

The Role, Strategies, and Future Development Trends of Libraries in Governing AI Information Pollution (Postprint)

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Abstract

With the rapid development of AI technology, AI-generated spam information is proliferating, posing severe threats to both individuals and society. Effectively governing AI spam information pollution has become a pressing issue requiring immediate attention. This study investigates AI information pollution through literature review and inductive-deductive methods. First, it proposes a definition, manifestations, characteristics, and hazards of AI information pollution. Second, it identifies the critical role of libraries in governing AI information pollution: as identifiers and selectors of high-quality information, promoters of professional information literacy education, and providers of reliable academic research information. Third, from three dimensions—information resource management, technology application, and user empowerment and services—it proposes strategies for libraries to govern AI information pollution. Finally, it outlines future development trends for library governance of AI information pollution: technology integration, cross-domain collaboration, and role transformation.

Full Text

Abstract

With the rapid development of generative artificial intelligence (GenAI), AI-generated information pollution has become an increasingly serious problem, posing significant threats to individuals and society. This study employs literature research and inductive-deductive methods to investigate information pollution. First, it defines information pollution, outlines its manifestations, characteristics, and hazards. Second, it highlights the critical role of libraries in governing information pollution: as discriminators and filters of high-quality information, promoters of professional information literacy education, and providers

of reliable academic research resources. Third, it proposes strategies for libraries to address information pollution from three dimensions: information resource management, technological application, and user empowerment and service. Finally, it identifies three future development trends: technological integration, cross-domain cooperation, and role transformation.

1. Definition, Manifestations, Characteristics, and Hazards of AI-Generated Information Pollution

1.1 Definition of AI Information Pollution

The academic community has not yet reached a consensus on the definition of AI information pollution, a concept closely related to disinformation and information fog. The need for conceptual rigor and reliability is particularly crucial for developing effective governance strategies. AI information pollution represents the result of combined technical limitations and application scenario complexities. One key technical cause is AI hallucination—the generation of plausible yet factually inaccurate content, particularly through deep learning algorithms that simulate human cognitive processes for deceptive or manipulative purposes. At the societal level, some actors exploit GenAI to generate and disseminate large volumes of false information for attention-seeking or public manipulation, while employing deepfake technology to create fabricated videos. These activities raise significant legal and ethical concerns, including intellectual property infringement, reputation damage, and evidence fabrication, especially when generated content lacks logical coherence or contradicts reality.

1.2 Manifestations of AI Information Pollution

AI information pollution extends beyond technical data quality issues to create direct and severe consequences across multiple dimensions, including social ethics, legal frameworks, and public information literacy. Since AI system performance fundamentally depends on training data quality, once polluted information enters the network, it creates a vicious cycle where content quality continuously degrades through iterative processes. As knowledge repositories and important carriers of social culture, libraries must ensure the accuracy of their collections and uphold principles of reliability. The pollution problem evolves from a single technical issue into a comprehensive social governance challenge.

1.3 Characteristics and Hazards of AI Information Pollution

AI information pollution exhibits three core characteristics. First, its generation speed and volume grow exponentially. Second, deepfake technology enables highly realistic manipulation of images, audio, and video, making such information difficult to detect. Third, polluted information spreads rapidly via the internet in short timeframes. The hazards are substantial: widespread dissemination of false information makes accurate information difficult to obtain, erodes public trust even in authoritative sources, and severely misguides youth values.

The phenomenon deepens current information fog, as technical defects, algorithmic bias, automated discrimination, or data misuse during large-scale content generation and distribution lead to massive proliferation of false, low-quality, or homogeneous multimedia content. This disrupts information ecosystems, intensifies value conflicts, and challenges legal and ethical boundaries. Responsibility attribution remains difficult, making timely prevention of illegal activities challenging.

2. The Important Role of Libraries in Governing AI Information Pollution

Libraries serve as critical nodes in national public cultural service systems and possess three essential capabilities for addressing AI information pollution.

2.1 Discriminator and Filter of High-Quality Information

Libraries must employ professional information evaluation metrics and analytical technologies to verify the authority of information sources—including text, audio, and video—and assess content accuracy and reliability. By screening out authentic and valuable information, libraries prevent AI-generated pollution from entering their service systems, ensuring high-quality information resource services.

