Final Portfolio

WRIT-0730-301, Fall 2022

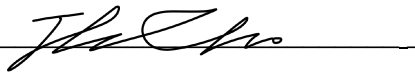
CHO, RYAN

Statement of Academic Integrity

My signature below certifies that I have complied with the University of Pennsylvania's Code of Academic Integrity in completing this portfolio.

December 12th, 2022 Date

RYAN CHO Name (printed)

 Signature

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Letter of Reflection

Dear Faculty Readers,

I am a second-year student in the college intending to major in Economics and Computer Science. Originally from South Korea, I came to the U.S. 6 years ago to attend high school and higher education. As a transfer student who completed a writing curriculum at a different institution just last year, I was confident I wouldn't learn much throughout this course. I was proven wrong, as I learned a lot through the difficulties I encountered while completing the various assignments for this seminar. More specifically, I found the concepts of rhetoric to be the most challenging to recreate in my writing.

I understood what rhetoric meant declaratively: how a writer uses language, logic, and other features to deliver the intended message to the target audience. However, I found it hard to apply what I learned about rhetoric to my writing. I struggled with crafting my rhetoric for a specific audience. The rhetoric of my white paper was meant to explain how bias can occur in AI and list possible solutions to stakeholders in the law enforcement sector, aiming to educate the audience to help them make sound choices when looking to implement predictive policing. However, my initial writing felt unfocused and purposeless as I kept writing without consciously targeting a particular reader base, which is especially apparent in the first draft of my white paper. For example, there are no implications of who the white paper can be helpful to in either the title or the introduction. There is also no mention of ethical or political context, which deprives the paper of any sense of urgency or goal. Upon self-reflection, I suspect this is due to my lack of experience in writing to educate or persuade an audience of my choice. Most of my previous writing endeavors were assignments in school with one clear audience: my instructor.

I attempted to remedy this issue by consciously always directing my writing toward someone while I wrote. I found it helpful to think of my paper as a script for a speech, and I imagined reading this to my audience. These efforts seem to have paid off as the rhetorical situation for the later drafts of my white paper seems more focused overall and has more solid rhetorical foundations. In my second draft of the white paper, I added a subtitle and changed my introduction to accommodate rhetorical elements to suggest that the intended audience is law enforcement agencies. Further, in my final draft, I altered the conclusion to state the intentions and goal of the white paper more clearly. Equipped with this new knowledge, I started the op-ed about why we shouldn't abandon predictive policing with more conviction regarding my rhetoric. I think this determination is visible even in my first draft. I make conscious decisions to target my writing toward skeptics of the future of predictive policing, and my goal of convincing readers to support the research of predictive policing is conveyed.

One crucial takeaway from this experience was that my writing will always have an audience whom I must craft my rhetoric for. Although not perfect, I hope the improvements I made in my writing ability in this seminar allow me to become a writer that is better able to communicate my message and goals to more people. Thank you for taking the time to read through the work I have completed throughout this seminar.

Sincerely,

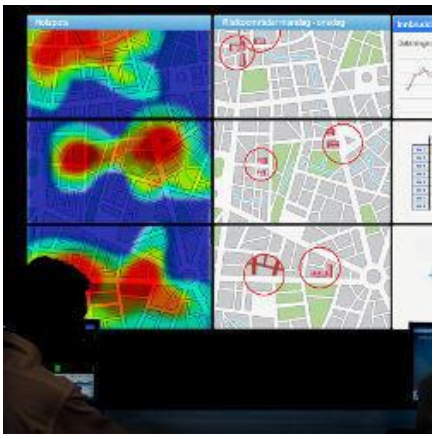
Ryan Cho

Op-Ed

WIRED Magazine

Predictive Policing: We Shouldn't Abandon It Just Yet

By Ryan Cho



1. Credit: Birgitte Blandhoel, https://cacm.acm.org/magazines/2017/2/212422-its-not-the-algorithm-its-the-data/abstract

In Broward County, Florida, an algorithm sifts through thousands of convicted individuals to assess their "Risk of Recidivism." This algorithm, called the 'Correctional Offender Management Profiling for Alternative Sanctions' or COMPAS algorithm, was designed by Equivant (previously Northpointe) to use a convicted person's history and questionnaire answers to estimate their risk of committing a crime again. In a damning report by ProPublica in 2016, it was claimed that the COMPAS algorithm displayed bias against Black defendants. The report concluded that the algorithm was 77% more likely to tag a Black defendant as being "high risk of committing a violent crime". Northpointe has disputed these claims.

Similarly, PredPol, a system designed to predict where crime is likely to occur to help the police dispatch their patrol units, has been under heavy criticism for potentially exacerbating existing police bias against neighborhoods with higher minority populations.

Cases like these keep occurring, and voices demanding the discontinuation of AI-based predictive policing are rising. But this technology is still in its infancy; is it really a good idea to pull the plug right now? I say no. We can't give up on this technology just yet.

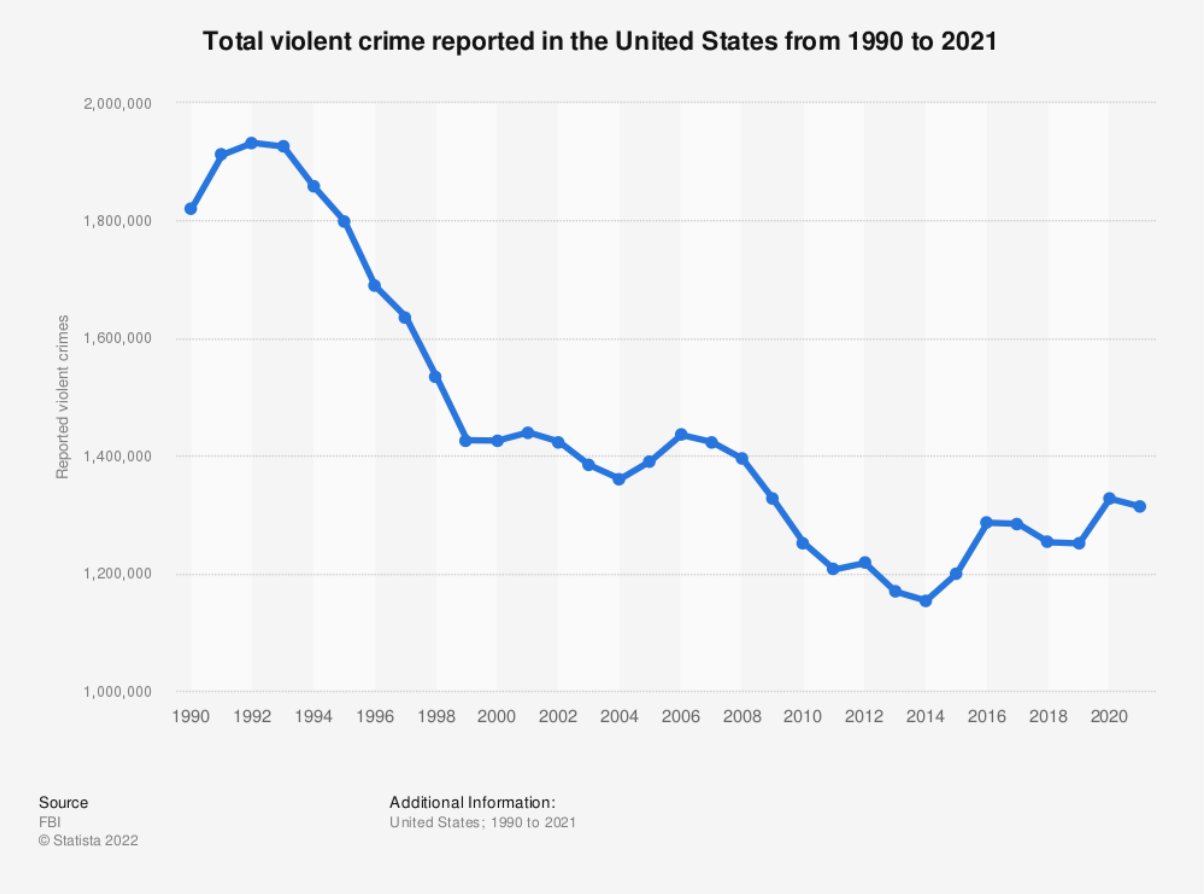
AI bias refers to the phenomenon of AI 'learning' human biases present in the data we generate. Predictive policing is especially susceptible to this problem as law enforcement has been and continues to be plagued with racial discrimination. By using data contaminated with years of racial and socio-economic bias, the predictive policing algorithms we create are inheriting these biases, learning how their human counterparts have discriminated against minority groups in the past.

The problem of AI bias may have a solution, however. Computer scientists are coming up with new innovative ways to eliminate bias from AI. AI has no motives or agendas of its own, contrary to what critics may make it seem. So AI has the potential to be completely bias-free. The only reason why bias exists in AI systems like predictive policing algorithms is that the data it feeds on has biases within them. So, if AI is so great at catching patterns humans can't, what if we use an 'auditing AI' to recognize and catch bias from these problematic algorithms?

That's exactly what companies are trying to achieve. Google has developed an auditing tool called the What-If Tool that assesses whether an AI is biased based on proprietary fairness indicators. IBM has created and shared its AI Fairness 360 toolkit, an open-source toolkit that scrutinizes for bias within an AI algorithm's results and helps mitigate those biases.

Private corporations are striving to develop technologies that help eliminate bias from AI because they have a financial incentive to do so. More and more companies are using AI to automate and enhance their hiring process, and suboptimal hiring choices due to a biased AI is not desirable. The hiring process is just an example: private corporations seek to reap the benefits of AI for their businesses without pesky bias getting in their way. With the speed at which AI technologies develop when backed by the private sector, there is hope for bias mitigation in AI, including in predictive policing systems.

We should continue developing predictive policing systems because the truth remains that the U.S. desperately needs some help in improving public safety. Over 15,000 homicides were committed in the United States in 2021, and the U.S. ranks 4th highest in intentional homicide rates among OECD nations with five intentional homicides per 100,000 people. Extending more broadly to total violent crime, the number totals around 1.3 million annually.



2: Violent crime has decreased since 1990 but is still lingering at around 1.3 million per year.

Source: Statista, FBI. https://www.statista.com/statistics/191129/reported-violent-crime-in-the-us-since-1990/

The U.S. must find an alternative method to increase safety for its citizens with dwindling resources. That's where predictive policing, if perfected, can be extremely valuable. There is and always will be a finite number of police officers, and they are handily outnumbered by the number of violent crimes in the U.S. Predictive policing can be an invaluable tool for U.S. law enforcement in achieving their goal of a safer America by helping to make the most out of existing resources. It may even help reduce racial profiling among the police force if the job of orchestrating patrol zones or random police stops is relegated to an objective AI system that is free of bias.

Countries like China, which are admittedly a lot less concerned about the freedoms of its citizens, have extremely low crime rates partly thanks to their intense technology-aided law enforcement, which implements not only predictive policing but also mass surveillance. While the argument isn't to make the U.S. a privacy-invading mass surveillance state, it remains a fact that China's system is efficient in controlling violent crime. Developing an unbiased predictive policing algorithm may provide a compromise that ensures the right to privacy for Americans while reducing crime in the U.S.

Predictive policing is flawed as a technology right now, and racial bias is unacceptable for a technology meant to improve the lives of ordinary people. What's also unacceptable is the amount of violent crime in the U.S., and the lack of resources to prevent them. Predictive policing is a technology that should be fixed and perfected, not thrown away, because it has the potential to drastically improve public safety in the U.S.

Post Outline

Rhetorical Situation

Proposition:

The U.S. should continue to develop AI-based predictive policing technologies despite its current bias issues.

Audience:

The audience will be readers of the Wired magazine and internet publication that are interested in artificial intelligence. More specifically, the op-ed will be targeted towards those with a strong opinion on the use of predictive policing algorithms. By reaching these people I can convince them to elect officials that have a similar view of predictive policing that I have.

Genre:

A short op-ed directed towards individuals interested in AI technology that regularly read Wired articles.

Motive of Author:

As an AI technology enthusiast and someone who hopes to work in AI related fields in the future, I fear that current worries about biases in predictive policing will result in lack of support for the development of this technology. I hope to garner support for predictive policing because I believe that if matured, it can become a useful tool for public safety in the U.S.

Motive of Reader:

To gain more information on what the current situation is surrounding predictive policing in the U.S., current technological innovations in AI bias removal, and some insight into why we should continue to support its development.

Goal of Author:

To convince readers that AI-based predictive policing should continue to be supported because of its future potential to become a fair way to reduce crime rates in the U.S.

Author's Plan:

Show why biases can be eliminated with more research. Stress why companies have an incentive to eliminate bias from AI. Compare to different countries that embrace predictive policing. Emphasize violent crime rates in the U.S. that can be controlled in the future using predictive policing.

Rhetorical Strategies:

Ample examples of other countries to emphasize that violent crime rates in the U.S. are unreasonably high and need to be remedied. Include examples of different bias elimination techniques to show that bias can be removed from AI algorithms.

Logical Outline

(Given) COMPAS algorithm has been studied to possess racial biases.

(Given) PredPol has received criticisms about its potential biases.

(Given) There is a vocal group that urges the U.S. to move away from supporting predictive policing

(Given) AI bias is the result of an AI learning from problematic data.

(Thus) The U.S. should continue to develop AI-based predictive policing technologies despite its current bias issues.

(Because) Bias in AI can be eliminated.

(For example) Research into bias elimination in AI is active, with Google, IBM and others pursuing bias elimination techniques.

