Distribution Agreement

In presenting this thesis as a partial fulfillment of the requirements for a degree from Emory University, I hereby grant to Emory University and its agents the non-exclusive license to archive, make accessible, and display my thesis in whole or in part in all forms of media, now or hereafter now, including display on the World Wide Web. I understand that I may select some access restrictions as part of the online submission of this thesis. I retain all ownership rights to the copyright of the thesis. I also retain the right to use in future works (such as articles or books) all or part of this thesis.

Katarina Zotovic   April 9, 2021

Algorithms in the Courtroom: A Philosophical Consideration of the Quantifiability of Justice

By

Katarina Zotovic

Jeremy Bell, Ph.D.
Adviser

Department of Philosophy

Jeremy Bell, Ph.D.
Adviser

Dilek Huseyinzadegan, Ph.D.
Committee Member

Sonal Nalkur, Ph.D.
Committee Member

2021

Algorithms in the Courtroom: A Philosophical Consideration of the Quantifiability of Justice

By

Katarina Zotovic

Jeremy Bell, Ph.D.
Adviser

An abstract of
a thesis submitted to the Faculty of Emory College of Arts and Sciences
of Emory University in partial fulfillment
of the requirements of the degree of
Bachelor of Arts with Honors

Department of Philosophy

2021

Abstract

Algorithms in the Courtroom: A Philosophical Consideration of the Quantifiability of Justice
By Katarina Zotovic

Quality of society continues to diminish as inequality persists. For far too long, there has been an urgent need for a more fair and effective criminal justice system in the United States. Modern times, in response, have called upon machine learning and algorithmic softwares as a means to the solution. Through violence risk predictors and sentencing programs, jurisdictions nationwide have implemented algorithms as assistants to judges and parole officers in what proponents hope is the beginning of a data-driven sentencing structure. Named after the very moral it aims to uphold, the justice system is in dire need of mitigating the bias and discrimination it has antithetically promoted since its inception. This paper explores justice from its roots in classical and modern philosophical thought, turning to technological ethics and Constitutional rights to consider the implications of increasing courtroom automation.

I ultimately arrive at two indispensable questions when considering the algorithmic means of quantifying justice: is it possible and is it desirable? I conclude that it is neither possible nor desirable. Additionally, I argue that the continuation of this pursuit only furthers society from attaining justice, perpetuates the prejudicial cycle it is claiming to dismantle, and severely encroaches upon fundamental guarantees in the U.S. Constitution. I propose alternative solutions including investment in the people themselves rather than in the machines predicting their crime, on community initiatives which promote individual education and support, and the integration of artificial intelligence in distinct capacities of the legal field where the stakes are not as high as they are for defendants awaiting the fates of their sentencing verdicts.

Algorithms in the Courtroom: A Philosophical Consideration of the Quantifiability of Justice

By

Katarina Zotovic

Jeremy Bell, Ph.D.
Adviser

A thesis submitted to the Faculty of Emory College of Arts and Sciences
of Emory University in partial fulfillment
of the requirements of the degree of
Bachelor of Arts with Honors

Department of Philosophy

2021

Table of Contents

I. Introduction

The basic functions of the United States courts - from the district levels to the Supreme Court - are uniform throughout the nation: implement justice, secure liberty, ethically resolve private disputes, promote social order, and ensure equal protection for all.[1] Since the inception of the court system in the 18th century, many individuals in the United States have not experienced the promise of justice as instituted by the court system. While certain states, regions, and citizens have encountered courtroom bias and discrimination more than others, the mere notion of their existence and prolonged acceptance in the Land of the Free is more than unsettling. Time and time again, the U.S. justice system has more distinctly resembled an *injustice* system in its policing practices, jury selections, sentencing protocols, and confinement methods. As a means to mitigate judicial biases and discrimination seen through judges, lawyers, and jurors, the 21st century has begun its incorporation of artificial intelligence (AI) in crucial courtroom proceedings. Beyond the administrative efficiencies that can come with streamlining tedious, manual, filing processes, the use of AI in determining risk and recidivism to influence prison sentences is a precarious undertaking. This technological shift has acted as an innovative means for machinery to quantify the nuances of philosophy, ethics, morality, and legal principles - a daring and dangerous feat.

Algorithms are at the core of much of contemporary, Western society, but the common understanding of algorithms today is not all-encompassing; their history spans into civilization before the common era. Merriam-Webster provides two definitions for the noun "algorithm":

---

[1] "Purposes and Responsibilities," *NACM Core.*

(1) a procedure for solving a mathematical problem in a finite number of steps that

frequently involves repetition of an operation

(2) *broadly:* a step-by-step procedure for solving a problem or accomplishing some end.[2]

By definition, algorithms are iterative in nature and have thus evolved over millennia most

evidently in numeric systems. Algorithms have been dated back to 300BC when Babylonians

were inscribing basic schemes into clay tablets to track grain stock and cattle. Soon after, the

numeric system arose with the abacus, algebra, variables, evaluative symbols, and the basic

conceptions of mathematics known today.[3] Most recently, algorithms have infiltrated

engineering, thus enabling computerized systems to manage tens of thousands of calculations in

short amounts of time. Algorithms, in their evolution and through their integration with

mechanics and engineering, have opened up new capabilities, among which are "AI-powered

solutions" that perform tasks to meet the rising demands of individuals, households, and

companies each day.

Artificial intelligence (AI) and algorithms are intricately related, yet not completely

synonymous. While an algorithm is a set of ordered processes for computational operation,

artificial intelligence embodies a group of algorithms working together for an intended output.[4]

As technological developments continue to accelerate at rapid paces, these algorithms become

infinitely more complex, resulting in devices and systems that are much harder to operate and

control. This lack of operation and control can often be seen as attractive and greatly beneficial;

a reason people are so eager to implement AI into daily tasks is that the repetitive and patterned

nature streamlines work which once necessitated constant labor and supervision. However,

---

[2] "Algorithm", *Merriam-Webster*.
[3] Souvik Das, "The Origin and Evolution of Algorithms: Digit," (2016).
[4] Kaya Ismail, "AI vs. Algorithms: What's the Difference?" (2018).

creating a system that works on its own should presuppose the training and knowledge for the operator to recognize and relieve its faults, a questionable ability for many who eagerly and impulsively unite AI with their daily life.

Renowned for its arcane language and lengthy case sizes, the legal field has experienced great benefits from the rise of modernization and technological integration in the workplace. Before its incorporation in courtrooms, AI was implemented to automate the mundane, tedious tasks of law practices – documenting, filing, sorting, billing, and other critical, administrative duties. For years, AI existed in the justice system through private law offices and police departments in simple, low-stake capacities, staying far removed from courtroom settings until only recently. With the continually problematic nature of the mass incarceration system and the insurgence of personal accounts regarding prejudice in rulings, the wide successes of predictive algorithms outside the courtrooms inspired the onset of its delayed introduction alongside judges. Today, machine learning has found its way to the judicial bench, bringing the long-awaited data analysis into legal decision-making.[5] Through predictive modeling and risk assessments, algorithms are aiming to diminish the human bias of judicial proceedings and minimize the jail-time of non-risk defendants as a means to addressing the severe incarceration and justice issues prevalent in the U.S. system. A key point to note and further consider in this algorithmic transition is the secrecy of the algorithms in use; to ensure confidentiality of sensitive data and to protect a company's intellectual AI property, the softwares used in courtrooms today function on largely hidden programs unknown to those outside of the private companies, a significant transparency issue that oversteps the traditionally-accepted ethical and legal standards.

---

[5] Saul Levmore and Frank Fagan, "Competing Algorithms for Law: Sentencing, Admissions, and Employment," (2021): 411.

Familiarity with AI is widespread and ever-increasing, and to such a degree that it seems difficult to grapple with the thought of society ever existing efficiently without its inclusion in daily life. Robotic vacuums clean the floors to help check-off household chores, face-recognition unlocks the world that lives behind a cell phone screen, and social media knows what to recommend to its users before they even get a chance to search for it themselves. Present-day humanity is so unconsciously intertwined in the mechanics of algorithms controlling various aspects of the day that many are keen to witness its integration in some capacity of judicial proceedings. However, to have a robotic vacuum miss a spot or two on the carpet is utterly inconsequential when considering an innocent and harmless human being imprisoned because of inaccurate, imprecise, and overall inadequate predictive algorithms. The repercussions of an algorithm's faulty application are far greater in the criminal justice system than in many other aspects of its already prevalent incorporation. Because of this, and along with numerous ethical and Constitutional conflicts, the desire to advance AI in courtrooms, and at the rapid pace of innovation today, must be slowed and thoroughly reconsidered.

A pressing concern felt by AI in criminal procedure is its restriction on due process. Outlined in both the Fifth and Fourteenth Amendments of the United States Constitution, due process establishes a safety net for life, liberty, and property for all.[6] In providing legal fairness that wholly encompasses and ensures these securities, a requisite of transparency prevails; at minimum, a defendant has the right to know the information being used in determining his or her sentence. However, privately-developed algorithms are afforded protections under trade-secret

---

[6] *U.S. Constitution.* Amend. V. "No person…shall be compelled in any criminal case to be witness against himself, nor be deprived of life, liberty, or property, without due process of law."
U.S. Constitution. Amend. XIV, § 1. "No State shall…deprive any person of life, liberty, or property, without due process of law; nor deny to any person within its jurisdictions the equal protections of the laws."

laws, consequently inhibiting the transparency necessary to achieve due process. In allowing this compromise of the Constitution, the gavel of justice has moved from the hands of judges into the hands of computer engineers. Dialogue spanning millennia from some of the smartest minds in history discussing justice, prying at the benefits and risks of varying viewpoints, detailing every subtlety regarding the principles underlying its implications on society, has suddenly been overridden by a hard and fast mechanical equation. Furthermore, it has been done with little deference to the deep-rooted precedents, ingrained patterns of thought, and great inherent value to the very processes meant to protect human life.

The favorable intentions of AI and algorithms as a means to reduce bias are notable, yet the premature entrance into the justice system without proper safeguards against legal and ethical corruptions is quite hasty and potentially more threatening to those accused. Important to these implementational concerns is an additional, most fundamental thought: in trying to quantify justice, one presupposes that there is a Truth claim to justice, there is something called justice that has nothing to do with social construction and has no relation to human beings or material conditions. To start the comprehensive dialogue needed to understand this multidimensional matter of intertwining AI with law, that fundamental presupposition must be discerned. Following this, leading theories of criminal law, the history of technology, engineering ethics, and the integration of algorithms in various legal spheres will be reviewed and discussed to ultimately ascertain whether AI can be incorporated into courts while maintaining the foundational ethical principles and Constitutional guarantees set forth in the United States.

II. Justice

Justice has been thoroughly studied and evaluated by a wide range of scholars across an expansive timeframe and a multitude of disciplines. Still, the present world is dealing with the

same issue of explicitly defining and uniformly understanding justice as it was over two-thousand years ago. Interestingly enough, without an unambiguous and consistent definition of justice, nearly every culture on earth has continued to raise the notion of it to a cardinal virtue to be pursued in their society. Though justice and its implications on society are continually studied and pursued, these patterns of thought and their adapting views are rooted in classical justice. The basic ideas held in philosophy and law are owed to the thinkers of Ancient Greece, making that the most fitting starting point in analyzing and grappling with the complexities underlying such a simple and familiar word.

Ancient Thought

Frustrated with Greek society and the sub-standard conditions of Athenian life, Plato turns to justice as the final remedy to evade the impending destruction of Athenian democracy. The content and discussion found in Plato's *Republic* is introduced asking, "What does Justice mean, and how can it be realized in human society?"[7] To develop his own conception of justice, Plato rejects the traditional thoughts of justice that came before him, those which he insists cannot be just if Athenian society is in such ruins as it is, in search for a better and more appropriate understanding that will remedy the Athenian political turmoil. In recording the dialogue between Socrates and the Athenian people, Plato authors the concluding viewpoints of several men who were subject to Socratic questioning when considering justice. Cephalus represents a traditional view of justice as honesty in word through truth and in deed through paying one's debts. Polemarchus remains on the same line of thinking though shifts to argue that justice is helping a friend and harming an enemy.[8] In typical Socratic method, Socrates counters their understandings with sample questions depicting how events in daily life would quickly

---

[7] Plato and Francis Macdonald Cornford, *The Republic of Plato.* (London, 1945): 1.
[8] Plato, *The* Republic, 2-7.

conflict with their justice claims. For instance, in response to Cephalus, Socrates indicates that returning a weapon to an insane friend would fit the justice definition laid out by Cephalus, but it would not be a just action. To Polemarchus, he argues that giving to each what is owed only renders more injustice in the enemy and in oneself.[9] Justice is not independent of society and it must be regulated within oneself by consideration of conditions beyond oneself. Viewing justice through the lens of either Cephalus or Polemarchus withholds recognition of the larger implications of one's actions, and leaves subjective discretion and action solely to individual perception. Though this is far from an exhaustive evaluation of the *Republic*'s exploration of traditional justice, it fundamentally embodies the traditional streams of thought that Socrates and Plato actively disputed in search of a more fulsome understanding of this ambiguous state.

Following his analyses of justice attitudes stemming from Cephalus, Polemarchus, and other Sophists in Ancient Greece, Plato identifies a notion of justice that satisfies both a just person and a just society. With a harmony between the soul's hierarchy of reason (wisdom and virtue), spirit (honor), and appetite (pleasure), "Justice finally appears, no longer only as a matter of external behavior towards others, but as an internal order of the soul, from which right behavior will necessarily follow".[10] Plato remarks that so long as each man meddles only with his own duties and does not interfere with those of others, his total focus will be on his own internal harmony which will translate into a collective external justice. Similar to looking under a microscope, a just city at large is composed of many just individuals where order flows from concepts of non-interference and soul harmony. The synthesis between the human entity and the social entity interacts for the effective good of the whole at large, bonding together to create justice. Plato's pursuit of the soul component of justice and the search for internal harmony for

---

[9] Plato, *The Republic,* 7-14.
[10] Plato, *The Republic,* 139.

external good acts as an initial notion of understanding justice as internally-driven, an early conception of the rehabilitative state of this moral quality.

Aristotle was a student to Plato as Plato was to Socrates. Though they are all regarded as the most celebrated figures in Western philosophy and their thoughts are complementary in nature, their considerations of justice vary in many respects. Across the philosophies of these three men, justice is understood as virtue-in-action. However, Aristotle rests many of his claims on the ultimate human aim for happiness. This goal cannot exist separate from moral virtues, the highest of them all being justice. Therefore, Aristotle begins to develop an understanding of the proper manifestation of justice as it occurs in oneself and in relation to others. In *Nicomachean Ethics,* Aristotle expresses justice with the necessary addition of its outward expression: "complete virtue, with the distinction that it is displayed towards others".[11] While there is a harmony within oneself, justice is relative to other persons. This introduces the notion of equity and the distribution of values to the recipients of justice. According to Aristotle, justice is distributed proportionally according to an individual's merit or worth, where equal and unequal treatments for persons must be considered proportionally.[12] This proportional equality creates a mean to justice "between more or too much and less and too little" where, under any disputes, a judge acts as the "living embodiment of that which is just…signifying that if they get the mean they will get that which is just."[13] Existing at this Golden Mean - the equilibrium between excess and deficiency - when speaking to emotions and passions stabilizes on justice and allows for what Aristotle sees as the ultimate ethical good: happiness. While Plato's justice can be thought of as 'everyone should do his own', Aristotle considers justice as 'everyone should have his

---

[11] Aristotle and F.H. Peters, *The Nicomachean Ethics of Aristotle,* (London, 1906): 139.
[12] Aristotle, *The Nicomachean Ethics,* 145.
[13] Aristotle, *The Nicomachean Ethics,* 149.

own'. Though they have contrasting emphases on duties as compared to rights, the case of justice

for both Aristotle and Plato is illustrated as a legal and moral concept that function together for

individual and societal good.[14]

Contemporary Thought

The 20th century saw a more contemporary thought of justice from American

philosopher John Rawls. His *Theory of Justice* asks the audience to imagine themselves in the

Original Position - self-interested, rational persons standing behind a veil of ignorance where

defining individual characteristics including sex, race, handicaps, and social class are unknown

about oneself or others. Importantly, these self-interested persons are not ignorant of (1) the

general types of possible situations in which humans can find themselves, and (2) the general

facts about human psychology and human nature.[15] Rawls argues that the objective principles of

justice will surface following this experiment; a self-interested person behind the veil of

ignorance is inclined to advocate for governing societal ideals which ensure that those at the very

bottom are still well-off provided this person is one of society's most disadvantaged. The

Principle of Equal Liberty and the Difference Principle are Rawls' resulting postulations: each

person has an equal right to the most extensive liberties compatible with similar liberties for all,

and social and economic inequalities should be arranged so that they are both (a) to the greatest

benefit of the least advantaged and (b) attached to offices and positions open to all under equal

opportunity for all.[16] Under the veil of ignorance, inequality will only be accepted if the

distribution of inequality exceeds the lowest utility in an equal distribution. The intuition Rawls

---

[14] Afifeh Hamedi, "The Concept of Justice In Greek Philosophy (Plato and Aristotle)." (2014): 1166.
[15] John Rawls, *A Theory of Justice,* (Cambridge, 1999): 15-22.
[16] Rawls, *A Theory of Justice,* 52-54.

notes is that justice may certainly make permissible inequality, but an optimal inequality: not all will get the same, but those at the very bottom will be better-off.

