The Grand Symphony of Generative Artificial Intelligence and Science and Technology Journals

Authors: Gu Liping, Gu Liping

Date: 2024-10-24T13:22:32+00:00

Abstract

Generative Artificial Intelligence (GenAI) technology is profoundly influencing the academic ecosystem and creative paradigms, sparking discussions on the authenticity of works. In the era of mechanical reproduction, works lost their unique value, shifting toward reliability and exhibition value, while GenAI further blurs the boundaries of work authenticity. The fields of literature, art, and scientific research are all impacted by GenAI, rendering the identification of scientific research outcomes increasingly complex. In response to these challenges, the academic community has formulated laws, regulations, and ethical standards, while academic journals have intensified supervision and review to ensure academic integrity and originality. Simultaneously, GenAI has also catalyzed the emergence of new professions, such as AI artists and designers, injecting new vitality into artistic creation, and positions like GenAI engineers have appeared in the scientific research domain. As a crucial vehicle for academic communication, scientific journals actively address these challenges by strengthening oversight, optimizing peer review processes, and innovating service models, thereby promoting the transformation, upgrading, and high-quality development of journals. The industrial chain of scientific journals has undergone evolution toward digitalization, conglomeration, and ecologicalization; the integration of generative artificial intelligence technology has spawned novel resource repositories, enriched content ecosystems, and provided diversified services. In the future, scientific journals and GenAI are expected to achieve symbiotic prosperity, advancing academic communication and knowledge innovation.

Full Text

Generative Artificial Intelligence and Scientific Journals: A Grand Symphony

National Science Library, Chinese Academy of Sciences, Beijing, 100190

Abstract

Generative Artificial Intelligence (GenAI) technology is profoundly reshaping the academic ecosystem and modes of scholarly creation, sparking widespread discussion about the authenticity of works. In the era of mechanical reproduction, works lost their unique, auratic value, shifting instead toward reliability and exhibition value. GenAI further blurs the boundaries of authenticity. Literature, art, and scientific research are all impacted by GenAI, making the verification of research outcomes increasingly complex. In response to these challenges, the academic community has formulated laws, regulations, and ethical standards, while academic journals have intensified oversight and review to ensure academic integrity and originality. Simultaneously, GenAI has given rise to new industries, such as AI painters and designers, injecting fresh vitality into artistic creation, while GenAI engineers and other novel positions have emerged in the scientific research domain.

As vital carriers of academic communication, scientific and technological journals are actively addressing these challenges by strengthening supervision, optimizing peer review processes, and innovating service models to drive transformation, upgrading, and high-quality development. The scientific journal industry chain is undergoing evolution through digitalization, conglomeration, and ecologization. The integration of generative artificial intelligence technology has catalyzed the creation of new types of resource repositories, enriching the content ecosystem and providing diversified services. In the future, scientific journals and GenAI are poised to achieve symbiotic prosperity, jointly advancing academic communication and knowledge innovation.

Keywords: Generative Artificial Intelligence; Scientific Journals; Authenticity of Works; Intellectual Property Rights; Evolution of Industrial Chain

---

In this rapidly evolving era, every major technological advancement strikes like a powerful storm, profoundly impacting and reshaping our academic ecosystem and creative paradigms. The concept of "Echtheit" (authenticity in German), originally proposed by Walter Benjamin in his seminal work *The Work of Art in the Age of Mechanical Reproduction*, provides a crucial lens through which to understand how technological transformation affects the essence of artistic and scholarly works.

Benjamin argued that in the age of mechanical reproduction, the "mass production" characteristic caused works to lose their unique, sublime, and eternal value intimately tied to specific times and places. This shift not only transformed work value from uniqueness to reliability, but also diminished the cult value of works while increasingly foregrounding their exhibition value. Today, the rapid development of Generative Artificial Intelligence (GenAI) technology is further accelerating this trend, posing new challenges to the reliability and exhibition value of scientific papers. Faced with this challenge, the academic community

has become divided: some strive to enhance GenAI applications and explore its limitless potential; others seek cross-disciplinary integration, attempting to combine AI technology with traditional research methodologies; while still others maintain a cautious stance, actively exploring new developmental paths.

