The Forms and Development Strategies of Artificial Intelligence Involvement in News Production

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Abstract. With the rapid development of technology, AI technology has deeply penetrated various stages of news production. From content generation, editing, and distribution to data analysis, it has shown great influence and application potential. This paper analyzes the various forms in which AI is involved in news production, such as automated news writing and editing, technical advancements in news data collection and analysis, and the personalization of news expression and experience. It also explores the challenges AI faces in news production, including the limitations of content generation, privacy and copyright issues, and how to ensure the authenticity of information. The paper provides strategies to address these challenges, aiming to promote the healthy and sustainable development of AI technology in news production, bringing new vitality and opportunities to the news industry.

Keywords: Artificial intelligence, news production, development strategies

1. Introduction

In today's era of information explosion, the rapid development of technology is transforming our lives and work in unprecedented ways, and the news industry is no exception. With the continuous innovation and breakthroughs in technologies such as big data, machine learning, and natural language processing, artificial intelligence (AI) has extensively and deeply penetrated various stages of news production. This technological revolution has not only radically altered the traditional processes of news gathering, production, and distribution but has also significantly enhanced the efficiency of news production. Moreover, it has greatly enriched the forms of news content and optimized news dissemination channels, taking the automation and intelligence of news production to new heights.

The introduction of AI technology has made news production more personalized and precise, meeting the growing and diversified needs of users, and bringing unprecedented development opportunities to the news industry. AI was initially introduced as an auxiliary tool in news production, such as translation software, speech-to-text programs, and typo-checking tools. Today, automated news writing technologies have matured, with applications like Narrative Science's news-writing robots, the Associated Press's WordSmith, and Tencent's Dreamwriter becoming indispensable in news production.

In recent years, human-machine collaboration has become a new trend in news production. The continuous emergence of new technologies and applications, such as AI news anchors and personalized recommendation algorithms, has further enriched the means and methods of news production, providing users with a more immersive news experience. Reviewing the development of AI involvement in news production, we can observe its evolution from the stage of auxiliary enhancement to automated production applications, and now to a stage of collaborative human-machine integration.

However, the application of AI technology in news production also faces numerous challenges and issues, such as the limitations of content production, protection of privacy and copyrights, and ensuring the authenticity of information. Therefore, this paper aims to comprehensively explore the development process, forms, challenges, and corresponding strategies of AI involvement in news production. The goal is to provide valuable insights to promote the healthy and sustainable development of AI technology in news production, injecting new vitality and opportunities into the news industry.