A student of Rawls, Onora O'Neill tackles considerations of global justice through its agents and with more consciousness for societal disadvantage. With a presupposition of autonomy for justice to be exercised, O'Neill states in her *Bounds of Justice* that "justice is then in the first place a matter of keeping to principles that can be adopted by all members of any plurality of potentially interacting beings."[17] In acknowledging the social state of the world, justice is experienced in a system where actions are reasoned by autonomous beings which influence surrounding parties. Her use of "plurality" to speak of justice's precondition – autonomy – illustrates the connectivity of the agent to those separate from the agent. Similar to Rawls, O'Neill notes that those separate from the agent have varying capabilities. Justice, then, demands no action "based on the principles of deception, violence, and coercion."[18] While still holding to components of the traditional notions of justice laid out in classical thought, O'Neill argues that justice cannot solely be those principles and it cannot be set apart from its institutionalization. However, those principles do outline the demands of justice for agents to implement in action. Pulling from Rawls' assertion that justice predicates the least being better-off, O'Neill emphasizes the need for the most vulnerable to be able to legitimately express concern and/or consent.[19] The intention, then, of justice is to ensure the protection of the weakest, not through mere lip-service of human rights advocacy, but through concentrated consideration of their well-being and concrete action for their benefit. O'Neill argues that justice will only remain a theory insofar as there are practical, global outcomes where the disadvantaged

---

[17] Onora O'Neill, *Bounds of Justice,* (Cambridge, 2002): 158.
[18] O'Neill, *Bounds of Justice,* 159.
[19] O'Neill, *Bounds of Justice,* 163.

can negotiate with the advantaged while given respect and consideration, with society

simultaneously assessing the temptations of the advantaged who hold power over the oppressed.

Long before Plato's *Republic* in 375BC, thinkers and citizens were speculating the

realization of justice in society. Over 2,400 years later, the speculations still stand, and the

pursuits of an algorithmic solution industrially skim the surface of long-standing reasoning and

wisdom. Plato, Aristotle, John Rawls, and Onora O'Neill are just a few among a multitude of

philosophers and thinkers who have provided different, yet sound, evaluations of justice,

illuminating the difficulties in agreeing upon a uniform characterization of it. The thoughts and

dialogue that have survived ages in the quest for justice have necessitated research, logic,

creativity, problem-solving, social skills, and principles as opposed to mechanical jurisprudence.

Without an honest and consistent understanding of justice, it will be impossible to fully achieve

it, but is an algorithm the solution? Can technology in any capacity produce a skill set that is

broad enough, yet also deep enough, to do the work of a fine, experienced, educated judge?

Nevertheless, the initial presupposition is not verified. To date, there is no Truth claim to justice,

and if there were, it would certainly not be separate from social construction or material

condition.

III. Concepts of Criminal Law

The justice system cannot stand idle waiting for the debates to end. Legal codes and

judicial courts have been formed and functioning on the readily available interpretations in order

to seek and implement justice for social order. Reviewing key intricacies of criminal law, a body

of law distinct from other law, expands upon the innate components of intuition and experience

rooted in criminal procedure. Because of this insight-driven nature, the legal system is willfully

crafted with broad guidelines to welcome subjective interpretation and flexible judgement. It is

important to note the intentionality behind this imprecise structure - there are infinite variations to criminal cases which appear identical on the surface, making the application of any hard and fast rules impractical and dangerous. The purpose of education and training to work in law enforcement, with specific regard to criminal conduct, is to develop a framework for understanding, judging, and legally determining the most appropriate course of action to situations that may be similar to others, but just distinct enough in their nature or condition to not yield a mechanical response. Because of this basis of training, police officers and other legal officials are armed with a discretion that asserts such authority over private individuals in hopes of maintaining public order throughout society.[20] With deeper theoretical information on criminal law, it becomes increasingly difficult to accept the utilization of automated facets of technology and equations in deliberately non-automated sectors of the legal field.

Criminalization

Criminal law is founded on the basic notion of criminalization, or deeming an act wrongful in the eyes of the law.[21] Identifying these acts assumes a valid reason for which they are wrong or should not be committed, and it should reflect something greater than oneself; this could be morality, divinity, or the polity's values depending on the thinker, but regardless of which, all converge in the name of justice. Criminalization opens the door to force being permissible (1) if an individual is doing a wrongful act, (2) to prevent an individual from doing a wrongful act, or (3) after the individual has done the wrongful act. With the power to arrest *ex ante* and *ex post*, police officers and private enforcement personnel determine the reasonable amount of force necessary to have an effective arrest under supposed merited suspicion or

---

[20] George L. Kelling, "'Broken Windows' and Police Discretion," (1999): 6.
[21] James Edwards, "Theories of Criminal Law," (2018).

evidence.[22] What starts as an initial restraint can be followed by searches and frisks, increased

surveillance, detention, questioning, and ultimately a charge for a crime. This extensive process -

from criminalization through potential imprisonment - illustrates the severity of an otherwise

simple concept of criminalization; it goes far beyond simply identifying a legal wrongdoing. A

single movement done in the wrong place at the wrong time can create an onset of legal troubles

and financial burdens for an innocent person. The ripple effects in losing housing opportunities,

employment, government aid, credit, and immigration status, among many other factors, are

detrimental to the predominantly poor, disadvantaged target populations of these defined

criminalizing acts.[23] The subjectivity and weight of *reasonable suspicion* and *probable cause* can

be misplaced and destructive, regardless of whether an initial search results in release or arrest.[24]

Criminal law does not simply identify laws, these standard legal rights and legal wrongs; it

justifies force and punishment whose side effects are severe on any and all accused.

Theories

Why does criminal law outline illegal acts? And for whom is it outlined? The motivations

behind the creation of the system as a whole drive the power designated to those who work in it

and affect the outcomes of those targeted by it. Three overarching theories to understand

criminal law and its distinction from civil law are punitive, communitarian, and preventative.

Punitive views of criminal law claim that the legal code established for crimes is solely to deliver

---

[22] Edwards

[23] Alexandra Natapoff, *Punishment without Crime: How Our Massive Misdemeanor System Traps the Innocent and Makes America More Unequal,* (New York, 2018): 3.

[24] "Terry v. Ohio." *Oyez,* (1967). The Court held that an officer may stop or frisk a suspect without any probable cause to arrest *if* there is reasonable suspicion that the individual has committed, is committing, or will commit a crime. *Reasonable suspicion* needs to be more than a "hunch" where "a reasonably prudent man" would be warranted in believing the individual poses a threat or is engaging in suspicious behavior.
"Brinegar v. United States." *Legal Information Institute,* (1949). The Court held that *probable cause* exists insofar as the facts and circumstances available to the officer are sufficient to warrant a belief that a crime is being committed, and would be so to "a man of reasonable caution."

justified punishment to offenders while outlining to potential offenders punishable acts.[25] While

the components which make punishment justified may be unknown, its engraining in law deems

it sufficient for application. A communitarian view to criminal law argues that law acts as an

instrument of the community, providing justice on behalf of all in the community. As opposed to

civil law which regulates disputes among individuals, or between some, criminal law is for the

benefit of all in the community - laws are for the protection of the entirety.[26] These two views are

applied following the commission of an act and into the criminal proceedings, interpreting the

purpose of the law as a response to previous action. The third view, preventative, theorizes

criminal law pre-crime. Criminal law as preventative means that the wrongdoings are explicit

and the punishments that could ensue are known before any commission occurs. Since an

individual is either aware of or has open access to the laws concerning what action is considered

a crime and the consequences that can arise, the desire to endure those repercussions is, in

theory, lesser than the desire to commit them.[27] But under this logic, it is important to consider

whether the repercussions are weighted equally to the criminal act, or greater so as to de-

incentivize commission. Does the punishment developed as preventative inherently need to be

greater than the cost of crime to sufficiently deter a potential perpetrator? With these three

fundamental and founded theories, regarding the system that exists today, it is rational to

understand them as working in conjunction with one another in a joint effort to address and

remediate criminal behavior.

In its noble efforts of common welfare and public safety, criminal law purports to assume

a rather bold standard of moral ground, and it does so with serious, lasting impacts. Because

---

[25] Edwards
[26] Edwards
[27] Edwards

crime and the determinants of criminalization are frequently politically decided, it raises

concerns about how political power and personal gain - whether financial benefit or public status

- feed into the laws which affect the everyday citizen whose circumstances and privileges are

significantly lesser. If these are the motives and the core of criminal law, they should not be

embedded in the name of morality or justice. In general, society is imposed with a uniform moral

structure through the law, though the individual moralities of those in the society differ from one

person to the next. This notion naturally flows from the root of a liberal democracy, but the

variants in this legal sect over, say, tax laws or property rights, is that criminal justice should not

be (1) politically-based or (2) drastically distinct from one individual to the next. If criminal law

is influenced by justice and seeks to promote justice, it should not be on the grounds of profit or

political corruption. Furthermore, criminal law as it functions in the U.S., regardless of motives

or intention, inarguably reflects a retributive justice. A system of justice for the people should

aim to restore the people and promote social order. As main tenants in the courts of law - the

resolution of disputes and the maintenance of a protected society - the people are at the forefront;

it is backward to consider their harm before their rehabilitation. The criminal law throughout

history and into the present era seems to have a skewed understanding of this focus.

These facets of criminal law are all enacted through criminal trial, where the culmination

of "criminal responsibility and liability are formally assigned, and the norms and doctrines of the

substantive criminal law are articulated and applied".[28] One of the defining features of the United

States courts and their trials is burden of proof - defendants are not responsible for proving their

own innocence, rather the government is forced to provide substantial evidence to persuade the

jury of the defendant's guilt.[29] Criminal trials embody the processes which aim to bring truth to a

---

[28] Antony Duff, "Theories of Criminal Law," (2002).
[29] "Criminal Cases", *United States Courts*.

situation and determine proper accountability for criminal action. However, the repercussions of a trial, regardless of the verdict, are life-altering on the defendant. As stated before, any criminal mark on an individual record is crippling to one's life. Of course, with accurate and proven guilt, the consequences are not to be disputed. But the focus is currently on the dangers to the wrongly convicted, and the detrimental repercussions of this system on the innocent. The power the government and the courts have over an individual are far from light, and the subjectivity intertwined into the trials and juries are monumental in shaping outcomes. With such power, is the democracy treating all members of society the same in its proceedings? History would argue not. Since humans have set a deep precedent of failing to appropriately conceptualize the application of justice - with an ethical, legal, and unbiased approach for all - technology's rise in the recent century has been viewed as a hopeful development for both the law and its people.

IV. Influx of Technology

With each passing year, contemporary society becomes increasingly more reliant on technology. When humans experience the faintest doubts or uncertainties, a technological device is in immediate use to resolve the mental strain of not knowing or of seeking more. Technology has begun to advance at unfathomable paces in the present day, with no sights of slowing down in any near future. As a broad branch of science, a distinction between the two - science and technology - is significant to address: "Whereas science aims to *understand* the world as it is, technology aims to *change* the world".[30] To change the world is to change the life lived in it: the collective norms once accepted, the interpersonal dynamics so crucial to social beings, and the expectations of human behavior and development. Though it is a subcategory to the overarching critical studies of "science", the end goal of technology is drastically different.

---

[30] Maarten Franssen, et al. "Philosophy of Technology," (2018).

Intent and Development

The first technological advancements dating back to the Stone Age included tools and artifacts developed for practical purposes and enhancements to daily, necessary chores. The rise of hunting, agriculture, and weaving clothes became culturally-embedded technical means for modernized progress.[31] Because of its practicability, the developments of these tools, irrigation systems, and clothing wheels were like a breath of fresh air for many whose jobs had been so manual and physically demanding for all of history prior. The important thing to note with these unprecedented discoveries is this: the manual ways of completing these duties were not far gone and were certainly still preferred by many following the more automated and assistive techniques. The introduction of technology did not take away from the ability to use animal skins as opposed to woven fabrics for clothes, the same way that today, access to a washer and dryer does not negate hand-washing and air-drying if desired. With incoming waves of technology during these early times suiting the most fundamental, practical purposes for people, the weight of the changes it produced and its looming potential detriments to society were invisible to many as excitement for these new worldly capabilities dominated.

As the centuries moved forward, technology began to fill the roles of more luxury needs with printing, railways, photography, and telephones among the mix. These inventions were initially satisfying the convenience of the rich, and technological inclusion into daily life was becoming more divisive. In his *Discourse on Inequality*, Jean-Jacques Rousseau claims that technological development in the state of nature introduces the "nascent society" where divisions in individual wealth and interpersonal dynamics between the rich and the poor grow as society moves farther away from nature.[32] By over-exploiting the resources available to humanity in

---

[31] Franssen

[32] Charles W. Mills, *The Racial Contract,* (Ithaca, 2011): 6.

order to push the bounds of possibilities available with intricate technological advancements, control over the simplest daily processes shifts to become the responsibility of a programed machine. In the over-exploitation, society has over-complicated what is needed for man to be happy and moral. Rousseau advocates for the beauty of simpler times and the true connectivity within oneself and with others, something technology is trying to achieve with social media and other innovations. These additions to modern civilization, which people firmly hold will improve and simplify their standing, only convolute the true necessities of life and move individuals away from genuine human nature. Computer engineers have transitioned into representatives of public service whose jobs are now to maximize technology and extend its capabilities far beyond what is comprehendible today, a development of science that thinkers like Rousseau believe strip the modern man of enjoyments from contemporary society.

Legal Integration

Technological advancements were such a success in many aspects of everyday life - they increased efficiency by making small, menial tasks automated, and they enhanced quality of life by serving more luxury purposes for individual pleasure. A logical subsequent incorporation was in a field requiring copious amounts of reading, writing, and speaking: law. The first notable technology that infiltrated the legal field was as recent as 1973 with the "UBIQ" terminal created by Lexis, a portal in which lawyers could search a case online as opposed to scanning through numerous books to find the exact reference or precedent for which they were looking.[33] This time-saving improvement allowed for the expansion of the legal field, further encouraging the pursuit of technologies to help perform additional time-consuming tasks. Legal teams were able to merge their use of "UBIQ" with up-and-coming document management softwares to ease the

---

[33] Ron Friedmann, "Back to the Future: A History of Legal Technology", (2017).

burden and time spent on the administrative end of the practice, maximizing efficiency practice-wide. Importantly, technologies not specific to law such as fax machines, emails, search engines, and diverse computer networks were each also increasingly incorporated in law firms and companies globally, creating a web of interconnection rooted in technological advancement. The invention and implementation of these initial legal technologies aligned well with the overall influx of varying assistive technologies, stimulating the rapid succession of new product releases from companies like IBM and Apple to satisfy the hunger many had for greater automated individual efficiency and collective connectedness.

Summation and Concordance were two softwares that changed the process of litigation and general legal case support in the 1980s. The programs utilized the innovative World Wide Web (WWW) and Local Area Networks (LANs) to benefit document review and case-sharing across multiple geographic locations. The speed of the search engines and review servers allowed for a structure and organization attorneys had never before experienced.[34] Legal insight, collaboration, and productivity continued to increase as society approached the turn of the 21st century, and the study and practice of law became more united with, and dependent on, technology as each year passed. Today, the exploration and rapid application of predictive algorithms in the courtrooms is promoting the interface of fields like never before. It was clear over forty years ago at the advent of this technological surge and it is still clear today, there exists a wide range of benefits from technology that has brought increasing human optionality and efficiency. The legal field is certainly not amiss to reaping these benefits to a momentous degree, but the expansion of technology applied to this specific line of society has fueled new questions and concerns. Successive to these worries, the ethics of technology is a field that has

---

[34] Liquid Litigation Management, "INFOGRAPHIC: Legal Technology Timeline", (2017).

grown as a result of the negative side effects of vastly influential and progressively spreading worldwide automation.

