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Artificial Intelligence in Journalism: A Narrative Review of Opportunities, Challenges, Ethical Tensions, and Human-Machine Collaboration

Habeeb Abdulrauf^{1*}, Abdulmalik Adetola Lawal², Amarachi Nina Uma Mba³, Comfort Ademola⁴, Zaynab B. Yusuf⁵,
Shalewa Babatayo⁶, Idris Ayinde⁷

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ABSTRACT

Artificial Intelligence (AI) is changing the practices of journalism around the world, which influence how news is gathered, produced, and disseminated. This review synthesizes theories, empirical, and other literature to explore the multidimensional impact that AI has on journalistic workflows and values. This review centered on 81 core sources published between 2015 to 2024, examining AI's affordances, including automation of routine reporting, data mining and audience personalization. The paper also assesses the emerging risks such as algorithmic bias, erosion of editorial transparency, and the popularity of deepfakes in the media. Guided by Human-Machine Communication (HMC) frameworks, Actor-Network Theory, and affordance theory, this review submit that AI is a collaborativated partner rather than a competitor to human journalists. Case examples from newsrooms worldwide (e.g., Associated Press, Washington Post, ICIJ) show both promise and issues in AI integration to the practice of journalism. The paper also addresses the ethical tensions arising from AI-generated content, newsroom accountability, and evolving public trust in machine-assisted reporting. The paper offers future directions that highlight seven key areas: advancing deepfake detection tools, creating of AI ethics guidelines, advocating for the AI training in journalism education, and bridging technological gaps between large and smaller newsrooms. It concludes by hammering on maintaining human editorial oversight and democratic values as AI is growingly augmented in journalistic practice. This paper, therefore, offers a timely and interdisciplinary contribution to media scholars, technologists, and newsroom leaders who are embracing the future of AI-driven journalism.

INTRODUCTION

A Revolution in Journalism Newsroom

Over the years, technological advancements have been reshaping the media ecosystem. The printing press, the telegraph, radio, television, and the internet each left an indelible mark on how news is produced, disseminated, and consumed. Today, we stand at the precipice of another revolution, driven by Artificial Intelligence (AI). No longer confined to speculative fiction or theoretical design, AI has begun to permeate newsrooms, changing the regular practices, augmenting decision-making, and raising fundamental questions about journalistic integrity and autonomy (Diakopoulos, 2019). AI offers a potent suite of tools poised to change the practice of journalism as both a profession and a social institution. These include, but are not limited to, automating financial reports and facilitating multilingual interviews and data analytics (Linden, 2017). The importance of these changes cannot be overemphasized. The integration of AI is occurring when public distrust in the media is eroding, an explosion of digital misinformation, and a rapid shift in news consumption habits, which is exacerbated by the

breaking out of the COVID-19 pandemic (Humprecht *et al.*, 2020; Tandoc & Kim, 2023). Ramos and Suizo (2022) emphasize that journalism during the COVID-19 pandemic faced major disruptions, including restricted access to sources, the need to transition rapidly to virtual reporting, and ethical dilemmas such as combating misinformation and protecting confidentiality. These pressures pushed journalists to embrace digital innovation, adopt new storytelling techniques, and rely more heavily on collaborative models of reporting. This adaptability underscores how crises accelerate technological adoption in journalism—a dynamic now mirrored in the integration of artificial intelligence. These conditions present both a necessity and an opportunity for examining how AI is changing the assignment of journalistic practice. As news organizations seek to remain competitive in the attention economy, practitioners are turning to algorithmic tools to enhance the personalization of new stories, efficiency, and its scalability. Yet, the result of such reliance, both normative and practical, remains underexplored scholarship.

This review synthesizes current scholarship on that

¹ School of Communication, Western Michigan University, Kalamazoo, MI, USA

² Media Innovation and Journalism, Reynolds School of Journalism, University of Nevada, Reno, USA

³ Department of Communication Studies, West Virginia University, West Virginia, USA

⁴ Communication Studies, Northern Illinois University, Illinois, USA

⁵ Department of Communication, Wayne State University, Detroit, Michigan, USA

⁶ Nicholson School of Communication and Media, University of Central Florida, Florida, USA

⁷ School of Media and Communication, Pan-Atlantic University, Lagos, Nigeria

* Corresponding author's email: habeeb.abdulrauf@wmich.edu

focuses on AI and journalism through a narrative lens. Unlike systematic reviews, which center on methodological homogeneity, the narrative approach instead, employ thematic exploration of concepts, ethical, and empirical literatures on a subject matter (Greenhalgh *et al.*, 2018). By so doing, the review surfaces emerging patterns, unresolved tensions, and global divergences in how AI is shifting journalistic practice and epistemology. It also contextualizes these shifts within sociotechnical systems and power structures. In this paper, we refer to artificial intelligence as a system designed for a narrow yet specific task, such as natural language processing (NLP), automatic speech recognition, or predictive analytics, rather than a multimodal general intelligence machine. Journalistic automation on the other hand, is the use of AI to assist or perform editorial tasks, such as writing, tagging, curating, or verifying news content (Graefe, 2016). Human–Machine Communication (HMC), according to Guzman and Lewis (2020), is argued as an AI agent not simply as a tool but as a social actor in communicative processes. The term “augmented journalism” describes hybrid systems where human judgment and algorithmic assistance co-produce editorial content (Dörr, 2016), while “editorial AI” means any computational system that involved in editorial workflows (van Dalen, 2012). The integration of AI into journalism presents a paradox. On one perspective, these tools enable unprecedented scale and personalization. Journalists can utilize AI to analyze large datasets, identify hidden trends, and unearth stories that would otherwise remain unknown. AI-driven tools can also help detect misinformation in real-time, identify visual manipulation (e.g., deepfakes), and translate content into different languages, thus expanding journalistic reach and timeliness (Rana *et al.*, 2022; Marconi & Siegman, 2017). These affordances on the other hand, bring up ethical and epistemological worries. Who controls the training data? How transparent are AI-generated outputs? To what extent does AI fuel bias or gatekeeping? And how do these systems destroy newsroom labor dynamics and professional norms?

