# A Prospective Study on the Application of Artificial Intelligence Language Models in Scientific Journals—Postprint Based on Analysis of ChatGPT

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## Abstract

This paper aims to explore feasible approaches for applying artificial intelligence language models (ChatGPT) to the development of Chinese scientific journals, thereby contributing to the digital transformation and deepening reform of Chinese scientific journals. Through literature analysis and case study methodology, this paper investigates the specific practices of applying ChatGPT to scientific journals. By incorporating critiques of artificial intelligence from the perspective of emergence theory, it examines the potential limitations of applying ChatGPT to scientific journals. The study finds that ChatGPT can assist editors and reviewers of scientific journals in extracting core content from literature, facilitating academic retrieval, generating reviews in specific fields, detecting academic misconduct, creating multilingual dissemination content, and conducting semantic analysis of literature through sentence vectors to assist in constructing knowledge graphs and journal digital platforms. However, regarding issues such as copyright and content monopolization, biological foundation and embodied critique, and emotional, moral, and ethical critique, the practical application value of ChatGPT remains questionable. The integration of artificial intelligence language models (ChatGPT) with scientific journals represents the direction of future development, and scientific journals should actively apply artificial intelligence language models such as ChatGPT in journal management practices to facilitate the high-quality development of outstanding Chinese scientific journals.

## Full Text

## Preamble

**Prospective Study on the Application of Artificial Intelligence Language Models in Scientific Journals—Based on Analysis of ChatGPT**

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## Abstract

[**Purpose/Significance**] This paper explores feasible approaches to applying artificial intelligence language models (ChatGPT) to the development of Chinese scientific and technological journals, aiming to contribute to the digital transformation and deepening reform of China's sci-tech periodicals. [**Design/Methodology**] Through literature analysis and case studies, this research examines specific applications of ChatGPT in scientific journals while critically evaluating potential limitations through the lens of emergence theory. [**Findings/Conclusion**] The study reveals that ChatGPT can assist editors and reviewers in extracting core content from literature, facilitating academic searches, generating domain-specific reviews, and detecting academic misconduct. It can also create multilingual communication content and perform semantic analysis of documents through sentence vectors to support knowledge graph construction and digital platform development. However, its practical value remains debatable regarding copyright issues, content monopolization, biological foundation and embodied criticism, as well as emotional and ethical critiques. [**Originality/Value**] The integration of AI language models like ChatGPT with sci-tech periodicals represents the future direction of development. Scientific journals should actively adopt such models in publishing practice to promote the high-quality development of China's excellent sci-tech periodicals.

**Keywords:** Artificial intelligence language model; ChatGPT; Sci-tech journal; Digital transformation; Content generation
**Classification Numbers:** TP18; TP391.1

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## 1.1 Policy Macro-Guidance: Supporting High-Quality Development of Chinese Sci-Tech Journals

The integration of AI language models like ChatGPT with sci-tech journals represents a viable path for promoting high-quality development under macro-policy guidance. China regards artificial intelligence as a strategic technology for leading the future, aiming to achieve national modernization and innovative development. The government has consistently supported and promoted AI technology development and application to foster economic growth, enhance

productivity, improve public services, and strengthen national security capabilities. The 14th Five-Year Plan emphasizes that AI development should focus on industrial integration applications and digital transformation as core objectives, thereby forming a data-driven, human-machine collaborative, cross-boundary integrated, and co-creative intelligent economic form.

In 2017, China's Ministry of Science and Technology issued the "Implementation Opinions on Deepening Reform and Innovation of Sci-Tech Journals," which called for strengthening digital construction and information technology application in sci-tech journals, advancing informatization in editing, distribution, and dissemination, and promoting digital transformation. The document explicitly emphasized strengthening IT application and developing technologies such as big data and artificial intelligence to enhance the efficiency and quality of editing and publishing processes. Sci-tech journals constitute a vital component of scientific research, shouldering the critical mission of being both the "dragon's head" and "dragon's tail" of research. Integrating AI technology with sci-tech journals, particularly leveraging mature and commercially viable AI language models like ChatGPT, can facilitate their digital transformation, propel the digital economy into a new era, and make greater contributions to establishing world-class Chinese journals and achieving national modernization goals.

