How Freedom is Undermined by Advanced Technology and What to Do About It

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ABSTRACT

This paper will provide a three-part analysis to demonstrate that automated decision-making systems (ADMS), representing advanced technologies, can and do undermine our freedom. The analysis will assess their impact on our freedom with three perspectives of how freedom can be defined. Based on each perspective, the paper will address how the encroachment to our freedom can be mitigated, preserved or regained.

The three-part analysis will focus on Charles Taylor's concept of having autonomy to exercise control over one's life; interference from the perspective of Philip Pettit's concept of domination-antipower and Sharon Krause's framing of the socially distributed character of human agency and how technological and human bias impacts freedom. This layered analysis captures the complex impact advanced technologies have on our freedom.

CCS CONCEPTS

• **Applied computing** → **Psychology; Sociology; Law, social and behavioral sciences.**

KEYWORDS

Trust and Control in Complex Systems, Democracy, Freedom and Advanced Technology

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1 INTRODUCTION

Through advances in cognitive design, data analytics and computing power, ADMS are increasingly being used to mediate our society. Their function is to limit or replace human judgement in key decisions by individuals within government and corporations. [11] They are thus determining with greater frequency how we live and under what conditions. A rationale for replacing humans is they will provide better judgements that are unbiased. Humans, in turn, trust the decisions of ADMS, further supporting the belief that ADMS produce better judgements. But are their decisions better

and less biased as compared to humans? ¹ Are ADMS leading to greater equality within society and enhanced freedoms or are they a detriment to a free, just and equal society?

How is better defined? Within social theory there is a tension between qualitatively and quantitatively better. What is quantitatively better does not necessarily mean it is qualitatively better. Yet ADMS design is built on the models of human cognition with the purpose to quantitatively optimize for a specific task. Better within the principles of freedom, qualitative evaluations must be included.

How is bias defined? Defining bias is much more problematic because the criterion used in cognitive science to assess human bias does not carry over to algorithmic bias assessments. Moreover, the character of bias is very different between machine and humans. Machine bias is based on the mathematical definitions of fairness as the framework to assess algorithmic bias. Assessing bias is two-pronged: social-cultural bias and complacency bias or the reliance on and trusting of technology.

Given the assumption that ADMS produce better and fairer outcomes, how is and to what degree is individual and societal autonomy impacted? This begs the question: How is freedom and equality defined? Political philosophers have debated for centuries on which theory or what combination of elements of theories best defines freedom and what determines greater or lesser equality within a society. The theory a society adopts is the framework that molds the social ethos and guides the society in how to interact as a collective and as individuals constituting that society. [14] The concept of freedom is the foundation of government policies and the limits of business capabilities.

To answer the question of how to define freedom, a combination of elements from three political theories will provide a more comprehensive foundation from which to assess ADMS control over individuals and society. A single theory cannot do justice to the complexity of ADMS' societal importance and their disruptive nature to our status quo. The first element of a theory of freedom elucidates the concept of who or what controls a person and what a person can do and be. For the context of assessing ADMS' influence upon freedom, it is pertinent to leverage Charles Taylor's exercise-concept. Taylor notes: freedom of self-direction is "the actual exercise of directing control over one's life". [12] Do ADMS have control of our lives? If yes, how?

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¹For the purposes of this paper I borrow from Charles Taylor who uses human as a synonym for persons and includes in the definition of humans, qualities he assigns to persons: "A person is a being with a certain moral status, or a bearer of rights. But underlying the moral status, as its condition, are certain capacities. A person is a being who has a sense of self, has a notion of the future and the past, can hold values, make choices; in short, can adopt life-plans. At least, a person must be the kind of being who is in principle capable of all this, however damaged these capacities may be in practice." [12]

