

Spring 6-15-2022

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Recommended Citation

Elizabeth, Claire, "Policing by Proxy: Interrogating Big Tech's Role in Law Enforcement" (2022). *University Honors Theses*. Paper 1199.

<https://doi.org/10.15760/honors.1208>

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Policing by Proxy: Interrogating Big Tech's Role in Law Enforcement

by

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**An undergraduate honors thesis submitted in partial fulfillment of the
requirements for the degree of**

Bachelor of Science

in

University Honors

and

Mathematics

Thesis Adviser

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Portland State University

2022

Abstract

not just those in power. Predictive policing, sometimes referred to as data-driven or actuarial policing, is a method of policing that uses a risk-based approach to law enforcement. For-profit technology companies market proprietary risk assessment algorithms to law enforcement organizations as tools meant to proactively mitigate crime. Using data collected from a vast array of sources, both personal and public, police are able to “predict” the likelihood of criminal activity in a given area using these algorithms. Proponents claim that risk assessment tools have the potential to fight crime with unbiased accuracy and speed by predicting when, where, and whom to police by relying on mathematics and data analytics. Critics argue however, that historically marginalized communities have been, and continue to be marginalized due to the use of data that act as proxies for race and ethnicity in risk assessment algorithms. For this reason, members of these communities are disproportionately affected by predictive policing practices, which has led to their overrepresentation in our modern carceral system. This paper provides a framework for understanding the link between America’s historic racial hierarchy and the disproportionate policing and/or incarceration of communities of color, and calls into question the supposed “unimpeachable” nature of data analytics in policing.

Keywords: risk assessment, data analysis/analytics, predictive policing, law enforcement, racism, discrimination, algorithms, technology

Policing by Proxy: Interrogating Big Tech's Role in Law Enforcement

Over the course of an average day, how many cameras do you notice? Closed-circuit television (CCTV) cameras have become ubiquitous in the modern world—at intersections, on campuses, in and around businesses, above many homeowners' front doors—rendering them perfectly banal, just another piece of the landscape. In the United States, there are approximately 50 million surveillance cameras in use. That's roughly 15.28 cameras per 100 Americans, which is the highest number of cameras per capita in the world (Baltrusaitis, 2022). This could have positive implications for crime prevention, and in expediting investigations. However, the ubiquity of surveillance cameras has raised concerns among the public in regard to privacy and racial equity. For instance, advances in facial recognition technology have allowed law enforcement to track individuals over time (Sheng et al, 2021). Facial analysis algorithms are typically trained on the characteristics of only a small subset of faces, primarily those of white males (Won, 2021). This has negative implications for citizens that don't fit into this narrow subset. The National Institute of Standards and Technology (NIST) found that, “[a]cross demographics, false positives...often vary by factors of 10 to beyond 100 times” (Face Recognition Vendor Test [FRVT], Executive Summary, 2019). This could potentially pose a threat to civil liberties, particularly freedoms of assembly and speech.

Predictive policing, otherwise known as actuarial or data-driven policing, is the process by which data is collected, fed into an algorithm, and analyzed in an effort to proactively mitigate crime. This data is generated by a variety of sources that may include CCTV security footage; images taken by traffic enforcement cameras or license plate readers; field interview cards from routine stops; social media profiles; cell phone records; or internet search history. These data points, combined with demographic information, as well as an individual's home

address and/or place of employment, may then be used by law enforcement to create individual citizen profiles.

Given a seemingly infinite supply of data, it makes sense to hand the grueling work of its collation and analysis off to a capable algorithm. From a digital optimist's perspective, reducing the amount of human error or bias in public data analysis could level the playing field for all citizens, regardless of social or racial status. This could lead to an overall reduction in wrongful arrests and convictions, which could potentially shrink prison populations. In fact, if predictive policing were to deliver on its promises, racial and social profiling might become a thing of the past.

Critics argue however, that the use of actuarial data analysis may in fact exacerbate bias. Data scientist Cathy O'Neil (O'Neil, 2017) describes algorithms as "opinions embedded in code." In other words, algorithms are created by humans who may inadvertently code their own biases—implicit and explicit—into their work. To compound the problem, if the aforementioned "discriminatory" algorithm is trained on flawed data, that discrimination becomes "baked in" and may perpetuate bias, something Deborah Won refers to as "garbage in, garbage out" (Won, 2021). In other words, an algorithm trained on faulty data will produce faulty results.

Over the course of these pages I will demonstrate that, while algorithms have proven themselves to be useful tools in myriad industries, including law enforcement, they are not a one-size-fits-all solution. Law enforcement's use of mathematics and data analytics as evidence that discrimination and bias are relics of a bygone era is a clever obfuscation. In reality, the daily experience of the communities most negatively impacted by predictive policing is one in which discrimination and bias are sewn into the very fabric of everyday life.

In the following pages, I will begin with a simple definition of algorithms, then briefly discuss the origins of our modern understanding of machine learning and artificial intelligence, as well as some of the ways that they've come to be used in modern law enforcement. I'll discuss the genesis of law enforcement, from its inception as an early warning system to its eventual metamorphosis into an organization meant to enforce the social and racial status quo. I'll discuss some of the policies and practices that have contributed to the continued segregation of communities of color despite past efforts at addressing the issue. I'll catalog and explore the origins of a few of the for-profit technology companies that have revolutionized the industry of prediction-making, and discuss some of the risk assessment tools that have been made available to law enforcement. I'll explore some of the ways these tools have benefitted law enforcement, as well as the impact they've had on civilians. Finally, I will demonstrate the ways that these various threads intertwine in order to make a case for a more measured approach in the use of risk assessment technology in our criminal justice system.

The Rise of the Machines

This section begins with a very general definition of algorithms, and introduces some of the ideas that would eventually give way to our current understanding of modern computing. I'll briefly discuss some of the ways that algorithmic prediction-making has been useful to public industry, and will provide a short example of one of the ways that prediction-making has been used to preserve historic power structures. This will be useful in developing an understanding of the direct linkages between the cherry-picking of data, the marginalization of communities of color, and poor outcomes for those communities.