These concerns are not purely speculative. Personalization algorithms such as those used by Google News or Flipboard risk creating filter bubbles and information silos (Pariser, 2011; Li *et al.*, 2011). AI-generated text, though efficient, may propagate errors or mimic ideological biases encoded in the training data (Johnson, 2021). Moreover, generative systems such as OpenAI’s GPT or Google’s Gemini have demonstrated the ability to produce persuasive but not so correct content, raising questions about accuracy, trust, and verification challenges on journalists (Floridi & Chiriatti, 2020). Moreso, the shift to AI-assisted journalism challenges the traditional relationship between journalists and audiences. AI allows for hyper-personalized news streams that align with users’ preferences, demographics, and browsing history (Broussard, 2018). While this can increase engagement, it also raises questions about editorial judgment and shared civic discourse. Long seen as a public good, Journalism

provides a common frame of reference, may become fragmented under algorithmic regimes. To responsibly integrate AI into journalism, scholars and practitioners must develop a critical framework that centers both innovation and ethics into the practice. This includes attention to governance, human–AI collaboration, newsroom transparency, and training programs that educate journalists with AI literacy. The main idea of this approach is that AI should augment rather than replace the human aspects of journalism, including critical thinking, ethical reasoning, contextual understanding, and narrative depth. This paper employs a narrative methodology, given the interdisciplinary and the growing nature of the topic. As systematic review method might be insufficient to capture the various disciplinary perspectives from media studies to computer science and information ethics, which define the discourse around AI in journalism. Moreover, this method supports sounds reflection and thematic synthesis across diverse cases and frameworks, which is essential for a field undergoing fast technological and normative change.

Theoretical Frameworks

The application of AI in journalism requires multidisciplinary theories to better understanding its evolving relationship. That said, here we are outlining four major theoretical frameworks to help conceptualize the social, technical, and communicative dynamics that is at play. The first in the list is Actor-Network Theory (ANT), Critical Algorithm Studies, Technological Affordance Theory, and the Human-Machine Communication (HMC) framework. These perspectives enable us to argue beyond deterministic or celebratory narratives and instead interrogate how AI systems co-construct journalistic practices, power structures, and audience experiences.

Actor-Network Theory (ANT): AI as an Editorial Actant

Actor-Network Theory (Latour, 2005), the main assumption is that both human and non-human entities, including algorithms and machines, function as “actants” that affect outcomes within a network. ANT positions AI not as a passive tool but as an active participant in shaping editorial decisions, routines, and content flows in the newsroom context (Lewis & Usher, 2013). AI recommender systems can be leveraged to prioritize certain story angles or sources, subtly directing newsroom attention. Moreover, an automated content generators can be embedded in news cycles, dictating the pace and structure of reporting. This theory therefore, compels us to examine how AI reshapes power relations among editors, journalists, audiences, and machines, often redistributing influence in unexpected ways (Thurman *et al.*, 2017)

Critical Algorithm Studies: Unpacking Opacity and Bias

Critical algorithm studies provide a framework for analyzing the social and epistemological effects of algorithmic decision-making (Gillespie, 2014).

Algorithms, while framed as neutral are literarily full of assumptions, data biases, and institutional priorities (Sandvig *et al.*, 2014). In journalism, this manifests in editorial AI systems trained on datasets that may reproduce racial, gender, ideological biases, or that privilege particular forms of knowledge (Broussard, 2018). The opacity of many machine learning models, are commonly referred to as “black boxes,” challenges traditional norms of accountability and verification in journalism (Diakopoulos, 2019). This studies therefore, encourage journalists and researchers to questioned who builds algorithms, whose values are encoded within it, and how they align (or clash) with democratic media norms (Rieder & Hofmann, 2020). As such, practitioners would be able to augment them into their works with clear understanding of what, why and how they work the way they do. Helping them to determine if they are ideal to their professional assignment.

Technological Affordance Theory: Constraints and Capabilities

The theory was originally introduced by Gibson (1979) and adapted to media studies by Norman (1999) and later scholars, focuses on what technologies enable or constrain users to do. Applying it to AI in journalism, the framework assumes that AI tools shapes journalism practices not just in terms of technical functions, but in the possibilities, they open or foreclose. AI writing assistants may afford faster story generation for example, but limit stylistic diversity. Chatbots used for audience interaction can foster engagement but may constrain real and human tone in their dialogue due to their template-based interactions. Importantly, affordances are relational; they emerge from the interplay between journalists’ intentions and the design of the AI system (Bucher & Helmond, 2018). This perspective therefore put journalists not as passive users of AI but as agents negotiating its constraints and possibilities. As they are saddles with big responsibilities of reporting nothing but truth about the day-to-day events as they happen accurately and objectively.

Computers as Social Actors (CASA): AI as a Social Actor

This paradigm views AI systems not merely as tools but as communicative agents capable of demonstrating social presence, relational cues, and message interpretation (Guzman & Lewis, 2020). Drawing from the Media Equation (Reeves & Nass, 1996) and the Computers as Social Actors (CASA) theory, it examines how users interact with AI as if it were human, attributing credibility, personality, and intentionality to it. In journalism, this is evident in user-facing applications such as AI-generated news anchors or personalized chatbots that deliver news content. These systems may shape audience trust, engagement, and perceptions of journalistic credibility (Sundar & Kim, 2019). Maylott *et al.* (2023) show that artificial intelligence, particularly large language models, can perform complex information-processing tasks much

faster than humans while still requiring human oversight for accuracy. Applied to journalism, this highlights how AI can help reporters analyze large datasets, process documents quickly, and extract key insights under tight deadlines, while journalists remain essential to interpret context, verify facts, and guard against bias. It draws attention to how design elements, such as voice, responsiveness, and anthropomorphism, mediate human responses to AI-driven journalism (Guzman, 2018; Edwards *et al.*, 2019). By framing AI as a social actor, CASA highlights the importance of transparency, design ethics, and social cues in shaping the perception of journalistic AI systems.

While each of these theories offers unique insights into the above discussion, a comprehensive understanding of AI in journalism requires integrating these frameworks in it. ANT foregrounds the networked agency of AI; critical algorithm studies challenged power and epistemology; affordance theory examines journalist-AI interactions; and CASA focuses on the communicative implications of AI systems. These frameworks are all together provide a robust foundation for analyzing how AI reshapes journalism from newsroom to audience engagement. This theoretical ideas is essential for navigating the complexities of AI adoption across global journalistic contexts and for designing ethical, effective, and human-centered AI systems in the media industry.