ADMS have a unique characteristic: they are more than tools used by individuals. Their purpose is to replace humans for specific tasks and decisions. Given the power they have in mediating society, they are considered entities onto themselves as well as tools used by individuals. [14] This unique characteristic requires Taylor's exercise-concept that focuses on a person's role in exercising their autonomy to be layered with Philip Pettit's framework that focuses on power as interference. Pettit expands the concept we generally associate with interference by "concentrating on the power of interference that others may wield, not just on the actual interference that they perpetrate." [10]

Even though ADMS have advanced computational intelligence, they are nonetheless created and maintained by humans. Their "intelligence" and hence decisions are inherently molded by the perceptions of their creators and users. The perceptions are unconscious and unintentional yet result in cultural biases that are tested as mathematically fair. [4] Sourcing elements of Sharon Krause's analysis of the socially distributed character of human agency, the effects of machine vis-a-vis human bias and their impact on freedom will be delved into.

2 ADMS AND THEIR ROLE IN SOCIETY

2.1 ADMS

ADMS are complex systems of algorithms, processing data for statistical modeling. Humans create these systems to predict behaviors of humans in specific scenarios with the goal of optimizing an outcome for a particular problem or situation. ADMS are postulated to be 'unbiased' because their judgement is purely based on mathematical equations and data. The mathematical equations are incredibly sophisticated and ADMS are able to improve their predictive abilities through continuous processing of data. A useful analogy is if an ADMS were to be a person, their algorithm is a result of their education, their processing is their body and the data are the nutrient that sustains them. As with a person, the more unbiased the education and the better the nutrients, the more egalitarian and healthier the person. Yet an ADMS, unlike a person, is not 'free' to choose their body, their education nor their nutrients. These elements are controlled by humans who create and maintain them.

2.2 ADMS Role in Society

ADMS have been in use for decades. However, it is only recently that their abilities to predict complex scenarios have exponentially improved as a result of discoveries in cognitive design, hardware engineering and the collection of personalized data. These improvements have led to the utilization of ADMS by governments to determine which immigrants will be granted entry; by hospitals to determine what treatment a patient receives; by schools to screen students; by corporations to hire and by banks to give credit. ADMS also influence the production and dissemination of news, social and professional interactions among people, the delivery of social services and the stability of financial markets. [11]

Their proliferation into all aspects of our society has been made under the rationale that ADMS are more productive than humans and have unbiased advanced computational intelligence. Tasks once performed by humans can be automated enabling governments and corporations to increase productivity. Their complex predictions are

a result of their capacity and efficiency in processing vast amounts of data. Humans cannot compare to their ability to process data. The assumed rationale that their predictions are unbiased is based on the fact that they are machines, devoid of human prejudices. These assumptions have led humans to believe that ADMS are better for certain tasks and decisions.

3 FREEDOM

3.1 An Exercise Concept

Taylor explicates that one is free only when one has the freedom of self-realization to effectively determine oneself and the shape of one's life. Yet to effectively determine oneself, one must be autonomous to exercise control over one's life. Further, Taylor notes that having the opportunity to be free requires one to already be exercising freedom. If one is totally unaware of one's potential, one is unaware of what one's opportunities are.

His analysis rests on what he calls a basic intuition that rather than freedom being a capacity to realize, freedom is a matter of being able to do something and of not having obstacles in one's way. [13]

Exercising one's capacities requires according to Taylor, a discrimination of motivations because the "capacities relevant to freedom must involve some self-awareness, self-understanding, self-control and moral discrimination, otherwise their exercise couldn't amount to freedom in the sense of self-direction". [13] Taylor argues "that we cannot defend a view of freedom which doesn't involve at least some qualitative discrimination as to motive". [13] It is a process of discrimination that involves making qualitative choices as a result of strong evaluation. A strong evaluation is discriminating on the basis of second-order desires "desires of desires as opposed to merely first-order desires which are "being able to do what one wants". [13] Strong evaluation in turn is the exercise of identifying what our true desires and motives are, that are the core of our identity of self. [12] It is a qualitative evaluation where there is also a consideration of what is 'good' above and beyond a quantitative evaluation of wanting to do something or wanting more of something. [12]

Do humans have the ability of strong evaluation? And do all humans have this ability equally? Not necessarily and some more than others. Some may not have the ability due to their particular psychology. Taylor uses the example of being motivated by fear: one's actions are motivated by inauthentically internalized standards or false consciousness that thwart one's self-realization. [13] Given this situation, a person "can't be the final authority on the question whether [they are] free; for [they] cannot be the final authority on the question whether [their] desires are authentic, whether they do or do not frustrate [their] purposes." [13] Therefore, due to human psychological constraints, self-realization can fail.

