

Artificial Intelligence Tools in Journalism: Roles and Concerns

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ABSTRACT

This paper provides a comprehensive analysis of artificial intelligence (AI) tools and their impact on modern journalism, examining their roles, applications, and associated challenges. The study explores various AI applications across key journalistic functions, including investigation, content creation, editing, distribution, video production, and translation. Through analysis of prominent tools such as Dataminr, ChatGPT, Deep Write, and Parse.ly, the research demonstrates how AI enhances journalistic capabilities in data analysis, content generation, and audience engagement. The paper identifies significant concerns surrounding algorithmic bias, job displacement, misinformation risks, and privacy issues in AI-driven journalism. Additionally, it examines future directions, highlighting developments in AI transparency, investigative capabilities, and multilingual journalism. The findings suggest that while AI tools offer transformative opportunities for improving journalistic efficiency and reach, their implementation requires careful consideration of ethical implications and the establishment of robust frameworks to maintain journalistic integrity. The study concludes that successful integration of AI in journalism depends on balancing technological innovation with ethical considerations and traditional journalistic values.

Keywords: Artificial Intelligence, Journalism, Tools, Challenges.

1. INTRODUCTION

Artificial intelligence (AI) is rapidly changing the landscape of journalism, bringing both exciting opportunities and significant challenges. With the rise of digital technology, news organizations are increasingly adopting AI tools to enhance various aspects of their operations. These tools assist with tasks such as content creation, data analysis, and personalized news delivery, allowing journalists to produce information more efficiently. For instance, AI can automate routine reporting on topics like sports scores and financial updates, freeing journalists to focus on more in-depth investigative work and storytelling.

However, the integration of AI into journalism is not without its concerns. One major issue is the potential for biased algorithms, which can impact the fairness and accuracy of news coverage. If AI systems are trained on biased data, they may inadvertently perpetuate stereotypes or exclude certain perspectives. Additionally, the reliance on AI tools raises questions about traditional journalistic standards, such as accountability and transparency. As AI systems take on more significant roles in content generation, the risk of misinformation and loss of human oversight becomes a pressing concern.

This review paper aims to explore the multifaceted roles of AI in journalism, highlighting both its benefits and the ethical and practical challenges it presents. By examining these aspects, we seek to better understand how AI is reshaping the future of news and the implications for journalistic integrity.

2. LITERATURE REVIEW

The integration of artificial intelligence (AI) in journalism has garnered considerable attention in recent years, highlighting its transformative impact on news production and dissemination. Various studies have examined the application of AI tools in journalism, revealing both the opportunities and challenges that arise.

AI technologies are being leveraged to automate routine tasks, enabling journalists to focus on more complex storytelling (Linden, 2017). For instance, automated content generation tools, such as Wordsmith, allow news organizations to produce data-driven articles quickly and efficiently (Davenport & Ronanki, 2018). These tools can analyze large datasets and generate reports on topics like financial earnings or sports statistics, significantly enhancing reporting efficiency. Similarly, AI-powered analytics help journalists understand audience

preferences and tailor content accordingly, leading to increased engagement (Noain-Sánchez, Amaya. (2022).

Despite these advancements, the use of AI in journalism raises critical ethical concerns. One major issue is algorithmic bias, which can distort news coverage and reinforce existing stereotypes (Diakopoulos, 2016). If AI systems are trained on biased datasets, the resulting content may reflect those biases, affecting the diversity and accuracy of news reporting. Furthermore, there is a growing concern about accountability in the use of AI-generated content. The lack of transparency regarding the algorithms and data used in AI tools can lead to questions about the credibility of news sources (Gutiérrez-Caneda, et al; 2024).

Additionally, the reliance on AI may threaten traditional journalistic values. As news organizations adopt automated tools, there is a risk of diminishing the role of human journalists in the editorial process (Ngoc, N. (2022). This shift raises concerns about the quality of journalism and the potential for misinformation, as AI systems may lack the critical thinking and ethical considerations inherent in human decision-making.

While AI offers significant benefits to the field of journalism, including increased efficiency and audience engagement, it also presents substantial ethical challenges that must be addressed. Future research should focus on developing guidelines and best practices for the responsible use of AI in journalism, ensuring that the integrity and credibility of news reporting are upheld.