(For example) Private corporations are pursuing bias elimination because are financially incentivized to do so. Companies aspire to automate their hiring processes.

(Because) The U.S. needs to improve public safety.

(For example) The U.S. has one of the highest intentional homicide rates in the OECD.

(For example) More than 15,000 homicides and 1.6 million violent crimes occur in the U.S. annually.

(For example) China, which actively implements predictive policing, has a significantly lower crime rate than the U.S.

(For example) Predictive policing could allow for reduced crime rates without compromising citizens' rights.

White Paper

Biases in AI-based Predictive Policing and Risk Assessment

White Paper for Law Enforcement Agencies Looking to Adopt AI-based Predictive Policing and Risk Assessment

Ryan Cho

Introduction

Predictive policing is defined as an analytics technology that assists law enforcement and the criminal justice system by using data to predict where crimes are likely to occur and who will commit them (Lau 2020). These predictive policing systems are designed to help make more efficient use of existing police resources by offering recommendations based on statistics (Shapiro 2017, 458). Another popular form of predictive policing technology involves predicting how likely a convicted felon is to re-offend. Although empirical evidence of the effectiveness of such systems is lacking, their claimed potential benefits are attractive to stakeholders in the criminal justice system (Meijer 2018, 1031-1039). Congress has been eager to make predictive policing and profiling technology a mandatory risk assessment tool for all federal prisons in a bill proposed in 2015 (Yapo 2018, 5366-5370). Predictive Policing technology is still in its infancy, pending verification of effectiveness. Yet, many have already adopted it, and it may even be implemented on a federal level in the United States.

According to computer scientists and philosophers, Artificial Intelligence is defined as an algorithm or a set of algorithms that produces an output based on inputs given, typically to provide a solution to a problem. Artificial Intelligence has become an integral part of society, with Predictive Policing being one of the many applications of AI. Since its inception, AI has become more independent of human instruction. Instead of being rule-based, AI now heavily depends on Neural Networks, a complex mathematical model designed to mimic neurons in the human brain, to operate and make decisions. As it becomes harder to dissect the inner workings of AI, ensuring fairness in predictive policing is becoming increasingly more difficult (Coeckelbergh 2020).

Due to the bias-related concerns listed above, along with real-world instances of bias, political and philosophical debates have sparked on how predictive policing software should be managed and used (Heaven 2020). Indeed, society would face immense moral implications if a discriminatory AI were to determine police strategy and policy.

This white paper will explain how bias can occur in predictive policing systems and explore plausible solutions to this problem for stakeholders in law enforcement considering the adoption of the technology. This document aims to provide a historical and technical overview of bias in AI-based predictive policing, along with some proposed solutions to eliminate potential biases that may occur.

History of Bias

To comprehend the scope and importance of bias in predictive policing technologies, it is important to inspect historical instances of bias in predictive policing. Various predictive policing algorithms have accumulated accusations of bias and discrimination. The most prominent example is the COMPAS system, an algorithm developed by Northpointe to predict whether a convicted criminal would re-offend. ProPublica studied the COMPAS algorithm and found that while its error rate was similar for black and white defendants,

the algorithm was twice as likely to label black defendants as high-risk compared to white defendants. Conversely, the algorithm wrongly labeled white defendants as safe at a higher rate than black defendants. The ProPublica report continued by stating that black defendants were 77% more likely to be tagged by the COMPAS algorithm as high risk of committing a violent crime and 45% more likely to be tagged as high risk of committing any crime (Angwin 2016).

While examples like the COMPAS algorithm clearly show bias in Predictive Policing systems, there is no clear empirical evidence to suggest widespread bias in AI-based Predictive Policing. (Meijer 2018, 1031-1039). However, even the possibility of such adverse effects merits closer inspection of these systems.

Historical examples of bias in predictive policing call for implementors to be more cautious in their attempts to adopt this technology. Acknowledging past issues and building expertise and preparedness to combat bias in predictive policing will help prevent similar problems from reoccurring. The public is also more likely to be optimistic about the shift towards predictive policing if the implementors openly address their concerns about fairness.

Potential Causes of Bias

Understanding how biases occur in AI is crucial for any attempt at bias mitigation. However, at what stage bias occurs in an AI-based system can often appear unclear. For example, the aforementioned COMPAS algorithm did not have questions regarding race in the questions they provided defendants (Angwin, 2016). Bias can develop in various ways in an AI's design and development process, but it is difficult to diagnose the cause. This stems from the "black box" problem, which refers to how developers know the input and design of the algorithm but cannot understand how the input is processed to produce the output. The inability to interpret Neural Network based AI causes the "black box" problem (Coeckelbergh 2020). However, one could inspect the parts of AI design that are revealed to the operator to identify points of concern.

Problematic Feature Selection

Biased feature selection can lead to biases in the outputs of AI. Issues in feature selection are the most obvious way an AI could be biased. Features are the attributes of data that the designers of an AI system select for the system to analyze. The AI uses these features to produce a result. For example, if race is included as a feature in a reoffence prediction AI, the AI will use information on race to predict whether the subject will re-offend. However, excluding a feature from evaluation is not as simple as removing the feature from the feature set. Returning to the example, if the AI is given income information and address, racial information could still be indirectly deduced by the algorithm when producing a result (Roselli 2019). Seemingly innocent choices of features could have underlying connections to other excluded data that have been contaminated with bias.

Inheriting Bias from Data Sets

Problematic data sets are often the cause of biases rather than issues with algorithm design. An incredible amount of data is needed to train a neural network fully, which makes the likelihood of an issue in the data set going unnoticed higher. AI can only learn from past information, especially for systems that adopt the popular neural network method. Data from the past inevitably have biases created by humans, and thus the AI will 'learn' these biases to produce biased results (Roselli 2019). The data set issue is more significant in the application of predictive policing because policing and the criminal justice system have historically been rampant with discrimination. Historical incarceration information will surely include arrests and convictions that were discriminatory in

nature (Heaven 2020). Biased data is the most influential and probable culprit of bias within AI.

Self-Fulfilling Prophecy

A biased AI risks becoming even more biased because of a 'feedback loop' or 'self-fulfilling prophecy.' This is because such a system continues to learn from recent data, and if itself has affected recent data through its decisions, it will reinforce its own biases. Roselli provides a good example: Algorithms that predict crime based on police reports may cause more police to be deployed to the site of the predictions, which may result in more police reports (Roselli 2019). If a biased predictive policing algorithm is deployed, it may reinforce its bias the longer it operates. A 'nearly impartial' AI with minuscule amounts of bias can turn itself into a heavily biased system by continued operation.

Possible Solutions

There are many potential solutions to the bias problem in predictive policing. While these are mere proposals, implementing these solutions may help mitigate bias in AI-based predictive policing.

Depend Less on Criminal Data

Most of the bias problems in predictive policing stem from the biased historical data our society has produced. This fact has led to some suggesting that future implementations should lower their dependency on criminal data.

HunchLab, developed by Azavea, is a predictive policing tool the NYPD uses to dispatch its patrol units more efficiently. HunchLab removed petty crimes such as drug sales and drunkenness from the training data to reduce bias, because these cases are "quality of life" offenses that correlate with poverty. Additionally, random dispatches to "medium-risk" locations were added to dilute further any bias that may remain in the system (Shapiro 2017). These measures may be effective to continue benefiting from data-driven predictive policing while reducing bias by pruning problematic data.

Fundamental Changes to Application

More drastic changes, including reforming how predictive policing technology is used, may rid systems of bias. A solution has been proposed in which AI monitors law enforcement officers instead of the citizens. Analyzing officers' performance and efficiencies may highlight which officers need more support, retraining, or reallocation (Ferguson 2017). This method would not rely on problematic historical data but would achieve the same result of making more efficient use of police resources.

Intense Regulation

The most straightforward method theoretically would be to uphold the status quo but mandate stricter legal regulation and scrutiny to firms developing predictive policing tools. Transparency throughout the production of predictive policing systems, particularly in the training data, can help identify bias issues before they cause damage (Roselli 2019). Transparency can allow implementors to filter biased data or choose not to elect a specific predictive policing product if some part of its development raises bias-related concerns.

Using and Researching Bias Detection and Elimination Methods

A long-term solution would be to research and use technologies that can help mitigate bias in AI systems. Significant progress has already been made in this aspect, with Google's People + AI Research (PAIR) group developing the What-If Tool. What-If Tool is an interactive tool suite that can audit the fairness of an AI model by testing the model against user-defined hypothetical inputs (Wexler 2020). Other corporations in the IT and auditing industry have also made their own tools, PWC and IBM being major

examples (Gow 2022). If bias auditing and mitigation technology continue to develop, they may be applied to predictive policing algorithms to rid them of bias.

Conclusion

The causes behind bias in predictive policing systems are most likely due to AI's vulnerability to data-induced bias. The suggested benefits of successful predictive policing may be valuable to society, but the technology is still prone to discriminatory bias. By being aware of the cause of bias in AI, implementors of AI-based predictive policing can exercise responsibility by developing and deploying adequate solutions. The most currently actionable solution is the legal regulation of predictive policing algorithms. As is with banking, healthcare, and other industries that have deep societal impact, predictive policing algorithm development may be a prime candidate for strict governmental regulation. The other solutions require more long-term investment for research and development but are required to ensure that all biases are eliminated, even the ones that may slip through regulatory measures.

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Post-Outline

Reason 1: Introduction

(Given) AI is prevalent in our daily lives (Coeckelbergh 2020)

(Given) Predictive policing is considered as a key tool for crime prevention (Yapo 2018)

(Given) There may or may not be potential benefits to predictive policing (Meijer 2018)

(Given) The use of predictive policing continues to grow (Yapo 2018)

(Given) AI is prone producing to biased results

(Given) There are political and philosophical debates surrounding predictive policing.

(Thus) This White Paper will explore the ways in which biases can occur in predictive policing and possible solutions to remedy the bias.

Reason 2: Problem

(What) AI-based predictive policing has previously produced biased results.

- (For example) COMPAS algorithm has been shown to have racial bias (Angwin 2016).

(Why) The black box problem arises where nobody knows how an AI comes to a decision, which can make biases hard to detect (Coeckelbergh 2020).

(Why) Current AI technology relies on neural networks which are prone to biases.

- (For example) Bias can also occur in the preliminary stages of AI where human bias can take place unintentionally in feature selection.
- (For example) The AI is exceptionally good at recognizing patterns from its training data, but problems arise when biased historical data is used.
- (For example) 'Feedback loops' or 'self-fulfilling prophecies' can occur to reinforce biases.
- (Roselli 2019)

Reason 3: Solution

(What) Relying less on historical data

- (For example) Re-evaluating data to exclude those that may be linked to race/socio-economic status (Shapiro 2017)

(What) Changing how predictive policing is applied

- AI to evaluate police performance instead of criminal activity (Ferguson 2017)
- If AI detects relatively high volume of police stops compared to actual arrests, police resources can be allocated to places where police stops yield more arrests.

(What) Setting up strict protocol for implementors and regulators to try detect bias.

- (For Example) Full transparency in the data being handled can be useful in detecting potential biases that the AI can pick up on (Roselli 2019)

(What) Using and researching bias detection and mitigation technologies.

- (For Example) Google's What-If Tool provides methods to test for bias in AI models (Wexler 2020).
- (For Example) PWC and IBM also have tools for fairness auditing and mitigation (Gow 2022).

Reason 4: Conclusion

The cause of bias in predictive policing is probably data-induced bias in AI. Implementors of predictive policing must implement solutions after understanding how bias forms in AI. Regulation is required and can be deployed right now, but further development of technical solutions are needed to rid predictive policing of bias.

Rhetorical Situation

Proposition: This White Paper will explain the ways in which bias can occur in predictive policing systems and explore plausible solutions to this problem.

Audience: Law enforcement, other implementors of predictive policing

Genre: White paper

Motive of the Author: To educate the audience on the reasons why biases can occur in AI-based predictive policing, and to suggest possible solutions to the problem.

Motive of the Reader: To gain an understanding of why bias occurs in AI-based predictive policing and to learn about possible ways to remedy the issue.

Goal: Prevent AI-based predictive policing programs from producing results that are discriminatory.

Plan, including where you will publish your white paper: Published in scholarly journals or distributed directly to relevant government agencies

Rhetorical Strategies: Abundant use of examples to portray how certain features of AI combined with biased data can produce biased results. Relevant examples to show adverse effects when applied to predictive policing.

Keywords: Predictive policing, AI ethics, AI bias, criminal justice system

One-on-one peer review of a colleague's White Paper

Submitter: Margot Schneider

Propositional Content

4 — Meets and sometimes exceeds expectations

The proposition is clear with premises that align with the propositional content. The introduction does a great job in informing the audience of the contents of the paper. Your premises consist of easily acceptable information that builds towards your proposition.

Invention

4 — Meets and sometimes exceeds expectations

The white paper takes novel concepts of digital autonomy and digital/physical space and explains them in an easily comprehendible manner. The contents of the paper builds as the reader continues to read, with little to no redundant information. Overall, I found the topic innovative and unique.

Rhetoric

3 — Mostly meets expectations

Overall, the rhetoric of your white paper is good. The contents, language, and technical depth is consistent with your intended audience. I would watch out for your tone and language, however. Sometimes, some assertive language like "should" or outright negative descriptions of entities may not be suitable for a explanatory white paper. Of course, you may be suggestive of your opinions while maintaining the explanatory mode, but it is a fine line and I think you may benefit from refining these aspects of your rhetoric.

Genre

4 — Meets and sometimes exceeds expectations

The paper follows all genre conventions of the white paper genre. I especially appreciated how your problem and solution sections were clearly divided, and even within those sections you distinguished different subsections to further clarify what you were explaining.