V. Ethics of Technology

Traditional ethics could never adequately address, prevent, or solve the problems created as a result of modern technology. Its focus on virtuous actions to lead to a moral life falls short in approaching the developing worldview in which technology's expansive freedom for action and choice extends far beyond the human mind. Because of this, technology ethics has become an increasingly prominent field in recent decades to ensure the ethical application of growing technological practices. As technology has transitioned from the weaving wheel to atomic weapons, it has given humans with free will even greater power to act. Following suit, the results of actions pertaining to technology - intentional or unintentional - now hold an even more considerable weight than they had for all of recorded humanity prior. Historically, humans were involuntarily constrained in technological control due to individual weakness and lack of collective resources. Today, the only constraint with the immense technological power is voluntary judgement and individual willpower rooted in ethics.[35] With that as the case, the dire need for assurance in guiding ethical principles is very far-reaching. As innovations expand, new ethical questions arise and the pressure on this field to keep up with ethical review and judgement is paramount for future civilization.

Value-Neutrality

Ethicists have grappled with various lines of thinking in understanding the interface between technology and human force upon it, a leading consideration asking: does technology hold the value, or is it the user who makes it have moral value? The Value-Neutrality Theory

---

[35] "Technology Ethics"

states that technology is a morally and politically neutral concept whose users determine whether it is good or bad.[36] Similar to the quote, "guns don't kill people, people kill people", the argument in value-neutrality is that an object itself is not inherently, say, detrimental, but rather it is the misuse by humans that results in the unfavorable outcomes sometimes seen. The same logic is true for a positive value and a favorable outcome. An inanimate object can be thought to have no value direction until a human acts upon it since humans bear the minds with value-laden thought. Technology does what it is told by humans and, without human activation, sits idle and value-neutral. While scientists and engineers tend to sway towards this pattern of thought, philosophers of technology often opt out of accepting this notion.

As promising as it may sound to say that technology has no directional value in an effort to encourage even greater technological discovery, this is far too naive. Technology "embodies a set of values, a framework, and an ideology".[37] The motives that lead to investing such extensive resources in creating a gadget, a software, a machine, or an algorithm are already value-laden thinking - there is a goal in mind for this new technology to satisfy and its execution heavily relies on the personal values of those whose idea is becoming realized. In ordering the creation or manufacturing of an object or a technological contraption, the values of the original thinker become an innate component of the final product. To hold to the gun analogy, while a gun can be used as a paperweight, this was not its original intent; the values of the gun are not in-line with its use as a heavy object by which to hold down papers. The gun is deviating from its purpose and its value direction if it is used apart from that for which it was made. While technology itself performs based on human input, the technological matter itself was designed with an intent and a purpose, therefore carrying a value, at least to some unspecified degree. The Value-Neutrality

[36] Boaz Miller, "Is Technology Value-Neutral?", (2020): 1.
[37] Nadia Caidi, et al, "How Neutral Can Technology Be?", (2006): 3.

Theory and the arguments for or against it are just one angle of technology ethics imperative in considering the confluence between humans, technology, and their growing interdependence.

Responsibility

The interface between technology, human will, and the arguments about value-neutrality introduce the notion of responsibility. With the power of technology to shape nearly all, if not all, conditions today - social, political, biological, psychological, environmental - the idea of responsibility concerning technological advancement is a cornerstone in modern tech-ethics. The constant transformations in technology have led to a drastic change in the definition and understanding of responsibility. What once used to be understood as a person acting consciously to take into account the outcomes of his or her actions, responsibility has now shifted away from the necessity of a human subject.[38] Ethicists understand responsibility as a subject - human or non-human - taking account for the results of an action. This gives responsibility the weight of a moral principle since individual freedom now influences the progression and dynamic direction of global human society.[39]

While humans have been the brains behind the advent of technology - programming and attempting to calculate its every move - it seems that the consequences following technology today have surpassed human control. Humans are indeed responsible for the creation of technology, but with glitches and viruses that cause technology to operate in unintended ways, the responsibility of technology must be distributed and weighted between collective, relational socio-technological factors.[40] Shared responsibility as a concept has widely taken form in ethics,

---

[38] Anastasia Platonova, "Responsibility in Technological Civilization: In Search of the Responsible Subject," (2013).
[39] Platonova
[40] Mark Coeckelbergh, "Moral Responsibility, Technology, and Experiences of the Tragic: From Kierkegaard to Offshore Engineering," (2012): 44.

policies, and practices today; in business or throughout daily life, few people recognize themselves as fully independent actors solely responsible for the formation of a concept or the ripple effects of a decision. Søren Kierkegaard's unique interpretation of moral responsibility and tragedy can be paralleled to the queries regarding allocating the burden of technology on humans as compared to the technology itself. Kierkegaard asserts that modern tragedy attempts to make the hero a sole, absolute, responsible being accountable for everything. However, the hero is not and cannot be accountable for all because all is not in his power.[41] Analogous to technology and the brainchild of its various forms, responsibility is gradually acquired by all parties involved. It is not only the mere creation of a device, for example, but also the thought and contributions made in the beginning stages of contemplating its inception that bear the burden. It is a slippery slope to argue that technological progress and the lifespan of a technological development is conclusive on absolutes; from the perspective of the humans involved in its formation, there is certainly *some* degree of responsibility, but that is likely shared between multiple individuals as well as the performance of the technology and the systems with which it is intertwined.

The Case of Boeing 737 Max 8

To illustrate the link between many different human factors and engineering systems, and the absolute need for all of them to function in-sync, consider a real-life product: the Boeing 737 Max 8. This airliner was indefinitely grounded in 2019 after it crashed twice within a five-month period. BBC wrote about the Lion Air flight with the headline "Boeing 737 Max Lion Air Crash Caused by Series of Failures", and the introductory sentencing read, "Investigators said faults by Boeing, Lion Air and pilots caused the crash". From the start of the article and the investigation,

---

[41] Coeckelbergh, 42.

collective responsibility is addressed. The article continues to discuss a variety of issues present, with an Indonesian air accident investigator cited saying that experts were able to pinpoint nine things that contributed to the crash. If even one of the nine had not occurred, the accident would likely not have occurred.[42] A 353-page crash report details what conclusively states: the plane's flawed softwares, mechanical design, and internal systems coupled with inadequate pilot skills, pilot responses, and interpersonal communication caused an incident that killed hundreds of people. Technology acts without fault for a large number of human interactions with it, but this emphasis on its failures is noted more frequently, and particularly so in this paper, because the failures are significant and affect society beyond solely those who unfortunately experience the direct impact of engineering and AI downfall. Lives lost due to the misstep of mechanics, AI, proper human utilization, and system unity continuously pressure the reconsideration of the extent to which society automates, and how it does so without proper safeguards. Moreover, it highlights the ambiguity in responsibility so central to engineering, adding impediments to the paramount task of properly addressing and mitigating the actors at fault.

Once technology is a component of the intricacies of life, it is incredibly difficult to dispose of it, the knowledge associated with it, and the system embedded in it that interacts with the surrounding world.[43] Collective moral responsibility is now unquestionable. The question becomes reliant on extent: to what extent is a human responsible for the outcomes of technology? This will be a particularly important question to consider in the application of algorithms in the courtroom. Ironically, there is no equation to determine the responsibility distribution of an algorithmic equation. However, acceptance of the notion that any endeavor with technology is a multifaceted moral responsibility is the foundation on which to explore

---

[42] Theo Leggett, "Boeing 737 Max Lion Air Crash Caused by Series of Failures," (2019).
[43] Peter Augustine Lawler, "The Problem of Technology," (2005): 125.

tech-ethics and further understand future artificial intelligence considerations. All of this starts in the hands of engineers, the math- and science-oriented visionaries who merge forces with investors, inventors, entrepreneurs, and industrial designers to bring to life a dream for the future.

VI. Engineering Ethics

Engineers are faced with constant moral dilemmas in their profession as they work to design the algorithms, build the machines, and compute the perfect operations for high-performance final products. Their work is evident in the smallest cracks of everyday life, yet the sheer vastness of their labor on this earth and far outside of it is nearly inconceivable. At the basis of their work is the sense - or preservation of the sense - that technology is a force for good in this world.[44] With the mindset and skillset to address and progress the most life-altering developments this side of humanity has ever known, engineers take on a particularly weighty responsibility when deciding to commit themselves to this occupation. Though it is clear that moral obligation and moral responsibility are collective, engineers still live on the frontlines of attack when technology fails and in the shadows when technology succeeds. Engineering is an occupation greatly shaping the future and intensely redefining the understanding of tech-ethics, the main ethical impasses stemming from the design phase of a proposed innovation.

Design

The design phase brings the concept "to life" without actually manufacturing an active product - this is the time in the early stages of the process when the proper blueprint for execution is finalized, where the ethics are most fully considered. In 1950, the Association of Engineers (VDI) in Germany created and presented a document to address the conflicting

---

[44] Abbas El-Zein, "As Engineers, We Must Consider the Ethical Implications of Our Work," (2013).

professional responsibilities engineers face in their jobs, as well as to make public the standards

of ethics in the engineering profession. When speaking of design, the report elaborates:

> Engineers are aware of the embeddedness of technical systems into their societal,
>
> economic and ecological context. Therefore, they design technology corresponding to
>
> the criteria and values implied: the societal, economic and ecological feasibility of
>
> technical systems; their usability and safety; their contribution to health, personal
>
> development and welfare of citizens; their impact on the lives of future generations. The
>
> fundamental orientation in designing new technological solutions is to maintain today
>
> and for future generations, the options of acting in freedom and responsibility.[45]

In their aim towards design realization and full technical fruition, engineers work tirelessly to

prevent the deviation of intent or the failure of systems. However, engineers are constricted in

wholly thinking through design ethics insofar as they are forced to also greatly consider how the

system may be utilized. More clearly, the scope of morality has shrunk for engineers as the uses

of devices have stretched far beyond their initial design and what was ever expected for the final

outcome.[46] Similar to many other industries and occupations, engineers work under the influence

of financial markets and client satisfaction when managing a project, though they are still

required to adhere to the same standards of ethics and safety regardless of external pressures.

Engineers have to delicately alleviate the improper uses of technology to the most considerable

extent while recognizing the tension between consumer freedom and shared responsibility.

Justification

    While engineers are taught to have integrity and morality in their designs and the pursuits

of their technological executions, more emphasis is being put in engineering education to

---

[45] VDI Executive Board, "Fundamentals of Engineering Ethics," (2002).
[46] El-Zein

account for entire system effects and collective responsibility. The challenge to this shared burden is the larger pool of morals, interests, and values incorporated into problem analysis, conceptualization, and final detail decision-making. The conversations revolve around tackling moral tradeoffs and prioritizing the safety of humanity while balancing the risks associated with future innovation. VDI highlights the cross-cultural and multi-dimensional lens through which every decision is looked through, explicitly stating, "[Engineers] are expected to analyze and weigh controversial views through discussions that cross borders of disciplines and cultures. In this way, they acquire and strengthen their ability to play an active part in such technology assessment".[47] Though this lengthens the time it takes to acquire the necessary compelling ethical, legal, and feasibility clearances for development, it provides assurance in the operation of the ultimate product. Technological developments are no longer confined to a single company or even a single geographic region; the qualitative and quantitative investigations and analyses span the globe, covering a multitude of time zones and cultures to ensure exhaustive ethical and performative review.

The complexity of the design phase and the laborious authorization protocols all build upon the cornerstone of a logical, ethical, and persuasive rationale for the investment of time, resources, and risk. This concept of justification is the pinnacle requirement of any engineering pursuit, with the extensive dialogue and thorough design phases all striving towards presenting an impartial argument for the importance of a technical result. The justification must be incredibly precise and convincing, outlining a definite strategy for the moral considerations, reviewed misconducts inside and outside of the direct company, and the risk-benefit analyses associated with the project.[48] The scrutiny involved in validating the intricacies of a technical,

---

[47] VDI Executive Board
[48] Andreea Ban and Mihaela Bucur, "What Does Engineering Ethics Involve?", (2018): 31-35.

systematic project provides the safeguards imperative to this modern-day notion of constant progress and novelty for the future of humanity. Intently working through these stages of AI engineering leads to agency, or the controls and limits embedded throughout design and development that prevent an algorithm from doing certain things under certain conditions.[49] This mitigates risks in hopes of avoiding any negative side effects possible during operation. Pressure is being applied to engineers daily and it is only increasing as ethicists are able to more concretely understand inputs, outputs, patterns of unaccounted-for consequences, and reactions with a web of systems to further resolve engineering ethics ambiguities. While this is more readily applied to tangible final products, the intangible nature of algorithms reroutes many tech-ethical considerations back to the start. Up to the present moment, this starting point has rested chiefly on the engineers largely independent of contribution from legal experts and scholars, placing tremendous legal weight on individuals unspecialized in the nuances of law and the web of courtroom proceedings.

VII. Algorithms & Artificial Intelligence

The world now generates such enormous volumes of data that algorithms are becoming more prevalent and predictive by the second. Data is being collected and stored into the internal databases of companies through phones, location services, social media, and web searches, whether an individual is actively using a device or not. There are considerable commercial interests in advancing the utilization of these massive amounts of data through AI, such as financial entities detecting fraud, media outlets expediting their updates of global events, or companies optimizing their supply chain models to minimize costs and enhance production. As the algorithmic input increases, companies have been able to greatly leverage the benefits of AI

---

[49] Genevieve Bell, "6 big ethical questions about the future of AI," (2020).

in human decision-making and business behavior. Understanding relationships between consumers and products is essential, and it has led to massive breakthroughs across many industries and institutions by improving operations, saving lives, and predicting risks before they materialize into unfavorable outcomes. The world today would look vastly different and increasingly disordered if it were suddenly stripped of any AI influence. Though there are cases, as illustrated with the Boeing 737 Max 8, where collective systems can go awry, this is, more often than not, seldom the case. It is important to note and understand the commercial and economic advantages so deeply rooted in AI in the present world, for many may be blind to the intricate ways algorithms guide and benefit the smallest components of a routine day.

The Case of Heineken

Consider Heineken, a 156-year-old company known for its success in the beer market. With recent partnerships signed to advance the company's data analytics, Heineken has expanded its brand to extensively rely on data-driven improvements for its brewing, marketing, customer relations, delivery, and product demand.[50] Being a company founded in 1864, it is evident that Heineken was able to make its way to the top of the global brewing list before the influx of technology and the augmentation of algorithms. It is also clear, however, that Heineken's use of technology expanded the opportunities for product creativity and corporate growth that likely only arose due to the increasing insights of valuable data. The success Heineken experienced with its leap into data analytics inspired a surge of companies to pursue routes similar to the beer giant. Heineken began using algorithmic forecasts to improve accuracy in stock quantities, which allowed for brewers to adjust production based on inventory. Their collaboration with Walmart analyzed shopper behavior when scouring shelves, providing

---

[50] Bernard Marr, "The Incredible Ways Heineken Uses Big Data, The Internet Of Things And Artificial Intelligence (AI)," (2020).

Heineken with intricate data on how each Heineken product found its way out of the store. With social media strategies to customize and tailor ads, Heineken has been able to develop relationships with users and create a personable dynamic that encourages engagement with the brand while also increasing content exposure.[51] Heineken took the descriptive information concerning *what has been happening* in their business operations and transitioned it into predictive analytics assessing *how patterns will continue* to unfold based on the data at hand. Following these critical insights, Heineken has been able to propose more relevant and productive action steps throughout the entire supply chain process. The thorough analyses, reviews, program developments, and implementational techniques that go into a consumer enjoying a Heineken beer while out with friends is astounding to consider. If AI can be implemented so intricately and productively for a bottle of beer, its influence on other industries feels remarkably hopeful.

While algorithms and AI are not free from any concern, the ultimate question lies in how the costs of their limitations compare to the benefits of their successes. Researchers have noted several epistemic and normative concerns to algorithms that sit at the base of exploring and developing a fulsome understanding of the ethics of algorithm processing. The first set of limitations regards the quality of evidence, or the conclusions drawn from the inputted data. Algorithms produce an output based on the data processed into them, resulting in probable but still inevitably uncertain knowledge. The inconclusive outputs are oftentimes seen as sufficient to make decisions, but there is undoubted insufficiency in drawing conclusive correlative insights from limited data. Similarly, the data inputted often lacks transparency in terms of its scope or quality, so the resulting evidence is inscrutable and difficult to interpret. The

---

[51] Marr

conclusions that are outputted are only as reliable and neutral as the data which was inputted, leaving a wide gap for misguiding the evidence and the evaluations of the algorithmic process.[52] Algorithmic evidence is imperative to consider through a limiting lens because it motivates a particular action or set of actions whose resulting actions themselves should also be held to strict ethical scrutiny.

