FRONTLINE SOCIAL SCIENCES AND HISTORY JOURNAL
(ISSN – 2752-7018)
VOLUME 04 ISSUE 11 Pages: 08-19
OCLC – 1276789625
Crossref doi Google Scholar WorldCat MENDELEY
FRONTLINE JOURNALS
Publisher: Frontline Journals


Journal Website: https://frontlinejournals.org/journals/index.php/fsshj



Research Article

# ARTIFICIAL INTELLIGENCE AND TEXT-PROCESSING GENERATIVE TOOLS: EFFECTIVE USE OF CHATGPT IN WORKING WITH SCIENTIFIC TEXTS

**Submission Date:** October 25, 2024, **Accepted Date:** October 30, 2024,
**Published Date:** November 06, 2024
**Crossref doi:** https://doi.org/10.37547/social-fsshj-04-11-02

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## ABSTRACT

Today, artificial intelligence tools have opened the door to fantastic opportunities for scientists conducting scientific research. In particular, artificial intelligence tools such as ChatGPT make it very convenient to write scientific articles. Using ChatGPT, you can quickly and easily write a scientific article, develop an article plan, add facts and evidence, and improve the style of the article. However, using ChatGPT also has its restrictions and rules because artificial intelligence cannot reflect the full human potential. In this thesis, several issues, such as why researchers should use ChatGPT, how to write an influential scientific article using ChatGPT, and the limitations of this artificial intelligence tool, are analyzed.

## KEYWORDS

Artificial Intelligence, ChatGPT, scientific article, editing, analysis, research, researcher.

## INTRODUCTION

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Today's modern world has become increasingly fast-paced and complex. This can be attributed to several factors, including the intensification of military and ethnic conflicts, gender equality issues, the struggle for universal principles, and technological phenomena. High technology, automation, and working with vast databases have permeated almost every sphere of human life, contributing to this complexity. Undoubtedly, one of the significant topics in technology today is artificial intelligence (AI) and its application across various fields.

Artificial Intelligence (AI) refers to a set of technologies that enable computers and internet networks to perform tasks relying on human intellectual capabilities. Examples include data reading and classification, natural language processing, and more. A key technology in AI is neural networks, which mimic the function of neurons in the brain, allowing computers to learn (or imitate) human experiences (Copeland B., 2024).

As it is known today, the field of AI traces back to pioneering research conducted by British mathematician, cryptographer, and logician Alan Turing. In 1936, he introduced the "Turing machine" concept to science. Only after his passing, in 1956, was the term "artificial intelligence" coined, and the first conference on AI was held at Dartmouth College in New Hampshire, USA (Copeland Jack., 2004).

Over the years, AI's development has significantly impacted various aspects of life, including the labor market. Driven by technological progress, companies have increasingly utilized AI to optimize processes, enhance efficiency, and reduce costs.

Improving data collection and processing technologies has boosted productivity across numerous fields, from medicine to finance and marketing to manufacturing. AI has led to advancements across all sectors, including journalism. In the media industry, AI usage has manifested differently across various domains. This can be observed in the following examples.

## METHODS

### 2.1. The Impact of Artificial Intelligence on the Media Industry

Today, AI is being utilized globally in journalism for hybrid automation in news programming, encompassing multi-faceted automation, intelligent data analysis, content production, and news curation processes (Diakopoulos N., 2019). Through qualitative text analysis, Chan-Olmsted examined the practical aspects of AI use in media

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and developed eight primary classifications for its application in the industry (Chan-Olmsted S. M. , 2019):

- Content creation;
- Content management;
- News optimization;
- Process automation;
- Audience recommendations and content search systems;
- Audience engagement;
- Leveraging audience expertise;
- Audience understanding.

AI innovations are increasingly beneficial for people by addressing challenges and creating new approaches to existing job roles (Hessman T., 2017).