## 1.2 Aligning with Industry Needs: Empowering Digital Transformation of Sci-Tech Journals

ChatGPT can effectively enhance the efficiency of the entire workflow of sci-tech journals—including proofreading, review, publication, distribution, and promotion—advancing their digital transformation into deeper waters. As carriers of scientific research outcomes, the editing and publishing processes are critical links for sci-tech journals. However, current workflows suffer from low efficiency. Traditional manual editing consumes substantial time and human resources while being prone to errors. Moreover, the large publication volume of sci-tech journals means editors must process massive amounts of textual data, resulting in slow processing speeds. Additionally, conventional editing approaches may be influenced by subjective factors such as editors' experience, competence, and workload, further affecting workflow efficiency and quality.

Consequently, sci-tech journals must explore more efficient and accurate editing and publishing methods to meet increasingly complex academic demands and growing publication volumes. In this context, the emergence of commercial AI products like ChatGPT provides new ideas and tools for digital transformation. Numerous domestic and international sci-tech journals have already begun experimenting with AI technology to optimize editing and publishing workflows. For example, the intelligent editing system co-developed by the Institute of Automation at the Chinese Academy of Sciences and sci-tech publishers utilizes natural language processing and machine learning to improve manuscript processing efficiency and reduce editing costs. The Human-Computer Interaction Lab at Tsinghua University launched "Qingci Proofreading," which employs pre-

trained language models and deep learning to leverage big data and computing power for text proofreading. Stanford University developed the GROBID intelligent paper proofreading system, which automatically extracts key information from scientific papers and generates structured metadata to improve publishing efficiency. Furthermore, AI language models can be applied to natural language generation, text summarization, machine translation, and other scenarios to further enhance journal editing and publishing efficiency and quality. Therefore, integrating AI technology represents an inevitable choice for the digital transformation of sci-tech journals, as it can both improve workflow efficiency and quality while accelerating the dissemination and application of scientific achievements.

## 2.1 Breaking the Professionalism-Timeliness Paradox: Enhancing Editorial and Review Efficiency

As important platforms for academic communication, sci-tech journals must balance both professionalism and timeliness. When screening and evaluating submissions, editors and reviewers often suffer from low efficiency due to heavy workloads, insufficient domain expertise, and repetitive tasks, resulting in long publication cycles from submission to publication. However, to ensure submissions meet academic publishing standards, the "three reviews and three proofreads" model remains a mandatory requirement and principle for journal editing. The paradox between timeliness and professionalism not only contravenes national requirements for prioritizing Chinese journals but also hinders their operation and development. Therefore, leveraging AI language models like ChatGPT to achieve key information extraction, automatic paper analysis, interdisciplinary exchange and complementarity, academic value assessment, academic misconduct detection, and reverse matching of reviewers and authors can help editorial boards improve efficiency and resolve the timeliness-professionalism paradox.

### 2.1.1 Extracting Core Content to Help Reviewers Quickly Screen Articles

During manuscript review, editors must screen and categorize large volumes of literature—a task requiring minimal specialized knowledge but consuming substantial time and manpower to identify high-quality submissions, particularly when reviewing foreign-language journals that demand strong language skills. By utilizing ChatGPT's natural language processing and machine learning or deep learning algorithms for semantic analysis, keyword extraction, text classification, and entity recognition, sci-tech journals can significantly improve screening efficiency and accuracy. Additionally, ChatGPT can accelerate translation speed and improve accuracy while enabling special handling for domain-specific terminology, injecting new vitality into journal development.

[Figure 1: see original paper] demonstrates the analysis results of HUMATA, an application integrated with ChatGPT, for foreign-language literature. By inputting specific questions and requirements, HUMATA can conduct detailed analysis of a paper's theme, core content, research methods, innovations, and academic value, while highlighting answer sources with yellow fluorescent markers. As shown in [Figure 2: see original paper], clicking on the page numbers indicated in HUMATA allows reviewers to examine and verify the literature analysis content.

