

Post-Development Print of the National Standard ‘Metadata Specification for Chinese News Picture Content Description’

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Abstract

ion: physical layer, logical layer, content layer, and theme layer. Existing image metadata description specifications focused on the physical and logical layers. This standard primarily defines content layer and theme layer metadata, offering higher distinctiveness and utilization value compared to traditional basic attribute cataloging.

Full Text

Preamble

The REML (Rich Event Markup Language) standard represents a comprehensive solution for news event information data. Its development followed an innovative “research-application” dual-track spiral model, which offers clear advantages. By fully considering practical application needs during the formulation process and validating the standard through real-world usage, this approach avoids the common problem of standards being developed in isolation from actual implementation. First, REML ensures that news event data can flow freely across multiple technical systems without requiring conversion, significantly reducing data usage and management costs while lowering development complexity for related systems. Second, REML maintains excellent compatibility with existing Chinese news information national standards (such as the Chinese News Markup Language, CNML), posing no disruptive technical risks for organizations and systems already using CNML. Third, REML employs knowledge-oriented semantic technologies that not only describe news event data itself but also enable linkage with external knowledge bases, facilitating semantic analysis and processing of news event data and even supporting the establishment of news event knowledge bases.

2.3 Applications and Prospects

National Standard Development for “Chinese News Image Content Description Metadata Specification”

As the adage goes, “a picture is worth a thousand words.” Visual information has always played a crucial role in human information production and consumption. In the context of convergent media development, images—with their high information density, strong visual appeal, and relatively small data footprint—have become indispensable for applications on social media platforms and in premium content production. The value of resources depends on their effective circulation, which in turn requires resource discovery. Image metadata serves as the core for describing image characteristics and forms the foundation for image discovery and circulation.

In this context, Xinhua News Agency proposed the development of a national standard for “Chinese News Image Content Description Metadata Specification.” The proposal was submitted by the National Technical Committee for Chinese News Information Standardization (hereinafter referred to as the “New Standards Committee”) to the Standardization Administration of China, which approved it as a project in the first batch of national standard plan projects for 2014. The standard focuses on describing visual content and semantic features of images and can be applied to image data collection, editing, storage, publishing, retrieval, and exchange processes.

Standard Development Background Visual content has become the most efficient medium for connecting media, brands, and consumers. Images serve as important carriers for visual content storage and dissemination. With the continuous development and popularization of internet technology and digital equipment, the volume of images has exploded, quality has continuously improved, and demand has expanded accordingly. Several large domestic and international commercial image companies and media institutions possess high-quality image libraries of tens of millions or even hundreds of millions of images, providing image materials for news, publishing, printing, advertising, marketing, and material production. Countless specialized image libraries and self-use image systems further demonstrate this trend.

Image feature description plays a vital role in image storage, management, retrieval, transaction exchange, and intelligent recommendation throughout the entire lifecycle. Without proper standards, we cannot achieve consistency, making image metadata standards essential for regulating all aspects of image production. Existing image metadata standards each have their own focus, and most lack systematic specification of visual content and semantic features, failing to meet the growing and evolving needs of image annotation. Currently, most image application systems have defined proprietary image metadata elements to describe image content features based on their own business requirements. These private metadata elements are difficult to exchange between different

businesses, restricting the full realization of image value.

The national standard “Chinese News Image Content Description Metadata Specification” (GB/T 35311-2017) was officially released at the end of December 2017, filling a gap in China’s news image application standards. It is also the world’s first image metadata specification focused primarily on describing visual content and semantic features of images, offering strong professionalism, a concise structure, good extensibility and compatibility, and high application value.

Standard Development Process In May 2015, the secretariat of the New Standards Committee led the formation of a standard drafting group, establishing a work approach that focused on media organizations and large commercial image libraries as primary research targets, while referencing cases from foreign relevant institutions and domestic and international standards. Over the course of a year, the drafting group conducted field research at multiple newspaper offices and commercial image companies, drawing extensively from domestic and international image description-related standards to form a draft for public comment. After multiple rounds of feedback and revisions, the draft was submitted as a review version to the New Standards Committee secretariat at the end of 2016. Following a letter ballot vote by committee members, a review meeting was held in April 2017. After further modifications, the final version was submitted to the Standardization Administration of China for approval and release. The national standard was officially published by the Standardization Administration at the end of December 2017 and can be accessed through the National Standard Full Text Public System [2].

The core objective of this standard is to better serve all aspects of image production and consumption, emphasizing practicality. Therefore, the drafting group conducted extensive research during the initial development phase, focusing on two categories: existing relevant domestic and international standards, and the standard’s primary application targets.

The drafting group first studied domestic and international standards, including the IPTC Photo Metadata Specification [3], EXIF Specification [4], and CNML Standard [5]. The research revealed that each standard had different emphases. The IPTC Photo Metadata Specification primarily defines descriptive metadata items for images. After several revisions, it supplemented some image content description metadata items, but these remained scattered and insufficiently comprehensive in describing image content semantic features. The EXIF Specification mainly involves technical metadata for images. The CNML Standard primarily targets news manuscripts and defines relatively few metadata elements related to image content.

The main application target for image metadata is image library systems. Research on image library websites and media organization image library systems revealed that personalized and private applications of image metadata

are widespread. Some metadata elements differ only in name but have similar meanings, while others have universal application value. Additionally, older image library systems increasingly fail to meet application demands, and new image library system designs face considerable confusion regarding image cataloging. The research and opinion collection process received active cooperation and strong support from experts across various image fields, continuously enriching and improving the standard's content.

