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Original article

Digital Surveillance and the Erosion of Privacy: A Sociological Perspective on Algorithmic Control

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Abstract - This paper examines how digital surveillance, powered by algorithmic technologies, is reshaping the boundaries of privacy and individual autonomy in contemporary societies. Drawing from sociological theories and empirical studies, it explores the mechanisms by which algorithmic systems are used to monitor, predict, and influence behavior often under the guise of efficiency, security, or personalization. The analysis highlights how these technologies contribute to new forms of social control, reinforcing power asymmetries between institutions and individuals. It also interrogates the implications for civil liberties, social stratification, and democratic governance. By critically engaging with concepts such as surveillance capitalism, data colonialism, and algorithmic governance, the paper underscores the urgent need for robust ethical and policy frameworks to safeguard privacy in the digital age.

Keywords - Digital Surveillance, Privacy, Algorithmic Control,Surveillance, Capitalism,Data Colonialism, Algorithmic , overnance, Social Control, Power Asymmetry, Technological Ethics, Digital Sociology.

1. Introduction

1.1 Background: Rise of Digital Surveillance in the 21st Century

The 21st century has witnessed an unprecedented expansion in the reach and sophistication of digital surveillance technologies. What began as a tool for national security and corporate efficiency has now become an embedded feature of everyday life. With the proliferation of smartphones, smart devices, and ubiquitous internet connectivity, individuals constantly generate data that is collected, stored, and analyzed by governments, corporations, and other institutions. Surveillance has shifted from being a targeted and localized activity to a mass-scale, automated process driven by algorithms and artificial intelligence. The transition from analog to digital monitoring has transformed how information is gathered not only passively through observation but actively through behavioral tracking and predictive modeling.

1.2. Relevance of the Topic in the Digital Era

In an age where data is considered "the new oil," understanding the dynamics of digital surveillance is crucial for assessing its broader societal implications. As platforms increasingly mediate our social, economic, and political interactions, surveillance mechanisms shape how individuals engage with the world and how they are categorized, judged, and governed. The COVID-19 pandemic accelerated the normalization of surveillance tools from contact tracing apps to biometric temperature scanners raising critical concerns about long-term impacts on privacy. The erosion of private boundaries, often justified in the name of efficiency, personalization, or public safety, brings into question fundamental human rights and democratic principles. Thus, analyzing digital surveillance is not merely a technological inquiry but a sociological imperative.

1.3. Sociological Approach and Structure of the Paper

Taking a sociological lens, the paper draws upon critical theories and empirical case studies to unravel how algorithmic surveillance transforms social relations. The analysis is grounded in interdisciplinary frameworks from

sociology, critical data studies, and media theory, emphasizing the interplay between technology and power. The paper proceeds as follows: Section 2 outlines the theoretical foundations; Section 3 analyzes the mechanisms through which algorithmic surveillance operates; Sections 4 and 5 explore the consequences for privacy and social control; Section 6 examines public perception and resistance; and Section 7 proposes pathways for ethical governance. The concluding section synthesizes the findings and offers directions for future research.

Table 1: Comparison – Traditional vs. Algorithmic Surveillance

Dimension	Traditional Surveillance	Algorithmic Surveillance
Data Collection	Manual observation, limited data points	Continuous, automated data streams from digital sources
Scope	Localized, person-specific	Global, mass-scale, affecting millions simultaneously
Agency	Human-controlled (e.g., police, CCTV staff)	Machine-mediated, algorithm-driven
Purpose	Crime prevention, national security	Behavior prediction, marketing, social scoring
Transparency	More visible and accountable	Opaque, often hidden from public understanding
Consent	Often explicit or institutional	Implicit or coerced through digital terms of service
Impacts on Autonomy	Limited to surveillance zones	Pervasive influence on decision-making and social behavior