### 2.1.2 Assisting Academic Search and Facilitating Interdisciplinary Exchange

Sci-tech journals receive abundant submissions covering extensive themes and broad knowledge domains. In recent years, academic research has increasingly delved into interdisciplinary fields, requiring reviewers to constantly monitor the latest academic and industry developments while maintaining sensitivity across various disciplines—demands that consume substantial editorial time. Leveraging the vast data encompassed by ChatGPT as an AI language model, journal editors can obtain the most academically and practically valuable domain reviews within minimal time. [Figure 3: see original paper] demonstrates ChatGPT's analytical capabilities for interdisciplinary knowledge, enabling editorial staff to complete interdisciplinary supplementation and exchange.

### 2.1.3 Reverse Detection of Academic Misconduct

The advent of AI language models like ChatGPT has provided a paradigm for mature commercial AIGC applications. However, in academic and publishing domains, ChatGPT has been banned by some universities, enterprises, and journals due to potential copyright controversies. For instance, the Chinese University of Hong Kong and JPMorgan Chase restrict students or employees from using ChatGPT, while *Nature* issued new regulations stating that large language model tools cannot be listed as paper authors. Shen Xibing, Director of New Media at the Chinese Medical Journal Publishing House, and his team discovered through testing that current domestic academic detection platforms such as CNKI and Wanfang cannot effectively detect duplication in ChatGPT-generated text. However, ChatGPT's unique computational language can be identified by itself, as demonstrated in [Figure 4: see original paper], which shows how direct questioning of ChatGPT can reverse-detect whether a text segment was generated by ChatGPT.

## 2.2 Capturing Writing Styles for Localized Content Creation

The 20th Party Congress report emphasized implementing a national cultural digitalization strategy to enhance the dissemination and influence of Chinese civilization. When using platforms like Twitter and Facebook to aggregate overseas audiences and tell China's stories, Chinese sci-tech journals often face cultural shock and other obstacles that adversely affect their global influence

and communication power. Skillfully leveraging ChatGPT's powerful content generation capabilities offers an effective path to overcome potential barriers in cross-cultural communication and enhance the products and dissemination effectiveness of Chinese English-language sci-tech journals. For example, RELX Group stated in its February 16 earnings report that the company is using ChatGPT to enhance its legal, medical, and scientific business products. Chinese English-language journal editors can copy original tweets from publishers like Springer or RELX on these new media platforms, then use ChatGPT to remember such expression styles for relevant creation. As shown in [Figure 5: see original paper], this approach helps bridge communication gaps arising from differences between Chinese and Western cultures and expression styles.

### 2.3 Word-Sentence Vector Models: Supporting Journal Digital Reform

Currently, ChatGPT provides free API access to all users, enabling sci-tech editorial boards to embed its word-sentence vector models into their digital management tools or platforms, similar to applications like Bing and HUMATA. Digital tools and platforms can help journals automate manuscript processing, rapidly retrieve articles, manage reader feedback, and improve overall efficiency and effectiveness. For example, Publons is a digital peer review platform that helps journals quickly identify suitable reviewers and editorial board members to improve manuscript quality. By integrating ChatGPT's established word-sentence vector models for semantic analysis of papers, sci-tech journals can create or update knowledge graph services with relatively low initial investment, achieve "enhanced publishing" through AI, extend publication added value, and facilitate independent updates to digital and intelligent management platforms.

For instance, when conducting semantic analysis or knowledge graph updates, sci-tech journals or publishing groups can utilize ChatGPT's word vector models, as shown in [Figure 6: see original paper], to model words and sentences in papers and literature. Each paper is represented as a high-dimensional vector containing information about its theme, sentiment, language style, and other aspects. These vectors are then mapped into low-dimensional space, with each paper represented as a point, and clustering algorithms group similar papers together. This approach eliminates the need for human identification in semantic analysis, as connections between words and phrases are "computed" through AI language models. Editors and reviewers can quickly browse these clustering results to identify high-quality papers relevant to the journal's themes.

Alternatively, semantic analysis via ChatGPT can classify papers into different categories such as theoretical research, experimental studies, or applied research. Model recommendation algorithms can then suggest highly relevant papers to editors and reviewers, assisting editorial boards and scholars in updating knowledge graphs and improving overall collaborative efficiency between journals and academic professionals.