In today's tech-driven society there's a tendency to think of algorithms as a relatively new phenomenon. After all, electronic computers have only been in use since the mid-1940s. But an

algorithm is simply a system of operations. Making dinner, taking a shower, getting ready for bed — these are all algorithmic processes, and there are as many algorithms for these tasks as there are types of people in the world. Yet algorithms, in our modern understanding of them, only came into use in the last seventy years or so. Mathematician and computer scientist Alan Turing would begin to lay the foundation for scholarship in the fields of artificial intelligence (AI) and machine learning in his seminal 1950 paper, “Computing Machinery and Intelligence”. Dr. Turing opened with a thought exercise he called “The Imitation Game”, which asked the simple question, “Can machines think?” (Turing, 1950).

Until Turing posed this question, computers weren’t considered to be capable of thinking for themselves. Yet his thought exercise suggested a new way one might imagine the relationship between humans and computers, and it would eventually lead to our modern understanding of machine learning and AI. Prior to this, the idea that a hunk of metal, wires, and tubes could think for itself must have seemed downright preposterous. At the time of Turing’s writing, computers as we know them today were unimaginable outside the realm of science fiction.

Law enforcement has embraced algorithmic risk assessment software. This has provided them with the digital tools necessary to collect and analyze massive data sets, which in turn have afforded department analysts the ability to make quantitative judgements as to when, where, and whom to police with immense speed. The use of risk assessment software isn’t limited to law enforcement however. It’s used in a variety of industries including child welfare agencies in flagging for neglect or abuse in the home (Ho & Burke, 2022); by the judicial system in making “pre-trial detention and release decisions” (Kehl et al, 2017); and of course, insurance companies use risk assessment in setting premiums for their clients.

Actuarial science, or formal risk assessment, uses probability and statistics to analyze and predict the financial implications of uncertain future events. Traditionally, actuarial science involves the analysis of insurance clients' mortality, the production of life tables, and the application of compound interest. In response to nondiscrimination laws enacted in the 1880s requiring that all clients be treated equally regardless of race, actuarial assessments were weaponized by large insurance companies in order to deny Blacks "the same benefits for the same premiums...guaranteed to whites" (Muhammad, 2019: 42). Hiding behind a veneer of high-level mathematics and data analysis, insurance providers could skirt the new laws and continue doing business as usual despite their continued use of blatantly prejudicial practices.

In the next section I'll provide an abridged history of American policing, beginning with an examination of its genesis as a poorly organized "private-for-profit" volunteer force, and its eventual transformation into a centralized municipal organization. This will be useful in illustrating how the guiding principle of seventeenth century policing has directly influenced modern-day law enforcement practice and ideology.

A History of Policing

American policing has been around since the mid-1600s. Its first iteration was the "Watch", primarily meant to function as a warning system to notify citizens of impending danger. Boston's night watch was created in 1636, followed by New York (1658), and Philadelphia (1700) (Potter, 2013: 1). Watchmen often performed their duties as punishment for crimes, or volunteered as a way to evade military service (p. 1).

In 1704 the first slave patrols were created in the Carolinas (Reichel, cited in Potter, 2013), and they would spread throughout the South through the end of the Civil War. Primarily vigilante organizations, slave patrols had three objectives: to "chase down, apprehend, and

return to their owners, runaway slaves; to provide a form of organized terror to deter slave revolts; and, to maintain a form of discipline for slave-workers who were subject to summary justice, outside of the law, if they violated any plantation rules” (Potter, 2013: 2). Postbellum, slave patrols would formally organize into publicly supported police forces whose main objectives were the control of former slaves via enforcement of segregationist “Jim Crow” laws, as well as the general preservation of public order.

In the North, formal police forces wouldn’t come about until 1838 in the city of Boston, shortly after which other large cities would follow suit. Modeled after municipal forces in London, their creation wasn’t meant to serve and protect citizens per se, but rather to protect the assets of propertied elites in American cities against the so-called “dangerous classes” which included the poor, immigrants, and freed Blacks. As opposed to the stated interest of *crime control*, business owners and elites aimed to create *social control* in the form of police presence, which would provide an organized body of men authorized to use force in order to provide protection of property and capital “under the illusion that...order was being maintained under the rule of law, not at the whim of those with economic power” (p. 3). Uniformed officers — “the most visible representation of the state” (Abdelfatah & Arablouei, 2020) — were thought to mitigate crime by the mere fact of their existence in the public sphere (Potter, 2013: 4).

The postbellum South created the “Black Codes” as a continued form of control over the Black community. “The [B]lack codes, for all intents and purposes, criminalized every form of African American freedom and mobility, political power, [and] economic power¹” (Abdelfatah & Arablouei, 2020). While the federal government afforded a modicum of civil rights to America’s newly-minted citizens and enforced these through the Freedman’s Bureau during Reconstruction, the post-Reconstruction South would strip these freedoms away as soon as legally feasible

¹ Khalil Gibran Muhammad addressing the origins of policing in America.

(Hurst, 2009). The Mississippi Black Code (other southern states would take Mississippi's lead and create their own) stipulated that any Black person who could not sufficiently prove gainful employment with the appropriate paperwork could be considered vagrant, and could therefore be arrested, fined, and incarcerated. Mississippi Vagrant Law stated "[t]hat all rogues and vagabonds, idle and dissipated persons, beggars, jugglers...runaways, common drunkards...night-walkers, pilferers, lewd, wanton, or lascivious persons...brawlers, persons who neglect their calling or employment, misspend what they earn, or do not provide for the support of themselves or their families...shall be deemed and considered vagrants" (Mississippi, 1866, Ch. VI, Sec. 1). Furthermore, a Black citizen could not lawfully leave his or her employment prior to the end date of an agreed-upon labor contract lest he or she "forfeit [their] wages for that year" (Ch. IV, Sec. 6). Failure to provide sufficient proof that a labor contract had legally ended could mean arrest and further conscription without pay (Ch. IV, Sec. 8).