2. Theoretical Framework

2.1. Michel Foucault and the Panopticon Revisited

Michel Foucault's concept of the Panopticon a metaphor derived from Jeremy Bentham's prison design remains one of the most influential theoretical models in surveillance studies. Foucault used the Panopticon to illustrate how power operates through visibility: the constant possibility of being watched compels individuals to regulate their own behavior. In the digital age, this model is both amplified and fragmented. Surveillance is no longer confined to institutions but dispersed across networks of data collection where users themselves become both observers and the observed. The digital Panopticon operates invisibly, making surveillance ambient and algorithmic. Unlike the traditional model, where authority is centralized, algorithmic surveillance is decentralized and embedded in the design of everyday technologies, creating what scholars call a "polyopticon" of mutual visibility and control.

Surveillance Capitalism (Shoshana Zuboff) Shoshana Zuboff's theory of surveillance capitalism offers a critical economic perspective on how digital surveillance operates. She argues that major tech companies, such as Google and Facebook, extract behavioral data from users to predict and ultimately influence their future actions. This commodification of human experience turns personal data into a new form of capital. Surveillance capitalism thrives on asymmetry: users often have little understanding or control over how their data is collected and monetized. This framework reveals how economic imperatives drive the intensification of surveillance and how individuals are transformed into data subjects whose lives are shaped by algorithmic nudges and behavioral predictions. Algorithmic Governance and Predictive Analytics Algorithmic governance refers to the use of computational systems to make decisions about people and populations. Predictive analytics, in particular, uses historical data to forecast future behavior, risks, or outcomes. These tools are used in domains ranging from criminal justice (e.g., predictive policing) to finance, education, and welfare services. While framed as objective or neutral, algorithms often encode and reinforce biases present in their training data. This creates a feedback loop where disadvantaged groups are more likely to be targeted, monitored, or penalized. Algorithmic governance shifts accountability from human actors to automated systems, raising serious concerns about transparency, fairness, and due process.

2.2. Data Colonialism (Couldry & Mejias)

Nick Couldry and Ulises Mejias introduce the concept of data colonialism to describe how digital surveillance replicates the extractive logic of historical colonialism. In this framework, data collection becomes a form of

resource extraction, where the raw material is not land or labor but human experience. Platforms claim ownership over the data generated by users, often without meaningful consent. This establishes a new kind of colonial relationship where powerful actors extract value from the everyday lives of individuals, especially in the Global South. Data colonialism thus links digital surveillance to global structures of inequality and domination.

2.3. Social Construction of Technology (SCOT)

The SCOT framework emphasizes that technology is not neutral or deterministic but shaped by social, political, and cultural contexts. Surveillance technologies are designed and implemented by actors with specific goals, values, and assumptions. The meaning and use of these technologies are also negotiated by users and institutions. This perspective helps us understand that algorithmic surveillance is not inevitable but the result of social choices. It invites critical reflection on whose interests are served by surveillance systems and how alternative designs could promote greater equity and accountability.

3. Mechanisms of Algorithmic Surveillance

3.1. How Data is Collected: Tracking, Sensors, Platforms

Digital surveillance relies on a vast and often invisible infrastructure for data collection. Every interaction with a digital device clicks, searches, purchases, location data, biometric inputs is tracked, recorded, and stored. Sensors embedded in smartphones, CCTV cameras, wearable tech, and smart home devices continuously collect information about users' movements, preferences, and behaviors. Social media platforms and search engines use cookies, beacons, and tracking pixels to follow users across websites and applications. This data collection is largely opaque to users, making it difficult to understand or control how personal information is being harvested.

3.2. Machine Learning and Predictive Profiling

Once data is collected, it is fed into machine learning algorithms that identify patterns, correlations, and trends. These systems generate predictive profiles that estimate a person's likelihood to behave in certain ways such as buying a product, committing a crime, or defaulting on a loan. Predictive profiling is often justified as a way to optimize decision-making, but it also raises ethical questions about fairness, consent, and agency. Individuals are categorized and acted upon based on statistical probabilities rather than personal knowledge, which can lead to discriminatory outcomes, especially when predictions are treated as objective facts rather than probabilistic assessments.