The application of AI in journalism has sparked contentious debates regarding its potential negative impacts on social dynamics. Concerns have emerged among media professionals about whether artificial intelligence could replace journalists (Sundar S., 2020). There are also fears that AI in journalism could displace the human factor in the field (Latar, N., 2015). However, from a social constructivist perspective, Linden (Linden C., 2017) emphasized that technology is shaped by human experience, demonstrating that AI replicates rather than fully replaces human behaviors. In this context, journalists remain a guiding force in preventing and mitigating the negative impacts that technology may bring.

### 2.2. The Impact of Artificial Intelligence on Text Processing

Generative AI is an algorithm that creates content (text, images, video, and audio) based on user instructions. Specifically, text-processing generative AI tools, such as ChatGPT, operate through a text-based neural network, where both input and output are text-based (Lim W. M. and et al., 2023). The foundation of all text-processing generative AI tools is language models. These tools utilize recurrent neural networks (RNNs) to calculate the probability of certain words appearing in sequence or proximity to one another (Luitse D. and Denkena W., 2021). Thus, the generative approach to text processing has changed with the introduction of transformer algorithms (Bouschery S. and et. al., 2023), which automatically establish connections between each part of the input data.

Considering that editing constitutes the foundation of text processing, the introduction of AI into the field has begun to shape new directions and concepts in editorial work. One such concept is generative artificial intelligence for text processing. This technology is intriguing

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and beneficial for all specialists working with text, including journalists, editors, copywriters, rewriters, publishers, translators, and researchers.

What is generative AI that assists in text processing? Generative AI in text processing is a technology that is increasingly gaining popularity among content specialists. It consists mainly of computer algorithms "trained" on large volumes of text that replicate what they have learned. Text-processing AI tools cannot think like humans; thus, the text generated by technology and the editorial work requires human oversight and intervention.

ChatGPT (Chat Generative Pretrained Transformer 3.5) is a large language model developed under the initiative of OpenAI, a company founded in San Francisco in 2015 by Elon Musk, Sam Altman, Greg Brockman, Ilya Sutskever, Wojciech Zaremba, and John Schulman (Bhattacharjee A., and Liu H., 2024). ChatGPT is part of a series of GPT models released by OpenAI. The first GPT, GPT-1, was introduced in 2018 and was utilized and studied in numerous articles, patents, and services worldwide. In 2019, OpenAI presented GPT-2; however, the complete model data still needs to be published due to potential misuse. In 2020, OpenAI released GPT-3.5, one of its largest and most advanced language models. ChatGPT is a version of the GPT-3.5 model and a chatbot OpenAI developed. In this context, ChatGPT is a language model that can provide responses that correspond to human speech by learning from large volumes of data. Large organizations like OpenAI trained ChatGPT using extensive written text libraries. To ensure ChatGPT's universality and effectiveness, thousands, if not millions, of examples were required. Generative AI cannot create "original" content. For generative AI—such as ChatGPT—to be effective in text processing, all necessary information must be available online and accessible to everyone. AI cannot read text encoded, hidden in PDF documents, or included in graphic images. Therefore, it may not yield the expected results.

Since its public launch on November 30, 2022, ChatGPT attracted the attention of over a million users within a week and received significant coverage in the media (Roose K., 2022). This success demonstrates that ChatGPT is one of the most exciting developments in AI (Aljanabi M., 2023). ChatGPT is the most advanced language model created to date (Rudolph J. and et. al., 2023) and is the strongest among chatbots (Heaven W., 2020). Some experts believe it could

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replace Google within a few years and become the world's most powerful search engine (Adetayo A., 2023).

In this research, the tahrirchi.uz team will specifically focus on the main application areas of text generators operating within the ChatGPT system: their effectiveness in working with scientific and popular scientific texts, as well as in the editing and rewriting processes.

### 2.3. The Role of Artificial Intelligence in Writing Scientific Research Papers

Today, artificial intelligence tools have opened up enormous opportunities for scientists conducting research. In particular, AI tools like ChatGPT are creating several conveniences in writing scientific papers. With the help of ChatGPT, researchers can quickly and easily write a scientific paper, develop an outline, incorporate facts and evidence, and improve the writing style of the article. However, certain limitations and regulations are also associated with the use of ChatGPT. This is because artificial intelligence cannot fully reflect human potential.