Police were given broad discretion as to what could be considered vagrancy, and therefore a crime. Imbued with the authority to trump up charges against Black citizens as they saw fit, officers would serve as a critical element in preserving the racial and class hierarchies that white Americans had grown accustomed to. Furthermore, as "indigenous whites" such as the Irish, Polish, Italians, Russians, and other white-passing immigrants assimilated into middle class white society, the definition of the "dangerous classes" would come to mean anyone unable to assimilate into the white-skinned majority, as well as the indigent, regardless of skin color (Abdelfatah & Arablouei, 2020).

Fast forward roughly three-and-a-half centuries, and our world looks quite a bit different, though some things remain eerily similar. Today's police forces continue to spend an inordinate amount of time policing majority Black, bown, and poor citizens (Stop LAPD Spying Coalition,

2021). Business owners and elites continue to use their power and political clout to protect their assets from the “dangerous classes” (McDaniel, 2022), and heavy officer presence continues to be regarded as an effective crime mitigation tactic. Their uniforms may have changed, but police continue to act as an organized body of the state with authority to use force in order to provide protection of property, capital, and social order.

The following section explores some of the practices that have contributed to the continued marginalization of non-white communities. Redlining, displacement, disenfranchisement, and gerrymandering, among others, have been some of the key methods used by white Americans to economically, politically, and geographically control Black and brown mobility. These practices fall under the umbrella of “racial capitalism”, a term conceptualized by academic Cedric J. Robinson (1983). I’ll begin with an introduction to the concept, then present three historical examples of its deployment in an effort to illustrate how it has been historically used to preserve social stratification in American cities.

The Cost of Doing Business

Advances in technology over millennia have impacted nearly every facet of daily life, accelerating human ingenuity and innovation in ways our ancestors could never have imagined. However, there remain large swaths of society who are consistently left behind. In what some like to think of as a “post-racial society” (Bonilla-Silva & Baiocchi, 2001), the day-to-day existence of many minority communities must feel strikingly similar to running on a hamster wheel — run as fast and as hard as you can only to end up right where you started.

Dr. Robin D.G. Kelley, Gary B. Nash Professor of American History at UCLA, outlined the concept in his 2017 talk, “What is Racial Capitalism and Why Does it Matter?” Dr. Kelley’s remarks offer a lens through which an understanding of the concept might begin to develop.

“[T]he secret to capitalism's survival is racism,” Kelley (2017) states. Racism, according to Kelley, provides a framework upon which to build an understanding of cultural attitudes toward race, class, and economic accumulation. By creating racial and economic boundaries around a community based on factors outside of their control, the ruling majority, aka whites, feels free to deny basic privileges and human rights to a monolithic “other”. The process of “other-ing” a community does a couple of things: It allows for the dehumanization of that community’s members, and it justifies their exploitation via their labor and their lands.

The phrase “racial capitalism” was originally coined by Cedric J. Robinson in his 1983 book *Black Marxism: The Making of the Black Radical Tradition*. Robinson posited that “[t]he tendency of European civilization to capitalism was...not to homogenize, but to differentiate...regional subcultural and dialectical differences into racial ones...From the twelfth century forward, it was the bourgeoisie and the administrators of state power who initiated and nurtured myths of egalitarianism while seizing every occasion to divide peoples for the purpose of their domination” (Robinson, 1983: 26). In other words, if societal groups could be differentiated from one another along visible or cultural lines — if they could be categorized and ranked — then a form of “natural selection” would order society in such a way as to place elites at the top of the food chain. Lesser groups would then fall into place as the means with which to establish elites’ economic and social position.

The economic and racial divides between white Americans and Americans of color however, was established long before the term racial capitalism was coined, and have been exacerbated in multiple ways, a few of which I’ll examine here. Redlining, or “the practice of denying a creditworthy applicant a loan for housing in a certain neighborhood even though the applicant may otherwise be eligible for the loan” (U.S. Federal Reserve, n.d.) was one tactic used

to marginalize communities of color. In an effort to address this, Title VIII of the Civil Rights Act of 1968, otherwise known as The Fair Housing Act (FHAct), was enacted to end unfair housing practices targeting minorities. This would eventually lead to a phenomenon that would come to be called “white flight”. As Black families began to migrate from the rural South into cities during the first half of the 20th century, white families began their own migration, from racially mixed cities and urban centers into racially homogenous suburbs. Later, in cities such as St. Louis, Missouri, as Black families began to attempt to move into the suburbs as well, whites would adopt race-restrictive deeds in an effort to preserve racial homogeneity (Federer Realty, 1923). When race-restrictive deeds failed to insulate white suburbanites from the encroaching Black population, white developers began creating private subdivisions even further outside city limits. Protected by real estate covenants, essentially hand-shake agreements between developers and residents, Black families were unofficially barred from moving in.

In the 1980s, as busing began to integrate St. Louis schools, Black families again tried relocating to the suburbs in an effort to be closer to their children’s new schools. Each time Black citizens managed to move into predominantly white areas, whites would again flee. Due to St. Louis County’s lax municipal incorporation rules, this gave way to a proliferation of municipalities in which the whiteness of a given community could be maintained by the use of zoning laws. As Black citizens attempted to move into these areas as well, majority-white enclaves could be rezoned again as single-family only, effectively preventing the construction of public housing (Balko, 2014).

