Legal and Ethical Reform for Gender-Inclusive AI: Addressing Invisible Symptoms and Biased Algorithms*

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Abstract

To enhance diagnostic accuracy and treatment efficiency, Case-Based Reasoning (CBR) systems are increasingly used in clinical decision support tools. However, this study is motivated by growing concerns that CBR systems often rely heavily on historical patient data. When past cases are predominantly male-oriented or reflect entrenched gender stereotypes in medical practice, CBR systems can misclassify or underdiagnose women's health conditions. Despite the widespread use of CBR, existing literature lacks sufficient analysis of its gendered implications from a legal and ethical perspective. This study addresses that gap by critically assessing how CBR systems perpetuate gender inequality in medical fields such as cardiovascular disease, pain management, and neurodevelopmental disorders. For example, heart disease is traditionally diagnosed based on male symptoms, leading to misdiagnosis in women; women's pain is often undertreated; and ADHD is frequently underdiagnosed in girls. Employing a qualitative methodology, this research draws on international human rights instruments such as the Convention on the Elimination of All Forms of Discrimination against Women (CEDAW) and Sustainable Development Goal 5 to evaluate the regulatory risks of algorithmic bias. The findings highlight how male-centric data, biased case selection, and gender-insensitive similarity measures contribute to health disparities. By integrating legal mandates with ethical AI design principles—and emphasizing inclusive data practices, transparent case selection, and gender-sensitive similarity metrics—this paper proposes a pathway toward the development of AI systems in medical contexts that are equitable, accountable, and gender-aware.

Keywords: Case-Based Reasoning (CBR) System, Artificial Intelligence (AI), AI Ethics, AI in Healthcare, Gender Equality.