AI tools like ChatGPT are becoming increasingly important in scientific research (Kurian N. and et al., 2023). In this age of technology, many researchers are effectively utilizing ChatGPT's services (Hutson M., 2022). By using these tools appropriately, which operate within the framework of artificial intelligence—one of humanity's greatest inventions—researchers can find reasonable solutions to existing problems in their fields, advance new hypotheses and perspectives, and achieve good results in terms of time and quality. The only condition is that these tools must be used while adhering to ethical standards (Oçak Z., 2023).

## RESULTS

Writing a scientific paper is a time-consuming process. Researchers must gather, sort, and review literature on their chosen topic and extract relevant quotes that align with their perspective. AI tools like ChatGPT help save time by performing these organizational tasks in seconds. This allows authors to save time and focus on the article that needs to be addressed in their research.

Furthermore, AI tools like ChatGPT help identify errors, inconsistencies, or gaps in arguments within the paper, thereby improving the quality of writing. Additionally, ChatGPT can assist in grammar and sentence construction in English, suggest appropriate vocabulary, and help translate text from one language to another.

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In addition to the above, ChatGPT can assist in suggesting article titles, summarizing or expanding research texts, discussing results, recommending creative ideas, and detecting plagiarism. Overall, using artificial intelligence tools like ChatGPT significantly aids researchers in writing their scientific and analytical papers more effectively and accurately, thus improving the quality and impact of their research results.

### 3.1. How does ChatGPT work?

Before understanding how ChatGPT operates, it is worth briefly discussing the definition of artificial intelligence. Artificial intelligence is a distinct field of computer science that focuses on creating computer systems capable of performing tasks associated with human intelligence, such as understanding language, learning, reasoning, problem-solving, and translating (www.openai.com, 2024).

ChatGPT is a chatbot developed by OpenAI, one of the American companies, that operates on an artificial intelligence basis. It is built on a deep neural network structure known as the transformer model, which utilizes a self-attention mechanism that differentially measures the significance of each incoming data point. The transformer model is designed to analyze vast corpora of text data to investigate context.

When a user inputs a text-based query, ChatGPT reads the entered text and searches for the appropriate response among similar texts previously inputted. Responses can be provided in formats ranging from short answers to lengthy essays and even in a conversational style (Dönmez I. and et. al., 2023).

Artificial intelligence tools like ChatGPT have become famous for many applications, including automated content creation, text translation, and natural language processing (Mohamed Hammad, 2023).

### 3.2. How Can ChatGPT Assist Researchers in Writing Scientific Papers?

ChatGPT can assist researchers in reviewing, sorting, and analyzing literature.

Topic Selection: ChatGPT reviews literature using relevant keywords and helps researchers choose a topic aligned with their area of focus. For example, a journalist-researcher might write, "What is the role of artificial intelligence in text editing?" ChatGPT would generate a list of research directions using relevant keywords, such as "The Role of Artificial Intelligence in Media Text Editing."

Literature Search: ChatGPT aids researchers in finding relevant literature by suggesting important databases and resources related to the

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topic. For instance, a researcher could ask, "Which database is better for finding articles on automated editing?" ChatGPT would then compile a list of literature related to the topic using keywords like "automated editing" and "article."

Article Selection: ChatGPT can help researchers review scientific papers necessary for literature reviews in thesis and article writing, providing summaries. For example, if a researcher asks, "Can you summarize the results of recently published articles on natural language processing?" ChatGPT would analyze the main conclusions of articles published on that topic and generate a brief overview of its relevance.

Quoting and Referencing: Researchers can submit requests to create citations in any style through ChatGPT. This artificial intelligence tool can format references, such as APA format, according to the requested style.

Overall, ChatGPT assists researchers in selecting topics relevant to their field, searching for literature and articles, analyzing and summarizing them, and providing citations, thus helping to accomplish many time-consuming tasks.

## DISCUSSION

### 4.1. ChatGPT and Text Quality

ChatGPT, like any artificial intelligence tool, has limitations despite its advancements.