2.1 Application of Artificial Intelligence in different area of Journalism

- Automated Content Generation
- Data Mining and Reporting
- News Gathering and Aggregation
- Personalization of Content
- Speech to Text Conversion
- Fact-checking
- Sentiment Analysis
- Image and Video Analysis
- Audience Analysis and Engagement
- Language Translation

3. USES OF ARTIFICIAL INTELLIGENCE TOOLS IN JOURNALISM

3.1 AI Tools In Investigation

Artificial intelligence (AI) tools are transforming investigative journalism by streamlining data analysis, improving source verification, and enhancing investigative techniques. AI-driven platforms offer journalists the ability to process large datasets, uncover hidden patterns, and provide credible insights in a fraction of the time required for traditional methods. This section explores key AI tools widely used in investigative journalism, including Dataminr, Maltego, DocumentCloud, the Truth Buzz program, and TinEye.

Dataminr is a real-time alert platform that leverages AI to detect breaking news events and emerging risks from publicly available data sources, such as social media and blogs. By processing massive amounts of data in real time, Dataminr helps journalists stay ahead of breaking stories, especially those involving critical events such as natural disasters, political movements, and public safety threats. The platform's ability to sift through unstructured data and identify newsworthy patterns makes it an invaluable tool for investigative reporters seeking to report on fast-evolving stories.

Maltego is another prominent tool in investigative journalism, particularly useful for mapping relationships between entities such as people, organizations, or networks. It utilizes AI and open-source intelligence to build visual graphs that allow journalists to analyze complex datasets, track connections, and reveal hidden relationships. Investigative journalists use Maltego for data mining and uncovering correlations that might be missed by conventional investigation techniques, particularly in stories involving financial crimes, political corruption, or cybersecurity threats.

Document Cloud is a cloud-based platform used to manage and annotate large volumes of documents in investigative journalism. It incorporates AI technologies like optical character recognition (OCR) to digitize and index documents, making them searchable and accessible for investigative purposes. Journalists use DocumentCloud to analyze and share documents, cross-reference data, and collaborate on investigative projects. The platform is particularly useful in handling leaked documents or large-scale investigations involving legal

and governmental files.

The Truth Buzz program was developed by the International Center for Journalists (ICFJ) to fight misinformation through AI tools that assist investigative journalists in identifying false or misleading information. By leveraging fact-checking algorithms and tools, the Truth Buzz program helps journalists detect inconsistencies, verify sources, and present accurate information to the public (Nirban et al., 2023). This is crucial in the modern media landscape, where the rapid spread of misinformation can significantly hinder journalistic efforts.

TinEye is a reverse image search engine powered by AI that allows investigative journalists to trace the origins of images used in their stories. By analyzing the digital fingerprints of images, TinEye helps verify the authenticity of visual media and track where images have appeared online (Khan et al., 2023). This tool is particularly valuable in investigative work involving visual evidence, such as human rights abuses, political propaganda, or corporate malfeasance, where verifying the source of an image is critical.

AI tools such as Dataminr, Maltego, DocumentCloud, the Truth Buzz program, and TinEye play essential roles in enhancing investigative journalism. These tools empower journalists to efficiently gather, analyze, and verify vast amounts of data, allowing them to focus on uncovering truths that might otherwise remain hidden.

3.2 AI Tools for Writing

In recent years, Artificial Intelligence (AI) has significantly transformed various fields, including journalism. AI-powered writing tools are playing a crucial role in automating content creation, enhancing writing quality, and assisting journalists in managing their workload. Below is an exploration of some key AI tools that have been widely adopted in the journalism industry.

ChatGPT

Developed by OpenAI, ChatGPT is a sophisticated language model that can generate human-like text based on user prompts. It leverages a large-scale neural network to produce coherent and contextually relevant content, making it useful for journalists in drafting articles, writing reports, and even conducting interviews in simulated environments (Brown et al., 2020). Its versatility allows it to generate content across various topics, making it a valuable tool in newsrooms for quick content generation and brainstorming ideas.

AI Writer

AI Writer is a content generation tool designed to produce articles from minimal input. It relies on AI algorithms to create well-researched content that is often optimized for search engines (SEO). For journalists, AI Writer is useful for drafting initial versions of news articles or opinion pieces, particularly when quick turnaround times are required (Dargham, et al; 2022). While it provides fast content creation, it still requires editorial oversight to ensure accuracy and journalistic integrity.