MATERIALS AND METHOD

In this paper, we adopt a narrative review approach to explore the relationship between artificial intelligence (AI) and journalism. And unlike systematic reviews, narrative reviews focus on synthesizing conceptual, theoretical, and empirical insights across disciplines to provide an integrative and interpretive understanding of a topic of discussion (Ferrari, 2015; Greenhalgh, Thorne, & Malterud, 2018).

Search Strategy and Inclusion Criteria

We identified through keyword-guided searches conducted across multidisciplinary academic databases by consulting relevant scholarly and gray literature, including Google Scholar, Scopus, Web of Science, JSTOR, and IEEE Xplore. Additional sources were gathered from reports, books and white papers by professional journalism bodies such as Associated Press, Harvard University Press, SAGE, MIT press, Oxford University Press among others authoritative sources. Among other sources, we used are conference proceedings such as AAAI, CHI, and ICA, selected preprints from repositories like arXiv and finally some Industry blogs and credible case studies. The key search terms we used to gathered our sources are but not limited to “AI and journalism,” “algorithmic journalism,” “deepfakes and media,” “human-machine communication,” “automated news writing,” “AI ethics in journalism,” “newsroom AI policies,” and “platform affordances.” And to ensure interdisciplinary relevance, materials from the fields of media and communication studies, journalism, computer science, HCI, ethics, and

legal studies were also included. Only materials meeting one or more of the following criteria were selected for analysis and inclusion. First, peer-reviewed articles, case studies, and book chapters, second, empirical or theoretical relevance to journalism or journalistic practice, third we make sure all material included were published in English and between 2015 and 2024, with most of the final ones focus on 2018–2024 to reflect recent developments in generative AI and news automation

Thematic Synthesis

From the initial pool of over 200 sources that were reviewed for relevance. Approximately 81 major sources were retained and categorized according to their theme. These categories were not predefined but emerged inductively through close reading and iteration. Therefore, this paper is guided by the following research questions:

1. What opportunities does AI present for journalism practice?
2. What are the technical and ethical challenges AI pose to the newsroom?
3. How are emerging technologies like deepfakes and news personalization shaping public trust in Journalism?
4. What frameworks can guide responsible human-machine collaboration in newsrooms?

This review employed conceptual integration rather than performing statistical meta-analysis, using case examples, theoretical lenses, comparative insights, and synthesization to develop a review that reflects current scholarly and professional debates. The Figure 1 following PRISMA flowchart illustrates the article selection process visually and in more clear and simple way:

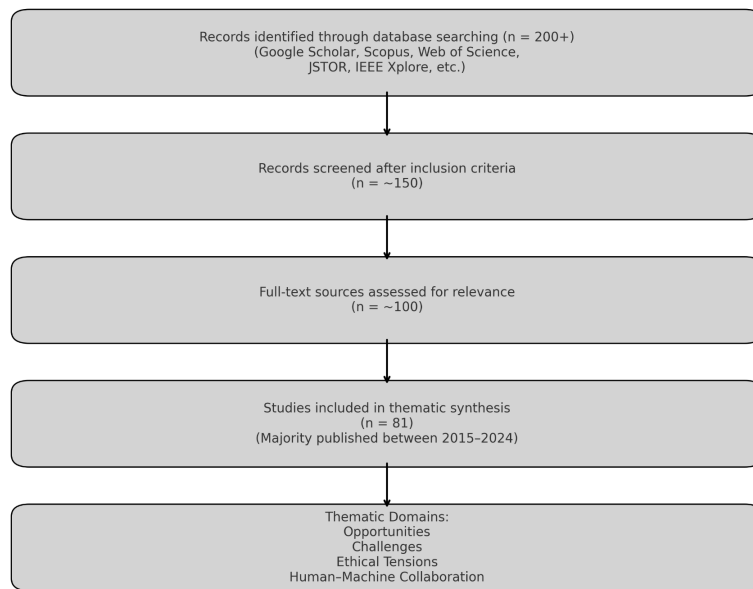


Figure 1: PRISMA flowchart for the article selection process.

Challenges of AI in Journalism

The incorporation of Artificial Intelligence (AI) into information gathering and dissemination (journalism) has resulted in both positive integrations and a set of profound disruptions—some anticipated and others unforeseen. As noted in the introduction and conceptualized through Actor–Network Theory, AI systems do not operate in isolation; rather, they function as actants within sociotechnical ecosystems that significantly shape editorial judgment, professional routines, and epistemological values. Although AI technologies offer a plethora of capabilities to manage and streamline production in the newsroom and enhance personalization, their integration also exposes structural, ethical, and operational vulnerabilities in the newsroom. These challenges represent existing and upcoming discrepancies that newsrooms must critically address to ensure a more journalistically responsible and human-centered integration of AI into the world of information

gathering and dissemination.

Bias and Algorithmic Fairness

One of the major tensions regarding the utilization of AI in journalism is the problem of inconsistency and algorithmic bias. Machine learning models utilize existing data for output results, and the fact that such data will most likely reflect existing societal inequities or underrepresent marginalized groups means the resulting systems can reinforce those embedded disparities. In journalism, biased AI may, to a large extent, influence what topics are deemed as “newsworthy,” who to quote, or how different groups are represented (Obermeyer & Mullainathan, 2019; Sandvig *et al.*, 2014). Such bias puts journalism’s normative role in offering balanced and inclusive narratives at serious risk. As Gebru *et al.* (2021) argue, fairness must be incorporated into both dataset curation and model design; yet, current industry standards often fail to meet expectations, particularly in news industries

whose primary goal is financial retribution.

Opacity and the Explainability Crisis

A plethora of AI tools utilized in information gathering and dissemination, especially those depending on deep learning, operate as “black boxes,” which offer not so much clarity in how outputs are derived. This process does not just make the editorial verification processes too complex; it also undermines public trust in automated reporting (Burrell, 2016). Integrity in journalism calls for traceability of information sources; however, opaque AI makes it really hard for reporters to explore or even investigate the concept of machine-generated output or predictions (Diakopoulos, 2019). The advent field of Explainable AI (XAI) offers some hope, and proposing frameworks for more interpretable outputs, and its application in newsroom contexts remains unexplored and under-theorized (Gilpin *et al.*, 2018).