The difficulty with assessing algorithmic response is that the ethics of resulting actions are dependent on the observer. For example, the concerns of evidence can all be thoroughly managed to result in conclusive, scrutable, and founded indications, but an action can still be seen as discriminatory to a protected class of people.[53] While all the possible precautions can be taken to ensure a just input in hopes of a just output, the resulting effects can still be unfair. Though recognizing these unfair outcomes as a plausible reality is a necessary first step, once the actions occur, they have already rippled through society and it is impossible to undo the processes or their lingering effects. The outcomes of algorithmic actions are transformative, not just to the systems they operate, but to the minds of the world whose conceptualizations change as algorithms encourage shifts in social, political, and individual organization based on varying new insights.[54] As when speaking about responsibility, there is a dire need in all of this innovation to be able to trace an artifact back to those who contributed to it. Software traceability has always been a concern, and engineers are continuously creating and adapting additional softwares to help with bidirectional links between a product and the myriad of developers involved in its evolution.[55] By being able to trace an outcome and its subsequent actions to a

---

[52] Brent Daniel Mittelstadt, et al., "The ethics of algorithms: Mapping the debate," (2016): 2.
[53] Mittelstadt, 5.
[54] Mittelstadt, 5.
[55] Chris Mills, et al., "Automatic Traceability Maintenance via Machine Learning Classification," (Madrid, 2018): 369.

specific algorithm, its engineer, and the remaining team of individuals and systems influencing it, one can address problems and remediate future errors in a more timely and responsible way. Because there can never be fully-secured protection against the quality of evidence, there can similarly never be full safeguards against the responses of an algorithm and the AI processing as a whole. Understanding the limitations and ethical concerns of AI is necessary in developing a baseline awareness of algorithms and constructing a framework on which to discuss its incorporation in the courtrooms.

VIII. Integration in Policing & Courtrooms

The automation of courtroom proceedings was just one of many algorithmic transitions in the government, which began deploying machine learning throughout varying sectors of operation in an effort to enhance public governance. The greatest courtroom automation came through the predictive and risk assessment softwares. These systems have been traced back to the end of the 19th century when statistics started to become more prevalent in criminological and penological analyses of sanctions and imprisonment.[56] The value of tracking data and understanding the insights that arise from data analysis was slowly uncovered as researchers felt a sense of control in crime prevention based on statistical findings of perpetrators and policing resources. By predicting dangerousness through probabilistic relationships in individuals, policies, and criminalities, the United States became optimistic about the utilization of statistical work in risk assessment tools.[57] Soon, these quantitative tools became active instruments integrated into numerous jurisdictions across the United States to predict future risk for misconduct and to aid in calculating a defendant's sentence period accordingly. However, there

---

[56] Jake Goldenfein, "Algorithmic Transparency and Decision-Making Accountability: Thoughts for buying machine learning algorithms," (Melbourne, 2019): 45.
[57] Goldenfein, 45.

was a desire for a complementary component that would come before the risk assessment instrument (RAI) seen in courtrooms, a piece of the predictive puzzle to identify and stop the crime before it is even committed.

Predictive Policing

Predictive policing arose from the glimmer of hope quantitative techniques gave to RAIs in bail and sentencing predicaments, but, moreover, the goal was to promote crime prevention with only limited resources. These automated policing softwares have been targeting methods for predicting crimes, offenders, perpetrators' identities, and victims of crimes.[58] Using insight from the RAND Corporation, a nonprofit institution improving policy and decision-making with research and analysis, the following table summarizes the intention of predictive analytics based on a selected distribution of problems with law enforcement and the variations from conventional techniques. The Summary Report illustrates the benefits of having access to and using large, complex data in policing in order to discuss the challenges that may arise from them.

Summary Report: Law Enforcement Use of Predictive Technologies*

Problem	Conventional Crime Analysis (low to moderate data demand and complexity)	Predictive Analytics (large data demand and high complexity)
Identify areas at increased risk		
Using historical crime data	Crime mapping (hot spot identification)	Advanced hot spot identification models
Using additional data (e.g., 911 call records, economics, demographics)	Basic regression models created in a spreadsheet program	Regression, classification, and clustering models
Identifying geographic features that increase risk of crime	Finding locations with the greatest frequency of crime incidents and drawing inferences	Risk terrain analysis
Identify a high risk of violent outbreak between criminal groups	Manual review of incoming gang/criminal intelligence reports	Near-repeat modeling (on recent intergroup violence)
Identify individuals who may become offenders (e.g., those on probation, on parole, high risk domestic violence incidents, mental health patients)	Clinical instruments that summarize known risk factors	Regression and classification models using the risk factors
Identify suspects using a victim's criminal history or other data	Manually review criminal intelligence reports and infer	Computer-assisted queries and cross-database analysis
Determine which crimes are part of a series and most likely to be re-committed by the same perpetrator	Crime linking with a table comparing the attributes of crimes known to be in a series	Statistical modeling to perform crime linking
Find suspects using sensor information around a crime scene (GPS, car information)	Manual requests and review of sensor data	Computer-assisted queries and analysis of sensor databases
Identify people at risk for victimization and the at-risk locations	Review of criminal records, manually graphing and mapping frequent crime sites	Advanced data mining to identify repeat offenders at risk, advanced crime-mapping tools to generate crime locations

*Drawn from The RAND Corporation, 2010

---

[58] Walter L. Perry, et al., "Predictive Policing: The Role of Crime Forecasting in Law Enforcement Operations," (2013): xiv.

Important to note in the synthesis of the table above is that, on its own, no current advancement of mathematics or engineered computations can reduce crime. The value of the word "predictive" in the term predictive policing is crucial - the tools utilized can make predictions based on the inputted data; however, it does not assume an assured foretelling of the future. To view actual reductions in crime, the creation and application of tangible action steps need to follow the highly sophisticated quantitative and qualitative modeling and analyses. Similarly, computers are not the end product of any software. Humans are, indubitably and by far, the most important elements in any automated predictive policing processing.[59] Even with an idealized algorithmic solution, a human needs to program that software, collect the data, and analyze the output. Results from Predictive Analytics yield invaluable guidance for those working with crime prevention, but those obtained from analyses including large-data risk-terrain and near-repeat modeling, for example, need to be addressed through actionable recommendations and implementations.

On the other hand, predictive policing with particularly high data complexity falls short in several regards. A primary concern is the lack of understanding of the factors that result in a prediction, misidentifying the risk factors and acting improperly following the flawed relation. This can be particularly dangerous if law enforcement begins targeting the wrong individuals or groups based on wrong inferences. As discussed, the quality and quantity of data used are central to the software. When speaking of predictive policing specifically, data collection and processing is integral since the data in question regards very precise locations, times, and people. For instance, the time of a criminal report is not necessarily the same as the time the crime occurred, and it should not be inputted into a software as such. If an emergency call comes in saying a

---

[59] Perry, xix.

crime has occurred, that does not yet justify a data point in the system simply because police were dispatched - further investigation might indicate there was not a crime at all. The initial suspects are not necessarily those found guilty by evidence later on, so this data should not be prematurely noted and inputted. The quantity of data for output precision is similarly not always the same. Gathering the most data is not always efficient or required depending on the scope of the crime and the criminal in question. Since action steps need to be suggested, curated, and implemented, there is a sense of urgency to society, but not at the cost of compromising the data being integrated and misrepresenting the outcomes. Finally, for the sake of this highlighted overview and not in hopes of an exhaustive list, is the concern of overlooking civil and privacy rights.[60] Labeling an area or a body of people as "high-risk" introduces more hot-spot policing and individual targeting. While the Supreme Court has ruled on standards for reasonable suspicion, the breadth of measures and the subjectivity of extent are still relatively undefined and open. Predictive policing and the direction it is moving with increased engineering requires extreme safeguards to function properly, a challenging and unlikely standard being met today.

PredPol

Though predictive policing tools are actively on the rise with IBM, Microsoft, and individual police departments crafting their own programs, PredPol has been one of the most notable, and most controversial, softwares implemented to date. PredPol is a leading predictive policing company founded in 2012 which uses machine-learning algorithms to direct police patrol operations by calculating crime predictions and then providing analytic reports to loop the data together.[61] Their location-based algorithms only collect three data points - crime type, crime location, and crime date/time - to draw links between places, criminal activity, and historical

---

[60] Perry, xxi.
[61] "Predict and Prevent Crime: Predictive Policing Software," *PredPol,* (2020).

crime rates (typically around two to five years of data). The algorithm then provides predictions

as to where and when a crime is most likely to happen. PredPol displays the algorithm's

geographic predictions as 500 x 500-foot red boxes on an interfaced Google Maps of the city,

representing the highest-risk areas in that city, and then updating daily, similar to the slightly

changing elements of a weather forecast checked every few hours. Police officers in given

PredPol jurisdictions are "instructed to spend roughly 10% their shift time patrolling PredPol

boxes".[62] These six minutes in each hour for every active police officer per a city's department,

not inclusive of commute time to and from the geographic area, is a substantial amount of time to

be spent in restricted areas of a city each day. However, if results over time do in fact yield a

reduction in crime, this concentrated time commitment in the supposed locus of criminal activity

can be a break in future policing operations.

PredPol advertises its apparent success with results gathered from an unspecified

Southern United States city with a population below 300,000 which had integrated the PredPol

software in its policing strategy. Within the first year, PredPol reports that the city experienced

robberies decrease by 44%, aggravated assaults decrease by 23%, and burglaries decrease by

20%. Using "well-researched metrics", PredPol ascertains that the crime reductions correlated

with saved officer time, sixteen fully-employed officers to be exact.[63] More clearly, PredPol

argues that the crime reduction can be quantified through officer time: hours spent by an officer

investigating a crime, responding to a call, or handling the aftermath of a crime because no

anticipated, preventative predictions were available. With saved time through PredPol's

predictive policing, departments cut costs by not having to recruit, train, and hire sixteen full-

time officers. The time saved by officers could then be allocated to working on and

---

[62] "Law Enforcement: PredPol Law Enforcement Intelligence Led Policing Software", *PredPol*, (2020).
[63] "The Cost of PredPol & How to Justify Your Purchase," *PredPol,* (2020).

implementing other community relation programs and safety strategies. Additionally, it correlates to money saved for the department. When considering an annualized basis measuring only officer time saved, this case study resulted in over one million dollars saved. The city made an initial investment of $60,000 for PredPol, yielding a return on investment of 2,900%. Simply, for every dollar the city spent, they received an equivalent twenty-nine dollars in additional officer time.[64] This hopeful, interconnected relationship - crime reduction also saving time and money - is one that PredPol strongly endorses. While this single-city review may seem encouraging on a quantitative level, it is one of only a few actively reviewed PredPol samples available to the public, and it fails to consider the impact of predictive policing on the community- and individual-levels with physical health, mental health, and increased social tension between residents and their local authority.

Before considering the more consuming drawbacks to the limited information regarding PredPol's success, there are advantages to PredPol's functionality, or at minimum to the idea behind its attempts. Because data - accurate and properly-acquired - are valuable for community engagement and statistical insight, PredPol can be flexible enough for most policing environments and department needs: it is reliant on individual city statistics and it is not conditional on implementation or practice. The analytics gathered by collecting historical and present crime data can be useful to a city beyond solely the red-box, real-time crime predictions, with each city having the ability to dictate how it will interpret and use the reports and predictions provided. PredPol co-founder Jeffrey Brantingham notes the importance of actively using the data in some practical capacity, with the individual department holding the discretion to determine which structural changes or policing methods are most relevant for their city. He

---

[64] "The Cost of PredPol"

states that outputs provided by PredPol do not guarantee use: "It's up to the police to use it… We all know that the treadmill in your garage can have an impact on your waistline, but if you're not getting up there and running on the treadmill, it's going to have no possible impact."[65] The potential for community benefit based on accurate predictions is central to the existence of PredPol. With adequate knowledge and training on how to respond to PredPol's predictions, police departments may certainly be able to identify and stop crime before it even happens. However, the concerns raised about PredPol start long before the software generates red boxes and is put into practice.

Concerns about PredPol are far-reaching, and many have cast doubts on its efficacy and claimed unbiased reporting, with a simple cost-benefit analysis making many wary of its current use. At the crux of it all is the algorithm the start-up uses. From a purely mathematical perspective - shared from the Tacoma Police Department in July 2012 - PredPol is based on the following model (the exact PredPol algorithm is unknown):

$$\frac{\partial B}{\partial t} = \frac{\eta D}{4} \nabla^2 B - \omega B + \theta \omega \delta.$$

This mathematical model was designed to account for three particular elements of offender behavior: repeat victimization, near-repeat victimization, and local search. Repeat victimization refers to repetitive behaviors of an address, near-repeat victimization refers to the proximity of other addresses to the previously reported criminal activity, and local search refers to the area near the homes of the criminals or the area near other crimes the perpetrators have committed.[66] However, this intimidating formula can be summarized as a moving average as follows:

$$\lambda(t, x, y) = v(t)\mu(x, y) + \sum_{\{k: t_k < t\}} g(t - t_k, x - x_k, y - y_k).$$

[65] Joyce Shimizu, *The Benefits of Using PredPol Daily*, (2015).
[66] Caroline Haskins, "Academics Confirm Major Predictive Policing Algorithm Is Fundamentally Flawed," (2019).

This equation reveals an average of subsets in a dataset, more simply just taking an average of where arrests have already happened, and reporting those as spots to continue being policed. The algorithm PredPol developed was inspired by a seismic activity model used when measuring earthquakes and their aftershock. PredPol's co-founders believed that crimes follow a pattern of occurrence similar to earthquakes and that crimes themselves also experience "crime aftershocks" or "aftercrimes.[67] By considering historic data and tracking crime repetition, crimes can be predicted to the largest possible proportion based on the near-repeat behavior. The relation between seismographic modeling and predictive policing modeling is unique and insightful, but the variations in the nature of data collection between earthquakes and crimes seldom permit creating a quantitative parallel. While it is reasonable to presume that gathering information on the occurrence of any earthquake on Earth is neutral and provides fulsome data, gathering data on crimes is dependent on reports and internal insight. Many crimes are not called in depending on the community or the individual, and the subjectivity in officers to make arrests introduces a multitude of contributing factors affecting the data. Understanding the patterns and history of crime is not as simple as placing seismographs around Earth to detect and record earthquakes.

Most importantly, the issues of bias and hot-spot policing are integral to the objections concerning PredPol. First and foremost, the algorithm does not request data about the race of offenders; yet, the variables it does request, such as zip code, can certainly act as a proxy for this. Similarly, with many years of historic data influencing the predictions, the algorithm is simply quantifying historic police bias and hot-spot discrimination. "Dirty" data from years prior allows for biased predictions based on discriminatory inputs. This influences the second concerning

---

[67] Bilel Benbouzid, "Values and Consequences in Predictive Machine Evaluation. A Sociology of Predictive Policing," (2018): 4.

aspect: feedback loops. Predictive policing softwares can quickly act as self-reinforcing tools. This can be understood through three simplified steps for PredPol: (1) the algorithm creates red output boxes initially generated from two-to-seven years of crime data, (2) the software encourages increased and consistent police presence in those defined areas, (3) the algorithm then receives input from police based on the crime data gathered from that initial geographic output. The result is police increasingly monitoring the same areas and not focusing on other neighborhoods because the self-affirming algorithm is not directing them there. PredPol is controlling itself and skewing its own input by its consistent geographic output. This, in turn, continues to target the same communities, likely minority ones. Hot-spot policing and daily increased police scrutiny to localized neighborhoods can aid in crime reduction, but it also imposes severe costs to the individuals affected by it when taken to stop-and-frisk measures or non-violent misdemeanor arrests. Because not every single crime is reported, and police are not surveying people and neighborhoods accurately, PredPol functions as a self-perpetuating predictive policing cycle that looks for and addresses crime in the same locations, putting minorities and people of color at a disproportionate risk of target and harm.

PredPol is a single iteration of predictive policing and, while it does not reflect every method or system which exists, it has been widely considered and discussed to think through predictive policing and algorithmic utilization in the legal system as a whole. Predictive policing certainly allows for some feelings of predictability and stability in the daily duties for a police officer, and it adds a level of control for police departments racing to optimize their efforts towards this overwhelming societal disorder, but to say it is completely unbiased illustrates an unsound awareness to ever-present issues and a faulty, premature implementation. PredPol brings scars of many an era of discriminatory policing and flawed, prejudicial data. There are

few known precautions around the quality of the data, and the persistent feedback loop only promotes the system which the algorithm claims to want to dismantle. Rather than minimizing it, the United States may be instilling additional harm through the use of predictive policing by simply covering the human bias seen throughout history with a man-made algorithmic equation interpreted by the same human authority the system is trying to replace.

