Exploring a New "Human-Machine Collaboration" Model for Content Quality Inspection in Electric Power Industry News Publishing (Post-Print)

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Abstract

During the critical juncture of media convergence and publishing integration, Yingda Media, through the exploration of new quality inspection models, has constructed an "Intelligent Content-Assisted Quality Inspection Service System" based on artificial intelligence algorithms, while simultaneously developing a knowledge base for the electric power industry. By integrating its own production operation characteristics to implement a "human-machine integration" proofreading model, the company has achieved intelligent proofreading and quality inspection of internal product content, thereby improving the work efficiency of operational staff and enhancing the quality of product content.

Full Text

Preamble

Exploring a "Human-Machine Combined" Content Quality Inspection Model for Electric Power Industry News Publishing

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Abstract: During this critical period of media convergence and publishing integration, Yingda Media has explored new quality inspection models by constructing a "Content Intelligent Assisted Quality Inspection Service System" based on artificial intelligence algorithms, while simultaneously building a knowledge base for the electric power industry. By practicing a "human-machine combined" proofreading model tailored to its own production characteristics, the

company has achieved intelligent proofreading and quality inspection of internal product content, improving the work efficiency of business personnel and enhancing product content quality.

Keywords: review; quality inspection; artificial intelligence; electric power industry; content quality

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1. Current Status of Content Review at Yingda Media Group

In recent years, the Party Central Committee has attached great importance to the development of the news publishing industry, vigorously promoting a transformation from quantitative scale-based growth to high-quality development. As a media enterprise navigating this critical period of media convergence and publishing integration, Yingda Media strives to minimize or even eliminate content quality risks, editorial quality risks, and printing quality risks to ensure the quality of books, journals, newspapers, and digital content products while reducing operational risks.

In June 2020, the National Press and Publication Administration issued the *Regulations on Newspaper and Periodical Quality Management*, which stipulates that newspapers with an editorial error rate exceeding three ten-thousandths are considered to have unqualified editorial quality, and periodicals exceeding two ten-thousandths are similarly unqualified. Prior to this, the National Press and Publication Administration had issued the *Regulations on Book Quality Management*, establishing that books with editorial error rates exceeding one ten-thousandth are unqualified. Furthermore, the Press and Publication Administration conducts two unscheduled inspections of publications annually, publicly announcing any quality failures and imposing severe penalties on relevant publishing units in accordance with regulations.

These industry policies and regulations have effectively prompted more publishing and media institutions to establish and improve content quality inspection mechanisms, strengthening quality control efforts and providing robust safeguards for producing outstanding publications and disseminating high-quality content. Since its establishment, Yingda Media Group (hereinafter referred to as "Yingda Media") has strictly implemented the ideological work responsibility

system and maintained rigorous content quality management, yet content quality risks persist. Currently, editors across various content product departments, particularly commissioning editors, face heavy production tasks and intense workloads. Editors review over 5 million words annually, and traditional manual proofreading inevitably leads to eye fatigue and mental exhaustion, resulting in missed or erroneous checks.

In addition to traditional manual proofreading, Yingda Media has employed machine proofreading, but the overall results have been unsatisfactory, particularly for electric power industry content. Existing machine proofreading tools cannot fully meet the specialized proofreading requirements. In response to this situation, Yingda Media has strengthened training of its proofreading models using electric power industry corpora and constructed a professional knowledge base, significantly enhancing machine proofreading capabilities.

The "three reviews and three proofreads" system is an indispensable component of content publishing workflows in Chinese publishing institutions. In recent years, as the volume of manuscripts requiring editorial review has continuously increased and state oversight of publication content quality has intensified, effectively applying artificial intelligence technology to reduce pressure on editorial staff while improving the efficiency and quality of content review and quality inspection has become a key focus of research in the publishing and media industry.

The development of the news publishing industry is driven by innovative technologies. The *2016-2017 China Digital Publishing Industry Annual Report* released by the China Press and Publication Research Institute proposed that "artificial intelligence technology will reshape publishing workflows." This involves establishing and improving production management processes characterized by crowdsourced intelligence and collaborative innovation, supported by big data and artificial intelligence technologies, to enhance the intelligence level of digital content production, process control, and distribution.

