

A Preliminary Analysis of Media Transformation in the Artificial Intelligence Era: A Case Study of Toutiao (Postprint)

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Abstract

Currently, artificial intelligence technology is in a stage of rapid development, with extensive applications in the media field that exert a strong influence and profound impact on the future development of the media industry. In 2016, “AlphaGo” defeated world-class Go players, making “artificial intelligence” one of the most prominent hot topics in the media industry at that time. Following the 7.0-magnitude earthquake in Jiuzhaigou, Sichuan on August 8, 2017, media news reports adopted the new technology of earthquake information broadcasting robots. The news that this robot could produce an article in 25 seconds triggered a “major earthquake” within the media industry. The emergence of viewpoints such as “robots writing articles, journalists facing unemployment” attracted widespread attention from all sectors of society. In the media environment where information technology is developing rapidly, the widespread application of artificial intelligence has demonstrated an unstoppable momentum. The rapid rise of “Toutiao” signifies that the fusion and innovation of media and artificial intelligence has become the mainstream trend for future media development. As a personalized information recommendation engine product, “Toutiao” is among the earliest domestic products to integrate artificial intelligence into mobile application scenarios. During the perplexing period of traditional media transformation, it seized this rare development opportunity, with algorithms and data constituting its core, thereby reflecting to some extent the future development trend of cross-boundary integration in media. This paper conducts an in-depth analysis using the development of “Toutiao” as a case study, and contemplates the integrated development and transformation and upgrading of media under the tide of artificial intelligence.

Full Text

Media Case Study • Media Industry

1. Overview of Artificial Intelligence

Artificial Intelligence (AI), as an academic concept, was formally introduced at the 1956 Dartmouth Conference, where John McCarthy first proposed the term “Artificial Intelligence.” McCarthy is therefore widely regarded as the “father of AI.” According to MIT Professor Winston, AI is defined as research on how to make computers perform tasks that would require human intelligence.

2.2.2 Timeliness

Major hot news events generate massive information databases within content systems. While these systems provide rich content, timeliness remains a critical attribute of news information. Toutiao leverages AI algorithms and web crawler technology to dramatically improve information distribution efficiency, enabling delivery of news content within extremely short timeframes.

3.1.2 Personalization and Precision Recommendation

Delivering personalized news information to interested users represents Toutiao’s core competitive advantage. Its strength lies in achieving both “personalization” and “precision.” Toutiao employs a technical model combining data, algorithms, and machine learning to deliver personalized and precisely targeted content recommendations. During the 2016 Rio Olympics, Toutiao tested an automated news-writing robot called “Xiaoming” (a homophone for the founder’s name “Zhang Yiming”), which automatically generated Olympic news reports and produced over 400 articles during the games. This model represents a disruptive innovation in traditional news production.

2.2.3 Social Features

Toutiao’s client supports multiple login methods including Tencent QQ, WeChat, Weibo, and mobile phone numbers, enabling rapid acquisition of users’ social relationship chains. This capability allows for more accurate user profiling based on interests and preferences. While expanding social distribution channels, this approach also facilitates seamless content circulation across social platforms.

3.1.3 AI as Technical Guarantee

In the artificial intelligence era, continuous technological innovation has provided Toutiao with excellent development opportunities. AI technology serves as the core driving force behind Toutiao’s development model. As technology advances and breakthroughs continue, Toutiao’s personalized recommendation system becomes increasingly accurate.

3. Development Advantages and Dilemmas of Toutiao in the AI Era

Since its establishment, Toutiao's client technology has gradually matured. As an enterprise emphasizing machine learning and computer vision, AI represents a key factor triggering media transformation. From the 2016 AlphaGo match against Lee Sedol to the exploration of robot writing and virtual anchors in journalism, AI applications in news communication have entered an explosive growth period.

3.2.1 Limitations of AI Technology

Despite its advantages, AI technology has inherent limitations. AI systems lack the professional ethics and qualities of human journalists. Data mining practices may infringe upon citizens' privacy rights. Web crawler technology carries significant risks of copyright infringement. In the internet era of information overload, AI algorithms that purely cater to hot topics can easily lead to news value distortion. AI news production models may prioritize individual interests over social public interest, creating ethical challenges for media organizations deeply integrating AI technology.

3.1 Advantages of Toutiao's Development Model

3.1.1 Rich Content and Wide Coverage

Toutiao utilizes web crawler technology to gather rich news information from major media platforms. However, while this ensures timeliness, the authenticity, effectiveness, and authoritative depth of news content may be insufficient. News stories with substantial value still require human journalists for verification and production. This automated model is primarily applied to formulaic news writing, such as natural disaster reports and sports news.

3.2.3 Intense Competition from Similar Products

As Toutiao rapidly developed, other news clients including Sohu News, NetEase News, and Tencent News began to imitate and adopt similar personalized recommendation technologies. When all major competitors possess comparable capabilities, Toutiao's competitive advantage gradually weakens. Each major portal has its own strengths, making it increasingly challenging for Toutiao to achieve breakthrough differentiation in this product category.

4. Reflections on Media Transformation in the AI Era

The continuous development and breakthroughs in AI technology will exert tremendous influence on media production and communication. Traditional media must consider how to achieve breakthroughs and development in this AI-driven news media ecosystem transformation.

4.1 Objectively Viewing AI Technology

Media organizations should adopt an open and inclusive mindset toward AI technology, understanding that it is not a panacea. While AI brings significant changes to news production and distribution, the development of journalism cannot be separated from the professional qualities and ethics of human journalists. In the context of rapid AI development, traditional media cannot remain on the sidelines but should embrace the trend with a progressive perspective, using human-machine collaboration to create broader future prospects.

4.2 Building “Intelligent Editorial Departments”

At the current stage, AI writing systems like Tencent’s Dreamwriter still cannot overcome the barrier between artificial intelligence and human thinking. The integration of human and AI in news writing will be a long-term process. Media organizations should utilize AI to improve news production efficiency and establish intelligent editorial departments. From an efficiency perspective, this addresses news timeliness and distribution; from a technical perspective, it involves data-driven, internet-based, and intelligent transformations. The goal is to enhance content production and distribution efficiency through human-machine collaboration.

4.3 Emphasizing Talent Cultivation

As AI technology develops, media organizations must cultivate talent capable of leveraging these new tools. The integration of human and artificial intelligence in news production will be a long-term evolutionary process. Media must train personnel who can effectively collaborate with AI systems while maintaining journalistic values and professional standards.

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

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