Another manifestation of racial capitalism is the displacement of an “undesirable” community under the guise of “urban renewal”. The City of Los Angeles’ displacement of Mexican-Americans from their homes in Chavez Ravine is one such example. For over a

century, a largely Mexican-American community made their homes along the slopes of the Chavez Ravine (Avila, 1997: 114). In July of 1950 the city sent eviction notices to residents of the Ravine. They would be required to sell their homes — some of which had been passed from generation to generation — in order to make way for low-income public housing (Mechner, 2020)². Frank Wilkinson, leader of the L.A. Housing Authority at the time explained the organization's choice in Jordan Mechner's film, *Chavez Ravine: A Los Angeles Story*. He described the housing authority's decision in rueful terms as “the tragedy of my life — absolutely. I was responsible for uprooting...I don't know how many hundreds of people” (Mechner, 2020). Former Ravine resident Cenovia Gamboa recalled the community's reaction: “They would tell us, if you don't sell we're gonna condemn your property — you won't get anything out of it. So that scared us.” Most residents moved out of the area voluntarily and scattered, but a few holdouts refused to leave. They were forcibly evicted from their homes by police and their homes were demolished.

Powerful real estate interests and the local Chamber of Commerce (among others) didn't want the land to be used for public housing, calling it “creeping socialism” (Mechner, 2020). Chavez Ravine was prime real estate, and powerful interests held enough sway with the city to ensure that public housing was never built. Chavez Ravine would remain empty for a number of years before the City of Los Angeles would sell it to Dodger owner Walter O'Malley for pennies on the dollar (Mechner, 2020). Groundbreaking for Dodger Stadium began in 1957.

Eric Avila, in his 1997 dissertation, described the general attitude of L.A. city government and wealthy developers as indifferent toward the plight of Chavez Ravine's residents. “The Dodgers would bring a new cultural attraction, additional income, and increased prestige to Los Angeles. Meanwhile, the Chavez Ravine and its remaining inhabitants [were] an

² Note: “Chavez Ravine...” originally premiered 07 June, 2005 on PBS' Independent Lens

obstacle to progress” (Avila, 1997: 135). The demolition of Chavez Ravine and the displacement of its community was meant to usher in a more “Americanized” entertainment and consumer hub (p.113), something the Stop LAPD Spying Coalition refers to as a “pattern of displacement to generate white wealth” (Stop LAPD Spying, 2021: 5).

A final example hits a bit closer to home. The Emanuel Hospital Urban Renewal Project was a redevelopment plan proposed by Emanuel Hospital in conjunction with the City of Portland, a 55-acre expansion of the hospital’s campus. In the lead-up to the proposed expansion, the Portland Development Commission (PDC) “purchased and demolished 188 properties” (Woolly, 2012: 2), displacing families, individuals, businesses, churches, and community non-profits. 171 households were displaced, 74 percent of which were Black and 32 percent of which owned their homes outright (p. 3). PDC prepared a relocation plan to address the displacement of predominantly Black households and businesses. But by using outdated data and creative data analysis, PDC was able to convince the city that there was no actual shortage of suitable housing for displaced residents, and therefore no need for additional construction. The Relocation Plan however, *did not actually plan* for resident relocation. By using “inaccurate and/or obsolete” data, in addition to cherry picking data that would give PDC the results they desired, the organization was able to shirk the very duty they’d been created for. This meant that, “PDC [was able] to rely upon the existing housing supply without having to provide new housing for displaced residents” (p. 2). Adding insult to injury, the plan never actually came to fruition — funding would run out before construction could begin, and the land that had been cleared for the project would remain vacant for nearly forty years.

These examples are only a handful of the ways that minority communities have historically been kept in a loop of disenfranchisement and generational poverty. A cocktail of

predatory lending and real estate practices, discriminatory laws, and patterns of white flight powered by institutional racism and classism has systematically funnelled minority communities into some of the least desirable parts of American cities in favor of white wealth and economic mobility. Add to this the feeling held by many that police look at them as criminals first and citizens second, along with a justice system that, to many, seems bent on bleeding their bank accounts dry. It's no wonder then that many in these communities are distrustful of a system that claims to treat all citizens fairly regardless of race, while its actions often prove otherwise.

Next I'll catalog a small sampling of the available risk assessment tools available to law enforcement, as well as their origin stories. I'll briefly discuss "broken windows" theory, one of the more controversial modern policing strategies of the past forty years, as well as its progeny, "stop-and-frisk". In doing so I'll point to the ways that these policies, used in concert with predictive policing practices, have been instrumental in maintaining racial and class segregation by focusing on the supposed criminality of neighborhoods that tend to house poor, Black, and brown citizens.

Private Software in Public Spaces

The three algorithmic risk assessment instruments I'll discuss below are some of the most well-known, though there are many more. CompStat, PredPol, and HunchLab, are relatively similar tools, in that they create "heat maps" used by police in making decisions as to where officers should be deployed. Many of the tools used in modern predictive policing are primarily developed by for-profit organizations, although collaboration between law enforcement and academia isn't unheard of. A few of these tools however, have come to fruition through a relatively organic process, one of which is a tool called CompStat.

CompStat isn't an algorithm per se. It is a geographic information system (GIS) used to integrate crime and demographic data. More of a system of weekly departmental meetings, it's meant to help police collaborate and communicate between precincts in order to improve police performance and share information. Used in departments all over the United States, CompStat is a tool that social scientists George L. Kelling and William H. Sousa, Jr. (2001) deemed "perhaps the single most important organizational [and/or] administrative innovation in policing during the latter half of the 20th century" (Kelling & Sousa, 2001). Its core objectives — accurate, timely intelligence; rapid deployment; effective tactics; and relentless follow-up and assessment — were supposedly first scrawled on a napkin by then-NYPD Deputy Commissioner Jack Maple during a brainstorming session at his favorite restaurant, according to a "beloved, mostly true myth" (Smith, 2018).

In 1993 Maple was named NYPD's top anti-crime strategist by the department's incoming police commissioner Bill Bratton, who would adopt the program officially in 1994. The use of CompStat would eventually lay the groundwork for New York City's controversial "broken windows" policy during the mid-1990s, which many felt was primarily focused on communities of color. It also aggravated career officers and detectives, who'd primarily relied on experience and instinct in their work, and were now expected to rely on data.