2. Forms of AI Involvement in News Production

With the rapid development of AI technology, its application in news production has expanded, moving from initial theoretical research and discussion to widespread and in-depth practical operations. A study of 106 cases from the mAkIngnews database shows that AI technology's applications in news communication cover 13 fields, with forms such as automated news writing, news reporting, enhanced journalist reporting, video image processing, and personalized recommendation falling under the category of news production, making up 58% of the applications [1]. (Figure 1)
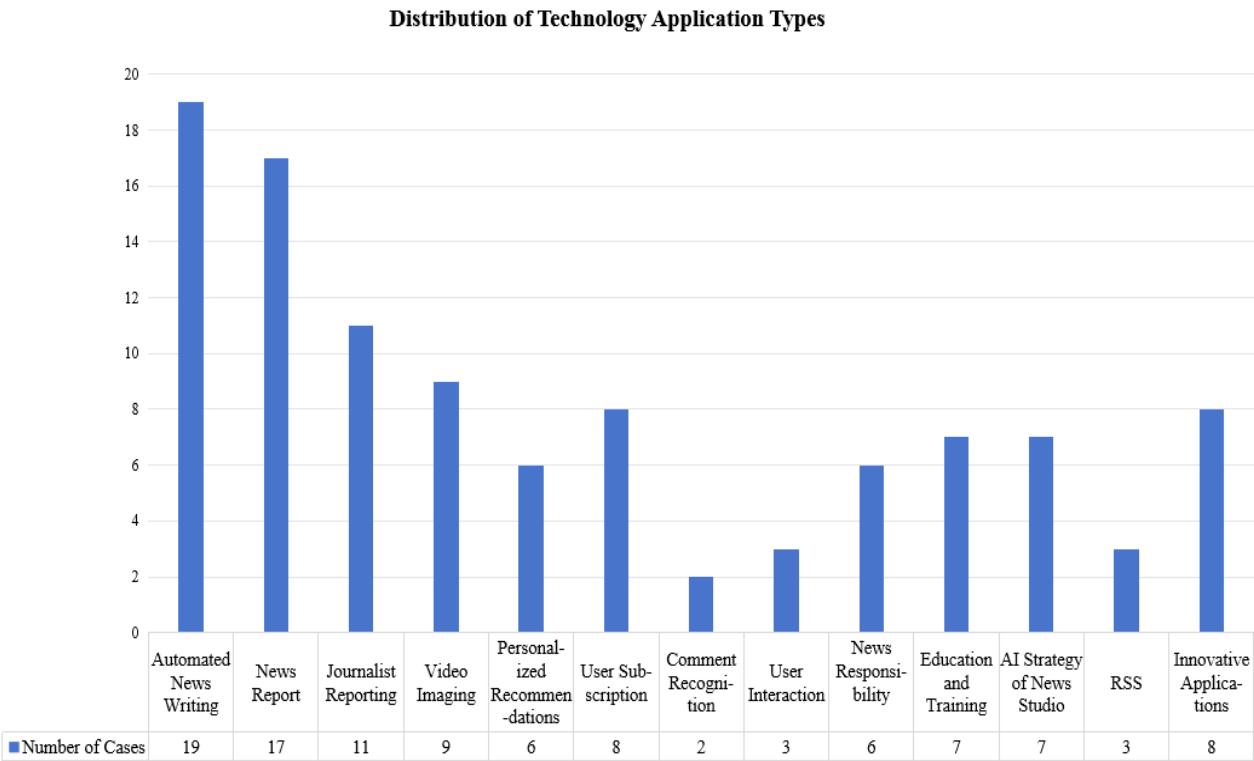

Figure 1. Distribution of AI Technology Applications in News Communication
(Image Source: https://mp.pdnews.cn/Pc/ArtInfoApi/article?id=33462269)

In the process of news production, the application forms of artificial intelligence (AI) show a variety of characteristics, mainly reflected in the following aspects:

2.1. Automation of News Writing and Editing

The traditional news content creation process is complex and labor-intensive. From interviews and information gathering to drafting reports and editing reviews, each step requires a significant amount of time and effort from journalists and editors. Journalists gather first-hand information through on-site interviews, while editors review the content for accuracy, adjust structure and language, and ensure the quality of the report. This process not only consumes time and energy but may also affect the timeliness and production efficiency of news due to human resource limitations.

With the advancement of AI technology, the automation of news writing and editing has been realized. AI news-writing robots can automatically generate news articles that meet the required standards based on predefined algorithms and templates. These robots can not only quickly write templated news such as finance and sports but also continuously improve the quality and accuracy of their writing through learning and optimization. AI news-writing robots are not constrained by time or location, and they can analyze datasets and generate news articles according to templates in a very short time, independently completing a large volume of routine, data-driven news reporting. This relieves the burden on journalists and allows for 24-hour continuous news reporting, significantly enhancing the efficiency and speed of news production and dissemination.

For example, Xinhua News Agency's automated news writing system, "Media Brain," can quickly analyze financial reports and sports event data, producing news articles instantly. This system can output a market analysis article within minutes of the close of stock trading, improving the speed of publication while avoiding errors that may occur during manual data interpretation. Sohu's "Xiaosou," an automated news production robot, excels in quickly generating and updating sports news, especially during major events such as the Olympics and the World Cup, where it can provide real-time updates on match results and related news,

greatly improving the timeliness of reporting. Internationally, one of the pioneers in automated news production is the Los Angeles Times' "Earthquake Bot," Quakebot, which can automatically publish preliminary reports within minutes of an earthquake by analyzing seismological data. Quakebot works by fetching real-time earthquake alert data from the United States Geological Survey (USGS) and filling it into a pre-designed news template to quickly generate a news report [2].

In addition, intelligent editing systems play a crucial role in news production by assisting editors in reviewing and modifying news content, thereby improving the quality and readability of news articles.