Presentation

4 — Meets and sometimes exceeds expectations

I think the presentation of this paper is appropriate. Section headers were informative and useful, and your citation style minimizes distractions while reading. I enjoyed the included figures as they were placed in such a way that aided the understanding of the contents.

Aesthetics/Reading Experience

4 — Meets and sometimes exceeds expectations

I enjoyed reading this white paper. One minor critique would be that the formatting of some of your subsections can seem a little cluttered. For instance, your examples under "Algorithm Applications" may benefit from alternative formatting. No issues other than that.

Weighted Average: A

General Comments

Great work! I thoroughly enjoyed reading this white paper and I personally feel that I have learned a lot from your explanations. Just a few minor tweaks and you should be ready for the final portfolio. I would focus on the rhetoric issue first, as that was what stood out to me most when reading. I don't know how to best explain it, but it felt as though the author was trying to convince me to think a certain way. Toning down assertive language should remedy this. Again, good job and keep it up!

Document Reviewed

Margot Schneider
Dr. Jean-Paul Cauvin
Writ 0730
October 28, 2022

Exploitative Data Collection and Algorithms: A White Paper for Policymakers

Introduction:

With one click, today's internet can take users anywhere - the grocery store, movie theater, mall, or a foreign country. While users traverse the internet with relative ease, artificial intelligence algorithms are hard at work behind the scenes ensuring that every move a user makes is recorded.

From social media and dating platforms to virtual professional opportunities, users constantly use platforms that exploit them for either capital or data. Certain users like medical patients, however, can benefit significantly from algorithms' unique pattern recognition abilities. In either case, users' autonomy is encroached upon due to their lack of understanding of the field, institutional failure to obtain consent, and a lack of ethical policy regulation.

This white paper investigates processes of data collection fueled by complex algorithms. This white paper also surveys a range of solutions and ethical frameworks offered by data experts that data policy makers may consider when seeking to draft legislation that would protect the privacy and autonomy of users.

Problem Definition:

Representmen, Consent, and Digital Autonomy

Many researchers agree that users may not understand the implications of their technology use, the subsequent data collection processes, and what it means for their digital footprint. Everything users do is tracked; these pieces of data are then recorded and kept in an online space.[1] Data analytics draws on all the available information on a subject to make algorithmic inferences about political stances, sexual identities, immigration statuses, and more. Whether or not the individual has chosen to reveal this information, the technology can deduce these major

[1] Englezos, Elizabeth. 2020. "Forget Consent? Answering the Challenges of the Digital Space." *Journal of Information Ethics* 29 (2) (Fall): 46-69. doi:https://doi.org/10.2307/JIE.29.2.46. https://proxy.library.upenn.edu/login?url=https://www.proquest.com/scholarly-journals/forget-consent-answ ering-challenges-digital-space/docview/2486868624/se-2.

identifiers.[2] A representman or an 'actor' is then created to 'play' users in the digital world; this actor has the autonomy to represent a user to third parties without the knowledge and consent of the material person. The digital character's actions influence how the physical person is viewed by others; because the digital persona can reach a wider audience than the material person, its influence becomes the dominant force in a material person's appearance.[3]

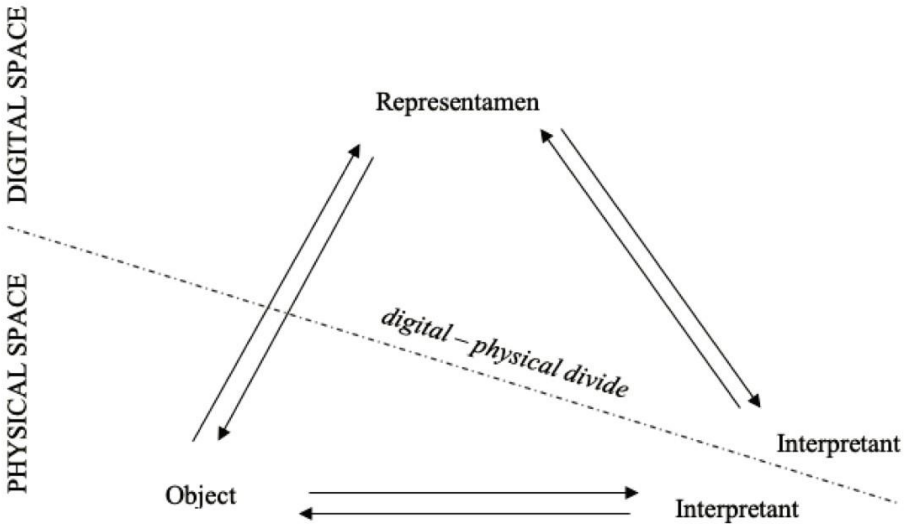

Figure 2, "Peirce's Semiotic Triangle in Digital and Physical Space" (Englezos, 2020). This diagram emphasizes how the material person and the digital representman inherently differ because of complicated algorithmic design, and are interpreted differently across a digital/physical divide.

Once this actor is created, several consequences come into play:

- User has lost autonomy over digital footprint
- Representman's actions are left up to algorithms, physical person no longer has input[4]
- Uncontextualized and isolated data points are subjected to biases of coders making algorithms - their decisions to emphasize or deemphasize certain data points can have social implications – predictive policing, elections, social media[5]

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[2] Pike, Elizabeth R. 2020. "Defending Data: Toward Ethical Protections and Comprehensive Data Governance." *Emory Law Journal* 69 (4): 687–743. https://search-ebscohost-com.proxy.library.upenn.edu/login.aspx?direct=true&db=aph&AN=143867557&s ite=ehost-live.

[3] Englezos 2020.

[4] Ibid.

[5] Ibid.

Despite data being deceivingly understood as an empirical set of points and codes, data and its algorithms are subjective.[6]

Giving consent to data use is challenging. A material person cannot accurately transfer into the digital sphere - they can accept certain terms and conditions, but this consent is moot if the representman has already established its own agency. Furthermore, the material person does not understand how their digital actor was synthesized, nor can they predict how it will represent them, and thus cannot grant legitimate agency anyways.[7] Even when consent of representman use is technically *possible* to obtain, oftentimes it is completely impractical due to disclosure overloads are in technical and impractical jargon.[8]

The Value of Data Capital

Companies substitute readable Terms and Conditions for deceptively free service, and profit from data brokerage rather than monetary gain.[9] Big technological monopolizers like Google and Facebook can force consent by reducing a user's options to either consenting or being disadvantaged by forgoing crucial and popular services.[10] If the user does not understand the dangers of forgoing their privacy, the choice is obvious: opt in.[11]

> Tech giants have a few ways of 'consensually' obtaining data from their users:

- Feigning anonymity through isolation. Constructed senses of anonymity on the internet is named by users as one of the most appealing features.[12]
- Fabricated mask of user control. Users *feel* autonomous (when really they are not) when presented with simple consent questions about sharing/using data; when simply asked the question, they are two times as likely to autonomously choose to share responses.[13]

Privacy, Protection, and Representation Issues

> Because consent is difficult to translate digitally, privacy of users is difficult to protect.

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[6] Ibid.
[7] Englezos 2020.
[8] Ibid.
[9] Cedric Courtois and Elisabeth Timmermans, "Cracking the Tinder Code: An Experience Sampling Approach to the Dynamics and Impact of Platform Governing Algorithms," *Journal of Computer-Mediated Communication* 23, no. 1 (January 2018): https://academic.oup.com/jcmc/article/23/1/1/4832995?login=true.
[10] Englezos 2020.
[11] Ibid.
[12] Ibid.
[13] Pike 2020.

Algorithms capitalize off of “data-poor” users.[14] Institutions are considered “data rich” because of 5 key elements that users lack: “technical means,” “autonomy of use,” “use patterns,” “social support networks,” and “skill.”[15] Institutions like Amazon, Google, and Facebook often author a corporate social responsibility framework to protect their users, though recent studies find these responsibilities are often neglected. Economic interests remain their utmost priority.[16]Additionally, these tech monopolizers use their algorithms to diminish minority voices.[17]Algorithms - pattern recognition machines - look for the most popular traits or responses to questions or stimuli.[18] This intrinsic purpose of the code devalues minority traits or opinions to identify majority patterns, which perpetuates systemic issues. Examine city infrastructure–using a Boston municipality mobile app, residents could digitally report potholes to the city for repair. Wealthy neighborhoods were frequently repaired and poor neighborhoods hardly ever were because their socioeconomic statuses made them less likely to have mobile phones.[19]

Algorithm Applications

Example(s) #1 - Algorithms and Health

The function of algorithms is to process data. With the gluttonous amounts of data available today, pattern recognition machines are not inherently good or bad. Some positive examples include algorithms in medicine; machines now can “identify metastatic breast cancer with 100% accuracy” - a percentage unmatched by physicians.[20] Machines also accurately predict future autism cases in infants.[21]

Machines have incredible abilities to evaluate mental health status. Algorithms can identify depression indicators by detecting decreased physical activity, connection with frequent contacts (likely loved ones), and social media presence, which can predict suicide up to two years prior and protect those suffering mental illnesses.[22]

Example #2 - Algorithms and Job Recruiting

Lots of algorithms also exploit users via data collection processes and presentations. ZipRecruiter lack of algorithmic transparency results in questionable “matching technology” of job applicants to companies. This can prevent users from

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[14] Richard Novak and Anton Pavlicek, "Data Experts as the Balancing Power of Big Data Ethics," *MDPI*, February 21, 2021, https://www.mdpi.com/2078-2489/12/3/97/htm.
[15] Ibid.
[16] Ibid.
[17] Englezos 2020.
[18] Ibid.
[19] Pike 2020.
[20] Ibid.
[21] Ibid.
[22] Ibid.

being presented to potential employers without knowledge of their exclusion or knowledge of what factors of their digital persona were involved.[23]

Example #3 - Problematic/Dangerous Algorithm Deductions

Algorithms can present safety issues by deducing undisclosed personal traits; Stanford University's algorithm that uses facial recognition technology to deduce sexuality can place members of the LGBTQ+ community at safety risk, especially in countries where expression of homosexuality is illegal.[24]

Example #4 - Mobile Dating Apps

Mobile dating apps like Tinder encapsulate many of the aforementioned ideas relating to digital consent and the value of data. These apps are appealing to users because they satisfy many personal needs: sexual, romantic, psychological, and validatory.[25] Activity on these apps translates into company revenue, either via users paying for premium subscriptions or data brokerage.[26] Tinder's algorithm supposedly supports mutual consent, as seen through its partner matching practices.[27] However, the platform's hidden algorithm actually gives each user an attractiveness score based on activity, matches users of certain scores together, and limits user interaction across the entire app.[28] The algorithms perpetually shift between enticing and restricting their users to addict them, which pulls them towards paying for premium services.[29]

Solutions:

<u>Perspective from Data Experts</u>

If policymakers are interested in tailoring their work for effectiveness and specific impact, then a helpful resource for them to target is data scientists, who have a foot in both the institutional and the user worlds.[30] This quality gives them unique insight - they're aware of the pros and cons of Big Data and algorithm science, exposed to the capitalist and exploitative nature of monopolizing tech institutions, *and* they understand the user context and experience. The special role that they inhabit is

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[23] Englezos 2020.
[24] Ibid.
[25] Femke Konings et al., "Behind the Screens: A Systematic Literature Review of Quantitative Research on Mobile Dating," *SpringerLink*, July 5, 2022, https://link-springer-com.proxy.library.upenn.edu/article/10.1007/s10508-022-02312-9#citeas.
[26] Courtois and Timmermans, 2018.
[27] Ibid.
[28] Ibid.
[29] Ibid.
[30] Novak and Pavlicek 2021.

defined by the following three characteristics: “motivation and competence; sense of responsibility for data ethics; [and] possibility and means to influence Big Data issues.”[31]

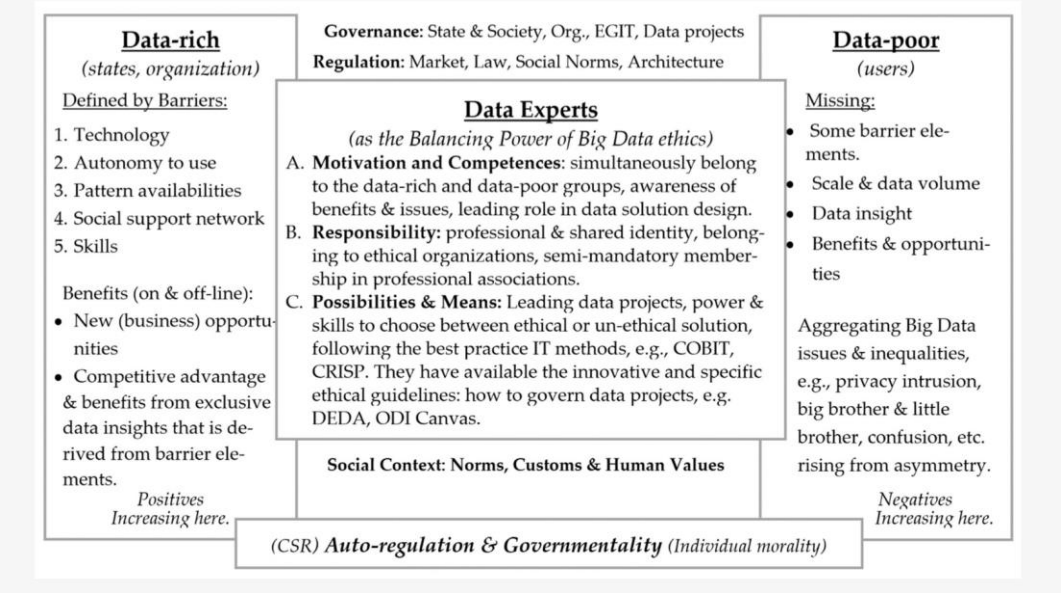

Figure 1, “Model mapping the role of data experts in Big Data ethics and describing them as a balancing power” (Novak and Pavlicek, 2021). This diagram highlights unique characteristics of data experts in juxtaposition of the institutions who have competitive advantages/exploitative motives and the users with little leverage.

