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The Emergence, Current Status, and Future Trends of “Robot Journalists” (Postprint)

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Abstract

As artificial intelligence technology becomes increasingly mature, the media industry has seized this opportunity to attempt to promote progress and breakthroughs in the news media field through technological innovation, with the application of “robot journalists” being one such example. Currently, “robot journalists” represent the most innovative attempt to apply intelligent technology in the news reporting domain. Their application not only makes news reporting more convenient and intelligent but also fulfills the journalism industry’s pursuit of both social and economic benefits. This paper employs content analysis and literature analysis methods, taking “robot journalists” as the research subject. It first traces the origins of “robot journalists,” analyzes their operating principles, processes, and characteristics, and conducts a multi-angle examination of how their developmental background shapes these features, subsequently analyzing the impact of “robot journalists” on the journalism industry. The author argues that the application of “robot journalists” in news production represents merely an innovation in media technology and still cannot replace human journalists as the absolute agents of news production. Finally, from a technical perspective, it presents the current developmental limitations and dilemmas of “robot journalists”—the hidden danger of de-storyfication in robot-generated news content, difficulty in producing “spotlight news” due to fixed perspectives, and news homogenization and lack of depth caused by templated production. Future writing robots will focus on grammatical accumulation, transitioning from logical calculation to semantic imitation; undergo algorithmic upgrading, shifting from information dissemination to in-depth reporting; and promote human-machine cooperation, moving from one-way operation to mutual assistance. It is believed that this feasibility study on the news production process, characteristics, limitations, and future development of “robot journalists” will provide certain reference significance for research on the close integration of intelligent technology and the media industry.

Full Text

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Abstract: As artificial intelligence technology continues to mature, the media industry has seized this opportunity to promote progress and breakthroughs in journalism through technological innovation, with the application of “robot journalists” being one such attempt. Currently, robot journalists represent the most innovative experiment in applying intelligent technology to news reporting. Their use not only makes news reporting more convenient and intelligent but also fulfills the journalism industry’s demands for both social and economic benefits. This paper employs content analysis and literature review methods to examine robot journalists as its research object. It first traces the background of their emergence, analyzing their operational principles, processes, and characteristics, and systematically examines how these developmental contexts shape their features. The paper then analyzes the impact of robot journalists on the journalism industry. The author argues that the application of robot journalists in news production represents merely an innovation in media technology and that they cannot replace human journalists as the absolute subjects of news production. Finally, the paper identifies current developmental limitations and dilemmas from a technical perspective: the de-storytization of robot-generated content, fixed perspectives that make it difficult to produce “focus news,” and templated production that leads to homogeneous and shallow reporting. Future writing robots will emphasize grammatical accumulation to achieve a transition from logical calculation to semantic imitation, undergo algorithmic upgrades to shift from information dissemination to in-depth reporting, and promote human-machine collaboration to move from unilateral operation to mutual assistance. This feasibility study on the news production process, characteristics, limitations, and future development of robot journalists will provide valuable insights for research on the close integration of intelligent technology and the media industry.

Keywords: robot journalist; new media business forms; news productivity; reporting patterns

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1. The Emergence Background of “Robot Journalists”

1.1 Era Background: Internet + New Media Business Forms The advent of artificial intelligence has evolved the traditional media era into an intelligent media era, and enthusiasm for AI has surged once again. The rapid rise of the journalism industry naturally depends on innovations in intelligent technology. The birth of robot news marks a leap in news production models from a handicraft stage to an assembly-line mass industrial period. Robots rely on computer technology to accurately capture data from massive information pools, select reporting angles based on the captured data, generate text, and then polish it with natural language processing, thereby achieving intelligence in news content production, distribution, and monitoring. In 2015, Tencent Finance took the lead in launching Dreamwriter, China’s first robot journalist for news writing, and published its first financial news article on an internet platform, heralding the beginning of automated journalism in China.

1.2 Audience Background: Personalized User Positioning The emergence of robot journalists and the use of drones at various news scenes mark the beginning of another round of competition for new intelligent technologies in the media industry. New technologies will inevitably become the primary means of liberating human resources and news productivity. According to the 42nd “Statistical Report on China’s Internet Development Status” released by the China Internet Network Information Center (CNNIC), as of June 2018, China’s internet penetration rate reached 57.7%, with mobile netizens totaling 788 million, and 98.3% of netizens accessing the internet via mobile phones. China’s internet infrastructure continues to be optimized and upgraded, with network poverty alleviation becoming a pathway for targeted poverty reduction. These statistics reveal that the number of mobile phone users has been increasing in recent years, and audience demand for media content is growing exponentially. Meanwhile, contemporary audience needs have shifted from one-to-many to one-to-one communication, with audiences accessing media in increasingly diversified ways and niche demands accounting for a growing market share. Consequently, robot news can select reporting angles based on the information it possesses to achieve multi-genre coverage and satisfy audiences’ personalized information needs.