How can we, flawed individuals with diverse values and goals achieve individual 'real' self-realization? Are ADMS better equipped in determining what is an individual's best exercise of their freedom? Perhaps. ADMS have been modeled on human cognitive processes. However, they are unburdened by psychological judgments that confuse one's real will from emotional motivation. They do not have human issues of inauthenticity. They possess advanced computational intelligence and have vast amounts of data on our

diverse proclivities. Following this line of argument to conclusion, ADMS would make better decisions on what are the best desires and actions for individuals.

ADMS decisions as to what is best for each individual is based on quantitative determinants that are designed into their algorithmic systems. As machines, they are unable to make qualitative decisions because their algorithms and statistical models are not strong evaluations. Unable to discriminate on the basis of second-order desires, ADMS cannot exercise strong evaluations that identify our desires, motives, or our identities.

According to Taylor, self-reflection and self-understanding are integral to freedom. One first recognizes through strong evaluation their second-order desires, the motivations that are the core of one's identity. As Taylor notes: "Our identity is defined by our fundamental evaluations"¹. [12]

"A person is a being with a certain moral status, or a bearer of rights. But underlying the moral status, as its condition, are certain capacities. A person is a being who has a sense of self, has a notion of the future and the past, can hold values, make choices; in short, can adopt life-plans. At least, a person must be the kind of being who is in principle capable of all this, however damaged these capacities may be in practice."² [12]

Once self-understanding is exercised, one can make judgements of significance that are quite independent of the strength of one's desires. When we hand over our responsibility and accountability of self-reflection, we have also disabled our ability to self-realize. When we have disabled our ability to self-realize, then we have also disabled our ability to be free. We have become complacent.

The exercise-concept of freedom requires active, participatory self-reflection. At this point in time (2019) ADMS cannot self-reflect on behalf of individuals. However, with advances towards Artificial General Intelligence (AGI), ADMS may well have cognitive capabilities enabling them to make qualitative decisions in the future. Once ADMS have the ability to make qualitative decisions, the risk of giving power to ADMS to judge what is our 'real' self and deciding what we really want, our autonomy is jeopardized, our capacities are blocked and we are less free.³ To protect our freedom from ADMS taking control of who we are and what we do, we must retain the exercise of self-realization. Through self-understanding and self-reflection, ADMS remain as tools performing specific tasks that we, as self-reflecting humans, have decided will contribute towards the autonomous exercise of our self-realization.

3.2 Interference

ADMS are built to make quantitative decisions that optimize resources; be the resources our time, governmental expenditures or corporate budgets. By allowing ADMS to make quantitative decisions on our behalf, is our freedom impacted? In what way?

Leveraging Pettit's framework, our freedom is undermined when our choices to do and be are interfered with. According to Philip

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Pettit, "All interfering behaviors, coercive or manipulative, are intended by the interferer to worsen the agent's choice situation by changing the range of options available, by altering the expected payoffs assigned to those options, or by assuming control over which outcomes will result from which options and what actual payoffs, therefore, will materialize." [10] At this point in time, an algorithmic system cannot be coercive under Pettit's definition because they cannot coerce their will through punishment or the threat of punishment. However, they have the capacity to be manipulative. Pettit defines manipulation as "covert and may take the form of agenda fixing, the deceptive or nonrational shaping of people's beliefs or desires, or the rigging of the consequences of people's actions." [10] Much of the information disseminated by ADMS through social media is tailored to strengthen or alter existing beliefs. By virtue of the optimization paradigm, ADMS push information based on the person's past information searches and the statistical model that categorizes that person into a predetermined profile of specific beliefs, socio-economic status and other attributes for categorization. The information the person receives is the information that has been calculated according to a profile, not what actually would be chosen by that person had they had 'free choice'. The choice of information is interfered with by the algorithmic system itself. This type of interference is irrational in that machines do not possess rationality yet they have the power through their mediation of information and social media to manipulative a person's opinions and beliefs.[9]⁴ When ADMS have the power to control information they control not only a person's beliefs, but also control their actions that are a result of their beliefs.⁵