Job Displacement and Professional Role Reconfiguration

The utilization of AI gives room for labor-related issues in the media sector. Some of the traditional duties of journalists, such as earnings reporting, sports recaps, and weather updates, have already been successfully automated and taken over by tools like Wordsmith and Heliograf (Graefe, 2016). This situation has raised serious concerns about the elimination of entry-level journalism roles, carrying significant implications for career development and editorial practices (Carlson, 2015). However, scholars emphasize that AI is more likely to reconfigure roles than eliminate them. Coddington (2014) suggests another approach towards hybrid roles that calls for data literacy, computational thinking, and oversight of algorithmic content.

Erosion of Trust, Credibility, and Human Perception

The perception of masses towards AI-generated news brings about another layer of complexity. Research suggests that readers often apply a “machine heuristic,” assuming that algorithmic outputs are objective or free from human bias (Sundar & Kim, 2019). This can both lead to absolute trust in unequal outputs and downplay authentic journalism when errors arise. When high-profile errors, such as AI-generated misinformation or misquotes, become public, they can destroy the reputation of not only the outlet’s credibility but also the institution of journalism itself (Marconi & Siegman, 2017). Balance and objectivity in AI authorship, combined with rigorous editorial oversight, are crucial for maintaining audience trust in this transformative landscape.

Personalization, Echo Chambers, and Algorithmic Gatekeeping

AI-driven personalization systems can bring about different levels of complexity. Inarguably, they can promote user engagement by bringing together relevant content, they also risk creating “filter bubbles” or echo chambers that reinforce users’ pre-existing opinions (Pariser, 2011). This form of gatekeeping has this

potential to shape public discourse by prioritizing ideologies that aligned with existing predisposition content over balanced reporting (Bozdag, 2013). This really jeopardizes the civic responsibility of journalists to expose audiences to a diverse perspectives. Moreover, the financial intent behind these systems often give priority to engagement metrics over editorial judgment, which challenges the journalistic norms of balance and impartiality (Napoli, 2019).

Data Ownership and Platform Dependency

The integration of AI in journalism often relies on unincorporated platforms, third-party APIs, and user data, which raises concerns about data sovereignty, autonomy and editorial objectivity. Since these AI tools are developed, owned and maintained by tech giants, then it is imperative to ask questions about information flow and those who controls the logic of content distribution, the priorities embedded in algorithms, and how newsrooms might be coerced into specific formats or narratives (Andrejevic, 2020). This structural reliance not only threatens the independence of journalism but may exacerbate asymmetries between small, local outlets and platforms that are dominant globally.

Legal Ambiguity and Regulatory Gaps

The legal implications of AI-generated journalism are largely unresolved. AI in journalism has led to many ethical and legal concerns which include Issues include authorship rights, libel liability, and the utilization of existing copyright frameworks to machine-produced content (German, D. M., 2024). For instance, if an AI-generated article disseminates false information, determining liability, whether it lies with the developer, the journalist, or the editor, is often unclear and this is a serious legal problems. Furthermore, most legal frameworks have yet to mandate transparency in AI-generated news or require disclosure labels. Without a coherent regulatory infrastructure, the use of AI in journalism operates in a legal gray zone, which exposes the news organizations to reputational and legal risk.

The “Black Box” Accountability Gap

Issues of accountability are also central to the broader problem of accountability. In traditional journalism, duties are assigned for authorship and editorial responsibility, but now that AI systems significantly contribute to content creation, the issue of accountability is almost impossible. Who should be held accountable when AI produces misleading content? Scholars argue that editorial teams must make use of “human-in-the-loop” safeguards to ensure that final outputs are reviewed and validated by qualified professionals (Diakopoulos, 2019; Graefe, 2016).

Deepfakes and the Disinformation Arms Race

One of the most dire concerns is the proliferation of synthetic media and deepfakes, hyperrealistic but fabricated videos or audio generated by AI. These tools

put in jeopardy the epistemic foundations of journalism by making it difficult to distinguish authentic visual evidence from digital forgeries (Vaccari & Chadwick, 2020). These are already being used in political disinformation campaigns, and the phenomenon of the “liar’s dividend,” where genuine footage can be dismissed as fake, also brings about the challenge to public discourse (Fallis, 2021).

Inequity in Resource Allocation

Using AI requires access to financial capital, technical expertise, and data infrastructure resources that are unevenly divided across the global media landscape. Though many countries, such as the U.S., UK, and China, invest in AI innovation labs and partnerships with tech firms, many community-based or Global South newsrooms lack the capacity to adopt such tools (Simon, 2024; Thomson Reuters Foundation, 2025; Gondwe, 2023). This digital divide poses a significant risk to promote existing inequalities in news quality, access, and production. Therefore, without concerted and realistic equitable AI design, the benefits of AI enhanced journalism will remain unevenly distributed among its users.

Opportunities and Use Cases of AI in Journalism

The concerns about AI’s impact on journalism are legitimate and diverse. It is equally important to spotlight the powerful affordances that AI offers across the news ecosystem. Enhancing news production to enable personalization and accelerate verification is a valid opportunity. And AI technologies present opportunities to manage editorial workflows, amplify data-driven storytelling, and reimagine audience engagement.

Automated Content Generation

AI is increasingly used in journalism to automate the generation of routine stories, such as those in financial reporting, sports, and weather. Natural language generation (NLG) tools such as Wordsmith and Heliograf have been successfully integrated by outlets like the Associated Press and The Washington Post to generate thousands of earnings reports and election updates with minimal human input (Linden, 2017; Graefe, 2016). Apart from the cost efficiency, AI journalism enhances timeliness and breadth of coverage. For instance, the AP reportedly expanded its coverage of corporate earnings by over 12-fold after implementing automation (Marconi & Siegman, 2017). This incorporation does not eliminate the role of journalists; instead, it enables them to focus on more complex stories that require human investigation, ethical judgment, or narrative nuance.

Personalization and Audience Engagement

AI also plays a central role in content personalization, particularly through recommendation algorithms that tailor newsfeeds based on individual user behavior. Platforms such as Google News and Flipboard utilize natural language processing (NLP) and collaborative

filtering to curate and rank articles based on relevance, thereby increasing reader engagement and retention (Li *et al.*, 2010). These algorithms analyze users’ reading history, search queries, and even emotional responses to predict interest.

