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GENDER INEQUALITY IN ARTIFICIAL INTELLIGENCE: FEMINIST POLITICAL ECONOMIC APPROACH

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Abstract

This paper aims to comprehensively explore the multifaceted dimensions of gender inequality within the digital economy shaped by AI. It goes beyond treating gender merely as another "variable" in the analysis. Instead, it positions gender as a central category and a lens, along with Nancy Fraser's (2008) 'Triple Axe of Justice' framework through which it scrutinises the heteropatriarchal aspects of the economic system and economic theory. This perspective reveals that gender plays a pivotal role in the global functioning of the economy, influencing structures of acknowledgement, redistribution, and representation. A feminist political economic approach to AI introduces a crucial perspective, one that not only addresses the gendered dimensions of AI but also examines the broader societal implications through the critical lens of political economy. Leveraging works of varied feminist political economic scholars, this paper delves into the interconnected economic, cultural, and political dimensions of AI from a feminist perspective. It explores how economic inequalities, cultural misrecognition, and political misrepresentation intersect within AI systems, shaping the experiences of different social groups. It also examines the commodification of care work through AI systems and disproportionate gendered divisions of labour. This paper explores AI's amplification of existing gender biases within a technoculture that systematically sidelines women through lapses in design and data. The narrative ultimately aims to invoke a call for a transformative force capable of harnessing AI to use its power to bridge gender gaps and reshape societal norms.

Keyword: artificial intelligence, feminist political economy, social risks of AI, gender inequality, nancy fraser.

1.INTRODUCTION

In recent years, public discourse surrounding the rapid advancement of artificial intelligence (AI) has been characterised by a palpable mix of fascination and apprehension. The transformative potential of AI technologies has sparked widespread discussions, focusing recently towards the possible social risks associated with their deployment. The narratives often revolve around job displacement, algorithmic bias, privacy invasion, and the ethical implications of intelligent systems. With these undoubtedly pivotal concerns, a comprehensive exploration into a nuanced feminist lens—one that brings forth critical insights often overlooked in mainstream discussions becomes necessary.

Delving into the gendered nature of technology became important just after recognizing the relationship between women and technology. As Sandra Harding (1986, p. 29 cited in Ernst & Horwath 2014) articulates, feminist critiques of science progressed from posing the 'woman question' in science to a more radical inquiry, the 'science question' in feminism. Rather than focusing on how women could achieve more equitable treatment within and by science, the emphasis shifted to questioning how a science deeply entwined with distinctly masculine projects could be utilised for emancipatory purposes. In tandem, theorists started scrutinising the processes involved in the development and use of technology, as well as those contributing to the constitution of gender and their access to it.

The post-feminist literature's optimism is encapsulated in Donna Haraway's (1985) cyborg metaphor,

suggesting that technology is an integral part of our collective identity. Viewing technology as inherent to our identity and embodiment, the concept of cyborgs becomes a tool for reshaping gender relations in technoscience. While Haraway sees potential for radical political transformations through advancements in technoscience, some misinterpret her work as an uncritical embrace of everything digital (Agenjo-Calderón & Gálvez-Muñoz 2019).

Undoubtedly, women actively shape hybrid, transgendered identities through their engagement with new media, such as diary writing on web logs. However, the fluidity of gender discourse in the virtual realm is constrained by the tangible, lived gender relations of the material world, especially with AI trickling down into varied fields. In the past two decades, Technofeminism, a burgeoning area that integrates feminism and Science and Technology Studies (STS), has emerged as a distinctive field. Feminist discourse within STS has actively theorised the interconnected nature of gender and technology, portraying it as a relationship characterised by mutual shaping and working towards gender equality in the technological landscape (Wajcman 2010). This essay will draw upon literature by prominent political economy scholars in the field of feminism, establishing connections with the insights offered by contemporary techno-feminist writers from the new age.

2. NANCY FRASER'S FRAMEWORK

Artificial intelligence technologies aim to simulate or replicate human cognitive abilities, enabling machines to process information, adapt to changing circumstances, and improve performance over time. This is cause for concern as society readily adopts technologies characterised by databases, classification systems, and algorithms, which remain concealed and elusive. Viewing digital technology as unparalleled, groundbreaking, and inherently positive is a common perspective, leading to the natural assumption that every technological advancement carries social benefits. Recognizing that innovations are performative, historically shaped, subjective, emerging, and indicative of established cultural norms is crucial (Balsamo 2011). Instead of adhering to a simplistic notion of linear progress, innovations might articulate distinctions and nuances within societal contexts.

