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ORIGINAL ARTICLE

Intersectionality and algorithmic discrimination

Interseccionalidade e discriminação algorítmica

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Abstract: This article analyzes how identity-based discrimination and social exclusion processes are reconfigured by algorithmic social differentiation, proposing a framework that links social systems theory with intersectionality as a critical and normative basis for legal responses. The increasing use of algorithms reproduces and amplifies historical inequalities, while the unidimensional categories of anti-discrimination law prove insufficient to capture the complexity of digital exclusion across multiple, interconnected social markers. A qualitative approach involving theoretical-conceptual reconstruction was employed, integrating social systems theory with the analytical perspective of intersectionality. The study demonstrates that algorithmic differentiation recombines classic forms of social differentiation through psychographic profiling, ranking, and the predictive control of communication flows. Algorithmic discrimination is systemic and polycontextual in nature, functioning as an automated reproduction of historical asymmetries rather than a mere technical glitch. The article concludes that addressing this exclusion requires moving beyond simplified views of equality and calls for multidimensional mechanisms – such as explainable transparency, independent auditability, meaningful human review, enhanced evidentiary standards, and democratic participation in technological governance.

Keywords: Discrimination. Algorithm. Intersectionality. Differentiation. Fundamental rights.

Resumo: O presente artigo analisa como os processos de discriminação e exclusão social baseados na identidade são reconfigurados pela diferenciação social algorítmica, propondo a articulação entre a teoria dos sistemas sociais e a interseccionalidade como parâmetro crítico e normativo para respostas jurídicas. Nesse sentido,

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a crescente utilização de algoritmos reproduz e amplifica desigualdades históricas, sendo as categorias do Direito Antidiscriminatório, de caráter unidimensional, insuficientes para capturar a complexidade da exclusão digital sobre múltiplos marcadores sociais interligados. Utilizou-se uma abordagem qualitativa de reconstrução teórico-conceitual, integrando a teoria dos sistemas sociais à perspectiva analítica da interseccionalidade. Evidencia-se que a diferenciação algorítmica recombina formas clássicas de diferenciação social por meio do perfilamento psicográfico, ranqueamento e controle preditivo do fluxo comunicativo. A discriminação algorítmica tem natureza policontextual e sistêmica, operando como reprodução automatizada de assimetrias históricas, e não como mera falha técnica. Conclui-se que o enfrentamento dessa exclusão exige superar visões simplificadas da igualdade, demandando instrumentos multidimensionais como transparência explicável, auditabilidade independente, revisão humana significativa, aprimoramento probatório e participação democrática na governança tecnológica.

Palavras-chave: Discriminação. Algoritmo. Interseccionalidade. Diferenciação. Direitos fundamentais.

1 INTRODUCTION

The expansion of decision-making, classification, recommendation, and surveillance algorithms is reshaping the forms of social inclusion and exclusion at an unprecedented pace. Far from neutrality, such technological structures frequently reproduce and amplify historical inequalities, especially when trained on biased datasets or developed within organizational contexts marked by social homogeneity and asymmetrical economic interests. In this scenario, algorithmic discrimination emerges as a paramount legal and political issue, challenging the traditional doctrinal tools of anti-discrimination law.

The discriminatory effects of automated systems cannot easily be reduced to a single axis of inequality; rather, the structure of digital exclusion presents complexities, involving recombinations, amplification effects, and ubiquitous yet inscrutable operations. Consequently, digital exclusion can simultaneously affect persons through several markers such as race, gender/sexuality, class, age, disability, requiring analytical approaches more complex than those offered by

one-dimensional legal categories. It is precisely here that intersectionality serves as a framework capable of capturing the overlaps, tensions, and mutations inherent in contemporary forms of digital exclusion.

On the one hand, recent literature on algorithmic discrimination has focused on identifying the social impacts of artificial intelligence on historically marginalized groups; on the other, on formulating normative instruments capable of curbing such asymmetries. Ulnicane (2024) demonstrates that intersectionality is a particularly relevant framework for understanding why AI systems tend to reproduce inequalities based on gender, race, ethnicity, and socioeconomic status, driven by the homogeneity of technological development environments (predominantly male, white, and Western) and the consequent replication of biases within the algorithms themselves. Algorithmic discrimination in labor relations necessitates the application of principles such as non-discrimination, explicability, accountability, and auditability as minimum parameters for the legal containment of automated decision-making processes (Santos; Graminho, 2024). Contemporary empirical research has also begun to address the issue of intersectional injustices in AI models, including through methods aimed at identifying sensitive subgroups that are particularly prone to bias within real-world text and image datasets (Xu et al., 2024). Studies on recruitment, surveillance, and automated recognition have reiterated that algorithmic discrimination is not merely an isolated programming flaw; rather, it stems from the interplay between biased historical data, homogeneous institutional design, and deeply entrenched social asymmetries (Sousa et al., 2024; Joseph; Anantharaman, 2024). Consequently, the literature is increasingly questioning how and why algorithms reproduce inequalities that elude linear, monocausal, or strictly technical interpretations.

This picture becomes even clearer when viewed alongside the literature on social systems theory and racial identity. In examining the status of individuals classified as "pardos" (mixed-race/brown) in Brazil, Sales and Carvalho (2025) demonstrate that rigid guiding

distinctions —such as the "Black/White" binary - simplify social reality, render multiracial identities invisible, and perpetuate exclusion precisely because they rely on categories inadequate for capturing hybrid and intersectional experiences. In this sense, the systemic reduction of complexity can turn into a mechanism of erasure when distinctions institutionalized within the semantic structure of functional systems fail to reflect the concrete plurality of individuals and their modes of belonging.