While this raises concerns about filter bubbles (as addressed earlier), personalization can also enhance accessibility, for example, delivering local updates to underserved communities or customizing news for linguistic minorities through machine translation (Diakopoulos & Koliska, 2017). If designed ethically, personalization engines can help re-engage disaffected audiences by connecting them to stories that matter personally, without compromising journalistic plurality.

Investigative Journalism and Data Analysis

AI’s ability to analyze vast amounts of unstructured data is a valuable tool for investigative reporting. Machine learning and entity recognition tools can work through a plethora of documents such as leaks, contracts, and emails, surfacing connections, anomalies, or hidden trends that might otherwise go unnoticed (Stray, 2019).

A very good example of this type of analysis is the Panama Papers investigation, in which the International Consortium of Investigative Journalists (ICIJ) used data mining tools and graph databases to analyze over 11.5 million leaked documents. AI-assisted analysis revealed tax avoidance schemes and shell companies involving global elites (Moyo, 2020). Similarly, the NYT and ProPublica have used AI-powered tools like DocumentCloud and Overview to visualize patterns and facilitate collaborative reporting.

These tools shift the journalist’s role from information gatekeeper to algorithmic investigator curating, interpreting, and contextualizing patterns found in data (Diakopoulos, 2019). This phenomenon reassigns journalists as “data ethnographers,” blending computational precision with human insight.

Real-Time Fact-Checking and Verification

AI is increasingly being used to combat misinformation in the digital age through tools such as ClaimReview, Full Fact’s Live, and TruthNest, which deploy machine learning for real-time detection of false claims across social media and news feeds (Graves, 2018). These tools rely on models trained on verified databases to flag potential inaccuracies, suggest fact-checks, and identify manipulative framing.

For example, Full Fact’s AI tool oversees televised debates, automatically note statistical claims, and cross-references them with public databases. In the same vein, the Poynter Institute and Google’s FactCheck Tools enable journalists to determine whether a claim has been previously verified, and this enhances reporting speed and accuracy (Nakov *et al.*, 2021).

Although these tools are not infallible, they reduce the workload on human fact-checkers and introduce automated layers of defense against viral falsehoods, an

essential step in safeguarding public trust.

Machine Translation and Multilingual Reporting

AI-driven machine translation has significantly expanded the possibilities of cross-border journalism. Modern tools such as Google Translate and DeepL rely on neural machine translation (NMT) architectures, which process entire sentences in context rather than word by word. This approach improves fluency, semantic accuracy, and overall readability, making MT more viable for professional journalistic use (Wu et al., 2016). Journalists are now able to translate interviews, press releases, or documents across languages with improved coherence and nuance, which makes diverse language content more accessible.

News agencies such as Reuters employ these systems to deliver multilingual newsfeeds, while Al Jazeera uses AI-enhanced translation to localize global stories for Arabic-speaking audiences. This not only expands the reach of journalism but also strengthens intercultural reporting—particularly valuable in conflict zones or diasporic communities where access to information in one’s native

language has historically been limited.

Synthetic Media for Immersive Storytelling

To further buttress this, AI-generated media (e.g., text-to-image or voice synthesis) is being used as a tool for immersive, narrative journalism. Projects like The New York Times’ Visual Investigations have utilized AI to restructure conflict zones using satellite imagery and machine learning-based object detection, which creates compelling visual narratives for war crimes and humanitarian stories (The New York Times Visual Investigations team, 2024). A good example of this is the team programmed an AI tool to scan satellite images of southern Gaza, which detected over 1,600 bomb craters, which were then manually validated to distinguish them from shadows, water towers, or older impacts (NYT editorial AI director, 2024). More experimental outlets have begun integrating AI-generated audio, avatars, or simulation tools into storytelling; though such use raises ethical questions, it without any doubt invites novel formats for conveying complex information. Ethical innovation in this sphere may postulate new ways to connect emotionally with readers and make data-heavy

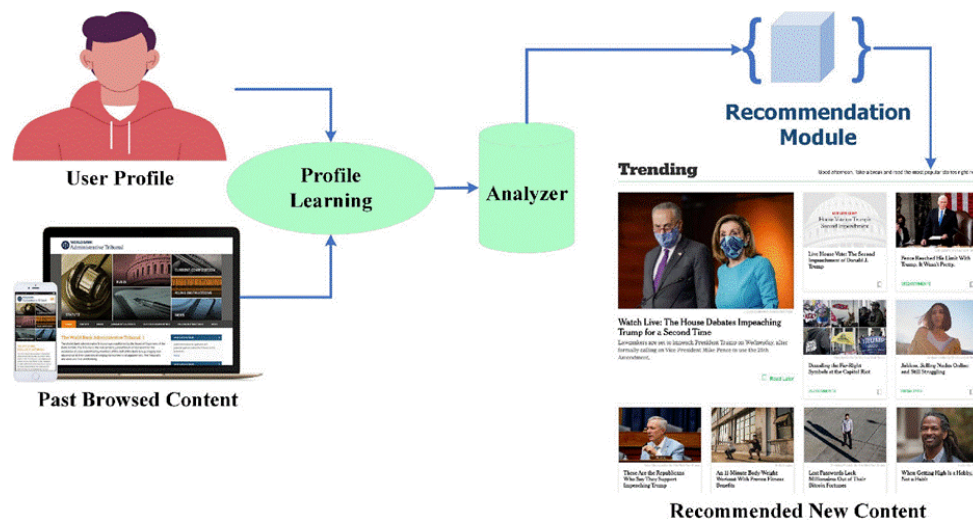


Figure 2: View of Algorithm news serving technique, adapted from Kabassi (2010)

stories more accessible.

Ethical Considerations of AI in Journalism

AI’s role in journalism raises various ethical concerns that is not just limited to technological capabilities. With the adaptation of newsrooms adopting machine learning for story generation, personalization, and automation, it becomes imperative to hold on to the longstanding journalistic principles of truth, fairness, and accountability whilst also navigating new complexities.

