Postprint: Enhancing News Content Production and Dissemination Efficiency through Artificial Intelligence

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Abstract

【Objective】 To analyze the integration practices of artificial intelligence technology embedded in news gathering and editing operations, and to explore pathways for intelligent transformation.

【Method】Literature analysis combined with case studies from mainstream media was employed to systematically review the application models and development trends of intelligent technology in gathering and editing operations.

【Results】 Artificial intelligence technology reconstructs the gathering and editing workflow, enabling multimodal content production; risks such as deepfakes and algorithmic bias become prominent; pressure for transformation of editorial positions intensifies.

【Conclusion】Constructing a “algorithm + human” dual gatekeeping mechanism, improving the intelligent gathering and editing system, and strengthening digital skills training for editorial staff are key focal points for advancing deep integrated development.

Full Text

Enhancing News Content Production and Dissemination Efficiency through Artificial Intelligence

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Abstract

[**Objective**] This study analyzes the integrated practices of embedding artificial intelligence technology into news gathering and editing operations, exploring

pathways for intelligent transformation. [**Methods**] Using literature analysis and drawing on cases from mainstream media, the paper systematically examines application models and development trends of intelligent technologies in editorial operations. [**Results**] AI technology reconstructs the editorial workflow, enabling multimodal content production; risks such as deepfakes and algorithmic bias have become prominent; and pressure for role transformation among editorial staff has intensified. [**Conclusion**] The key to advancing deep integration lies in constructing a dual-gatekeeping mechanism combining "algorithmic + human" oversight, improving the intelligent editorial system, and strengthening digital skills training for editorial personnel.

Keywords: artificial intelligence; news gathering and editing; media convergence; intelligent transformation; risk prevention and control

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1. Intelligent Technology Reshaping the System Architecture of News Gathering and Editing

Intelligent technology has achieved deep empowerment across the entire news gathering and editing workflow. In the news discovery phase, intelligent crawler systems continuously monitor diverse information sources such as social media and government websites through deep learning algorithms, enabling intelligent identification of trending events and potential news value. In content production, intelligent writing systems like CCTV.com's "AI Editorial Department" leverage natural language processing to rapidly analyze and generate reports from structured information such as sports events and financial data, enhancing the timeliness and standardization of news production [1]. In content review, the "Zhixiaozhu" platform developed by People's Daily employs computer vision and text classification algorithms to conduct multi-dimensional gatekeeping of political texts and visual content, preventing the spread of false information. In content distribution, Xinhua News Agency's "Media Brain," based on transformer pre-trained models, possesses cross-modal content understanding and generation capabilities, intelligently transforming text news into short videos, graphics, and other formats while optimizing distribution strategies based on audience characteristics through intelligent algorithms.

Chuan Guan News, in collaboration with Tencent Cloud, has created a "Digital Journalist Matrix" that explores innovative models of collaborative operation between human journalists and digital avatars, providing practical references for regional media's intelligent transformation. China Media Group has applied AIGC technology in major thematic reporting, launching innovative products

such as *Millennium Poems* and *Chinese Mythology*, pioneering new digital pathways for traditional cultural dissemination. Through systematic application of intelligent technologies, media organizations at all levels are constructing integrated intelligent editorial systems encompassing gathering, editing, reviewing, and distribution, driving the transformation of news production toward digitalization and intelligence.

2. Digital Transformation Driving Deep-level Changes in Editorial Operations

Digital transformation has become the core driving force in media industry development. With breakthroughs in generative AI technology, large models represented by ChatGPT, Llama2, and Gemini are deeply intervening in news gathering and editing operations, propelling editorial production toward intelligent and digital leaps. Media organizations are pioneering new paradigms in news production by building intelligent production systems, reshaping editorial chains, and strengthening algorithmic empowerment.

