

Digitization of Chinese Ancient Books in the Context of Digital Humanities: Research Overview and Future Prospects

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Abstract

Ancient books are the treasures of the Chinese nation which occupy a pivotal position in the global civilization's development. The deep exploration and effective utilization of books' contents can effectively promote the unique Chinese wisdom. As an emerging interdisciplinary research method, digital humanities provides a novel theoretical framework and technical support for the digitization of Chinese ancient books. This study focuses on the research of the digitization of Chinese ancient books under the framework of digital humanities in the past decade. It aims to reveal the core characteristics of its practical process and summaries the future development trends. This paper first outlines the research overview and importance of the digitization of Chinese ancient books. Subsequently, it elaborates on the applications and contents of digital humanities technologies in three key areas: ancient book research, promotion and collation of ancient books. Then, from the four dimensions of construction concept, service model, talent structure, and technical application, this paper summarizes the main characteristics of current practices in the digitization of ancient books. Based on this, the paper further points out several limitations in the process of ancient book digitization. The improvement strategies are proposed to address these limitations. The rise of digital humanities has greatly promoted the deep integration of humanities disciplines and technology. However, the journey of ancient book digitization still faces a series of challenges and obstacles, such as the different data processing standards and the shortage of professionals in ancient book digitization. Therefore, exploring effective strategies to overcome these challenges in the field of ancient book digitization has become an urgent research topic in academia.

Keywords

Digital Humanity; Ancient Books; Digitalization

1. Introduction

1.1. Significance of Chinese ancient books

Chinese ancient books encapsulate the profound Chinese conventional wisdom and ideas, which embody Chinese spiritual values, thinking patterns and moral norms. With high social values and cultural significance, Chinese ancient books play a vital role in world culture. Thus conservation and development of these ancient books are of great importance of fostering Chinese national spirits, strengthening national soft power and enhancing cultural identity. Although with more advanced preservation techniques compared to the past, the existing ancient books are inevitably subject to damage which may not be able to be handed down for generations. Furthermore, the most significant point is the appropriate development of these books.

1.2. Digital humanity

Digital humanity is an emerging field by infusing contemporary information technology and humanities. It brings new opportunities for digitalization of Chinese ancient books. The practical significance of digital humanities lies in providing new research methods and paradigms for humanities studies, offering scholars new perspectives, and providing novel approaches for the formulation and resolution of emerging humanistic issues(Wei, 2018). Moreover, digital humanity takes advantage of computer technology, data processing and visualization to digitalize the content of these books which could be of great help for readers to grasp the essence of underlying Chinese wisdom. Furthermore, digital humanistic technology could discovers and systematizes the hidden ideas and development tendency of Chinese culture and history by collecting and analyzing the numerous fragmented knowledge.

From 1970s on, the emerging digital humanities technologies are utilized for digitalization of these ancient books and constructed data vaults. By 2023, the released online digital resources of ancient books in China has reached 130,000, which achieving a relative balance between the preservation and utilization of these books. But the early digitalization is only digital transform and storage of those ancient books. By adopting different text encoding and data formats and other processing methods, different data vaults have different degree of compatibility which bring troubles for users and impede resource sharing. (Lei, 2024)

From the current international trends in digital humanities research, its cutting-edge practices mainly include GIS-based historical and geographical visualization, text mining and TEI standards in literature, corpus linguistics based on large corpora, video capture and motion analysis in dance, as well as image analysis, color restoration, and digital reconstruction in archaeology. (Fan, 2013)

Nowadays, digitalization of Chinese ancient books is still facing difficulties. The digitization of ancient books primarily involves following issues. One is the computer encoding of Chinese characters, particularly the encoding of variant and variant-form characters. And the other is the ability of computer image recognition to convert images into character data(Chen, 2022). This thesis aims to conclude research progress and future trend in digitalization of these books by doing a research

overview.

2. Literature Review

As an emerging interdisciplinary subject, digital humanities is deeply transforming the means and approaches about how humanities conduct researches. In this background, the digitalization of Chinese ancient books gains huge progress, which providing new research aspects for conservation and inheritance of these ancient books and opening a new area for humanities researches at the same time.

Since 2015, the research on ancient books by scholars in China has been maintaining a growing trend, especially between 2019 and 2021. This is mainly due to the fact that 2019 and 2020 are in the final stage of the implementation of the “13th Five-Year Plan” for the protection of ancient books. (Jia & Gong, 2023)

This thesis intends to summarize current research to describe key issues, technological application and research results and predict future tendency in the digitalization of Chinese ancient books.

2.1. Significance of digitalization of ancient books

Ancient books are made of paper which are susceptible to issues such as insect damage, moisture, and paper degradation. The challenge of long-term preservation of these resources is a critical issue for libraries and other document storage institutions to address (Fan, 2013). Meanwhile, rich ancient books cover areas, including linguistics, politics, history and so on. The traditional researchers of ancient books would experience the process of finding its origin, examining and verifying its versions, then editing and collating its content and so on. Obviously, these processes require a large amount of manpower and mental works, which leading to a lack of empirical evidences to prove researches' logicity. By employing digital humanities technology, the research process would be more efficient and less time-consuming (Qin & Ouyang, 2022).

2.2. Application of digital humanities in digitalization of ancient books

Digital humanities platforms aim to provide researchers with tools to observe historical materials and retrieve data. Meanwhile, these platforms could help researchers to discover some unexpected academic issues and find out new frontiers (Lu & Li, 2019).