"Broken Windows" policy is based on its namesake theory. George L. Kelling (referenced above) and James Q. Wilson (1982) used broken windows as a metaphor for disorder within neighborhoods. In their theory, disorder in the form of broken windows (though nearly any public eyesore can act as a proxy) is directly linked to crime. If one of a building's windows is broken, then it's only a matter of time before the rest are broken as well. "Window-breaking does not necessarily occur on a large scale because some areas are inhabited by determined

window-breakers whereas others are populated by window-lovers,” they mused, but “one unrepaired broken window is a signal that no one cares, and so breaking more windows costs nothing” (Kelling & Wilson, 1982). The implications of “broken windows” theory seem to be that the “disorder” of broken windows creates something of a snowball effect, inevitably leading to more insidious forms of disorder, increased criminal activity, and eventually, a state of relative anarchy. The state is left with no other choice but to move in and restore order using whatever draconian measures necessary to save the community from itself. By metaphorically infantilising a neighborhood’s residents, it’s easy to justify a strong paternalistic state presence for the purposes of social control. It just so happens that a majority of “broken windows” policing takes place in predominantly poor neighborhoods where communities of color make up a majority of the population.

Post-9/11, the threat of terrorism by a foreign “other” loomed large in the American psyche. At the urging of then-police commissioner Ray Kelly, the NYPD would begin to implement another controversial policy, “stop-and-frisk”. Its stated intention was a reduction of firearm-related homicides as well as the possible apprehension of terrorists. By allowing officers to rely on their own discretion in order to detain, question and examine individuals based on “reasonable suspicion”, illegal firearms could be discovered and removed from city streets, deterring the carrying of illegal firearms altogether. “Reasonable suspicion” also gave officers an excuse to stop and question people who seemed “out of place”. In white neighborhoods, those “outsiders” tended to be Black and Latinx citizens. In response to public pushback as a result of something that looked an awful lot like racial profiling, commissioner Kelly argued that race had no bearing on who was being stopped. Police were simply being deployed in crime-ridden parts

of the city, which just so happened to be “in poorer neighborhoods where the suspects, as well as the victims, were predominantly people of color” (Smith, 2018).

One of the more well-known collaborations between law enforcement and academia was the partnership between P. Jeffrey Brantingham, professor of anthropology at the University of California, Los Angeles (UCLA) and the Los Angeles Police Department (LAPD). Dr. Brantingham has described his research as “focus[ing] on modeling and measuring the fundamental dynamics of crime patterns using cutting-edge mathematical methods” in order to “translate these models into practical tools for use by police and communities in combating crime” (Brantingham, n.d.). In 2007 the LAPD’s new police chief Bill Bratton (formerly of the NYPD) began seeking academic partners to help improve on LAPD’s risk assessment capabilities. In remarks delivered to The National Institute of Justice that year, Bratton expressed his conviction that partnerships between law enforcement and academia “are particularly important as we enter the new paradigm of the 21st century, where intelligence-led policing and...issues like terrorism and cybercrime begin to confront us” (Ritter, 2007). Brantingham got in touch, and his team would end up developing a risk assessment model based on the prediction of earthquake aftershocks. Brantingham’s team posited that, similar to an earthquake, after one crime was committed in a particular area, “aftershocks” of similar crimes were likely. Armed with LAPD data, the algorithm could predict the likelihood of property crimes within specific boundaries in order to create “crime maps”. This risk assessment tool would eventually become PredPol (Moravec, 2019). In 2021 PredPol rebranded itself as Geolitica. Along with the name change, the company decided to move away from their original predictive policing model and toward a model they now refer to as “geographical analytics” (PredPol, 2021).

HunchLab, originally a product of the Philadelphia-based startup Azavea, was developed in part by Azavea's President and CEO Robert Cheetham while working for the Philadelphia Police Department. Its intent was the prediction of the likelihood of particular crime types and their occurrence at various locations across specific time periods. HunchLab "primarily surveys past crime, but also [takes into account] factors like population density; census data; the locations of bars, churches, schools, and transportation hubs; schedules for home games — even moon phases" (Chammah & Hansen, 2016) to create "hot spots", or locations of interest. In 2018 HunchLab was sold to ShotSpotter, "the leader in gunshot detection solutions" (ShotSpotter, 2018). In a blog post announcing the sale, Cheetham explained Azavea's decision to sell the product he'd developed as a moral one. "Over the past several years, an array of incidents have publicly documented violence, civil rights violations, and abuse of power by police officers across the United States. Law enforcement agencies have rightfully come under increasing scrutiny. Further, 'predictive policing' tools...have been used in some communities to engage in pervasive surveillance of citizens, something that I believe is wrong" (Azavea, 2019).

As the public demands more accountability from departments and officers, it would seem that some of the people who opened Pandora's Box have experienced a change of heart, or at least some attitudes have begun to evolve. It's hard to say how much of an impact statements such as Cheetham's have had on the risk assessment industry, or how a company's rebranding efforts change their fundamental approach. By selling HunchLab to ShotSpotter, is policing on the road toward improvement on past practices? Or is the sale just a way to shift public scrutiny onto someone else? In Azavea's case, their pivot to a geospatial model shifts focus away from predictive policing, but it's difficult to see how selling their criminal risk assessment software to another risk assessment company isn't merely corporate triage.

In the next section I'll discuss everyday data collection from an anecdotal perspective. I'll discuss some of the ways that risk assessment tools have positively impacted law enforcement, including better allocation of department resources and improved turnaround time in solving cases. I'll provide an example of a department that saw significant improvement in its ability to deliver real results to the city it serves, and discuss the positive impact that data-driven policing and risk analysis have had on the management of the cumbersome datasets that come along with a growing populace.