2.2. Technological Advancements in News Data Collection and Analysis

Before the advent of AI technology, news data collection and analysis were primarily reliant on human efforts. Journalists would traditionally gather news leads and information through reading large volumes of material, watching news videos, manually searching social media posts, and conducting street interviews, among other methods.

In the early stages of news production, AI, through technologies such as web crawlers and natural language processing, can quickly collect, analyze, and process vast amounts of data, accurately identifying and extracting key information. It can also classify, filter, and organize the data according to different requirements. Compared to manual data collection, AI allows for customized settings based on specific needs, fulfilling information collection requirements in various scenarios while avoiding human interference and ensuring data accuracy. This precision is especially critical in news data analysis, as it helps journalists quickly find valuable news leads and reporting angles, providing the audience with more timely and targeted news, thus ensuring the efficiency and quality of news production.

By leveraging AI technology, news reporting can present data in a visualized format, which is not only intuitive and easy to understand but also helps users better grasp the information and trends behind the data. In data journalism, for instance, AI can generate various charts and visual reports based on the collected data. These charts and reports can clearly display the relationships and trends between data points. Through in-depth analysis of the data, AI can help journalists identify key information, determine the theme and structure of the news, and assist the audience in better understanding the news events and the implications behind the data.

2.3. Personalization of News Expression and Experience

AI technology is profoundly transforming the news industry, particularly in terms of news expression and user experience, where its personalization characteristics are becoming increasingly prominent.

With the intervention of AI technology, personalized news expression is mainly reflected in the customization of content. AI analyzes audience reading habits, geographic locations, interests, and other multi-dimensional data to provide customized news content tailored to target audiences' needs. This personalized news delivery not only meets users' individualized demands but also enhances the relevance and readability of news. For instance, news applications may recommend relevant news based on users' interest tags, allowing them to quickly access the information they are most interested in. Additionally, AI offers diverse news formats such as videos, audio, and charts, enriching the methods of news expression while improving the audience's reading experience. For example, for users who prefer video news, AI can prioritize video news recommendations, while for users who enjoy data-driven news, AI can recommend content that includes detailed data visualizations.

The involvement of AI technology has also led to personalized news experiences for audiences. Through advanced recommendation algorithms, AI can recommend news content that aligns with users' personalized preferences based on their reading history and interests. Users no longer need to spend a significant amount of time searching for content of interest amidst a flood of news; instead, they can directly access the most relevant news through recommendation algorithms. For instance, the intelligent recommendation system of "Toutiao" uses deep learning and natural language processing to provide personalized news recommendations based on users' reading habits and preferences. This system not only improves the efficiency of news distribution but also enhances the reading experience.

Moreover, technologies such as virtual reality (VR) and augmented reality (AR) provide users with intelligent, immersive, interactive news experiences. The *New York Times*' "Displaced" VR project allows users to experience the lives of children in war-torn environments while accessing news. In this project, users wear VR equipment to immerse themselves in the survival conditions of children displaced by war. AI technology transforms the user's news experience into a multi-dimensional, all-encompassing, and immersive personalized experience [3].

3. Issues in the Development of AI Involvement in News Production

The application of AI technology in news production is becoming increasingly widespread, significantly improving the efficiency and reach of news production. However, while AI plays an important role in news production, it also brings a series of challenges.

3.1. Difficulty Ensuring News Authenticity

The essence of news is its truthfulness. Although AI technology can quickly generate a large volume of news reports, it is difficult to ensure the authenticity and accuracy of the content.

First, AI news reporting mainly relies on algorithms and data analysis, and the authenticity of its content is highly dependent on the accuracy and completeness of the input data. Data can be biased, erroneous, or misleading. AI news reports often use data sources that have not been manually verified, leading to inaccuracies in the news content. Additionally, algorithm design can introduce biases, causing the perspective and content of the news to deviate from objective facts. Thus, the authenticity of AI-generated news is largely constrained by the quality of the input data and the rationality of the algorithm design.