The courtroom complement to predictive policing is algorithmic RAIs, the risk assessment tools the courts have begun utilizing to assess the violent risk of a defendant. Because the criminal justice system funnels many into jail only as suspects - not yet found guilty by trial in court - the RAIs have attempted to inform these pretrial detentions, bail amounts, and sentencing durations. Similarly, with American incarceration rates already at an alarming high, the ability to defer placement of low-risk defendants away from already overflowing corrections centers relieves at least one component of the criminal justice system concerns. The assumption is that if the defendant poses a threat to society, the RAI, in partnership with the judge, will send the individual to jail; little to no determined threat to society sends the defendant home to await trial. "Threat to society" is quantified through a numerical risk score outputted based on question responses and personal data about the defendant. The range of risk scores - low, medium, and high - guides the judge's ultimate decision, and this score can further influence prison housing and services for the defendant. The algorithms used for pretrial risk assessments are proprietary and not subject to state or federal laws, meaning they can remain undisclosed and lack the transparency many desire in order to fully understand the information being considered in a criminal case. Upon analysis of the intricacies and uses of a leading risk assessment process, the constitutionality of these types of softwares will be examined.

COMPAS

Correctional Offender Management Profiling for Alternative Sanctions (COMPAS) is a widespread risk assessment algorithm created by for-profit Equivant (previously Northpointe). Initially developed in 1988, COMPAS is used across agencies nationwide today, being consistently revised to remain up-to-date with the growing criminological knowledge and changing correctional practices.[68] The primary risk assessment models developed by COMPAS measure the likeliness of the defendant to recommit a crime, one model looking at general recidivism and the other considering violent recidivism. The assessment aims to not only provide a score, but to also help practitioners devise and implement a support strategy based on the unique results of the individual. With overcrowded prisons already an issue, the brevity and efficiency that comes from COMPAS in determining urgency, risk, and need for pretrial prison placement can serve as a critical "triage" step in the criminal justice system. The raw scale scores are calculated from the 137-question risk assessment and then converted into decile scores, which can only be interpreted relatively and in relation to the norm group.[69] Generally, across all of COMPAS's scales and specifically for the two primary risk models at focus, the decile ranking is as follows:

- 1 - 4: scale score is low relative to other offenders in the norm group
- 5 - 7: scale score is medium relative to other offenders in the norm group
- 8 - 10: scale score is high relative to other offenders in the norm group

The norm group was built from over 30,000 data points sampled between January 2004 and November 2005 from prisons, paroles, jails, and probation sites across the United States. The

---

[68] "M & A," *Equivant*, (2020).
[69] *See Appendix A*

normative groups were divided into eight categories to account for both males and females in each criminal justice site, generating relevant norms for reference.[70] This brief overview of an otherwise extensive and comprehensive Northpointe Suite lays a sufficient foundation for discussing the use of COMPAS in the justice system, in particular the violence recidivism assessment tool. Assuming that norming, validity, and reliability remain consistent and true throughout COMPAS, the focus of the discussion will narrow into the violence recidivism variables to develop a more thorough understanding of this leading method of algorithmic courtroom processing.

To estimate the likelihood of reoffending, COMPAS' Violent Recidivism Risk Scale considers five salient risk factors. These variables, depicted in the equation below, are current age, *a,* age of first arrest, a_{first}, history of noncompliance, $h_{noncompliance}$, vocational education, $v_{education}$, history of violence, $h_{violence}$.[71] The construction of the equation is such that race is intentionally not taken into account, and factors that the founders believed may act as a proxy (i.e. neighborhood, socioeconomic background, family characteristics) are avoided to keep the variables specific to the offender and the determination of their societal risk. Though the private company uses proprietary softwares and models, the following is an equation identified in Northpointe's official "Practitioner's Guide to COMPAS Core" to calculate an offender's violent recidivism risk score, *S.* Each scale variable is multiplied by a weight, *w*, determined by the strength of each scale item in relation to an offender's recidivism based on Northpointe study data:

$$S = a(-w) + a_{first}(-w) + h_{violence}(w) + v_{education}(w) + h_{noncompliance}(w)$$.

---

[70] *Practitioner's Guide to COMPAS Core,* Northpointe Inc, (2015): 8.
[71] *Practitioner's Guide,* 29.

Markedly, the defendant's current offense is not included in the risk calculation. During the

development of the violent recidivism risk model, data showed that the current, violent offense

does not significantly affect the prediction given by the risk score. Rather than yield a potentially

counterintuitive and misleading score to interpreters, the risk scale forfeits inclusion of the

variable. This does not, however, negate the importance of the nature of the most recent offense

and the absolute necessity of its consideration in the placement and management of the

offender.[72] COMPAS integrates both historic and criminogenic qualities of the defender into a

quantitatively simple and understandable violent risk model, but this is just the beginning of a

long-winded process that requires human decision-making and implementation.

The Case of Eric Loomis

Eric Loomis is just one of many examples of the consequences of the COMPAS

algorithm and the controversies that arise with questions of over-reliance and due process. In the

case of *Wisconsin v. Loomis*, the Supreme Court of Wisconsin found Eric Loomis guilty of five

criminal counts due to his participation as the driver in a 2013 drive-by shooting, all as a repeat

offender. When taken into custody, Loomis was asked a series of questions whose answers were

then inputted into COMPAS' recidivism algorithm. His risk scores indicated a high risk of

recidivism across all recidivism measurements, including violent recidivism, influencing the

judge's longer sentence for Loomis. Beyond his assertions that the circuit court's use of

COMPAS violated due process, Loomis also claimed that the judge improperly relied on

COMPAS in his sentencing, negating the consideration of probation and handing down a

maximum sentence. Loomis' arguments against COMPAS were rooted in the software's

assessment based on group data as opposed to individualized and unique qualities of himself as

---

[72] *Practitioner's Guide,* 29-30.

the defendant in this specific case consideration. The Court unanimously ruled against Loomis, stating that the circuit court merely used COMPAS' risk assessment as a supplement to sentencing rather than fully relying on it. "Importantly, a circuit court must explain the factors in addition to a COMPAS risk assessment that independently support the sentence imposed. A COMPAS risk assessment is only one of the many factors that may be considered and weighed at sentencing."[73] *Wisconsin* defended COMPAS, asserting that the algorithm only acts as a support and reinforcement to the judge, not as the sole or even primary decision-maker. Based on Loomis' prior criminal history coupled with the severity of the crime, the judge was supposedly able to reach the same sentencing verdict regardless of COMPAS' risk assessment.

As opposed to simply accepting COMPAS as a justifiable courtroom software if disclaimers about its novelty are noted in a decision, ProPublica did a study in 2016 to explicitly study if, and how, bias exists in COMPAS. ProPublica sampled the risk scores of over 7,000 people arrested in Broward County, Florida through 2013 and 2014. Using the same benchmark as COMPAS of defining recidivism as "a new arrest within two years", ProPublica investigated how many of those thousands of individuals were actually charged with new crimes in this two-year time frame: 20%.[74] One-fifth of the people that the score forecasted would recommit violently actually did. Most concerning of all, researchers found that COMPAS' formula was "particularly likely to falsely flag black defendants as future criminals, wrongly labeling them this way at almost twice the rate of white defendants. White defendants were mislabeled as low risk more often than black defendants."[75] Though COMPAS does not take race into account, the algorithm is more biased towards black defendants and has a greater racially disparate impact

---

[73] *State of Wisconsin v. Loomis,* (2016): 40.
[74] "Sample COMPAS Risk Assessment COMPAS 'CORE'"
[75] Jeff Larson, et al, "Machine Bias," (2016).

than legal experts had previously believed. A study by Alexandra Chouldechova followed

ProPublica's publication and showed that the false positive and false negative rates that indicate

racial bias from ProPublica are a "direct consequence of applying an instrument that is free from

predictive bias to a population in which recidivism differs across groups."[76] By rearranging the

COMPAS score to be equally wrong about black and white defendants, Chouldechova found that

people need to be treated differently in order to create an equal outcome. Counter-intuitively,

both studies have shown that a model free from predictive bias at the root can still be

discriminatory and oppressive in implementation and practice.

Though COMPAS is a nationally leading RAI, the awareness of other instruments in

parallel to this one is important for understanding the variations and nuanced differences that all

yield predictions to influence sentencing statuses for defendants. The Public Safety Assessment

tool (PSA) by the Laura and John Arnold Foundation has the same goal in mind as COMPAS -

assist judges in gauging defendant risk pre-trial. It differs in its use of nine variables which

additionally take into account the current offense and prior failure to appear in court, though it

similarly does not utilize race or geography as factors.[77] The federal Pretrial Risk Assessment

(PTRA) was developed by the Administrative Office of the U.S. Courts and is currently in use by

probation and pretrial officers to assist in decisions regarding defendant release and detention

recommendations. Rather than focusing solely on reoffending risks, the risk assessment indicates

to officers the risk of an individual's failure to appear in court and suggestions for placement

(release or detention).[78] Each of these three predictive systems utilizes distinct weights, factors,

---

[76] Alexandra Chouldechova, "Fair prediction with disparate impact: A study of bias in recidivism prediction instruments," (New York, 2016): 1.

[77] *Public Safety Assessment: Risk Factors and Formula,* Laura and John Arnold Foundation, (2016).

[78] "Pretrial Risk Assessment," *United States Courts*.

and protected softwares; yet, all three of them could hypothetically be used against the same, one defendant. The problem with this will be elaborated upon later.

Risk assessment softwares consider correlations, or relationships in data between multiple variables, to predict future outcomes based on historic datasets. However, as introductory classes in school often teach, correlation does not indicate causation. Crime rates may increase with frozen yogurt consumption, but that does not mean that someone who consumes frozen yogurt "causes" crime. Similarly, multiple events co-occurring at the same time does not imply that one caused the other(s) - it may be a mere coincidence with no causal connection. While it can certainly be valuable to note when variables move in the same direction - correlations can provide important insight that shape predictions and future action - courts and justice-driven algorithms have permanent and lasting effects on individuals. The challenge with correlation and variables is that (1) it is difficult to identify which variable is "causing" the outcome, and (2) there is a lack of knowledge into any extraneous or confounding variables. Accurately weighing variables in an algorithm is incredibly difficult when these two conditions create such uncertainty and introduce the possibility of not accounting for important and related factors. Many risks permeate the risk assessment softwares themselves as the correlative relationships lying at the basis of the algorithm's construction could simply be deceptive results from a conglomeration of unidentifiable or entirely excluded factors. If additional variables are taken into account, though it may increase the ability for predictive accuracy, it also further expands the room for flawed causal relationships. The dangers of falsely or incompletely correlating variables and reducing nuanced social life and criminal behavior to homogenous factors can be detrimental to those encountering the criminal justice system.

IX. Constitutionality & Transparency

Thus far, the vast majority of this discussion has been through a lens of critical analysis and ethical consideration. These analyses found, at the base, gaping holes in a once-hopeful algorithmic integration and increasing critiques regarding many aspects of predictive policing softwares and RAIs. Between the data selected and inputted into the algorithms, the action steps pursued following analytic inferences, the adverse social impact, the discriminatory policing practices, and the incessant over-incarceration of particular groups of people, it is startling that the law has permitted such erroneous results since the inception of courtroom AI. Beyond ethics and the normative and descriptive qualitative and quantitative evaluations, algorithms are a massive legal issue and have presented an ongoing constitutional debate. Transparency is an area of contention that regularly arises when the legalities of algorithms and AI are analyzed, resulting in greater concerns regarding the maintenance of the esteemed guarantee of due process. Secret algorithms are making lasting marks on the trajectory of a person's life; understandably, this is equally a legal concern as it is one of justice.

Due Process

Reverting to *Wisconsin v. Loomis,* Eric Loomis was one of the first defendants that legally challenged the constitutionality of COMPAS and various facets of related softwares. In Loomis' case, he argued that he was sentenced by the influence of a software that illegally denies him due process. Loomis cited three reasons for his claim: "(1) it violates a defendant's right to be sentenced based upon accurate information, in part because the proprietary nature of COMPAS prevents him from assessing its accuracy; (2) it violates a defendant's right to an individualized sentence; and (3) it improperly uses gendered assessments in sentencing."[79] The

---

[79] *State of Wisconsin v. Loomis,* 13.

Court argued against each of these points, saying that (1) courts use COMPAS alongside a judge and not on its own, also providing information outlining COMPAS' limitations and additional cautions with implementation, (2) COMPAS uses group data as a method of ensuring the accuracy of the individual sentencing it provides, and (3) gender must be accounted for to produce statistically accurate scores.[80] Furthermore, the Court rested their case on the available knowledge regarding the information inputted into COMPAS, stating that the proprietary algorithm inputs information (e.g. the answers to the questionnaire) whose validity and accuracy can be checked though the algorithm itself may not be. Loomis and the courts could reflect on the answers to the assessment questions; this information was, as the Court stated, useful in knowing *what* information the algorithm was using. It was not, however, useful in knowing *how* that information was being integrated into the software - the main concern about these automated and influential sentencing algorithms. Due process guarantees a defendant the right to be sentenced based on materially accurate information in a fair and non-arbitrary manner by a neutral decision-maker, several fundamental standards that the courts vehemently assert COMPAS meets though they still, in conjunction with their support, acknowledge its problematic and limiting nature.

Defining the scope of material inaccuracy in reference to AI is a challenge because the datasets and their outputs are entirely probabilistic and rarely completely accurate. Attaching varying and unspecified weights to different algorithmic or simply integrating multiple seemingly accurate datasets together in good faith can amplify inaccuracies and yield erroneous predictions. As exemplified with the Boeing 737 Max 8, a system can be composed of substantively precise parts that, together, are unfortunately unreliable or work defectively.

---

[80] *State of Wisconsin v. Loomis,* 32.

Constitutionally, this is an additional feat for the defendant, on whom the burden of proof lies to prove inaccuracy in his or her case. Since neither the prosecution nor the courts have any incentive to challenge an algorithm's accuracy, and each of these party's functions on the premise that the court's adoption of the RAI assumes thorough review and scrutiny of accuracy before adoption, it is up to the defendant alone to raise and argue for due process concerns. Because algorithms change as new data is presented and as new research introduces a cause for updates, it makes it increasingly difficult for a defendant to create a strong case against accuracy testing - the algorithm used on the defendant may very well be different than the one used in the prior week or the prior year by the court.[81] The lack of ability to hold the courts or softwares accountable, or to merely challenge their accuracy to ensure a constitutional proceeding, perpetuates the already widespread concerns regarding the realities of a fair trial with AI.

Trade-Secret Rights

The anchor on which companies rely to keep consumers engaged and leave competitors in the dark is the right to protect intellectual property. To maintain confidentiality and limit the ability of unauthorized disclosure or acquisition, companies pursue patents, copyrights, trademarks, and other forms of privacy support for often tangible and clearly visible products. Trade-secret rights fall under intellectual property protection, though they are typically used for the protection of less tangible infrastructures of a business: engineering methods, formulas, business plans and financial information, computer softwares, internal data, and research and development. While this fundamental protection is essential to the continued success of a company, especially in private markets, the trade-secrets should not interfere with or negate the due process rights of consumers. And, for most industries, a balance has been found to ensure

---

[81] John Villasenor and Virginia Foggo, "Artificial Intelligence, Due Process, and Criminal Sentencing," (2020): 322.

that businesses can retain product confidentiality while still giving the public enough information to know what it is they are using, eating, drinking, or wearing (i.e. listing the ingredients on a boxed food without outlining the exact measurements and recipe). In the criminal justice system, however, a tension between trade-secrets and due process still exists, and its lengthy persistence is only at the cost of the defendant's due process rights. How is a defendant expected to cross-examine an algorithm?

As seen in *Loomis*, the courts neither probed into Northpointe's algorithms nor requested auditing and review that could mitigate the legal tension, fully ensuring the protection of trade-secrecy rights for COMPAS without challenge. Though adequate scrutiny was lacking, the courts remained adamant about the presence of due process in Loomis' case. Paradoxically, they simultaneously acknowledged that the absence of additional pertinent information from Northpointe yielded insufficient evaluations of algorithmic features that were used in sentencing Loomis (e.g. gender). The most vital component in easing the tension outlined by the people and affirmed by the courts is transparency and accountability. These two features in unison establish a middle-ground between unquestionable due process and protections of algorithmic trade-secrets.

Transparency

If algorithms are to be implemented as "unbiased" assistants to, and future replacements for, biased humans both in policing and in courtrooms, the departments and courts have an immense obligation to ensure clarity in the technicalities of the softwares. This long precedes the procurement of the program in a county; it includes an array of specialized professionals working with the engineers and developers to closely examine every step in software creation. Understanding the integration of specific variables, their weights, the quality and quantity of data

used, a thorough synthesis of the historic baseline data, the permissible margin of error in predictability, and the accuracy rates after numerous pre-implementation experiments and analyses is imperative. Many layers of auditing, certifications, and internal reviews have to be conducted from a legal, ethical, and political perspective, and legal authorities require the capacity of understanding the intricacies of how and why a particular decision is reached. Algorithmic transparency constitutes an entire grasp of the purpose, function, structure, and protocol for an algorithm without necessitating the knowledge of the precise algorithm itself.