Everyday Data

Virtually every move we make in the digital space creates data. Each time we hit the “like” button to indicate our approval of, or our disgust with an idea, a product, a political view, or a cat video, one more data point is added to a set of characteristics that makes up an individualized digital “fingerprint”. Every question we type into a search engine is picked up by an algorithm, analyzed, compiled, and stored as data that can then be used to present us with products, people, ideas, or services it “thinks” we’ll enjoy. Data influences everything from the interest rates we’re offered in lending; to the ease with which we’ll be able to obtain property; to the music, arts, and culture we enjoy. There are billions of data points virtually swirling around each and every one of us at all times, pushing us toward certain things and directing us away from others. The task of synthesizing and analyzing all of these data points might be an impossibility for a single individual, but modern computers and the algorithms they house give us an incredible amount of power. Our machines and the knowledge we’ve imbued them with have enabled us to accomplish more in a day than prior generations would have been capable of accomplishing over the course of weeks, months, or perhaps even years.

Risk assessment software has helped to create solutions not just in the field of data analysis, but has made possible the optimization of systems and processes in countless industries. Data analysis and its applications have enabled us to innovate and expand our technological literacy at an incredible rate. In law enforcement, the use of risk assessment software has enabled departments to streamline police and detective work. This is good news for the bottom line, not only for purportedly understaffed and overburdened police departments, but for taxpayers as well. It has also ostensibly made way for increased accuracy and decreased redundancy within departments, which may also be good news for those mistakenly caught up in the justice system, or those who commit petty crimes. Law enforcement argues that using data and analytics has the potential to keep dangerous criminals off of our city streets while releasing those who pose no danger to society back into their communities.

In 2014, Anne Milgram, former Attorney General (AG) of New Jersey and incumbent administrator of the DEA, delivered a TED talk titled “Why smart statistics are the key to fighting crime”. About a month after her appointment to the AG’s office, Milgram discovered that detectives were using an excruciatingly slow and inefficient system of data collection and analysis only to come to conclusions with extremely poor accuracy. She described her frustration with this system, one in which detectives were going through years worth of cases line by line and writing their findings down on yellow legal pads. “I wanted to introduce data and analytics, and rigorous statistical analysis into our work. In short, I wanted to ‘moneyball’ criminal justice...It worked for the Oakland A’s, and it worked in the state of New Jersey” (Milgram, 2014). According to Milgram, bringing data-driven detective work to New Jersey meant that not only did police work become more efficient, but crime was significantly reduced, increasing public safety in what had been considered one of the most dangerous cities in America. With the

implementation of data analysis and prediction-making software, Milgram was able to boast that police had been able to reduce murder by a staggering 41 percent, as well as a significant reduction in crime overall. The changes she put into place seemed to show that, if detectives weren't bogged down with stacks of documents and analysis, their valuable time could be spent doing the police work they'd been trained for rather than searching for needles in haystacks.

Burdened with huge amounts of data, how does an individual or an organization make sense of it *without* using some sort of algorithmic analysis? I think most would agree that poring over hundreds, or even millions of lines of data for hours or days is inefficient. Humans get tired, lines of figures start to blur together, or the same line is read multiple times, incidentally inflating the numbers. The larger the dataset, the greater the possibility that mistakes will occur, and that they'll occur often. A good algorithm can be invaluable for this kind of work, potentially saving time, money, and a good bit of sanity in the process. So what's the problem? Yes, algorithms and data analysis are powerful tools that have proven themselves incredibly useful. In fact, in a lot of ways we've become reliant on them.

I think it's worth asking some admittedly philosophical questions in regard to our relationship with the tools we've built in an effort to make our lives more effortless: In a world in which nearly every move we make is subject to scrutiny by someone sitting behind a monitor, where every keystroke can be reduced to a data point, what gets lost in translation? After all, if the very things that make us individuals can be sorted, categorized, scored, and filed by an algorithm, how much of our humanity remains?

In the following section I'll draw attention to the parallel between law enforcement's early days as "an organized body of the state with authorization to use force in order to provide protection of property, capital, and social order"³, and the force currently in place. I'll also

³p. 9

discuss some of the research being conducted around risk assessment in pretrial justice and sentencing, as well as some of the promises it holds as criminal justice moves forward.

The Devil's in the Data

Critics of data-driven policing and criminal justice claim that it reproduces and reinforces bias. Risk assessment tools used to predict recidivism in arrestees for instance, have historically generated higher risk scores for non-white arrestees than for whites regardless of crime type or criminal history. This may have to do with elevated police presence in neighborhoods whose residents are primarily people of color. A Stanford study found that “surveillance cameras are concentrated in commercial, industrial, and mixed city zones, and also in areas with higher shares of non-white residents.” The study also found that the prevalence of surveillance cameras remained high in these areas even after they’d adjusted for zone, which they found showed “potential disparate impacts of surveillance technology on communities of color” (Sheng, et al., 2021: 2).

Stanford’s study seems to lead to the conclusion that, if there is heightened surveillance in areas predominantly populated by communities of color, it follows that more arrests will be made in those locations, thereby raising the possibility that citizens from those areas will be overrepresented in the justice system. By determining that a location is a “hot spot”⁴, a department ostensibly has probable cause to patrol that location more heavily. Not only that, but every stop gives an officer the opportunity to gather information not just on the individual they’ve stopped, but those connected to that individual. In an interview conducted by Sarah Brayne (2017), an officer describes how such an interaction might play out: “So a pedestrian stop, this individual’s walking, “Hey, can I talk to you for a moment?” “Yeah what’s up?” You

⁴ See Private Software in Public Spaces, p. 13

know, and then you just start filling out your [field interview]⁵ card as he answers questions or whatever. And what it was telling us is who is out on the street, you know, who's out there not necessarily maybe committing a crime but who's active on the streets" (Brayne, 2017: 987).