Why and How Data Experts can Prioritize Humane Ethics in Their Work

Data experts have a few methods of prioritizing ethics. They do not necessarily need to have corporate responsibility initiatives in mind when creating ethical algorithms - they can solve problems and alter priorities directly in their code.[32]

Once users recognize the extent to which they are exploited, they have a right to demand a new ethical framework.[33] Data experts are subject to this potential harm as much as any user; further, they are aware of the extent to which their image is left up their digital representman. “59% of tech workers have worked on products they have felt harmful to society, and more than 25% of workers in AI who had such experience quit their jobs as a result. This was particularly marked in relation to AI products,” explains one study.[34] This shift has led to a rise of activism against such products, which works to keep tech giants in check and brings the topic of AI’s social

[31] Ibid.
[32] Ibid.
[33] Englezos 2020.
[34] Lu Cheng, Kush Varshney, and Huan Liu, "Socially Responsible AI Algorithms: Issues, Purposes, and Challenges," *Journal of Artificial Intelligence Research*, August 2021, moz-extension://e7198161-a150-4eda-9983-5c5c2e704296/https://www.jair.org/index.php/jair/article/do wnload/12814/26713/.

responsibility to media attention.[35] As a result, universities and research institutions are now taking steps to mitigate the harm caused by their algorithms.[36]

As both an expert and user, these data scientists have certain ethics ingrained in them from childhood, in addition to their professional expertise; philosopher Jan Sokol urges them to use these ethics in search for moral rightness.[37] At the end of the day, data experts were people long before they were experts, and they will remain people no matter the validity of their expertise. Human values, Sokol argues, should remain the ultimate guiding factor in algorithmic work.[38]

One way of putting humane ethics first is to use the DEDA framework used by Dutch institutions. DEDA (Data Ethics Decision Aid) can serve as a guiding framework for fostering early, inclusive conversation when designing data projects.[39] DEDA is broken into three steps: establishing methodology, organizing stakeholders, and asking 29 ethical questions about ways to use data.[40] Some questions include: “Is there someone in the team who can explain how the algorithms in use work? Can you communicate how the algorithms work? Where does the data(set) come from?”[41]

Conclusion:

The structure of prominent and heavily-relied-upon data rich institutions allows for many ethically exploitative actions of which their users remain usually unaware. Policy makers should target data expert stakeholders who hold a unique position from which they could legitimately and effectively regulate Big Data by actively prioritizing humane ethics in their technical work. Some researchers agree that ethics can and should be at the center of technical data work; policymakers can use this information and proposed framework to defend user autonomy with targeted and specific technical policy. Ultimately, policy makers can use this white paper to serve as solution oriented stakeholders who can decrease user exploitation and mitigate threats to user autonomy.

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[35] Ibid.

[36] Ibid.

[37] Novak and Pavlicek 2021.

[38] Ibid.

[39] Ibid.

[40] Ibid.

[41] Ibid.

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Konings, Femke, Sindy Sumter, Isle Vranken, and Laura Vandenbosch. "Behind the Screens: A Systematic Literature Review of Quantitative Research on Mobile Dating." *SpringerLink*, July 5, 2022. https://link-springer-com.proxy.library.upenn.edu/article/10.1007/s10508-022-02312-9#cit eas.

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On-Demand Writing 2

I was recently notified of an event where some staff at the Six Degrees National Hotel in Washington D.C. mistreated and discriminated against our guests. The Six Degrees National Hotel does not condone racism and discrimination of any kind in our hotels, and the reported behavior of the staff at our Washington D.C. location is unacceptable in any circumstance. I want to offer my sincerest apologies to the members of the Mandarin Education Association who were subject to this inexcusable treatment by our staff, and to all our other guests who trusted us with providing the exceptional hotel experience that is expected of us. We broke our promise of providing the best possible customer experience to the guests that chose to stay with us. The Six Degrees National Hotel will commence immediate action to prevent similar incidents from occurring again to any of our guests, including a chain-wide re-education program to make sure all our staff is aligned with our values against discrimination and commitment to service. At Six Degrees National, we are committed to providing our guests with the highest quality of service, and we hope to regain the trust of our guests who were rightfully disappointed in us for allowing such incidents to occur under our management. Again, we apologize for the recent unprofessional and discriminatory behavior of our staff. We hope to serve you again at our best once our shortcomings have been resolved.

Op-Ed: Pre-Outline

Rhetorical Situation

Proposition:

The U.S. should continue to develop AI-based predictive policing technologies despite its current bias and privacy issues.

Audience:

The audience will be readers of the Wired magazine and internet publication that are interested in artificial intelligence. More specifically, the op-ed will be targeted towards those with a strong opinion on the use of predictive policing algorithms. By reaching these people I can convince them to elect officials that have a similar view of predictive policing that I have.

Genre:

A short op-ed directed towards individuals interested in AI technology that regularly read Wired articles.

Motive of Author:

As an AI technology enthusiast and someone who hopes to work in AI related fields in the future, I fear that current worries about biases in predictive policing will result in lack of support for the development of this technology. I hope to garner support for predictive policing because I believe that if matured, it can become a useful tool for public safety in the U.S.

Motive of Reader:

To gain more information on what the current situation is surrounding predictive policing in the U.S., and some insight into why we should continue to support its development.

Goal of Author:

To convince readers that AI-based predictive policing should continue to be supported because of its future potential benefits.

Author's Plan:

Show why biases can be eliminated with more research, and list potential benefits that a successful predictive policing algorithm can bring. Compare to different countries that embrace predictive policing. Emphasize violent crime rates in the U.S. that can be controlled in the future using predictive policing.

Rhetorical Strategies:

Ample examples of other countries to emphasize that violent crime rates in the U.S. are unreasonably high and need to be remedied. Include examples of different bias elimination techniques to show that bias can be removed from AI algorithms.

Logical Outline

(Given) Predictive policing has been criticized for racial and socioeconomic biases.

(Given) Privacy is a concern often brought up when discussing predictive policing.

(Given) There is a vocal group that urges the U.S. to move away from supporting predictive policing

(Given) When implemented correctly, predictive policing has the potential to effectively combat crime.

(Thus) The U.S. should continue to develop AI-based predictive policing technologies despite its current bias and privacy issues.

(Because) Bias in AI can be eliminated.

(For example) Research into bias elimination in AI is active, with Google, Microsoft, IBM and others pursuing bias elimination techniques.

(Because) Violent crime rates in the U.S. is significantly higher than other countries.

(For example) Highest homicide rate in the OECD.

(For example) China, which actively implements predictive policing, has a significantly lower crime rate than the U.S.

Op-Ed: Early Draft

Predictive Policing: We Shouldn't Abandon It Just Yet

By Ryan Cho

In Broward County, Florida, an algorithm sifts through thousands of convicted individuals to assess their "Risk of Recidivism". This algorithm, called the 'Correctional Offender Management Profiling for Alternative Sanctions' or COMPAS algorithm, was designed by Equivant (previously Northpointe) to use a convicted person's history and questionnaire answers to estimate their risk of committing crime again. In a damning report by ProPublica in 2016, it was claimed that the COMPAS algorithm displayed bias against Black defendants. The report concluded that the algorithm was 77% more likely to tag a Black defendant as high risk of committing a violent crime. Northpointe has disputed these claims.

Similarly, PredPol, a system designed to predict where crime is likely to occur to help the police dispatch their patrol units, has been under heavy criticism for exacerbating existing police bias against neighborhoods with higher minority populations.

Cases like these keep occurring, and voices demanding the discontinuation of AI-based predictive policing are on the rise. But this technology is still in its infancy; is it really a good idea to pull the plug right now?

Scientists are coming up with new innovative ways to eliminate bias from AI. AI starts inherently unbiased as it possesses no preconceived notions. Contrary to what critics may make it seem like, AI has the potential to be completely bias free. The only reason why bias exists in AI systems like predictive policing algorithms is because the data it feeds on has biases within them. So, what if we use AI, which is inherently bias-free, to remove bias from other problematic AI?

That's exactly what companies are trying to achieve. Google has developed an auditing tool called the What-If Tool that assesses the bias of an AI based on fairness indicators. IBM has created and shared their AI Fairness 360 toolkit, which is an open-source toolkit that scrutinizes for bias in a given AI algorithm and helps to mitigate those biases.

Private corporations are striving to develop technologies that help eliminate bias from AI not out of the goodness of their hearts but because it is in their best interest to do so. More and more companies are using AI to automate and enhance their hiring process, and suboptimal hiring choices due to a biased AI is not desirable. With the speed at which AI technologies develop when backed by the private sector, there is hope for bias mitigation in AI including predictive policing systems.

We should continue to develop more fair predictive policing systems because the truth remains that the U.S. sorely needs enhancement in ensuring public safety. Over 15,000 homicides were committed in the United States in 2021, and the U.S. ranks 4th highest in intentional homicide rates among OECD nations with 6 intentional homicides per 100,000 people. Extending broader to total violent crime, the number totals 1.6 million annually.

Combined with a growing movement to defund the police, the U.S. then must find an alternative method to increase safety for its citizens. That's where predictive policing, if perfected, can be extremely valuable. There are a finite number of police officers, who are

handily outnumbered by number of violent crimes in the U.S. Predictive policing can be an invaluable tool for U.S. law enforcement and the general public.

Countries like China, which are admittedly a lot less considerate of the freedoms of its citizens, have extremely low crime rates partly thanks to their intense technology-aided law enforcement who not only implement predictive policing but also mass surveillance. The U.S., by developing and using a fair predictive policing AI may be able to bring down U.S. crime rates without resorting to becoming a privacy invading surveillance state.

Rhetorical Situation

Proposition:

The U.S. should continue to develop AI-based predictive policing technologies despite its current bias and privacy issues.

Audience:

The audience will be readers of the Wired magazine and internet publication that are interested in artificial intelligence. More specifically, the op-ed will be targeted towards those with a strong opinion on the use of predictive policing algorithms. By reaching these people I can convince them to elect officials that have a similar view of predictive policing that I have.

Genre:

A short op-ed directed towards individuals interested in AI technology that regularly read Wired articles.

Motive of Author:

As an AI technology enthusiast and someone who hopes to work in AI related fields in the future, I fear that current worries about biases in predictive policing will result in lack of support for the development of this technology. I hope to garner support for predictive policing because I believe that if matured, it can become a useful tool for public safety in the U.S.

Motive of Reader:

To gain more information on what the current situation is surrounding predictive policing in the U.S., current technological innovations in AI bias removal, and some insight into why we should continue to support its development.

Goal of Author:

To convince readers that AI-based predictive policing should continue to be supported because of its future potential to become a fair way to reduce crime rates in the U.S.

Author's Plan:

Show why biases can be eliminated with more research. Compare to different countries that embrace predictive policing. Emphasize violent crime rates in the U.S. that can be controlled in the future using predictive policing.

Rhetorical Strategies:

Ample examples of other countries to emphasize that violent crime rates in the U.S. are unreasonably high and need to be remedied. Include examples of different bias elimination techniques to show that bias can be removed from AI algorithms.

Logical Outline

(Given) COMPAS algorithm has been studied to possess racial biases.

(Given) PredPol has received criticisms about its potential biases.

(Given) There is a vocal group that urges the U.S. to move away from supporting predictive policing

(Thus) The U.S. should continue to develop AI-based predictive policing technologies despite its current bias issues.

(Because) Bias in AI can be eliminated.

(For example) Research into bias elimination in AI is active, with Google, IBM and others pursuing bias elimination techniques.

(For example) Private corporations are pursuing bias elimination because they aspire to automate their hiring processes.

(Because) Violent crime rates in the U.S. is significantly higher than other countries.

(For example) The U.S. has one of the highest intentional homicide rates in the OECD.

(For example) More than 15,000 homicides and 1.6 million violent crimes occur in the U.S. annually.

(For example) China, which actively implements predictive policing, has a significantly lower crime rate than the U.S.

(For example) Predictive policing could allow for reduced crime rates without compromising citizens' rights.

Op-Ed: Model

The model for my op-ed was from the WIRED magazine.

Here is a link to the model op-ed.

Or: https://www.wired.com/story/ai-algorithms-need-drug-trials/

Op-Ed: Peer Reviews Received

Draft 1

Reviewer: Hana Bader

Propositional Content

4 — Meets and sometimes exceeds expectations

Proposition is clearly stated in the title, which is succinct and engaging. Evidence is pieced together in a logically coherent manner. Counter argument is addressed nicely. As a minor note, I'm not sure if this statement helps your argument: "Private corporations are striving to develop technologies that help eliminate bias from AI not out of the goodness of their hearts but because it is in their best interest to do so." While a true statement, it isn't necessarily comforting to the reader that the use of AI to identify bias isn't being developed with good intentions. Maybe you could rephrase this as something like: "companies are motivated to develop technologies that eliminate bias because...". Then you wouldn't have to explicitly say that this area of development is selfishly-motivated.