2.1. Redistribution (Economic Justice)

The economic ramifications of AI, encompassing prospects of job displacement, automation, and economic disparity, align closely with the axis of redistribution. The transformative potential of AI in reshaping labour markets raises apprehensions about the impact of automation on certain care-related tasks and the need to ensure that technological advancements do not further exacerbate existing care inequalities. Traditional economic metrics often fail to capture the value of unpaid care work (Elson 2002). AI's impact on the economy further excludes this form of work, contributing to the invisibility of caregiving responsibilities within economic analyses and policies.
Fraser's (2021) work on the concept of "The Crisis of Care" provides a foundation for understanding and addressing the complex issues with AI surrounding care within feminist political economy. Fraser argues that care work, traditionally associated with women and often performed within the private sphere, has been systematically undervalued and overlooked in economic and political discussions. This includes tasks related to caregiving, nurturing, and maintaining the well-being of individuals and communities. As societies undergo economic changes, there is a trend towards the marketization of care services (Bakker 2007). The introduction of AI into care services can be seen as part of this. It involves outsourcing care work to the market, where it becomes commodified and subject to market forces (Lokot & Bhatia 2020). Fraser critiques this shift, arguing that it can exacerbate existing inequalities and devalue the significance of care relationships. In today's relevant debates, this raises questions about who has access to AI-driven care services, the potential exploitation of AI in profit-driven care models, and the overall impact on the quality and equity of care. Applying AI in care settings also introduces ethical questions about privacy, consent, and the role of human connection in caregiving (Bettio, Della Giusta & Di Tommaso 2017) (Maras, & Alexandrou 2019).

Women also face a slightly elevated risk of job displacement due to automation. This is attributed to the fact they often occupy roles involving a higher

degree of routine and repetitive tasks making them vulnerable to substitution, such as clerical support or retail jobs, in comparison to men (Lawrence, 2018; Schmidpeter and Winter-Ebmer, 2018; Brussevich et al., 2019).

Hannah Arendt (1958,1998), sceptical of automation and AI, expressed her reservations shortly after Alan Turing's (1950) exploration of whether machines can think. She acknowledged the perceived significance of automation and AI in advancing progress but questioned whether these technologies should be considered the defining elements of prosperity. Arendt emphasised the utmost importance of human plurality derived from our uniqueness, asserting that unpredictable political and creative potentials arise from such distinctiveness, crucial for social transformation. Technologies that jeopardise this plurality, she argued, pose a threat to the potential for social transformation and the ability to rectify injustices.

Algorithms that allow staff to be hired through a standardised selection procedure reiterate these fears. Datasets may be fed into the AI system in such a way that there is a broader discrimination towards women since they hold employment histories that are non-standardized whereas shift in favour of makes with traditionally normative careers. Women's representation in the information technology, electronics, and communications (ITEC) sector lags significantly behind their overall workforce participation (Ernst & Horwath, 2014). Amazon, a prominent technology company, faced a setback when it decided to discontinue its in-house AI recruitment technology. The algorithm, unable to prevent the systematic downgrading of women's profiles for technical positions, posed a significant challenge. Similar to many AI recruitment systems, Amazon's algorithm evaluated CVs over the past decade and those of individuals who were already employed. Using this data, it identified the most 'successful' candidate profile. Due to the limited representation of women in technical roles at Amazon, the algorithm's preference for male candidates further exacerbated existing patterns of sex segregation within the company (Lavanchy 2018). Globally too, only 22% of AI professionals are female, in stark contrast to the 78% who are male, according to the World Economic Forum (2018). In the EU and the United Kingdom, only 16 % of all AI-skilled individuals are women (LinkedIn 2019).

2.2. Recognition (Cultural Justice)

Cultural justice, as conceptualised by Fraser, entails acknowledging and appreciating a variety of identities, experiences, and knowledge forms. In the realm of AI, concerns about bias, discrimination, and fairness come to the forefront. If AI systems are trained on skewed data or lack diverse perspectives in their development, they have the potential to perpetuate and worsen current social inequities. The gender imbalance in the development process results in technologies that do not adequately consider diverse perspectives, needs, and potential impacts, further reinforcing gender inequality. Judith Butler (1990) is primarily known for her contributions on how gender identities are constructed and performed within social and cultural contexts. While her work is not explicitly focused on feminist political economy, her insights can be applied to discussions around AI. Her ideas encourage a questioning of rigid gender binaries embedded in algorithms. Her work critiques essentialist views of identity and emphasises the contingent and performative nature of gender. Applying this perspective to AI debates prompts questions about who defines gender categories in AI, what data is used for training, and how these choices impact the construction of gender within AI systems (Drage and Frabett, 2023).