Second, AI's involvement in news production reduces the technical threshold for producing news, making it easier for malicious actors to fabricate rumors and generate realistic images, audio, or videos, challenging the common belief that "seeing is believing." The rise of fake news generated through AI is substantial. In June 2024, a piece of news surfaced on online platforms titled "The Clash Between Law Enforcement and Humanity: A Woman in Her Fifties Dies After Her Electric Bike Is Confiscated." The report claimed that a woman in Chengcheng County, rushing to care for her gravely ill father, encountered traffic police. After begging in vain and having her electric bike confiscated, she collapsed emotionally and suffered a heart attack, leading to her death. After investigation, this news was found to be fake. A man named Tian used AI tools to fabricate and publish this false information, which caused significant negative impact locally.

According to the 2024 Artificial Intelligence Security Report published by Qi An Xin Group, AI-driven deepfake fraud increased by 3,000% in 2023, and AI-based phishing emails rose by 1,000%. These figures indicate an extremely rapid growth in AI-generated fake news [4].

3.2. Ethical Issues in Journalism Becoming Prominent

The ethical issues exposed by the use of AI technology in news production are becoming increasingly prominent. In addition to concerns about the authenticity and fairness of news, these issues extend to personal privacy, copyright protection, and other areas.

AI's infringement on personal privacy in news production is a growing concern. During the process of news gathering and reporting, AI technology may unknowingly collect, mine, and analyze personal data without authorization, thereby violating individuals' privacy rights. For instance, some news organizations use AI to track and analyze users' online behavior to obtain exclusive news or make personalized recommendations. This practice often occurs without users' consent, thereby infringing on their privacy rights. In February 2024, Reddit reached an agreement with Google, allowing Google to use Reddit's vast high-quality user content for AI model training. According to Reuters, the data trading market is currently valued at approximately $2.5 billion and is expected to rise to $30 billion within the next decade. The U.S. Federal Trade Commission (FTC) has launched an investigation into this matter, claiming that such data trading practices may violate privacy protection or intellectual property regulations.

The issue of copyright protection and infringement in AI-generated news is another urgent problem. Some news organizations use AI technology to quickly generate and publish news content, but this content often lacks originality and may even directly copy or adapt works already published by other media outlets. This behavior not only infringes on the copyright of the original authors but also damages the reputation and credibility of the news industry.

AI-powered news recommendation systems often base their recommendations on users' personal preferences and habits. While this personalized recommendation enhances the user experience, it can also lead to the creation of an "information cocoon," where users are exposed only to news content that aligns with their existing views, making it difficult to encounter alternative perspectives. This can result in biased understanding and misinterpretation of social events. For example, some social media platforms use AI to recommend news content that matches users' interests, causing them to focus only on topics and viewpoints they find appealing while overlooking other important but less popular issues and viewpoints [5].

3.3. Lack of Depth and Humanistic Concern in AI-Generated News

AI-generated news typically relies on data and algorithms, allowing for the rapid production of news articles. However, it often falls short in terms of in-depth analysis, investigating the background of events, understanding the causes of incidents, and evaluating their social impact. The mechanical nature of AI news production means that the content frequently remains superficial, lacking depth and insight.

News reporting is more than just a compilation of facts; it involves understanding the context, background, and emotional nuances of the subjects involved. When dealing with complex information, AI lacks the profound understanding of human emotions and social culture, resulting in an inherent deficiency in humanistic concern.

For instance, AI writing tools can automatically generate financial news, quickly reflecting market dynamics. However, due to the absence of in-depth analysis and humanistic concern, readers often only receive data-level information, without AI being able to interpret the economic phenomena and social implications behind the numbers. When reporting on disaster news, AI-generated reports may only provide basic disaster statistics and updates on rescue efforts, but unlike human journalists, AI cannot conduct

on-the-ground interviews, dig into meaningful details, or showcase the human spirit in times of crisis. This leaves AI-generated news lacking in humanistic concern and emotional resonance.

4. Development Strategies for AI Involvement in News Production

As AI-generated news becomes increasingly widespread, its efficient and rapid information processing capabilities have brought unprecedented changes to news dissemination. However, how to promote the healthy development of AI news production and facilitate human-machine collaboration remains a pressing issue.