Nevertheless, a significant analytical gap remains. Although intersectionality has been widely mobilized to describe multiple forms of exclusion - and critiques of algorithmic discrimination have advanced at both regulatory and applied levels - few studies articulate social systems theory with the intersectional approach to digital exclusion. There is a lack of a theoretical reconstruction demonstrating how algorithmic discrimination becomes entrenched across different communicative spheres, how it impacts the distribution of recognition and attribution, and how it challenges the law to operate with more robust concepts of equality, evidence, liability, and trust. Compounding this is the inadequacy of existing literature, which often treats AI regulation as a predominantly domestic, sectoral, or technical issue, overlooking the fact that the governance of automated systems is shaped by asymmetries between legal regimes and the gap between normative obligations and effective protection against complex forms of discrimination.

In this regard, the problem that guides this research arises: how does intersectionality theory, when articulated with social systems theory, allow for a more precise understanding of algorithmic discrimination and its effects on the reproduction of inequalities in digital environments? The hypothesis maintained here is that the technical opacity of algorithms, combined with the social sedimentation of biases present in data, organizational practices, and algorithmic design, demands a legal reconstruction of equality that accounts for the complexity of intersectional configurations of exclusion.

Algorithmic discrimination cannot be adequately observed without a simultaneously systemic and intersectional approach. It is systemic because exclusion is not viewed here as an exclusively individual or moral event, but rather as the result of communicative operations spanning Law, Politics, the Economy, Science, and organizations (companies, courts, parliaments etc.). It is intersectional because the harms produced by such systems are not distributed homogeneously; instead, they fall more severely upon individuals whose life paths are shaped by multiple markers of vulnerability. Thus, while discrimination is present in all these cases, the issue is far more complex when contextualized regarding a Black woman in a digital environment than, for instance, a Black man or a White woman: disadvantages compound in a non-linear fashion, amplified by the specific circumstances of each concrete case.

As its general objective, this study analyzes how processes of discrimination and social exclusion based on identity are intensified and reconfigured by algorithmic social differentiation. It proposes intersectionality as both a critical semantics and a normative parameter for formulating legal and institutional responses aligned with the protection of fundamental rights in contemporary society. Specifically, the analysis begins by examining the construction of identity and social exclusion within functionally differentiated society, observing how the person's partial inclusion in functional roles (economic, political, legal) can transform identity symbols and their markers into vectors of exclusion. Secondly, it addresses the emergence and mechanics of algorithmic social differentiation, investigating how digital media, algorithms, and platforms recombine classical forms of social differentiation (segmentary, stratified, functional, and center–periphery), subjecting individuals and their identities to prediction, ranking, profiling, and the control of communicative flows. It then demonstrates the analytical power of intersectionality in diagnosing complex inequalities, evaluating this semantic framework's capbility to transcend one-dimensional legal approaches and highlighting how

the overlap and simultaneity of social markers (such as race, gender, and class) produce specific, transversal forms of subordination and invisibility. Fourthly, it maps the entrenchment of historical prejudices and structural asymmetries within opaque, automated decision-making systems (e.g., facial recognition, content moderation, and generative AI tools), noting the disproportionate impact on vulnerable groups. Finally, the text discusses normative horizons for legal responses, encompassing the sensitive application of the proportionality principle, the strengthening of duties regarding explainable transparency and auditability, the incorporation of procedural mechanisms for contestation, and the guarantee of democratic participation by affected communities in technology governance.

Declaration of AI use. This work involved the limited and instrumental use of generative artificial intelligence tools, especially *Perplexity*, solely as an auxiliary resource for research and textual revision. Its use was restricted to isolated translation of terms, occasional suggestions of sources, and sporadic identification of possible argumentative redundancies. The definition of the research problem, the selection of bibliography, the theoretical construction, the analysis, the writing process, and the final version of the text were entirely produced by the human author, who retained full control over the content, conceptual choices, and conclusions presented.

2 IDENTITY, SOCIAL EXCLUSION, AND FUNCTIONAL DIFFERENTIATION

Understanding identity in functionally differentiated societies requires abandoning any substantialist or fixed notion of the subject. Rather than an inner essence, identity thus should be viewed as a form of coupling between psychic systems and social communications – produced and stabilized within specific contexts of recognition, inclusion, and exclusion. With the advent of modernity, identity is no

longer presented as a stable essence of the person; instead, it becomes a social construct through which each psychic system seeks to include its self-conception within social communication, coupling itself to the social system (society) via language and stabilizing itself amidst the constant evolution of its environment. In this semantic framework, the figure of the subject functions as a formula for the plausibility of universal inclusion, even while it simultaneously conceals the anonymous nature of the social processes that generate mass exclusion. Consequently, identity should be understood less as an internal attribute of the individual and more as a semantic structure coupling consciousness and communication (Luhmann, 1986; Luhmann, 2006).

Operationally, identity arises from the establishment of a difference: a psychic system can only establish its identity (its self-referential understanding of "itself") by simultaneously specifying what it is not, thereby condensing meaning references suitable for repeated use and for ordering communicative recursivity (Luhmann, 1990; 2006). With Modernity, the social system's conception of the "person" evolves; old metaphysical justifications are discarded in favor of assuming greater symbolic relevance within the social environment, transforming the person into a point of imputation for actions and expectations within a functionally differentiated society (Luhmann, 1986). Systems such as Law, Politics, and the Economy do not encompass the individual in their biopsychic totality, but rather in partial functional roles. Economically, the person appears as a "payer" or "receiver" (in their various senses). Politically, as a "voter," "citizen," "candidate," or "authority" (among others). Legally, as a "party," "rights holder," "obligor," etc. Consequently, identity becomes central precisely because no single functional system provides a stable, all-encompassing definition of what the person is.

Identity thus becomes a matter of individual self-reference, even though it paradoxically depends on social validation. A person must communicate his/her own subjectivity through socially intelligible codes to be recognized as unique and autonomous; the acceptance of these codes depends on the communication structures available within

interactions, organizations, and functional systems. In other words, modern identity is socially mediated self-exposure.