## 3 The "Emergence" Dialectical Picture on Large Model Foundations: Analyzing ChatGPT's Current Issues

The academic term "emergence" can be traced to 19th-century British scholar John Stuart Mill, who believed emergent phenomena universally exist in the objective world. John Holland, a principal founder of emergence theory, defined "emergence" in *Emergence: From Chaos to Order*: "In complex adaptive systems, emergence phenomena are everywhere: ant colonies, neural networks, immune systems, the internet, and even the world economy. Any process where the whole's behavior is far more complex than its constituent parts can be called emergence." Generally speaking, "emergence" refers to phenomena where simple, preset interactive behaviors among individuals in a system create unpredictable complex patterns.

AI expert Maosong Sun suggests that ChatGPT may exhibit emergent phenomena under the combined support of generative models, understanding models, big data, and computing power. Why didn't previous AI models demonstrate "emergence"? From the perspective of emergence generation mechanisms, four key elements produce emergence in systems: autonomous individuals, identical behavioral rules, environmental entropy input, and system-individual feedback. As an artificial intelligence language model, ChatGPT reorganizes connections between things through extensive training, achieving "feedback" under "self-supervised learning" that previous AI language models never involved. From a systems science perspective, ChatGPT's innovation lies in satisfying environmental entropy input and opening the critical node of "system-individual feedback." This self-supervised learning feedback, aided by deep learning technology, enables ChatGPT to "emerge" an "infinitely intertwined picture" for the human world—a picture that echoes Engels' analysis: "When we reflect on nature, human history, or our own mental activity, what first presents itself to our eyes is a picture of infinite interconnections and interactions."

However, the content generation connections in current AI have not been fully understood by humans. From the emergence theory perspective, this means: "only the butterfly transformation result" is visible without knowing its "metamorphosis process"—possessing "a complex system composed of countless individual components or factors" while being "unable to predict its collective characteristics." This AI development paradigm still fails to escape existing critiques of artificial intelligence. Liangjia Wang, starting from emergence theory and combining symbolic, connectionist, and behaviorist paradigms, summarized three classic critiques of AI: semantic understanding and intentionality critique, biological foundation and embodied critique, and the critique of lacking emotional, tacit, and telepathic capabilities. This section examines ChatGPT's current problems from these three critical perspectives of emergence theory, combined with practical usage analysis.

### 3.1 Semantic Understanding and Intentionality Critique Dissolved: Machine Text Copyright Disputes or Content Monopoly

Searle questioned AI's semantic understanding and intentionality: computer programs are purely syntactic, while human language expression is semantic; computer programs cannot think but merely perform pattern matching according to rulebooks. ChatGPT, as an outstanding AI language model, has evolved from copying sentences to copying meanings and then to human-like interaction, which to some extent dissolves Searle's critique of AI understanding and intentionality. However, this disruption generates new challenges for copyright protection.

First, ChatGPT's meaning-copying function will break through existing plagiarism detection systems for academic misconduct. According to OpenAI, the latest ChatGPT's training data at the hundred-billion level has certain delays, so when data is insufficient, ChatGPT may fabricate literature and data to answer user questions, as shown in [Figure 7: see original paper], where ChatGPT generated non-existent scholar information. However, Professor Maosong Sun believes that once ChatGPT integrates with search engines, it can achieve iterative updates of stored data. ChatGPT can create answers based on meaning copying rather than sentence copying according to the latest data. As mentioned earlier, databases like CNKI and Wanfang cannot effectively detect duplication in ChatGPT-generated content—a problem that academia and industry are still exploring, awaiting mature solutions.

Second, whether texts generated by AI language models like ChatGPT possess copyright remains contested. If included in copyright protection regulations, it would create content monopolies for companies like OpenAI based on their first-mover advantage in AI. If copyright attribution for AI language models is completely denied, it neglects the contributions of model designers. This dilemma and paradox require broad, authoritative international institutions and organizations to lead dialogue mechanisms and jointly formulate copyright agreements for AI language models like ChatGPT.