Main Content and Features of the Standard Content Overview

The standard's main content provides precise definitions for image metadata elements, particularly emphasizing the description of visual content features and semantic information. Focusing primarily on editorial and creative images, the standard defines 40 metadata elements, categorized into three parts: public metadata, editorial image metadata, and creative image metadata.

The standard selects and organizes metadata elements from four perspectives: (1) "Form," referring to visual representation, primarily including main objects and environmental information in the image; (2) "Meaning," referring to image themes, primarily including concepts, topics, and categories; (3) "Technique," referring to creative methods, primarily including composition and photographic technical information; and (4) Basic logical attributes of images, primarily including image identifiers, news image titles, and captions. The specific content of the standard can be found in the National Standard Full Text Public System [2].

Standard Features

1. Derived from Application

In practical applications, image discovery can be divided into retrieval and recommendation. Image retrieval primarily includes keyword search, category search, topic search, and attribute filtering. Keyword search for creative images focuses on themes and visual content, while for editorial images it emphasizes news figures, locations, and events. Attributes used for filtering search results primarily focus on image color, format, size, and character features. Image recommendation includes popular, similar, personalized, and editor-recommended options, with similar recommendations mostly based on image color and theme similarity analysis. Most image content metadata elements defined in the standard originate from these application scenarios.

2. Detailed yet Flexible

The standard provides relatively detailed definitions for character feature description and photographic techniques. Information about characters—including number, gender, age, ethnicity, behavior, expression, clothing, and relationships—as well as photographic technical information—including image color, format orientation, shot size, color tone, composition method, and photographic techniques—play important roles in refining search results and

enabling automatic image analysis and recommendation. The standard does not provide detailed specifications for image topics, custom categories, or visual content, allowing for user-defined extensions to accommodate various business scenarios and improve the standard's applicability.

3. Emphasis on Standardized Annotation

The standard defines 22 extensible controlled vocabularies to standardize annotation for 20 metadata elements, reducing inconsistencies in subjective annotation and facilitating support for search result filtering.

4. Hierarchical and Systematic

The drafting group first established a hierarchical architecture for image metadata, dividing it into four layers based on different levels of semantic abstraction: physical layer, logical layer, content layer, and theme layer. Existing image metadata description specifications focused on the physical and logical layers. This standard primarily defines content layer and theme layer metadata, offering higher distinctiveness and utilization value compared to traditional basic attribute cataloging.

Application Considerations Standards originate from application, serve application, and require continuous improvement through application. Two issues in standard application require careful consideration and response.

The first issue concerns legacy image annotation and existing image library system transformation. As image businesses continuously evolve and upgrade, a significant portion of image library systems currently face transformation and upgrading challenges. Simultaneously, the volume of legacy images is enormous, and these have already been annotated based on previous standards and custom metadata. How to complete the conversion of legacy image metadata to the new specification with minimal effort while upgrading image library systems is a critical issue for standard promotion and application. Upgrading image library systems and migrating legacy image metadata is necessary, consistent with software lifecycle patterns, and required by technical and business development. A feasible approach is for image system designers to map existing metadata to corresponding elements in the new standard, distinguishing between direct correspondence, indirect correspondence, and non-correspondence, and maximizing the use of automated methods to achieve partial metadata migration and conversion while preserving existing annotations and gradually completing new metadata annotation.

The second issue concerns the relationship between image intelligent processing technology and text-based image metadata specification application. With the rapid development of machine learning and artificial intelligence technology, computers have achieved increasingly higher levels of intelligence in image processing, recognition, and understanding, moving from domain-specific to general-purpose applications. However, text-based image feature description continues

to play a primary role in image storage, editing, management, retrieval, and exchange. The two approaches are not opposing but rather complementary and mutually reinforcing. Image metadata standards can fully utilize computer automatic processing technology to improve annotation efficiency and quality in application, while text-based image metadata annotation results—rich in specifications, content, and themes—can play important roles in image automatic processing and intelligent recommendation. A dual-pronged approach enables images to better serve social production and life.

Summary and Outlook The national standard “Chinese News Image Content Description Metadata Specification” defines a set of metadata elements for visual content and semantic information of Chinese news images from two application perspectives—news editorial images and creative images—facilitating cross-domain and cross-application image exchange and better serving image acquisition, editing, distribution, analysis, and recommendation business processes. The standard does not address image copyright metadata specifications, which can follow other copyright metadata standards in application. The newly released version has not yet specified personalized metadata for digital charts, comics, GIFs, and other image types, but the defined metadata elements can be applied to annotation of these image types.

The standard development process received guidance and support from numerous image domain experts. The drafting group continuously revised and improved the standard from perspectives including image characteristics, news image editing, and current status and development of image applications, striving to achieve relative balance in completeness, professionalism, and practicality. However, continuous improvement is necessary to maintain its vitality. It is hoped that the standard will receive increasing application, with deficiencies identified through usage to promote standard upgrades and revisions, thereby better serving practical applications.

References

- [1] Ren Yue, Zeng Huang. *Picture Editing Handbook* (4th Edition). China Photography Publishing House, September 2015.
- [2] National Standard Full Text Public System. <http://www.gb688.cn/bzgk/gb/index>
- [3] IPTC Photo Metadata Standard. <http://www.iptc.org/std/photometadata/specification/IPTC-PhotoMetadata>
- [4] EXIF Image Metadata. <https://www.exif.org/image-metadata.html>
- [5] National Technical Committee for Chinese News Information Standardization. National Standard GB/T 20092-2013 *Chinese News Markup Language*

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

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