2.1 Construction and Operation of Intelligent Production Systems

Intelligent production systems are reconstructing media organizations' operational models. Xinhua News Agency's "Xinhua Rongyi" project has built an intelligent production cloud service platform for all media, focusing on three dimensions: "zero/low-code, collaborative management, and AI-enabled efficiency enhancement." This platform integrates and calls various intelligent tools through API interfaces, enabling intelligent collection of news materials, automatic text generation, and intelligent content distribution. Fujian Radio and Television Group has built an intelligent media system for efficient and precise management of massive content resources, breaking down data barriers across gathering, production, review, and distribution. China Media Group's 5G Ultra-HD and Intelligent Media Asset Management Platform achieves HD-quality media assets, intelligent video production, virtualized live reporting, and integrated production processes through an "intelligent media library," forming a complete intelligent production closed loop [2]. People's Daily, relying on the State Key Laboratory of Media Convergence and Communication, has integrated deep learning and computer vision technologies to develop "Zhixiaozhu," an intelligent error-correction product for political discourse widely used in government agencies and enterprises. The Interim Measures for the Management of Generative AI Services, jointly issued by the Cyberspace Administration and seven other departments, provides institutional guarantees for building intelligent production systems and promotes standardized development of intelligent media. Under this policy framework, media organizations are accelerating intelligent production system construction, continuously strengthening efforts in content production, technology development, and risk control to transform intelligent production systems from technical support platforms into business innovation engines.

2.2 Digital Reorganization and Optimization of Editorial Chains

The digital reorganization of editorial chains demonstrates new characteristics of "human-machine collaboration" [3]. Chuan Guan News has built a "Digital Journalist Matrix" that applies AIGC technology to news brief production, enabling a collaborative model where human journalists conduct frontline interviews while digital avatars provide back-end interpretation. People's Daily's "Creative Brain" constructs professional knowledge graphs to transform editorial experience into algorithmic rules, assisting journalists in writing and optimizing articles. Hunan Satellite TV has introduced metaverse technology in variety show production to achieve digital twins of content, creating a new model of digital-physical integration. Ningxia Radio and Television Station has established an intelligent media system for efficient data aggregation, analysis, and monitoring, optimizing the all-media content production chain. Baidu Intelligent Cloud's collaborations with CCTV.com and People's Daily on "AI Help You Find" and "People's Daily Creative Brain" provide new approaches for editorial process reconstruction [4]. Through deep learning technology, these tools can rapidly analyze massive data, extract key information, and generate content that conforms to communication patterns. With breakthroughs in multimodal large models and the emergence of AI Agent concepts, editorial chains are evolving toward more intelligent and open directions. CGTN's digital special exhibition *Millennium Tune: Song Dynasty Landscapes and Birds* employs 3D animation replication and naked-eye 3D technology to bring traditional art to life, demonstrating the innovative potential of digital editorial work in cultural communication. The collaborative integration of cloud computing, blockchain, and AI technologies further strengthens data processing capabilities, enhances content production security and credibility, and provides solid technical support for digital reorganization of editorial chains. This intelligent operation model centered on "human-machine coupling" is becoming the new normal in news gathering and editing operations.

2.3 Enhancement of Production Efficiency through Algorithmic Empowerment

Algorithmic empowerment is comprehensively enhancing news production efficiency [5]. People's Daily's "Tianmu" intelligent identification system adopts an "AI-governed-by-AI" approach to identify generated content, detect deepfakes, and trace synthesis methods, building a content security defense line. Xinhua News Agency's 5G Ultra-HD platform achieves informatization of the entire business chain from shooting, transmission, and production to distribution through an intelligent workflow. The platform builds "5G Ultra-HD Platform" and "Intelligent Media Library" to comprehensively enhance media videoization, digitalization, and intelligence levels, achieving HD-quality media assets, intelligent video production, virtualized live reporting, and integrated production processes. In intelligent calibration, laboratory algorithm-based intelligent error-correction products for political discourse have been deployed, covering

political text content risk control, visual target compliance detection, political figure video forgery detection, and cross-modal content security radar [6]. With breakthroughs in multimodal large model technology and the emergence of AI Agent concepts, algorithmic empowerment is driving news production toward greater efficiency, precision, and intelligence, providing strong support for digital transformation of media organizations.

3. Risk Identification and Challenge Response in Intelligent Editorial Environments

As AI technology becomes deeply applied in news gathering and editing, multidimensional risks and challenges have gradually emerged. From content generation to technology application, and from professional roles to ethical norms, issues in intelligent editorial environments require systematic response and prevention.