Jasper AI

Jasper AI, formerly known as Jarvis, is a popular AI writing assistant used by content creators and journalists alike. Jasper uses machine learning to assist in drafting long-form articles, social media posts, and press releases. Journalists benefit from its ability to generate engaging content quickly while allowing customization through various tones and styles (Ghariz et al., 2024). Jasper AI's integration with SEO features also helps in optimizing articles for digital platforms.

LongShot AI

LongShot AI is an AI-powered tool that excels in producing in-depth, researched content. It is particularly useful for journalists working on feature articles, investigative pieces, or content that requires substantial background information. LongShot AI's ability to generate fact-checked and coherent long-form content makes it a valuable asset in journalism.

Peppertype.ai

Peppertype.ai is designed to help writers and journalists generate high-quality content quickly. It assists in drafting articles, generating headlines, and creating social media content. Peppertype.ai's focus on brevity and clarity is particularly useful for journalists who need to create concise yet impactful news summaries. Additionally, it offers suggestions for improving readability, making it an effective tool for refining written pieces.

Connexon

Connexon is an AI-driven content creation tool that specializes in generating text for marketing and journalism. It employs machine learning algorithms to create content that aligns with the style and tone required by journalists. Connexon is especially helpful for producing short-form articles or news updates, contributing to the efficiency of newsroom operations (Ota et al; 2024).

Article Forge

Article Forge uses deep learning techniques to produce high-quality, unique articles with minimal human input. For journalists, it is beneficial when creating drafts for news articles or blogs, especially when working under tight deadlines. Article Forge's ability to research and incorporate facts into its generated content is a significant advantage in maintaining journalistic standards.

Copy.ai

Copy.ai is another AI tool that has gained popularity in journalism for its content generation capabilities. It can quickly draft news articles, product descriptions, or headlines based on user-provided inputs. Copy.ai's strengths lie in its simplicity and the ability to create readable content that can serve as a foundation for more refined journalistic work. However, like most AI tools, it requires human oversight to ensure accuracy and coherence.

AI tools are transforming journalism by enhancing the efficiency and quality of content creation. While these tools offer significant advantages, they also raise concerns regarding accuracy, bias, and the potential for replacing human journalists. Therefore, the role of these tools should be seen as augmentative rather than substitutive, ensuring that journalistic integrity remains intact.

3.3 AI Tools for Editing

The rise of artificial intelligence (AI) in journalism has revolutionized editing tasks, streamlining workflows and enhancing editorial quality. Various AI-driven tools provide journalists with advanced capabilities in writing, grammar correction, and content improvement, allowing them to focus more on creativity and story development. Here are some of the key AI tools that are transforming editing in journalism:

Deep Write

Deep Write is a sophisticated AI tool designed to assist with content generation and refinement. It uses deep learning algorithms to provide suggestions for enhancing writing quality, offering improvements in grammar, coherence, and stylistic tone. Deep Write also aids in content analysis by assessing readability and clarity, making it particularly useful for journalists aiming to fine-tune their work. Its ability to adapt to different writing styles makes it a versatile tool in journalistic editing (Ahmad, et al; 2022).

QuillBot

QuillBot is an AI-powered paraphrasing tool that helps writers rephrase sentences while maintaining the original meaning. It offers multiple modes such as fluency, formal, and creative, allowing journalists to tailor their writing to specific contexts. QuillBot also provides grammar correction features, making it a helpful tool for both editing and improving the readability of articles. Its ability to restructure content without losing meaning is especially beneficial in journalism, where precision and clarity are paramount.

Wordtune

Wordtune is another AI-driven tool that assists in rewriting and refining text to improve clarity, conciseness, and engagement. By offering alternative phrasing suggestions, Wordtune allows journalists to make their content more dynamic and easier to understand. The tool integrates seamlessly with popular writing platforms, enhancing the workflow of editing tasks for professionals in the journalism field. Additionally, Wordtune's ability to adjust the tone of writing makes it a versatile asset in adapting content for different audiences.