Invention

4 — Meets and sometimes exceeds expectations

I think you managed to define the urgency of the problem well (i.e. citing crime rates in the U.S.). You also manage to acknowledge that AI bias is an important issue without detracting from your main argument.

Rhetoric

4 — Meets and sometimes exceeds expectations

The op-ed presents a lot of evidence while still remaining approachable and engaging. I liked that you occasionally posed rhetorical reflection questions to the reader. Your examples are well synthesized and digestible for general audiences such as Wired readers.

Genre

4 — Meets and sometimes exceeds expectations

You fulfilled the structure of an Op-Ed. The tone of the paper reads as more conversational and approachable. There is strong use of persuasive/justificatory language. Paragraphs and sentence structures are brief and engaging.

Presentation

4 — Meets and sometimes exceeds expectations

Your formatting looks polished, and I didn't find any grammar errors. My only suggestion here is to maybe add hyperlinks to relevant articles/studies where you cite evidence.

Aesthetics/Reading Experience

4 — Meets and sometimes exceeds expectations

You transition between paragraphs well, and use nicely varied sentence structure. The paper is interesting to read.

Weighted Average: A

General Comments

This is a really strong first draft. You manage to work in a lot of information and statistics without detracting from the engaging/approachable format of an op-ed.

Draft 2

Reviewer: Gabriel Hackel

Propositional Content

4 — Meets and sometimes exceeds expectations

I think your proposition is mostly clear throughout your writing, but at times seems overrun by the other parts of your logical outline. If your proposition is something along the lines of "we need ai that is unbiased (which we can obtain through auditing)", I think you should consider shifting all of your paragraphs to focus more on that rather than individual topics that happen to be supportive of your proposition. Nonetheless, it is very clear that you know a lot about this subject matter.

Invention

4 — Meets and sometimes exceeds expectations

I think overall the invention of this piece is pretty fantastic. While we talked about the bias of AI pretty extensively, I hadn't encountered the take on Ai Auditing -- something I found very interesting. The only thing that I could point out that doesn't help the invention of this piece is the reliance on predictive policing. Obviously this is crucial and needs to be addressed, but it was presented in such a way that it was a bit predictable. However, as a whole, this piece was very inventive.

Rhetoric

3 — Mostly meets expectations

It's clear that you have a reader in mind throughout this piece; however, the tone at times varies. I think this plays more into the Genre of your op-ed, but the reader seems to vary from academic to curious citizen depending on the paragraph. (Some paragraphs are just asking questions and forcing the reader to reflect while others are merely evidence presenters)

Genre

3 — Mostly meets expectations

It's clear that this is an Op-ed; however, the tone varies a lot. It starts out almost seeming like a research paper, providing immediate evidence and presenting in an unbiased fashion. This, contrasted with later paragraphs that pose rhetorical questions, is a little confusing. I think the questions make it seem much less formal, and the use of "we" aids that, but the extensive use of evidence and the attitude in which it is synthesized provides lots of variations of formality.

Presentation

3 — Mostly meets expectations

I like the graphs and images -- they certainly help. However, on the first page, I think it may have messed up the text (it might just be in penn reviewer's format though).

Aesthetics/Reading Experience

4 — Meets and sometimes exceeds expectations

Enjoyable to read, and solid flow.

Weighted Average: A-

Reviewer: Adra Ivancich

Propositional Content

4 — Meets and sometimes exceeds expectations

I think your proposition is clearly stated and your title does a good job of introducing the topic. I think the examples you include support your proposition well.

Invention

3 — Mostly meets expectations

I think that while your examples create a sense of importance, it may be helpful o explicitly state why this issue must be addresses now. This may be a little difficult as you are proposing that we should continue to do something, but I think possibly outlining the consequences of not doing so might help.

Rhetoric

3 — Mostly meets expectations

I think that while you do a good job of outlining the proposition, however, the paper seems a little vague on a specific stance. It may be useful to use some stronger language when outlining your examples and content so it becomes clear what the goal of the article is.

Genre

3 — Mostly meets expectations

I think because it is unclear what the primary goal of the article is it is difficult to say whether or not it represents the genre well. I think generally it does a good job of presenting the topic in a way that can be read in an academic journal but I think further clarification of the goal is necessary to refine the genre.

Presentation

3 — Mostly meets expectations

I think the organization of ext seems to be well done and clear. It seems there are some formatting errors but those should be easily fixed for the final version. It may be. good idea to add subheadings as well however this is not necessary.

Aesthetics/Reading Experience

3 — Mostly meets expectations

I think the article is fairly pleasant to read and very interesting. I think the examples used support the topic well while being interesting to the reader.

Weighted Average: B+

General Comments

Overall, I think this is a very well written article. The organization of information is very clear and the examples used support the topic well an are very interesting. I think one area of improvement may be in the specificity of the goal if the paper. I think it may be useful to explicitly state this and further clarify what you aim to accomplish with this article. Bo doing so it may help clarify other aspects of your article such ad the specific genre. Overall, very well done!

Op-Ed: Peer Reviews Given

Draft 1

Submitter: Hana Bader

Propositional Content

4 — Meets and sometimes exceeds expectations

The reasons strongly support the proposition, and the proposition is clear. Premises are also relevant and helpful in understanding the other components of the op-ed.

Invention

2 — Partially meets expectations

The current iteration lacks a "so what" factor. While it is abundantly clear that there is a need to be mindful of what we need to teach algorithms, this piece could benefit from some examples of what people could do to achieve this.

Rhetoric

3 — Mostly meets expectations

The premises and reasons have sufficient explanation to appeal to your target demographic of high school educated people with an interest in science and technology. You may benefit from a reformatted title that is more consistent with your proposition and may appeal more to your readers.

Genre

3 — Mostly meets expectations

This is undoubtedly an op-ed, but you may find it helpful to alter the tone of the writing to me more informal. Currently the language may sound too academic for an op-ed. While not required, genre conventions like providing a story-like anecdote to begin with may improve the genre aspect of your op-ed.

Presentation

3 — Mostly meets expectations

The writing itself is coherent without any serious grammatical issues. The op-ed would benefit from stylistic elements that may help it feel more like an op-ed. Perhaps pictures may help achieve this goal.

Aesthetics/Reading Experience

3 — Mostly meets expectations

This op-ed provided a pleasant reading experience. The reasons were persuasive and engaging. A method in which you can improve the reading experience would be if you added a little more invention to provide the reader with some insight that they cannot obtain elsewhere.

Weighted Average: B

General Comments

Great first draft to your op-ed. I like how thorough you were with your premises before diving into your reasons. I think you can further refine this piece of writing to be more of an op-ed, right now it seems like you are still using conventions and tone more suitable for a white paper. You may also benefit from making more bold and inventive claims, as this writing revolves around your opinion.

Draft 2

Submitter: Gabriel Hackel

Propositional Content

3 — Mostly meets expectations

The propositional content of this Op-Ed is good overall. The premises aren't necessarily "facts" in that their truth could be empirically verified, but it aligns with the rest of the propositional content. The proposition itself is clearly stated. The explanations could be improved somewhat, as currently your first and second arguments lacks distinction from each other. In other words, they seem too similar to each other in its current state. Otherwise, your propositional content is good.

Invention

4 — Meets and sometimes exceeds expectations

I enjoyed reading your examples and explanations, as they provide some unique insight into the field of AI. One minor suggestion would be to expand upon some of your examples, as I feel some of them will benefit from further elaboration. For example, the iPhone example might be more clear if you expanded upon it further.

Rhetoric

4 — Meets and sometimes exceeds expectations

Your rhetoric seems pretty clear to me. There are clear rhetorical aspects to your op-ed that targets people that hype up Artificial Intelligence, and your goal to persuade them is well represented. One suggestion is to bolster your rhetoric in your conclusion, for example by explicitly addressing your intended audience.

Genre

4 — Meets and sometimes exceeds expectations

This piece of writing adheres to all the genre conventions of the op-ed. Your proposition is justificatory, and your line of reason also aligns with the justificatory mode. I especially liked how you used language and tone to strongly express your opinions to distinguish your writing from other genres like the white paper.

Presentation

3 — Mostly meets expectations

Presentation is solid, but a little tame. This looks and feels like an assignment (which it is), but maybe you could throw in a little flair since it is supposed to be an op-ed. Good formatting and nearly no errors.

Aesthetics/Reading Experience

4 — Meets and sometimes exceeds expectations

Reading experience was smooth and pleasing overall. No major complaints in the flow of the op-ed. Again, I enjoyed your use of language to strongly convey your opinion and it genuinely felt passionate.

Weighted Average: A

General Comments

Great work! I think this op-ed is now in its final editing stages, and you just need to address some minor details to make this perfect. I enjoyed your ideas and writing style, and I could genuinely feel that you were passionate about making a point and convincing your intended audience. I would focus on my suggestions regarding your propositional content, as I felt that some tweaks there could significantly improve your op-ed.

Submitter: Adra Ivancich

Propositional Content

4 — Meets and sometimes exceeds expectations

Proposition is clear from the title and also clearly implied in writing. Premises are relevant to the proposition. Reasons are clear and logically sound, supporting the proposition.

Invention

3 — Mostly meets expectations

The op-ed provides insight into the topic. I found the example of the German law to be especially enlightening. I think you can further strengthen the invention of this op-ed by expanding your opinion to be slightly more specific. For example, while it is clear from your writing that policies need to be implemented, you could specify what kinds of regulations you think will be helpful.

Rhetoric

4 — Meets and sometimes exceeds expectations

The writing provides ample evidence in a straightforward manner that is suitable for readers of the Verge or the Wired. The propositional content of this op-ed is suitable for your intended audience of policy makers.

Genre

3 — Mostly meets expectations

This draft mostly fulfils the genre conventions of an op-ed. However, as op-eds are meant to be approachable and persuasive, I think you may benefit from other rhetorical devices such as anecdotes. As op-eds can be more informal than white papers, I advise you fully capitalize on this difference by changing the tone of your writing a little to make it more approachable.

Presentation

3 — Mostly meets expectations

Good presentation, there are no presentational issues with your writing. I especially liked that you hyperlinked to the German law. You may find it helpful to include some pictures to make your op-ed more like an op-ed.

Aesthetics/Reading Experience

4 — Meets and sometimes exceeds expectations

This op-ed offered a pleasant reading experience. None of the arguments or transitions between them seemed forced, and their positioning within the text was logically sound. I had no difficulty following the logical reasoning of this op-ed.

Weighted Average: A-

General Comments

Great second draft! I found your op-ed to be engaging and informative. I think your next steps are clear: make your writing more op-ed like. You should be able to achieve this by either adding anecdotal evidence, changing your tone, or adding illustrations. Your writing is on a great track, these are just my suggestions.

Op-Ed: Revision Plans

Revision Plan (Draft 1)

Based on the one-on-one session with Dr. Cauvin, I need to strengthen my propositional content by defining and explaining AI bias more explicitly. I also must rephrase and elaborate on my claim that AI-based systems are inherently unbiased by explaining that AI-based systems have the *potential* to be completely free of bias. Based on Hana's comment I will rephrase my explanation regarding the motives behind private corporations to be more convincing to the reader. I personally feel that my second argument of claiming that the US has an unacceptably high rate of violent crime was less effective than my first argument, I will remedy this weakness by making the logic and rhetoric behind my second argument much stronger. I share Dr. Cauvin's sentiment that my op-ed feels like it lacks a proper closing statement, so I will add concluding words to make my op-ed feel more polished. Apart from those changes, I will add illustrations and graphs to add to the presentation and reading experience of my op-ed.

Revision Plan (Draft 2)

Based on the feedback that I received from both my peers and Dr. Cauvin, I will focus my efforts on making the proposition more obvious. While the proposition is clear in my opinion, I can see where ambiguity could rise within my op-ed, so I will address this issue by more explicitly stating my proposition. I also received feedback that my op-ed reads too much like an academic journal article. I can remedy this by using stronger language and tone to emphasize the fact that I am trying to be persuasive. I also found minor errors in my writing and sentences that can seem unconcise, which I plan on addressing in my final draft.

White Paper: Proposal & Pre-Outline

Proposal

Preliminary Proposition: This White Paper will explore the ethical issues that arise when using AI for predictive policing.

Target Audience: Regulators and stakeholders in the criminal justice systems looking to implement Artificial Intelligence into their predictive policing strategies. This White Paper could be published in scholarly journals or distributed directly to relevant government agencies. It should also be available for people who are affected by predictive policing, whether it be convicted individuals or residents of a 'predictive policing hotspot.'

Keywords: Predictive policing, AI ethics, AI bias, criminal justice system

Pre-Outline

Reason 1: Introduction

(Given) AI is prevalent in our daily lives

(Given) Predictive policing is considered as a key tool for crime prevention

(Thus) This White Paper will explore the ethical issues that arise when using AI for predictive policing.

Reason 2: Problem

Current AI technology relies on data to train deep neural networks.

- The black box problem arises where nobody knows how an AI comes to a decision.
- The AI is exceptionally good at recognizing patterns from its training data, but problems arise when biased historical data is used.
- Bias can also occur in the preliminary stages of AI where human bias can take place unintentionally.

AI-based predictive policing has previously produced biased results.

- Include examples like COMPAS here.

Reason 3: Solution

Setting up strict protocol for implementors and regulators to try detect bias.

- Full transparency in the data being handled can be useful in detecting potential biases that the AI can pick up on
- Scrutinize trial results for 'feedback loops' or 'self-fulfilling prophecies.'

Changing the current implementation standards of predictive policing AI.

- Re-evaluating data to exclude those that may be linked to race/socio-economic status
- AI to evaluate police performance instead of criminal activity.