Bias and Fairness

AI systems represent the data on which they are built. Whenever this data carries embedded societal or editorial biases, algorithms can reinforce stereotypes, overlook marginalized voices, or skew coverage in unintended ways, and these issues highlight the need for careful consideration and ongoing evaluation of AI’s role in journalism. For example, an AI trained

on overrepresented crime reports from particular communities may disproportionately highlight those neighborhoods, exacerbating stigmatization (Gebru et al., 2021). To mitigate such issues, it’s important to:

- Train on diverse, representative data with documented metadata (Gebru et al., 2021).
- Conduct algorithmic audits to identify bias across content types, tone, and representation.
- Involve diverse editorial oversight to identify blind spots in AI outputs (Binns, 2011).

Transparency and Disclosure

AI’s “black box” nature, which signifies the bot’s opaque operating system, erodes trust and accountability. Journalists must explain when, how, and why AI is used. Leading newsrooms now disclose AI contributions, such as tagging automated stories (Cools & Diakopoulos, 2023), and some adopt explainable AI (XAI) methods to

ensure editors can interrogate algorithmic logic (Lipton, 2018).

Public Trust and Credibility

Trust in journalism is already affected. If AI-generated content is indistinguishable from human-written articles or worse, and it's only discovered after errors, audiences may disengage and lose complete hope in any

disseminated news. Thus, ethical strategies include:

- Clear labeling of AI-generated content.
- It is crucial to ensure that every AI-assisted output undergoes a human editorial review.
- The importance of human journalists in narrative framing and moral judgment is emphasized (Montal & Reich, 2017).

Algorithmic Echo Chambers

5 Pillars of Ethical AI

Developed by IBM, these foundational pillars provide essential guidance for responsible AI usage. By adhering to key principles like explainability, fairness, robustness, transparency, and privacy, we can ensure our innovations are ethical and respect individual rights.

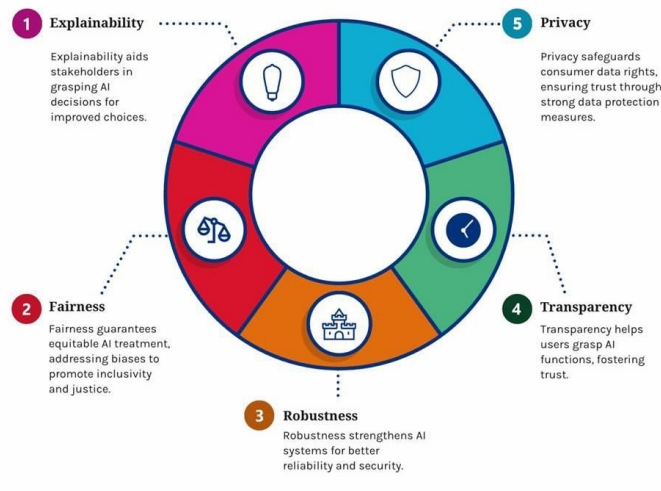


Figure 3: 5 Pillars of Ethical AI by IBM

AI-powered personalization can foster “filter bubbles” that limit exposure to diverse perspectives (Pariser, 2011). While personalization enhances relevance, it may also undermine journalism’s broader mission to inform the public.

Ethical mitigation strategies include:

- Disrupting echo chambers by injecting serendipitous content into news feeds.
- Providing users with controls to customize or override personalization settings.
- Regularly auditing algorithms to ensure diversity of exposure (Bandy & Diakopoulos, 2020).

Legal Ambiguity and Accountability

AI-generated content poses unresolved legal questions: Who owns AI-generated work? Who is liable for libel or misinformation? Ethical best practices include:

- Dealing with all AI outputs as drafts subject to human approval.
- Implementing editorial guidelines for AI oversight.
- We should prioritize user privacy and data protection, particularly in jurisdictions that lacking clear legal protections (Calo, 2018).

Deepfakes and Synthetic Media

Perhaps the most urgent ethical threat is the rise of deepfakes, AI-generated content that can convincingly

mimic real individuals. These pose a serious challenge to truth in journalism. Newsrooms should:

- Adopt deepfake detection tools (Westerlund, 2019).
- Label synthetic media transparently.
- Educate the public on misinformation risks.

Upholding Human Judgment

AI lacks empathy, ethical reasoning, and contextual judgment. Journalists are not just content generators; they are sense makers. Upholding the human role is vital:

- Developing AI usage codes of ethics that align with journalistic norms is crucial for upholding transparency, accountability, and editorial integrity in automated news production (Diakopoulos & Koliska, 2017).
- Train journalists in AI literacy and ethical vigilance.
- Encourage audience engagement to gauge sentiment and guide responsible deployment.

Human–Machine Communication in the Age of AI Journalism

Successfully embedding AI into journalism is not just a technical or ethical challenge; it is a matter of effective communication and collaboration between humans and machines. Human–Machine Communication (HMC) provides an important template for understanding how journalists converse with artificial agents in the newsroom. As AI systems become autonomous, proactive,

and capable of naturalistic dialogue, they restructure not just how journalists work but how meaning, control, and authorship are negotiated in the production of news (Guzman & Lewis, 2020).

A Shift from Command to Collaboration

Historically, journalists have interacted with machines in a command-based manner, by utilizing databases, dashboards, or editing tools to execute predetermined tasks. AI, especially generative AI and machine learning systems, introduces tools that are semi-autonomous. Tools that are capable of making decisions and that “talk back” by proposing topics, generating drafts, or predicting audience reactions (Lewis *et al.*, 2020). This constant evolution transforms the relationship from tool use to collaborative interaction, reshaping journalistic routines and editorial dynamics. These are some strategies we have proposed for seemingly collaborative work.

Understanding AI Capabilities and Constraints

Journalists must develop “AI literacy” as a baseline for understanding how AI systems work, what they are trained on, and where their limitations lie. This literacy aids them in identifying when AI outputs may be malfunctioning, overgeneralizing, or omitting nuance (Chiu *et al.*, 2024; Laupichler *et al.*, 2022). For example, many large language models lack temporal awareness and are unable to validate facts, which denotes that journalists must maintain skepticism even when outputs appear to be very human or perfect. Research shows that when users understand the logic behind intelligent systems, their ability to manage and anticipate machine behavior improves significantly (Laupichler *et al.*, 2022).

