

A Bibliometric Analysis of Gender Stereotypes in AI

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Abstract. Artificial intelligence became an important part of current learning and work procedures. With its generalization, new challenges emerge such as the formulation of specific ethics rules and intended purposes and the integration of its use in the extant set of generally accepted norms and principles. The present paper integrates in the research area focused on gender stereotypes in artificial intelligence by providing a bibliometric analysis of the articles published in Web of Science on this topic. Using Vos Viewer as analysis instrument, the paper is a structured study of the literature that puts in evidence the main concepts and themes treated so far in this field, the interest shown by the academic community in each of the previous years and in different geographical zones to this topic and the main directions in the evolution of the research on gender stereotypes in artificial intelligence. The paper highlights the importance and interest for this subject and presents a twofold contribution to the literature. By creating a synthesis of the main conclusions of the previous research, it allows a quick understanding of the state of the art for researchers, academics and practitioners in the field. It also provides a basis for developing new research topics related to gender bias and its mitigation strategies in AI, as well as with the integration of this aspect within the research aiming to balance security and data protection in AI within the business environment.

Keywords: Gender stereotypes, Generative AI, bibliometric analysis, diversity, perception, regulatory actions.

Introduction

Artificial intelligence technologies are increasingly embedded in systems that influence human lives, from hiring algorithms to virtual assistants. As AI becomes more prevalent, concerns have emerged regarding the reproduction and amplification of societal biases, particularly gender stereotypes within these systems (Belanche wt al., 2019; Pelau et al.; 2024; Barbul et al., 2022). A growing body of literature has examined the ways in which gender bias permeates AI design, training data, applications, and societal impact (Delgosha & Jhajiheydari, 2020; Flavian et al., 2024; Loureiro et al., 2023). However, while many individual studies have investigated aspects of gender stereotypes in AI, there has been limited synthesis of this research field. This study presents a bibliometric analysis of the scientific literature on gender stereotypes in AI, using VOS viewer to visualize and interpret patterns in authorship, keyword co-occurrence and thematic evolution. Bibliometric methods provide a quantitative framework for mapping the development and structure. By applying this method, we aim to identify key contributors, research clusters, and gaps in the literature that can inform future interdisciplinary inquiry.

The findings of this analysis contribute to a clearer understanding of how the academic community has engaged with the issue of gender stereotypes in AI, and how this engagement has evolved over time. This overview is intended to serve researchers, policymakers, and developers seeking to navigate and address gender bias in emerging AI systems.

Literature review

Stereotypes of gender in AI

The intersection of AI and gender studies has become an increasingly important field of research in recent years. As AI technologies proliferate in various sectors, it has become evident that they can both reflect and reinforce societal biases, including those related to gender. Gender stereotypes, deeply embedded in cultural, social, and historical contexts, are often inadvertently encoded into AI systems, influencing outcomes and perpetuating inequality (Ahn et al., 2022; Dang et al., 2023; Liu & Shi 2025).

Gender stereotypes can significantly affect AI development by introducing biases in training data and algorithms, leading to discriminatory outcomes. Additionally, the lack of diversity among AI developers and the reinforcement of stereotypes through user interactions can perpetuate societal inequalities, highlighting the need for ethical guidelines and diverse, inclusive AI development practices. The widespread adoption of intelligent virtual assistants (IVAs) has introduced new challenges, such as ethical guidelines and integration with existing norms, with this study examining how gender and ethnolinguistic stereotypes in IVA voices impact user trust (Cameron et al., 2025; Pelau et al., 2025; Cui & Zhong 2023; Van Doorn et al., 2017). The appearance-based stereotypes significantly influence the portrayal of women in financial reports, with images often reflecting societal stereotypes and economic conditions rather than deliberate corporate strategies (Jeldes-Delgado et al., 2024). Gen-AI has rapidly become a cornerstone technology, significantly influencing digital business and IT industries, necessitating more empirical research to understand its comprehensive effects on operations, organizational structures, and human resource management (Teng et al., 2025; Pop et al., 2023).

Thematic mapping and VOS viewer visualizations reveal the need for inclusive, interdisciplinary research on gender bias in AI, emphasizing intersectional perspectives and ethical principles throughout the AI lifecycle. Computer Science (CS) must evolve its educational approaches to attract and retain diverse students, particularly from underrepresented gender groups, by integrating interdisciplinary programs that resonate with their unique interests and skills (Happe et al., 2025). Adopting intelligent virtual assistants, addressing appearance-based stereotypes, evolving computer science education, and understanding Gen-AI's impact highlight the need for ethical guidelines, societal norms, and interdisciplinary approaches to foster trust, diversity, and innovation in technology and research.