Table 2: Data Collection Methods in Digital Surveillance

Method	Examples	Primary Function	User Awareness
Device Sensors	GPS, accelerometers, microphones, cameras (in smartphones, wearables)	Collect physical and behavioral data (location, motion, biometrics)	Low
Tracking Technologies	Cookies, beacons, tracking pixels	Monitor web/app activity across platforms	Very Low
Platform Analytics	Google Analytics, Meta Pixel	Collect usage patterns and demographic profiles	Low
Biometric Systems	Face recognition, fingerprint scanners	Authenticate users, monitor physical presence	Moderate (varies by context)
IoT & Smart Devices	Smart TVs, home assistants, smart thermostats	Monitor home environment and user interactions	Low

3.3. Case Studies: Social Media, Smart Cities, Predictive Policing, Workplace Surveillance

In social media, platforms like Facebook and TikTok use algorithms to monitor engagement and tailor content, thereby influencing users' emotions, beliefs, and behaviors. These platforms serve as sites of both self-expression and algorithmic control. In smart cities, surveillance extends to public infrastructure, where facial

recognition, license plate readers, and environmental sensors monitor citizens' movements. Predictive policing programs analyze crime data to anticipate criminal activity, disproportionately targeting marginalized communities and reinforcing systemic bias. In workplaces, employers use digital tools to track productivity, monitor communications, and assess employee sentiment, creating environments of constant observation and performance pressure.

3.4. The Role of Platforms (Google, Meta, Amazon, etc.)

Tech giants like Google, Meta (Facebook), Amazon, and Microsoft function as central nodes in the surveillance ecosystem. Their business models depend on extracting and monetizing user data through targeted advertising and algorithmic personalization. These companies wield enormous influence over how surveillance technologies are developed, implemented, and regulated. They often operate with minimal transparency, controlling vast amounts of personal information without democratic oversight. Their platforms set the terms of engagement for billions of users, shaping not only consumer behavior but also cultural norms, political discourse, and public policy.

Table 3: Applications of Predictive Profiling Across Sectors

Domain	Data Used	Purpose	Key Ethical Concern
Marketing	Purchase history, browsing behavior, demographic data	Predict purchase intent; personalize ads	Manipulation of consumer choices
Finance	Credit history, social media activity, geolocation	Assess creditworthiness, loan approval	Algorithmic bias and redlining
Criminal Justice	Criminal records, neighborhood data, social network analysis	Predict criminal behavior or reoffending risk	Racial profiling; pre-crime logic
Employment	Productivity metrics, keystroke logs, psychometric testing	Hire/fire decisions, promotions, workplace monitoring	Invasion of privacy, loss of autonomy
Healthcare	Wearable data, genetic information, electronic health records	Predict disease risk, personalize treatments	Discrimination, data misuse

4. The Erosion of Privacy

4.1. Redefining Privacy in the Digital Age

The concept of privacy has undergone a significant transformation in the digital era. Traditionally understood as the right to be left alone or to control access to personal information, privacy now intersects with complex systems of data extraction, surveillance, and prediction. In a digital ecosystem where data is continuously generated, often without conscious effort or awareness, privacy is no longer about mere concealment but about the management of one's digital presence. Social media platforms, smart devices, and online services normalize the exchange of personal information for access, convenience, or social connection, eroding the boundary between public and private spheres. In this context, privacy is not just a personal concern it becomes a structural issue tied to the design of digital infrastructures and the economic logics that govern them. The very architecture of the digital world is built to expose, collect, and exploit data, making the protection of privacy an increasingly complex and contested terrain.