II. Reflections on the Authenticity of Works

Before the widespread emergence and profound influence of generative artificial intelligence on academic creation, each scholarly work shone like a unique star in the night sky, radiating the distinctive wisdom and emotion of its creator. In literary creation, words served not merely as tools for information transmission but as vessels for the author's inner world, nourishing readers' minds like flowing streams. In artistic creation, colors and lines became direct expressions of the artist's soul, weaving dreams that guided audiences into fantastical realms. In scientific research, each paper represented a courageous exploration of the unknown, embodying researchers' painstaking efforts and wisdom—their unremitting pursuit of scientific truth. These works collectively formed the solid foundation of authenticity, while scientific journals, as the intersection of science and art, carried these authentic works and disseminated them to broader audiences.

III. Challenges Posed by Generative AI

However, with the sudden rise of generative artificial intelligence technology, this once-dazzling starry sky now seems shrouded in a mysterious and complex mist. Leveraging powerful learning capabilities through advanced algorithms such as cosine similarity, probability matrix computation, and transformers, generative AI can produce astonishingly realistic content that is nearly indistinguishable from human-created works. While this technological leap brings convenience, it quietly blurs the boundaries of authenticity. In literature and art, AI "works" have triggered profound discussions and widespread controversies about originality, copyright ownership, and the very nature of art. The scientific research domain has not been spared either; massive data processing and sophisticated algorithmic application have made verifying research outcomes increasingly complex and difficult. Researchers must now devote more time and energy to understanding GenAI's operational mechanisms to address its potential impacts across all stages—including experimentation, creation, reading, peer review, editing, processing, and reuse.

IV. Safeguarding and Exploring Intellectual Property Rights

Confronted with unprecedented challenges from generative artificial intelligence, the academic community has not retreated but has actively taken action to strike a balance between protecting intellectual property and encouraging technological innovation. Governments, international organizations, and academic journals worldwide have formulated relevant laws, regulations, and ethical standards to govern the use and development of generative AI technology. Exam-

ples include UNESCO's *Guidance for Generative AI in Education and Research* and China's *Interim Measures for the Management of Generative AI Services*, which provide clear guidance and norms for the academic community. Simultaneously, academic journals are actively adjusting their strategies, intensifying supervision and review of GenAI-generated content to safeguard academic integrity and originality. These efforts not only help maintain academic order and dignity but also provide robust guarantees for the healthy development of generative AI technology.

V. Flourishing Development of Emerging Industries

The evolution of generative AI technology has not only brought challenges and disruptions but has also created new opportunities and vitality for society. As the technology matures and its application domains expand, new professional groups such as AI painters and AI designers have emerged, utilizing AI technology for artistic creation and design work and injecting fresh energy into the art world. In the scientific community, large-scale foundational projects driven by data innovation have sprung up like bamboo shoots after rain, while positions such as GenAI engineers for researchers and forward-looking data librarians have emerged as important forces driving research efficiency improvement. Additionally, roles like AI trainers are playing increasingly significant roles in the research domain. The rise of these emerging industries not only enriches the job market and broadens career options but also injects new dynamism into economic development.

VI. Response Strategies and Innovation in Scientific Journals

As crucial carriers of academic communication and important platforms for scholarly exchange, scientific journals play a pivotal role in responding to the transformation brought by generative AI technology. While upholding academic rigor and originality, scientific journals are actively embracing opportunities and challenges presented by new technologies. By strengthening supervision, optimizing review processes, and innovating service models, journals can better address the challenges and risks posed by GenAI. For instance, the *Regulations on the Use of Generative AI Technology in Paper Writing and Peer Review* issued by the Chinese Medical Association Publishing House and the *Guidelines for the Boundaries of AIGC Use in Academic Publishing* formulated by the Institute of Scientific and Technical Information of China clearly define the scope and limitations of GenAI technology in academic publishing. These regulations and guidelines provide strong support and direction for journals' response strategies.