- If AI detects relatively high volume of police stops compared to actual arrests, police resources can be allocated to places where police stops yield more arrests.

Reason 4: Conclusion

AI can be useful in predictively preventing crime and can more efficiently allocate law enforcement resources but pose risks of exacerbating existing biases in our society. Rigorous regulatory scrutiny and changing current implementation of policing AI can help remedy the potential biases that may appear.

Preliminary Rhetorical Situation

Proposition: This White Paper will explore the ethical issues that arise when using AI for predictive policing.

Audience: Law enforcement, stakeholders in the criminal justice system, regulators, convicted individuals, residents of a 'predictive policing hotspot.'

Genre: White paper

Motive of the Author: To educate the audience on the reasons why biases can occur in AI-based predictive policing, and to show possible solutions to the problem.

Motive of the Reader: To gain an understanding of why bias occurs in AI-based predictive policing and to learn about possible ways to remedy the issue.

Goal: Prevent AI-based predictive policing programs from producing results that are ineffective and/or discriminatory.

Plan, including where you will publish your white paper: Published in scholarly journals or distributed directly to relevant government agencies

Rhetorical Strategies: Abundant use of examples to portray how certain features of AI combined with biased data can produce biased results.

Keywords: Predictive policing, AI ethics, AI bias, criminal justice system

Sources (Preliminary)

Angwin, Julia, Jeff Larson, and Lauren Kirchner. “Machine Bias." *ProPublica*. (May 2016). https://www.propublica.org/article/machine-bias-risk-assessments-in-criminal-sentencing.

Coeckelbergh, Mark. *AI Ethics*. The MIT Press (2020)

Ferguson, Andrew. “Policing ’Stop and Frisk’ With ’Stop and Track’ Policing.” *Huffpost.* (August 2017).

Meijer, Albert, and Martijn Wessels. “Predictive Policing: Review of Benefits and Drawbacks”. *International Journal of Public Administration* (2018): 1031-1039.

Roselli, Drew, Jeanna Matthews, and Nisha Talagala. “Managing Bias in AI” *Proceedings of WWW '19: The Web Conference.* (May 2019).

Shapiro, A. "Reform predictive policing." *Nature* 541 (January 2017): 458–460. https://doi-org.proxy.library.upenn.edu/10.1038/541458a.

Yapo, Adrienne, and Joseph Weiss. 2018. “Ethical Implications Of Bias In Machine Learning”. *51st Hawaii International Conference on System Sciences* (2018): 5366-5370. https://aisel.aisnet.org/cgi/viewcontent.cgi?article=1649&context=hicss-51.

White Paper: Early Draft

White Paper on Biases in AI-based Predictive Policing

Introduction

Predictive Policing is currently defined as an analytics technology that assists law enforcement and the criminal justice system by using data to predict where crimes are likely to occur and who is likely to commit them. These predictive policing systems are designed to make recommendations to make more efficient use of existing police resources (Shapiro 2017, 458). Other forms of predictive policing technology include methods to predict how likely a convicted felon is to re-offend. Although empirical evidence of the effectiveness of such systems is lacking, its claimed potential benefits are attractive to stakeholders in the criminal justice system (Meijer 2018, 1031-1039). In fact, Congress has been eager to make predictive policing and profiling technology a mandatory risk assessment tool for all federal prisons in a bill proposed in 2015 (Yapo 2018, 5366-5370). Predictive Policing technology is still in its infancy pending verification of effectiveness from academia, yet it has already been adopted by many and may be implemented on a federal level in the United States.

An accepted definition of Artificial Intelligence is an algorithm or a set of algorithms that produces an output based on inputs it is given, typically to provide a solution to a problem. Artificial Intelligence has become an integral part of society, Predictive Policing being one of the many applications of AI. Since its inception, AI has evolved to become more independent of human instruction. Instead of being rule-based, AI now heavily depends on Neural Networks, a complex mathematical model designed to mimic neurons in the human brain, to operate and make decisions. As it becomes harder to dissect the inner workings of AI, ensuring that Predictive Policing systems are bias-free is critical in protecting citizens from discrimination and prejudice (Coeckelbergh 2020).

History of Bias

Although new, Predictive Policing technologies have already accumulated accusations of bias and discrimination. The most prominent example is of the COMPAS system, an algorithm developed by Northpointe to predict whether a convicted criminal would reoffend. ProPublica studied the COMPAS algorithm and found that while its error rate was similar for both black and white defendants, the algorithm was twice as likely to label black defendants as high-risk compared to white defendants. Conversely, the algorithm was found to wrongly label white defendants as safe at a higher rate than black defendants. The ProPublica report continued by stating that black defendants were 77% more likely to be tagged by the COMPAS algorithm as high risk of committing a violent crime, and 45% more likely to be tagged as high risk of committing any type of crime (Angwin 2016).

While there are examples like the COMPAS algorithm that clearly show bias in Predictive Policing systems, there is no clear empirical evidence in literature to suggest widespread bias in all Predictive Policing systems. (Meijer 2018, 1031-1039). However, even the possibility of such adverse effects merit closer inspection of AI-based Predictive Policing.

Potential Causes of Bias

In what stage bias occurs in an AI-based system is often unclear. For example, the aforementioned COMPAS algorithm did not have questions regarding race in the questions

they provided defendants (Angwin, 2016). Bias can develop in various ways in the design and development process of an AI, but it is difficult to diagnose the cause. This stems from the "black box" problem which refers to how developers know the input and design of the algorithm but cannot understand how the input is processed to produce the output. The inability to interpret Neural Network based AI causes the "black box" problem (Coeckelbergh 2020). However, one could inspect the parts of AI design that are revealed to the operator to identify points of concerns.

Problematic Feature Selection

The most obvious way an AI could be biased is if the AI is given features that have biases within them. Features are the attributes of date that designers of an AI system select. The AI then uses these features to produce a result. For example, if race is included as a feature in a reoffence prediction AI, the AI will obviously use this information to deduce whether the subject is likely to reoffend. However, excluding a feature is not as simple as removing the feature from the feature set. Returning to the example, if the AI is given income information and address, racial information could still be indirectly deduced by the algorithm when producing a result (Roselli 2019).

Inheriting Bias from Data Sets

Problematic data sets are often the cause of biases rather than issues with algorithm design. To fully train a neural network, an incredible amount of data is needed. Most of the developer's effort is devoted to making these data sets, which makes the likelihood of an issue in the data set going unnoticed higher.

AI, especially for the popular neural network based AI, can only learn from past information. Data from the past inevitably have biases that were created by humans, and thus the AI will 'learn' these biases to produce biased results.

The data set issue is higher in significance in the application of Predictive Policing, because policing and the criminal justice system has historically been rampant with discrimination. Historical incarceration information will surely include arrests and convictions that were discriminatory in nature (Roselli 2019).

Self-Fulfilling Prophecy

A biased AI is in risk of becoming even more biased because of a 'feedback loop' or 'self-fulfilling prophecy.' This is because such systems continue to learn from recent data, and if it has affected recent data through its decisions, it will reinforce biases that it had created itself. A good example was provided by Roselli: Algorithms that predict crime based on police reports may cause more police to be deployed to the site of the predictions, which in turn may result in more police reports.

Works Cited

Angwin, Julia, Jeff Larson, and Lauren Kirchner. “Machine Bias." *ProPublica*. (May 2016). https://www.propublica.org/article/machine-bias-risk-assessments-in-criminal-sentencing.

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Roselli, Drew, Jeanna Matthews, and Nisha Talagala. “Managing Bias in AI” *Proceedings of WWW '19: The Web Conference.* (May 2019).

Shapiro, A. "Reform predictive policing." *Nature* 541 (January 2017): 458–460. https://doi-org.proxy.library.upenn.edu/10.1038/541458a.

Yapo, Adrienne, and Joseph Weiss. 2018. “Ethical Implications Of Bias In Machine Learning”. *51st Hawaii International Conference on System Sciences* (2018): 5366-5370. https://aisel.aisnet.org/cgi/viewcontent.cgi?article=1649&context=hicss-51.

Post-Outline (Draft 1)

Reason 1: Introduction

(Given) AI is prevalent in our daily lives (Coeckelbergh 2020)

(Given) Predictive policing is considered as a key tool for crime prevention (Yapo 2018)

(Given) There MAY be potential benefits to predictive policing (Meijer 2018)

(Given) The use of predictive policing continues to grow (Yapo 2018)

(Thus) This White Paper will explore the ways in which biases can occur in predictive policing and possible solutions to remedy the bias.

Reason 2: Problem

(What) AI-based predictive policing has previously produced biased results.

- (For example) COMPAS algorithm has been shown to have racial bias (Angwin 2016).

(Why) The black box problem arises where nobody knows how an AI comes to a decision, which can make biases hard to detect (Coeckelbergh 2020).

(Why) Current AI technology relies on neural networks which are prone to biases.

- (For example) Bias can also occur in the preliminary stages of AI where human bias can take place unintentionally in feature selection.
- (For example) The AI is exceptionally good at recognizing patterns from its training data, but problems arise when biased historical data is used.
- (For example) 'Feedback loops' or 'self-fulfilling prophecies' can occur to reinforce biases.
- (Roselli 2019)

Reason 3: Solution

Setting up strict protocol for implementors and regulators to try detect bias.

- Full transparency in the data being handled can be useful in detecting potential biases that the AI can pick up on

Changing the current implementation standards of predictive policing AI.

- Re-evaluating data to exclude those that may be linked to race/socio-economic status
- AI to evaluate police performance instead of criminal activity.
    - If AI detects relatively high volume of police stops compared to actual arrests, police resources can be allocated to places where police stops yield more arrests.

Reason 4: Conclusion

AI can be useful in predictively preventing crime and can more efficiently allocate law enforcement resources but pose risks of exacerbating existing biases in our society. Rigorous regulatory scrutiny and changing current implementation of policing AI can help remedy the potential biases that may appear.

Rhetorical Situation (Draft 1)

Proposition: This White Paper will explore the ways in which biases can occur in predictive policing and possible solutions to remedy the bias.

Audience: Law enforcement, stakeholders in the criminal justice system, regulators, convicted individuals, residents of a 'predictive policing hotspot.'

Genre: White paper

Motive of the Author: To educate the audience on the reasons why biases can occur in AI-based predictive policing, and to show possible solutions to the problem.

Motive of the Reader: To gain an understanding of why bias occurs in AI-based predictive policing and to learn about possible ways to remedy the issue.

Goal: Prevent AI-based predictive policing programs from producing results that are discriminatory.

Plan, including where you will publish your white paper: Published in scholarly journals or distributed directly to relevant government agencies

Rhetorical Strategies: Abundant use of examples to portray how certain features of AI combined with biased data can produce biased results. Relevant examples to show adverse effects when applied to predictive policing.

Keywords: Predictive policing, AI ethics, AI bias, criminal justice system

White Paper: Midterm Draft

Biases in AI-based Predictive Policing

White Paper for Law Enforcement Agencies and Courts Looking To Adopt AI-based Predictive Policing

Ryan Cho

Introduction

Predictive Policing is currently defined as an analytics technology that assists law enforcement and the criminal justice system by using data to predict where crimes are likely to occur and who will commit them. These predictive policing systems are designed to make recommendations for more efficient use of existing police resources (Shapiro 2017, 458). Another popular form of predictive policing technology involves predicting how likely a convicted felon is to re-offend. Although empirical evidence of the effectiveness of such systems is lacking, their claimed potential benefits are attractive to stakeholders in the criminal justice system (Meijer 2018, 1031-1039). Congress has been eager to make predictive policing and profiling technology a mandatory risk assessment tool for all federal prisons in a bill proposed in 2015 (Yapo 2018, 5366-5370). Predictive Policing technology is still in its infancy, pending verification of effectiveness from academia. Yet, many have already adopted it, and it may even be implemented on a federal level in the United States.

An accepted definition of Artificial Intelligence is an algorithm or a set of algorithms that produces an output based on inputs given, typically to provide a solution to a problem. Artificial Intelligence has become an integral part of society, Predictive Policing being one of the many applications of AI. Since its inception, AI has become more independent of human instruction. Instead of being rule-based, AI now heavily depends on Neural Networks, a complex mathematical model designed to mimic neurons in the human brain, to operate and make decisions. As it becomes harder to dissect the inner workings of AI, ensuring fairness in Predictive Policing discrimination is becoming increasingly more difficult (Coeckelbergh 2020).

This White Paper will explain how bias can occur in predictive policing systems and explore plausible solutions to this problem. This document aims to provide a historical and technical overview of bias in AI-based predictive policing, along with some proposed solutions to eliminate potential biases that may occur.

History of Bias

Although new, Predictive Policing technologies have already accumulated accusations of bias and discrimination. The most prominent example is the COMPAS system, an algorithm developed by Northpointe to predict whether a convicted criminal would re-offend. ProPublica studied the COMPAS algorithm and found that while its error rate was similar for black and white defendants, the algorithm was twice as likely to label black defendants as high-risk compared to white defendants. Conversely, the algorithm wrongly labeled white defendants as safe at a higher rate than black defendants. The ProPublica report continued by stating that black defendants were 77% more likely to be tagged by the COMPAS algorithm as high risk of committing a violent crime and 45% more likely to be tagged as high risk of committing any crime (Angwin 2016).

While examples like the COMPAS algorithm clearly show bias in Predictive Policing systems, there is no clear empirical evidence in literature to suggest widespread bias in AI-based Predictive Policing. (Meijer 2018, 1031-1039). However, even the possibility of such adverse effects merits closer inspection of these systems.