Transparency further constitutes an explicit direction of control and oversight. To ensure accountability, there needs to be a universal knowledge of who in the courthouse, police department, or state has control over the algorithm, a direct contact with the developers, and a consistent review of the algorithms-in-use in parallel with the rampant, ever-changing research. Additionally, a manual available to the public in layman's terms expanding upon the complex algorithmic intricacies - intent, use, rationale, guide to interpretation - should be widespread, especially for a defendant whose lifeline may be within the lines of those very pages. Identifying accountability and expounding an otherwise opaque process provides clarity and transparency while directly addressing, rather than acknowledging and further disregarding, the imperfection of human involvement in the entirety of algorithmic systems. Increasing regulations and standards that exist for algorithmic transparency is a preliminary step to resist corporate intrusion, ensure trade-secret rights are upheld, and resolve incessant due process disputes.

Predictive Parity

The final, key consideration in assessing algorithmic transparency and constitutionality is predictive parity, a fairness metric frequently used in AI development to calculate the "ratio of

true positives to those labelled high-risk generally".[82] In other words, predictive parity considers varying subgroups to ensure that the precision rate of the algorithmic results and scores is the same for each population. For RAIs such as COMPAS, researchers must ensure that the softwares predict recidivism at the same level of accuracy for both black and white defendants. These studies, their datasets and methodologies, are to be made clear beforehand as opposed to a third-party research group exploring it years after implementation due to several challenges following contested sentencing verdicts. Predictive parity is a type of transparency that provides assurance, which the public needs when it comes to algorithms, especially when they are used to make decisions that can permanently dictate any one of their future's. From a legal and ethical perspective, there needs to be constitutionally-regulated algorithmic transparency to ensure accountability and to outline the intricacies of its functioning. Moreover, this high level of scrutiny assures that experts in the criminal justice system have rigorously assessed the mechanisms before implementing the softwares, and that they have exhaustively been intertwined in the design and creation to ensure a fair addition to the justice system.

X. Synthesis & Analysis

There is urgency in the need to establish a space where people can be as objectively prosecuted as possible. However, the courts will not be able to jettison their own carceral logic. Though the very system is named after the moral principle it aims to uphold, time and time again it has failed to live up to its title. Due to the criminal justice system's historic perpetuation of bias and discrimination, algorithmic automation in the courtroom is the most recent endeavor to mitigate the past in hopes for a safer future. Two prevailing questions formulate as the quantification of justice is wholly considered, each which prompts its own review:

---

[82] Goldenfein, 53.

1. Is it possible?

2. Is it desirable?

To address the first, upon initial thought, one might argue that it is possible. There are algorithms created and implemented, it seems obviously, technically *possible* - desirable is another question. Justice, pulling from Athenian philosophy and the evolution of these classical thoughts, has a requisite for truth and a strong internal realization. Including in it, both separately and together, the pursuit of soul harmony, happiness, and optimal inequality, justice is a universal standard determined by, among other components, individual, deep-rooted attainment. It is merely unfathomable to engineer *anything* that can numerically, truthfully assess these elements of justice laid out by Aristotle, Plato, Rawls, and O'Neill. In addition, calculating weights for the relational factors between justice and crime inherently diverts from the disposition of justice qualities. This is all entirely implausible to do mechanically across all legal cases which are incredibly variable and distinct in nature from one defendant to the next. The accepted notions of the idiosyncratic essence of justice as discoursed through ancient philosophy and into modern thought cannot be captured with machine learning.

As discussed earlier, artificial intelligence in a distinguished court of law falsely presupposes a Truth claim to justice. Making such a presumption, though, supports the claim that humans can remove themselves from a world of value, and it boldly encourages the endeavor of quantifying justice under the initial assumption that this is, in fact, possible. However, there is something about the very notion of justice that is in an antagonistic relation with an automated technological software. This logic transfers to the justice system as a whole, where bringing objectivity into a system already racially tainted is inconceivable. In no way does this point devalue the efforts for objectivity nor does it suggest slowing progress towards this end; to the

contrary, it identifies the misplaced, though incredibly persistent, attempts to create a basis for rerouting efforts. For mechanical jurisprudence to be realized in any capacity through an algorithmic risk predictor, there must be a Truth claim to that which it is trying to quantify. Though justice has been intimately studied and experienced - jointly through its presence and its absence depending on the individual and the context of time - there is no Truth claim to it that would create a platform for mathematically measuring it while retaining the nuances of its nature. Implementing judicial mathematical modeling only slows and near-removes the discourse necessary to progress thought towards a more comprehensive understanding of justice.

Rousseau's perspective concerning the over-exploitation of resources in the incessant production of machinery during the 18th century finely parallels to the concerns raised with AI in courtrooms. Similar to nature being limited in resources, police departments and courtrooms work under bounded budgets and finite operational capacity. By over-investing in emerging technology in hopes of long-term resource conservation, proponents of AI in sentencing are endangering the defendants whose livelihoods rest on an incomplete algorithm. Judicial proceedings thereby continue to alienate people from the organization and maintenance of their own personal and legal conditions. While Rousseau may be right in noting that man is born free, the algorithmic continuum prevailing in the 21st century is delicately concealing the ever-present chains with progressive, automated change.[83] It is seldom possible to unshackle civilization while bonding them to the hardened structure of a system of secret equations.

Finally, in considering the inherent value of an algorithm, it is flawed to consider them as more fair than human decision-makers. Kierkegaard alludes to the modern tragedy that comes as a result of the burden of technology on humankind. Assuming a neutral and objective algorithm

---

[83] A reference to Rousseau's infamous opening line in The Social Contract, "Man is born free and everywhere is in chains."

created by value-laden thinkers is the first of many flawed assumptions that are inputted into the development and implementation of courtroom automation. Kierkegaard draws on the human tendency towards absolutes which, in resemblance with technological scenarios, blindly dictates sole responsibility on the basis of one improper assumption. It is (a) incorrect and (b) unwanted to argue for inherently perfect algorithms. It is (a) incorrect because algorithms are not inherently free of error or inherently more fair and (b) unwanted because the ambiguity and individualized nature of justice requisites a dimension of subjective thinking and reason. To make a social, philosophical, and ethical concept a predominantly statistical one is fragmentary at best. Conclusively, from philosophical perspectives alone, it is not possible to quantify justice.

Though philosophically unsound, the possibility of justice quantification through a Constitutional perspective may provide some insight for those still hopeful of this tech-ridden future. Constitutionally, with the algorithms currently in-use, the two most pressing legal concerns are due process and burden of proof. Both have been legally challenged before, with the courts upholding their protection in each individual case. However, there are several inconsistencies with the adamant insistence of their protection in the challenged cases concurrent with the openness in acknowledging the unclear nature of the softwares that were utilized in sentencing. Regardless of which angle is taken, there is not sufficient transparency in the algorithms currently in-use in courtrooms. As was rightly addressed in *Loomis*, the defendant knows the information that was inputted into the algorithm with COMPAS' recidivism tools. Despite that information, the defendant does not know the weight each variable holds, what dataset influenced that weight, or the remaining compilation of the equation. Knowing the data inputted is the starting point in sufficient transparency; *how* this data is integrated into a prediction system is a distinct, and necessarily subsequent, step for adequate transparency.

Algorithmic transparency is the leading due process concern and even the courts have acknowledged issues regarding it, still justifying its use as assistance to the judge rather than the sole decision-maker. Regardless of the degree to which it is used, if it is, the defendant still deserves transparency. This raises the question of why even invest in, employ, and reference third-party softwares if the judge is still able to reach the same verdict without it? If there were a contradiction between the judge's decision and the risk prediction of the algorithm, which party would dominate and how would the court reconcile this decision? These considerations are still unresolved, and the sheer lack of clarity in them bolsters even more bias in an acclaimed unbiased tribunal.[84]

Satisfying due process becomes even more complex when several different softwares are used that ultimately result in a defendant being entered into the system and receiving a sentence. Between, for example, PredPol, COMPAS, and PTRA, a defendant has a multitude of unidentifiable algorithms completely detached from one another, yet perpetuating one another, to further accelerate an individual's life behind bars. Every encounter with and sentence-based decision by the justice system is a tally in the legal books, which algorithms further reference to predict risk or to suggest detention or release. For instance, to be hot-spot policed by PredPol increases odds that an individual will be determined high(er)-risk by COMPAS, additionally increasing chances for a detention outcome rather than a release from PTRA. One system's bias will perpetuate the next system's bias and create a dangerous data loop. Furthermore, with the collection of softwares working distinctly between each person and being utilized in no uniform manner across the States, there is no standard for policing and sentencing between defendants.

---

[84] "An unbiased tribunal" is a guaranteed procedure in procedural due process as proposed by Judge Henry Friendly in 1975. Though it is not legally engrained, it remains highly esteemed and influential in the United States court system.

Due process cannot, in good faith, be firmly guaranteed to a defendant who has, at the current time, been sentenced with the influence of an algorithm. Without an unwavering guarantee, which to date is not possible with conflicting implementation standards, trade-secret rights, and algorithmic transparency requirements, the defendant's liberty and justice are not Constitutionally preserved.

The essence of this due process concern is further propagating the reshaping of burden of proof. While this standard mandates that the court legally establish a fact upon a party's request, the pressure lies on the defendant to prove inaccuracy. With AI, it is impossible to prove inaccuracy since the algorithms are constantly revised, not allowing for historical accuracy assessments or the accumulation of adequate evidence that there was, in fact, materially inaccurate information adopted in initial judgement. If a defendant seeks access to or information regarding any input that was used in trial, restricting access to it violates due process and places an impediment in burden of proof pursuits. While the courts have not revoked burden of proof or altered the standards with the emergence of AI, they have made it exceedingly difficult for the defendant to formulate a substantial case to challenge the system and prove inaccuracies. All that results is an ineffectual application of the Constitution and a degradation of the rights of the defendant. One's being is not just one's own - each individual is part of a social space that captures each person in very specific ways. Without the ability to understand the space and the factors that shape one's identity in the eyes of the law, a defendant stands defenseless. As established earlier, it is in the nature of technology to change the world and advance previously accepted courses of action, but if the legal precedents and Constitutional standards stay stagnant, technology's unceasing dynamic force will further infringe upon the Constitutional securities of individuals encountering the justice system. Constitutionally, it is not possible to continue

integrating decision-making AI while simultaneously adhering to the immutable principles and precedents rooted in the U.S. justice system.

For the sake of a complete review, while philosophically and constitutionally it has been deemed not possible, it is worth imagining a scenario in which this world of AI-based judicial sentencing *is* possible. Upon determination that it is indeed possible to quantify justice, desirability through several dimensions must be reviewed. First, the reliability of these softwares is an integral component of their utilization. People do not desire to opt into unreliable systems. Though each software ensures that race is not a variable taken into account, by-proxy, it is. Consider the variable "age of first arrest". A present-day 50-year-old black American male may have been arrested at the age of 16 when, in 1987, a black American boy could have been arrested for anything or nothing at all. This is a simple example of inherent "dirty" data in algorithms, but it is the reality that many people face. Constructing an algorithm to calculate risk scores with factors that in no way correlate with race is nearly impossible if accuracy wants to be retained. Predictive algorithms using limited, flawed, human-curated data with historic bias to make simple but long-lasting predictions does not constitute reliability. Moreover, the correlation-to-causation assumptions of the predictions are often inappropriate and far too ambiguous to manufacture a dependable system. It may be more valuable to explicitly consider race to account for the bias that exists in variables rather than to conceal it in a by-proxy fashion. The algorithms today are not reliable, rather they merely act as deceptive veneers of impartiality.

When considering engineering and technology ethics, it becomes clear that technology is not directed to justify its outputs. The design phase of a system is intentionally held under such scrutiny so that the explicit justification of its complete functioning is acceptably, fully unknown. Even if, from a technological or ethical perspective, this is deemed satisfactory and permissible,

the question at hand is desirability. Is it desirable to not know how an output was reached, especially when that output changes the trajectory of one's life? It is not in human nature to prefer or to be content with a lack of such influential information. In cognition and reasoning, humans seek order and clarity. It provides neither order nor clarity to be sentenced to prison by a system one has no way of cross-examining, or merely more intently reviewing. Without a means to justify the ends, a defendant is forced to be complacent to an undisclosed algorithm whose outputs even the engineers themselves can scarcely explain. Achieving the ideal of fully understanding algorithmic output is diametrically opposed to the functioning of the algorithms themselves. This reality is wholly undesirable.

Ultimately, people should be punished for what they did, not what they might do. As with failed polygraphs no longer allowed as evidence against a defendant since the failure rate is high enough to exceed the guilt beyond a reasonable doubt, risk prediction softwares have largely been shown to have (a) accuracy to that of the flip of a coin and/or (b) a racially disparate impact on black American individuals and other minority communities. The United States prides itself on the freedom of "innocent until proven guilty", but an algorithmic prediction does not *prove* anything, certainly not guilt. By siloing the softwares from court experts and legal parties, refuting the algorithm becomes an impossible feat. Minimizing human judgement to create space for predictive modeling pushes humans out-of-the-loop in criminal proceedings, which have only ever been and relied upon human-in-the-loop systems. It is worth considering the world that these AI systems are building, and how this world relates to the world today. A world populated by social beings whose order has been contingent upon interpersonal dynamics is rapidly becoming automated and robotized. Who had the authority to dictate that this is a good idea? Present glimpses into the danger of this impending future on humanity certainly shape the

desirability one has to see a world of that nature realized. As with Plato rushing to halt the looming fate for the Athenian polis, there is now a need to do the same for the American polis. Simply, it is neither possible nor desirable to quantify justice.

Alternatives

If algorithms are not the solution for criminal justice injustices, efforts from these AI endeavors need to be redirected accordingly. The main question to consider is this: could the money being funneled into algorithms be put into community programs instead? Rather than investing in the systems that sentence individuals, jurisdictions should invest that money towards supportive and preventative measures. In that way, cities can reduce the demand for these judicial algorithmic assistances altogether. Investing in a system that reduces recidivism rather than one that predicts it is significantly more valuable and just. This can take shape through programs that regard violence as the multi-layer public health concern that it is: increasing access to family intervention counselors, expanding community wellness sites, strengthening early childhood education, raising awareness about substance abuse and mental health. With well-targeted strategies that focus on prevention rather than discipline, the crime rates, and, subsequently, the demand for predictive algorithms, decrease.

With the nuanced and intuitive nature of justice and the justice system, human understanding, experience, interpretation, and response is critical. A redistribution of budget, specifically from the funds of research and development for courtroom algorithms and into training for individual reasoning and performance, can create a massive social ripple effect to address the issues of human prejudice in the legal workplace and in surrounding society. Focusing attention on AI solutions pulls away from those who established the system seen today – humans. AI cannot be expected to dismantle a system that it did not create. There needs to be

an institutionalized form of fairness and diversity that is rooted in the people who comprise the

public and who later get employed by government agencies into decision-making roles. This

exceeds the common, non-serious approach proposed by overly-optimistic parties simply

imploring people to be fair. The alternative includes better recruitment and training processes,

widespread staff support, consistent review of fairness in codified and realized procedure, and a

continuous atmosphere of active and perpetual commitment to non-prejudicial behavior. The

people make up the system - by investing in the people, the system as a whole benefits.

Courtroom de-socialization has remained a controversial alternative in recent history,

though it is becoming increasingly preferred as society is revolutionizing the traditional

understandings of equal persons and equal treatment. De-socializing courtrooms means

removing social information regarding the parties involved in the cases from courtroom

proceedings, i.e. refraining from indicating to the judge and jury the race or gender of the

offender and the victim in a violent crime. Though this information was once an absolute

necessity in court cases – the qualities of race, wealth, occupation, education, and social

integration directly correlating with the quantity of law applied – it is regarded today as an

unnecessary propagation of negative discrimination. These "blind" courtroom settings would

function with lawyers questioning involved parties and witnesses apart from the judiciary panel,

then providing transcriptions of responses. By keeping unneeded social characteristics out of the

courtroom, judges and juries are left to rightfully exercise their discretion with fewer

opportunities for prejudicial leanings. However, de-socializing courtrooms creates an inability to

address the discrimination that may occur pre-trial, such as stops based on suspicion and other

conditions of arrest. In this case, concealing social information in the courtroom is a grave and

serious sentence-altering matter. Therefore, this proposed solution, to operate appropriately,

would perhaps conceal only certain social detail on a case-by-case basis. Understandably, there are still functional and procedural uncertainties with this alternative; nonetheless, it can yield promising outcomes if more resources are invested in studying its future potential.