The relationship between identity and exclusion thus becomes intrinsic to a functionally differentiated society (Luhmann, 2006). Since there is no longer a fixed status guaranteed by birth (such as "noble" or "commoner") each person must construct an identity capable of justifying inclusion in various social systems. When the mobilized identity symbols (e.g., educational background, wealth, appearance, political affiliation) are not recognized as valid, identity itself becomes a basis for social exclusion.

This formulation is particularly relevant to the debate surrounding algorithmic technologies. When algorithms classify, rank, filter, or render people invisible based on historical data patterns, they do not merely distribute opportunities unequally; they also affect the social conditions under which identities are recognized. It is observed that algorithmic exclusion in the context of the increasing algorithmization and platformization of social communications is not limited to legal categories of harm (whether pecuniary or non-pecuniary) or procedural injury (such as disrespect of fundamental guarantees like access to justice, legality, the adversarial principle, due process of law); rather, it can affect the very possibility of the symbolic circulation of certain subjects across functional systems (Luhmann, 2006; Tosini, 2020).

The exclusion of a person within one or more social systems (interactions, organizations, functional systems) can also generate identities of resistance, through which individuals and groups react to the social invalidation of what they symbolize. Such reactive identities do not always manifest in an emancipatory way: at times, they assume rigid or fundamentalist contours. Even so, they reveal that exclusion does not remain silent: it potentially transforms into a communication of resistance capable of irritating social systems and demanding new ways of addressing equality (Luhmann, 2006).

In this sense, people excluded due to what they communicate through their behavior, appearance, or a biography marked by traits of

"race," "gender," and "class" may seek to mask one or more traits of their identity to increase their chances of coupling with social systems. Alternatively, they may further emphasize the characteristics forming the basis of their social exclusion to interact or organize with others who assert their own identities in similar terms, thereby triggering the possibility of irritating social systems through political and legal struggles for rights that translate into their inclusion. Of course, only the two poles of this identity-based reaction (identity change or reaffirmation) have been described here - but each context will present a different configuration, involving varying degrees of passivity or reactivity. Furthermore, since identity is multifaceted in a functionally differentiated society, a single identity may be subject to various types of exclusion and, consequently, exhibit a wide range of intersecting forms of passivity and reactivity in response to that exclusion.

From this perspective, it becomes evident that social exclusion is not limited to the denial of formal rights but can affect the very conditions of a person's symbolic recognition within different social systems. Identity, therefore, becomes simultaneously a resource for inclusion and a vector of vulnerability, especially when intersected by social markers that amplify or exacerbate exposure to exclusion. It is precisely at this juncture that the discussion regarding identity and social exclusion extends to contemporary digital infrastructure. If social forms of recognition are already selective, algorithmic mediation tends to intensify this process, reshaping the ways in which communication distributes visibility, accessibility, and a sense of belonging.

3 ALGORITHMIC SOCIAL DIFFERENTIATION

The emergence of digital technologies has profoundly altered social differentiation by introducing new forms of communication production, circulation, and control. Algorithms, platforms, and automated systems do not merely mediate interactions in this landscape:

they organize social life by modulating expectations, opportunities, and modes of access. Digital electronic infrastructure intervenes in the way communication is (re)produced within a functionally differentiated society (Baecker, 2025). In this sense, the next society may well compute every ongoing communication according to electronic programs hyperlinked to every conceivable form of control (social, spatial, or temporal).

New media generate an excess of meanings (contingency) that a society's culture cannot accommodate, which in new social structures and forms designed to distribute this contingency across different societal spheres and condense it into a redundant pattern applicable to all social situations. This excess of contingency thus reorients expectations regarding communication content and the interpretation of experiences: established social structures determine expectations of meaning (where and from whom to expect it), while culture governs the familiarity (or lack thereof) of communications. However, these elements are overwhelmed by the "form" of communication (its scale, pace, patterns, etc.). In this regard, four fundamental changes in the mode of communication have shaped the evolution of society:

i. *Language (dawn of society):* expanded the possibilities for referencing things that were neither present nor verifiable, necessitating the control of communicative boundaries (who speaks, and about what) through segmentary social structures (division into tribes) and a culture of secrets and taboos.

ii. *Writing (Antiquity):* caused an overflow in the volume of symbols referring to the past and the future (as text enabled communication bridging past and future), demanding a stratified social structure (divided into aristocracy and commoners) and a teleological culture, thereby shaping social communications toward a common destiny.

iii. *The Printing Press (Modernity):* further increased the volume of communications involving critical perspectives (as texts

became accessible to more people with diverse viewpoints), sparking a social dynamism that gradually led to a society structured around functional subsystems (specifically differentiating Law, Politics, and Science from Religion).

iv. *Digital Media (Contemporary Era):* caused an overflow of images and data, potentially interconnecting every communication with every other, demanding a network-based structure and a culture of social complexity.

The form into which society is evolving differs from the functionally differentiated model because digital media has transformed social structure and culture as profoundly as writing and the printing press did, introducing an overflow of meanings that expanded the possibilities for communication and experience within society. In this sense, while modern society was largely defined by autonomous systems – the egoistic individual (psychic systems) and bureaucratic organization (across all social systems) – the emerging society is rediscovering connectivity. In this new context, functional systems do not disappear; rather, they are exposed to such high levels of contingency that they are compelled to establish new structural couplings with the systems in their environments. Two external factors (observed as characteristics of the social systems' environment) – climate change and migration – reflect an internal factor (stemming from the social systems that create and utilize them) – digital communication – thereby contributing to feedback-rich relationships between systems and their environments.

The computer emerges as a new participant in communication, introducing yet another system with which to interpenetrate – beyond the social and psychic systems. However, its internal operations are so opaque that Luhmann (2006) recommended maintaining an indeterminate stance regarding its place in the future development of social theory. This indeterminacy can be understood within the incommensurable polyhedron of mutual interpenetration among social

systems (including the vast array of interactions and organizations), psychic systems (currently numbering around 8 billion), and algorithms, software, and platforms (each with its own mode of data access and processing).