Historical examples of bias in Predictive Policing call for implementors to be more cautious in their attempts to adopt this technology. Acknowledging past issues and building expertise and preparedness to combat bias in predictive policing will help prevent similar problems from reoccurring. The public is also more likely to be optimistic about the shift towards predictive policing if the implementors openly address their concerns about fairness.

Potential Causes of Bias

At what stage bias occurs in an AI-based system is often unclear. For example, the aforementioned COMPAS algorithm did not have questions regarding race in the questions they provided defendants (Angwin, 2016). Bias can develop in various ways in an AI's design and development process, but it is difficult to diagnose the cause. This stems from the "black box" problem, which refers to how developers know the input and design of the algorithm but cannot understand how the input is processed to produce the output. The inability to interpret Neural Network based AI causes the "black box" problem (Coeckelbergh 2020). However, one could inspect the parts of AI design that are revealed to the operator to identify points of concern.

Problematic Feature Selection

The most obvious way an AI could be biased is if it is given features that have biases. Features are the attributes of data that the designers of an AI system select. The AI then uses these features to produce a result. For example, if race is included as a feature in a reoffence prediction AI, the AI will use this information to predict whether the subject will re-offend. However, excluding a feature is not as simple as removing the feature from the feature set. Returning to the example, if the AI is given income information and address, racial information could still be indirectly deduced by the algorithm when producing a result (Roselli 2019). Seemingly innocent choices of features could have underlying connections to other excluded data that have been contaminated with bias.

Inheriting Bias from Data Sets

Problematic data sets are often the cause of biases rather than issues with algorithm design. An incredible amount of data is needed to train a neural network fully. Most of the developer's effort is devoted to making these data sets, which makes the likelihood of an issue in the data set going unnoticed higher. AI can only learn from past information, especially those that adopt the popular neural network method. Data from the past inevitably have biases created by humans, and thus the AI will 'learn' these biases to produce biased results. The data set issue is more significant in the application of Predictive Policing because policing and the criminal justice system have historically been rampant with discrimination. Historical incarceration information will surely include arrests and convictions that were discriminatory in nature (Roselli 2019).

Self-Fulfilling Prophecy

A biased AI risks becoming even more biased because of a 'feedback loop' or 'self-fulfilling prophecy.' This is because such systems continue to learn from recent data, and if it has affected recent data through its decisions, it will reinforce biases it had created. Roselli provides a good example: Algorithms that predict crime based on police reports may cause more police to be deployed to the site of the predictions, which may result in more police reports (Roselli 2019).

Possible Solutions

Depend Less on Criminal Data

Most of the bias problems in predictive policing stem from the historical data our society has produced includes biases. This

fact has led to some suggesting that future implementations should lower their dependency on criminal data.

HunchLab, developed by Azavea, is a predictive policing tool the NYPD uses to dispatch its patrol units more efficiently. HunchLab removed petty crimes such as drug sales and drunkenness from the training data to reduce bias because these cases are most likely "quality of life" offenses that correlate with poverty. Additionally, random dispatches to "medium-risk" locations were added to dilute further any bias that may remain in the system (Shapiro 2017). These measures may be effective to continue benefiting from data-driven predictive policing while reducing bias by pruning problematic data.

Fundamental Changes To Application

More drastic changes, including reforming how predictive policing technology is used, may rid systems of bias. A solution has been proposed in which AI monitors law enforcement officers instead of the citizens. Analyzing officers' performance and efficiencies may highlight which officers need more support, retraining, or reallocation (Ferguson 2017). This method would not rely on problematic historical data but would achieve the same result of making more efficient use of police resources.

Intense Regulation

The most straightforward method theoretically would be to uphold the status quo but deploy stricter regulation and scrutiny to firms developing predictive policing tools. Transparency throughout the production of predictive policing systems, particularly in the training data, can help identify bias issues before they cause damage (Roselli 2019). Transparency can allow implementors to filter biased data or choose not to elect a specific predictive policing product if some part of its development raises bias-related concerns.

Conclusion

The causes behind bias in predictive policing systems are clear and expected because the technology is vulnerable to data-induced bias. Solutions, however, are not as obvious. There is not enough empirical evidence to identify which biases occur in which application, and suggested solutions are unproven. However, by being aware of the cause of bias in AI, implementors of AI-based predictive policing can exercise responsibility by caution.

Works Cited

Angwin, Julia, Jeff Larson, and Lauren Kirchner. “Machine Bias." *ProPublica*. (May 2016). https://www.propublica.org/article/machine-bias-risk-assessments-in-criminal-sentencing.

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Ferguson, Andrew. “Policing ’Stop and Frisk’ With ’Stop and Track’ Policing.” *Huffpost*. (August 2017).

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Roselli, Drew, Jeanna Matthews, and Nisha Talagala. “Managing Bias in AI” *Proceedings of WWW '19: The Web Conference.* (May 2019).

Shapiro, A. "Reform predictive policing." *Nature* 541 (January 2017): 458–460. https://doi-org.proxy.library.upenn.edu/10.1038/541458a.

Yapo, Adrienne, and Joseph Weiss. 2018. “Ethical Implications Of Bias In Machine Learning”. *51st Hawaii International Conference on System Sciences* (2018): 5366-5370. https://aisel.aisnet.org/cgi/viewcontent.cgi?article=1649&context=hicss-51.

Post-Outline (Draft 2)

Reason 1: Introduction

(Given) AI is prevalent in our daily lives (Coeckelbergh 2020)

(Given) Predictive policing is considered as a key tool for crime prevention (Yapo 2018)

(Given) There MAY be potential benefits to predictive policing (Meijer 2018)

(Given) The use of predictive policing continues to grow (Yapo 2018)

(Thus) This White Paper will explore the ways in which biases can occur in predictive policing and possible solutions to remedy the bias.

Reason 2: Problem

(What) AI-based predictive policing has previously produced biased results.

- (For example) COMPAS algorithm has been shown to have racial bias (Angwin 2016).

(Why) The black box problem arises where nobody knows how an AI comes to a decision, which can make biases hard to detect (Coeckelbergh 2020).

(Why) Current AI technology relies on neural networks which are prone to biases.

- (For example) Bias can also occur in the preliminary stages of AI where human bias can take place unintentionally in feature selection.
- (For example) The AI is exceptionally good at recognizing patterns from its training data, but problems arise when biased historical data is used.
- (For example) 'Feedback loops' or 'self-fulfilling prophecies' can occur to reinforce biases.
- (Roselli 2019)

Reason 3: Solution

(What) Relying less on historical data

- (For example) Re-evaluating data to exclude those that may be linked to race/socio-economic status (Shapiro 2017)

(What) Changing how predictive policing is applied

- AI to evaluate police performance instead of criminal activity (Ferguson 2017)
- If AI detects relatively high volume of police stops compared to actual arrests, police resources can be allocated to places where police stops yield more arrests.

(What) Setting up strict protocol for implementors and regulators to try detect bias.

- (For Example) Full transparency in the data being handled can be useful in detecting potential biases that the AI can pick up on (Roselli 2019)
-

Reason 4: Conclusion

AI can be useful in predictively preventing crime and can more efficiently allocate law enforcement resources but pose risks of exacerbating existing biases in our society. Rigorous regulatory scrutiny and changing current implementation of policing AI can help remedy the potential biases that may appear.

Rhetorical Situation (Draft 2)

Proposition: This White Paper will explain the ways in which bias can occur in predictive policing systems and explore plausible solutions to this problem.

Audience: Law enforcement, courts, implementors of predictive policing

Genre: White paper

Motive of the Author: To educate the audience on the reasons why biases can occur in AI-based predictive policing, and to show possible solutions to the problem.

Motive of the Reader: To gain an understanding of why bias occurs in AI-based predictive policing and to learn about possible ways to remedy the issue.

Goal: Prevent AI-based predictive policing programs from producing results that are discriminatory.

Plan, including where you will publish your white paper: Published in scholarly journals or distributed directly to relevant government agencies

Rhetorical Strategies: Abundant use of examples to portray how certain features of AI combined with biased data can produce biased results. Relevant examples to show adverse effects when applied to predictive policing.

Keywords: Predictive policing, AI ethics, AI bias, criminal justice system

White Paper: Peer Reviews Received

Draft 1

Reviewer: Sophia Jorgensen

Propositional Content

3 — Mostly meets expectations

Could you make your proposition clearer? I understand that you haven't gotten to your solutions yet, but referring to the fact that you will be talking about them later would be great to include. You flesh out the history and potential biases very well, just the addition of the solutions section is needed.

Invention

3 — Mostly meets expectations

I know you still need to add solution section, so I'm just going to give you a 3, but I think those novel ideas will come out in that section. Adding some sort of urgency to the issue would help readers understand its relevance. You could add this when talking about the COMPAS algorithm or something more timely.

Rhetoric

4 — Meets and sometimes exceeds expectations

Audience: those in the criminal justice system. I feel like this paper targets those in the justice system because you provide a slight background on Predictive Policing as well as how the biases arise. You will definitely target them further in the solutions sections as well.

Genre

2 — Partially meets expectations

I would make sure your proposition is a bit clearer and add the solution section to make it a true white paper.

Presentation

3 — Mostly meets expectations

Sections are clearly outlined. Paper is easy to follow.

Aesthetics/Reading Experience

3 — Mostly meets expectations

Paper was generally interesting to read & I think the addition of the solution section will make it even more engaging.

Weighted Average: B

General Comments

Great first draft! It sounded like you were informed about your topic and conveyed it clearly. I thought you discussed high-level issues like the black-box problem and the self-fulfilling prophecy. Some possible edits to be made would be making your proposition a little clearer, adding the "timeliness" of the issue, and the solution section.

Draft 2

Reviewer: Hana Bader

Propositional Content

4 — Meets and sometimes exceeds expectations

Your proposition is explanatory and clearly defined. All of your supporting reasons directly reinforce the proposition. The overall logical structure of your paper is coherent and well-laid out.

Invention

3 — Mostly meets expectations

The statistics that you present comparing the discrepancies in how white and black defendants are labeled by predictive policing algorithms certainly defines a problem. However, the urgency of this problem is not clear. You might want to explicitly define the potential impacts of disproportionate policing of black individuals, such as how it might affect incarceration rates.

Rhetoric

4 — Meets and sometimes exceeds expectations

You clearly define the stakeholders in the introduction of the paper, reference them throughout, and propose targeted solutions for each in your concluding paragraphs. There is no ambiguity about who your stakeholders are. You also explain complex AI concepts in a clear manner that is tailored to the intended audience. The use of headings and subheadings throughout your paper adds clarity.

Genre

4 — Meets and sometimes exceeds expectations

Your paper clearly follows the conventions and structure of a white paper. It is explanatory in nature, defines a problem, identifies the relevant stakeholders, and proposes concrete solutions.

Presentation

4 — Meets and sometimes exceeds expectations

Your paper is nicely formatted, with no errors in grammar conventions. The use of paragraph headings and subheadings is effective.

Aesthetics/Reading Experience

4 — Meets and sometimes exceeds expectations

Overall, this paper was enjoyable to read. Your writing style is eloquent and your sentence structures flow nicely.

Weighted Average: A

General Comments

Your white paper is very polished, in terms of presentation, as well as logical and rhetorical structure. The only suggestion I have is to emphasize the urgency of biased policing algorithms by exploring the long term impacts for defendants.

Reviewer: Adra Ivancich

Propositional Content

4 — Meets and sometimes exceeds expectations

I think you do a good job explicitly stating what the proposition and goal of the paper are in the beggining and make it very clear what you are aiming to do. I also think you follow through well with a clear explanation of the issues surrounding predictive policing.

Invention

3 — Mostly meets expectations

I think that while you allude to the urgency of the issue, it is never explicitly defined.

Rhetoric

3 — Mostly meets expectations

I think you do a good job of targeting your audience however you may want to more explicitly state who your stakeholders are. You focus mostly on people who face discrimination (such as people from low income communities, etc.) however you may want to explicitly state that these people are the main stakeholders in this issue. If you want to target any other stakeholders you should also explicitly state this.

Genre

4 — Meets and sometimes exceeds expectations

I think the paper stays in the explanatory genre and clearly explains the problem you chose to address as well as the possible solutions.

Presentation

4 — Meets and sometimes exceeds expectations

Your presentation of information is very well done and organized. Your layout makes each section of the paper very well defined in its purpose and displays the information very well. The citations are also accurately included.

Aesthetics/Reading Experience

4 — Meets and sometimes exceeds expectations

I think due to the explanatory nature of the paper it is very information heavy however I think you still do a good job of presenting it in such a way that it logically flows and is easy to understand.

Weighted Average: A-

General Comments

Overall I think your paper is very well written and refined. I think your main issues lie in your lack of explicit statements however I think that the implied statements is well supported (if that makes sense?). I think you clearly explain you proposition and goal for your paper and do a good job supporting this. Generally I think there is not much for you to change, as most of your revisions would revolve around explicit statements and specificity.

Draft 3

Reviewer: Gina Ryu

Propositional Content

4 — Meets and sometimes exceeds expectations

The proposition is clearly stated, and the premises set up the proposition well.

Invention

4 — Meets and sometimes exceeds expectations

The different sections of the white paper are well fleshed out and supported with a nice range of sources. The sources are nicely synthesized and used appropriately. I don't think there are any additional aspects of the problem or solution that would be necessary to add to the paper.

Rhetoric

4 — Meets and sometimes exceeds expectations

Overall, the white paper is well targeted to your explicit audience for people in law enforcement. The solutions seem well fleshed out and were developed with the target audience of law enforcement officials in mind.