VII. New Development Trends in the Scientific Journal Industry

Currently, the "scientific journal industry chain" is undergoing unprecedented transformation, with its evolution clearly demarcated into three stages: digitalization, conglomeration, and ecologization. This evolution not only reflects the rapid development of the scientific journal industry but also reveals its strong

capacity to adapt to new technologies and demands. The nine versions of academic papers—including author manuscripts, accepted manuscripts, approved manuscripts, preprints, online-first publications, published versions, postprints, record versions, and data versions—have each assumed new forms and characteristics throughout this evolutionary process.

Particularly with the integration of generative AI technology, more significant changes have emerged at the back end of the scientific journal industry chain. While maintaining their core value, traditional indexing databases and citation databases have begun deep integration with GenAI technology, giving rise to a series of new resource repositories such as knowledge element databases, big data catalogs, search engines, and intelligence product databases. These new repositories not only greatly enrich the content ecosystem of scientific journals but also provide more diversified and intelligent service models.

Furthermore, the emergence of new resources such as think tank talent databases, large language model libraries, scientific chart repositories, and scientific agents has injected new vitality into the scientific journal industry. These resource repositories not only help enhance the academic level and influence of scientific journals but also provide strong support for achieving higher-quality development in the context of globalization and digitalization.

VIII. Looking Forward: A Vision of Symbiotic Prosperity

In the age of mechanical reproduction, the "aura" of works gradually lost its unique charm and mystique, a trend that once triggered profound reflection on artistic authenticity and value. Today, under the influence of generative AI technology, this trend is undergoing new and more complex transformations.

Driven by technology, scientific journals will become more intelligent, personalized, and efficient. By employing generative AI technology, journals can achieve automatic content generation, intelligent auditing, and precise dissemination, thereby significantly improving the efficiency of editing, publishing, and distribution. Simultaneously, journals can leverage AI technology to provide personalized content customization and services, meeting the increasingly diverse needs of readers and authors.

Guided by academic principles, technology will develop in a more regulated, orderly, and healthy manner. As generative AI technology becomes widely applied in the scientific journal domain, relevant laws, regulations, ethical standards, and industry norms will continue to improve and strengthen. This will help ensure that scientific journals maintain academic rigor and originality while employing new technologies, while also providing robust safeguards for the healthy development of technology.

In the future, scientific journals and generative AI technology are expected to achieve a new situation of symbiotic prosperity and collaborative advancement. Scientific journals should actively respond to challenges, fully utilize the advan-

tages of GenAI technology, and promote their own transformation, upgrading, and high-quality development. At the same time, journals must maintain their commitment to and pursuit of academic values, ensuring that paper quality and academic value remain the core and foundation of their development. In this process, scientific journals and generative AI technology will jointly write a new chapter for the new era, contributing greater strength to academic communication and knowledge innovation.

References

[1] Benjamin W. Das Kunstwerk im Zeitalter seiner technischen Reproduzierbarkeit[C]//Tröndle M., Steigerwald C. (eds). Anthologie Kulturpolitik. Munich: transcript Verlag.

[2] Gu Liping, Qian Jiuhong, Ma Wen, Han Yanli, Wan Yijia, Sun Ping, Zhang Hongbo, Du Wei, Hao Yue. Analysis of the Policy Environment for Ensuring the Healthy Development of the Journal Platform Industry[C]//China Association for Science and Technology (ed). Report on the Development of China's Scientific and Technological Journal Industry (2023): Special Topic on Optimizing the Ecosystem of the Scientific Journal Industry from the Perspective of Platform Economy. Beijing: Science Press, 2024: 51-92, 213-234.

Note: Figure translations are in progress. See original paper for figures.