The specific operation that the "next society" produces and reproduces is the communication of digital data. Analogous to the role "values" play at the normative level (Luhmann, 2006), "data" connect things cognitively, enabling learning (for social and psychic systems) by linking world events (Baecker, 2025). This operation takes the form of an "interface" between the algorithmic and the social, presenting a "sub-face" to algorithms and a "surface" to human perception, social use, and cultural interpretation. Thus, the communication of digital data is always the communication of computable data, the only stable aspect of which is its ceaseless availability for further calculations and differing interpretations. Yet, in asserting their facts, data paradoxically seem to eliminate the need for further calculations or alternative interpretations, presenting themselves as both precise and indisputable.

In this sense, Taekke (2022) outlines a possible new type of basic social differentiation: algorithmic differentiation. Enabled by digital media, this form of differentiation vastly amplifies society's communicative power to compute, monitor, predict, distribute, inform, command, and influence. The complexity and dynamics of modern society (driven by the digital media revolution) have grown to such an extent that earlier forms of differentiation have lost their efficacy or become latent. But this new form does not replace previous ones; rather, it transcends and recombines them, transforming society into a functionalist technostructure that utilizes human beings as "frictionless resources" - where human contributions are organized with increasing efficiency and immediacy, turning the person into an interchangeable and "hyper-flexible" component of the system.

Digital technologies have evolved alongside social and economic power structures, moving from the internet's initial idealism (which promised to democratize knowledge through universal access)

to AI and platform era dominated by corporations whose assets are valued by the market in unprecedented ways. Despite this disillusionment, exponentially growing technological interactivity creates new communicative possibilities (contingency) while incorporating opaque decision-making structures that restrict and direct communication with users (interaction with individual psychic systems and with organizations). Far from being neutral tools, technological structures constitute closed causal orders operating according to their own internal logics - significantly impacting the circulation of information, the construction of epistemology, and social structuring as a whole (Taekke, 2025).

The internet has increasingly been monopolized by a small number of immensely powerful global platforms that regulate interactivity through monetization and advanced data profiling in ways that primarily serve economic interests. AI amplifies this trend by incorporating artificial forms of communication whose decision-making logics are encoded into the technology itself without possibilities of negotiation. When technological structures are organized primarily around the pressures of economic logic, lacking sufficient institutional anchoring, a shift in power occurs: decision-making processes increasingly elude public scrutiny and democratic political regulation. A pluralistic and transparent technological landscape is therefore a prerequisite for ensuring that technology remains part of society's functional differentiation rather than becoming an autonomous, totalitarian center of power. Technological evolution does not guarantee democratic values: this is a political matter regarding which regulation and accountability forms must be continuously re-evaluated.

The person (comprising psychic and living, physical systems) becomes a frictionless resource, fully open to being read by algorithmic mechanisms, reduced to a "Big Data citizen": a cog that algorithms distribute across space and time in a purely functionalist manner, free from the biological or social constraints that once hindered the operation of the social "machine."

Algorithmic differentiation, however, is not a form that simply replaces or sidelines functional differentiation; rather, it recombines all previous forms of social differentiation - segmentary, stratified, functional, and center-periphery - modulating each according to a logic entirely different from their former theoretical meanings:

i. *New segmentation:* while classical segmentary differentiation divided society into equal, robust units (families, tribes), in the algorithmic era, it is individualized and processed at "invisible depths" via psychographic profiles created by machine learning algorithms. Political and commercial micro-targeting, using customized messages visible only to the target (so-called "black posts"), is a process whereby the system reaches individuals with specific emotional or economic characteristics, treating each person as a distinct segment within public communication.
ii. *New stratification:* pre-modern stratification was based on inequalities of social position derived from birth (membership in the nobility or the commonality). In the algorithmic era, inequality is dictated by algorithmic predictive analysis of behaviors, qualifications, and social history. The individual is continuously ranked by the system (rather than just at birth), determining their inclusion in or exclusion from social processes. Algorithms used by banks and insurance companies, for instance, decide who is "worthy" of credit or services.
iii. *New functional differentiation:* functional differentiation divides society into specialized systems (Law, Politics, Science, Economy, etc.), each with its own code. In the algorithmic era, these systems lose some of their autonomy as they are permeated by the logic of AI. Decisions within these systems (e.g., what constitutes "good education" or a "political solution") come to be guided by statistical computational

models, transcending the internal norms of each functional system. For example, the use of AI in education prescribes data-driven learning trajectories, thereby undermining the teacher's pedagogical role.

iv. *New Center-Periphery Differentiation:* traditionally, the center (e.g., a capital city) exercised power over a geographic or social periphery. In the algorithmic age, the center becomes a non-geographic technostructure (ubiquitous and invisible) defined by major technology companies, while the periphery consists of the mass of individuals monitored and "nudged" in real-time through digital flows.

Algorithmic differentiation does not entirely replace previous forms of differentiation but recombines them under a new logic driven by computation, prediction, and continuous monitoring. The result is an intensification of power asymmetries and processes of exclusion that become less visible, more diffuse, and precisely for this reason, more difficult to regulate legally. If algorithmic differentiation reorganizes the criteria for visibility and the distribution of opportunities, it becomes necessary to examine conceptual categories capable of grasping inequalities that cannot be reduced to a single explanatory axis. It is within this context that intersectionality emerges as an indispensable critical framework.

4 INTERSECTIONALITY AS A CRITICAL SEMANTICS OF INEQUALITY

Intersectionality emerges as a critical response to the limitations of one-dimensional readings of inequality, which address discrimination based on race, gender, class, or other markers as if they operated in isolation. In contrast to this observational myopia, intersectionality constitutes an analytical framework aimed at understanding how these

axes combine, reinforce one another, and produce specific experiences of subordination.