Addressing the question of intentionality, at this point in time, it is illogical to give ADMS intentionality. However, the case can be made that with the advent of AGI, there is the potential that ADMS will attain rational capacity and be able to process with intent.

Addressing the question of ADMS having control of outcomes and payoffs, ADMS do, but limited by their algorithmic capacity. ADMS have been created to statistically optimize outcomes and their ability in this is superior to that of humans. They have informational access which Pettit notes is a resource that is a power over another.[10]⁶ The complexity of the systems is such that the systems are 'black boxes' where their decisions cannot be explained by humans nor can ADMS explain their process because they are machines. The outcome, by virtue of the process to reach the outcome, cannot be challenged because it cannot be explained nor demonstrated. Therefore, their superior optimization ability combined with their access to information and their status, has created a situation where they are perceived as more powerful than humans.

ADMS' unique characteristic of being entities onto themselves that limit and replace human decision-making, satisfies Pettit's

²Of note in Taylor's definition of identity and the connection to fundamental evaluations (strong evaluations), he does not require perfection of evaluation. Instead it is the practice (exercise) of the capability by persons "however damaged" I. Freedom is in the practice, not in the optimization.

³Raymond Bond, through correspondence introduced the potential of artificial general intelligence that has the potential to further impact our freedom.

⁴ADMS also create the information, further supporting the claim that ADMS manipulate beliefs by controlling the information persons receive. For example, the Washington Post and Associate Press are using robots and artificial intelligence to create news reports and alerts. [9]

⁵One can also argue that ADMS are being used by humans and governments to manipulate and in certain situations this is true. However, for the purposes of this paper, focus is on situations where the manipulation is not the nefarious actions of humans.

⁶ADMS require vast amounts of information-data to make decisions. Big data is the term applied to the amalgamation of data warehouses that ADMS access.

condition that domination must be by an agent, an individual or collective (government or corporation). [10] They have the power to interfere in defining a person's choices and thereby they have the power to diminish our freedom.

Augmenting ADMS' limited control of outcomes is the control of those who control the ADMS. The institutions, governments and corporations who use ADMS as tools can program and feed information to intentionally manipulate and to control our beliefs, actions and life prospects for their own gain. Considering this, the undermining of our freedom is amplified when ADMS' power and those who control ADMS is taken into consideration. The control ADMS have over our behavior and thoughts is in turn controlled by the individuals controlling the ADMS.

Given the power to interfere by ADMS and those who control them, how can we emancipate ourselves and take back our freedom? Pettit's framework of antipower is a solution. A person is free to the degree that no entity has the power to interfere with, nor be master over them. [10] To curtail and limit the power an entity "ADMS and/or those who control ADMS - has over individuals and society, regulation is required. Control and use of resources that enable their power are to be identified and appropriate regulation enforced. [10]

Governments, most notably in the EU and UK, are acknowledging ADMS power to interfere. Aligned to Pettit's framework for antipower where government regulation curtails domination [10], regulations are being put in place that curtail powers of interference. Two examples are the General Data Protection Regulation (GDPR) which regulates the data privacy, and 'black box' outcomes. GDPR was put in place to constrain ADMS power over personal data and requires all ADMS decisions to be explainable in lay-person's terms. The electronic privacy regulation (ePR) extends to inter-personal communication services, most notably the tracking of online behavior through the use of 'cookies'. [1] The intention of these two regulations is to curb the power of ADMS and their sphere of interference and abate their undermining our freedom. As ADMS are used in greater degrees to mediate our society and as their cognitive abilities increase, regulation of ADMS decisions and of those accountable for their decisions will need to be monitored and developed further.