Formulating Effective Prompts and Queries

Interacting with AI requires a communicative mindset. Whether asking an AI to write a headline, summarize a story, or extract data trends, success depends on the clarity and specificity of the human prompt. Journalists are thus encouraged to develop “prompt engineering” skills, crafting clear, targeted instructions that elicit accurate and nuanced outputs (Bashardoust *et al.*, 2024). This aligns with HMC theories, which position human users as co-constructors in meaning-making, where conversational scaffolding and iterative feedback loops enhance system performance (Guzman, 2018).

Data Curation and Editorial Grounding

AI does not function in a vacuum. It operates on data chosen (or neglected) by humans. In journalism, this places journalists in a crucial gatekeeping role regarding the sources, datasets, or linguistic patterns that an AI system uses (Diakopoulos, 2019). Curating representative, balanced, and ethically sourced data sets is vital to avoid bias amplification. Moreover, once the AI produces an output, whether a trend analysis, summary, or predicted engagement metric, it is the journalist’s responsibility to interpret and contextualize that result. This aligns with

a human-in-the-loop model, which emphasizes human oversight to ensure accuracy, reliability, and ethical use of AI-generated outputs (Demartini *et al.*, 2020).

Emotional Intelligence and Social Presence

One underexplored but emerging area in HMC is the emotional and relational perception of machines. As AI-generated texts become more human-like, some journalists may attribute competence or warmth to the system, which is a process known as mind perception (Waytz *et al.*, 2014). Such perceptions can influence how journalists trust or rely on AI. Studies in media psychology indicate that when systems mimic social cues (e.g., tone, empathy), users may engage more collaboratively; however, such mimicry may also mask the system’s true limitations (Nass & Moon, 2002). Balancing functional trust with critical awareness is essential.

Training, Feedback Loops, and Co-Evolution

As AI systems evolve, so too must journalistic practices. Feedback mechanisms in which human editors revise AI outputs, and those corrections feed back into the system, are key for improvement (Graefe, 2016). Newsrooms that implement training cycles between humans and AI agents can foster mutual adaptation, as journalists learn to prompt more effectively and evaluate more accurately. AI systems improve their relevance and tone through dynamic, iterative interaction with users. This feedback loop exemplifies symbiotic Human–Machine Communication (HMC) a co-evolutionary model in which human creativity and machine automation mutually reinforce each other (Lewis, Guzman, & Schmidt, 2020).

Skills Critical Journalist for Effective Human-Machine Collaboration

As AI continues to evolve and also reshape journalistic practices, the role of the journalist is evolving from that of a sole content creator to a hybrid collaborator working alongside intelligent systems. This transformation requires new competencies beyond traditional journalistic expertise. Tomorrow’s journalist must be proficient in data analysis, critical reasoning, technological literacy, and human–machine coordination (Graefe, 2016; Guzman & Lewis, 2020).

Data Analysis and Visualization

The integration of data journalism underscores the need for journalists to be comfortable working with quantitative data, both as input and output for AI systems reports. Reporters must be capable of grasping AI results through statistical understanding, questioning anomalies, and transforming findings into accessible visuals. AI may uncover trends, but human judgment is crucial for interpreting them meaningfully, without biases. Journalists who are very simmered with strong data fluency are better equipped to engage with algorithmic tools and craft nuanced narratives critically. Moreover, developing visualization literacy, like the ability to edit AI-generated

graphs or maps, ensures that visual storytelling remains accurate, ethically responsible, and audience-appropriate (Foa Couraçeiro *et al.*, 2024). For instance, a political journalist might use an AI tool to identify demographic patterns in voter turnout. Regardless, human oversight is essential to ensure that visualizations are not misleading, that axes are properly scaled, and that color schemes do not introduce bias.

Critical Thinking and Problem-Solving

In a human–AI workflow, skepticism is essential: AI outputs must be interrogated, not blindly accepted. Journalists should treat AI-generated information as they would treat any other source, acknowledging its potential for errors, omissions, or misinterpretations. For example, a detected trend or correlation must be verified: is it causal, spurious, or biased? Journalists may also need to troubleshoot AI outputs by refining prompts, correcting transcripts, or adjusting data pipelines (Diakopoulos & Koliska, 2017; Demartini *et al.*, 2020). Journalists with strong critical thinking skills act as the final gatekeepers between automated content and the public, ensuring that ethical and editorial standards are preserved (Diakopoulos, 2019).

Communication and Storytelling

Even the most advanced AI cannot replace human narrative intuition. Storytelling, which is the heartbeat of journalism still remains a human strength. AI may generate drafts or analyze patterns, but it is the journalist's duty to construct meaningful arcs, pose powerful questions, and provide cultural context. Edwards *et al.* (2013) argue that effective message design remains essential even when a message originates from a machine. Human editors must refine and proofread AI-generated content to ensure emotional tone and coherence and to ensure it is coherent with the intended audience and journalistic values. A journalist might use AI to analyze 10,000 leaked documents, but the crafting of the whistleblower narrative, the moral stakes, and the broader societal implications rely entirely on human interpretive labor. Additionally, journalists need to communicate AI's function to others, editors, audiences, or sources. This includes explaining how the AI arrived at its conclusion, its limitations, and why the results are trustworthy. Transparent storytelling reinforces credibility in an age where automation can invite suspicion (Lewis *et al.*, 2020).

Transparency in the Tool

Journalists are more likely to trust AI systems when they can understand and verify how decisions are made, especially in the context of reinforced biases. Explainability features, such as keyword rationales or output confidence levels, help users make informed judgments about the reliability of AI output (Gunning & Aha, 2019). Incorporating visible logic and transparency in AI-powered journalistic systems enables Journalistic HMC benefits from systems that include visible logic,

allowing humans to audit and correct flawed assumptions. Such transparency supports informed skepticism and trust calibration. For instance, when using an AI topic classifier, being able to view the keywords or sentence fragments it used to tag a story helps a journalist assess whether the classification was appropriate or misguided.

Adaptability and Flexibility

The future of AI-enhanced journalism is evolving in an unanticipated way. Both journalists and AI tools must adapt to rapidly shifting technologies, platforms, and audience expectations. Training programs and digital upskilling should be continuous, not episodic. Likewise, AI tools should be modular, capable of adjustment without complete retraining. Flexibility is also ideological: humans must retain editorial control at all times, and systems should be responsive to new kinds of journalistic missions (e.g., climate coverage, diversity reporting). Consider a newsroom shifting its focus toward investigative environmental journalism. The personalization algorithms used for audience engagement should adapt to this new focus, highlighting long-form investigations instead of short celebrity updates.