4.2. Consent and the Illusion of Choice

One of the central ethical problems in the digital surveillance landscape is the notion of "consent." While companies often claim that users voluntarily agree to terms of service and privacy policies, the reality is more coercive and opaque. These agreements are typically long, dense, and difficult to understand, functioning more as legal shields than meaningful contracts. This undermines the concept of informed consent and replaces it with what scholars call "the illusion of choice." Moreover, even when users do consent, they cannot reasonably anticipate how their data will be combined, analyzed, or sold to third parties. In effect, individuals are enrolled into

a system of surveillance capitalism without true autonomy, raising critical concerns about ethical legitimacy and digital rights.

4.3. Data Commodification and Behavioral Manipulation

In digital capitalism, personal data is not just collected it is commodified. This means that intimate aspects of human life emotions, preferences, movements, relationships are turned into marketable assets. This commodification feeds into behavioral advertising models, where users are targeted with content designed to manipulate choices and behaviors. Algorithms optimize for engagement and profit, not well-being or truth, often leading to manipulative feedback loops. For example, platforms may amplify emotionally charged content to increase time spent on the site, thereby nudging users toward specific emotional or political states. Over time, this manipulation of behavior not only infringes on privacy but also reconfigures the way people think, act, and relate to others. The commodification of data thus becomes a mechanism of soft control, where autonomy is undermined not through coercion but through subtle, algorithmic persuasion.

4.4. Effects on Autonomy and Identity

The erosion of privacy in digital environments has profound implications for personal autonomy and the construction of identity. When surveillance becomes pervasive, individuals may alter their behavior due to the perceived threat of being watched a phenomenon akin to Foucault's notion of self-disciplining in the Panopticon. People may censor themselves, conform to norms, or perform identities that align with platform expectations to avoid scrutiny or algorithmic penalties. Moreover, algorithmic systems often categorize users based on limited data points, reducing the richness and fluidity of human identity to fixed digital profiles. This datafication can distort how individuals are perceived and treated by institutions, potentially affecting access to resources, opportunities, and rights. In essence, digital surveillance systems not only extract value from users but also shape the very conditions under which identities are formed and expressed.

5. Algorithmic Control as Social Control

5.1. Surveillance and Behavior Modulation

Algorithmic surveillance does not merely record behavior it increasingly aims to shape it. Through predictive analytics, recommendation systems, and automated decision-making, surveillance technologies function as tools of behavioral modulation. Platforms learn from user interactions and, in turn, feed users content that reinforces certain patterns of thought or action. This creates an echo chamber effect, where exposure to alternative viewpoints is minimized and behavioral predictability is maximized. In the workplace, for example, performance monitoring software can incentivize overwork or suppress dissent. In policing, predictive tools can influence how officers patrol communities. In all these domains, the goal is not just observation but control subtly influencing individual choices in ways that align with institutional or commercial interests. This transforms surveillance into a powerful mechanism of social engineering.

5.2. Profiling and Digital Exclusion

Algorithmic profiling involves categorizing individuals based on inferred traits, behaviors, and risk scores. While ostensibly aimed at personalization or efficiency, profiling can result in exclusionary practices. Credit scoring algorithms may deny loans to people based on neighborhood data rather than individual creditworthiness. Predictive policing may target specific communities for heightened surveillance based on historical crime patterns, leading to a cycle of over-policing and criminalization. These systems often operate without transparency or recourse, leaving individuals unaware of how they are being profiled or why certain decisions are made about them. Digital exclusion thus emerges not only from lack of access to technology but from discriminatory algorithmic logic that marginalizes certain populations from full participation in society.

5.3. Reinforcement of Existing Inequalities (Race, Class, Gender)

Algorithmic systems often reproduce and reinforce existing social inequalities. Because they are trained on historical data, algorithms can encode societal biases related to race, class, and gender. For instance, facial recognition software has been found to have higher error rates for people of color, leading to wrongful arrests or misidentification. Job recommendation algorithms may prioritize male candidates for leadership roles based on biased historical hiring data. In welfare systems, risk prediction models may disproportionately scrutinize low-income recipients. These outcomes are not accidental; they reflect the structural inequities embedded in both data and design. Far from being neutral, algorithmic systems function as mirrors of social prejudice, amplifying disparities under the guise of objectivity.