ChatGPT

ChatGPT, developed by OpenAI, has become a widely used AI tool for generating and editing content. Journalists use ChatGPT to assist with drafting articles, refining language, and even brainstorming new ideas. Its natural language processing capabilities allow it to engage in coherent conversations, making it a valuable resource for editing tasks that require more than just grammar correction. The tool is particularly useful for journalists who need to produce content quickly, as it provides suggestions for improving the structure, tone, and coherence of text (Rezk, 2023).

Edward Tian's GPTZero

Edward Tian is credited with developing GPTZero, a tool designed to detect AI-generated content. While GPTZero is not strictly an editing tool, it plays a significant role in journalism by ensuring the authenticity of content. Journalists and editors use it to verify whether text has been produced by AI, thus safeguarding against the unintentional dissemination of machine-generated material. This tool helps maintain the integrity of journalistic work in an era where AI is increasingly used in content creation (Habibzadeh, 2023).

TweetGPT

TweetGPT is an AI tool used for generating and editing content specifically for social media platforms like Twitter. It assists journalists by suggesting succinct and engaging tweets that are aligned with the tone and style appropriate for the platform. This tool is particularly valuable for journalists who need to craft brief yet impactful messages for their audiences. By offering suggestions for improving the tone and phrasing of tweets, TweetGPT enhances the quality of social media communications, making it a useful tool in the modern

journalism landscape.

3.4 AI Tools for Distribution

AI has significantly enhanced content distribution in journalism, making it more efficient and targeted. AI tools analyze audience behavior and preferences to ensure that journalistic content reaches the right audience through the most appropriate channels.

Hootsuite

Hootsuite is a popular AI-driven social media management platform that helps journalists and media organizations schedule and distribute content across multiple platforms. Using machine learning algorithms, Hootsuite analyzes audience engagement data to optimize the timing and frequency of posts. This ensures that journalistic content is distributed at times when it is most likely to reach and engage the intended audience.

Parse.ly

Parse.ly is an AI-powered content analytics tool used by media organizations to track audience interaction and behavior across websites and social media platforms. It offers insights into which topics are trending and how different content pieces are performing, enabling journalists to tailor their distribution strategies. By leveraging these insights, media professionals can optimize their content for maximum reach and engagement.

Taboola

Taboola is an AI-based content recommendation platform that helps distribute journalistic articles through sponsored content networks. It uses algorithms to suggest articles to users based on their browsing history and interests, increasing the likelihood of readership. This tool helps journalists and media outlets expand their audience reach beyond organic traffic by delivering content to readers who are more likely to be interested.

3.5 AI Tools for Video Editing

AI is playing a crucial role in simplifying video editing, which is especially useful for journalists in an era where video content is increasingly important. AI-powered video editing tools can automate various stages of the editing process, saving time and enhancing production quality.

Adobe Premiere Pro with AI Features

Adobe Premiere Pro has integrated several AI features to streamline video editing tasks. For instance, the "Auto Reframe" tool uses AI to automatically adjust aspect ratios for different platforms, ensuring that content is optimized for both vertical and horizontal viewing. AI in Premiere Pro also assists with color correction and scene detection, improving the overall quality and coherence of video content.

Magisto

Magisto is an AI-powered video editing tool that automates the process of creating polished videos. By analyzing raw footage, Magisto identifies key moments, applies transitions, and adds background music to create professional-quality videos. This tool is widely used in journalism for producing quick, visually appealing news clips, making it a go-to choice for journalists who need to produce video content without a steep learning curve.

Pictory

Pictory is another AI video editing tool that allows users to turn scripts or long-form content into short, engaging videos. It leverages AI to automatically extract highlights from longer footage, making it ideal for creating bite-sized news videos for social media. Pictory's ability to transform text into video content is particularly valuable for journalists looking to repurpose written content into video format.

3.6 AI Tools in Translation

In the globalized media landscape, AI-powered translation tools have become essential for journalists aiming to reach multilingual audiences. These tools use advanced machine learning algorithms to provide accurate translations, allowing content to be easily shared across linguistic boundaries.

Google Translate

Google Translate is a widely used AI-powered translation tool that supports over 100 languages. Its AI-based neural machine translation (NMT) system provides more accurate translations by considering entire sentences, rather than word-for-word replacements. For journalists, this tool is valuable for translating international news stories or interviews, enabling them to communicate with global audiences more effectively (Chen, 2024).