Methodology

A bibliometric analysis provides a systematic approach to assessing the research work produced in this domain, helping to identify key trends, major authors, and influential publications. By mapping the evolution of research on gender stereotypes in AI, such an analysis sheds light on the methodologies employed, key findings, and emerging research gaps. This paper presents a bibliometric analysis of 127 papers to explore existing literature on the intersection of gender, stereotypes, and AI, aiming to evaluate the scope of current research, its focus areas, and potential directions for future inquiry. Through this analysis, we seek to answer topics such as major themes

that dominate the literature on gender stereotypes in AI, researchers leading the discourse on this subject, evolution of the field over time and identification of trends, and the key research gaps that need further exploration to address the challenges of gender bias in AI systems. We claim to set the stage for a deeper investigation into the body of work addressing gender stereotypes in AI, offering insights into both the progress made and the challenges that remain in mitigating bias within AI systems.

This study conducts a bibliometric analysis of literature on gender stereotypes in artificial intelligence, employing VOS viewer to visualize research trends, keyword co-occurrence and citation patterns. Using data extracted from Web of Science, between 2014 and 2025, the analysis identifies key thematic clusters, influential authors, prolific institutions, and leading countries contributing to this growing field. Results show a notable surge in publications, paralleling increased global concern over algorithmic bias and ethical AI. Thematic mapping reveals core clusters focused on topics such as gender bias in machine learning, diversity in datasets and societal dynamics of algorithm design. VOS viewer visualizations indicate a strong interdisciplinary nexus with collaborations bridging computer science, gender studies and ethics. This study highlights the evolving conversation around gender stereotypes in AI and emphasizes the need for inclusive, cross-disciplinary research approaches to ensure more equitable and socially responsive AI development.

Results

The analysis of gender stereotypes in AI provides a comprehensive overview of the evolving research landscape, shedding light on trends, key topics, and global contributions. By examining publication data over the years, it is evident that interest in this subject has significantly increased, particularly from 2020 onwards. The analysis also highlights the interdisciplinary nature of the research, spanning fields such as computer science, business, communication, and ethics, among others. Furthermore, the geographic distribution of contributions underscores the USA's leadership in this area, complemented by notable efforts from European nations and emerging economies. These findings set the stage for a deeper understanding of how gender biases in AI are being explored and addressed globally.

The bibliometric analysis of gender stereotypes in AI reveals a significant growth in research over the years, peaking in 2024 with 61 studies. While earlier years, such as 2014 and 2019, show minimal activity, there has been a clear surge in interest and publications from 2020 onward. These results can be observed in figure 1.

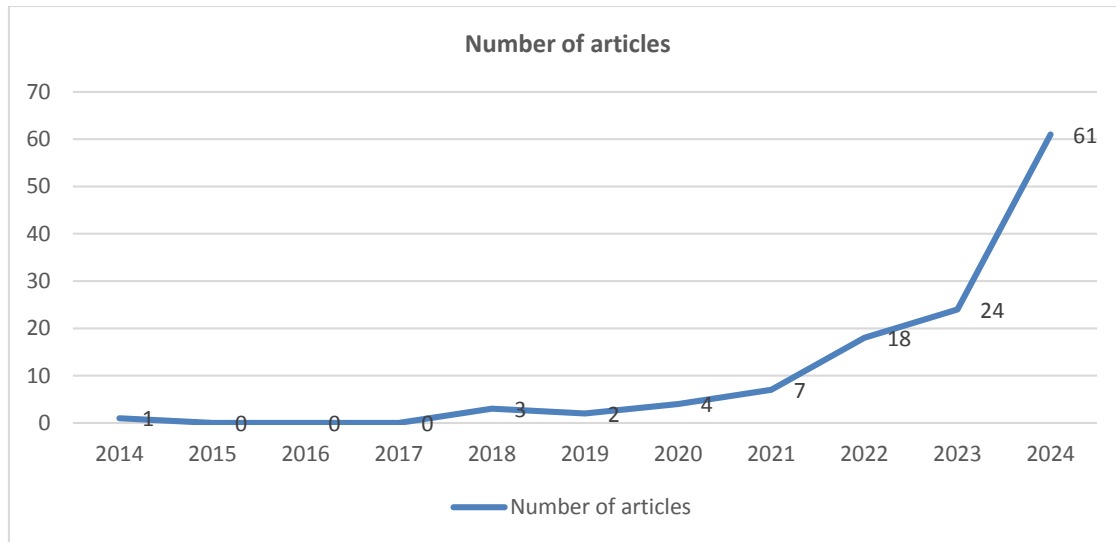


Figure 1: Number of articles published based on key words “artificial intelligence” and “gender stereotypes”

Source: Own research results.