At present, the application of digital humanities in ancient books' researches encompasses following three aspects: ancient book research, ancient book promotion, ancient book collation. Firstly, the ancient book research refers to research on historical situations of authors, writing process and changes of versions and so on. It always ends with conclusion to express authors' ideas and findings after exploring varies of aspects with academic values. Secondly, the ancient book promotion is designed to develop the public' interest in culture behind these ancient literature and

fostering their reading desire and improving their reading ability by learning more background knowledge. Libraries could provide exhibition of ancient literature, present dynamic display of manufacturing process of books or offer an immersive reading of books' content. Thirdly, the ancient book collation refers to various ways of processing these books to make reading these ones more convenient. (Li et al, 2024)

2.3. Characteristics of digital humanities practices in digitalization of ancient books

In digital humanities practices of these books, some characteristics appeared in following four processes, construction concept, service model, talent structure and applied technologies.

2.3.1. Construction concept

Digital humanities projects possess extensive historical retrospection and profound relevance. Different from the conventional digitalization of ancient books, digital humanities c on these books focus on content mining of books' content. These project begins with deep analysis of sentences, semantics and pragmatic features instead of analyzing the words level at first. (Wang & Long, 2023)

2.3.2. Service model

The service model is fundamental and common. There are three service models: online data service, visualization service and compilation of ancient books. Online data service provides services, such as data retrieval, data downloading and so on. visualization service offer users with service, such as geographic information service, knowledge graph, data-linking and so on. Compilation of ancient books provides basic technical tools, such as entity recognition and data mining. (Wang & Long, 2023)

2.3.3. Talent structure

Digital humanities projects involves a varies of works, such as technical development, algorithm models, and system development. It requires the participation of professionals from multiple disciplines to engage in the research. (Wang & Long, 2023)

2.3.4. Applied technologies

To develop a digital humanities platform often requires the application of a variety of different technologies. The practice of digital humanities technology in ancient books is characterized by its comprehensiveness and integration. (Wang & Long, 2023)

2.4. Limitation of digital humanities in digitalization of ancient books

There are still issues in the current works concerning digitalization of ancient books, which hindering further development of its digitalization process.

2.4.1. Inconsistent construction standards of digitalization

Through literature research and network survey, it is found that most of the existing ancient books research projects adopt closed construction mode. Therefore, the standards of different works in the digitalization of ancient books are not unified. This phenomenon leads to obvious differences in the contents of various databases and platforms constructed, which hinders the smooth development of the integration and compatibility of ancient book resources in China.

2.4.2. Mismatch between talent cultivation and market demand

Few colleges set up the major of digitization of ancient books. Thus, the total number of talents cultivated in the digitization of ancient books is small. Meanwhile, the students of this major could not learn corresponding knowledge which is of help for their employment. (Zhao & Qu, 2024)

2.5. Solutions

2.5.1. Unified construction standards and norms

On the one hand, the relevant departments of local government should accelerate the development of unified construction standards and norms about the data resources of ancient books, description of ancient resources, organization of ancient resources and long-term preservation of ancient resources. On the other hand, these departments should learn from the experience of the international developed countries in the construction of standards and norms for digital resources to speed up the introduction into China and make corresponding revision of international standards. (Jia & Gong, 2023)

2.5.2. Improving discipline development

More universities should establish relative major and enroll undergraduates from interdisciplinary backgrounds, particularly those with a computer science background. This aims to achieve complementary advantages among various disciplines. Meanwhile, these universities should form a teaching staff, including teachers from different disciplines. Moreover, These universities should also optimize and adjust their curricula to train talents according to the needs of society. At the same time, the university also needs to build corresponding practical teaching bases and increase practical teaching. (Zhao & Qu, 2024)

3. Future trend of digitalization of ancient books

Digital humanities is only an extension of traditional cultural knowledge methods. It is about the organic combination of digital humanities and ancient books to form a

new research content. Firstly, in in-depth study of ancient books, researchers should not only focus on digitization of ancient resources, but also on strengthening cooperation and communication with other research scholars from history, philosophy, literature and linguistics discipline. This movement could integrate humanism, philosophical thinking and value into the study of ancient books. Secondly, the contents of Chinese ancient books are usually illustrated. The pictures appeared in ancient books can help readers understand the historical evolution of traditional artifacts. Therefore, in the future research, scholars should pay attention to expand the scale of ancient book data and strive to build a digital platform that integrates all kinds of ancient books. (Jia & Gong, 2023)

4. Conclusion

As an emerging technology, digital humanities have already been widely applied in various fields of ancient book research. From the application of digital humanities technology, digital humanities occupies an vital part of ancient books' research, promotion and collocation. Though the practice of ancient book digitalization, some features also reveal the great improvement that digital humanities technology bring to digitalization of ancient books. However, it is clear that some limitations suppress the progress of ancient book digitalization. Some scholars also proposes its corresponding solutions. In response to these challenges, this thesis proposes corresponding improvement strategies and future research directions. At the same time, it is necessary to increase the training of professional talents and improve the overall quality and innovation ability in the field of ancient book digitization. In short, the rise of digital humanities has injected new vitality and impetus into the digitization of ancient books. In the future, attention will be paid to the development trends in this field and the inheritance and development of excellent traditional Chinese culture.

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