Analysis of Artificial Intelligence Applications in Broadcasting: Postprint

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Abstract

Amidst today's rapid development of broadcasting and television, the emergence of artificial intelligence technology has further enhanced the functionalities of broadcasting and television, demonstrating significant technological advantages. This paper examines the application of artificial intelligence in news communication, particularly within the broadcasting and television domain, and elucidates the significance of AI' s emergence for improving program quality. Finally, through critical reflection on the application of artificial intelligence technology, it summarizes the problems in AI utilization and proposes corresponding solutions, aiming to strengthen the effectiveness of artificial intelligence technology and better serve broadcasting and television.

Full Text

Analysis of Artificial Intelligence Applications in Radio and Television Broadcasting

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Abstract: In today' s rapidly evolving radio and television landscape, the emergence of artificial intelligence technology has further enhanced broadcasting capabilities, demonstrating significant technical advantages. This paper examines AI applications in news communication, particularly within the radio and television domain, elucidating the significance of AI for improving broadcast program quality. Finally, through reflection on AI technology implementation, the paper summarizes existing problems and proposes corresponding solutions, aiming to strengthen AI effectiveness and better serve radio and television broadcasting.

Keywords: artificial intelligence; radio and television broadcasting; filter bubble; news production

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Artificial intelligence is widely regarded as a representative of new-era information technology development. Its integration with the radio and television industry has catalyzed sector-wide restructuring, exerting profound influence on key architectural components including production systems, user platforms, and distribution platforms. Current applications in various regions demonstrate increasingly tight integration between AI technology and broadcasting, generating far-reaching impacts on news and television programs alike. To fully leverage AI' s advantages, a deep understanding of its application landscape is essential —constituting the primary objective of this research.

1.1.1 AI Expands Information Source Boundaries

In journalism, "footwork" emphasizes a reporter' s ability to be present at news scenes and obtain firsthand information, arriving promptly to document events and serve as a witness to history. However, under traditional workflows, reporters cannot achieve rapid information extraction; regardless of their footwork capabilities, reaching the scene inevitably requires considerable time. AI technology has effectively resolved this limitation—for instance, through sensor technology that expands information source boundaries and enhances journalistic footwork. Sensors, a novel technology developed on the Internet of Things foundation, can be widely deployed across drones, remote sensing satellites, and other devices with AI support, enabling continuous monitoring of target areas and transmitting abnormal information to media centers for news extraction [1]. The *Washington Post*, for example, employed sensors to detect urban gunfire as early as 2014, using the data to assess city safety levels. This monitoring system achieved seamless integration with television stations and police departments, ensuring broadcast news divisions had access to real-time urban safety information—a practice that proved successful. Similarly, China Central Television' s 2014 program "*Supposedly Spring Festival Travel Rush*" adopted a comparable approach by interfacing with Baidu Maps to create visualized news data, enabling real-time assessment of traffic flow and passenger volume during the travel rush while achieving second-level responses to various emergencies.

1.1.2 Leveraging Algorithms for News Material Identification

AI technology functions through specific algorithms. In news identification processes, AI can employ semantic analysis, image processing, and language processing technologies to evaluate information content, with the resulting assessments serving as feasible indicators for determining news value. For instance, when Huffington Post Broadcasting organized a local community discussion on climate

change, its AI analysis system extracted 32 pieces of information related to violence and other illegal activities from hundreds of thousands of user comments, thereby discovering valuable news leads. Additionally, AI can perform initial news information processing, such as adding tags or classifying information. As AI technology continues to mature, its information processing capabilities will significantly strengthen. For example, by leveraging AI' s analytical capabilities, knowledge graphs and background information can be used within news materials to predict development trends in news information, ultimately grasping the causes of news events and enhancing staff responsiveness.