1.3 Policy Background: AI Media Enters Public View The development of robot news in the intelligent media era cannot be separated from strong government support, as national policies encourage technological innovation across all industries. Indeed, future development trends in robot news technology should emphasize innovation, from content innovation to model innovation. Today, artificial intelligence technology has been written into government work reports, with national policies encouraging technological innovation to achieve integration between technology and industries, thereby promoting industrial innovation and development. Currently, the application of robot news writing has emerged and been applied to major media platforms under the support of

national policy.

2. Development Status and Impact of “Robot Journalists”

The emergence of robot journalists once caused unprecedented panic among news professionals, sparking heated debate about whether robot journalists will replace human journalists. The Associated Press, the first to adopt robot technology, believes that robot journalists “liberate journalists by reducing repetitive news and data processing.” Therefore, robot journalists cannot replace human journalists; they are based on specific computer systems that efficiently and accurately capture data, collect reliable information, and generate text, thereby simplifying the news production process and replacing manual information retrieval, reading, and decision-making. The application of robot journalists represents a certain degree of liberation of human resources in news media. During the 2016 Rio Olympics, Toutiao’s news-writing robot Zhang Xiaoming produced 457 news briefs and match reports on tennis, football, badminton, and other events, covering everything from group stages to finals, with publishing speeds nearly simultaneous with live television broadcasts.

2.2.1 Production Subject “Mechanization” Robot writing transforms the news production subject from humans to machines. In the traditional media era, every step of news production—from interviewing, screening, and editing to data capture and final publication—relied on human workers, who were the absolute subjects of news production. However, as the global financial crisis spread and competition within the media industry intensified, many media organizations began relying on technology to reduce labor costs and improve news production efficiency. Consequently, robot journalists have realized the transformation of news production subjects from human to machine. In a sense, the news production subject—machines—has liberated human workers from cumbersome information collection and writing processes, allowing them to pursue more in-depth follow-up reporting and thereby saving labor costs.

2.2.2 Production Content Precise and Personalized Authenticity is the primary principle of news, and robot writing—relying on powerful information processing capabilities and minimal involvement of human subjective consciousness—can reduce errors in draft content to a certain extent and improve news accuracy. Robot writing not only achieves news precision but also pushes personalized information to users. Robot news utilizes algorithmic technology to capture and compare user personal information, pushing different information to users’ mobile terminals based on individual differences. In 2018, according to Bloomberg reports, Twitter began using robot journalists to push personalized news to users and send event notifications to attract a larger and broader audience.

2.2.3 Production Process Intelligent and Efficient Gustave Le Bon’s concept of “the era of crowds” suggests that humans are like swarming ants,

reveling in groups while losing their individuality. Today, we are in the digital age, where information dissemination often exhibits characteristics of massive volume, high speed, and divergence. For most media platforms, how to capture users' attention among vast amounts of information is a significant challenge. The author believes that intelligent and efficient news production processes are an effective solution to this problem. First, production speed is fast—robot journalists have broken through the limits of human capability in terms of speed. Second, intermediate production links are simplified: in data processing, robot journalists based on specific computer systems can collect and integrate data more efficiently than human journalists; in publishing, robot journalists are integrated with the internet, and article release requires only coding or a keystroke. Finally, 24-hour rolling news production is possible. Since the production subject of robot news is a machine, its working hours are unrestricted—as long as coders set up the program, it can work continuously around the clock.

3. Dilemmas and Limitations of “Robot Journalists”

3.1 The Hidden Danger of De-storytization in Robot News Content

Robot news content construction often lacks “temperature” and “human touch,” and the absence of narrative storytelling language greatly affects readers' interest. “Story” holds an important position in news works, and regardless of how media technology innovates, “story” as a narrative element should not be “marginalized.” Robot writing, however, emphasizes “data center” and “information center,” and its application reveals the hidden danger of de-storytization through its patterned, structured, and singular approach. This hidden danger not only affects the quality of robot news content but also hinders the future vision of widespread robot journalist application. Alberto Nardelli, an editor at *The Guardian*, said at the 2015 Polis Journalism Conference: “Without humanized thinking, data itself is meaningless. What kind of news story to try to tell—that's the only thing I keep in mind.” Undoubtedly, in any era, “telling good stories” is a professional requirement of journalism, which robot journalists currently cannot fulfill.