The prevalence of male involvement in AI work and design creates a reinforcing cycle in which biases become ingrained in machine learning systems. A study evaluating three prominent gender classifiers in facial recognition technology—developed by IBM, Microsoft, and Face++—revealed that these systems are more accurate in recognizing male faces than female faces, with error rate differences ranging from 8.1% to 20.6%. The highest error rates, indicating less accurate performance, were observed for darker female faces, ranging from 20.8% to 34.7% (Buolamwini and Gebr, 2018)(Scheuerman, Pape & Hanna 2021).

Word embedding models depict semantic relationships through vector addition and similarity, showcasing their effectiveness in solving analogy puzzles. For instance, recognizing that ‘Japan’ is to ‘Paris stands to France’ as

'Tokyo stands to x'. Yet, examples like 'man stands to woman as computer programmer stands to x,' resulting in the stereotypical response of 'homemaker', show us how stereotypical associations can be reproduced (Bolukbasi, Chang, Zou, Saligrama & Kalai 2016).

In the realm of digital/virtual assistants like Alexa, Cortana, and Siri, intentional incorporation of female features, including names and voices, presents them as helpful, sympathetic, and pleasant (Bartoletti & Xenidis, 2023). These assistants perform tasks traditionally associated with secretarial roles, such as scheduling and setting reminders (Catalyst 2019; West, M., et al., 2019). The deliberate feminization of these voice assistants is noteworthy, especially given their ubiquitous presence and the increasing reliance on hands-free, voice-based human-computer interaction (West M., et al., 2019). This design choice reinforces gendered notions, portraying women as subservient and always available at the touch of a button (West M., et al., 2019). In translating sentences related to professions from non-gendered to gendered languages, Google would offer only one stereotypical translation, even if there were feminine and masculine forms available. The algorithm tended to choose the pronoun most frequently associated with that profession, inadvertently reflecting a biased perspective (Kuczmarski 2018 as cited in EIGA 2021).
At different stages of development of an AI system, gender biases infiltrate. It would be impossible to claim that algorithms that support automated decision-making are neutral, devoid of biases towards women (EIGA 2021).

2.3. Representation (Political Justice)

While technology envelops us in every aspect of life, crucial questions remain about how this technology is crafted, who reaps its benefits, and who does not. Despite the persistent discourse on women's opportunities in the evolving knowledge economy, men still overwhelmingly hold sway in technical fields (Grabham, Cooper, Krishnadas, & Herman 2008). This has built a technoculture and technocracy that has consistently marginalised women denying them positions of leadership and power. A political justice approach, with recent movements like 'Data Feminism' and 'Design Justice' (Costanza-Chock 2020) have emerged to critically analyse technology, aiming to foster greater equity in technological practices. Labour market economists commonly attribute sex segregation practices to variations in human capital, the disproportionate burden of domestic responsibilities on women, and instances of employment discrimination (Becker, 1971).The burden is on the institutions of technoscience to create inclusivity with structures that can accommodate women.

2.3.1 Design Justice

Michel Foucault's (1997b) lectures on "governmentality" underline the risk to freedom and autonomy posed by passive engagement with technology. Foucauldian critique can be used not to outright reject the current state of AI but to prompt reflection on the conditions such as design that allow technologies to curtail users' control over discourse and manipulation.

like technologies vary, the design process is inherently subjective, shaped by the narratives and beliefs of the designer, the community they are part of, and the era in which they exist. Participatory design (PD) is an approach for 'democratisation of technology' to enhance technological systems by incorporating future users into the design process (van der Velden & Mörtberg 2014). Its primary motivation is to empower users and create systems better aligned with their needs. PD exemplifies a novel form of technological citizenship (Winner 2013b). Unless gender issues in the design process are recognised and dealt with, there exists a strong possibility of gender inequalities being built into the technology itself ' (Asaro 2000, p.346)

Feminist scholar Donna Haraway (1991) had theorised that technology will intertwine our bodies with it. This can be visualised in the modern world by the introduction of Google Glasses and Facebook's acquisition of the Oculus Rift, an immersive virtual reality headpiece. Our techno-biological futures could have very minimal control if we don't keep checks and balances on such endeavours (Srinivasan, 2019).