1.2 AI Extends Distribution Capabilities

With AI technology support, news has truly achieved interaction among humans, algorithms, and content. Leveraging AI' s powerful data analysis capabilities, various algorithms have gradually permeated internet platforms, becoming integral components of news information dissemination. This is because AI-enabled algorithms can collect personalized user information and relational data—for instance, by analyzing user posts and content preferences on Weibo to complete user profiling [2]. Simultaneously, AI algorithms can identify user behavioral information on platforms, including page dwell time and like counts, to extract key news materials. When public attention toward a particular topic on Weibo increases significantly, AI technology can use algorithms to identify topic content and determine whether it contains news value. Alternatively, after identifying users' news browsing behaviors, AI can push targeted news materials to continuously expand the target audience for news—these all represent important manifestations of enhanced AI distribution capabilities.

1.3 AI Transforms the Writing Subject

AI technology has fundamentally transformed traditional news workflows, particularly through innovation in writing subjects. As early as 2017, relevant institutions introduced robots with intelligent writing capabilities, whose primary functions include providing personalized recommendations, assisting broadcast journalists in their writing processes, and offering speech recognition and image analysis features. Case studies from various broadcast stations demonstrate that these AI robots significantly enhance journalists' responsiveness to news information. During the 2018 FIFA World Cup, for example, the robot generated broadcast news reports immediately after the Russia-Saudi Arabia match concluded, detailing the entire match process including technical fouls and goals. This improved broadcasters' responsiveness to news events, enabling them to consistently provide first-hand materials to the public amid increasingly fierce competition—a clear advantage. From a long-term perspective, AI-based robot information distribution primarily targets information terminals and personal information platforms. As different types of user platforms with varying focuses log into AI platforms, broadcast news responsiveness will be further enhanced.

2. AI Technology in Radio and Television Program Production

2.1 AI Enhances Production Efficiency

In broadcast program production, content creation constitutes the fundamental link. Under traditional technical environments, broadcast program manufacturing was time-consuming, labor-intensive, and inefficient. By contrast, AI technology performs editing, scheduling, and other tasks by simulating human workflows based on data support, thereby improving production efficiency. The earliest case of AI application in broadcast program production was Fox' s Watson system, which learned from horror films to extract background music and scene information, ultimately editing a 6-minute clip from a 90-minute film—launching AI' s involvement in broadcast production. Building on this prospect, China Central Television' s Channel 5, considering the demands of real-time sports broadcasting, collaborated with domestic universities and enterprises to develop a "multi-mode video + AI editing" robot capable of identifying video and audio streams. This robot can produce a complete game highlights package within just five minutes after a match concludes, helping television stations replay key game moments. Hunan Broadcasting Network also partnered with local enterprises at the end of 2019 to develop an "Intelligent Content Production Platform" featuring broadcast program editing and online scheduling functions, achieving "edit while broadcasting" and significantly improving work efficiency.

2.2 AI Enriches Program Formats

AI technology has enabled more diverse forms of expression in radio and television programs, with intelligent robots gradually taking center stage and even becoming program protagonists. Based on experiences from broadcast stations across China, AI applications in programs manifest primarily in two aspects: First, as discussion topics within programs, where AI participates as a subject of conversation—for instance, Tianjin Television' s *Super Intelligence* program features discussions centered on AI technology. Second, as active participants in broadcast programs—for example, in 2015, Dragon TV collaborated with Microsoft to develop an AI host named "Xiaoice," which assumed responsibility for weather news broadcasting. In Jiangsu Satellite TV' s *Arena of Genius*, human contestants competing against AI was introduced, making the television program more novel and effectively attracting audience attention.

2.3 AI Facilitates Broadcast Content Dissemination

2.3.1 AI-Based Multimodal Review Multimodal review technology constitutes a crucial component for improving broadcast program quality. It involves using intelligent technology to deconstruct entire broadcast program content, conducting detection across text, image, and screen modalities to assess whether program segments comply with regulations or whether hosts use inappropriate language. Advertising also represents an important aspect of AI multimodal re-

view, during which AI technology can quickly intercept non-compliant content to ensure broadcast programs provide positive guidance for residents [3]. However, it should be noted that current AI-based multimodal review technology still has considerable room for development. To ensure review quality, AI can handle simple broadcast program reviews while staff can manage more complex or ambiguous cases.