From a legal standpoint, discrimination corresponds to disadvantageous treatment based on categories proscribed by the normative legal framework, linking directly to the principles of equality and human dignity (Moreira, 2017). At this level, the semantic-structural legal distinction between formal and material equality has evolved to increasingly underpin situations where rights are asserted: while the former refers to the equal treatment owed to every person, regardless of contextual peculiarities (that is, the affirmation that everyone holds the same rights by virtue of belonging to the same politico-legal community), the latter requires consideration of the factual inequalities that justify differentiated treatment to promote substantive equality (the affirmation that, due to a range of historical and/or biological/biographical reasons, certain individuals or groups should hold a set of rights distinct from those of the majority, to rectify the disadvantage that placed them in a position of inequality).

However, the semantics of equality reveals significant limitations when confronted with forms of exclusion that do not operate in exclusion based on race, gender, class, or any other specific marker. In this context, the theory of intersectionality was developed as a critical response to legal and political approaches that treat discrimination in a one-dimensional manner, as they fail to capture how different axes of social disadvantage combine to produce unique experiences of exclusion (Crenshaw, 1989; 1995; McCall, 2001).

The case of *DeGraffenreid v. General Motors* (United States, 1976), concerning workplace discrimination under Title VII of the Civil Rights Act (United States, 1964),[1] is cited by Crenshaw (1989) as a paradigmatic example.

[1] "DISCRIMINATION BECAUSE OF RACE, COLOR, RELIGION, SEX, OR NATIONAL ORIGIN SEC. 703. (a) It shall be an unlawful employment practice for an employer--

In the case, five Black female employees from St. Louis, Missouri, sued General Motors for discrimination. They argued that the company's seniority policy - which had favored the hiring of white employees until 1964 - resulted in the layoff of all Black women hired after 1970 during an economic downturn. The core of the plaintiffs' claim was precisely the recognition and protection of their rights not merely as Black people or as women, but specifically as Black women—a distinct category subject to a unique form of discrimination. However, the Court rejected this claim, stating that the plaintiffs failed to prove the existence of decisions specifically targeting Black women as a protected category; it ruled that they were entitled to redress for only one category of discrimination, but not for a complex combination of both.[2] This forced Black women to choose between emphasizing racial discrimination or gender-based discrimination in their lawsuits - thereby ignoring the intersectional nature of the social forces oppressing them - due to "legislative intent" and "procedural economy."

In that instance, Black women sought legal recognition not merely as Black people or as women, but as Black women, a category

(1) to fail or refuse to hire or to discharge any individual, or otherwise to discriminate against any individual with respect to his compensation, terms, conditions, or privileges of employment, because of such individual's race, color, religion, sex, or national origin; **or**

(2) to limit, segregate, or classify his employees in any way which would deprive or tend to deprive any individual of employment opportunities or otherwise adversely affect his status as an employee, because of such individual's race, color, religion, sex, or national origin.

(b) It shall be an unlawful employment practice for an employment agency to fail or refuse to refer for employment, or otherwise to discriminate against, any individual because of his race, color, religion, sex, or national origin, or to classify or refer for employment any individual on the basis of his race, color, religion, sex, **or** national origin".

[2] "The legislative history surrounding Title VII does not indicate that the goal of the statute was to create a new classification of "black women" who would have greater standing than, for example, a black male. The prospect of the creation of new classes of protected minorities, governed only by the mathematical principles of permutation and combination, clearly raises the prospect of opening the hackneyed Pandora's box".

whose specific experience of discrimination could not be reduced to either dimension in isolation. The court's refusal to acknowledge this combination rendered the plaintiffs' concrete and complex experience invisible, demonstrating the inadequacy of a legal model unable to grasp the overlapping nature of forms of exclusion. Thus, intersectionality is not limited to aggregating categories; it shifts the way the problem is observed. Instead of starting from abstractly isolated identities, it demands an examination of the concrete interactions between social markers, enabling an understanding that inequality is multidimensional, relational, mutable, and contextual. It is not a simple matter of coexistence of race, gender, and class, but rather the production of specific configurations of discrimination that vary across time, space, and the organizational and institutional environments in which they manifest (McCall, 2001; Collins & Bilge, 2020).

In the context of systemic complexity, intersectionality can be viewed as a semantics consistent with polycontexturality (Luhmann, 2006). It allows for the observation of how harmful communications can be simultaneously characterized across political, economic, cultural, and legal dimensions at the systemic-functional, organizational, and interactional levels. In doing so, it expands the law's observational capacity, providing the means to recognize that certain seemingly neutral or unintentional disadvantages are, in fact, concrete effects of broader structures of inequality.

At this juncture, the principle of proportionality gains prominence as an instrument for the legal control of arbitrary differentiations. It is not merely a matter of assessing subjective discriminatory intent, but of examining whether classifications and treatments are reasonable and legitimate, or whether they produce unjustified disadvantages for specific groups: intersectionality challenges the application of proportionality by requiring an examination of who cumulatively bears the social costs of this purported neutrality.

Conceptually, intersectionality is the interactive overlap of multiple axes of identity (such as race and gender) that uniquely shape social

experience (Crenshaw, 1995). Rather than viewing identity categories in isolation, it makes evident how they combine to create more specific forms of exclusion. In the case of violence against women of color, the issue is not merely sexism or racism, but simultaneous operation of racist and sexist communication, generating forms of subordination distinct from those experienced by Black men or white women. Thus, intersectionality requires an analytical lens that recognizes the complexity (multidimensionality) of oppression; within an intersectional approach to inequality, several central characteristics can be identified:

i) *Simultaneity of multiple identities:* recognition that exclusion usually result from more than one factor. Rarely is an individual discriminated against solely based on race; such discrimination is often accompanied by discrimination based on membership in disadvantaged socioeconomic classes, marginalized gender identities, etc.

ii) *Interactivity of axes of subordination:* recognition of the interdependence of social categories such as race, gender, and class, which construct complex forms of exclusion. Consequently, the marginalization of Black people is intensified when they are female and/or from lower socioeconomic classes.

iii) *Specificity of experiences:* excluded people cannot be reduced to a single identity category; thus, the violence experienced by a poor Black woman cannot be explained solely by racism, sexism, or class, but rather by the confluence of all these factors.

iv) *Marginalization resulting from single-category approaches to inequality:* approaches such as feminism centered solely on white women, or anti-racism centered solely on the experiences of Black men, further render individuals with intersectional identities invisible.