5.4. Surveillance of Marginalized Communities

Marginalized communities are often subject to intensified and intrusive surveillance. From predictive policing in Black and Brown neighborhoods to biometric tracking of refugees and welfare recipients, surveillance practices disproportionately affect those with the least power to resist or opt out. These communities become "test zones" for experimental technologies such as facial recognition, drone surveillance, or emotion detection, often without meaningful oversight or consent. Surveillance in these contexts serves not only to monitor but to discipline to enforce compliance with social norms or state control. This asymmetrical surveillance reinforces social hierarchies, where certain groups are hyper-visible and others remain relatively immune from scrutiny. The targeting of marginalized communities through digital surveillance reveals how algorithmic control is deeply entangled with systemic injustice.

6. Public Perception and Resistance

6.1. Normalization of Surveillance: Convenience vs. Control

One of the paradoxes of contemporary digital life is the widespread acceptance even embrace of surveillance technologies. Many users willingly trade personal data for convenience, personalization, or entertainment. Smartphone apps, voice assistants, and smart home devices make life easier, but also deepen the reach of surveillance. This normalization is driven by corporate narratives that frame surveillance as benign or necessary, masking the power dynamics involved.

As surveillance becomes embedded in the mundane, its political and ethical implications are obscured. The convenience-surveillance tradeoff is rarely framed as a real choice, as opting out often means social exclusion or economic disadvantage. Over time, this contributes to the internalization of surveillance as a natural and inevitable part of digital life.

6.2. Privacy Fatigue and Resignation

As surveillance practices become more complex and ubiquitous, many users experience what is known as "privacy fatigue" a sense of exhaustion or helplessness in the face of constant data extraction. Faced with endless terms of service, frequent data breaches, and inscrutable algorithms, individuals may feel powerless to protect their privacy.

This can lead to "resignation," where users continue to engage with digital platforms despite knowing they are being surveilled. Rather than resistance, this produces a passive acceptance of surveillance as unavoidable. Privacy fatigue is not simply a psychological issue but a structural condition, reflecting the lack of meaningful alternatives and the overwhelming nature of digital surveillance infrastructures.

Table 4: The Convenience vs. Control Trade-Off

Digital Service	Convenience Offered	Surveillance Risk	User Agency
Google Maps	Real-time navigation and traffic	Constant location tracking	Limited (location sharing often

	updates		always on)
Amazon Alexa Google Assistant	Voice-controlled smart home features	Audio data constantly collected	Low (difficult to monitor or delete data)
Facebook Instagram	Personalized feeds and social connectivity	Behavioral tracking and ad profiling	Moderate (algorithm not transparent)
TikTok	Short-form video content discovery	Data collection including facial biometrics	Low (privacy settings not easily accessible)
Free Mobile Apps	Entertainment, productivity, utility	Sharing of personal data with third parties	Very Low (opaque terms of service)

6.3. Digital Activism and Resistance (e.g., Encryption, Anti-Surveillance Tools)

Despite the pervasiveness of surveillance, forms of resistance are emerging. Digital activists and privacy advocates have developed tools and strategies to counter algorithmic control. Encryption technologies such as Signal and ProtonMail offer secure communication channels. Browser extensions like Privacy Badger and ad blockers reduce data tracking. Movements advocating for digital rights push for transparency, accountability, and user empowerment. Beyond technological tools, resistance also takes the form of policy advocacy, educational campaigns, and grassroots mobilization. These efforts challenge the narrative of surveillance inevitability and assert that digital systems can and should be designed to respect human dignity and autonomy.