If a stop results in an arrest, another risk assessment tool is used to make the decision as to whether that individual should be held in custody or released: a risk score⁶. If the individual's score is high, that might mean their bond is set higher or lower, or it might mean the difference between pretrial detention and release. An individual's risk score may also be used to predict whether they'll show up in court on an appointed date, or whether they're likely to reoffend, which can then be used to decide the length and/or severity of their sentence if found guilty. A 2016 ProPublica study examined the disparity between pretrial risk scores generated by COMPAS⁷ software for Black and white defendants in Broward County, Florida, and found that recidivism risk predictions were correct roughly 61 percent of the time, and violent recidivism prediction was correct about 20 percent of the time. They concluded that COMPAS mislabeled Black defendants as high-risk for future criminality at nearly twice the rate for white defendants. (Angwin, et al.: 3).

Picard et al. (2019) also created a risk assessment tool in a case study, in which they put ProPublica's findings to the test. The researchers anonymized a sample of 175,000 New York City arrestees and ran them through their algorithm. They found that their risk assessment instrument performed similarly to ProPublica's in that it was more likely to mislabel Black defendants as high-risk in comparison to Latinx or white defendants. This disparity, they concluded, had the potential to "foster racially-disparate pretrial outcomes" (p. 4).

⁵ Police contact card

⁶ An easily calculated number that reflects the level of risk associated with an individual due to factors such as past arrests, group affiliation, etc.

⁷ COMPAS, an acronym for Correctional Offender Management Profiling for Alternative Sanctions, is an assistive software and support tool used to predict recidivism risk, or that a criminal defendant will re-offend.

In order to determine whether their algorithm could be used fairly, Picard et al. ran their sample through it under three scenarios: “business as usual”, “risk-based”, and “hybrid charge-and-risk-based”. In their first trial, they found that a “business as usual” approach exhibited disparities in pretrial detention with regard to race and ethnicity. Trial two, a “risk-based” approach, exhibited disparities in pretrial detention as well as in false positives. Their third trial “restrict[ed] detention by both charge and risk level...[while also] tak[ing] pretrial detention off the table for *all* defendants charged with a misdemeanor or non-violent felony” (pp. 11-12). Their findings suggested that the latter scenario would “reduce overall detention rates and lessen the racial disparities found in...prior scenarios...[and] racial disparities in false positives would also be largely alleviated”. As a result of this experiment, Picard, et al. concluded that a targeted risk-based pretrial strategy, “specifically, a strategy of reserving pretrial detention only for defendants facing serious, violent charges and using risk-based decision-making only with those charges” (p. 14) carried with it “significant potential” in the reduction of unnecessary incarceration, and that it could significantly reduce racial disparities in pretrial detention and sentencing.

The results from ProPublica’s and Picard et al.’s studies certainly have promising indications for increased equity in sentencing, but what about arrests themselves? The recent virtual meeting of the Salzburg Global Seminar featured ongoing research being conducted that, at least peripherally, suggests the possibility of better outcomes for citizens during interactions with police, but these depend on industry-wide policy changes. “Traditional measurement systems often bias policy processes towards downstream problems...[rather than] upstream causes, such as basic needs” (Dixon, 2022). Solutions to these systemic problems, as always, need to start at the top.

In the next section, I'll begin with some of the claims that for-profit software companies make about their products in an effort to market them to law enforcement organizations. I'll address some of the worries that people whose work involves data-driven law enforcement have raised, and I'll address community concerns that directly counter some of the claims made by software developers and law enforcement.

Problem...Solved?

For-profit software companies make pretty lofty claims in an effort to sell their “software solutions” to law enforcement. These include “transparency and accountability”, “efficient, effective, and equitable public safety outcomes”, and the absence of bias in decision-making software due to the objective nature of algorithms. To hear the Geolitics of the world tell it, their products deliver better, faster, more accurate decision-making to police at the touch of a button. They imply that these instruments save money, resources, time, headaches, and livelihoods. Not only that, but as long as police use these tools correctly, the public can rest easy knowing that only “bad guys” end up in jail. This should come as much-needed relief to law abiding citizens everywhere. Much of the rhetoric espoused by law enforcement regarding these tools is simply a regurgitation of these claims. As departments try to keep up with rising crime rates (Datalytics, 2021), risk assessment algorithms have become one of their most often-used and valuable tools in fighting crime.

Not everyone is convinced however, that algorithmic risk assessment is the key to America becoming an egalitarian utopia. Former Attorney General Eric Holder under Barack Obama expressed serious misgivings about law enforcement's increased use of risk assessment tools in his 2014 address to the National Association of Criminal Defense Lawyers. He feared that a reliance on these instruments would fail to reduce bias against those in minority

communities, and that their use could potentially subvert important tenets of the U.S. Constitution's Fourteenth Amendment, guaranteeing that "[n]o state shall...deny to any person within its jurisdiction the equal protection of the laws" (Constitution, 1868). Holder was concerned that the use of risk assessment in judicial decision-making could "inadvertently undermine...efforts to ensure individualized and equal justice...[and] may exacerbate unwarranted and unjust disparities" (Angwin, et al, 2016). Research (Picard et al., 2019; Angwin et al., 2016) indicates that Holder's concerns were well-founded.

One concern regarding the use of risk assessment tools is the danger of the "feedback loop". This refers to the data used as input in a risk assessment algorithm — its output reflects its input. For instance, say police are sent to a location based on a risk assessment tool's prediction. Officers go to that location expecting that that's where they'll find criminality. Any incident police witness while in that location becomes data. At the end of the shift, the new data is fed into the original algorithm, which embeds something called sampling bias into the original. This refers to a situation in which a sample is collected in such a way that some members of the intended population in question have a lower or higher sampling probability than other populations. This now reinforces the initial risk assessment's prediction, which in turn spits out faulty data. Because unexpected criminal incidents may also occur in locations that police have been sent to by the algorithm, "there is the potential for this sampling bias to be compounded, causing a runaway feedback loop" (Friedler & Wilson, 2021). So if a risk assessment algorithm repeatedly sends officers to the same locations, chances are that more criminality will be witnessed and recorded within that location. And in neighborhoods whose residents are primarily communities of color, it follows that this will result in increased contact between those community members and law enforcement, resulting in increased arrests. Feedback loops in

policing have the potential to convince officers and their superiors that the locations a risk assessment algorithm keeps sending them to are simply more crime-prone than communities with less police contact (ACLU, 2018).