3.3 Bias

Yet even with these checks through regulation to curb ADMS power to interfere, do ADMS undermine our freedom through quantitative decisions that perpetuate and deepen inequality? Or do they provide better judgements that are unbiased which lead to greater equality and enhanced freedoms?

The significance of bias in determining freedom is articulated by Sharon Krause. Krause maintains individual agency is socially distributed because it includes intersubjective exchanges, making other people integral to the agency of the individual. [7] An intersubjective perspective implies that human agency is never a matter of dominator-dominatee but instead agency extends beyond the internal faculties of the person's intentional choice and individual control. [7]

Krause points to the cultural biases inherent in societies that have molded beliefs about gender roles and have stigmatized one ethnicity or race. Krause's concept gives an understanding of the power amongst humans in influencing another's identity and agency. "The biased social cognitions and racial meanings that stigma entails, set up a system of social interactions in which unfreedom emerges without any sovereign dominators." [6] Cultural biases are impersonal, often unconscious and unintentional. They form insidious habits of thought, selective patterns of social intercourse and biased processes of social cognition. [6] They create systemic inequalities reflecting and regenerating limited life prospects, thwarting agency that stand in the way of freedom. [6] Including bias and intersubjective exchanges into the analysis of interference acknowledges their serious threat to freedom.

Applying this concept to ADMS, from the perspective that they are machines, their statistically optimized quantitative outcomes are tested according to mathematical definitions of fairness. Yet there are at least 21 mathematical definitions of fairness and they are contradictory. [15] Compounding the issue of perceived fairness, it has been reported, that ADMS outcomes are no more accurate than a human's. [5] Moreover, the test for mathematical bias determines efficiency, independent of the societal or political consequences of their predictions. Therefore, a mathematical assessment alone is not sufficient towards assessing inequality. The assessment of the impact of ADMS bias on our freedom needs to be expanded to include the role humans have in creating discriminatory ADMS predictions that stand in the way of a person's freedom.

ADMS learn from the specific data given to them, the algorithms generalize into categories and the statistical models drive an automated decision. It is a process of evidence-based decision making, whereby the ADMS decisions are only as reliable as the evidence supplied, namely historical data, on which the decision is based. Historical data will almost always reflect historical prejudices against certain social groups, prevailing cultural stereotypes, and existing demographic inequalities. [2] Unconscious human biases are "built into" ADMS.

With the unconscious biases built in, ADMS decisions become self-fulfilling predictions. For example, with the ADMS-predictive policing system, a statistical model determines areas of high crime. The modeling uses historical data of past arrests to determine where more police officers are to be deployed. This historical data may be biased because it may include demographic disparities and an asymmetry of types of arrests (more petty crimes in lower income areas). Following the ADMS prediction of higher crime in those areas, the officers are unconsciously and subtly lowering their threshold for stopping, searching, or arresting people. [2] The prediction will appear to be validated because more people are being arrested. However, this prediction is self-fulfilling because more officers with lower thresholds arrest more in the predicted area than the fewer officers with higher thresholds arresting less in other areas. As the predictive policing system is used more and more, the skewed data used by the ADMS creates the compounded effect of a feedback loop, further strengthening the prediction based on biased data. When the prediction is seemingly validated, the unconscious bias and stigma of the social group living in the area is reinforced.

Following Krause's principles, this example demonstrates an undermining of the freedom of the social group being discriminated

against. The bias fosters existing patterns of social interaction and enforces self-confirming beliefs that intensify the existing social inequality of the area with heightened policing. [6] It is a case of unfreedom, where the historical data affirms only a part but not the whole of the individual's identity within that social group. [6] The use of the predictive-policing model ingrains the cultural degradation and internalized stigma of the social group being disproportionately policed. Krause would cite this as an example of oppression.