2.3.2 Data Feminism

Sally Haslanger (2012, 2018, 2019) formulated a perspective known as materialist feminism, which underscores the interconnected roles of material

resources and social meanings in generating social injustice. This viewpoint draws attention to the interplay between technical concerns, like gender-related biases in algorithms and datasets, and the intricate material and social frameworks that give rise to and shape their consequences. Haslanger formulates a comprehensive theory delineating the production and reinforcement of social injustice, applying it to scrutinise racism and misogyny (Haslanger 2017b) while proposing strategies for resistance. As a materialist feminist, she underscores that the social world is inherently material. Initially, social justice, according to Haslanger, primarily involves averting material harms and deprivation, extending beyond economic injustices and violence to encompass marginalisation, powerlessness, and cultural imperialism (Haslanger 2017a; Young 1990). Rejecting the purely symbolic nature of these oppressions, Haslanger contends they impose social and material constraints systematically limiting certain individuals' opportunities to meet needs, express experiences, and develop capacities for a fulfilling life (Young 1990). Furthermore, she argues that social injustice results from an intricate interplay between material conditions and culture rather than isolated cultural or social factors.

Currently, feminist political economy scholars need to scrutinise whose data is collected by whom and for what purpose within the global circuits of surveillance capitalism. A study was conducted in collaboration with DAWN (Chami, Bharati, Mittal, & Aggarwal 2021), which aimed to embark on a feminist political economy examination of data policies and practices by closely analysing the erosion of privacy and data autonomy within the menstrual apps market. It sought to explore how self-data tracking practices shaped data subjectivity, along with examining the policy dimensions of data processing by platform companies, particularly from the Global South. Notably, data privacy emerged as a significant concern in the aftermath of AI. Not only that, but the menstruating body of a woman was dematerialized for data to amplify the economy's capitalist value.

Such studies of new algorithmic technologies acknowledge the critical importance of addressing societal questions but even so, 'AI scientists continue to demonstrate a limited understanding of the social' (Joyce et al., 2021, p. 5).

Women's lives end up at a serious economic disadvantage when datasets that are biased towards the male gender are used for hiring, promoting and compensating. This does not only have negative impacts on women, but also business and economies. A study by Gartner. Inc. said that "By 2022, 85% of AI projects will deliver erroneous outcomes due to bias in data, algorithms or the teams responsible for managing them. This is not just a problem for gender inequality – it also undermines the usefulness of AI" (Niethammer 2020) Feminist economies must confront the impacts of new technologies on their lives through building collective agency. Iris Marion Young's framework of 'Politics of Difference' ; challenging the reduction of social justice to distributive justice (1990), Chandra Mohanty's concept of 'Transnational Feminist Solidarity'; a discussion of gender warrants decolonizing knowledge and practising anticapitalist critique (2007) and Nancy Fraser's 'Participatory Parity'; justice requires individuals and groups to interact on an equal footing with each other (Armstrong & Thompson 2009) are especially relevant for shaping policy frameworks to address structural biases in AI, particularly those impacting women in labour and the economy. Now, more than ever, is the opportune moment for women to unite, drawing inspiration from these frameworks, and collectively demonstrating solidarity. It is crucial to recognize that if AI has contributed to these gaps, it also presents an opportunity for us to leverage AI strategically, closing these disparities and fostering a more inclusive and equitable landscape for women in labour and the broader economic context.

Women have played varied roles in society such as being a consumer, an employer, a caregiver and even an agent of political change. Ideals of femininity keep changing, and thus the challenge to address the growing inequality between these ideals and the notions of gender needs to be addressed.

3. CONCLUSION

While scholars are acknowledging the social significance that digital transformation holds, public debates still lack discourse on the gender-specific effects, especially on women in the labour market. Artificial intelligence mimics data from patterns. If the dataset itself is biased

or there is bias in assigning the creators of the algorithm, it is inevitable to escape the inherent bias that the AI system will hold. Economic disparities are created when these algorithms are used for recruitment, amplifying gender inequalities in society. The bias in AI perpetuates a cycle where fewer women enter the field, contributing to the shortage of women in AI, which, in turn, reinforces biases in the technology.

A critical approach moves beyond the conventional discourse, uncovering hidden power structures, economic inequalities, and societal imbalances challenged by AI technologies. By situating AI within the framework of feminist political economy, we gain a more comprehensive understanding of the multifaceted social risks that extend beyond the immediate concerns dominating public narratives. The systematic exclusion of women and feminist activists from online spaces, despite the profound impact of science, technology, algorithms, Big Data, and artificial intelligence on their lives and the feminist movement, requires urgent attention. Addressing this gap should coincide with the establishment of a rights-based internet governance regime through fostering public debate (Gurumurthy & Chami, 2017). These new AI technologies primarily sift through existing information instead of facilitating the generation, communication, or contemplation of new content. This might create economic value but will inadvertently decrease social value.

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