3.1 Authenticity Crisis of Algorithmically Generated Content

Algorithmically generated content faces an authenticity crisis in news editorial environments [7]. Generative AI primarily relies on data feeding and algorithmic parsing, with information collection and processing logic significantly different from humans. AI lacks causal reasoning capabilities and can only estimate and match based on data in corpora, resulting in inherent deficiencies in fact-checking ability. Globally, AI-generated fake news websites have increased to 957, covering 15 languages and spanning politics, technology, entertainment, and other fields. In media fields with strict requirements for information accuracy and reliability, algorithmically generated content may be deliberately used to create and spread false information, causing media ecosystem deterioration [8]. In 2023, Wall Street Journal journalist Markoni pointed out that some AI companies used mainstream media articles without authorization to train models, resulting in copyright disputes in generated content. People's Daily, relying on the State Key Laboratory of Media Convergence and Communication, released the "Zhixiaozhu" intelligent error-correction product for political discourse, which has been deployed in over 100 institutions. Such technological innovation provides important support for addressing the authenticity crisis of algorithmically generated content and promotes the establishment of more comprehensive content authenticity verification mechanisms.

3.2 Security Risks of Deepfake Technology

As a product of AI development, deepfake technology poses severe challenges to news editorial environments [9]. Through deep learning methods, deepfakes can manipulate and modify text, images, audio, video, and other content to achieve highly realistic intelligent production. The application of deepfake technology in news production causes negative impacts such as dissolution of news authenticity, disorder in communication order, and failure of public opinion guid-

ance. The technology may also infringe upon personal reputation rights, privacy rights, copyright, and other rights, endangering national security and triggering political trust crises [10]. In July 2023, the Interim Measures for the Management of Generative AI Services were promulgated, explicitly proposing classified and graded regulation of generative AI services to provide institutional guarantees for standardizing deepfake technology applications. In November 2023, 28 countries including China and the EU jointly signed the Bletchley Declaration, expressing concern about systemic risks brought by rapid AI development and providing a framework for international governance of deepfake technology. At the technical level, major media organizations are accelerating the construction of multi-level verification systems centered on digital watermarking and content fingerprinting, enhancing identification and prevention capabilities for deepfake content through technical means to ensure authenticity and credibility of news communication.

3.3 Transformation Resistance of Traditional Editorial Roles

Deep application of intelligent technology is reshaping the functional positioning of traditional editorial roles [11]. AI-based news production operates on fixed codes and templates, leading to fixed and patterned phenomena in intelligent news. In media practice involving human-machine interaction, multiple subjects including communication subjects, implementation subjects, reception subjects, resource subjects, and influence subjects continuously emerge, with core relationships presenting contradictory balances. Models possess "black box" characteristics during parsing and generation processes, exhibiting opaque and unexplainable features. Editorial staff face multiple pressures including work method transformation, professional skill enhancement, and thinking mode innovation [12]. In the evolution of the global digital media ecosystem, machine logic gradually replaces humanism as the foundational epistemology of information civilization, plunging humanity's overall media experience into existential crisis. Traditional editorial roles need to actively adapt to intelligent transformation demands while maintaining professional values. Xinhua News Agency's "Xinhua Rongyi" next-generation converged media production cloud service project focuses on three key aspects—"zero/low-code, collaborative management, and AI-enabled efficiency enhancement"—to empower non-media organizations with media capabilities and optimize content production processes. CCTV.com's proposal of the "AICC" concept and construction of the "AI Editorial Department" provide reference paths for mainstream media's application of AI technology. Facing transformation resistance in traditional editorial roles, media organizations need to achieve optimized upgrading of editorial processes through technological innovation and business reconstruction, building more efficient and intelligent news production systems.

4. Pathways for Intelligent Editorial System Construction

The in-depth application of AI technology in news gathering and editing is accelerating the transformation and upgrading of traditional editorial operations. Building intelligent editorial systems, improving risk prevention and control mechanisms, and strengthening talent team construction are key pathways for achieving high-quality development of editorial operations.