DeepL

DeepL is another advanced AI translation tool known for its high-quality translations, particularly in European languages. Its neural networks analyze not only the meaning of individual words but also the context of entire paragraphs, producing more nuanced translations. Journalists use DeepL to translate articles and reports with high linguistic accuracy, making it a reliable tool for cross-border journalism.

Microsoft Translator

Microsoft Translator is an AI-based tool that provides real-time translation for over 70 languages. It is particularly useful for live reporting or interviews in foreign languages, as it offers features such as speech recognition and translation. This tool enables journalists to break language barriers in real time, making it an indispensable asset for those working on international stories.

4. CONCERNS AND CHALLENGES

The integration of artificial intelligence (AI) tools in journalism has sparked significant debate, particularly around ethical and operational concerns. One major challenge is bias in AI algorithms. AI tools, especially those involved in content creation and editing, are trained on large datasets that may inherently carry biases related to gender, race, or political perspectives (Paik, 2023). This can lead to the unintentional propagation of biased narratives or skewed reporting, compromising the integrity of journalistic work.

Another key concern is the potential threat to journalistic jobs. As AI tools increasingly handle tasks like editing, content generation, and even reporting, there are fears that these technologies could replace human journalists, particularly in tasks that require routine analysis and reporting. This raises the question of whether AI can fully replicate the nuanced decision-making, ethical judgments, and creativity that human journalists bring to their work.

Misinformation also remains a critical issue. AI tools designed for content generation, such as ChatGPT, can be used to produce large volumes of text that may spread false or misleading information if not carefully regulated (Kertysova, 2018). Ensuring that AI tools are used responsibly in journalism is crucial to preventing the spread of disinformation, which can harm public trust in media outlets.

Additionally, there are privacy concerns related to AI-driven analytics used in content distribution. Many AI tools track user behavior to optimize distribution strategies, raising ethical questions about user consent and data protection. Journalists and media organizations must navigate these challenges to maintain ethical standards while leveraging AI's benefits.

5. FUTURE DIRECTION

Looking ahead, the role of AI in journalism will likely expand, bringing both opportunities and new challenges. One area of development is improving AI transparency and accountability. Researchers and technologists are working on building AI systems that can explain their decision-making processes more clearly. This will allow journalists to better understand how AI-generated recommendations or content are produced, fostering greater trust in AI tools.

Moreover, AI is expected to become more adept at supporting investigative journalism. Future AI tools could analyze vast amounts of data from open-source documents, social media, and government reports, assisting journalists in uncovering hidden patterns or stories. This would enable newsrooms to break stories more quickly and efficiently.

Another significant area of growth is multilingual journalism. As AI translation tools improve, they will allow journalists to produce content in multiple languages simultaneously, greatly enhancing global news coverage. This capability will be crucial in reaching diverse audiences and bridging communication gaps between different regions and cultures (Chen, 2024).

To address ongoing concerns about bias and misinformation, future AI tools will likely incorporate more sophisticated algorithms capable of detecting and mitigating bias. Additionally, AI ethics guidelines for journalism are expected to become more formalized, with news organizations adopting clear standards on how AI should be used responsibly in newsrooms (Paik, 2023).

6. CONCLUSION

The integration of AI in journalism represents both a transformative opportunity and a complex challenge. AI tools have the potential to revolutionize content creation, editing, and distribution, making news production more efficient and tailored to audience needs. However, these advancements come with ethical concerns about bias, misinformation, job displacement, and privacy. As AI technologies continue to evolve, it will be critical for media organizations to adopt frameworks that prioritize transparency, fairness, and accountability. By addressing these concerns and leveraging AI responsibly, journalism can harness the power of these tools to enhance its role in society while maintaining trust and integrity. The future of AI in journalism is promising, but it requires careful navigation to balance innovation with ethical considerations.