2.3.2 Personalized Program Recommendations Through Algorithms In the current new media era, public attention forms the foundation for broadcasters' survival and development. This requires broadcast stations to continuously cultivate loyal user groups and leverage the seamless connection between users and broadcasters in the internet age to understand audience preferences. Broadcasters can therefore employ this technology to achieve targeted material 推送 by identifying multi-dimensional cross-indicators of user entertainment behavior trajectories. For example, a foreign television station utilizes AI technology to generate preview images for programs viewers want to watch. These previews use intelligent recognition technology to extract any image frames from videos that might attract audience attention, establishing user interest models and achieving personalized program menu customization—a successful case worth emulating by Chinese broadcasters.

3. Reflections on AI Technology Application

3.1 Problems in Broadcasting AI Application

3.1.1 Filter Bubbles from Personalized Recommendations AI technology implementation is built upon big data analysis, extracting key materials from user preference databases and completing 推送 based on user interests. However, over time, broadcasters' continuous 推送 of user-interest content may lead to homogenization and singularity in information reception, ultimately creating "filter bubbles" that cause users to gradually lose interest. Additionally, as broadcasters develop, some users show high preference for entertainment variety shows. While such content primarily entertains audiences, when AI calculates user preferences for these programs and continuously provides similar content, users may become addicted and enveloped in virtual happiness—a phenomenon that clearly contradicts broadcasters' original intentions for employing AI technology.

3.1.2 Privacy and Data Security Issues In the AI era, the cost of customized services for radio and television program production has gradually decreased, giving users more choices when watching programs. However, in reality, targeted broadcasting relies on massive data collection. Before providing customized services, broadcasters must gather large amounts of user data, transforming personal information from private to commodified assets targeted by broadcasting markets, leaving user privacy unprotected. Research by relevant scholars indicates that AI technology has lowered the difficulty for advertisers

to conduct targeted campaigns, enabling broadcast producers to mine user personal information and resulting in large-scale privacy leaks [4].

3.1.3 Human-AI Contradictions As previously discussed, AI technology significantly improves broadcasters' production efficiency. For instance, producing a 2-minute video may require over four hours of manual editing but only minutes with AI technology—a stark contrast that fuels discourse about "AI replacing traditional media professionals." While AI's emergence notably enhances television program quality and has been successfully applied in broadcast production and news, stakeholders must further understand AI's characteristics and application status, proactively addressing promotion challenges and eliminating obstacles to make AI a key driver for broadcast quality improvement.

3.2 Solutions and Recommendations

3.2.1 Improve Legal Regulations and Accountability Mechanisms For broadcasters, AI technology represents an important force for industry transformation and development, yet its associated problems cannot be ignored. These issues largely stem from inadequate legal regulations. To ensure AI plays a greater role in broadcasting, government departments should strengthen legislation and improve legal-ethical frameworks, specifically defining boundaries for AI' s collection and analysis of user data to ensure long-term legal compliance. Relevant departments should also keep pace with the times, clarifying user privacy protection requirements and establishing accountability for online behavioral tracking. Combined with position responsibility mechanisms and detailed regulations, this prevents broadcasters from neglecting content control in pursuit of economic benefits, achieving unity between economic and social responsibilities [5].

3.2.2 Achieve Comprehensive Human-Machine Collaboration AI technology has become crucial for further improving broadcast quality, making its integration with broadcasting necessary. For broadcast program production and creation, reasonable participation between staff and AI should be guided from the planning stage onward. For example, AI can be used in content editing and key material extraction to 串联 materials into complete storylines, improving efficiency. Moreover, AI' s advantage lies in its powerful deep learning capabilities, enabling it to extract inherent patterns and experiences from broadcast programs after intensive learning. Under human-machine collaboration, human creativity inspires ideas while AI replicates them, thereby improving both broadcast program quality and work efficiency.

3.2.3 Enhance Media Literacy and Strengthen Public Rationality In the process of broadcast intelligence technology improvement, public support is crucial. Broadcasters should fully leverage their role in guiding audiences to strengthen information cognition and feedback capabilities. This includes actively understanding AI algorithm recommendation patterns and using modern

awareness to enhance comprehension of broadcast information. Additionally, audiences should proactively diversify their viewing behaviors to address filter bubble issues, laying the foundation for ensuring AI personalization and intelligent recommendations.

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