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# **Women and Artificial Intelligence: Gendered Dimensions of Innovation, Ethics, and Policy**

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## **Abstract**

Artificial Intelligence (AI) is increasingly embedded in social, economic, and political systems. Yet its development and deployment are marked by persistent gender disparities. Women are systematically underrepresented in AI research, policymaking, and corporate leadership, while at the same time facing disproportionate harms from algorithmic bias. This paper interrogates the gendered dimensions of AI through three interlinked themes: (1) women's participation in AI development, (2) gendered impacts of AI systems, and (3) governance frameworks for inclusive innovation. It traces the historical and structural factors that have led to the underrepresentation of women in science and technology, including educational inequalities, workplace discrimination, and unpaid care work. It then examines how biased training data, opaque algorithms, and unregulated deployment produce discriminatory outcomes in fields such as healthcare, recruitment, predictive policing, and content moderation. Using case studies from the European Union, India, and international organizations, the paper assesses current policy responses and highlights their limitations in addressing systemic inequities. It argues for a feminist framework of AI governance grounded in intersectional data audits, participatory design, algorithmic transparency, and substantive representation of women as co-creators of technology. Such an approach moves beyond tokenistic inclusion and reframes women not as vulnerable subjects but as active producers of AI knowledge. By centering gender justice in AI ecosystems, policymakers can ensure that technological innovation advances substantive equality and human rights rather than reproducing old hierarchies in new digital forms.

**Keywords:** Women; Artificial Intelligence; Algorithmic Bias; Feminist Technology; Digital Rights; AI Governance; Gender Justice

## **INTRODUCTION**

Artificial Intelligence has been heralded as the “electricity of the twenty-first century,” a foundational technology transforming everything from supply chains to medical diagnostics.<sup>1</sup> Yet AI is not created in a vacuum; it reflects the social, cultural, and political contexts of its developers. As scholars of science and technology studies have shown, technological systems encode the values of those who design them.<sup>2</sup> Consequently, the persistent gender gap in AI research and industry raises not only ethical concerns but epistemic ones: whose knowledge counts, and whose experiences are excluded?

Women face a dual challenge in the AI ecosystem. On one hand, they remain significantly underrepresented as engineers, data scientists, and policy architects.<sup>3</sup> On the other, they are disproportionately subjected to algorithmic harms ranging from misclassification in facial recognition systems<sup>4</sup> to gendered disinformation campaigns online.<sup>5</sup> This paper situates these challenges within a broader historical and structural analysis of gendered exclusion from science and technology and argues for a rights-based, feminist framework of AI governance.

## **WOMEN’S PARTICIPATION IN AI DEVELOPMENT**

### **A. Structural Barriers to Entry**

Despite decades of efforts to diversify STEM fields, women constitute less than 30 percent of the global AI workforce.<sup>6</sup> Factors contributing to this disparity include gendered stereotypes in

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<sup>1</sup> Andrew Ng, Artificial Intelligence Is the New Electricity, *Stan. HAI Blog* (Oct. 20, 2017), <https://hai.stanford.edu/news/artificial-intelligence-new-electricity>.

<sup>2</sup> See Sheila Jasanoff, *States of Knowledge: The Co-Production of Science and Social Order* 3 (2004).

<sup>3</sup> World Econ. Forum, *Global Gender Gap Report 2024* (2024), <https://www.weforum.org/reports/global-gender-gap-report-2024>.

<sup>4</sup> Joy Buolamwini & Timnit Gebru, Gender Shades: Intersectional Accuracy Disparities in Commercial Gender Classification, *Proc. Mach. Learning Res.* (2018).

<sup>5</sup> U.N. Broadband Comm’n, *Cyber Violence Against Women and Girls: A Worldwide Wake-Up Call* (2015).

<sup>6</sup> World Econ. Forum, *supra* note 3.

education, unequal access to mentorship, implicit bias in hiring, and the disproportionate burden of unpaid care work.<sup>7</sup> These barriers produce a “leaky pipeline,” where women drop out of AI careers at higher rates, especially at senior levels.<sup>8</sup>

This exclusion has epistemic consequences. Research indicates that diversity in teams leads to more robust problem-solving and ethical foresight.<sup>9</sup> Without women’s perspectives, AI systems risk embedding blind spots that reinforce existing inequalities. As Noble argues, “Algorithms are not abstract; they are products of a social system that privileges some groups over others.”<sup>10</sup>

## **B. Tokenism Versus Substantive Inclusion**

Corporate diversity initiatives often emphasize numeric representation without altering decision-making power structures. Women may be included on advisory panels but excluded from actual code-writing or strategic governance roles.<sup>11</sup> A feminist approach demands not just inclusion but influence—women shaping the goals, metrics, and ethical parameters of AI projects.

