needed on the job, but still prepared me nonetheless.

Conclusion

This portfolio will present a summary and reflection on an internship and an STS research paper on AI in policing. Given the current discourse around policing in the U.S., discussing technology's role in a just and safe society is important. The technical report will be completed by the end of the fall semester, while the research for the STS paper is ongoing and will be completed in the spring semester. The technical report describes several challenges faced during the software development process, including developing comprehensive tests. I will also explain how more collaboration in CS classes would better prepare students for industry work.

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