Lack of Context: AI tools like ChatGPT sometimes do not fully understand academic texts' context and nuances. This can lead to providing information or literature that is only somewhat relevant to the research topic.

Incorrect Information: AI tools operate based on pre-existing databases, so they can produce inaccurate conclusions and responses on topics that still need to be well-studied. Consequently, they may suggest biased or incorrect recommendations.

For instance, on August 20, 2024, a news story that gained widespread attention on social media and in the media world was titled "Advice from a Book Written by ChatGPT Poisoned a Family." (Umarkulov A, 2024) The report indicated that a family of mushroom foragers in the UK was poisoned after following a book recommendation generated by ChatGPT. The head of the family, who was hospitalized, noted that the book on Amazon contained illustrations and advice that included several dangerous errors.

It was emphasized that the proliferation of books written by neural networks seriously threatens novice mushroom foragers.

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Because such sources often contain incorrect information, including recommendations on "identifying poisonous mushrooms by taste and smell," which can lead to disastrous consequences, journalists from The Guardian conducted an investigation. They found that such books are entirely composed of texts generated by ChatGPT and possess an unnatural literary style that does not correspond to the topic. As a result, the international online bookstore Amazon removed some of these dubious books from sale. However, the problem of coarsely written and vague literature due to neural networks still needs to be solved.

Creative Dependence: Such unfortunate situations illustrate the necessity for editors and specialists to review any information, particularly scientific data, generated by AI systems. Over-reliance on AI tools may diminish creative and critical thinking, as well as the ability to assess text quality independently.

Technical Limitations: AI tools may struggle to understand complex scientific concepts, technical terms, or the subtle nuances of scientific texts. This issue becomes even more pronounced when translating artistic and scientific works through AI. During our research, we noted that when the Turkish-language book "Şah-i Nakşibend" was translated through AI, the sentence "O sırada Bahaddin, içinde ve dışında dürülen uzun ince yollarda gönlündeki düğümlerin çözümüne yürüyordu" was rendered into Uzbek as "O'shanda, Bahouddin, uzun yupqa yo'l ichkari-tashqi dumalab ketdi. U yuragidagi tugunlarni hal qilish tomon yurardi," which is nonsensical and incorrect. The team at Tahrirchi. uz observed several shortcomings in materials translated and edited through AI programs during our research, having worked on more than ten scientific articles.

Language Limitations: Most AI tools have been developed in English, and their integration into other languages depends on demand. Currently, there is no Uzbek-language equivalent of ChatGPT. Therefore, Uzbek researchers are required to communicate in English through this AI tool.

### 4.2. Artificial Intelligence and Plagiarism

AI tools like ChatGPT can generate texts similar to those found in previously published articles or online resources, thus offering potentially plagiarized content. In scientific research, the risk of plagiarism is a severe potential issue that must be acknowledged.

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Experts have developed several recommendations to prevent this, helping researchers make effective use of AI capabilities:

1. Summarizing Findings: Researchers should summarize the conclusions suggested by AI and articulate their views and opinions on the matter.
2. Citing Sources: When using AI-generated text, researchers must accurately reference the sources utilized in the text. This requires adhering to proper citation practices and quotation rules.
3. Plagiarism Checks: When using the ChatGPT service, researchers should run the text through a plagiarism checker. This helps prevent copyright infringement.

## Conclusion

It is important to note that effective use of artificial intelligence tools can benefit any field, particularly in scientific research. Based on the above considerations, we propose the following hypotheses:

1. In the near future, AI's contributions to scientific research may be specifically acknowledged. For instance, journals may review previously published articles by indicating the percentage of input from AI tools in editing and conceptual contributions, or measures may be taken to prevent authors from improperly using AI.
2. AI may become an integral part of most research. It can be regarded not as a deficiency but as a research tool.
3. Systems that operate with AI will always require oversight in both design and practice. This necessity will drive AI developers to seek improvement and continuously enhance service quality. Therefore, research produced with the aid of AI cannot fully replace human potential. That is to say, AI tools should be used, as mentioned above—as instruments to improve the quality of work.

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