The detailed topics analysis highlights that "Computer Science Artificial Intelligence" leads with the highest focus, accumulating 25 studies. Interdisciplinary topics such as "Computer Science Interdisciplinary Applications" and "Business" follow closely with 17 and 15 studies, respectively. Other significant areas include "Computer Science Theory Methods" with 14 studies and "Communication," which recorded 11 studies. Ethics and multidisciplinary approaches have also gained attention, with 6 and 7 studies in respective categories like "Humanities Multidisciplinary" and "Education Educational Research." Additionally, niche fields such as "Robotics," "Health Care Sciences Services," and "Linguistics" show emerging interest with 3 to 4 studies each. These results can be observed in table 1.

Table 1. Publication fields for articles related to key words “artificial intelligence” and “gender stereotypes”

Topics	Values
Computer Science Artificial Intelligence	25
Computer Science Interdisciplinary Applications	17
Business	15
Computer Science Theory Methods	14
Computer Science Information Systems	13
Communication	11
Information Science Library Science	9
Social Sciences Interdisciplinary	9
Management	8
Education Educational Research	7
Humanities Multidisciplinary	7
Multidisciplinary Science	7
Ethics	6
Psychology Multidisciplinary	6
Psychology Applied	5

Source: Own research results.

The analysis by countries of publications resulted from search results based on key words “artificial intelligence” and “gender stereotypes” shows that the USA leads significantly with 49 contributions, reflecting a dominant focus on AI research and gender stereotypes. European countries, include Spain (10), Germany (9), and England (5), also demonstrate notable engagement in the topic. Emerging participation from countries like India (7), China (8), and Brazil (3) highlights global interest and diverse perspectives in addressing gender stereotypes in AI. These results can be observed in table 2.

Table 2. Publications per country for articles related to key words “artificial intelligence” and “gender stereotypes”

Countries	Values
USA	49
Spain	10
Germany	9
China	8
India	7
England	5
Italy	5
Canada	5
Portugal	5
Australia	4
Belgium	4
Sweden	4
Austria	3
Brazil	3
France	3
Israel	3
Nroway	3
South Korea	3

Source: Own research results.

The analyses highlight the growing academic and research interest in gender stereotypes in AI, with a significant surge in publications observed between 2020 and 2024. The focus spans diverse disciplines, with Computer Science (Artificial Intelligence) taking the lead, followed by interdisciplinary applications in business, communication, ethics, and management, reflecting the multidimensional nature of the topic. Additionally, the geographic distribution of research efforts demonstrates the USA's dominance, while contributions from Europe and emerging economies like China and India illustrate the global recognition of this issue. The data underscores the importance of continued cross-disciplinary and international collaboration to address gender bias in AI effectively. This progress sets a strong foundation for future research, particularly in areas like mitigation strategies, ethical implications, and achieving equitable representation in AI systems worldwide.

The bibliometric analysis of gender stereotypes on AI is based on Web of Science Articles and was performed with VOS Viewer. The following network visualization represents a conceptual map of terms, based on existing literature regarding the AI stereotypes. The clusters of words and their connections suggest the forming of four key areas: bias and algorithmic concerns (red), gender and human perception (green), technology and development (blue) and others (yellow).

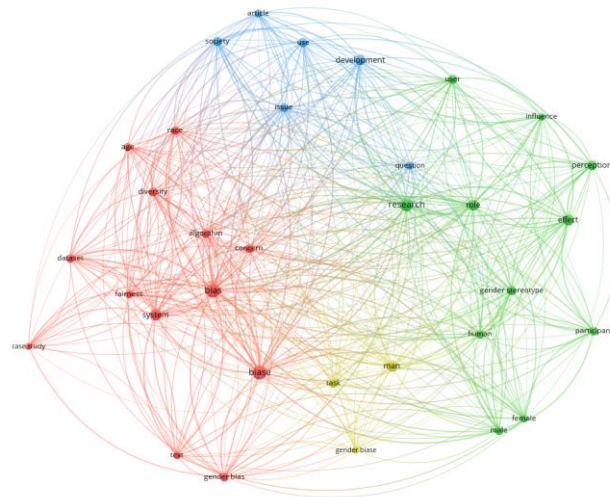


Figure 2. Conceptual map of terms regarding AI stereotypes

Source: Own research results based on VOS Viewer output.