6.4. Policy Responses and Legal Frameworks (e.g., GDPR, AI Act)

Governments and international bodies have begun to respond to the challenges of digital surveillance through policy and regulation. The European Union's General Data Protection Regulation (GDPR) sets global standards for data protection, emphasizing user consent, data minimization, and the right to be forgotten. The proposed AI Act seeks to regulate high-risk AI applications, including those involving biometric surveillance, predictive policing, and automated decision-making. While these frameworks represent important steps toward accountability, enforcement remains uneven, and corporate actors often find ways to circumvent or dilute regulatory efforts. Moreover, in some countries, state surveillance intensifies under the guise of national security or public safety, undermining privacy rights. Thus, the legal landscape remains contested, highlighting the need for ongoing vigilance, advocacy, and transnational cooperation.

Table 5: Overview of Key Legal Frameworks on Surveillance

Law/Regulation	Jurisdiction	Key Provisions	Limitations/Criticisms
GDPR	European Union	Consent, data minimization, right to be forgotten	Loopholes, inconsistent enforcement across EU
AI Act (Draft)	European Union	Regulation of high-risk AI systems including surveillance tech	Not yet enacted; industry lobbying ongoing
CCPA	California, USA	User rights over personal data and opt-out options	Does not fully restrict data collection or use
FISA / Patriot Act	United States	Government surveillance powers (esp. for national security)	Often bypasses user rights; minimal transparency
PIPEDA	Canada	Fair information practices and organizational accountability	Needs updates for AI and real-time tracking

7. Toward Ethical and Inclusive Governance

7.1. Rethinking Transparency and Accountability in AI

As algorithmic systems become increasingly embedded in critical societal domains from finance and healthcare to policing and employment there is an urgent need to rethink how transparency and accountability are operationalized in artificial intelligence (AI). Traditional notions of accountability, which rest on human responsibility, become complicated when decisions are made or mediated by opaque algorithms. Transparency

must extend beyond making code open-source; it involves ensuring that data sources, decision-making processes, and value assumptions are clearly communicated to affected populations. Algorithmic decisions must be explainable, contestable, and auditable. Accountability mechanisms should be built into the lifecycle of algorithmic systems from design and deployment to evaluation and redress so that both developers and institutions are held responsible for harmful outcomes. This rethinking is not just technical; it is fundamentally political and ethical, demanding inclusive governance frameworks that protect public interests over corporate secrecy or state opacity.