Finally, if algorithms *must* be integrated in some capacity to control crime, there is a proposed method of doing so. By redirecting the implementation of machine learning correlates and predictions away from predictive sentencing algorithms and into greater community welfare solutions, a company still gets to maintain their business and operations, but with more concentrated remediating efforts. This suggestion presumes the same thorough analyses and reviews that were discussed for AI courtroom utilization – it does not discount or minimize the concerns raised with these correlative insights and algorithmic outputs as seen in predictive policing or risk assessment instruments. It simply recommends that, once those developmental, ethical, and Constitutional issues are fully identified and addressed, the machine learning correlates begin to work in partnership with community initiatives to hot-spot-program rather than hot-spot-police areas that are more susceptible to criminal activity. Additionally, with the lack of access to legal services acting as an obstacle for many, artificial intelligence can be used to give people legal advice on their potential claims and cases when the rates of lawyers are exorbitant and out of reach. These approaches utilize the benefits granted by technological advancements in efficiency and prediction, and they appropriately incorporate outputs in ways that continue to focus on pre-crime or pre-trial support. Predictions should not be used as conclusives to incarcerate someone, but they should be used as aids in establishing localized relief and support in the areas and to the people who need it most. Algorithms should not be used to imitate and amplify bias, but they should be used to support the imbalance of personal and legal protections towards vulnerable groups.

XI. Conclusion

Algorithms in the courtroom are a sensitive and urgent matter. In a country leading with its incarceration rates, and with a distinct and disturbing history of police brutality, the pressure to address and mitigate the discrimination and procedural concerns present in the United States criminal justice system is at an alarming high. Efforts have continually been displaced, and the focus has looked far beyond the problem. The issue is the people, and it will always come down to the people. Even in a best-case scenario where a predictive algorithm outputs a number or a short phrase, it is up to the legal experts to intuit a response, an application strategy, and the appropriate subsequent steps. Efforts need to be invested in rearing minds and training professionals away from unhealthy habits and prejudicial patterns of thought. As promising as AI can be in mundane tasks, the legal system cannot be dehumanized into a system of equations. This premature and inconsistent algorithmic automation puts already disadvantaged citizens at even greater risk and further perpetuates a cycle of discrimination and over-policing. Technology and algorithms are not value-neutral, in them carrying a value direction which becomes hidden from those it affects. Concealing prejudice through engineering is not the appropriate means for mitigating bias. It is better to be without it than to misapply it, leaving one solution for the United States in this regard: stop the use of predictive algorithms in courtrooms.

From ancient philosophy and into tech-ethics and algorithmic development, this paper has analyzed the revolutionizing advancements in law with machine learning and artificial intelligence. It has shown how time-saving devices have become time-absorbing, and how this shift has begun its encroach upon ethical and legal rights of the polis. The complexity and secrecy of AI may be fit for many fields and industries, but its place in the courtroom is unfit and ill-conceived. Society has a yearning for algorithmic integration because it appears *technically*

possible, but genuinely reaching a point of meeting both comprehensive ethical possibility and desirability standards is still far out of reach. By continuing on this track in courtrooms, the system will be led into a destructive data dictatorship that will compromise the integrity of the United States justice system. It will also veer farther from the justice that civilization has been pursuing since before the common era. Law and the discretion innate to its existence are shaped by social qualities that cannot be captured in a mechanical mechanism because justice cannot be separated from its social condition. Intuition, gut-feeling, sensibility, and understanding cannot be programmed. These are just a few of the vital components of the judicial branch of government that make law retain a highly-esteemed global standing. Algorithms have simply been changing the ways the law is administered, in it becoming further removed from justice and redefining legal rules that steer this nation away from its fundamental protections. Algorithms may augment much of human life, but to say it augments the lives of the incarcerated or those on trial is an inaccurate statement that acts as a testament to a failed system.

The research, design, development, and implementation of algorithms in courtrooms is a valiant effort to resolve an extremely serious and persistent issue that has flooded the United States justice - specifically criminal justice - system since its inception. Branches of technology and engineering ethics are still growing; they need to be given more time to expand their breadth and depth of knowledge before society does algorithmic trial-runs on real-life defendants. Still, questions remain unanswered about the conflicts of shared responsibility and algorithmic accountability, or the protection of both trade-secret rights and due process guarantees. Engineers also need to merge dialogue with criminological experts who understand the weight of involvement with the law and the severity of an inaccurate software output before designing anything that will influence a potential suspect. Algorithms have unfortunately been integrated

without sufficient understanding, caution, scrutiny, and safeguards, but they simply are not and cannot be the long-term solution the United States needs. There are approaches that can be taken to guide the legal field away from the negative prejudice inherent in it, and they start with adhering to the human-in-the-loop structure so integral to legal proceedings. Investing resources into human development, education, support, and training should be the focus; this is the only viable and sustainable solution, and it is the only hope for a brighter future. With a justice system that seeks to punish as opposed to reform, AI can never be expected to make such a practice just.

Bibliography

"Algorithm." *Merriam-Webster*, Merriam-Webster, www.merriam-webster.com/
    dictionary/algorithm.

Aristotle., and F.H. Peters. *The Nicomachean Ethics of Aristotle.* London, K. Paul, Trench,
    Trübner, 1906.

Ban, Andreea and Mihaela Bucur. "What Does Engineering Ethics Involve?" *University of
    Medicine, Pharmacy, Sciences and Technology of Tîrgu Mures*, vol. 15, no. 2, 2018, pp.
    31-35.

Bell, Genevieve. "6 big ethical questions about the future of AI." *TED: Ideas Worth Spreading,*
    December 2020, https://www.ted.com/talks/genevieve_bell_6_big_ethical_questions_
    about_the_future_of_ai?language=en.

Benbouzid, Bilel. "Values and Consequences in Predictive Machine Evaluation. A Sociology of
    Predictive Policing." *Science & Technology Studies,* vol. 31, 2018, pp. 1-17.

"Brinegar v. United States." *Legal Information Institute,* Legal Information Institute,
    www.law.cornell.edu/supremecourt/text/338/160.

Caidi, Nadia, et al. "How Neutral Can Technology Be?" *Association for Information Science &
    Technology*, John Wiley & Sons, Ltd, 18 October 2006,
    asistdl.onlinelibrary.wiley.com/doi/pdf/10.1002/meet.14504201162.

Chouldechova, Alexandra. "Fair prediction with disparate impact: A study of bias in recidivism
    prediction instruments." *FATML Conference,* New York, 2016, pp. 1-6.

Coeckelbergh, Mark. "Moral Responsibility, Technology, and Experiences of the Tragic: From
    Kierkegaard to Offshore Engineering." *Science and Engineering Ethics,* vol. 18, 2012, pp.
    35-48.

"The Cost of PredPol & How to Justify Your Purchase." *PredPol,* 12 October 2020,
    blog.predpol.com/the-cost-of-predpol-how-to-justify-your-purchase.

"Criminal Cases." *United States Courts,* www.uscourts.gov/about-federal-courts/types-
    cases/criminal-cases.

Das, Souvik. "The Origin and Evolution of Algorithms: Digit." *Digit.in*, Digit, 3 May 2016,
    www.digit.in/features/science-and-technology/the-origin-of-algorithms-30045.html.

Duff, Antony. "Theories of Criminal Law." *Stanford Encyclopedia of Philosophy,* Stanford
    University, 14 October 2002, stanford.library.sydney.edu.au/archives/spr2013/entries/
    criminal-law/.

Edwards, James. "Theories of Criminal Law: Features of Criminal Law." *Stanford Encyclopedia of Philosophy,* Stanford University, 6 August 2018, plato.stanford.edu/criminal-law/.

El-Zein, Abbas. "As Engineers, We Must Consider the Ethical Implications of Our Work." *The Guardian*, Guardian News and Media, 5 December 2013, www.theguardian.com/ commentisfree/2013/dec/05/engineering-moral-effects-technology-impact.

Franssen, Maarten, et al. "Philosophy of Technology." *Stanford Encyclopedia of Philosophy*, Stanford University, 6 September 2018, plato.stanford.edu/entries/technology/.

Friedmann, Ron. "Back to the Future: A History of Legal Technology." *Prism Legal*, 4 November 2017, prismlegal.com/back_to_the_future-a-history-of-legal-technology/.

Friendly, Henry J. "Some Kind of Hearing." *University of Pennsylvania Law Review,* Pennsylvania, vol. 123, 1975, pp. 1267-1317.

Goldenfein, Jake. "Algorithmic Transparency and Decision-Making Accountabiity: Thoughts for buying machine learning algorithms." *Melbourne Law School,* Melbourne, 2019, pp. 41-61.

Hamedi, Afifeh. "The Concept of Justice In Greek Philosophy (Plato and Aristotle)." *Mediterranean Journal of Social Science,* vol. 5, no. 27, 2014, pp. 1163-1167.

Haskins, Caroline. "Academics Confirm Major Predictive Policing Algorithm Is Fundamentally Flawed." *VICE*, 14 February 2019, www.vice.com/en/article/xwbag4/academics-confirm-major-predictive-policing-algorithm-is-fundamentally-flawed.

Ismail, Kaya. "AI vs. Algorithms: What's the Difference?" *CMSWire.com*, CMSWire.com, 26 October 2018, www.cmswire.com/information-management/ai-vs-algorithms-whats-the-difference/.

Kelling, George L. "'Broken Windows' and Police Discretion." *National Institute of Justice,* U.S. Department of Justice, 1999, pp. iii-57.

Larson, Jeff, et al. "Machine Bias." *ProPublica*, 23 May 2016, www.propublica.org/article/ machine-bias-risk-assessments-in-criminal-sentencing.

"Law Enforcement: PredPol Law Enforcement Intelligence Led Policing Software." *PredPol*, 30 September 2020, www.predpol.com/law-enforcement/#predPolicing.

Lawler, Peter Augustine. "The Problem of Technology." *Perspectives on Political Science,* vol. 34, no. 3, 2005, pp. 125-134.

Leggett, Theo. "Boeing 737 Max Lion Air Crash Caused by Series of Failures." *BBC News*, BBC, 25 October 2019, www.bbc.com/news/business-50177788.

Levmore, Saul and Frank Fagan. "Competing Algorithms for Law: Sentencing, Admissions, and Employment." *University of Chicago Law Review*, vol. 88, no. 2, 2021, pp. 367-412.

Liquid Litigation Management. "INFOGRAPHIC: Legal Technology Timeline." *SlideShare*, 20 June 2017, www.slideshare.net/LLMinc/infographic-legal-technology-timeline.

"M & A." *Equivant*, 12 November 2020, www.equivant.com/m-and-a/.

Marr, Bernard. "The Incredible Ways Heineken Uses Big Data, The Internet Of Things And Artificial Intelligence (AI)." *Bernard Marr & Co.,* Bernard Marr, 2020, bernardmarr.com/default.asp?contentID=1210.

Miller, Boaz. "Is Technology Value-Neutral?" *Science, Technology, and Human Values,* vol. 46, no. 1, 2020, pp. 53-80.

Mills, Charles W. *The Racial Contract.* Cornell University Press, 2011.

Mills, Chris, et al. "Automatic Traceability Maintenance via Machine Learning Classification." *IEEE International Conference on Software Maintenance and Evolution*, Madrid, 2018, pp. 369-380.

Mittelstadt, Brent Daniel, et al. "The ethics of algorithms: Mapping the debate." *Big Data & Society*, vol. 3, no. 2, 2016, pp. 1-21.

Natapoff, Alexandra. *Punishment without Crime: How Our Massive Misdemeanor System Traps the Innocent and Makes America More Unequal.* New York, Hachette Book Group, 2018.

O'Neill, Onora. *Bounds of Justice.* Cambridge University Press, 2000.

Perry, Walter L., et al. "Predictive Policing: The Role of Crime Forecasting in Law Enforcement Operations." *RAND Safety and Justice Program,* 2013, pp. xiii-xxiii.

Plato., and Francis Macdonald Cornford. *The Republic of Plato.* London; New York: Oxford University Press, 1945.

Platonova, Anastasia. "Responsibility in Technological Civilization: In Search of the Responsible Subject." *Institute for Human Sciences*, 25 October 2013, www.iwm.at/publications/5-junior-visiting-fellows-conferences/vol-xxx/anastasia-platonova-responsibility-in-technological-civilization/.

Practitioner's Guide to COMPAS Core. Northpointe Inc, 2015, http://www.northpointeinc.com/downloads/compas/Practitioners-Guide-COMPAS-Core-_031915.pdf

"Predict and Prevent Crime: Predictive Policing Software." *PredPol*, 11 March 2020, www.predpol.com/.

"Pretrial Risk Assessment." *United States Courts*, www.uscourts.gov/services-forms/probation-and-pretrial-services/supervision/pretrial-risk-assessment.

Public Safety Assessment: Risk Factors and Formula. Laura and John Arnold Foundation, 2016, https://craftmediabucket.s3.amazonaws.com/uploads/PDFs/PSA-Risk-Factors-and-Formula.pdf.

"Purposes and Responsibilities." *NACM Core,* 9 March 2015, nacmcore.org/competency/ purposes-and-responsibilities/.

Rawls, John. *A Theory of Justice: Revised Edition.* The Belknap Press of Harvard University Press, 1999.

"Sample COMPAS Risk Assessment COMPAS 'CORE.'" *DocumentCloud*, www.documentcloud.org/documents/2702103-Sample-Risk-Assessment-COMPAS-CORE.html#annotation/a296601.

Shimizu, Joyce. *The Benefits of Using PredPol Daily*, 19 December 2015, blog.predpol.com/using-predpol-daily.

State of Wisconsin v. Loomis, 2015 A.P. 157 (2016).

 "Technology Ethics." *Technology Ethics - Markkula Center for Applied Ethics*, Santa Clara University. www.scu.edu/ethics/focus-areas/technology-ethics/.

"Terry v. Ohio." *Oyez,* www.oyez.org/cases/1967/67. Accessed 20 September 2020.

U.S. Constitution. Amend. V.

U.S. Constitution. Amend. XIV, § 1.

VDI Executive Board. "Fundamentals of Engineering Ethics." *VDI The Association of Engineers,* Düsseldorf*,* 2002.

Villasenor, John and Virginia Foggo. "Artificial Intelligence, Due Process, and Criminal Sentencing." *Michigan State Law Review,* vol. 295, 2020, pg. 296-354.

Appendix A[85]

Risk Assessment

PERSON

Name:		Offender #:		DOB:
	Gender: Male	Marital Status: Single	Agency: DAI	

ASSESSMENT INFORMATION

Case Identifier:	Scale Set: Wisconsin Core - Community Language	Screener:	Screening Date:

Current Charges

☐ Homicide	☑ Weapons	☑ Assault	☐ Arson
☐ Robbery	☐ Burglary	☐ Property/Larceny	☐ Fraud
☐ Drug Trafficking/Sales	☐ Drug Possession/Use	☐ DUI/OUIL	☑ Other
☐ Sex Offense with Force	☐ Sex Offense w/o Force		

1. Do any current offenses involve family violence?
   ☑ No ☐ Yes

2. Which offense category represents the most serious current offense?
   ☐ Misdemeanor ☐ Non-violent Felony ☑ Violent Felony

3. Was this person on probation or parole at the time of the current offense?
   ☑ Probation ☐ Parole ☐ Both ☐ Neither

4. Based on the screener's observations, is this person a suspected or admitted gang member?
   ☐ No ☑ Yes

5. Number of pending charges or holds?
   ☑ 0 ☐ 1 ☐ 2 ☐ 3 ☐ 4+

6. Is the current top charge felony property or fraud?
   ☑ No ☐ Yes

Criminal History

Exclude the current case for these questions.

7. How many times has this person been arrested before as an adult or juvenile (criminal arrests only)?
   5

8. How many prior juvenile felony offense arrests?
   ☐ 0 ☐ 1 ☐ 2 ☐ 3 ☑ 4 ☐ 5+

9. How many prior juvenile violent felony offense arrests?
   ☐ 0 ☐ 1 ☑ 2+

10. How many prior commitments to a juvenile institution?
    ☐ 0 ☑ 1 ☐ 2+

COMPAS Core Version 8.1.18.12 ©2011 Northpointe, Inc. All rights reserved.

---

[85] The COMPAS scale was developed by Northpointe "based on a variety of behavioral and psychological constructs that are of very high relevance to recidivism and criminal careers" (*Practitioner's Guide, 23*). This version of the COMPAS "CORE" Risk and Needs Assessment was obtained from Wisconsin, which implements COMPAS across each stage of the criminal justice system after conviction. ("Sample COMPAS")

Note to Screener: The following Criminal History Summary questions require you to add up the total number of specific types of offenses in the person's criminal history. Count an offense type if it was among the charges or counts within an arrest event. Exclude the current case for the following questions.