2.2 Promoter of Professional Information Literacy Education

Libraries constitute vital platforms for enhancing public information literacy. In the digital intelligence era, information literacy extends beyond traditional resource acquisition, evaluation, and utilization to include the ability to identify AI-generated content. Libraries should conduct training sessions and lectures to teach users techniques for recognizing AI-generated information, guiding them to evaluate language patterns, logical coherence, and information sources. This cultivates critical thinking skills and improves users' information acquisition efficiency and quality.

2.3 Provider of Reliable Academic Research Information

As indispensable knowledge infrastructure in academic research systems, libraries bear the mission of building high-quality information ecosystems. Confronted with massive academic resources and complex information environments, libraries must establish systematic quality assurance mechanisms to fortify the credibility of academic information. By strengthening collaboration with research institutions and publishers through academic information quality assurance frameworks, libraries can ensure the authenticity and reliability of scholarly information, providing researchers with professional information screening and knowledge discovery guidance services.

3. Strategies for Library Governance of AI Information Pollution

Building upon their existing capabilities in information discrimination, literacy promotion, and academic resource provision, libraries must systematically construct a governance framework across three dimensions.

3.1 Information Resource Management Level

3.1.1 Establishing Information Resource Admission Standards To prevent sudden AI information pollution incidents, libraries need to establish admission standards. Existing regulations such as the Public Library Business Specifications and the National Library Digital Resource Object Management Guidelines specify selection criteria, service quality control, and long-term preservation requirements for library information resources. Libraries should further refine verification mechanisms, establishing evaluation standards for authenticity, logical coherence, intellectual property ownership, and ethical compliance. Given the vast volume of resources, libraries must introduce advanced information technologies, selecting reputable technology suppliers that ensure transparency and explainability.

3.1.2 Emergency Management Mechanisms Libraries should establish robust emergency management systems. First, form interdisciplinary response teams comprising librarians, IT professionals, security engineers, and legal compliance advisors with rich experience in handling information pollution incidents. Second, develop dynamic emergency plan databases with tiered response mechanisms—categorizing incidents into three levels based on impact severity. For major events (e.g., forged e-books rapidly spreading across libraries), coordinate with relevant authorities. For moderate events (e.g., contaminated materials gradually diffusing between libraries), block transmission links and technically restrict interaction with polluted content. For general events (e.g., localized low-quality AI-generated content), implement real-time comparison systems using Retrieval-Augmented Generation (RAG) technology to automatically downgrade or remove suspicious information after verification against authoritative knowledge bases. Third, establish multi-party information reporting and collaboration mechanisms to strengthen coordination with supervisory departments and social forces.

3.2 Technology Application Level

3.2.1 Employing Descriptive AI for Information Discrimination Libraries can leverage descriptive AI technologies for information verification. As emphasized in IFLA's strategic response to AI, responsible and explainable AI applications are crucial in library contexts. Descriptive AI with Natural Language Processing (NLP) capabilities can use machine learning models to identify differences between false and authentic information by analyzing vo-

cabulary usage and semantic features, automatically detecting and classifying untrustworthy information. The system can downgrade misleading or false content in search rankings, effectively filtering out low-quality information.

3.2.2 Labeling AI-Generated Content Domestic and international regulations—including the Administrative Provisions on Deep Synthesis Internet Information Services, Interim Measures for Generative AI Services, and the EU Artificial Intelligence Act—explicitly require labeling of algorithmically generated or synthesized content. Libraries should accordingly require publishers and creators to label AI-generated works, protecting users’ right to know and choose.

3.2.3 Optimizing Information Retrieval with RAG Technology Retrieval-Augmented Generation (RAG) combines information retrieval with large language models. Based on user queries, RAG extracts relevant content from library knowledge bases and uses it as context to generate responses that align with library collection standards. Libraries should conduct specialized lectures and provide online courses to enhance users’ awareness and ability to identify AI information pollution, teaching them to recognize common forms of pollution and evaluate information reliability and credibility.

3.2.4 Blockchain Technology for Source Tracing Blockchain’ s decentralization, immutability, and transparency offer new approaches for library information resource management. First, use decentralized data management to reduce single-point failure risks. Second, record each information source, author, and upload date on blockchain to ensure verifiability and prevent source-less information from entering library collections. Third, track information dissemination paths to help users trace evolution and assess authenticity.

3.3 User Empowerment and Service Level

3.3.1 Building User Feedback Mechanisms Users often detect suspicious information during resource use. Libraries must establish comprehensive feedback channels with 24/7 coverage, three-tier review processes, and incentive mechanisms. This transforms users into quality supervisors and system optimizers, enhancing participation and trust.