RESULTS AND DISCUSSION

This review highlights that AI adoption in journalism is reshaping newsroom practices, though in uneven and contested ways. Evidence from cases such as the Associated Press and The Washington Post clearly shows how automation supports efficiency in journalism routine tasks, including financial reporting and election coverage, while organizations like the ICIJ employ machine learning to manage large-scale data leaks (Graefe, 2016; Marconi, 2020). These applications underscore AI is most valuable when augmenting journalistic capacity, particularly in data processing and scale, rather than serving as a wholesale substitute for editorial work.

At the same time, ethical challenges remain central. Scholars point to persistent issues of bias, opacity, and cultural misalignment, which erode trust and risk reinforcing inequalities (Bucher, 2018; Diakopoulos, 2019). This is in tandem with Critical Algorithm Studies, which emphasize that algorithms are embedded within social and institutional contexts, shaping what is considered credible or newsworthy. Journalists' hesitance to delegate editorial judgment to AI reflects enduring concerns about transparency and the preservation of professional integrity.

Finally, our findings stress that AI functions best as part of a collaborative model. Human–machine interaction allows journalists to retain narrative framing and ethical oversight while machines handle data-intensive tasks, consistent with HMC and Actor–Network Theory perspectives (Guzman & Lewis, 2020; Lewis *et al.*, 2019). Yet access to these tools is highly uneven: while U.S., U.K., and Chinese newsrooms lead experimentation, many Global South contexts lack infrastructure and training to adopt AI effectively (Moyo *et al.*, 2019). Such

disparities highlight that AI's affordances are shaped by broader questions of equity, reminding us that its impact is not inevitable but contingent on institutional, cultural, and resource conditions.

CONCLUSION

The emergence of AI in journalism represents one of the most significant transformations since the advent of the Internet. This review has shown that AI offers clear opportunities for enhancing efficiency and scale in newsrooms, as seen in the Associated Press's automated earnings reports, The Washington Post's election updates, and the ICIJ's use of machine learning in the Panama Papers investigation (Moses, 2017; ICIJ, 2016; Marconi, 2020). These innovations illustrate how AI can augment journalistic practice, freeing reporters to focus on analysis, creativity, and in-depth storytelling rather than routine tasks.

Yet, the challenges remain profound. Issues of bias, opacity, and hyper-personalization threaten credibility and civic discourse (Cools & Diakopoulos, 2024). The rise of deepfakes further undermines trust, with cases of manipulated media targeting both executives and journalists (Robins-Early, 2024; VoA News, 2024). Likewise, the CNET incident revealed how undisclosed AI-generated articles erode transparency and public confidence (Farhi, 2023). These examples demonstrate the urgent need for stronger detection tools, newsroom AI ethics policies, and regulatory safeguards to uphold accuracy and accountability (Cools & Diakopoulos, 2023).

Looking ahead, journalism's future lies in collaboration rather than competition between humans and AI. Machines offer speed, scale, and pattern recognition, while journalists bring ethical reasoning, contextual insight, and narrative depth (Marconi, 2020; Cools & Diakopoulos, 2024). Human-Machine Communication frameworks highlight how these complementary strengths can produce more responsive and impactful reporting. For this to succeed, newsrooms must invest in AI literacy, interdisciplinary teamwork, and a culture that frames AI as a collaborator.

In conclusion, AI is neither a panacea nor a catastrophe for journalism. It is a powerful tool that, when applied responsibly, can expand the profession's capacity and reach. But careless use risks eroding public trust and democratic accountability. The responsibility rests with journalists, editors, and institutions to center human judgment, demand transparency, and proactively address bias. By doing so, the profession can ensure that AI strengthens journalism rather than undermines it.

Future Directions

Several strategic pathways must be prioritized to ensure its ethic, as AI-driven journalism moves from innovation to integration, inclusive, and effective evolution. These directions focus on technological development, industry standards, education, equity, public trust, and regulatory

frameworks.

1. **Combatting Deepfakes and Media Manipulation:** Future research should prioritize advanced detection technologies for deepfake media when integrating them into newsroom workflows and practices. Initiatives like Adobe's Content Authenticity Initiative and blockchain-based tools can offer great solutions for ensuring integrity and trust in the media.

2. **Creating Ethical Standards for AI Use:** An industry-wide ethical frameworks that include transparency in citing AI-generated content must be put prioritize, as well as editorial oversight protocols, algorithmic fairness, and data privacy protections. Leading organizations like the Society of Professional Journalists and Global Editors Network can spearhead this standard and ensure its wide uptakes.

3. **Training in AI Literacy:** Journalists need proper education in AI usage and know how, data analysis, and ethical reasoning. This training could be inform of workshops, short courses, and interdisciplinary seminars should emphasize both the capabilities and limitations of AI to avoid over-reliance and ensure human judgment remains central of the practices.

4. **Bridging the AI Divide:** The development of lightweight, cost-effective AI tools is essential to support local and under-resourced newsrooms. Partnerships, open-source models, and nonprofit funding can help reduce disparities and prevent AI from becoming a tool exclusive to elite organizations and can be available to those who could not afford smart phone as well. A good example is encouraging the building of more climate friendly low-power AI that required little to no internet to be used.

5. **Studying Audience Perceptions of AI-Generated Content:** Future studies should explore how different audiences perceive credibility and trust across AI-written versus human-authored new reports. Research should draw on frameworks like the "machine heuristic" (Sundar & Kim, 2019) to inform decisions about disclosure and deployment.

6. **Cross-Disciplinary Innovation:** Collaboration between journalists, engineers, ethicists, and scholars is another strong area to look into as well. Projects like Journalism AI (Polis, LSE) show how such partnerships can create tools like explainable AI systems that align technological capabilities with journalistic values.

7. **Engaging in Policy and Regulatory Debates:** As governments regulate AI in some countries of the world, journalism must advocate for policies that protect against harms like misinformation and algorithmic opacity without restricting investigative autonomy, newsroom independence, or source confidentiality. In summary, a balanced approach combining technological innovation with strong ethical foundations, inclusive access, and interdisciplinary collaboration will shape the next phase of responsible, impactful AI-driven journo practice in this profession.

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