---

11. How many times has this person been arrested for a felony property offense that included an element of violence?
☐ 0 ☑ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5+

12. How many prior murder/voluntary manslaughter offense arrests as an adult?
☑ 0 ☐ 1 ☐ 2 ☐ 3+

13. How many prior felony assault offense arrests (not murder, sex, or domestic violence) as an adult?
☑ 0 ☐ 1 ☐ 2 ☐ 3+

14. How many prior misdemeanor assault offense arrests (not sex or domestic violence) as an adult?
☑ 0 ☐ 1 ☐ 2 ☐ 3+

15. How many prior family violence offense arrests as an adult?
☑ 0 ☐ 1 ☐ 2 ☐ 3+

16. How many prior sex offense arrests (with force) as an adult?
☑ 0 ☐ 1 ☐ 2 ☐ 3+

17. How many prior weapons offense arrests as an adult?
☑ 0 ☐ 1 ☐ 2 ☐ 3+

18. How many prior drug trafficking/sales offense arrests as an adult?
☑ 0 ☐ 1 ☐ 2 ☐ 3+

19. How many prior drug possession/use offense arrests as an adult?
☑ 0 ☐ 1 ☐ 2 ☐ 3+

20. How many times has this person been sentenced to jail for 30 days or more?
☐ 0 ☑ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5+

21. How many times has this person been sentenced (new commitment) to state or federal prison?
☐ 0 ☑ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5+

22. How many times has this person been sentenced to probation as an adult?
☑ 0 ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5+

Include the current case for the following question(s).

---

23. Has this person, while incarcerated in jail or prison, ever received serious or administrative disciplinary infractions for fighting/threatening other inmates or staff?
☑ No ☐ Yes

24. What was the age of this person when he or she was first arrested as an adult or juvenile (criminal arrests only)?
14

Non-Compliance

Include the current case for these questions.

25. How many times has this person violated his or her parole?
☑ 0 ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5+

26. How many times has this person been returned to custody while on parole?
☑ 0 ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5+

27. How many times has this person had a new charge/arrest while on probation?
☐ 0 ☐ 1 ☐ 2 ☐ 3 ☑ 4 ☐ 5+

28. How many times has this person's probation been violated or revoked?
☐ 0 ☐ 1 ☑ 2 ☐ 3 ☐ 4 ☐ 5+

29. How many times has this person failed to appear for a scheduled criminal court hearing?
☑ 0 ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5+

30. How many times has the person been arrested/charged w/new crime while on pretrial release (includes current)?
☐ 0 ☐ 1 ☐ 2 ☑ 3+

Family Criminality

The next few questions are about the family or caretakers that mainly raised you when growing up.

31. Which of the following best describes who principally raised you?
☐ Both Natural Parents
☐ Natural Mother Only
☐ Natural Father Only
☐ Relative(s)
☐ Adoptive Parent(s)
☐ Foster Parent(s)
☑ Other arrangement

32. If you lived with both parents and they later separated, how old were you at the time?
☑ Less than 5 ☐ 5 to 10 ☐ 11 to 14 ☐ 15 or older ☐ Does Not Apply

33. Was your father (or father figure who principally raised you) ever arrested, that you know of?
☑ No ☐ Yes

34. Was your mother (or mother figure who principally raised you) ever arrested, that you know of?
☑ No ☐ Yes

35. Were your brothers or sisters ever arrested, that you know of?
☐ No ☑ Yes

36. Was your wife/husband/partner ever arrested, that you know of?
☑ No ☐ Yes

37. Did a parent or parent figure who raised you ever have a drug or alcohol problem?
☑ No ☐ Yes

38. Was one of your parents (or parent figure who raised you) ever sent to jail or prison?
☑ No ☐ Yes

Peers

Please think of your friends and the people you hung out with in the past few (3-6) months.

39. How many of your friends/acquaintances have ever been arrested?
☐ None ☐ Few ☑ Half ☐ Most

40. How many of your friends/acquaintances served time in jail or prison?
☐ None ☐ Few ☑ Half ☐ Most

41. How many of your friends/acquaintances are gang members?
☐ None ☑ Few ☐ Half ☐ Most

42. How many of your friends/acquaintances are taking illegal drugs regularly (more than a couple times a month)?
☑ None ☐ Few ☐ Half ☐ Most

43. Have you ever been a gang member?
☐ No ☑ Yes

44. Are you now a gang member?
☐ No ☑ Yes

Substance Abuse

What are your usual habits in using alcohol and drugs?

45. Do you think your current/past legal problems are partly because of alcohol or drugs?
☑ No ☐ Yes

46. Were you using alcohol or under the influence when arrested for your current offense?
☐ No ☑ Yes

47. Were you using drugs or under the influence when arrested for your current offense?
☑ No ☐ Yes

48. Are you currently in formal treatment for alcohol or drugs such as counseling, outpatient, inpatient, residential?
☑ No ☐ Yes

49. Have you ever been in formal treatment for alcohol such as counseling, outpatient, inpatient, residential?
☑ No ☐ Yes

50. Have you ever been in formal treatment for drugs such as counseling, outpatient, inpatient, residential?
☑ No ☐ Yes

51. Do you think you would benefit from getting treatment for alcohol?
☑ No ☐ Yes

52. Do you think you would benefit from getting treatment for drugs?
☑ No ☐ Yes

53. Did you use heroin, cocaine, crack or methamphetamines as a juvenile?
☐ No ☑ Yes

Residence/Stability

54. How often do you have contact with your family (may be in person, phone, mail)?
☐ No family ☐ Never ☐ Less than once/month ☐ Once per week ☑ Daily

55. How often have you moved in the last twelve months?
☐ Never ☑ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5+

56. Do you have a regular living situation (an address where you usually stay and can be reached)?
☐ No ☑ Yes

57. How long have you been living at your current address?
☑ 0-5 mo. ☐ 6-11 mo. ☐ 1-3 yrs. ☐ 4-5 yrs. ☐ 6+ yrs.

58. Is there a telephone at this residence (a cell phone is an appropriate alternative)?
☐ No ☑ Yes

59. Can you provide a verifiable residential address?
☐ No ☑ Yes

60. How long have you been living in that community or neighborhood?
☐ 0-2 mo. ☐ 3-5 mo. ☐ 6-11 mo. ☑ 1+ yrs.

61. Do you live with family—natural parents, primary person who raised you, blood relative, spouse, children, or boy/girl friend if living together for more than 1 year?
☐ No ☑ Yes

62. Do you live with friends?
☑ No ☐ Yes

63. Do you live alone?
☑ No ☐ Yes

64. Do you have an alias (do you sometimes call yourself by another name)?
☑ No ☐ Yes

Social Environment

Think of the neighborhood where you lived during the past few (3-6) months.

65. Is there much crime in your neighborhood?
☑ No ☐ Yes

66. Do some of your friends or family feel they must carry a weapon to protect themselves in your neighborhood?
☑ No ☐ Yes

67. In your neighborhood, have some of your friends or family been crime victims?
☐ No ☑ Yes

68. Do some of the people in your neighborhood feel they need to carry a weapon for protection?
☐ No ☑ Yes

69. Is it easy to get drugs in your neighborhood?
☑ No ☐ Yes

70. Are there gangs in your neighborhood?
☐ No ☑ Yes

Education

Think of your school experiences when you were growing up.

71. Did you complete your high school diploma or GED?
☑ No ☐ Yes

72. What was your final grade completed in school?
9

73. What were your usual grades in high school?
☐ A ☐ B ☑ C ☐ D ☐ E/F ☐ Did Not Attend

74. Were you ever suspended or expelled from school?
☐ No ☑ Yes

75. Did you fail or repeat a grade level?
☑ No ☐ Yes

76. How often did you have conflicts with teachers at school?
☐ Never ☑ Sometimes ☐ Often

77. How many times did you skip classes while in school?
☐ Never ☑ Sometimes ☐ Often

78. How strongly do you agree or disagree with the following: I always behaved myself in school?
☐ Strongly Disagree ☑ Disagree ☐ Not Sure ☐ Agree ☐ Strongly Agree

79. How often did you get in fights while at school?
☐ Never ☑ Sometimes ☐ Often

Vocation (Work)

Please think of your past work experiences, job experiences, and financial situation.

80. Do you have a job?
☑ No ☐ Yes

81. Do you currently have a skill, trade or profession at which you usually find work?
☑ No ☐ Yes

82. Can you verify your employer or school (if attending)?
☑ No ☐ Yes

83. How much have you worked or been enrolled in school in the last 12 months?
☐ 12 Months Full-time ☐ 12 Months Part-time ☐ 6+ Months Full-time ☑ 0 to 6 Months PT/FT

84. Have you ever been fired from a job?
☑ No ☐ Yes

85. About how many times have you been fired from a job?
0

86. Right now, do you feel you need more training in a new job or career skill?
    ☑ No ☐ Yes

87. Right now, if you were to get (or have) a good job how would you rate your chance of being successful?
    ☑ Good ☐ Fair ☐ Poor

88. How often do you have conflicts with friends/family over money?
    ☐ Often ☐ Sometimes ☑ Never

89. How hard is it for you to find a job ABOVE minimum wage compared to others?
    ☐ Easier ☑ Same ☐ Harder ☐ Much Harder

90. How often do you have barely enough money to get by?
    ☐ Often ☑ Sometimes ☐ Never

91. Has anyone accused you of not paying child support?
    ☑ No ☐ Yes

92. How often do you have trouble paying bills?
    ☐ Often ☐ Sometimes ☑ Never

93. Do you frequently get jobs that don't pay more than minimum wage?
    ☐ Often ☐ Sometimes ☑ Never

94. How often do you worry about financial survival?
    ☐ Often ☐ Sometimes ☑ Never

Leisure/Recreation

Thinking of your leisure time in the past few (3-6) months, how often did you have the following feelings?

95. How often did you feel bored?
    ☐ Never ☑ Several times/mo ☐ Several times/wk ☐ Daily

96. How often did you feel you have nothing to do in your spare time?
    ☐ Never ☑ Several times/mo ☐ Several times/wk ☐ Daily

97. How much do you agree or disagree with the following - You feel unhappy at times?
    ☐ Strongly Disagree ☑ Disagree ☐ Not Sure ☐ Agree ☐ Strongly Agree

98. Do you feel discouraged at times?
    ☐ Strongly Disagree ☑ Disagree ☐ Not Sure ☐ Agree ☐ Strongly Agree

99. How much do you agree or disagree with the following -You are often restless and bored?
    ☐ Strongly Disagree ☑ Disagree ☐ Not Sure ☐ Agree ☐ Strongly Agree

100. Do you often become bored with your usual activities?
    ☑ No ☐ Yes ☐ Unsure

101. Do you feel that the things you do are boring or dull?
    ☑ No ☐ Yes ☐ Unsure

102. Is it difficult for you to keep your mind on one thing for a long time?
    ☑ No ☐ Yes ☐ Unsure

Social Isolation

Think of your social situation with friends, family, and other people in the past few (3-6) months. Did you have many friends or were you more of a loner? How much do you agree or disagree with these statements?

103. "I have friends who help me when I have troubles."
    ☐ Strongly Disagree ☐ Disagree ☐ Not Sure ☐ Agree ☑ Strongly Agree

104. "I feel lonely."
    ☑ Strongly Disagree ☐ Disagree ☐ Not Sure ☐ Agree ☐ Strongly Agree

105. "I have friends who enjoy doing things with me."
☐ Strongly Disagree ☐ Disagree ☐ Not Sure ☐ Agree ☑ Strongly Agree

106. "No one really knows me very well."
☑ Strongly Disagree ☐ Disagree ☐ Not Sure ☐ Agree ☐ Strongly Agree

107. "I feel very close to some of my friends."
☐ Strongly Disagree ☐ Disagree ☐ Not Sure ☑ Agree ☐ Strongly Agree

108. "I often feel left out of things."
☐ Strongly Disagree ☑ Disagree ☐ Not Sure ☐ Agree ☐ Strongly Agree

109. "I can find companionship when I want."
☐ Strongly Disagree ☐ Disagree ☐ Not Sure ☑ Agree ☐ Strongly Agree

110. "I have a best friend I can talk with about everything."
☐ Strongly Disagree ☐ Disagree ☐ Not Sure ☐ Agree ☑ Strongly Agree

111. "I have never felt sad about things in my life."
☑ Strongly Disagree ☐ Disagree ☐ Not Sure ☐ Agree ☐ Strongly Agree

Criminal Personality

The next few statements are about what you are like as a person, what your thoughts are, and how other people see you. There are no 'right or wrong' answers. Just indicate how much you agree or disagree with each statement.

112. "I am seen by others as cold and unfeeling."
☑ Strongly Disagree ☐ Disagree ☐ Not Sure ☐ Agree ☐ Strongly Agree

113. "I always practice what I preach."
☐ Strongly Disagree ☐ Disagree ☐ Not Sure ☑ Agree ☐ Strongly Agree

114. "The trouble with getting close to people is that they start making demands on you."
☑ Strongly Disagree ☐ Disagree ☐ Not Sure ☐ Agree ☐ Strongly Agree

115. "I have the ability to "sweet talk" people to get what I want."
☑ Strongly Disagree ☐ Disagree ☐ Not Sure ☐ Agree ☐ Strongly Agree

116. "I have played sick to get out of something."
☐ Strongly Disagree ☑ Disagree ☐ Not Sure ☐ Agree ☐ Strongly Agree

117. "I'm really good at talking my way out of problems."
☑ Strongly Disagree ☐ Disagree ☐ Not Sure ☐ Agree ☐ Strongly Agree

118. "I have gotten involved in things I later wished I could have gotten out of."
☐ Strongly Disagree ☐ Disagree ☐ Not Sure ☑ Agree ☐ Strongly Agree

119. "I feel bad if I break a promise I have made to someone."
☐ Strongly Disagree ☐ Disagree ☐ Not Sure ☑ Agree ☐ Strongly Agree

120. "To get ahead in life you must always put yourself first."
☐ Strongly Disagree ☑ Disagree ☐ Not Sure ☐ Agree ☐ Strongly Agree

Anger

121. "Some people see me as a violent person."
☐ Strongly Disagree ☐ Disagree ☑ Not Sure ☐ Agree ☐ Strongly Agree

122. "I get into trouble because I do things without thinking."
☐ Strongly Disagree ☐ Disagree ☑ Not Sure ☐ Agree ☐ Strongly Agree

123. "I almost never lose my temper."
☐ Strongly Disagree ☐ Disagree ☐ Not Sure ☑ Agree ☐ Strongly Agree

124. "If people make me angry or lose my temper, I can be dangerous."
☐ Strongly Disagree ☑ Disagree ☐ Not Sure ☐ Agree ☐ Strongly Agree

125. "I have never intensely disliked anyone."
☐ Strongly Disagree ☑ Disagree ☐ Not Sure ☐ Agree ☐ Strongly Agree

126. "I have a short temper and can get angry quickly."
☐ Strongly Disagree ☑ Disagree ☐ Not Sure ☐ Agree ☐ Strongly Agree

Criminal Attitudes

The next statements are about your feelings and beliefs about various things. Again, there are no 'right or wrong' answers. Just indicate how much you agree or disagree with each statement.

127. "A hungry person has a right to steal."
☑ Strongly Disagree ☐ Disagree ☐ Not Sure ☐ Agree ☐ Strongly Agree

128. "When people get into trouble with the law it's because they have no chance to get a decent job."
☐ Strongly Disagree ☑ Disagree ☐ Not Sure ☐ Agree ☐ Strongly Agree

129. "When people do minor offenses or use drugs they don't hurt anyone except themselves."
☑ Strongly Disagree ☐ Disagree ☐ Not Sure ☐ Agree ☐ Strongly Agree

130. "If someone insults my friends, family or group they are asking for trouble."
☐ Strongly Disagree ☐ Disagree ☑ Not Sure ☐ Agree ☐ Strongly Agree

131. "When things are stolen from rich people they won't miss the stuff because insurance will cover the loss."
☑ Strongly Disagree ☐ Disagree ☐ Not Sure ☐ Agree ☐ Strongly Agree

132. "I have felt very angry at someone or at something."
☐ Strongly Disagree ☐ Disagree ☐ Not Sure ☑ Agree ☐ Strongly Agree

133. "Some people must be treated roughly or beaten up just to send them a clear message."
☑ Strongly Disagree ☐ Disagree ☐ Not Sure ☐ Agree ☐ Strongly Agree

134. "I won't hesitate to hit or threaten people if they have done something to hurt my friends or family."
☐ Strongly Disagree ☐ Disagree ☑ Not Sure ☐ Agree ☐ Strongly Agree

135. "The law doesn't help average people."
☑ Strongly Disagree ☐ Disagree ☐ Not Sure ☐ Agree ☐ Strongly Agree

136. "Many people get into trouble or use drugs because society has given them no education, jobs or future."
☑ Strongly Disagree ☐ Disagree ☐ Not Sure ☐ Agree ☐ Strongly Agree

137. "Some people just don't deserve any respect and should be treated like animals."
☑ Strongly Disagree ☐ Disagree ☐ Not Sure ☐ Agree ☐ Strongly Agree