3.3.2 Enhancing Librarian Professional Competencies Systematically improve librarians’ professional literacy and information governance capabilities through: (1) Technical principle cognition—understanding NLP, knowledge graph construction, and model fine-tuning; (2) Practical tool application—using AI tools for intelligent retrieval and data analysis; (3) Critical thinking development—recognizing AI-generated content through linguistic patterns and logical flaws, and providing human expertise when information authenticity is questionable.

3.3.3 Establishing Quality Information Recommendation Platforms

Provide multi-dimensional, high-quality information recommendations for all users. Optimize recommendation algorithms to enhance precision and logical authenticity, intercepting polluted information at the source through data cleaning and multi-layer review mechanisms. Employ multimodal analysis technologies like image forgery detection and semantic consistency verification to identify hidden inconsistencies.

4. Future Development Trends in Library Governance of AI Information Pollution

Following analysis of capabilities, strategies, and feasible approaches, three major development trends emerge.

4.1 Technology Integration Trend

Libraries will uphold the principle of “using technology to combat technology,” constructing dynamic defense systems that integrate descriptive AI, RAG, and blockchain. This involves building comprehensive information verification systems, establishing admission standards, creating tiered emergency management systems with circuit-breaker mechanisms, and developing dynamic audit mechanisms for full-lifecycle active governance.

4.2 Cross-Domain Cooperation Trend

As key hubs in social information ecosystems, libraries hold unique strategic positions in knowledge governance. Despite limited individual capacity, cross-domain resource collaboration networks can reshape social information governance patterns. Cooperation can unfold across: (1) Technology—jointly developing monitoring tools with tech enterprises; (2) Law—collaborating with government on legislation and international standards; (3) Academia—developing cross-disciplinary trustworthy resources with universities; (4) Public education—partnering with media to raise deepfake awareness; (5) Ethics—forming cross-domain ethics committees; (6) International—joining global governance initiatives; (7) Industry—blockchain content certification with publishers. This systematic, collaborative approach optimizes resource integration and enhances overall public cultural service levels.

4.3 Role Transformation Trend

In the process of governing AI information pollution, libraries’ roles will transform profoundly from traditional information custodians to intelligent information governance cores and cross-domain collaboration hubs. By integrating descriptive AI, establishing tiered emergency systems, organizing critical thinking training, building user feedback channels, and creating blockchain certification systems, libraries will shift toward collaborative governance frameworks that actively manage full information lifecycles.

5. Conclusion

This paper has deeply explored libraries' important role in governing AI information pollution, proposing three-level strategies and three future development trends. Libraries should fully leverage their advantages in information discrimination, literacy education promotion, and academic research information provision. Through strategic innovation in information resource management, technological application, and user empowerment, libraries must actively respond to future trends of technological integration, cross-domain cooperation, and role transformation. By participating in international governance and achieving trustworthy knowledge resource traceability, libraries are transforming into innovation leaders in information retrieval and service revolution.

References

- [1] Xinhua Daily Telegraph, 2024-10-22(6).
- [2] NewsGuard. Tracking AI-enabled misinformation: 1254 “unreliable AI-Generated news” websites (and counting), false narratives generated by artificial intelligence tools[EB/OL]. [2025-02-10]. <https://www.newsguardtech.com/special-reports/ai-tracking-center/>.
- [3] Artificial Intelligence Literacy in the Digital Intelligence Era: Framework and Implementation Path[J]. *Journal of Library Science in China*, 2024(4): 71-84.
- [4] The European Parliament, the Council of the European Union. Artificial Intelligence Act[EB/OL]. [2024-06-13]. https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=OJ:L_{202401689}.
- [5] Sun Y, Sheng D, Zhou J. AI hallucination: towards a comprehensive classification of distorted information in artificial intelligence-generated content[J]. *Humanities and Social Sciences Communications*, 2024(1): 1-14.
- [6] Ajankar S, Dutta P. Unveiling priorities and challenges involved in artificial-intelligence-powered misinformation detection: a comprehensive analysis[J]. *IEEE Access*, 2024(1): 1-4.
- [7] EU Information Fog Governance Practices and Strategic Considerations[J]. *Library and Information Service*, 2024(1): 4-15.
- [8] Basic Controversies and Countermeasures of Generative Artificial Intelligence and Its Educational Applications[J]. *Open Education Research*, 2023(2): 105-111.
- [9] Economic and Social Impacts of ChatGPT[J]. *Review of Industrial Economics*, 2024(1): 4-15.
- [10] Panoramic Portrait and Governance Paradigm of New Generation Artificial Intelligence Technology Development[J]. *Journal of Nanchang University (Humanities and Social Sciences)*, 2023(3): 5-21.