### 3.2 Biological Foundation and Embodied Critique Remains: The "Pseudo" Presence of Human-Machine Collaboration

As an AI language model, ChatGPT has not detached from the "human" user subject and cannot simultaneously possess biological foundations and computational models to interact with the world environment. Interactivity constitutes the basic dynamic of cognitive emergence theory, manifesting as object-object, mind-object, and mind-body-object-environment interactions or structural coupling. Dreyfus emphasized the role of the body in intelligent behavior. From this perspective, current AI like ChatGPT has not incubated truly human-like service products. Therefore, the primary direction for sci-tech journals using ChatGPT revolves around content knowledge systems, such as digital platform construction, enhanced publication incubation, and improving derivative value

of knowledge service products, rather than replacing human editorial staff.

### 3.3.1 Technical Black Box Raises Ethical and Moral Concerns

In *AI Superpowers*, Kai-Fu Lee raised concerns about AI, noting that deep learning algorithms implicitly contain biases difficult to detect beyond technical aspects. Humans have tamed ChatGPT with its outstanding content creation capabilities through massive data and model optimization, but ChatGPT does not maintain a completely neutral and objective stance. In December 2022, Assistant Professor Yang Yu from Tsinghua University's Institute for Interdisciplinary Information Sciences led a team to assess ChatGPT's level of gender discrimination. Test results showed that ChatGPT predicted teachers as male with over 70% probability and doctors as male with over 60% probability, inheriting human gender stereotypes. Beyond OpenAI's ChatGPT, Microsoft's Tay chatbot also generated discriminatory remarks against minority groups. Whether AI language models like ChatGPT will perpetuate racial and political biases in human society and produce differential outputs when used by journal editors for content creation, topic planning, or paper screening remains questionable.

### 3.3.2 Single-Objective Function and Fairness Value Displacement

Another explanation for why AI like ChatGPT has not escaped emergence theory's critique regarding emotions and ethics lies in the singularity of AI objective functions and the adverse externalities from focusing solely on optimizing single objectives. Kai-Fu Lee argues that AI training currently targets single objectives, potentially causing AI to over-pursue corporate performance goals without considering user welfare. From an economic perspective, if sci-tech journals use AI language models like ChatGPT to screen submissions and create knowledge service products with only equilibrium price as the target, although social surplus value may be maximized and efficiency optimized, fairness will be compromised. In other words, ChatGPT may guide sci-tech journals and publishers to select content that best matches human interests or popularity, including vulgar or sensationalist material, while neglecting information truly valuable to human society or content with humanistic concerns.

### 3.3.3 Non-Explainability or Non-Reproducibility Increases Trust Crisis Risk

Results derived from AI like ChatGPT possess non-explainability—showing only causality while lacking logically coherent simplicity and reproducibility—making them more likely to trigger distrust in human society. Although journal editors can directly use ChatGPT for literature duplication detection or to determine whether content is machine-generated, ChatGPT can only provide single results without being able to reproduce the process and logic behind them, preventing editors from conducting secondary verification. At the level of human society's larger system, complete reliance on ChatGPT, which cannot be secondarily

examined or explained in human language, may reproduce phenomena like AlphaGo defeating top human player Lee Sedol. However, in humanities and social sciences fields where absolute objectivity of "1," "0," "yes," or "no" does not exist, this will amplify the social distrust exacerbated by AI language models like ChatGPT.

As a mature and commercially deployed AI language model, ChatGPT has created a new paradigm for the integration of AI and sci-tech journals. With AI language models like ChatGPT, editors and reviewers can be liberated from mechanical, repetitive, and tedious screening and proofreading tasks, collaborating with machines to rapidly improve review efficiency while better leveraging human creativity. Although current ChatGPT and upcoming models like Baidu's "Wenxin Yiyan" may still face disputes over copyright and ethics, AI technology remains in dynamic development. For the issue of single-objective functions in AI, Tristan Harris proposed a hybrid complex objective function solution. ChatGPT's current shortcomings such as data fabrication and missing literature citations will likely be overcome as OpenAI integrates its language models with intelligent search engines (like Bing) and more extensive data and training. Meanwhile, the vision of sci-tech journals using ChatGPT to create virtual digital humans, launch video paper presentation modes, and deeply integrate with metaverse technology development will become reality.

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