Police contact also determines an individual's risk score. If that individual ends up in court, their risk score may be used to make pretrial detention and release decisions; predictions as to whether they'll show up for a court date; how high their bond should be set. If this individual ends up being convicted and sentenced, their risk score is again used to decide how long their prison sentence should last. It's used again by the parole board in making predictions regarding the individual's likelihood to recidivate and whether they'll violently recidivate if released. This is its own feedback loop, and a particularly vicious cycle.

Discussion and Conclusions

Algorithms and their applications have improved our lives in countless ways, though we might not necessarily know exactly how they work. In order for one to understand the way an algorithm works at a nuts-and-bolts level, it's necessary to have at least a middling understanding of computer science. In general, police officers don't go into law enforcement because they dream of pushing numbers around, and most have neither the education nor the inclination to muck about in an algorithm's guts. Similarly, many of us probably know at least something about how law enforcement works, but if we wanted to enter the field it would be ideal if we possessed at least a middling understanding of the law. Maybe we've had to deal with the odd parking ticket, or we've been caught speeding, but a few brushes with the law doesn't mean we know how law enforcement actually works, and for a lot of us, our encounters with police haven't been particularly memorable. Maybe we notice surveillance cameras here and there, but we don't necessarily give them much thought. This is as true for me as it is for many of my peers. In my

case it has as much to do with the fact that I lead a quiet life as it does with the fact that I'm white. Add to that cis-gendered, middle class, American-born — and through absolutely no effort on my part, I've enjoyed the privilege of moving through the world without incident. I don't worry about looking like I belong where I am, because I don't have to — the world I live in was made *for* me. Yet for someone who doesn't fit the above criteria, the systems of surveillance that I, and people who look like me, pay almost no attention to act as modern systems of oppression.

In this thesis I started by defining algorithms at their most basic level. I discussed the genesis of our modern understanding of algorithms as well as the history of policing, and provided a bit of backstory for a handful of risk assessment tools as well as their origin stories. I talked a bit about the benefits of risk assessment tools in law enforcement, and some of the effects they've had on the public. I discussed some of the policies and practices used by the American government and white communities in their efforts to maintain racial stratification, how some of those practices manifested, and how they've affected historically marginalized communities. Finally, I discussed the ways in which our criminal justice and law enforcement systems have used the risk assessment tools at their disposal in order to single out and discriminate against people of color.

Law enforcement claims that algorithmic risk assessment software has made it possible for them to do their jobs more effectively. And not only that, but it makes them better police. Because an algorithm isn't human, it must not harbor any biases. Well then, this must mean that bias is no longer an issue in police work, and we can all rest easy knowing that cops are out on the streets catching the bad guys. It would be great if this were true, that by putting the kind of decision-making that makes or breaks a person's life in an algorithm's capable "hands" is the

same as delivering justice. But just like children and pets, algorithms exhibit learned behavior. When that behavior is reinforced, the algorithm (or the child, or the dog) learns that what it did was right. Raised on biased data, anything — animal *or* machine — will eventually begin to “think” that those biases are facts. A pitbull raised to fight doesn’t fight because the breed just inherently loves fighting. She fights because she was trained to. The data she’s received all of her life dictates her actions — her outputs. All she wants to do is the thing she’s been trained to do — it’s not the dog’s fault that the data she was raised on is abhorrent. The reputation pitbulls have gotten as aggressive fighting dogs have everything to do with their trainers. Aggression isn’t a foregone conclusion.

So what about the argument that some neighborhoods just house more criminals? Well, if there’s a high concentration of cops in a given area, it’s inevitable that criminal activity will be discovered there. It’s not that crimes aren’t being committed all over the city — and possibly *worse* crimes! It’s just that, if a dog barks at the mail carrier every day, and every day the mail carrier leaves, the dog begins to correlate her actions with that result. Similarly, if more officers are in a given area, *of course* they’ll always catch criminals, but the mere fact that they’re catching criminals is not a result of police being in that particular area. If cops were out there policing *every* area of a city — rich neighborhoods as well as poor; white neighborhoods as well as neighborhoods populated by communities of color — and keeping an eye out for crime in general, as opposed to focusing on crimes they think of as specific to historically marginalized communities, then they could start patting themselves on the back for “cleaning up our streets”. But the types of criminal activity that do the most harm to our society are not happening in our inner cities, and they’re not being committed by the poor. They’re largely being committed by white, moneyed elites who have learned through reinforcement that what they’re doing, while it

may be wrong, will likely never be investigated, and they'll likely never be caught. Furthermore, if they ever happen to be caught, whatever retribution they're handed down from the state will just be a bump in the road that can be smoothed over with money.

My aim in this thesis has been to demonstrate the ways that predictive policing via algorithmic risk assessment instruments have been used as a fig leaf by law enforcement. By hiding behind mathematics, statistics, and data analysis, law enforcement can feign transparency in policing, and can justify their treatment of citizens according to where they fall on the race / class totem pole — “Just look at the numbers!” they crow, “Numbers don't lie!”

Law enforcement was created to act as a means of stratification between elites and the “dangerous classes”. Algorithms haven't changed that. My strategy here has been to build a connection between America's history of racial discrimination and social control, and its continued exacerbation of the racial and class divides that remain a reality in our so-called “color blind society”. By examining the history of law enforcement I established the parallel between policing's early iteration as a force meant to protect the assets of elites via the suppression of racial and class mixing, and our current law enforcement system. I also wanted to examine some of the tactics used by white Americans in their effort to maintain racial homogeneity and superiority. As researchers work to deepen their understanding of, and improve risk assessment technology, let's hope that they do not lose sight of the importance of developing technology that serves all citizens, not just those in power.

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