- [11] On the Subject of Liability for Generative AI Infringement—From a Collectivist Perspective[J]. *Library and Information Service*, 2024(4): 79-85.
- [12] Investigation and Research on Metadata Librarians in Foreign University Libraries: Skills and Approaches[J]. *Information Studies: Theory & Application*, 2024(13): 69-77.
- [13] AIGC-Driven Smart Library Transformation[J]. *Library Work and Study*, 2023(7): 9-16.
- [14] WH/T 87.1—2019 Public Library Business Specifications Part 1: Provincial Public Libraries[S]. Ministry of Culture and Tourism of the People's Republic of China, 2019.
- [15] National Library Digital Resource Object Management Guidelines[M]. National Library of China Publishing House, 2010.
- [16] The Value of AIGC Embedded in Library Knowledge Services[J]. *Library Work and Study*, 2024(5): 63-70.
- [17] The Integrated Symbiotic Development Path of Research Libraries and Digital Publishers—A Case Study of the National Science Library, Chinese Academy of Sciences[M]. National Library of China Publishing House, 2018.
- [18] Guidelines for the Specification and Application of Digital Resource Unique Identifiers in National Library[M]. National Library of China Publishing House, 2013.
- [19] Scientific Ethics and Legal Construction of Artificial Intelligence Applications[J]. *Library Work*, 2024(12): 66-70.
- [20] Measures for the Identification of Artificial Intelligence-Generated Synthetic Content (Draft for Comment)[EB/OL]. [2024-09-14]. https://www.cac.gov.cn/2024-09/14/c_1728000676244628.htm.
- [21] Provisions on the Administration of Deep Synthesis Internet Information Services[J]. Ministry of Public Security of the People's Republic of China, 2023(1): 1-4.
- [22] Interim Measures for the Administration of Generative Artificial Intelligence Services[J]. Ministry of Public Security of the People's Republic of China, 2023(5): 2-5.
- [23] Cybersecurity Standard Practice Guide—Methods for Identifying Generative Artificial Intelligence Service Content: TC260-PG-20233A[S]. Secretariat of the National Information Security Standardization Technical Committee, 2023.
- [24] The European Parliament. Artificial Intelligence Act and its impact on labor law[J]. *Global Law Review*, 2024(3): 5-27.
- [25] Schatz B, Kennedy M. Labeling Act of 2023[EB/OL]. [2023-07-27]. <https://www.congress.gov/118/bills/s2691/BILLS-118s2691is.pdf>.

- [26] Becker A. California AI Transparency Act[EB/OL]. [2024-09-19]. https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_{id}=202320240SB942&firstNav=tracking.
- [27] IFLA. Developing library strategic response to artificial intelligence[EB/OL]. [2023-11-20]. <https://www.ifla.org/g/ai/developing-a-library-strategic-response-to-artificial-intelligence>.
- [28] Shukla R, Sinha A, Chaudhary N. TweezBot: an AI-Driven online misinformation identification algorithm for Twitter social networks[J]. *Electronics*, 2022(5): 743.
- [29] Research on Librarians' Digital Intelligence Literacy and Its Cultivation Path[J]. *Library and Information Service*, 2023(9): 47-52.
- [30] Scenario Applications and Model System Construction of Smart Libraries Driven by Digital Intelligence[J]. *Academic Library Work*, 2023(2): 95-102.
- [31] Li Weidong. Library Participation in False Information Governance: Foreign Progress and Implications[J]. *Library Science Research*, 2022(7): 25-38.
- [32] Analysis of Technology Applications in Archival Work[J]. *Library Work and Study*, 2025(3): 64-65.
- [33] ChatLib: Reconstructing Knowledge Services in Smart Libraries[J]. *Journal of Academic Libraries*, 2024(2): 72-80.
- [34] A Model for Scientific Data Management in University Libraries Based on Blockchain Technology[J]. *Information Studies: Theory & Application*, 2024(5): 53-69.
- [35] IFLA. trend report 2024: facing the future with information confidence[EB/OL]. [2024-09-30]. <https://repository.ifla.org/items/ae4dfcc0-8def-4318-8c4c-7f0507d15609>.
- [36] IFLA. strategy 2024-2029[EB/OL]. [2024-10-01]. <https://repository.ifla.org/items/300159c9-9973-433e-9ad5-3e69f4ea4832>.

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