3.2 Fixed Perspectives, Difficulty Writing “Focus News”

When constructing content, robot journalists suffer from fixed perspectives due to their mechanized and templated programming. Robots have fixed criteria for judging “news value” when gathering information, and after following designed news templates, they often produce formulaic news from a single perspective that is hardly readable. The mechanical nature of robot journalists leads to deviations in grasping public information needs, making it difficult to focus on what the public requires and to write “focus news” needed by contemporary society. In contrast, while professional journalists may not match robot journalists in terms of information volume and breadth, they possess unique news perspectives and independent critical thinking abilities. Most writing robots excel in data-driven news, but this type of data journalism features similar, fixed, and monotonous perspectives, making it mostly used in sports, finance, and disaster

reporting. Taking Tencent' s Dreamwriter financial news as an example, most content involves organizing stock price data, which is fundamentally different from articles written by professional journalists that assess current market conditions and future trends—it is merely mechanical extraction and sorting of data without readability.

3.3 Templated Production Leads to Homogeneous, Shallow News

While robot writing offers efficiency unmatched by professional journalists, its generation method of human templates plus data filling has inherent flaws. The aggregation of data information causes robot writing to suffer from 固化的新闻框架 (solidified news frameworks). Currently, Chinese robot news often features repetitive sentence structures, headlines, and word choices. Conducting in-depth news reporting is something robot journalists cannot achieve at present, which undoubtedly exacerbates news homogenization in China. For example, most NBA game news produced by robot writing consists of scores, representing a typical sports news template in robot writing databases. As AI applications become more widespread, future Chinese robot-generated sports news will more or less be produced based on this template, leading to long-term templated news production. Although professional journalists cannot match robot journalists in speed and accuracy, they far surpass robot journalists in terms of readability, hierarchical structure, and language application. The AI era still requires professional journalists to complete news stories rich in emotion, depth, and “personality.”

4. Future Development of “Robot Journalists”

4.1 Grammar Accumulation: From Logical Calculation to Semantic Imitation Template limitations are a major weakness of robot writing. To increase the readability and human touch of robot news, more writing templates will be designed in the near future. Future template design should emphasize accumulating grammatical knowledge for robot writing and learning different language expression styles to achieve a transition from rigid logical calculation to vivid semantic imitation, thereby cultivating robots' narrative abilities and improving news output quality. As computer technology develops, future robot journalists may evolve into intelligent agents that break the de-storytization hidden danger, enabling them to develop certain news perception capabilities and write more emotionally expressive, story-driven narratives.

4.2 Algorithm Upgrade: From Information Release to In-depth Reporting Robot journalists are products of technological development based on big data. Future robot writing development will focus on improving algorithmic upgrades. Since robot writing content is generated through direct data capture and organization from databases, robot journalists' language material assembly originates from database platforms. This requires big data companies to improve data resource databases to enrich language sources for robot databases and accelerate data platform construction for algorithmic upgrades.

These improvements will enable robot journalists to transition from information release to in-depth reporting, change the rigid language connection status quo in robot news, enhance news content construction, strengthen optimization of news production processes, and eliminate the homogenization crisis.

4.3 Human-Machine Cooperation: From One-way Operation to Mutual Assistance Although robot writing has become a reality and is increasingly widely applied in the news field (particularly in disaster reporting), its various writing limitations currently prevent it from replacing professional journalists. For journalists in the contemporary era, when facing AI penetration into the news field, they should utilize its instrumental nature rather than blindly rejecting it. Mutual assistance between humans and machines will create a new business model. Instead of viewing robots as professional threats, journalists should see them as assistants to clarify news production division of labor and achieve news quality improvement. AI helps save time and money in news production, and news robots' excellent data analysis capabilities can liberate professional journalists from tedious, homogeneous work, improving news production speed and efficiency and helping journalists keep pace with the expanding global media landscape. This has important practical significance for the future direction of China's journalism industry.

In the long run, the application of robot journalists in media will drive the development and innovation of the entire media industry. However, robot journalists cannot replace the dominant position of professional journalists due to their inherent limitations. The de-storytization hidden danger of robot writing may alienate people's understanding of news standards, turning news content into worthless products of digital stacking. Under database constraints, rigid and formulaic writing fixes robot perspectives, making it difficult to write focus news, while templated production and lack of thinking ability lead to homogeneous, shallow content. Future writing robots will emphasize multi-level database platform construction, grammatical accumulation, and algorithmic upgrades to achieve a transition from logical calculation to semantic imitation. With improved language material databases, robot journalists are expected to shift from simple information release to in-depth reporting. Human-machine cooperation is the future trend of robot news, and the complementary advantages of mutual assistance will help innovate and develop a new ecology for journalism, moving from one-way operation to mutual help—the best method for achieving symbiotic growth between robot news production and news professionals.

Footnotes:

CNNIC Releases the 42nd “Statistical Report on China’s Internet Development Status” [EB/OL]. (2018-08-20)/[2019-04-10].

[Headline] Discussing “Story is King” in the Era of Data Journalism: What is *The Guardian* Talking About? [EB/OL]. (2015-04-10)/[2019-04-10].

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

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