Research on the design and compilation of thematic map of converged media and its publication

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Abstract: With the vigorous development of the mobile Internet, traditional paper-based maps have faced significant challenges and urgently need to find new directions for transformation and adjustment. This article analyzes the problems existing in the development of traditional maps and the advantages and characteristics of new media maps under new technologies. It combines "thematic maps" with "new media network technology" organically, explores the design, compilation and development research plan of new media thematic maps, and proposes ideas for data information security and traceability protection.

Keywords: thematic map, integrated media, information security

1. Introduction

Maps are one of the important tools for human communication and are widely regarded as one of the three international languages along with music and painting. They present geographical locations, terrain features and humanistic information through specific map symbols and scales, forming a graphical visual language. Thematic maps are maps specifically designed to represent particular geographical phenomena or themes. Compared with topographic maps, thematic maps highlight specific thematic content through symbols, colors and charts, such as geology, minerals, resources, environment, population and social economy. Thematic maps effectively help readers quickly understand complex data and information through intuitive map language and are widely used in scientific research, policy-making, education popularization and other fields.

"Converged media" itself does not specifically refer to a certain form of media communication, but rather a concept, which is the abbreviation of media convergence. It is an operation mode that integrates traditional media such as television, radio, newspapers, periodicals and magazines with new media emerging in recent years such as official accounts and short videos, and gives full play to their communication value.

With the integration and innovation of new technologies such as big data, cloud computing and artificial intelligence, maps have developed from traditional paper maps to various forms such as electronic maps, digital maps and mobile maps. The reading groups, information carrying capacity and expression methods of maps have also undergone tremendous changes. gainst this backdrop, this paper proposes the integration of "thematic maps" with "converged media network technology."By leveraging new media and advanced technologies, it aims to innovate the design, compilation, and development approaches of thematic maps.The endeavor is to construct novel forms and scenarios for digital map applications, thereby establishing a complementary system between paper-based and digital products.Furthermore, it seeks to achieve a multi-faceted integration of online and offline map products and services, ultimately facilitating the transformation and fostering innovative development within the map industry.

2. The current development status of thematic map design and compilation

2.1 The limitations of traditional map compilation

In the current era of information technology, big data and mobile network emerging media, the traditional map industry is facing unprecedented development opportunities and challenges. The traditional map is mainly based on paper printed matter, and its transmission mode is single and the coverage is limited, which is not conducive to the sharing and utilization of information. As a static information carrier, paper maps are limited by physical conditions such as paper and scale, and it is difficult to display as much content as possible in a limited space. In addition, the cycle from production to publication is relatively long, and a thematic atlas may take several years or even more than ten years to complete, and cannot be flexibly interactive, which makes it difficult to meet the requirements of modern society for the timeliness and interaction of map information, and reduces the efficiency of map dissemination and use.

On the other hand, the traditional cartographic work often focuses too much on the technical level of map preparation, but ignores the actual use needs of users and the cultural and artistic value of maps. In the process of map design and compilation, there is a lack of pertinity, high homogeneity of maps, and the displayed information usually contains a large amount of basic geographic information. Users need to select the parts they care about from these complex information, and the lack of exploration of user needs also limits the diversity and artistic development of map products.

Peculiarity	Paper Map	Media Map
timeliness	The publication	With smart phones,

	cycle is longer	tablets and other portable devices, instant access to the web
content	The shortest thematic atlas will be about 1 year, and the longest it more than 10 years	It is a dynamic map product integrating sound, picture, video, animation and text
interactivity	Static map carrier, information expression is relatively simple, carrying content is limited	Interactive communication with readers through the Internet in the form of news comments, forwarding and sharing
transmissibility	It is one-way in nature, and it is difficult to interact with readers	The speed of information transmission and update is fast, and the channels of communication are abundant

Table 1. Comparison Between Paper Maps and Fused Media Maps

2.2 The characteristics of the media map

Media map integrates the advantages of traditional maps and modern multimedia technology, and has obvious advantages in timeliness, content, interaction and communication compared with traditional paper maps. This new map experience mode brings users more rich, interactive and personalized services. Analyze the main functions and characteristics of the media map from the aspects of multimedia and cross-platform, mass and sharing, interaction and immediacy, personalized and customized, spatial geographic information visualization, etc.

2.2.1 Multimedia and cross-platform

The media map not only provides static image information, but also integrates text, image, audio, video and other media forms, making the map a multimedia information platform. This mapping application supports multiple devices and operating systems, including desktop computers, tablets, smartphones, etc., ensuring that users can easily access and use it anytime, anywhere.

2.2.2 Mass and sharing

With the help of cloud computing and big data technology, Rongmedia Map is able to store and process large amounts of data information and allow users to easily access and share this information. In addition, it can quickly respond to user query requests and provide accurate data analysis results.

2.2.3 Interactivity and immediacy

The Media map allows users to interact with the map in a two-way way. Users can click, shrink, and drag the map to obtain detailed information. with

Media maps often provide real-time updates, such as the practical applicability and timeliness of the map are enhanced by the weather condition and weather prediction.