4.1. Strengthening News Verification Mechanisms

The efficiency of AI news production has accelerated the spread of information, but it has also increased the risk of inaccuracies. News verification mechanisms play a crucial role in ensuring the authenticity of news content in AI-generated reports.

First, establishing strict news source verification protocols is essential to ensure that the news materials collected by AI are authentic and reliable, thereby guaranteeing the truthfulness of AI-generated news from the source. Second, incorporating AI technology to assist with verification, using techniques such as natural language processing to conduct in-depth analysis of news content, identify and filter out false information, and build evaluation models for news authenticity. Finally, introducing a human review stage, where professional news editors can verify the AI-filtered news, ensuring accuracy. Regular evaluations of the effectiveness of these verification mechanisms should also be conducted to maintain the authenticity of the news. Additionally, a news authenticity complaint and feedback system should be established, encouraging the public to report suspected false news, allowing for timely investigation and resolution.

4.2. Enhancing Human-AI Collaboration

Human-AI collaboration in news production refers to the cooperation and joint effort between humans and AI during the news production process, with the goal of producing high-quality news reports. The core of human-AI collaboration lies in fully utilizing both artificial intelligence and human intelligence to achieve efficient and high-quality news production, where both depend on and interact with each other to develop together [6].

Human-AI collaboration plays a crucial role in AI-driven news production. AI excels in collecting, organizing, and integrating vast amounts of information, handling repetitive and tedious tasks, thereby significantly reducing the workload of human journalists and editors. When humans and machines work closely together, the combination of human judgment and AI's data analysis capabilities allows news production to move beyond the surface-level information stacking of AI-generated news and to explore the deeper meanings behind events, enhancing the depth of the news. Moreover, human journalists and editors bring emotional understanding and humanistic care, making news more relatable to readers. Human editors can also refine and adjust AI-generated text, ensuring that the news is expressed more clearly and is easier to understand, thus improving its readability. Strengthening human-AI collaboration not only boosts the efficiency of news production but also enables a qualitative leap in the depth, humanistic concern, and readability of news content.

4.3. Improving Legal Regulations

The news industry is a vital part of society, and its healthy development is essential for social stability and the construction of democracy and the rule of law. With the intervention of technology in AI-driven news production, new challenges are emerging in terms of news ethics and professional integrity.

Improving legal regulations can provide a clear legal framework and regulatory mechanisms for AI-driven news production, fostering the healthy development of the news industry. By enacting relevant laws and regulations, the market order of the news industry can be standardized, preventing unfair competition and malicious infringement, while safeguarding personal privacy and copyrights. At the same time, such regulations can provide legal protection for news professionals, safeguarding their rights and promoting their enthusiasm and creativity.

5. Conclusion

This paper explores in depth the application, forms of expression, and development strategies of artificial intelligence (AI) technology in news production, revealing how AI has gradually penetrated various stages of news production, from content generation, editing, and distribution to data analysis. It illustrates how AI has become an indispensable part of the news production process.

With the rapid development of technologies such as big data and natural language processing, automated news writing has become possible and has emerged as a highlight of AI technology in news production. The introduction of automated tools like news-writing robots has significantly enhanced the efficiency and quality of news production, allowing news content to be delivered to audiences more quickly and accurately.

In recent years, human-AI collaboration has become a new model for news production, with AI applications expanding further. New technologies and applications, such as AI news anchors and personalized recommendation algorithms, have not only enriched the methods and means of news production but also provided users with more personalized and precise news services. These applications not only improve the level of intelligence in news production but also offer users a more immersive news experience.

However, the application of AI technology in news production also faces many challenges and issues. Ensuring the authenticity and objectivity of content, protecting privacy and copyright, and avoiding algorithmic bias are problems that require deep reflection and solutions. Therefore, while discussing the application of AI technology in news production, this paper also proposes corresponding development strategies aimed at promoting the healthy and sustainable development of AI technology in the field.

In conclusion, the application of AI technology in news production has already achieved remarkable success and demonstrated significant influence and potential. As technology continues to advance and its application scenarios expand, AI will play an increasingly important role in news production. We have every reason to believe that, with the assistance of AI technology, the news industry will embrace a broader development prospect and a brighter future.

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