These features help explain why approaches focused exclusively on "women," "Black people," or "the poor" viewed as homogeneous

groups tend to obscure deeply unequal internal experiences. McCall (2001) elaborates on this point by structuring the notion of "configurations of inequality," through which gender, race, and class articulate in ways that are relational, intra-group, conflict-ridden, and spatially variable. Collins and Bilge (2020), in turn, insist that intersectionality should not be turned into a finished product, as its critical power depends on remaining linked to concrete contexts, specific social practices, and historically oppressed voices.

The normative power of intersectionality lies precisely in the refusal to naturalize inequalities and the rejection of individualistic or reductive explanations. Rather than a mere "sum of oppressions," inequality emerges as a complex structuring of power relations. In the legal realm, this opens the system to new equality issues, allowing situations previously treated as matters of race, gender, or class to be examined in ways that better reflect social complexity.

Intersectionality enables social systems that stabilize normative expectations (Law and Politics primarily) to observe inequality relationally and contextually rather than merely cumulative, thereby demanding more rigorous forms of observation and justification. Its contribution lies in revealing that certain disadvantages stem not from a single factor, but from the structural interplay of multiple conditions of vulnerability. This perspective is particularly relevant when applied to the digital environment, where social biases are embedded in databases, predictive models, and automated decisions. Consequently, the issue of algorithmic discrimination can be examined as a technically mediated expression of pre-existing, structurally embedded social inequalities.

5 ALGORITHMIC DISCRIMINATION AND THE AUTOMATED REPRODUCTION OF BIASES

Algorithmic discrimination encompasses various forms of bias that emerge when algorithms are used in decision-making systems.

Such biases can infiltrate various stages of a digital solution's development, from its planning, design, and programming to its implementation and ultimate use (Gerards; Xenidis, 2021). It is not, therefore, an accidental anomaly, but rather a structural risk embedded within the very sociotechnical chain of algorithmic production.

A primary reason for its occurrence lies in the reflection of human prejudices, stereotypes, and structural inequalities within the data used to train algorithmic models, as well as in the decisions made by the managers, designers, programmers, and operators of these tools. Thus, algorithms do not create discrimination *ex nihilo*; instead, they reproduce, entrench, and amplify pre-existing social patterns, often on a scale far exceeding that observed in ordinary human practices.

This form of discrimination differs from traditional modalities (such as those found in segregationist, eugenic, colonialist, fascist, or imperialist ideologies), primarily due to its scale, speed, and opacity. The so-called algorithmic "black box" (opacity) hinders access to the system's internal workings and training data, particularly when these are protected by trade secrets or intellectual property regimes. Consequently, observing discrimination becomes increasingly difficult, not because it does not exist, but because it is hard to pinpoint the specific origin of the bias or the harm.

The legal implications of this opacity are manifold. First, establishing evidence in legal proceedings becomes difficult, as victims and oversight bodies are often unable to determine how the algorithm operated, whether unequal treatment occurred based on a protected characteristic, or even whether discrimination took place at all. Secondly, the attribution of responsibility becomes more complex, as the decision-making chain involves various actors (developers, suppliers, integrators, contracting parties, and system operators). Thirdly, the application of traditional anti-discrimination law categories is strained, particularly regarding the distinction between direct and indirect discrimination.

The difficulty of proving direct discrimination within opaque systems may increase reliance on the concept of indirect discrimination,

which operates based on disproportionate effects and broader tests of objective justification. While this approach is significant, it can also reduce predictability and legal certainty if not accompanied by more refined evidentiary, procedural, and regulatory parameters. In this sense, algorithmic discrimination operates in a markedly intersectional manner. Image databases, computer vision systems, content moderation, automated recruitment, and image generation demonstrate the rendering of Black people invisible, the association of whiteness with the norm, the hyper-sexualization of women, and the reproduction of racial and gender hierarchies across multiple digital contexts.

Racial identity, in conjunction with other markers, contributes to the shaping of vulnerabilities and forms of violence (both material and symbolic) within the digital environment (Junqueira; Botelho-Francisco, 2022). Consequently, current technological design can be viewed as racist, contributing to the pejorative and degrading treatment of Black people. Although they mediate interactions and content, algorithms are not free from bias, as they are human-created structures embedded in unequal social contexts. Thus, algorithmic racism manifests in the visibility and invisibility of Black people within databases and computer vision systems. Algorithmic training and image labeling reproduce gender and racial biases, associating categories such as "boss" and "wealth" with white men, and "secretary" and "poverty" with Black women or Black people. Furthermore, racist algorithmic communication on social media, such as bots programmed to rapidly and widely disseminate information that is intentionally or unintentionally racist, combined with ineffective moderation by social media platforms, can foster hate speech against Black people.

Algorithmic sexism and racism have been observed in image-generating AIs, such as Midjourney, from an intersectional perspective (Gomes, 2023). An analysis of images generated by Midjourney, focusing on image content and prompt structure, revealed that algorithms trained on vast datasets and influenced by user input reproduce and perpetuate social biases. Regarding the application, images of human

figures generated by Midjourney showed a predominance of white, female bodies in the results, even when race was not specified in the prompts. Prompts frequently called for young, beautiful women with European features, or for sensual clothing and poses; this resulted in hyper-sexualized imagery and demonstrated that whiteness is treated as the universal standard for human representation, requiring explicit specification to include other races or ethnicities. A direct link to algorithmic discrimination was thus identified: through their patterns of inclusion and exclusion and the reproduction of biases, Midjourney's algorithms perpetuate biases rooted in white supremacy and sexism. Racialized groups experience digital microaggressions, facing either invisibility or a negative hyper-visibility that reinforces stereotypes, marginalization, and exclusion.