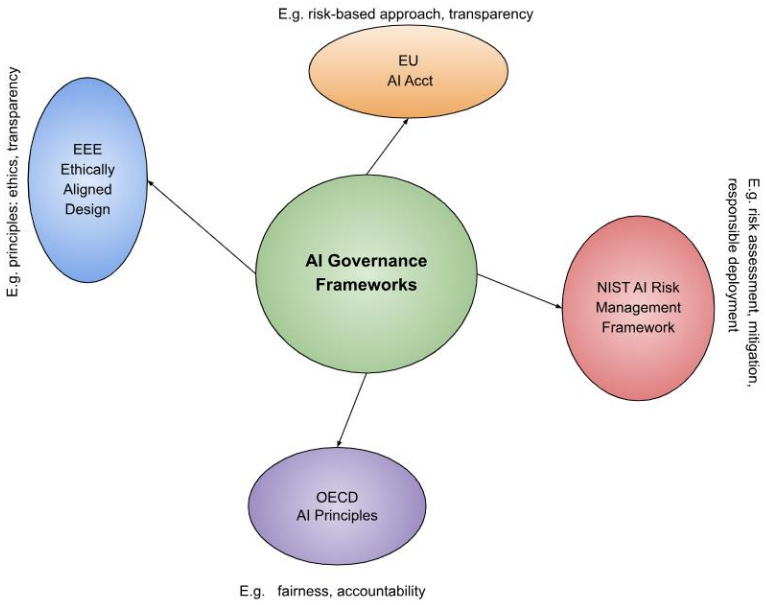

Fig. 1 AI Governance Frameworks

7.2. Democratic Oversight and Participatory Design

Democratizing the governance of surveillance technologies involves creating structures that allow citizens to have a say in how digital systems are developed, implemented, and monitored. Participatory design is one approach that emphasizes the inclusion of diverse stakeholders particularly those who are most affected by surveillance in the design process. Rather than being passive subjects of technological control, individuals and communities should be empowered as co-designers and decision-makers. Democratic oversight mechanisms such as algorithmic impact assessments, public audits, and citizen review boards can provide checks and balances against the unchecked deployment of surveillance tools. These practices foster legitimacy and trust while ensuring that technologies align with societal values and do not disproportionately harm vulnerable groups.

7.3. Alternative Models: Data Trusts, Decentralized Identity

In response to the failures of traditional data governance, alternative models are being explored to redistribute power and control over personal data. One such model is the data trust**,** where an independent fiduciary body manages data on behalf of a community or group of users, ensuring that it is used ethically and for collective benefit. Another promising development is decentralized identity**,** which gives individuals greater control over their digital identities and credentials, allowing them to choose when and how to share their information. These models shift the paradigm from corporate data ownership to community stewardship or self-sovereignty. While still in experimental stages, they offer a vision of a digital future where privacy, dignity, and agency are prioritized over extraction and exploitation.

7.4. The Role of Civil Society and Academia

Civil society organizations and academic institutions play a vital role in challenging the dominant narratives of surveillance and proposing alternative frameworks for data justice. Civil society acts as a watchdog, holding governments and corporations accountable through advocacy, litigation, public education, and coalition-building. Academia contributes by producing critical research, exposing algorithmic harms, and informing policy debates with evidence-based insights. Interdisciplinary collaborations across sociology, law, computer science, and philosophy are particularly important for understanding the complex social, technical, and ethical dimensions of digital surveillance. Both civil society and academia are essential in imagining and building equitable digital futures, grounded in democratic values and human rights.

Fig. 2 AI Regulatory Authority

8. Conclusion

This paper has examined the profound sociological implications of digital surveillance, demonstrating how algorithmic systems are not just technical tools but powerful instruments embedded within existing power structures, economic systems, and cultural norms. As surveillance becomes increasingly data-driven, it reconfigures traditional notions of privacy, autonomy, and governance by commodifying personal information and reinforcing social inequalities. Algorithmic profiling often disproportionately targets marginalized communities, entrenching systemic discrimination under the guise of technological neutrality. Through a sociological lens, it becomes evident that surveillance is a deeply social phenomenon shaped by forces such as capitalism, colonial legacies, and structural injustice. The rise of algorithmic surveillance calls for a rethinking of long-held sociological concerns around identity, agency, and institutional power, especially as new technologies mediate how individuals are categorized, controlled, and understood. To respond to these challenges, it is essential to move beyond individualistic conceptions of privacy and embrace collective frameworks of data justice that emphasize transparency, equity, and accountability. Future research must pay closer attention to how surveillance manifests in different geopolitical contexts, particularly in the Global South where data colonialism continues to expand unchecked. Interdisciplinary approaches and participatory research are crucial in capturing the nuanced ways algorithmic governance affects lived experiences. Policy frameworks must also evolve rapidly to regulate emerging technologies such as generative AI and brain-computer interfaces, ensuring that ethical safeguards are in place before harm is done. Ultimately, the goal must be to strike a balance between innovation and human rights to promote technological advancement without compromising dignity, freedom, and social equity. This requires a

collective shift: from passive surveillance acceptance to active civic engagement, from data extraction models to practices of data stewardship, and from technological determinism to frameworks rooted in ethical and democratic imagination. While algorithmic surveillance poses significant challenges, it is not an unstoppable force. Through critical awareness, informed policy, and collective action, it is possible to envision and build alternative digital futures that are more inclusive, transparent, and just.

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