Intelligent proofreading represents a branch of artificial intelligence application in natural language processing. Compared with more subjective fields such as news writing, AI application in proofreading is more straightforward. In content editing and proofreading processes, effective AI application can significantly improve proofreading efficiency, reduce the difficulty of manual review, prevent omissions, and ensure accuracy. However, the knowledge accumulated by editorial staff through daily practice—including common sense, textual norms, and language logic—is difficult for machines to master or replace. Therefore, in the foreseeable future, machines cannot replace human work. Consequently, the primary role of intelligent proofreading technology and tools is to "assist" rather than "replace" human effort.

2. Exploration of New Content Quality Inspection Models at Yingda Media Group

2.1 Construction of Yingda Media' s "Content Intelligent Assisted Quality Inspection Service System"

Since existing market quality inspection tools cannot fully meet Yingda Media' s needs, the company developed its own "Content Intelligent Assisted Quality Inspection Service System" tailored to the characteristics of the electric power industry. This system was designed and developed based on extensive research across multiple business and support departments, including Yingda Media' s Book Editing and Processing Center, Quality Inspection Center, *State Grid News* Editorial Center, *State Grid* Magazine Editorial Center, and Network Information Center. The development integrated relevant policies and standards in the news publishing industry, such as *GB/T 15834-2011: General Rules for Punctuation*, *General Standardized Chinese Character Table (2013 Edition)* , *GB/T 7744-2015: Information and Documentation—Rules for Bibliographic References*, *GB/T 3101: General Principles Concerning Quantities, Units and Symbols*, and *GB/T 20001: Rules for Drafting Standards*. The system employs advanced technologies including artificial intelligence, natural language processing, sensitive information semantic recognition, content structuring, and PDF content extraction, combined with extensive rules and industry corpora, to provide intelligent checking and correction services.

The system can perform comprehensive checks on manuscript content, including character and symbol verification, professional knowledge validation, document logic analysis, text similarity detection, and specialized processing of formulas, editorial board member names, and picture/table content through automatic recognition and sorting. Its inspection capabilities include checks for easily confused words, sensitive terms, political information, non-standardized terminology, punctuation, unit symbols, term translations, key term monitoring, chronological notation, place names, standards, classical poetry citations, thousand separators, full-width/half-width characters, as well as verification of document outline titles, chart and formula numbering, and reference formats.

Currently, hundreds of editors use this system for manuscript inspection, with tens of thousands of system uses and over ten thousand manuscripts reviewed. Editor feedback demonstrates that the system significantly improves manuscript processing efficiency and quality.

2.2 Building Inspection Capabilities Based on Content Types

Different content types—books, journals, newspapers, and new media—share the common requirement of ensuring content accuracy, such as checking for easily confused words and sensitive content. However, each medium possesses distinct characteristics. For instance, books on electric power industry topics emphasize professional knowledge and include numerous specialized textbooks and monographs, while newspapers focus more on news content. Furthermore, books and

journals follow different style formats.

Consequently, Yingda Media has developed detailed quality inspection dimensions tailored to different content types. In addition to checking for character, punctuation, sensitive content, and knowledge errors, book and journal manuscripts require verification of outline logic, charts, formulas, and layout elements. Therefore, book proofreading incorporates manuscript style and logical outline checks, while journal editing includes paper layout element verification and reference format inspection. By aligning inspection capabilities with specific content types, the system ensures accurate quality inspection results across all categories.

2.3 Design of "Human-Machine Combined"Content Quality Inspection Workflow

The "human-machine combined" proofreading model leverages the advantages of both manual and software proofreading while compensating for their respective limitations, effectively improving proofreading efficiency and quality. The specific implementation varies slightly depending on content type, as elaborated below for books, journals, and media content.

2.3.1 Book and Periodical Content Production Workflow Yingda Media' s content production operations are highly digitized, with most business departments and personnel conducting manuscript review and processing online. Editors use Microsoft Word or WPS Office for book and journal manuscript processing, enabling rapid extraction of manuscript structure, location of various elements, and correction of errors based on the comprehensive editing functions of these platforms.