Algorithmic surveillance technologies are not neutral, as they are structured within specific social, political, and economic contexts (Ramos; Teider, 2023). They reflect and perpetuate structural inequalities and power dynamics, particularly when relying on data already labeled with historical and social biases. In the context of police use of facial emotion recognition in Detroit, USA, it was found that AI crystallizes bias rather than reducing it, particularly regarding race, class, and gender. Such surveillance not only reproduces practices of control over Black and impoverished bodies but also restricts their freedom and mobility. The intersection of social markers of difference within the digital ecosystem reveals that algorithmic discrimination operates in a fundamentally intersectional manner, combining variables of race, gender, and social class. In Brazil, the implementation of algorithmic systems for public security provides an empirical example of this dynamic.

The racial dimension is reflected in the disparities and lack of transparency found in training datasets and machine learning calibration; the underrepresentation of Black skin tones results in disproportionate false-positive rates when biometric data is cross-referenced with arrest warrants. Gender acts inseparably from this flaw:

seminal studies reveal that the technical accuracy of computer vision software drops sharply when analyzing the facial features of Black women compared to other demographic groups (Buolamwini; Gebru, 2018). In Brazil, data compiled by independent organizations indicate that approximately 90% of individuals detained via facial biometric monitoring during initial operations belong to the Black population (Nunes et al., 2023).

Social class bias dictates the spatial distribution and incidence of this automated surveillance. Facial recognition-enabled image capture points are concentrated primarily in public transport infrastructure and the peripheral areas of major metropolitan centers, thereby subjecting the working class, more than any other group, to overt police interventions triggered by algorithmic technical errors. Documented cases in Salvador's urban terminals and subway stations, where Black women from the city's outskirts were stopped and taken to the police station due to biometric identification errors while commuting to work, epitomize intersectional algorithmic racism by automating the suspicion of Black, female, and poor bodies in urban space (Monteiro, 2022).

These elements justify the assertion that algorithmic discrimination is, by definition, polycontextural. It is simultaneously an economic issue, as it affects access to credit, employment, and opportunities; legal, because it may violate equality, due process, privacy, and the right to a full defense; political, because it affects flows of public visibility and invisibility; and scientific, because it challenges the very criteria for the production and validation of knowledge regarding how the systems operate.

Algorithmic discrimination operates on multiple levels and cuts across various social systems; therefore, legal and institutional responses cannot be one-dimensional either. We must abandon the assumption of technological neutrality and recognize that algorithmic systems are constructed within specific social, economic, and political contexts. Based on this premise, legal decisions must shift from merely relying

on the technical functioning of these applications to evaluating the concrete effects produced on historically marginalized groups.

In this context, proportionality remains relevant as a technique for controlling legally unjustified distinctions, but it must be operationalized in a way that is sensitive to intersectional complexity. The question is not merely whether a specific automated criterion is formally rational, but whether its impacts impose disproportionate burdens on individuals situated in cumulatively disadvantaged social positions. This requirement aligns the proportionality assessment with a substantively rich interpretation of equality.

It is essential to give effect to obligations regarding transparency, auditability, and the oversight of algorithms. Establishing oversight bodies, adopting codes of ethics and conduct, fostering cooperation between data protection authorities and equality bodies, and encouraging diversity within science and technology professional communities are fundamental measures for reducing bias and enhancing institutional responsiveness (Gerards; Xenidis, 2021; Ulnicane, 2024).

However, the requirement for transparency cannot be understood naively. In complex technological systems, merely making the tool's programming code formally open or providing technical information does not solely resolve the problem of the algorithm's legal and social intelligibility. Transparency must be combined with procedural mechanisms for challenging decisions, meaningful human review, facilitated evidentiary processes, database documentation, decision traceability, and independent auditing. Furthermore, the democratic participation of affected communities in the design, implementation, and monitoring of these technologies must be a cornerstone of regulation. In this regard, there must be an epistemological shift away from the narrow question of the tool's technical functionality toward a broader inquiry concerning the political and economic structures to which the organization responsible for its implementation is linked. In other words, regulating algorithms entails regulating communicative power relations.

The legal governance of algorithmic exclusion must also address the risk of economic capture of the normative processes themselves. The expansion of the economic logic of major platforms into functional systems (Law, Politics, Science, etc.) threatens to hollow out transformative regulatory agendas, replacing them with forms of norm-setting oriented more toward consumption than citizenship (Teubner, 2020; Bachur, 2013; Tosini, 2020; Anderson, 2013). This implies that AI regulation cannot be limited to the creation of formal standards but must preserve the centrality of fundamental rights (Teubner, 2020; Bachur, 2013).

At the doctrinal level, this suggests at least five areas for development: (a) strengthening transparency-related obligations (explicability, auditability, accountability); (b) refining evidentiary criteria for indirect discrimination in automated environments; (c) clearly defining chains of liability among the actors involved; (d) structuring independent algorithmic audits (going beyond the self-regulation that platforms claim to implement); and (e) incorporating intersectional analysis into public policies and judicial decisions regarding digital equality.

These measures do not, in themselves, eliminate the paradoxes inherent in the problem. The very use of algorithms by decision-making organizations can lead to legal "over-explanation" (Esposito, 2022; Ferreira, 2022): the allure of accepting overly precise machine-generated answers at the expense of the interpretive openness necessary for the evolution of the law. Therefore, the challenge lies not simply in increasing the use of technology in legal decision-making, but in preserving the legal system's critical autonomy in the face of solutions that are technically sophisticated yet socially opaque.