4.1 Iteration and Application of Intelligent Editorial Technology

Intelligent editorial technology development demonstrates diversified characteristics [13]. Xinhua News Agency's 5G Ultra-HD and Intelligent Media Asset Management Platform achieves mutual collaboration among "content production, intelligent applications, terminal equipment, and process reengineering," promoting informatization of the entire business chain for visual content production from shooting, transmission, and production to distribution, storage, and management. By building the "5G Ultra-HD Platform" and "Intelligent Media Library," the platform comprehensively enhances media videoization, digitalization, and intelligence levels, achieving HD-quality media assets, intelligent video production, virtualized live reporting, and integrated production processes. Fujian Radio and Television Group, Ningxia Radio and Television Station, Chengdu Media Group, and other local media continue exploring intelligent media system construction, achieving efficient and precise management of massive content resources and promoting efficient data aggregation, connection, analysis, monitoring, and application. In intelligent calibration, laboratory algorithm-based intelligent error-correction products for political discourse have been deployed, covering political text content risk control, visual target compliance detection, political figure video forgery detection, and cross-modal content security radar [14]. With breakthroughs in multimodal large model technology and the emergence of AI Agent concepts, intelligent editorial technology will develop toward deeper levels, achieving more comprehensive, richer, more accurate, and more reliable information perception and intelligent workflows.

4.2 Construction and Improvement of Risk Control Systems

Risk control system construction is an important guarantee for the healthy development of intelligent editorial operations [15]. The Interim Measures for the Management of Generative AI Services, jointly issued by the Cyberspace Administration and seven other departments, explicitly proposes classified and graded regulation of generative AI services and adopts effective measures to encourage innovative development. In practice, major media organizations are exploring the establishment of multi-level risk control mechanisms [16]. People's Daily's "Tianmu" intelligent identification system explores a new content risk control model of "AI-governed-by-AI," capable of identifying AI-generated content, detecting deepfakes, and tracing synthesis methods. When using AI, media organizations need to implement classified and graded protection based on information importance, regulate data collection, storage, and usage behaviors, and

establish differentiated privacy protection mechanisms. Simultaneously, systematic layouts for standardized data regulation, data asset management, and data security protection ensure the safety and reliability of editorial operations. The Bletchley Declaration signed by multiple countries provides a reference framework for risk management of AI applications. In content review, media organizations are building intelligent review systems based on deep learning, establishing multi-dimensional evaluation indicators to achieve comprehensive gatekeeping of content authenticity, timeliness, and value orientation. At the technical level, distributed technologies such as blockchain record content generation and dissemination processes, establishing traceable and verifiable content responsibility chains to effectively prevent false information dissemination risks.

4.3 Training and Transformation of Editorial Talent

The digital transformation of editorial talent is the core element of intelligent upgrading [17]. Against the backdrop of deep AI application, traditional editorial staff need to master new skills such as data analysis, algorithmic application, and intelligent writing. Chuan Guan News, in collaboration with Tencent Cloud Intelligence, has issued "Digital Intelligence Assistants" to journalists, jointly building China's largest digital journalist matrix to promote role transformation from single content producers to versatile talents such as data analysts and algorithmic planners. CCTV.com's AICC-related concepts and "AI Editorial Department" construction practices provide new ideas for editorial staff transformation [18]. Editorial talent training needs to emphasize the combination of theory and practice, strengthen data thinking and technical literacy, and enhance cross-disciplinary integration capabilities. Establishing comprehensive training systems that conduct specialized training on intelligent editorial tool applications, data analysis methods, and algorithmic principles helps editorial staff adapt to intelligent transformation needs. Through project practice and technical exchanges, editorial staff can master intelligent tool usage methods and enhance digital work capabilities. In talent evaluation mechanisms, establishing a dual-track assessment system of "technology + business" that incorporates digital skill mastery and intelligent tool application effectiveness into evaluation indicators guides editorial staff to actively adapt to intelligent transformation needs. People's Daily, Xinhua News Agency, and other mainstream media have begun exploring the establishment of specialized data journalism teams, building integrated editorial talent teams to provide talent support for intelligent editorial business development.

The deep integration of AI technology and news gathering and editing is an inevitable trend. By constructing intelligent editorial platforms, optimizing business processes, and strengthening risk prevention and control, organic unity between technological empowerment and professional values can be achieved. In the future, we should further improve the intelligent editorial technology system, strengthen digital capacity building for editorial talent, and promote high-quality development of news gathering and editing operations. While ensuring

news authenticity and professionalism, we should fully leverage AI's positive role in enhancing editorial efficiency and innovating presentation forms, forming a new human-machine collaborative intelligent editorial model. Currently, major media organizations are actively exploring intelligent transformation paths, achieving optimized upgrading of editorial processes through technological innovation and business reconstruction, and building more efficient and intelligent news production systems.

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