During manuscript processing and review, editors use intelligent assisted proofreading tools integrated into Word or WPS to conduct preliminary reviews, checking for typos, sensitive terms, punctuation, unit symbols, non-standard electric power terminology, variant characters, traditional characters, similar content, manuscript style, and manuscript elements. Following preliminary review, editorial staff can either return manuscripts with proofreading marks and exported review results to authors for revision or make corrections themselves. After preliminary review, manuscripts enter the three reviews and three proofreads stage, where editors and proofreaders can comprehensively check Word manuscripts or typeset files, export results, make corrections, and provide false positive feedback.

After final manuscript approval and typesetting, the Quality Inspection Center uses the intelligent assisted quality inspection system for pre-print quality checks. In addition to Word manuscript inspection, editorial, proofreading, and quality control personnel must also check typeset files. Quality inspectors use the PDF inspection tool of the "Content Intelligent Assisted Quality Inspection Service System" to conduct quality inspections on pre-press typeset files, ensuring the

final quality checkpoint before printing.

This workflow adds a preliminary review stage that eliminates numerous errors and ensures standardized manuscript formatting before formal processing, saving editors substantial time on style standardization during formal processing and ensuring accuracy. The "human-machine combined" content quality inspection workflow for book and periodical products is illustrated in Figure 1 [Figure 1: see original paper].

2.3.2 Media Content Production Workflow In addition to books and journals, Yingda Media produces numerous media products and services, such as digital newspapers and new media content. Media content reaches broader audiences than books and journals, necessitating extremely high standards for checking sensitive terms, prohibited words, leadership information, uncivilized language, slogans, violence and terrorism-related content, and political content involving national territorial sovereignty. Media manuscripts also have strong timeliness requirements.

For traditional and digital newspaper editors and reporters, content to be published can be entered into the media editor within the editorial system or the information editing module of the platform CMS system. Since the editorial system integrates the character and symbol checking capabilities of the intelligent assisted quality inspection system, it can rapidly check manuscripts for typos, incorrect word collocations, sensitive content, knowledge errors, and punctuation.

For new media products (such as Grid Headlines), editors and reporters primarily use online editors for content creation, as political, character, and knowledge checking capabilities have been encapsulated within these online editors. For content to be published on Weibo or WeChat public accounts, editors and reporters can enter text into Word or WPS editors and use the integrated proofreading tools to check for errors.

The "human-machine combined" content quality inspection workflow for media products is illustrated in Figure 2 [Figure 2: see original paper].

2.4 Construction of Yingda Media' s Industry Knowledge Base

When checking for errors such as typos, non-standardized terminology, unit symbols, and standard citations, using generic algorithm models or checking rules from general domains without customization cannot satisfy practical industry application scenarios.

Yingda Media' s knowledge base administrators can create institutional databases for error words, sensitive terms, non-standardized terminology, key terms, leadership ranking rules, leadership positions, and whitelisted terms. The electric power and energy sector employs specialized terminology and knowledge vocabularies. By analyzing the characteristics of electric power and

energy domain content, the company has formed a knowledge base incorporating commonly used standardized terminology, quantities and units, and other industry-specific knowledge. Integration with the "Content Intelligent Assisted Quality Inspection Service System" enables accurate, comprehensive, and rapid proofreading of easily confused words, sensitive terms, and non-standardized terminology, helping business personnel identify low-level errors immediately. This assists book and journal editorial staff in reducing work pressure while improving manuscript review speed and quality.

Through exploration of new quality inspection models, Yingda Media has achieved intelligent proofreading and quality inspection of product content, improving business personnel efficiency and product quality while significantly reducing production costs and operational risks. This approach demonstrates strong practicality, advancement, and foresight. It has further clarified the strategic direction and primary pathways for Yingda Media Group to build a first-class new media group, enabling transformation of content production models to generate greater social and economic benefits. This provides robust support for Yingda Media' s strategic goal of becoming a first-class new media group, promotes sustainable development, and better serves the reform and development of State Grid Corporation of China.

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