2.2.4 Personalization and customization

Rongmedia Map can provide personalized and customized services according to the interests and preferences of users. For example, recommending specific places or activities based on a user's search history and behavior. In addition, Rongmedia map can customize and develop corresponding map interface and functional modules according to specific application scenarios, providing professional solutions for specific thematic content.

2.2.5 Visualization of spatial geographic information

Using advanced visualization technologies such as 3D modeling, virtual reality (VR) and augmented reality (AR), Rongmedia Map uses immersive interactive Spaces to enhance user experience and engagement.

3. Converged media map online release mode

3.1 Multi-port release of the media map

In the development and construction of the converged media map, detailed record, classification, organization and storage are carried out according to the spatial and regional distribution of thematic map resource data, location, grade and general situation, etc., and a thematic map resource database with open collaboration, co-construction and sharing, differential storage and efficient operation is established, with "one upload and multiple simultaneous display".

The editors and their team designed and developed an integrated electronic atlas scanning code release system, characterized by the same data format and page-turning reading experience as the printed atlas. This system enables features such as table of contents indexing, image browsing, audio guidance, high-definition zooming, and facilitates quick navigation and selective access between different chapters. It enhances the overall overview and visualization of the electronic version of the atlas, and has been demonstrated in multiple high-quality atlases, including Water Atlas of China (see Figure 1).Achieve PC, mobile, APP, small program and other multi-port synchronous display function. Users can switch ports to achieve a consistent experience, without losing online map content, and realize the interconnection between different devices. At the same time, multi-end synchronization has real-time, server-side data changes. The multi-port release mode is suitable for different user groups, which greatly improves the dissemination range and speed of map products.

Figure 1. Multi-media release of *Water Atlas of China*

3.2 HTML5 based media map release

HTML5 is the integration of programming, video processing, audio processing, image processing, animation and other technologies. It includes HTML, CSS, JavaScript and other technologies, which can improve the richness, portability and independence of web application services. HTML5 is completely open, can develop some cross-platform, more feature-rich software products, at the same time, it also provides multi-threading and more interactive features, easy to achieve the complex effects of large programs.

3.3 Integrated thematic atlas publication data release

3.3.1 Static atlas scan code release

With the same data format and page-flipping reading experience as paper atlases, an integrated electronic atlas publishing system is realized, featuring directory indexing, image browsing, voice guidance, high-definition zooming, and facilitating quick jumps and selective reading between different chapters, enhancing the overall view and visualization of the electronic atlas reading experience. Additionally, on the basis of the original ordinary QR code atlas scanning and publishing system, an attempt and development have been made for the mini-program code atlas scanning and publishing system. The mini-program code has functions such as custom logos and binding to official accounts, making it more aesthetically pleasing, secure, with a higher fault tolerance rate, and conducive to promotion and publicity.

3.3.2 Custom release of dynamic atlas

By leveraging key technologies such as constructing adaptive matching geographic base maps, dynamic cartographic mapping techniques, and sample-based learning for map style transfer, this system enables rapid online customization of data visualization forms including dynamic thematic statistical charts, dynamic thematic maps, and geographic statistical models. It establishes an online publishing system for dynamic thematic atlases that integrates data, software, and models to meet individualized customer demands.

3.4 The launch of an immersive human-computer interaction experience with images

By leveraging virtual reality technologies such as AR, VR, 3D modeling, and digital twins, and taking into account various factors including the goals of map services, scene recognition capabilities, individual user needs, audience perspectives, and visual environmental conditions, immersive application scenarios of multimedia maps are launched to enhance users' experiences in digital environments and web browsing, and to strengthen the immersive interaction experience of the audience.

4. Information security and traceability protection of converged media map

Map is a very special cultural product with high technical content and high sensitivity of the data itself. While the online digital release of converged media map provides convenience for users, data theft and illegal tampering often occur.

Through ASE encryption algorithm, transparent encryption and decryption model driven by file filtering and other encryption technologies, the "Thematic map data encryption and publication protection system" which integrates copyright protection, data encryption, access control and authorization tracking is established to effectively protect the interests of map data producers and promote the safe sharing of thematic map data. Improve the modern security management level of thematic map data, realize data copyright protection and traceability management, effectively prevent data leaks and illegal dissemination, and protect data security.

5. Closing remarks

As a new product of the development of The Times, converged media map products greatly enrich the user experience and enhance the practical value of map products by virtue of its dynamic display, interactive operation and multimedia integration. In the future, map workers should continue to explore the integration means and innovative service mode of "converged media + map", build new scenarios for map digital application with the help of new media and new technology, launch a series of converged media products with professional characteristics, and form a product line and service system integrating paper products and digital products online and offline. Promote the dissemination, sharing, reuse and innovation of characteristic map products among scientific research, industrial application and public services in various fields, and promote the diversified and three-dimensional development of map industry towards geographic information services, knowledge services and cultural services.

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