Nevertheless, the semantic framework of intersectionality is being progressively assimilated into Brazilian Law as an interpretive basis capable of highlighting the simultaneous and interconnected production of inequalities. This concept aligns closely with the notion of multiple or aggravated discrimination, particularly in light of the

Inter-American Convention against Racism, Racial Discrimination and Related Forms of Intolerance, which was incorporated with constitutional status via Decree No. 10.932/2022 (Brazil, 2022). With this milestone, intersectionality ceases to function merely as a descriptive theoretical category and begins to play a normative and hermeneutic role in the realization of substantive equality.

At the institutional level, the Protocol for Judging with a Gender Perspective stands out. Developed by the National Council of Justice (CNJ Resolution No. 492/2023), it has been made mandatory for the entire Judiciary (Brazil, 2023). The norms int that document solidified the requirement for judicial analysis that is sensitive to the interplay between gender and other relevant social markers, such as race, ethnicity, class, sexual orientation, and disability. Thus, even when the term "intersectionality" does not explicitly appear in the operative part of court rulings, its logic has already been incorporated by Brazilian courts as an interpretive parameter.

Consequently, an epistemic shift must underpin the legitimation of algorithmic use: rather than merely questioning the technical accuracy of an algorithmic tool, it is necessary to question the political and economic structures to which the implementing organization is linked, and the nature of that connection. This change in perspective demands greater democratization in the establishment of legal standards, translating into broader participation by affected communities in the design, implementation, and monitoring of these technologies.

6 CONCLUSION

Algorithmic discrimination constitutes one of the most significant contemporary challenges to equality law. Its distinct nature stems from a combination of scale, speed, technical opacity, and the capability to reproduce, intensify, and naturalize pre-existing social patterns of subordination. Consequently, one-dimensional legal approaches tend

to be insufficient to grasp the concrete harms caused by automated systems in social contexts marked by structural inequalities.

The reconstruction proposed here argues that social systems theory and intersectionality, when articulated together, offer a particularly fruitful analytical framework for addressing this problem. The former allows us to understand that exclusion is not an isolated event but a communicative operation that cuts across different functional systems (politics, economy, law, etc.) and organizations (companies, parliaments, courts, etc.). The latter highlights that such exclusions do not affect abstract, homogeneous subjects, but rather individuals situated within complex power configurations where race, gender, class, and other markers intersect intricately; in this way, modes of exclusion mutually reinforce one another, in a way that goes beyond a mere sum of discriminations that could be simply and linearly observed and resolved on an individual basis.

Research into how technology reshapes society demonstrates that algorithmic differentiation cannot be understood merely as a technical-instrumental advancement, but rather as a profound reconfiguration of the structures of communication, visibility, and the distribution of opportunities. By transcending data volumes and interconnecting communicative flows on an unprecedented scale, digital infrastructure reorganizes classical forms of social differentiation—segmentary, stratified, functional, and center-periphery—subjecting the individual to continuous ranking, psychographic profiling, and predictive targeting.

In this scenario, the relationship between identity and exclusion takes on even more complex and opaque dimensions. As previously discussed, identity in modernity ceases to be a static essence and instead functions as a coupling structure between individual consciousness and social communication. When the symbolic circulation of subjects becomes mediated by platforms and algorithms, social markers of difference (especially race, gender, and class) are incorporated into training data and decision-making code. The result is not neutrality,

but the automated reproduction, stabilization, and amplification of historical inequalities, turning algorithmic mediation into a new vector of vulnerability and selectivity.

Faced with this decision-making opacity and the exponential scale of the impacts, the legal response requires moving beyond one-dimensional and purely formal interpretations of equality. It is from this perspective that this work has invoked intersectionality as a critical and indispensable framework. By shifting the focus to the simultaneity and interactivity of axes of subordination, the intersectional perspective reveals that algorithmic discrimination disproportionately affects bodies and subjects who bear the burden of accumulated historical disadvantages. This exposes the inadequacy of rigid legal categories that force a choice of only a single, isolated protected marker.

From this standpoint, algorithmic discrimination emerges not merely as a technical glitch, but as a form of unequal distribution regarding recognition, visibility, opportunities, and legal protection. The issue encompasses both material damages and harm to the conditions for the symbolic inclusion of concrete identities within a functionally differentiated society. This insight demands that the law abandon oversimplified views of equality and develop instruments sensitive to the multidimensional nature of exclusion. Given the polycontextural nature of algorithmic exclusion, simultaneously affecting Law, the Economy, Politics, and Science, legal and institutional responses must be equally multidimensional and robust. Relying solely on technical operations or the self-regulation of the digital market is insufficient. The most appropriate institutional responses, in turn, entail informed transparency, auditability, democratic participation, diversity in technological production, evidentiary strengthening, meaningful human review, and the preservation of the centrality of fundamental rights in the face of the expansion of platform-mediated economic rationality. The effectiveness of these measures will depend, however, on the ability to prevent regulation itself from being captured by economic interests capable of undermining the critical potential of equality.

In summary, intersectionality, when articulated with systems theory, allows for an understanding of algorithmic discrimination as a form of communication that is structurally complex and legally irreducible to isolated traditional categories. Addressing algorithmic exclusion thus requires a legal framework capable of observing digital society in its polycontexturality, without abandoning a normative critique of the structures that render inequality technically reproducible.

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Data Availability

The authors declare that all data used in the research are available in a public repository, in accordance with open science practices. Revista Sequência encourages the sharing of research data that ensure the transparency, reproducibility and verification of published results, while respecting applicable ethical principles. Accordingly, disclosure of information that would allow the identification of research subjects or compromise their privacy is not required. Data sharing should therefore prioritise scientific integrity and the protection of sensitive data, ensuring that results are made public without undue exposure of participants.

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