# **ALGORITHMIC BIAS AND GENDERED HARMS**

## **A. Biased Training Data**

Most AI systems rely on large datasets scraped from historical records or online content. When these datasets reflect past discrimination, the resulting models perpetuate it. For example, recruitment algorithms trained on historical hiring data have been found to downgrade résumés

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<sup>7</sup> UNESCO, *Cracking the Code: Girls’ and Women’s Education in STEM* (2017).

<sup>8</sup> AnitaB.org, *Top Companies for Women Technologists 2023* (2023).

<sup>9</sup> Scott E. Page, *The Difference: How the Power of Diversity Creates Better Groups, Firms, Schools, and Societies* 7 (2007).

<sup>10</sup> Safiya Umoja Noble, *Algorithms of Oppression: How Search Engines Reinforce Racism* 2 (2018).

<sup>11</sup> Id.

containing female-coded terms such as “women’s chess club.”<sup>12</sup> In healthcare, AI diagnostic tools trained primarily on male patients can under-detect conditions in women.<sup>13</sup>

## **B. Intersectionality Matters**

Gender does not operate in isolation. Women of color, LGBTQ+ women, and women with disabilities often experience compounded harms from AI systems. Buolamwini and Gebru’s seminal study showed that commercial facial recognition systems misclassified darker-skinned women at error rates of up to 34 percent compared to less than one percent for lighter-skinned men.<sup>14</sup> This highlights the need for intersectional data audits rather than a single “gender” metric.

## **C. Surveillance and Online Safety**

AI also shapes women’s experiences online. Automated content moderation systems may fail to remove gendered hate speech or, conversely, over-censor feminist activism.<sup>15</sup> Predictive policing algorithms have been criticized for targeting marginalized neighborhoods, where women often bear the brunt of surveillance in public spaces.<sup>16</sup> Without gender-sensitive oversight, such systems can exacerbate existing vulnerabilities.

# **POLICY AND GOVERNANCE RESPONSES**

## **A. European Union’s Artificial Intelligence Act**

The European Union’s draft Artificial Intelligence Act classifies AI systems by risk level and mandates transparency, human oversight, and conformity assessments for high-risk

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<sup>12</sup> Jeffrey Dastin, Amazon Scraps Secret AI Recruiting Tool That Showed Bias Against Women, *Reuters* (Oct. 10, 2018), <https://www.reuters.com/article/amazon-ai-bias-idUSKCN1MK08G>.

<sup>13</sup> Irene Y. Chen et al., Why Is My Classifier Discriminatory?, *NeurIPS Conf.* (2018).

<sup>14</sup> Buolamwini & Gebru, *supra* note 4.

<sup>15</sup> Sarah Myers West, Censored, Suspended, Shadowbanned: Algorithmic Moderation and Feminist Activism, *Feminist Media Stud.* (2020).

<sup>16</sup> Rashida Richardson et al., Dirty Data, Bad Predictions: How Civil Rights Violations Impact Police Data, Predictive Policing Systems, and Justice, *N.Y.U. L. Rev. Online* (2019).

applications.<sup>17</sup> While the Act references “fundamental rights,” it does not explicitly require gender impact assessments. Feminist legal scholars argue that without binding equality metrics, risk-based regulation may normalize biased systems.<sup>18</sup>

## **B. India’s National Strategy for AI**

India’s National Strategy for AI—branded “AI for All”—emphasizes inclusion and ethical use.<sup>19</sup> However, it lacks enforceable obligations on gender equity, focusing instead on economic competitiveness. This gap is significant given India’s gendered digital divide, where women are less likely to have access to smartphones, digital skills, and financial technology.<sup>20</sup>

## **C. International Norm-Setting**

UNESCO’s 2021 *Recommendation on the Ethics of Artificial Intelligence* urges states to “promote gender equality and counter stereotypes in digital spaces.”<sup>21</sup> The UN High-Level Panel on Digital Cooperation likewise calls for gender mainstreaming in tech governance.<sup>22</sup> Yet implementation remains fragmented, with few mechanisms for accountability or civil society participation.