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REFERENCES

- Ahmad, I., Alqurashi, F., Abozinadah, E., & Mehmood, R. (2022). Deep journalism and DeepJournal V1.0: A data-driven deep learning approach to discover parameters for transportation. *Sustainability*, 14(9), 5711. <https://doi.org/10.3390/su14095711>.
- Brown, T. B., Mann, B., Ryder, N., Subbiah, M., et al. (2020). *Language Models are Few-Shot Learners*. Preprint. <https://doi.org/10.48550/arXiv.2005.14165>.
- Chen, Y. (2024). The metamorphosis of machine translation: The rise of neural machine translation and its challenges. *Applied and Computational Engineering*, 43(1), 99-106. <https://doi.org/10.54254/2755-2721/43/20230815>.
- Dargham, M., Hachimi, H., & Boutalline, M. (2022). *How AI is automating writing: The rise of robot writers*. In *Proceedings of the 8th International Conference on Optimization and Applications (ICOA)*, Genoa, Italy, 06–07 October 2022. IEEE. <https://doi.org/10.1109/ICOA55659.2022.9934723>.
- Davenport, T. H., & Ronanki, R. (2018). *Artificial intelligence for the real world: Don't start with AI, start with business problems*. Harvard Business Review, 96(1), 108-116.
- Diakopoulos, N. (2016). *Accountability in algorithmic decision making*. Communications of the ACM, 59(2), 56-62.
- Ghariz, G., Seghir, H., Boucetta, N., Boubih, S., Janati-Idrissi, R., & El Alaoui, M. (2024). The impact of artificial intelligence on improving text in the process of conceptualization in biology: Case of education sector. *Journal of Theoretical and Applied Information Technology*, 102(13), 5203. <https://www.jatit.org>.
- Gutiérrez-Caneda, B., Lindén, C.-G., & Vázquez-Herrero, J. (2024). Ethics and journalistic challenges in the age of artificial intelligence: Talking with professionals and experts. *Frontiers in Communication*, 9. <https://doi.org/10.3389/fcomm.2024.1465178>
- Habibzadeh, F. (2023). GPTZero performance in identifying artificial intelligence-generated medical texts: A preliminary study. *Journal of Korean Medical Science*, 38(38), e319. <https://doi.org/10.3346/jkms.2023.38.e319>.
- Kertysova, K. (2018). Artificial Intelligence and Disinformation: How AI Changes the Way Disinformation is Produced, Disseminated, and Can Be Countered. *Security and Human Rights*, 29(1-4), 55-81. <https://doi.org/10.1163/18750230-02901005>.
- Khan, S. A., Sheikhi, G., Opdahl, A. L., Rabbi, F., & others. (2023). Visual User-Generated Content Verification in Journalism: An Overview. *IEEE Access*, PP(99). <https://doi.org/10.1109/ACCESS.2023.3236993>.
- Linden, C.-G. (2017). Algorithms for journalism: The future of news work. *The Journal of Media Innovations*, 4(1), 60. <https://doi.org/10.5617/jmi.v4i1.2420>.
- Ngoc, N. (2022). JOURNALISM AND SOCIAL MEDIA: THE TRANSFORMATION OF JOURNALISM IN THE AGE OF SOCIAL MEDIA AND ONLINE NEWS. *European Journal of Social Sciences Studies*, 7(6). <http://dx.doi.org/10.46827/ejsss.v7i6.1316>.
- Nirban, V. S., Shukla, T., Purkayastha, P. S., Kotalwar, N., & others. (2023). The Role of AI in Combating Fake News and Misinformation. In *Innovations in Bio-Inspired Computing and Applications* (pp. 690-701). https://doi.org/10.1007/978-3-031-27499-2_64.
- Noain-Sánchez, Amaya. (2022). Addressing the Impact of Artificial Intelligence on Journalism: the perception of experts, journalists and academics. *Communication & Society*. 35. 105-121. <https://doi.org/10.15581/003.35.3.105-121>.
- Ota, R., Ray, S. S., & Alli, S. S. (2024). Exploring the impact of artificial intelligence on content creation: A comprehensive study. *International Journal of Research Publication and Reviews*, 5(7), 597–604. <https://doi.org/10.55248/gengpi.5.0724.1620>.
- Paik, S. (2023). Journalism Ethics for the Algorithmic Era. *Digital Journalism*. <https://doi.org/10.1080/21670811.2023.2200195>.

Rezk, S. M. M. (2023). The role of artificial intelligence in graphic design. *Journal of Art, Design and Music*, 2(1), Article 1. <https://doi.org/10.55554/2785-9649.1005>.