Genre

4 — Meets and sometimes exceeds expectations

All the conditions for a white paper are met. The division of the paper through bolding and underlining allows for clear separation of each of the parts of the white paper.

Presentation

3 — Mostly meets expectations

The citations are uniform and the formatting looks clean overall. Some of the headings could possibly be changed to have more parallel structure (ex: possible solutions headings differ in the part of speech they are). There are little to no grammatical mistakes but I think there are a couple of typos present that would benefit from one more review (ex: first sentence of conclusion).

Aesthetics/Reading Experience

4 — Meets and sometimes exceeds expectations

This was a pleasant reading experience and a very informative paper.

Weighted Average: A

General Comments

Overall, this white paper was an enjoyable read and seems to satisfy all the requirements for submission. The final draft seems ready to submit, save for a few possible changes in word choice.

Reviewer: Margot Schneider

Propositional Content

4 — Meets and sometimes exceeds expectations

Your proposition definitely is reliant on some strong and potentially "up to interpretation" premises. However, I respect the setup of the intro, where you lay out your givens as correct and not really argumentative (i. e. PP is bad, causes societal problems, and biases are harmful to civilians). Wording of prop is clear to me. Definitely clearly followed according to plan throughout the paper.

Invention

4 — Meets and sometimes exceeds expectations

Really strong explanation. I totally followed everything you said. I really liked that when you introduced terms that may be new to your explicit readers (law enforcement agencies, terms like "black box" and "feedback loop," you explained them in simple but refined language. Great work, and all your sub-points strung together nicely.

Rhetoric

4 — Meets and sometimes exceeds expectations

I think your language was the right mix of technical and digestible. You didn't spend too much time explaining how these systems integrate into law enforcement agencies because your readers likely already know; you definitely spend more time explaining the technologies themselves, which would be much more useful to your readers.

Genre

3 — Mostly meets expectations

The title subheader is pretty strong and direct. It does demonstrate exactly who you are targeting this paper for, which is helpful, but it feels perhaps like it could take a justificatory tone because it is telling me exactly what you expect/want your reader to do/implying that there are dangers in the adoption of certain methods. Some wording in the introduction is confusing or vague. At the end of the 3rd paragraph, the last sentence feels a bit op-ed style. Also, society feels vague - who do you actually mean by this?

Presentation

4 — Meets and sometimes exceeds expectations

Why is Predictive Policing capitalized? Otherwise, clean writing, I did not pick out any obvious and repeated errors.

Aesthetics/Reading Experience

3 — Mostly meets expectations

I am a bit confused by the two-column formatting strategy used. It doesn't seem particularly necessary and didn't really add to my reading experience, usually I prefer to read straight down a page, especially in academic writing. It feels a bit article-y, which feels like generally more a journalistic or opinionated style of writing as opposed to a generally bland academic format. Some general wordiness especially in the solutions section. "a solution has been proposed," "The most straightforward method theoretically..." not huge problems, but def some intro sentences into new ideas could be cut/revised.

Weighted Average: A

General Comments

Great work Ryan. This paper is well written and very readable. Your close attention to all the different elements of a white paper are evident in this piece. My comments are small and specific, but overall, your paper feels that it is right about ready to go.

White Paper: Peer Reviews Given

Draft 1

Submitter: Sophia Jorgensen

Propositional Content

3 — Mostly meets expectations

Proposition is clearly stated and expanded upon in the paper. However, while the proposition states that the 'ethical issues of predictive policing' will be examined, a significant portion of the paper is dedicated to explaining where biases can occur in a predictive policing system.

Invention

4 — Meets and sometimes exceeds expectations

The paper brings invention in that the solutions proposed are novel, detailed, and thorough. By exploring extreme solutions as well as intermediary ones, the paper provides a macroscopic overview of the landscape of predictive policing that would be useful for the general public and for professionals.

Rhetoric

3 — Mostly meets expectations

The rhetoric of the paper generally achieves the goal of the paper which is explanatory. However, I feel the examples and reasons related to the 'ethical issues' portion could be reformed to better suit the proposition, as mentioned in the Propositional Content section of my review.

Genre

3 — Mostly meets expectations

I feel that headings for different sections would be beneficial, especially because white papers usually include sections in their formatting and organization.

Presentation

5 — Consistently exceeds expectations

I found no issues with semantic coherency or with grammar in this paper.

Aesthetics/Reading Experience

4 — Meets and sometimes exceeds expectations

The concise delivery of the material made for a pleasurable reading experience. The ideas within the paper were coherent and as a reader it was persuasive.

Weighted Average: A-

General Comments

I personally feel like this was a great start to your white paper. The list of edits you included would be great additions, and after those edits I think your paper should be as informative as it could be. Polishing the paper overall to conform more closely to the white paper genre as well as strengthening your rhetoric would make this paper even better!

Draft 2

Submitter: Hana Bader

Propositional Content

3 — Mostly meets expectations

Proposition is explanatory and clearly stated. Sources behind some of the premises in the introduction could be clearer.

Invention

3 — Mostly meets expectations

The reasons listed are very coherent and logical explanatory reasons often with insight that may not be immediately obvious to readers. However, there is a lack of urgency. Emphasizing why these issues are so important (although they obviously are) would be helpful in strengthening your paper.

Rhetoric

2 — Partially meets expectations

Although discussion about the intended audience is present in the conclusion, I feel it would be helpful to include this information earlier in the paper, perhaps in the introduction or through a subtitle. Also the reasons imply an intended audience but sometimes does not explicitly connect back to the audience.

Genre

4 — Meets and sometimes exceeds expectations

The proposition, reasons, and the overall organization of the paper align with the white paper genre.

Presentation

2 — Partially meets expectations

Adding sections to separate the different areas of your white paper would be extremely helpful. Although the content is coherently placed, the paper is sometimes hard to follow due to lack of section headers.

Aesthetics/Reading Experience

4 — Meets and sometimes exceeds expectations

The topic and its elaboration was enjoyable to read. The reasons were presented in an engaging manner.

Weighted Average: B

General Comments

This is a great second draft! I think you have all the necessary content pertaining to your topic, but some polish to make it 'more of a white paper' would be beneficial. Nice work.

Submitter: Adra Ivancich

Propositional Content

3 — Mostly meets expectations

Clear premises and effective paraphrasing of sources. The proposition is implied but not explicitly stated, clearly stating the proposition may strengthen the paper.

Invention

4 — Meets and sometimes exceeds expectations

The reasons are explanatory and abundant with examples, aiding with cohesion and clarity.

Rhetoric

3 — Mostly meets expectations

The intended audience is implied but not stated. This paper may benefit from explicitly identifying the audience and catering the explanation of the content towards your specific audience.

Genre

3 — Mostly meets expectations

Proposition is explanatory and in line with the white paper genre. Organization is coherent, but lack separation.

Presentation

3 — Mostly meets expectations

Section headers may assist with the overall presentation of the paper. The content is sometimes hard to follow when there is a shift in what is being discusses. Otherwise the presentation is fine.

Aesthetics/Reading Experience

4 — Meets and sometimes exceeds expectations

The reading experience was great with multiple viewpoints that may not be obvious to the typical reader. Also provides expertise and insight into the overall state of automated vehicles.

Weighted Average: B+

General Comments

This is a great second draft of your white paper! I think that you have crafted a solid base for you to improve upon, and that would include polishing the rhetorical aspects and the presentation aspect of your white paper

* Penn Reviewer cut off the last few words of my general comments for this review, so I added them back for the portfolio.

Draft 3

Submitter: Gina Ryu

Propositional Content

4 — Meets and sometimes exceeds expectations

Clear and relevant premises that are eloquently presented. Proposition is also clearly stated and is explanatory in nature. Line of reason is also valid, good paraphrasing and elaboration of sources.

Invention

3 — Mostly meets expectations

Explanations were generally very easy to follow. I also enjoyed your explanation of your reasons with good integration of facts and figures. I did feel, however, that some urgency regarding the issue earlier on would have been helpful. You do mention there are controversies, but some further elaboration may help place some political and societal context behind the topic.

Rhetoric

3 — Mostly meets expectations

The rhetorical situation of the paper is clear overall, but you may benefit from inferring your audience earlier in your writing. You could, for example, add a subtitle to explicitly state who your audience is. As it currently stands, it is hard to infer who the main audience of your white paper is until you get to the conclusion. Otherwise, the contents of the paper are rhetorically consistent with your goals and intended audience.

Genre

4 — Meets and sometimes exceeds expectations

You display a complete understanding of the white paper genre. The proposition, line of reason, and overall organization all align with the genre conventions of the white paper. If I were to give one suggestion, maybe expanding upon the conclusion would be worthwhile. Currently the conclusion seems a little lackluster compared to the amount of information you conveyed in the previous paragraphs.

Presentation

4 — Meets and sometimes exceeds expectations

The formatting is consistently good throughout with no major issues. I especially enjoyed your citation method that kept the text clean, although I would check with the professor if this style of citation is acceptable according to the rubric. Again, a subtitle may be helpful but not required.

Aesthetics/Reading Experience

4 — Meets and sometimes exceeds expectations

No major issue with the reading experience of the paper. I enjoyed reading this paper. One minor complaint would be to make the headings a little more descriptive, but the current headings are absolutely acceptable if it is your intention to keep it that way.

Weighted Average: A-

General Comments

Great final draft of your white paper, Gina! Reading your white paper, I felt that you have no more additions to make content wise. In my opinion, all you have remaining to do are some minor polishing according to the feedback you receive for this draft. Maybe focus on addressing the urgency and audience related problems that I mentioned in my feedback. Good work!

Submitter: Margot Schneider

Propositional Content

4 — Meets and sometimes exceeds expectations

The proposition is clear with premises that align with the propositional content. The introduction does a great job in informing the audience of the contents of the paper. Your premises consist of easily acceptable information that builds towards your proposition.

Invention

4 — Meets and sometimes exceeds expectations

The white paper takes novel concepts of digital autonomy and digital/physical space and explains them in an easily comprehendible manner. The contents of the paper builds as the reader continues to read, with little to no redundant information. Overall, I found the topic innovative and unique.

Rhetoric

3 — Mostly meets expectations

Overall, the rhetoric of your white paper is good. The contents, language, and technical depth is consistent with your intended audience. I would watch out for your tone and language, however. Sometimes, some assertive language like "should" or outright negative descriptions of entities may not be suitable for a explanatory white paper. Of course, you may be suggestive of your opinions while maintaining the explanatory mode, but it is a fine line and I think you may benefit from refining these aspects of your rhetoric.

Genre

4 — Meets and sometimes exceeds expectations

The paper follows all genre conventions of the white paper genre. I especially appreciated how your problem and solution sections were clearly divided, and even within those sections you distinguished different subsections to further clarify what you were explaining.

Presentation

4 — Meets and sometimes exceeds expectations

I think the presentation of this paper is appropriate. Section headers were informative and useful, and your citation style minimizes distractions while reading. I enjoyed the included figures as they were placed in such a way that aided the understanding of the contents.

Aesthetics/Reading Experience

4 — Meets and sometimes exceeds expectations

I enjoyed reading this white paper. One minor critique would be that the formatting of some of your subsections can seem a little cluttered. For instance, your examples under "Algorithm Applications" may benefit from alternative formatting. No issues other than that.

Weighted Average: A

General Comments

Great work! I thoroughly enjoyed reading this white paper and I personally feel that I have learned a lot from your explanations. Just a few minor tweaks and you should be ready for the final portfolio. I would focus on the rhetoric issue first, as that was what stood out to me most when reading. I don't know how to best explain it, but it felt as though the author was trying to convince me to think a certain way. Toning down assertive language should remedy this. Again, good job and keep it up!

White Paper: Revision Plans

Draft 1

My proposition is justificatory as pointed out by the reviews, which I plan on altering to be explanatory. Clearly stating my proposition would also be helpful. I received feedback that my draft lacks a sense of urgency. I should fix this issue by adding more context that surrounds the problem I'm writing about. I plan on bolstering the rhetoric of my draft by more clearly stating the intended audience of my paper, as well as what goals my readers may have in mind when reading my paper. Another issue that was identified was my lack of citations in the problem definition portion of my paper. I think this happened because I used one source for nearly every piece of information I included in that section. Adding more sources to verify my definition should solve these issues. A good suggestion I intend to apply is adding a subtitle to make the rhetoric of my paper more evident. Formatting wise I will make the appropriate changes to follow the white paper convention.

Draft 2

Based on the feedback, I think I have successfully fixed the issue where my line of reason was explanatory, but my proposition was not. All my peer reviewers critiqued that my paper lacks a sense of urgency, and I agree. In my next revision, I will attempt to bridge the facts and figures I present with real-world implications to stress the urgency and importance of the problem I am describing. The reviews pointed out that my audience and stakeholders are still a little unclear, so I will find more ways to state my audience more coherently. Dr. Cauvin mentioned that adding information on who gave the definitions in my paper could strengthen the credibility of the information, so I plan on doing that as well. Although not mentioned in the feedback, I personally feel that I can add more content wise to my white paper, especially in the portion where I discuss solutions. I will do some additional research and add new solutions to my paper.

Draft 3

I am now in the final refining stages of my white paper. I do not feel I need to add more content to my white paper, and this opinion seems to be shared by all of my reviewers. Dr. Cauvin mentioned that my white paper would greatly benefit if, for each section, I added a sentence to declare what I am going to discuss in the section and why it is important to consider. I think this would help address Margot's critique that at times my white paper felt like an op-ed because the explanatory nature of the text was not stressed enough. The other remaining changes include fixing typos, grammatical errors, and conciseness issues.

END