The red cluster focuses on algorithmic bias, fairness in AI systems, and dataset-related concerns. The presence of “diversity”, “race,” and “age” suggests discussions around demographic biases in technology and AI systems (Davis et al., 2023). The green cluster likely deals with gender biases and stereotypes in research, societal roles, and human perception. The connections between “man”, “woman,” and “participant” suggest the study of human subjects (Hillis et al., 2024). The blue section likely addresses the societal implications of technology development, how biases emerge in tech applications, and the role of research in mitigating these issues. The link to “issue” suggests discussions around challenges in implementation (Hall 2021).

Regarding key observations, “bias” is the most central concept, indicating that whether in AI, research, or human perception is a focal point. Connections between clusters suggest interdisciplinary discussions, such as how algorithmic bias (red) influences human perception and gender roles (green). It implies that AI and datasets might encode and reinforce gender stereotypes, influencing societal perceptions. Studies on algorithmic bias likely investigate how AI systems treat male and female individuals differently, highlighting fairness issues in machine learning models (Hitron et al., 2022). “Research” serves as a bridge, connecting different perspectives, suggesting that academic inquiry is crucial in understanding and addressing these biases (Adams & Loideain, 2019). Connection between the red (bias and algorithmic concerns) and blue (technology and development) clusters indicates that concerns about algorithmic bias are deeply tied to technology development and use in society. Bias in AI systems isn’t just theoretical, it has real-world implications that researchers and developers need to address (Li et al., 2024). Researchers likely focus on how to design fairer AI systems and address biases at the development stage, emphasizing responsible AI practices (Wang, 2020). Connection between the green (gender and human perception) and blue (technology and development) suggests that research on gender roles and biases isn’t just an academic pursuit but has tangible effects on how technology is developed and deployed (Costa & Ribas, 2019). The influence of research on AI ethics and societal norms is evident here. Studies on gender bias in AI (e.g., voice assistants, hiring algorithms) (Woods, 2018; Lu & Zhang, 2025) likely impact policy decisions and system improvements.

Next, we will describe the gender bias in AI systems. The connection between gender bias and AI systems (highlighted in the red and green clusters) suggests that AI algorithms and datasets

often reflect or amplify existing societal biases. Gender bias in AI primarily emerges through biased datasets, such as AI model learn from historical data, which often contains gender stereotypes. The link between “dataset” (red cluster) and “gender bias” (green cluster) suggests that biased training data is a major concern (Marinucci et al., 2023).

Conclusion

This network visualization likely represents an interdisciplinary discussion on bias in AI, gender, and society. It highlights the need for collaboration between technologists, social scientists, and policymakers to address biases in AI systems and ensure ethical development.

This bibliometric analysis offers a comprehensive overview of the landscape surrounding gender stereotypes in AI, shedding light on the structure, evolution, and focus area of this critical research domain. Using VOS viewer, we mapped the intellectual foundation of the field, revealing key research clusters, influential publications, and the interdisciplinary nature of the discourse.

Our findings indicate a significant rise in academic attention to gender bias in AI over the past decade, with dominant themes including bias in machine learning models, ethical implications of AI applications, and the representation of the gender in data sets and algorithms. Notably, the field is driven by contributions from both technical and social science disciplines, reflecting the complex, multifaceted nature of the problem. Despite the growth in research output, the analysis also highlights notable gaps, such as limited collaboration across disciplinary boundaries. Addressing these gaps will be essential for building a more inclusive and comprehensive understanding of how gender stereotypes manifest in AI systems. Ultimately, this study not only maps the academic conversation around gender stereotypes in AI but also underscores the importance of continued, interdisciplinary efforts to mitigate bias and promote fairness in the development and deployment of AI technologies.

Future research should prioritize intersectional perspectives, amplify underrepresented voices, and explore the tangible impacts of biased AI systems in real-world context, contributing to the creation of AI technologies that are not only intelligent but also just. Furthermore, policy frameworks, educational curricula and industry standards must be informed by the growing body of knowledge to ensure that ethical principles are embedded not only in AI design but across its lifecycle. The integration of bibliometric insights into strategic research planning can guide funding agencies, academic institutions, and technology developers toward more balanced, fair and socially conscious innovation in AI.

Acknowledgement

This paper was co-financed by The Bucharest University of Economic Studies during the PhD program.

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