Referencing Iris Marion Young, Krause notes oppression results from constraints on 'self-development'. When individuals are arrested disproportionately, their development is constrained. [6] Krause also notes Charles Taylor in stressing the importance of non-oppression for freedom of the individual: self-respect is undercut within the individual of a marginalized group, where their motivation to act is demoralized and undermined. Krause explains Taylor's approach as locating agency in the social interactions that affirm and embody aspects of an individual's identity. [6]

Another human bias is automation-complacency. It exists when humans over-rely on automation to complete a task complacently because it requires minimal effort or they believe the ADMS have superior intelligence. [3](44) An ADMS outcome would be accepted without validating against data bias, what is not taken into account, and the prediction's optimization constraints. The psychological status bestowed on ADMS contributes to complacency bias. Greater confidence is given to ADMS decisions than to decisions made by humans. [8]

Machines, in the process of their modeling produce statistical correlations, not causations. With the example of predictive-policing, the ADMS correlated data into categories and based on the categorized data predicted areas that may have higher crime. The cause of the higher crime was not further investigated. Instead the solution was more policing that lead to more arrests and greater inequality between social groups. It can be argued that those using the system complacently accepted the ADMS predictions and did not question if their strategy was preventative and fair to the community they are to serve.

The predictive-policing example demonstrates that the quantitative decisions by ADMS carry social biases inherited from humans. Automation-complacency creates a self-fulfilling prediction loop intensifying the existing societal inequality that is already inherent. This inequality undermines the freedom of those stigmatized.

The characterization of ADMS decisions being unbiased is mathematically contradictory and is socially incorrect. Using biased ADMS decisions leads to inequality, oppression and the undermining of freedom. ADMS biases leading to inequality are being reported and the awareness is motivating research into the causes and effects of ADMS bias. Standards and guidelines are being put in place, notably by the International Organization for Standardization (IOS) and the Institute of Electrical and Electronic Engineers (IEEE) to mitigate algorithmic biases. (46) Along with the proliferation of ADMS into our society, action must and is being taken to minimize their role in deepening the inherent inequality that exists within our society.

4 CONCLUSION

ADMS do have the capacity to undermine our freedom. We, humans, are ultimately responsible and accountable to mitigate and control any power ADMS have that would undermine our freedom. Through the lens of Taylor's exercise-concept it was demonstrated that ADMS can undermine our freedom. To thwart their ability, it is essential for us to not abdicate accountability and responsibility of strong evaluation, of qualitative discrimination of motivations and self-understanding. Exercising control of one's life requires us to not be complacent. Analyzing the impact of ADMS' quantitative decisions against Pettit's concept of interference, ADMS manipulate our decisions and beliefs and undermine our freedom. It must be our collective responsibility to be aware of their power and keep control. Collectively we are accountable in protecting our antipower through comprehensive controls over ADMS. It is essential to enact government regulations controlling the sources of data, the modeling of data and the outcomes of data. Individuals and collectives within a society must have recourse to the decisions that are automated. Investigating bias of ADMS vis-a-vis humans, ADMS inherit existing cultural biases from humans. The belief that machines are bias free is incorrect. Promoting the belief that ADMS are unbiased gives way to complacency bias further intensifying the instilled biases within ADMS decisions and further exacerbating inequality. Against Krause's perspective that cultural biases, inherent in social systems, influence our intersubjective exchanges of social interactions, the agency of persons in stigmatized groups becomes fragmented and their freedom undermined. Given this, it is critical that there must be public awareness of ADMS bias and the impact on society. With greater public awareness, greater oversight in the creation and use of ADMS is advocated. Through awareness of the inequality ADMS decisions perpetuate, oversight via standards and guidelines are to be further developed and enforced. Otherwise, ADMS and those who control them will have continued and increasingly more power to undermine our freedom. ADMS are machines that ultimately must continue to be under the power of humans. Extending ADMS power over us will undermine our freedom and create a less just and less equal society.

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