# **TOWARD A FEMINIST FRAMEWORK FOR AI GOVERNANCE**

## **A. Intersectional Data Audits**

Governments and corporations should mandate intersectional audits of training data and model outputs. These audits would examine how algorithms perform across different gender, race,

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<sup>17</sup> Proposal for a Regulation of the European Parliament and of the Council Laying Down Harmonised Rules on Artificial Intelligence (Artificial Intelligence Act), COM (2021) 206 final.

<sup>18</sup> Anna Artyushina, The EU Artificial Intelligence Act: A Feminist Critique, *Eur. J. Women’s Stud.* (2023).

<sup>19</sup> NITI Aayog, *National Strategy for Artificial Intelligence – #AIForAll* (June 2018), <https://www.niti.gov.in/ai-for-all>.

<sup>20</sup> GSMA, *The Mobile Gender Gap Report 2023* (2023).

<sup>21</sup> U.N. Educ., Sci. & Cultural Org., *Recommendation on the Ethics of Artificial Intelligence* (2021), <https://unesdoc.unesco.org/ark:/48223/pf0000381137>.

<sup>22</sup> U.N. Sec’y-Gen., *The Age of Digital Interdependence: Report of the UN High-Level Panel on Digital Cooperation* (2019).

class, and ability categories.<sup>23</sup> Without such granular analysis, bias remains hidden behind aggregate accuracy scores.

## **B. Participatory Design**

Women must be engaged not merely as test subjects but as co-designers of AI systems. Participatory design methods, borrowed from human-computer interaction, can incorporate user perspectives into early stages of model development.<sup>24</sup> This approach democratizes expertise and surfaces ethical concerns before deployment.

## **C. Algorithmic Transparency and Explainability**

Black-box algorithms hinder accountability. Feminist frameworks emphasize the right to explanation, enabling affected individuals to challenge adverse AI decisions.<sup>25</sup> Transparency should extend beyond source code to include decision rationales, data provenance, and potential impacts on vulnerable groups.

## **D. Substantive Representation in Governance**

National AI councils, corporate ethics boards, and international standard-setting bodies should include women in decision-making positions with real authority. Quotas may be one mechanism, but structural reforms—such as funding women-led AI research labs—are essential for sustained impact.<sup>26</sup>

# **RECONCEPTUALIZING WOMEN IN AI ECOSYSTEMS**

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<sup>23</sup> Inioluwa Deborah Raji et al., Closing the AI Accountability Gap: Defining an End-to-End Framework for Internal Algorithmic Auditing, *ACM FAccT* (2020).

<sup>24</sup> Elizabeth F. Churchill, Participatory Design: How Participatory is it?, *ACM Interactions* (2021).

<sup>25</sup> Bryce Goodman & Seth Flaxman, EU Regulations on Algorithmic Decision-Making and a “Right to Explanation,” *A.I. Magazine* (2017).

<sup>26</sup> World Bank, *Women, Business and the Law 2024* (2024).



Prevailing discourses often frame women primarily as “vulnerable users” needing protection from algorithmic harms. While protection is crucial, this framing can reinforce paternalism and obscure women’s agency. A feminist approach reframes women as knowledge producers and innovators, whose lived experiences enrich AI design and governance.<sup>27</sup> Such a shift aligns with a broader human-rights-based vision of digital transformation.

## **CONCLUSION**

The ethics of AI cannot be gender-neutral. Without intentional efforts to address structural exclusion and algorithmic bias, AI will reproduce existing hierarchies in new, digital forms. Conversely, integrating feminist principles—intersectional audits, participatory design, transparency, and substantive representation—offers not only a corrective but also a pathway to more innovative and equitable technologies.

As governments, corporations, and international bodies race to regulate AI, centering women’s rights and expertise is not an optional add-on but a prerequisite for legitimate, trustworthy, and socially beneficial innovation.

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<sup>27</sup> Sasha Costanza-Chock, *Design Justice: Community-Led Practices to Build the Worlds We Need* 10 (2020).